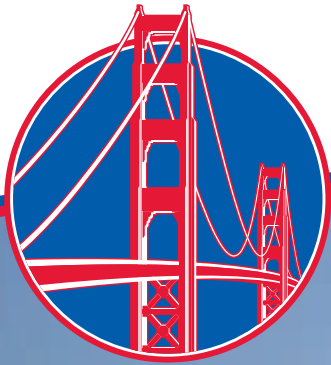


# BIOMEDICAL AND HEALTH INFORMATICS

*From Foundations to Applications to Policy*

November 14-18, 2009  
Hilton San Francisco  
San Francisco, CA



AMIA 2009  
SAN FRANCISCO

AMIA 2009 ANNUAL SYMPOSIUM  
ADVANCE PROGRAM

**27.75 CATEGORY 1 CME CREDITS AVAILABLE**

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# An Invitation to Attend from the Scientific Program Committee Chair

**Lucila Ohno-Machado**

Chair, AMIA 2009 Scientific Program Committee  
University of California, San Diego

The AMIA Annual Symposium has been the premier forum for presenting scientific studies and policy related to biomedical and health informatics since its inception in 1976. In 2009, we continue this long tradition of excellence while continuing to enhance AMIA's signature event, making it the preeminent gathering of its kind for the biomedical and health informatics community.

At AMIA 2009, you will see an expansion of the 2008 initiative when manuscripts were published in the *Journal of the American Medical Informatics Association*. We have enhanced this program to include the following additional journals *AI Medicine*, *Computers in Biology and Medicine*, *International Journal of Medical Informatics*, *Journal of Biomedical Informatics*, *Journal of the Medical Library Association*, and *Methods of Information in Medicine*. Presentations of these outstanding scientific manuscripts along with contributions that appear on the Annual Symposium Proceedings are a key feature of AMIA 2009. The scientific program committee and editors of these journals have my gratitude for their tremendous effort and commitment to this innovation.

The program showcases two exciting keynote speakers. The opening keynote speaker on Sunday, November 15, 2009 is Mark D. Smith, President and CEO of the California Health Care Foundation. On Monday, November 16, 2009, AMIA welcomes David Blumenthal, the National Coordinator for Health Information Technology at the US Department of Health

and Human Services to deliver a keynote address. We have also designed a series of invited sessions placing an emphasis of informatics taking place in the private sector. AMIA marks a period of executive transition in 2009 with retirement of Don Detmer and Ted Shortliffe assuming the role of President and CEO, the latter of which will describe his vision of the organization in a special session on Monday morning.

Tutorials, panels, workshops, posters, presentations by members of the American College of Medical Informatics, the much anticipated "Year in Review" session, demonstrations, partnerships in innovation, and networking opportunities continue as key elements of the annual symposium. Awards for distinguished papers, best student papers, distinguished posters, signature achievements in biomedical and health informatics, and many more honors and recognitions remain a constant part of the annual symposium. AMIA 2009 is the place where health care thought leaders have time to communicate their latest work to an audience of 2,000 plus attendees—and the benefit is mutual.

The AMIA 2009 Annual Symposium is an excellent venue for academic and industry recruitment, networking, and for enabling face-to-face interactions with colleagues from all over the world. On behalf of AMIA and the Scientific Program Committee, I invite you to attend and hope to see you in San Francisco, November 14-18, 2009.

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## SCHEDULE-AT-A-GLANCE

### Friday, November 13

8:00 am – 5:00 pm	Third i2b2 Workshop on Natural Language Processing Challenges for Clinical Records
6:30 pm – 9:00 pm	ANI Governing Directors Dinner**

### Saturday, November 14

8:00 am – 12:00 pm	10x10 at UIC In-person Session
8:00 am – 12:00 pm	10x10 at Nova Southeastern In-person Session
8:30 am – 4:30 pm	AMIA Board of Directors Meeting+ Tutorials*
8:30 am – 4:30 pm	
5:00 pm – 7:30 pm	Workshops
7:00 pm – 10:00 pm	AMIA Leadership Dinner**

### Sunday, November 15

8:00 am – 12:00 pm	10x10 at OHSU In-person Session
8:00 am – 12:00 pm	10x10 at UAB In-person Session
8:00 am – 12:00 pm	10x10 at University of Utah In-person Session
8:00 am – 12:00 pm	Student Paper Competition
8:00 am – 12:00 pm	Nursing Informatics WG Special Event
8:30 am – 12:00 pm	Tutorials*
1:00 pm – 3:00 pm	Opening Session and Keynote Presentation
3:30 pm – 5:00 pm	Scientific Sessions
5:00 pm – 7:00 pm	Innovation and Information Center Open
5:00 pm – 7:00 pm	Welcome Reception in the Innovation and Information Center
6:30 pm – 10:00 pm	ACMI Dinner and Induction of Fellows**

### Monday, November 16

7:00 am – 8:15 am	Committee Meetings
8:30 am – 10:00 am	Semi-plenary Sessions
10:00 am – 1:30 pm	Innovation and Information Center Open
10:30 am – 12:00 pm	Scientific Sessions
10:30 am – 1:30 pm	Poster Session I Preview
12:30 pm – 1:30 pm	Keynote Presentation
1:45 pm – 3:15 pm	Scientific Sessions
3:15 pm – 7:00 pm	Innovation and Information Center Open
3:30 pm – 5:00 pm	Scientific Sessions

5:15 pm – 7:00 pm	Poster Session I (authors present)
5:00 pm – 6:30 pm	Committee Meetings
5:30 pm – 10:00 pm	Working Group Business Meetings
6:30 pm – 7:30 pm	Corporate Reception**
6:30 pm – 7:30 pm	International Reception**
6:30 pm – 10:00 pm	JAMIA Editorial Board Dinner+

### Tuesday, November 17

7:00 am – 8:15 am	Committee Meetings
7:00 am – 8:30 am	CARING Breakfast*
8:30 am – 10:00 am	Semi-plenary Sessions
10:00 am – 1:30 pm	Innovation and Information Center Open
10:30 am – 12:00 pm	Scientific Sessions
10:30 am – 1:30 pm	Poster Session II Preview
12:30 pm – 1:30 pm	State of the Association Meeting
1:45 pm – 3:15 pm	Scientific Sessions
3:15 pm – 7:00 pm	Innovation and Information Center Open
3:30 pm – 5:00 pm	Scientific Sessions
5:00 pm – 6:30 pm	Committee Meetings
5:15 pm – 7:00 pm	Poster Session II (authors present)
5:30 pm – 7:30 pm	Working Group Business Meetings
6:30 pm – 7:30 pm	AMIA 2009 SPC Reception**
7:30 pm – 9:00 pm	Chairman's Club Reception**
9:00 pm – 12:00 am	Dance Party

### Wednesday, November 18

7:00 am – 8:30 am	Academic Forum Meeting
8:30 am – 10:00 am	Scientific Sessions
10:30 am – 12:00 pm	Scientific Sessions
12:15 pm – 1:00 pm	Closing Session

#### SCHEDULE LEGEND

\* Additional fee required  
 \*\* By Invitation only  
 + Board members only  
 WG = Working Group

## KEYNOTE PRESENTATION

### Opening Keynote Speaker

#### Mark D. Smith

President and CEO  
California HealthCare Foundation  
**Sunday, November 15, 2009**  
**1:00 – 3:00 PM**

Mark D. Smith, M.D., M.B.A. will give the AMIA 2009 opening keynote address on Sunday, November 15, 2009. Dr. Mark Smith is president and chief executive officer of the California HealthCare Foundation. The Foundation is an independent philanthropy with assets of more than \$900 million, headquartered in Oakland, California, and dedicated to improving the health of the people of California through its three program areas: Better Chronic Disease Care, Innovations for the Underserved, and Market and Policy Monitor. A board-certified internist, Smith is a member of the clinical faculty at the University of California, San Francisco, and an attending physician at the Positive Health Program for AIDS care at San Francisco General Hospital. He is a member of the Institute of Medicine and serves on the board of the National Business Group on Health.

Prior to joining the California HealthCare Foundation, Smith was executive vice president at the Henry J. Kaiser Family Foundation. He previously served as associate director of the AIDS Services and assistant professor of medicine and of health policy and management at Johns Hopkins University. He has served on the Performance Measurement Committee of the National Committee for Quality Assurance and the editorial board of the *Annals of Internal Medicine*. Dr. Smith received a bachelor's degree in Afro-American studies from Harvard College, a medical doctorate from the University of North Carolina at Chapel Hill, and a master's in business, with a concentration in health care administration, from the Wharton School at the University of Pennsylvania.

### Keynote Speaker

#### David Blumenthal

National Coordinator for Health Information Technology  
US Department of Health and Human Services  
**Monday, November 16, 2009**  
**12:30 – 1:30 PM**

David Blumenthal, M.D., M.P.P., was appointed on March 20, 2009, as the Obama Administration's choice to serve as the National Coordinator for Health Information Technology. As National Coordinator, Dr. Blumenthal leads the implementation of a nationwide interoperable, privacy-protected health information technology infrastructure. Dr. Blumenthal previously served as a physician and as the director of the Institute for Health Policy at The Massachusetts General Hospital/Partners HealthCare System in Boston, Massachusetts. He was also the Samuel O. Thier Professor of Medicine and Professor of Health Care Policy at Harvard Medical School. From 1987-1991 he was Senior Vice President at Boston's Brigham and Women's Hospital. From 1981 to 1987 he was Executive Director of the Center for Health Policy and Management and Lecturer on Public Policy at the John F. Kennedy School of Government at Harvard. During the late 1970s, Dr. Blumenthal was a professional staff member on Senator Edward Kennedy's Senate Subcommittee on Health and Scientific Research. He served as chief health adviser to the Dukakis Presidential campaign, and a senior health adviser to the Obama for President campaign.

Dr. Blumenthal is a member of the Institute of Medicine of the National Academy of Sciences. He was the founding chairman of AcademyHealth (formerly the Academy for Health Services Research and Health Policy). He has served as a trustee of the University of Chicago Health System and currently serves as a trustee of the University of Pennsylvania Health System (Penn Medicine).

## AMIA 2009 SCIENTIFIC PROGRAM COMMITTEE

#### Lucila Ohno-Machaco

Chair  
University of California, San Diego

#### Vimla Patel

Foundations Track Chair  
Arizona State University

#### Dominik Aronsky

Applications Track Chair  
Vanderbilt University

#### Patricia Abbott

Johns Hopkins University

#### Elmer Bernstam

University of Texas at Houston

#### Patricia Flatley Brennan

University of Wisconsin - Madison

#### Christopher G. Chute

Mayo Clinic College of Medicine

#### Enrico Coiera

University of New South Wales

#### Rebecca Crowley

University of Pittsburgh

#### Amar Das

Stanford University

#### Patrice Degoulet

University René Descartes

#### Julio Facelli

University of Utah

#### Marcelo Fiszman

National Library of Medicine

#### Hamish Fraser

Harvard Medical School

#### Carol Friedman

Columbia University

#### Sherrilyne Fuller

University of Washington

#### William Hersh

Oregon Health & Science  
University

#### Winston Hide

University of Western Cape

#### John Holmes

University of Pennsylvania

#### Casimir Kulikowski

Rutgers University

#### Ronilda Lacson

Massachusetts Institute of  
Technology

#### Joshua Lee

University of California, San Diego

#### Tze Yun Leong

National University of Singapore

#### Heimar Marin

Federal University of Sao Paulo

#### Eneida Mendonca

University of Chicago

#### Prakash Nadkarni

Yale University

#### Omolola Ogunyemi

Charles Drew University of  
Medicine  
and Science

#### Tomohiro Sawa

Teikyo University

#### Jack W. Smith

University of Texas Health Science  
Center

#### Ricky Taira

University of California,  
Los Angeles

#### Griffin Weber

Harvard University

#### Nurse Planner

#### Judy G. Ozbolt

University of Maryland  
School of Nursing

## TUTORIAL OVERVIEW

More detailed descriptions can be found beginning on page 12.

### E.H.R. Series

Focuses on the key expertise required for individuals responsible for EHR selection, implementation, deployment, and evaluation.

- T04** - Practical Modeling Issues Representing Coded and Structured Patient Data in EHR Systems
- T05** - Human-Centered Design and Evaluation of Health Information Systems
- T12** - Evaluating Health IT Projects: A Practical Approach
- T14** - Standards for Storing and Exchanging Clinical Data in Electronic Health Record Systems
- T20** - Practical Guide to Clinical Computing Systems: Design, Operations, and Infrastructure
- T21** - Approaches to Clinical Computer-Based Documentation
- T24** - Clinical Decision Support: A Practical Guide to Developing Your Program to Improve Outcomes
- T25** - Paradigm Shift – A Fresh Approach to the EHR

### Methods Series

Designed for individuals looking for advanced instruction from leading experts on procedures and techniques characteristic of the field of biomedical informatics.

- T01** - HL7 Clinical Document Architecture (CDA)
- T02** - Knowledge-Based Decision-Support Systems for Implementing Clinical Practice Guidelines
- T10** - The Road to Cognitive Systems Engineering
- T15** - A Gentle Introduction to Support Vector Machines in Biomedicine
- T22** - Building Bayesian Decision Support Systems

### Primer Series

Designed to provide an introduction to key current and emerging areas in informatics considered essential to the core foundation of informatics theory, application, and practice.

- T06** - An Introduction to Clinical Natural Language Processing
- T07** - Preparing for an Informatics Career in Industry – What You Really Need to Know
- T08** - Introduction to Biomedical and Health Informatics
- T11** - Clinical Research Informatics: Theory, Methods, and Best Practices
- T16** - Application of Computer Simulation in Medical Informatics
- T17** - Role of Social Networks in Teaching and Advancing Health Informatics: What Can Second Life Contribute to This Process?
- T18** - Discovering Knowledge: An Introduction to Data Mining Principles and Practice
- T19** - Introduction to Translational Bioinformatics
- T23** - Ontologies in Biomedicine
- T27** - The eXtensible Markup Language (XML)

### Selected Topics Series

Provides in-depth treatment of special topics in biomedical and health informatics, bioinformatics, and public health informatics.

- T03** - Transforming & Visualizing Clinical Data for Research
- T09** - Current Research & Practice for Nursing Sensitive Quality Indicators: Informatics Applications
- T13** - Personal Health Records and E-health Portals
- T26** - Overview of Public Health Informatics
- T28** - Clinical Classifications and Biomedical Ontologies: Terminology Evolution, Principles, and Practicalities

## SESSION THEMES

AMIA 2009 submissions are categorized as either foundational contributions of novel informatics methods, or as more practical reports of the application of informatics in the biomedical sciences or the day-to-day practice of health care. To help attendees identify sessions in which they are most interested, we have organized them into the following themes:

- 20/20 Global e-Health Informatics Capacity Building
- Clinical Decision Support, Outcomes, and Patient Safety
- Clinical Research Informatics
- Clinical Workflow and Human Factors
- Consumer Informatics and PHRs
- Data Integration and Exchange
- Data Mining, NLP, and Information Extraction
- Education
- EHR and CPOE Systems
- Informatics Discovery, Innovation and Industry
- Policy and Ethical Issues
- Public Health Informatics and Biosurveillance
- Terminology and Standards
- Translational Bioinformatics

AMIA 2009 themes appear in the program chronology beginning on page 12.

## CONTINUING EDUCATION

Attendees of the AMIA 2009 Annual Symposium may earn valuable continuing education credits by participating in scientific sessions, tutorials, and workshops.

### Physician Continuing Education

AMIA is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to sponsor continuing medical education for physicians. AMIA designates this continuing medical education for up to 27.75 hours of Category 1 credit toward the American Medical Association (AMA) Physician's Recognition Award. Each physician should claim only those hours of credit that he or she actually spends in the educational activity.



**UNIVERSITY OF MARYLAND**  
**SCHOOL OF NURSING**

### Nursing Contact Hours

Nursing contact hours will be provided by the University of Maryland School of Nursing's Office of Professional Development. In order to earn contact hours, please sign in at the registration desk each day to receive contact hours for this conference. Please complete the evaluation provided after you attend each session. Before you leave the conference, drop the evaluation form off at the registration desk. The total number of hours for tutorials, workshops and the symposium is 27.75.

The University of Maryland School of Nursing's Office of Professional Development and Continuing Education is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's (ANCC) Commission on Accreditation.

## LEARNING OBJECTIVES

*The objectives of the AMIA 2009 Annual Symposium are:*

- To demonstrate and discuss issues related to the development, application, and evaluation of information technologies in medicine and health care.
- To provide a comprehensive portfolio of presentations that detail work, progress, and challenges in theoretical and applied information systems development.
- To improve the knowledge and skill of attendees with respect to using, developing, and managing information technologies as they relate to medicine and health care.
- To present research and applied methodologies and results in the broad field of medical informatics.
- To promote information exchange among attendees.

### Who Should Attend

Attendees of the AMIA Symposia come from a variety of venues, notably from some of the most technologically innovative health care facilities in the world.

An anticipated attendance of 2,000 will include physicians, nurses, dentists, pharmacists and other clinicians; health information technology professionals; computer scientists and systems developers; policy makers; biomedical engineers and bioinformaticians; consultants and vendor representatives; medical librarians; academic researchers and scientists; and other professionals involved in the collection and dissemination of health information.

### Disclosure

Before the program, all faculty will disclose the existence of any financial interest and/or other relationships they may have with the manufacturer or manufacturers of any commercial product or products to be discussed during their presentation. This includes any honoraria/expenses, grants, consultant role, speaker's bureau membership, stock ownership, or any other special relationship. AMIA includes a disclosure list with the on-site registration materials.

*A special website will be set up for you to claim your continuing education credits. Specific instructions will be printed in the on-site program.*

**Session rooms will be listed  
in the On-site Program.**

## EXHIBITOR LIST

*As of August 21, 2009*

3M Health Information Systems  
Agency for Healthcare Research and Quality  
Arizona State University  
Boston-Area Biomedical Informatics Research Training Programs  
CAHIIM  
CDISC  
Centers for Medicare & Medicaid Services  
The Children's Hospital of Philadelphia  
Columbia University  
Consilience Software  
CTG  
Diagnosisone, Inc.  
Dimensional Insight  
Duke University School of Nursing  
Elsevier  
Estenda Solutions, Inc.  
First DataBank, Inc.  
ImmPort  
Indiana University School of Informatics  
Intelligent Medical Objects  
IOS Press, Inc.  
Johns Hopkins University School of Medicine  
Krames  
Lexi-Comp, Inc.  
M\*Modal

Marshfield Clinic  
Medical Alliances  
Medicomp Systems, Inc.  
National Library Of Medicine  
Nova Southeastern University  
Office of the National Coordinator  
for Health Information Technology  
Oregon Health & Sciences University  
PEPID  
Regenstrief Institute  
ScienceTRAX  
Springer  
Thomson Reuters  
University of Minnesota  
University of Pittsburgh  
University of Texas  
University of Utah  
University of Virginia  
University of Washington  
University of Wisconsin-Milwaukee  
VA Information Resource Center  
Vanderbilt University  
Vocollect  
Wolters Kluwer Health  
Zynx Health



# STATE OF THE ASSOCIATION MEETING AND MEMBERSHIP INFORMATION

## State of the Association

It has been an exciting year for AMIA and informatics. Please join us for the State of the Association Meeting on Tuesday, November 17, from 12:30 pm to 1:30 pm.

David W. Bates, AMIA Chairman, and Edward H. Shortliffe, AMIA President and CEO, will co-chair this session which is designed to provide AMIA members and attendees with a state of the association address. Topics will include work of the Board of Directors, new and continuing initiatives of AMIA, and a general update of AMIA's strategic directions in clinical informatics, clinical research informatics, public health/population informatics, and translational bioinformatics.

Drs. Bates and Shortliffe will also review AMIA's work in the policy arena including initiatives around clinical decision support, policy papers, and general advocacy efforts.

## About AMIA and Membership

AMIA is the professional home for biomedical and health informaticians. AMIA is dedicated to the development and application of informatics in support of patient care, public health, teaching, research, administration, and related policy. AMIA's 4,000 members advance the use of health information and communications technology in clinical care and clinical research, personal health management, public health/population, and translational science with the ultimate objective of improving health. Since its inception in 1990, AMIA has grown to encompass an interdisciplinary and diverse group of members representing over 55 countries. Members include:

- Physicians, nurses, dentists, pharmacists, and other clinicians
- Researchers and educators
- Advanced students pursuing a career in informatics
- Scientists and developers
- Government officials and policy makers
- Consultants and industry representatives
- Standards developers

The demand for workers who understand health care, information systems, and technology is growing rapidly. The US Department of Labor estimates a 49% growth in the demand for trained individuals prepared to be administrators, specialists, consultants, educators, and researchers at organizations that include:

- Academic institutions
- Community-based organizations
- Government agencies and the military
- Health care facilities
- Industry
- International health
- Private practice
- Research facilities

Informatics is fundamental to the future of health care, biomedical research, and public health. Informatics puts you in a position to make a difference and joining AMIA assures that you will succeed!

AMIA plays a pivotal role in the transformation of the US health system and makes measurable contributions to the improvement of health of the nation through continued development and implementation of informatics. AMIA is an integrating force that strengthens the nation's ability to create and manage the science and knowledge base of health care. AMIA is an active participant in the development of global health information policy and technology with particular emphasis on using health information technology to meet the health needs of underserved populations around the world.

AMIA's programs and initiatives support the major domains of informatics which include clinical informatics, clinical research informatics, public health informatics, and translational bioinformatics.

Be part of the professional home for biomedical and health informatics, join AMIA today! Membership is open to individuals and organizations. Visit [www.amia.org](http://www.amia.org) for more detailed information.

**BE PART OF THE PROFESSIONAL HOME FOR BIOMEDICAL AND HEALTH INFORMATICS – JOIN AMIA TODAY!**

## AWARDS PROGRAM OVERVIEW

AMIA provides a series of merit awards each year for research work submitted to its Annual Symposium through the rigorous submission and review process.

### Distinguished Paper Awards

From a slate of candidate papers recommended by the Annual Symposium Scientific Program Committee, the Awards Committee will recognize five notable and distinguished papers from the Annual Symposium. Distinguished papers are awarded at Annual Symposium but contain no ordinal designation. Papers of the Student Paper Competition finalists are not eligible.

### Distinguished Poster Awards

The Awards Committee will recognize between two and ten distinguished posters with an award presented at the Annual Symposium Closing Session. Posters are selected by the Annual Symposium Poster Committee and forwarded to a committee who judge nominated posters during the AMIA 2009 poster sessions.

### Homer R. Warner Award

The Homer R. Warner Award is named for Homer R. Warner, MD, PhD, a pioneer in the field of informatics and the founder of the Department of Medical Informatics at the University of Utah. A cash prize is offered for the paper awarded at the AMIA Annual Symposium that best describes approaches to improving computerized information acquisition, knowledge data acquisition and management, and experimental results documenting the value of these approaches. The candidate papers are recommended by the AMIA Annual Symposium Scientific Program Committee, and the selection of the recipient is made by the University of Utah Department of Medical Informatics.

### AMIA Signature Awards

The Signature Awards program provides an opportunity for AMIA members to be recognized for significant contributions to the field at different stages of their career.

### The Martin Epstein and Student Paper Awards

The Martin Epstein and Student Paper Awards are issued in recognition of best student papers at the Annual Symposium. Student papers are selected by the Annual Symposium Scientific Program Committee and forwarded to the Student Paper Advisory Committee (SPAC) who nominate eight finalist papers for presentation at the Student Paper Competition. Based on a combination of the written paper and oral presentation, the judges will select a first, second, and third place paper. If the first place paper is truly extraordinary, the SPAC awards the Martin Epstein Award.

### AMIA New Investigator Award

This award recognizes an individual for early informatics contributions and significant scholarly contributions on the basis of scientific merit and research excellence. The criteria for nomination include significant scientific productivity in informatics prior to reaching eligibility for fellowship in the College of Informatics, multiple significant scientific publications, and demonstrated commitment to AMIA.

### Virginia K. Saba Informatics Award

This award recognizes a distinguished career with significant impact permeating the care of patients and the discipline of nursing. The Virginia K. Saba Informatics Award recipient will demonstrate the use of informatics to transform patient care; visionary leadership;

goal impact; enduring contribution to professional practice, education, administration, research, and/or health policy; and a commitment to AMIA demonstrated through membership.

### Donald A.B. Lindberg Award for Innovation in Informatics

This award recognizes an individual at any stage of a career for a specific technological, research, or educational contribution that advances biomedical informatics. Dr. Lindberg's continuous commitment to the field has dramatically altered the scope and extent of informatics' practice and research. The work leading to a winner of this award will have been conducted in a not-for-profit setting, and the adoption of the particular advance by the informatics community will be on a national or international level.

### Don Eugene Detmer Award

This award recognizes an individual that has made a significant singular contribution or series of contributions over the course of a career exemplifying the expertise, passion, and spirit that Dr. Detmer has for health policy.

### Morris F. Collen Award of Excellence

In honor of Morris F. Collen, a pioneer in the field of medical informatics, this prestigious award is presented by the American College of Medical Informatics (ACMI) to an individual whose personal commitment and dedication to medical informatics has made a lasting impression on the field. The award is determined by ACMI's Awards Committee.

## WORKING GROUP AWARDS

### Diana Forsythe Award

Honors either a peer-reviewed AMIA paper published in the Proceedings of the Annual Symposium or peer-reviewed article published in JAMIA or other journals publishing medical informatics related content that best exemplifies the spirit and scholarship of Diana Forsythe's work at the intersection of informatics and social sciences with a cash prize. Selection is determined by a sub-committee of the AMIA Awards Committee and the AMIA People and Organizational Issues Working Group, with the award presented annually at the AMIA Annual Symposium.

### Nursing Informatics Working Group Award

Honors a student who demonstrates excellence in nursing informatics and who has the potential to contribute significantly to the discipline of nursing and health informatics.

### Harriet H. Werley Award

A cash prize is presented to the paper presented at the AMIA Annual Symposium with a nurse as first author that is judged to make the greatest contribution to advancing the field of nursing informatics. The candidate papers are recommended by the AMIA Annual Symposium Scientific Program Committee, and the selection of the recipient is made by a special committee within the AMIA Nursing Informatics Working Group.

## THINGS TO DO IN SAN FRANCISCO



### Fisherman's Wharf

At San Francisco's Fisherman's Wharf, history, culture, and ethnic pride form a distinctive blend that gives it a strength and vitality all its own. From the Gold Rush days until the turn of the century, the city's fishing fleet was composed of lateen-rigged sailboats known as "feluccas", copies of the crafts the Italian fisherman used in their native land. Having no luck in the quest for gold, the Italian immigrants were much more skillful at the seafood trade. Today, the fishing fleet and many of the Wharf's internationally-acclaimed restaurants are operated by the grandsons and great-grandsons of these past generations of hardworking folk.

### Chinatown

Home to the largest urban population of Chinese people outside China, Chinatown is so authentic, you'll forget you're in San Francisco.

### Golden Gate Bridge

Arguably one of the world's most beautiful bridges, the Golden Gate Bridge is an internationally recognized symbol of San Francisco. Over 45 million vehicles cross the bridge annually!

### Union Square

Most famous (and expensive) among San Francisco's shopping centers is Union Square. Bordered by Geary, Powell, Post and Stockton Streets, Union Square is actually more than just the square itself. The adjoining streets are lined with restaurants, theaters, boutiques, galleries, shops, and services. Its flagship stores include Neiman-Marcus, Macy's, Saks Fifth Avenue, Niketown, and Tiffany's. For those with sophisticated, urban tastes, Union Square offers unparalleled selection in apparel, jewelry, shoes, and even home furnishings.

### Cable Car Ride

Cable Cars, which vie with the Golden Gate Bridge as the symbol of San Francisco, are an irresistible way to see the city. Dress warmly and you can ride outside, catching visual treats that motorists routinely miss.

### Golden Gate Park

Where can you see buffalo grazing, ride a vintage carousel, or visit a "touching tide pool"? Golden Gate Park, of course! With an area larger than New York's Central Park, Golden Gate Park offers tranquility, excitement, activities, and education that draw both locals and visitors year-round. The park houses several museums and gardens.

### Alcatraz

Alcatraz Island sits isolated amidst the cold winds of the bay. Spanish explorer Juan Manuel de Ayala named this foreboding rock for the pelicans nesting there. This infamous island, the subject of legend, lore and a few Hollywood movies, once held scores of prisoners incarcerated above its cliffs.

### Museums/Galleries

Whether it's roaming bison or Impressionism, the San Francisco Bay Area probably has some form of museum to honor it. Visit fine arts museums, aquariums, and beautiful parks that make nature the focus. Delight the kids with interactive museums designed just for them. Have a penchant for nautical history? The coastline offers a multitude of opportunities to see old ships and even learn sea chanteys! The Bay Area's museums are also a great way to discover how San Francisco came to be what it is today.

### Union Street

Amidst chic shops and restaurants, enjoy the brightly painted Victorians and secret courtyards. As much fun at night as it is in the daytime.

### Broadway/North Beach

Settled by Italian immigrants, the area offers outstanding Italian food and charming, old world cafés. The effects of subsequent immigrants makes this neighborhood a fascinating melange of history and cuisine. And talk about nightlife!

### Mission District

So named because of Mission Dolores' presence (oldest Mission in the state), the area remains largely Hispanic in its population and feel. Truly authentic Mexican food is found here, particularly at 16th and Valencia.

### Japan Center

Since 1968, this tranquil 5-acre complex has showcased the best of Japanese life: a spa, shops, furnishings, and of course, great restaurants.

### South of Market

With the proliferation of Internet companies in the Bay Area, South of Market (SOMA) is now considered one of the hippest neighborhoods in the city. Check out the California Historical Society, the Jewish Museum, and the Ansel Adams photography center, too.

### San Francisco Zoo

Located near the southern portion of Ocean Beach, the zoo is a great destination for family fun, 365 days a year. Admission is free the first Wednesday of every month.

### Wine Tasting in San Francisco

Visit the Winery Collective is the first multi-winery tasting room in San Francisco focused on boutique wineries. This unique experience allowing you to taste wines from dozens of small wineries across California right in San Francisco without having to travel to each of the wine regions.

# AMIA 10x10 - 10,000 TRAINED BY 2010



## Goal

AMIA believes that strengthening the breadth and depth of the health informatics workforce is a critical component in the transformation of the American health care system. AMIA is committed to the education and training of a new generation of biomedical and health informaticians to lead the transformation of the American health care system through the deployment and use of advanced computing systems of care.

The AMIA 10x10 program aims to realize the goal of training 10,000 health care professionals in biomedical and health informatics by the year 2010. This training is conducted in a wide range of settings across the United States by AMIA in collaboration with key strategic partners in the informatics education community.

## Program Outline

AMIA's 10x10 utilizes curricular content from existing informatics training programs and other AMIA educational initiatives with a special emphasis toward those programs with a proven track record in distance learning.

Currently AMIA's 10x10 courses cover the following topics in the field of informatics:

- Clinical or health informatics
- Clinical research informatics
- Translational bioinformatics
- Nursing informatics
- Public Health informatics

Several in-person sessions for 10x10 offerings held earlier this year, will be hosted at the AMIA 2009 Annual Symposium. These sessions provide additional lectures, panel discussions, project work, and an opportunity for students to interact with faculty.

## Program Outline

- To provide introductory level informatics knowledge/education for health care professionals who are in a position to advise or apply informatics-rooted solutions to problems encountered in their health care practice settings.
- To raise awareness to the importance and role of informatics in answering the health information technology training challenge across the clinical informatics, public health/population informatics, and translational bioinformatics domains.
- To promote information exchange about AMIA's member institutions currently providing education and training opportunities in informatics.
- To prepare individuals for further training.

## 10x10 Partners

- Oregon Health & Science University (OHSU)
- Stanford University
- University of Alabama at Birmingham (UAB)
- University of Cincinnati (UC)
- University of Illinois at Chicago (UIC)
- University of Minnesota School of Nursing (UMN)
- Nova Southeastern University (NSU)
- The University of Utah (Utah)
- Kansas University Medical Center (KU)

## Upcoming Offerings

*AMIA 10x10 at Nova Southeastern University (NSU)  
October 19, 2009 – December 11, 2009*

The Masters of Science in Biomedical Informatics Program at Nova Southeastern University offers its Survey of Biomedical Informatics Distance Learning Course as part of the AMIA 10x10 Program.

View a detailed course description and register for this offering at [www.amia.org/e-learning](http://www.amia.org/e-learning).

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*AMIA 10x10 at The University of Utah  
September 6, 2009 – December 13, 2009*

The Department of Biomedical Informatics at the University of Utah will be offering its Public Health Informatics Distance Learning Course as part of the AMIA 10x10 Program. The AMIA-Utah 10x10 course is targeted at individuals who will work in the emerging field of population/public health informatics, in either a clinical or public health setting.

View a detailed course description and register for this offering at [www.amia.org/e-learning](http://www.amia.org/e-learning).

## Registration Information and Details

Please refer to [www.amia.org](http://www.amia.org) for up-to-date information regarding registration and additional offerings

## FRIDAY, NOVEMBER 13

8:00 am - 5:00 pm  
3:00 pm-6:00 pm  
6:30 pm-9:00 pm

**Third i2b2 Workshop on Natural Language Processing Challenges for Clinical Records**  
**Registration Open**  
**ANI Governing Directors Dinner**

## SATURDAY, NOVEMBER 14

7:00 am - 6:00 pm  
8:00 am - 12:00 pm  
8:00 am - 12:00 pm  
8:30 am - 12:00 pm

**Registration Open**  
**10x10 at UIC In-person Session**  
**10x10 at Nova Southeastern In-person Session**  
**Half-day Tutorials**

T01 HL7 Clinical Document Architecture (CDA)  
T02 Knowledge-based Decision-support Systems for Implementing Clinical Practice Guidelines  
T03 Transforming & Visualizing Clinical Data for Research  
T04 Practical Modeling Issues Representing Coded and Structured Patient Data in EHR Systems  
T05 Human-centered Design and Evaluation of Health Information Systems  
T06 An Introduction to Clinical Natural Language Processing  
T07 Preparing for an Informatics Career in Industry – What You Really Need to Know

8:30 am - 4:30 pm

**Full-day Tutorials**

T08 Introduction to Biomedical and Health Informatics  
T09 Current Research & Practice for Nursing Sensitive Quality Indicators: Informatics Applications

8:30 am - 4:30 pm  
10:00 am - 10:30 am  
1:00 pm - 4:30 pm

**AMIA Board of Directors Meeting**  
**Coffee Break**  
**Half-day Tutorials**

T10 The Road to Cognitive Systems Engineering  
T11 Clinical Research Informatics: Theory, Methods, and Best Practices  
T12 Evaluating Health IT Projects: A Practical Approach  
T13 Personal Health Records and E-health Portals  
T14 Standards for Storing and Exchanging Clinical Data in Electronic Health Record Systems  
T15 A Gentle Introduction to Support Vector Machines in Biomedicine  
T16 Application of Computer Simulation in Medical Informatics  
T17 Role of Social Networks in Teaching and Advancing Health Informatics: What Can Second Life Contribute to This Process?

2:30 pm - 3:00 pm  
5:00 pm - 7:30 pm

**Coffee Break**  
**Workshops**

W01 Barcode Medication Administration Implementation in an Acute Care Hospital and Lessons Learned  
W02 Performance Measurement, Reporting and Improvement using Electronic Health Records  
W03 Research Methods for Understanding Groups, Organizations and Communities  
W04 Standards in Clinical Decision Support: Activities in Health Level Seven and Beyond  
W05 Third i2b2 Workshop on Natural Language Processing Challenges for Clinical Records  
W06 Qualitative Methods in Biomedical Informatics and the Three Rs: Rationale, Rigor, and Roadblocks  
W07 Good Evaluation Practice in Health Informatics – GEP-HI  
W08 Experiences from the forefront of EMR implementation and use in Canadian primary care: Benefits & Barriers  
W09 Virtual Environments for Training in Health Care  
W10 "Where Will Our Patients Go?" An Exploration into the Medical Home  
W11 Objective, Methods, Assessment in Informatics Education  
W12 Writing for Publication in Biomedical Informatics  
W13 Social Networking Applications @ AMIA & Beyond

7:00 pm - 10:00 pm

**AMIA Leadership Dinner (by invitation)**

**Session rooms will be listed  
in the On-site Program.**

## Friday, November 13, 2009

### 3:00 PM-6:00 PM REGISTRATION OPEN

### 8:00 AM-5:00 PM AFFILIATE EVENTS

#### Third i2b2 Workshop on Natural Language Processing Challenges for Clinical Records

The third i2b2 workshop on Natural Language Processing (NLP) for clinical records is a challenge on the automated extraction of medication information from discharge summaries. The goal of the medication extraction challenge is to continue i2b2's effort to open patient records to studies by the NLP and medical informatics communities for the advancement of the state-of-the-art in automatic processing of narrative medical text. To achieve the goal, i2b2 made available a set of de-identified patient records and annotation guidelines. In this workshop, we will discuss the medication extraction challenge, study the complexity of the task, review some approaches to automatically identifying medication-related information from medical records, and present the challenge results. The findings of the i2b2 challenge on medication extraction will shed light onto the state of the art in natural language processing for information extraction from clinical records. It will showcase applications that are available for accurate recognition of medication-related information from narrative records.

### 6:30 PM-9:00 PM AFFILIATE EVENTS

#### ANI Governing Directors Dinner

## Saturday, November 14, 2009

### 7:00 AM-6:00 PM REGISTRATION OPEN

### 8:00 AM-12:00 PM SPECIAL EVENTS

#### 10x10 at UIC In-person Session (students only)

#### 10x10 at Nova Southeastern In-person Session (students only)

### 8:30 AM-12:00 PM TUTORIALS

#### T01: Methods Series

##### HL7 Clinical Document Architecture (CDA)

*Robert Dolin, Semantically Yours*

This tutorial will introduce the audience to the HL7 Clinical Document Architecture, Release 2 (CDA R2) and Continuity of Care Document (CCD) specifications. CDA R2 became an ANSI-approved HL7 Standard in May 2005, is derived from the HL7 Reference Information Model, and is expressed in XML. It's model is richly expressive, providing a mechanism for incremental semantic interoperability. CCD is the product of collaboration between ASTM and HL7, and reflects the ASTM Continuity of Care Record data elements expressed as a CDA R2 document.

The first part of the tutorial will begin with a didactic overview of HL7 Clinical Document Architecture (CDA), followed by a group exercise where a CDA instance will be built. The second part of the tutorial will provide a didactic overview of HL7 Continuity of Care Document (CCD), followed by a group exercise where a CCD instance will be built. A basic knowledge of XML will be helpful, but isn't required to participate in this tutorial.

#### By the end of the tutorial, participants will be able to:

- Recognize key concepts included in HL7 Version 3
- Understand the approach and objectives used in the creation of the standard
- Understand the overview of the standard, not sufficient for implementation but sufficiently detailed to enable the attendee to understand the scope and contents of the standard

#### Outline of Topics:

- HL7 Clinical Document Architecture
- HL7 Continuity of Care Document

**Intended Audience:** Those seeking to understand the CDA and/or CCD standards; those seeking an introduction to CDA and/or CCD as a step towards full certification; those seeking to influence the future direction of the CDA and/or CCD standards; decision makers seeking to understand the business rationale for implementing CDA and/or CCD.

**Content level:** 25% Basic, 50% Intermediate, 25% Advanced

#### T02: Methods Series

##### Knowledge-based Decision-support Systems for Implementing Clinical Practice Guidelines

*Samson Tu, Stanford University; Susana Martins, Mary Goldstein, VA Palo Alto Health Care System*

Clinical practice guidelines, or more generally clinical recommendations, are summaries of evidence-based best practices. In recent years, there has been an explosion of published guidelines. Computer-based decision-support tools can enhance the implementation of these guidelines by bringing focused recommendations to care providers at the point of decision-making. This tutorial will first give a general introduction to the history and practice of clinical decision-support systems, and then look at alternative methods for representing and delivering clinical recommendations.

We will use examples of guideline-based knowledge-based systems that have been implemented to illustrate both technical aspects of system development and organizational aspects of deployment and integration into clinical workflow. The technical aspects will include the steps and problems involved in formalizing guideline recommendations in computable format, system architecture, and technical challenges of integrating an external application into a continually-changing IT environment. The organizational aspect will address successful strategies for implementing the system into multiple medical centers of a large health care network. Presentation will be mixed with exercises and demonstrations of actual clinical systems that can provide decision support to primary care clinicians.

**By the end of the tutorial, participants will be able to:**

- Discuss characteristics of CDSS that help or hinder their acceptance
- Describe alternative methods for representing computable CPGs
- Understand the steps and issues involved in encoding guideline knowledge
- Outline the issues involved in deploying, integrating, and maintaining a knowledge-based DSS for implementing guidelines

**Outline of Topics:**

- Introduction to CDSS
- Alert and reminder systems
- Alternative computable models of CPG
- The roles of standards
- Knowledge acquisition and maintenance for guideline-based CDSS
- Sociotechnical issues of deploying CDSS

**Intended Audience:** researchers; physicians, nurses, and other health care professionals; and computer scientists, system developers, and programmers.

**Content level:** 20% Basic, 60% Intermediate, 20% Advanced

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**T03: Selected Topics Series**

**Transforming & Visualizing Clinical Data for Research**

*Shawn Murphy, Massachusetts General Hospital*

Using data collected in the clinical care domain for clinical research poses many challenges. Clinical data is diverse in structure and reliability. It is generated in truly massive quantities, but for consumption mostly by human eyes, not by machines. To be useful for clinical research, the data must usually be transformed to a machine readable format. Considerations of sensitivity and specificity must be considered when performing these transformations. One then needs a systematic approach to organizing the data such that queries can be generated against seemingly disparate data. This usually translates into finding a suitable "atomic fact" and organizing the data into these discrete pieces. Finally, the data must be shown to clinical researchers and allowed to be queried in a format that provides insights into and hypothesis testing of the data.

**By the end of the tutorial, participants will be able to:**

- Understand the complexities of using clinical data for research and be given methods and approaches for which to solve local problems.
- Understand the concept and value of structuring clinical data such that queries against disparate data can be performed.
- Understand the various solutions that currently exist for querying and visualizing clinical data.

**Outline of Topics:**

- Principles and methods for transforming clinical data for use in clinical research
- Organizing clinical data into databases for use in clinical research
- Visualizing and querying clinical data to test hypothesis
- Insights and solutions from querying and visualizing clinical data
- Limitations in using this data for clinical research

**Intended Audience:** Scientists, clinical researchers, people working in safety and quality research, biomedical engineers and workers in bioinformatics, and programmers.

**Content level:** 100% Intermediate

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**T04: EHR Series**

**Practical Modeling Issues Representing Coded and Structured Patient Data in EHR Systems**

*Stanley Huff, Intermountain Healthcare*

This tutorial will describe the need for formal data models for the EHR and how standard terminologies are used in the models. Starting with use cases encountered while developing EHR systems at Intermountain Healthcare, the instructors will discuss the basic name-value pair paradigm for flexible representation of patient data; the proper roles for standard terminologies like LOINC, SNOMED CT, First Data Bank, and RxNORM; approaches to handling pertinent negative findings and negation; support for precoordinated data entry while storing the data in a post coordinated database; and storage of data that belongs to another patient (baby or donor) in the patient record.

There are no absolute prerequisites for this tutorial. However, those who have experience in designing, developing, configuring, and implementing EHR systems will find the tutorial more meaningful. Experience in modeling of medical data and knowledge of standard coded terminologies like SNOMED CT, LOINC, and RxNORM will also be very helpful.

**By the end of the tutorial, participants will be able to understand:**

- The assumptions and motivation for formal definitions of detailed clinical models
- How standard coded terminologies are referenced by detailed clinical models, and the different roles that SNOMED CT and LOINC play in the models
- The various alternative logical models for implementing clinical models related to diagnoses, allergies, problems, procedures, orders, and observations.
- The importance of adhering to terminology and modeling standards in developing or purchasing interoperable EHR systems
- National and international activities for sharing models that enable interoperability of EHR systems

### Outline of Topics:

- What are detailed clinical models?
- Why are detailed clinical models important?
- What are the requirements for defining and using detailed clinical models?
- Name-value pair (NVP) and entity-attribute-value (EAV) strategies for representing clinical data
- What are the proper roles for use of LOINC, SNOMED CT, drug codes (First Data Bank, RxNorm) and classifications in the models
- The necessity of supporting both pre and post coordinated models in a clinical system
- Approaches to the representation of negation and pertinent negative findings
- Storing data that belongs to another person (relative, family member, donor) in the patient record
- Specific alternatives for modeling including observations, diagnoses, problems, procedures, allergies
- Open candid discussion of ideas that the participants have about ways that the modeling issues can be addressed
- Importance of supporting open consensus standards for EHR systems that are purchased or developed
- Brief discussion of various national and international activities related to formal clinical data models

**Intended Audience:** Designers, developers, implementers of EHR systems, scientists, educators, researchers, and biomedical engineers interested in clinical data modeling and interoperability of EHR systems.

**Content level:** 50% Intermediate, 50% Advanced

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### T05: EHR Series

#### Human-centered Design and Evaluation of Health Information Systems

Jiajie Zhang, University of Texas Health Science at Houston;  
Vimla Patel, Arizona State University

A current and significant challenge in the design and implementation of health information technology (HIT) is to deal with the high failure rate of HIT projects. A large number of HIT projects fail. Most of these failures are not due to flawed technology, but rather due to the lack of systematic considerations of human and other non-technological issues in the design and implementation processes. In other words, designing and implementing HIT is not so much an IT project as a human project about human-centered computing such as human-computer interaction, workflow, organizational change, and process reengineering. Due to the complexity and unique features of health care, human-centered methods and techniques specifically developed for health care are necessary for the successful development of health information systems that would increase efficiency and productivity, increase ease of use and ease of learning, increase user adoption, retention, and satisfaction, decrease medical errors, decrease development time and cost, and decrease support and training cost. In this tutorial we will teach one such method that is specifically developed for Electronic Health Records (EHR) systems. After the half-day tutorial, the attendees should have a basic understanding of the usability issues in health IT and should be able to use the learned method to evaluate the usability of EHR and related products.

### By the end of the tutorial, participants will be able to:

- Understand the principles of human-centered design
- Understand the significance of human-centered design and the consequences of technology-driven development
- Use human-centered methodologies and techniques to evaluate health information systems
- Use human-centered processes to design health information systems that have good usability

### Outline of Topics:

- The human side of human-computer interaction
- Basic frameworks and methodologies of human-centered design
- Usability evaluation techniques
- UFuRT: a new framework and process for human-centered design and evaluation
- Case studies: usability evaluation of EHR
- Case studies: usability evaluation of medical devices
- Patient safety and human-centered design

**Intended Audience:** Scientists; researchers; physicians, nurses, and other healthcare professionals; and computer scientists, system developers, and programmers; graduate students and postdoctoral fellows.

**Content Level:** 40% Basic, 50% Intermediate, 10% Advanced

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### T06: Primer Series

#### An Introduction to Clinical Natural Language Processing

Leonard D'Avolio, VA Boston Healthcare System; Wendy Chapman, University of Pittsburgh; Dina Demner-Fushman, National Library of Medicine; John Pestian, Cincinnati Children's Hospital

Natural language processing is the umbrella term used to describe the automated structuring and extraction of information formatted as free text. The demand for natural language processing technologies in medicine will grow significantly in the coming years. This growth will be fueled by the continuing adoption of the electronic medical record, increasing emphasis on quality measurement and improvement initiatives, and the growing need for evidence to be used as part of evidence-based medicine. This half-day tutorial is designed to introduce clinicians and informaticians to the practice, tools, techniques, and science of clinical natural language processing. Instruction will be hands on, inter-active, and case driven. The tutorial will focus primarily on clinical NLP, although related uses and methods such as literature-based NLP and text mining will be discussed to lend context. Topics covered include: an overview of clinical NLP and its uses in medicine; a brief history of clinical NLP and the evolution of NLP methods; the challenges to NLP; the number of approaches used to process natural language and the strengths and weaknesses of each; implementation considerations, creating annotated corpora as training/test sets, evaluation of NLP, and a review of open source tools for natural language processing. Demonstrations and in-class exercises will be used to help tie the theory of NLP to

everyday research problems addressed by these technologies. The tutorial will be taught by four instructors experienced as researchers, developers, and users of a variety of tools and approaches to clinical NLP.

**By the end of the tutorial, participants will be able to:**

- Describe the current uses of clinical NLP
- Describe the relationship between clinical NLP and related techniques such as text and data mining
- Understand the challenges to clinical NLP
- Describe the various approaches to clinical NLP and their strengths and weaknesses
- Understand the process of clinical NLP and its various components
- Find available open source clinical NLP components, frameworks, and packages
- Identify potential implementation concerns and challenges
- Understand the process of creating and using annotated corpora
- Interpret the performance of published clinical NLP research

**Outline of Topics:**

- Overview: What is NLP and how is it being used in medicine?
  - Literature
  - Clinical reports
  - Applied to bioinformatics
- What makes clinical NLP so difficult?
  - Overview of policies affecting NLP
  - Characteristics of the clinical documentation environment
- Different approaches to clinical NLP
  - Simple rules-based (information extraction)
  - Statistical
  - Symbolic or grammatical
  - Hybrid approaches
- The clinical NLP process
  - The various components of clinical NLP
    - Annotated corpora for training/testing
    - The pipeline or clinical NLP software
    - Evaluation (its role in the process)
- Available open source tools and components
- Implementation considerations
- Evaluating clinical NLP (in greater detail)

Users will also be exposed to several open source technologies for clinical NLP including the Unstructured Information Management Architecture (UIMA) and Knowtator for manual annotation. They will also experience, first hand, the challenges of clinical NLP through manual annotation of de-identified patient records.

**Intended Audience:** Any clinician or medical informatician with an interest in learning more about clinical NLP.

**Content level:** 70% basic, 30% intermediate

**Tutorial Schedule Change: T07 with J. Cimino and C. Chute has been renamed T28 and moved to Sunday, 8:30 a.m.-12:00 p.m. A new offering labeled T07 follows.**

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**NEW! T07: Primer Series**

**Preparing for an Informatics Career in Industry –What you Really Need to Know**

*Steven Labkoff, Pfizer Inc., Joseph Bormel, Quadramed Inc., Arlene Ansel, Witt/Kieffer, Linda Hodges, Witt/Kieffer*

An estimated 50% of informatics fellows leave academia or clinical for their full time job. For many, this is their first time leaving the academic, medical, or health care realm. There are many lessons that you need to know and understand when approaching companies for a job that they don't teach you in residency or fellowship. Getting it right can be the difference between getting a great job offer and waiting around with no call backs or interviews.

**By the end of the tutorial, participants will be able to:**

- Understand the pathway to enter the business world.
- Recognize the kinds of opportunities for Informaticians in industry
- Understand where the jobs are – the obvious and non-obvious places
- How to work with recruiters
- How to prepare your resume (not your CV)
- Interview techniques
- Job offers & correspondence
- Timelines, deliverables, and deadlines in industry
- Working in your new company and with your new boss
  - Once you are in a new job in industry, understanding corporate culture
  - Managing by objectives
  - Goal setting
  - Reviews - mid-year and annual
  - The STAR system
- Getting ahead once you are in industry

**Intended Audience:**

- Fellows who expect to graduate in roughly 18 months
- Informaticians or clinicians who are contemplating transitioning into industry
- Faculty who coach students or fellows into career pathways

**Content level:** 100% basic

## 8:30 AM-4:30 PM TUTORIALS

### T08: Primer Series

#### Introduction to Biomedical and Health Informatics

Dominic Covey, University of Waterloo; John Holmes, University of Pennsylvania; Christopher Cimino, Albert Einstein College of Medicine

This is an intense, multi-instructor, full-day tutorial intended to introduce those with little or no knowledge of informatics, to the nature, key concepts, and applications of this discipline. We examine what the field is about and how it can help us address key challenges in the health field. Major objectives of the tutorial include enhancing the value of the conference to the participant and helping the participant discover specific topics of interest that can be explored both during and after the conference. Although no tutorial of this duration can cover all topics, the material targets the high profile areas of informatics such as clinical or health care informatics, bioinformatics, and public health informatics, and points the participants in the direction of broader and deeper enquiry.

#### By the end of the tutorial, participants will be able to:

- Understand the current landscape of the science and practice of Health Informatics.
- Better determine and define your areas of interest in informatics.
- Select sessions at the conference in your areas of greatest interest.
- Launch a systematic process of broadening and deepening their knowledge.
- Access Health Informatics information resources.

#### Outline of Topics:

- Health, health care, and their challenges for health informatics
- Bioinformatics
- The Nature, Structure, and Management of Health Data, Information, and Knowledge “Intelligent” Health Systems
- Health Communications Systems
- The Health User Interface and Interactive Systems
- Human/Social Aspects of Health Information Systems
- Major Healthcare Applications
- Health Informatics Education
- The Future and Persistent Issues in Health Informatics

**Intended Audience:** Health care professionals (physicians, nurses, and allied professionals), health system administrators, CIOs and managers, medical librarians, other information professionals, academics from other fields interested in Health Informatics.

**Content level:** 100% Basic

### T09: Selected Topics Series

#### Current Research & Practice for Nursing Sensitive Quality Indicators: Informatics Applications

Norma Lang, University of Wisconsin Milwaukee College of Nursing; Leanne Currie, Columbia University; Colleen Frey, Detroit Medical Center; Jacqueline Moss, UAB School of Nursing; Judy Murphy, Aurora Health Care; Nancy Nelson, Intermountain Healthcare; Kaija Saranto University of Kuopio; Charlotte Weaver, Gentiva Health Services

While quality measures have been widely developed to evaluate care related to specific medical conditions across various care settings, relatively few measures have been developed to measure the impact of nursing care on patient outcomes. In 2003, the National Quality Forum (NQF) initiated the development of a set of ‘Nursing Care Performance Measures’ to provide a framework for gathering the data and information necessary to measure the contribution of nursing care to patient outcomes and quality of care. This tutorial will present a critical analysis of the NQF’s nursing sensitive care measures to lay the groundwork for discussion of ongoing research and practice related to these quality indicators. The speakers will present methods to integrate these indicators into clinical information systems to support both clinical decision making and measurement of these outcomes across the care continuum.

The tutorial presenters include nurses who represent industry, research and practice in the acute and homecare settings. The tutorial will address challenges associated with implementing nursing sensitive outcome measures to evaluate the impact of nursing care on quality and safety outcomes. The tutorial will also engage participants in focusing on integrating nursing quality measures into automated clinical information systems to ensure data capture as a by-product of care delivery. In addition, the presenters will discuss methods to guarantee that data are electronically captured so both researchers and quality specialists can better understand the extent to which nurses contribute to quality patient care and outcomes.

#### By the end of the tutorial, participants will be able to:

- Describe early foundational work to develop and test the implementation of the National Quality Forum (NQF) Endorsed Nursing-Sensitive Care (NSC) Performance Measure Set.
- Identify strategies to integrate quality metrics into an automated nursing care planning and documentation system.
- Discuss current informatics research and best practices related to fall and injury prevention and pressure ulcer prevention.
- Discuss processes to capture nursing quality indicators in the homecare setting.
- Describe requirements for auto-capture of data needed to measure the effectiveness of nursing care across the continuum.

#### Outline of Topics:

- Overview of the Nursing Care Performance Measures and foundational work by the NQF related to these measures.
- Current research and practice related to the following:
  - Pressure ulcer prevention

- Fall and injury prevention
- Sepsis
- Rapid response teams
- Ventilator Associated Pneumonia
- Continuity of Care
- Current state of computer-based nursing documentation and the degree to which it supports auto-capture of data needed to measure the effectiveness of nursing care.

**Intended Audience:** Nurses, physicians, and others involved in quality measurement and integration of quality measures into clinical information systems.

**Content level:** 100% Intermediate

## 8:30 AM-4:30 PM BUSINESS MEETINGS

### AMIA Board of Directors Meeting (Board members only)

## 10:00 AM-10:30 AM COFFEE BREAK

## 1:00 PM-4:30 PM TUTORIALS

### T10: Methods Series

#### The Road to Cognitive Systems Engineering

*Laura Militello, University of Dayton Research Institute; Corey Fallon, Cindy Dominguez, Klein Associates Division of ARA; Jason Saleem, VA HSR&D Center on Implementing Evidence-Based Practice*

The tutorial includes a combination of theory, lecture, and hands-on activities illustrating how Cognitive Systems Engineering fits into the design process. This tutorial will explore cognitive indicators of system effectiveness, critical decision method for cognitive task analysis and decision requirements analysis. The goal of this offering is to provide an expansion of perception and conception of cognitive requirements in the systems engineering process.

#### By the end of the tutorial, participants will be able to:

- Undertake the rudiments of CSE.
- Describe the concept of macrocognition.
- Demonstrate a small set of CSE methods.
- Expand on the ability to “see” cognition.

#### Outline of Topics:

- Introduction to Macrocognition
- Cognitive Performance Indicators (how to find the cognition)
- Introduction to Critical Decision Methodology
- Group Exercise: Conduct a CDM
- Build a Decision Requirements Table
- Group Exercise: Design concept development
- Transitioning our work into the development process
- Final Discussion about CSE Processes
- CSE papers for other perspectives

**Intended Audience:** Developers of systems and any clinician or biomedical informatician with an interest in learning more about cognitive systems engineering

**Content level:** 40% Basic, 40% Intermediate, 20% Advanced

### T11: Primer Series

#### Clinical Research Informatics: Theory, Methods, and Best Practices

*Philip Payne, Ohio State University; Peter Embi, University of Cincinnati*

Clinical research is critical to the advancement of medical science and public health. Conducting such research is a complex, resource intensive endeavor comprised of a multitude of actors, workflows, processes, and information resources. Recent national-level research and policy efforts have explicitly focused on increasing the clinical research capacity of the biomedical sector, largely through fostering improvements in both workflow and information management infrastructure. These efforts have served to increase attention on clinical research throughout the governmental, academic, and private sectors. In the specific context of the intersection between biomedical informatics and clinical research, the emergence of both a notable body of literature and a set of targeted funding mechanisms such as the National Cancer Institute’s (NCI) Cancer Biomedical Informatics Grid (caBIG) and National Center for Research Resources (NCRR) Clinical and Translational Science Award (CTSA) programs have served as significant catalysts for the emergence of a robust sub-discipline of informatics focusing on clinical research applications, known as Clinical Research Informatics (CRI).

In this tutorial, we will provide researchers, technical leaders, and technical staff with an overview of the core definitions and informatics theory that collectively contribute to the successful practice of CRI. We will use a set of research vignettes to illustrate common challenges and opportunities in the CRI space and best-practice approaches to such scenarios, including: 1) the design and implementation of integrative clinical research information management systems; 2) the query of disparate enterprise and research information systems to support clinical research activities and information dissemination/reporting; and 3) the identification and recruitment of clinical research participants via multiple retrospective and prospective modalities.

#### By the end of the tutorial, participants will be able to:

- Define clinical research informatics and understand its relationship with other biomedical informatics sub-disciplines as well as the clinical/translational sciences
- Synthesize the role of current health care and informatics policy and standards setting developments relative to the practice of CRI.
- Identify and discuss core informatics theories, methods, and best practices in order to analyze and plan solutions to common clinical research information management challenges

### Outline of Topics:

- Clinical Research Informatics (CRI) definition and relationship(s) to other biomedical informatics sub-disciplines and the clinical/translational sciences
- Current CRI-relevant funding, policy, and standards-setting efforts or initiatives
- Enterprise architectures for integrative clinical research information management
- Semantic interoperability and knowledge engineering in the clinical research domain
- The relationship of human factors and/or workflow optimization to the effective deployment and utilization of clinical research information management systems
- Common CRI challenges and their solutions
  - Integrating enterprise systems and CRI platforms
  - Querying disparate data sources in support of clinical research related analyses and/or information dissemination
  - Clinical research participant identification and recruitment

**Intended Audience:** Scientists; researchers; physicians, nurses, and other health care professionals; and computer scientists, system developers, and programmers.

**Content level:** 20% basic; 50% intermediate; 30% advanced

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### T12: EHR Series

#### Evaluating Health IT Projects: A Practical Approach

*Caitlin M. Cusack, NORC at the University of Chicago, Eric G. Poon, Brigham and Women's Hospital/Harvard Medical School, and Brian E. Dixon, Regenstrief Institute*

For years, health information technology (health IT) has been implemented with the goals of improving clinical care processes, health care quality, and patient safety. Evaluations frequently take a back seat to project work, and frequently do not take place at all. Given the large investment required for health IT projects, stakeholders are increasingly demanding to know both the actual and future value of these projects. As a field we are gradually moving away from talking about theoretical value of these implementations, to a place where we must measure actual value. Isolated studies and anecdotal evidence are not enough – not for our stakeholders, nor for the health care community at large. Evaluations must be viewed as an integral piece of every project, not as an afterthought.

While much has been written about the theory of evaluation, there has been a dearth of practical real-world tools to assist in choosing measures and constructing evaluation plans in health IT. As stakeholders demand more accountability and evidence of impact of these projects, the lack of such practical tools has become even more apparent. The instructors in this course have taken the theory of evaluating HIT, and developed tools and a practical approach to planning and executing evaluations. This tutorial has been designed to share these tools with others as they embark on choosing measures for evaluation plans of their own.

### By the end of the tutorial, participants will be able to:

- Compile metrics for a health IT project
- Determine which metrics are practical to measure
- Formulate a plan around the chosen metrics
- Write an evaluation plan

### Outline of Topics:

- Why conduct evaluations of Health IT: The motivations behind evaluation
- A Practical methodology to write an evaluation plan
- Quantitative Considerations
- Qualitative Considerations
- Survey Considerations

**Intended Audience:** Health care professionals looking for guidance as to how to evaluate their health IT project.

**Content level:** 80% Basic, 20% Intermediate

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### T13: Selected Topics Series

#### Personal Health Records and E-health Portals

*Patricia Flatley Brennan, University of Wisconsin-Madison; Jonathan Wald, Partners HealthCare System; Stephen Ross, University of Colorado Denver*

Personal health records (PHRs) complement clinical documentation by providing patients with access to subsets of their clinical records and with the health information management tools needed for self-care and effective health care utilization. Taking on many forms, including E-health portals, stand-alone applications, and Web 2.0 services, PHRs may also provide lay people with access to health care systems resources, including health information, appointment scheduling and provider communication, and personal health tracking. This tutorial will introduce clinicians, systems administrators, and IT developers to critical issues regarding the design and deployment of personal health records. During the tutorial, participants will have an opportunity to examine and critically evaluate existing personal health records tools, explore e-health portals, and discuss technical, ethical and policy considerations related to the deployment of personal health records tools. An update of the national environment and how it may affect individual programs will be provided: AHIC, HITSP, consumer empowerment use case and associated standards, and the health plans' initiative.

### By the end of the tutorial, participants will be able to:

- Differentiate personal health records from other information processing tools used in health care
- Develop a strategy to appraise the clinical consequences of PHRs
- Evaluate the technical requirements, ethical considerations and social value of personal health records.

### Outline of Topics:

- Personal Health Records and E-health portals
- Basic Definitions
- Shared features
- Unique aspects
- Demonstration – Prototypes and early approaches
  - Tethered and untethered systems
  - Portals to health care systems
- Clinical considerations
  - Fostering health goals with PHRs and eHealth Portals
  - Health education
  - Personal health monitoring
  - Communication with professionals
  - Creating a life-long health record
- View from the National Scene
  - AHIC & HITSP
  - Consumer empowerment use case and associated standards
  - Health Plans initiative
- Social Benefits of PHRs and eHealth Portals
  - Surveillance
  - Public Health Education
  - Health Services Research
- Technical Considerations and Challenges
  - Platforms and Devices
  - Integration with clinical information systems
  - Human-computer interaction
- Policy Considerations
  - Privacy
  - Impact on clinician workload
  - Burden on patients and families

**Intended Audience:** Clinicians, managers of E-Health Portals, health educators, public health practitioners, engineers and computer scientist who work with distributed information systems, integration of disparate data bases or network-level authorization, authentication, or privacy policies.

**Content level:** 50% Basic, 30% Intermediate, 20% Advanced

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### T14: EHR Series

#### Standards for Storing and Exchanging Clinical Data in Electronic Health Record Systems

Walter Sujansky, Sujansky & Associates, LLC

The absence of widely implemented clinical data standards has been cited as a major barrier to the adoption of EHRs in the United States. This tutorial discusses the practical importance of data standards in ambulatory EHRs and describes some of the most important standards for storing and exchanging clinical data in real-world systems. Specific standards that will be covered include HL7, NCPDP Script, CCR, LOINC, SNOMED, and DOQ-IT. The tutorial will also address certain of the issues that have hindered the adoption and effective use of clinical data standards in the U.S, and will describe ongoing efforts to address these issues within the government and private sector. A recently developed HL7 standard for reporting laboratory results to ambulatory EHRs (ELINCS) will be presented as a case study of the process for developing, disseminating, and implementing a clinical data standard to meet a practical need.

### By the end of the tutorial, participants will be able to:

- Understand how clinical data standards influence the functionality and usability of EHRs
- Evaluate the appropriate roles and the strengths/limitations of several prominent data standards
- Appreciate the practical difficulties of applying existing data standards effectively within EHRs
- Understand a number of current initiatives striving to increase the value of standards for EHRs, including the ELINCS lab-reporting project

### Outline of Topics:

- Purpose/role of data standards in ambulatory EHRs
  - No EHR is an island
  - Semantic interoperability
- Important data standards for EHRs
  - Messaging standards (HL7, NCPDP SCRIPT)
  - Document standards (CCR, CDA)
- Terminology standards (LOINC, SNOMED-CT, NDC, RxNorm, other drug terminologies)
  - Issues/barriers in the practical adoption and use of data standards
- Current initiatives to address/overcome barriers
  - Work of private entities (HL7, IHE, Connecting For Health)
  - Work of federal government (HITSP, CCHIT, NLM)
- Case Study: ELINCS (EHR-Laboratory Interoperability and Connectivity Standards)

**Who should attend:** Developers of ambulatory EHR systems, including systems for decision support, reporting, analysis, and interfacing; Purchasers and users of ambulatory EHR systems; Developers of clinical data standards; Students interested in the practical uses and technical features of existing clinical data standards.

**Content Level:** 40% Basic, 40% Intermediate, 20% Advanced

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### T15: Methods Series

#### A Gentle Introduction to Support Vector Machines in Biomedicine

Alexander Statnikov, Constantin Aliferis, New York University; Douglas Hardin, Vanderbilt University; Isabelle Guyon, Clopinet

This half-day tutorial will introduce support vector machines (SVMs) and their applications in biomedicine. SVMs are among the most important recent developments of machine learning and pattern recognition and have extensive applications in biomedicine and other fields. Unlike other approaches, these techniques are robust in data analysis with high variable-to-sample ratios and large number of irrelevant variables, they can learn efficiently very complex functions, and they employ powerful regularization principles to avoid overfitting.

A common obstacle in understanding and using SVMs is that they are mathematically challenging especially for biomedical researchers lacking extensive technical backgrounds. The tutorial is designed to enable all interested researchers grasp SVM fundamentals regardless of prior mathematical training. First, we will introduce basic principles behind SVMs in an

intuitive manner. Then we will describe SVM-based algorithms for classification, regression, clustering and novelty detection, variable selection and dimensionality reduction. These algorithms are widely used and/or gaining popularity in biomedical applications. Throughout the tutorial we will provide case studies for each class of methods and give pointers to software implementations and additional literature. The knowledge gained in this tutorial will allow researchers to break the barriers of classical statistics and older pattern recognition and be able to conduct complex and high-dimensional analyses easily and efficiently.

### **By the end of the tutorial, participants will be able to:**

- Execute complex machine learning and pattern recognition tasks in high-dimensional biomedical datasets by following the protocols and principles presented.
- Efficiently perform variable selection using state-of-the-art SVM-based methods.
- Understand advantages and limitations of SVM-based algorithms over classical statistics and other pattern recognition techniques.

### **Outline of Topics:**

#### Part I

- Introduction
- Necessary mathematical concepts
- Support vector machines (SVMs) for binary classification: classical formulation
- Basic principles of statistical machine learning

#### Part II

- Model selection for SVMs
- Extensions to the basic SVM model:
  - SVMs for multiclass classification
  - Support vector regression
  - Novelty detection with SVM-based methods
  - SVM-based variable selection
  - Computing posterior class probabilities for SVM classifiers

#### Part III

- Case study 1: Application and comparison of multiclass SVMs and state-of-the-art classifiers in cancer microarray gene expression data
- Case study 2: Application of SVM classifiers to a variety of text categorization tasks in biomedicine
- Case study 3: Prediction of clinical laboratory values using SVM classifiers
- Case study 4: Using SVMs for modeling clinical judgment and implicit guideline compliance in the diagnosis of melanomas
- Case study 5: Using SVMs for feature selection
- Case study 6: Comparison of SVM-based variable selection methods with Markov-blanket methods; Pitfalls of using SVM-based methods for causal feature selection
- Case study 7: Outlier detection with SVM-based methods in ovarian cancer mass-spectrometry proteomics data

#### Part IV

- Software implementations of SVM-based algorithms
- Additional literature
- Conclusions

**Intended Audience:** Biomedical informatics scientists and researchers, clinicians, bioinformaticians, biostatisticians, data analysts, programmers, students.

**Content level:** 25% Basic; 50% Intermediate; 25% Advanced

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### **T16: Primer Series**

#### **Application of Computer Simulation in Medical Informatics**

*Duane Steward, David Milov, Nemours; Waldemar Karowski, Jose Sepulveda, Luis Rabelo, Yan Wang, University of Central Florida*

This tutorial centers on the application of computer simulation in medical informatics, specifically discrete-event, continuous-process, system-dynamics and agent-based-modeling technologies. The faculty from this tutorial comes from University of Central Florida's (UCF) Industrial Engineering and Management Systems (IEMS) where the UCF and the adjacent Research Park are home to the world's largest concentration of simulation technology resources (commercial, military and academic). The material will feature several tangible examples for tutorial exercises based on experiences at Nemours Children's Clinics and Hospitals (care delivery), State of Florida and Orange County Health Department (disaster response plan validation), Chilean National Hospitals (emergency and imaging department operations), NASA and others.

Following an introductory overview of the four modeling modalities, hands-on experience will be provided that enables rich appreciation of the potentials and issues in applying this area of informatics to problem-solving and validation. Participants are required to supply their own laptop with a fully charged battery for deployment of time-limited simulation software (FlexSim, AnyLogic and specific exercise modules).

### **By the end of the tutorial, participants will be able to:**

- Understand how to apply computer simulation to medical informatics
- Evaluate the appropriate strengths and limitations of computational simulation
- Understand how to use tools that can validate and inspire effectiveness and efficiency in the delivery of care

### **Outline of Topics:**

- DEM Fundamentals
  - Queue, service, resource bind/release, model 'wiring' formalized in a network graph; basic animation for visualization and decision support
  - basic workflow example - Nemours ED
  - hands-on exercise: manipulation of a simulator w/o libraries
- Augmented DEM
  - health care specific libraries; 3-D animation and fly-by visualization

- rapid workflow extension or increased system complexity - Chilean ED, Imaging
- hands-on exercise: manipulation of a simulator with libraries
- Agent-based Simulation
  - agent-based project(s) rendered as hands-on exercise
- Non traditional Applications
  - evaluate disaster response - Orange County Health Dept POD evaluation
  - impact of Personal Health Records
  - non-traditional critical data elements from patients illustrating complex system validation

**Intended Audience:** Individuals looking for a hands-on experience that would enable full appreciation of the potentials and issues in applying this area of informatics in the context of new prospective federal administration initiatives.

**Content level:** 40% Basic, 40% Intermediate, 20% Advanced

### T17: Primer Series

#### Role of Social Networks in Teaching and Advancing Health Informatics: What Can Second Life Contribute to this Process?

*Constance Johnson, Duke University; Chris Paton, University of Auckland; Ed Hammond, Duke University Medical Center*

Social networking is creating quite a following these days. Is it just a passing fad, or will it provide new and innovative opportunities for health informatics? AMIA has placed new emphases on the need for training health informaticians - the 10 x 10 program. What can social networking offer to make distance learning more accessible and better? With the costs and time of face-to-face encounters, can social networking offer more reality in virtual meetings? This tutorial introduces social networking to the AMIA audience: what it is, what tools are available, and how we can use it. The leaders will provide examples and opportunities from experiences in using this new domain.

#### By the end of the tutorial, participants will be able to:

- Understand social networking and its scope of potential use
- Understand Second Life as a major component for social networking
- Develop innovative concepts for the future built around social networking

#### Outline of Topics:

- What is Social Networking
  - What is xxx 2.0 all about?
  - What are some of the tools and applications available in this domain?
  - The role of social networking in teaching
  - The role of social networking in simulation

- What is Second Life
  - Become acquainted to what Second Life is all about and what it offers
  - Role playing in a 3-D world
  - Interactive learning
  - Avatars, building, communication, scripting, sharing, community
  - Capability and flexibility
  - The Second Life Community
- Teaching in a virtual world
  - Tools
    - Content authoring tools such as Moodle or Sloodle, Blackboard
    - Webinars such as Eluminate, Adobe Connect
    - Screen recorders such as Camtasia
    - More social networking tools such as Facebook
    - Second Life teaching tools such as online tests, whiteboards, blackboards
    - Videos such as Youtube
    - Dmi-dmi
    - Others
  - Practical experience in using Second Life and other tools in Distance Learning in the Duke School of Nursing
- Simulation
  - Role and opportunity for Second Life in simulation and building 3-D models
  - Practical experience in the Duke School of Medicine and Duke School of Nursing
  - Practical Experience in the National Institute for Health Innovation and the University of Auckland

**Intended Audience:** Individuals interested in learning how to use social engineering in distance learning simulation, and new opportunities for personalized communication.

**Content level:** 60% basic; 40% intermediate

### 2:30 PM-3:00 PM COFFEE BREAK

### 5:00 PM-7:30 PM WORKSHOPS

#### Workshop 1

#### Barcode Medication Administration Implementation in an Acute Care Hospital and Lessons Learned

*A. Agrawal, S. Holzman, C. Russo, D. Civan, Kings County Hospital; A. Glasser, Courtyard Group*

Barcode medication administration (BCMA) systems ensure the five "rights" during medication administration: right patient, drug, dose, route, and time. Growing evidence suggests the efficacy of BCMA in reducing medication administration errors and therefore, implementing BCMA systems is a vital component of a medication safety strategy. Implementing BCMA is a complex project involving many disciplines including nursing, pharmacy, admitting, information

technology, and physicians - each with their unique workflow issues. For example, for nursing, the issues of concern are the configuration of BCMA software screens, and reliability of hardware such as medication carts and scanners, whereas for pharmacy, the issues of maximizing efficiency in medication unit dose barcoding and inventory management are of main concern. Suboptimal planning and poor project methodology may lead to poor adoption or to nurses adopting BCMA workarounds that can negate potential benefits, or worse, lead to new errors. The workshop is based on our hands-on experience with successfully implementing BCMA at a 630-bed acute tertiary care hospital. We will describe our BCMA system and project methodology, discuss important considerations related to pharmacy, technology, admitting, clinical work-flow, and end-user training, and finally, share the lessons learned from our experience.

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## Workshop 2

### Performance Measurement, Reporting and Improvement using Electronic Health Records

*A. Jain, S. Hayden, Cleveland Clinic*

Performance measurement and reporting of quality outcomes is critical in the current health care climate. We discuss the role of the EHR and EHR-derived data in efficiently measuring and reporting of patient-specific processes and outcomes. Governance issues, workflow consistency, and technical challenges remain obstacles for institutions that have implemented an EHR for clinical purposes and now begin to think about local, regional, and national quality initiatives. Through an interactive workshop, we will explore the role of a multi-disciplinary group at our institution in leveraging our EHR-based clinical data repository to design and implement algorithms for rapidly deriving, validating, and delivering patient-specific performance measures and outcomes related to quality improvement projects. We will discuss the role of the EHR in both a regional collaborative and national reporting obligations. Finally, we will focus on overcoming governance and clinical workflow challenges, extending investments already made in the health IT infrastructure, and developing a team to manage the complexity of secondary use of EHR data to measure and impact on quality.

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## Workshop 3

### Research Methods for Understanding Groups, Organizations, and Communities

*M. Benham-Hutchins, Northeastern University; J. Effken, The University of Arizona; K. Courtney, University of Pittsburgh*

This workshop will provide an overview of how research methods such as network analysis and community based participatory research can be used to enhance the depth and breadth of informatics research involving groups, organizations, and communities. Exemplar studies utilizing each of these methods will be examined. Participants will discuss how to critically appraise informatics research with groups, organizations and communities and share their own experiences with these types of projects and research methods. Participants will also receive a reference list of

available software tools that support these research approaches. This workshop is intended for informatics researchers, systems designers, and interested health providers. At the end of this workshop, participants will be able to: 1. Articulate the challenges and benefits of using social network analysis, organizational network analysis or community-based participatory methods in informatics research; 2. Describe the potential ethical issues associated with these methods in informatics research; and 3. Discuss strengths and weaknesses of available software tools.

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## Workshop 4

### Standards in Clinical Decision Support: Activities in Health Level Seven and Beyond

*R. Jenders, UCLA School of Medicine; G. Del Fiol, K. Kawamoto, Duke University*

Health Level Seven (HL7) is the principal health information technology international standards development organization (SDO). Prominent among its suite of standards are formalisms related to clinical decision support (CDS) including the Arden Syntax, GELLO, Infobutton and Decision Support Service (DSS) standards. Continuing improvement in these standards and ongoing development of future decision support standards require wide participation in order to maximize their success. Accordingly, the purpose of the workshop is twofold. First, instructors will convey the latest developments regarding existing CDS standards and related efforts to develop new standards. Second, the instructors will solicit feedback so that attendees who do not participate in HL7 can have input into the standards activities of that organization while placing them in the context of other SDOs and harmonization efforts. The instructors of this workshop, who are the co-chairs and/or project leaders of the CDS Work Group of HL7, will review progress in these areas. They will present the details of the ongoing development of the extant HL7 standards and planned future ones, including an Order Set standard. Finally, they will solicit discussion regarding the future direction of standards development in these areas.

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## Workshop 5

### Third i2b2 Workshop on Natural Language Processing Challenges for Clinical Records

*O. Uzuner, Middle East Technical University, Northern Cyprus Campus and SUNY-Albany; I. Solti, University of Washington*

The third i2b2 workshop on Natural Language Processing (NLP) for clinical records is a challenge on the automated extraction of medication information from discharge summaries. The goal of the medication extraction challenge is to continue i2b2's effort to open patient records to studies by the NLP and medical informatics communities for the advancement of the state-of-the-art in automatic processing of narrative medical text. To achieve the goal, i2b2 made available a set of de-identified patient records and annotation guidelines. In this workshop, we will discuss the medication extraction challenge, study the complexity of the task, review some approaches to automatically identifying medication-related information from medical records, and present the

challenge results. The findings of the i2b2 challenge on medication extraction will shed light onto the state of the art in natural language processing for information extraction from clinical records. It will showcase applications that are available for accurate recognition of medication-related information from narrative records.

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## Workshop 6

### **Qualitative Methods in Biomedical Informatics and the Three Rs: Rationale, Rigor and Roadblocks**

*T. Panniers, George Mason University; B. Kaplan, Kaplan Associates and Yale Center for Medical Informatics; J. Ash, Oregon Health & Science University; R. Benditt, University of Alberta; J. Brixey, Kansas University Medical Center; S. George, Charles Drew University of Medicine and Science; S. Haque, Syracuse University; C. LeRouge, Saint Louis University; A. Shachak, University of Toronto*

Among the “grand challenges” identified by AMIA, sociotechnical issues are recognized as important to be addressed by researchers and practitioners alike. Responding to this challenge necessitates using a variety of different methods to address these issues. Rather than relying solely on experimental designs, studies of sociotechnical issues call for approaches that are sensitive to context. Different kinds of qualitative methods do that. These include participant observation, document review, and semi-structured interviews. This workshop follows on from last year's Birds of a Feather (BoF) Session, Qualitative Evaluation - Theory and Experience: the Good, the Bad, and the Ugly, where attendees expressed a need for more in-depth discussion of qualitative methods. Workshop leaders, who have come to qualitative research from different disciplines and research traditions, will engage participants in considering key concepts related to qualitative research used alone or in tandem with other methods.

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## Workshop 7

### **Good Evaluation Practice in Health Informatics - GEP-HI**

*J. Talmon, Maastricht University; M. Beuscart-Zéphir, Centre Hospitalier Universitaire ; P. Elkin, Mount Sinai School of Medicine*

Several authors have presented text books that provide guidance on the selection of study designs and methods for evaluation studies in health informatics. They often indicate some of the methodological pitfalls (and related biases) that may exist. Nevertheless, researchers are still asking for guidance on how to do evaluation studies in practice. Many of the questions are not related to the methods to use, but to how to get a proper definition and profile of the evaluation project, such that the results can inform a decision to be made. To address this problem and need, members of the AMIA, EFMI

and IMIA working groups on evaluation have developed GEP-HI: Guidelines for Good Evaluation Practice in Health Informatics. The objective of this workshop is to briefly present those guidelines and to discuss with the participants a few case studies to demonstrate what problems may arise and how GEP-HI could guide the planning, design and execution of a Health Informatics Evaluation study. GEP-HI can be applied broadly including, but not restricted to evaluations during the development, implementation and post-marketing surveillance of EHRs, PHRs, CPOE, clinical databases, NLP systems for clinical use etc. Participants are encouraged to familiarize themselves with GEP-HI that is available at <http://iig.umit.at/efmi/>

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## Workshop 8

### **Experiences from the Forefront of EMR Implementation and use in Canadian Primary Care: Benefits & Barriers**

*N. Shaw, University of Alberta*

A research team consisting of senior academics from the universities of Alberta, Dalhousie, Sherbrooke and Toronto undertook a series of 20 case studies of EMR implementation and use in pan-Canadian primary care. This research was sponsored and undertaken in partnership with the Canadian Medical Association, with financial support from Canada Health Infoway. Bringing EMRs into their practice was a leap of faith for many physician early adopters. These case studies represent the first time in Canada that a structured approach has been taken to examine the benefits of EMRs to primary care delivery. The research consisted of two stages: the EMR System and Use Survey, which was used to tailor the subsequent interview; and a site visit comprising a one-hour interview with the lead physician, and one-hour observations of how the physician, nurse and office staff interacted with their EMR. Our results are extensive and the individual case summaries and reports should be referenced for full details (<http://www.cma.ca/EMRcasesstudies>). However, in summary, we found that there are clear success factors and specific roadblocks that affect the implementation and use of EMRs. This research produced seminal evidence to support the implementation and use of EMRs in Canadian primary care. However, it also raises questions about areas that need further research. These include financial, social, policy and pragmatic issues, which affected EMR implementation, and the impact of payment and practice models (such as patient rostering and collaborative/multidisciplinary practice) on EMR success. However, for the first time we can point directly to 20 clinics of differing types (e.g., single practitioners, small group practices, large multidisciplinary clinics) and geographic areas (e.g., rural, remote, inner city) and demonstrate that EMRs can be implemented, used, and bring great benefit to patients, physicians, and the health care system.

## Workshop 9

### Virtual Environments for Training in Healthcare

*P. Dev, Innovation in Learning Inc.; K. Kahol, Arizona State University*

Three-dimensional virtual environments are the basis of highly popular online multi-person video games (World of Warcraft, Neverwinter Nights). The same technology has been used by educators to construct virtual learning environments for education in business, humanities, libraries, military, and healthcare. Some environments, such as those in Second Life, are exploratory, with structure provided through organized meetings and presentations 'in-world'. Other environments resemble videogames, with sequential levels of play, providing a structured progress through the learning material, albeit in a game-like format. This workshop invites informatics educators and practitioners to participate in discussing current and potential uses of 3D virtual environments for learning and work in healthcare. Selected presentations on the topic will seed the discussion in the workshop.

## Workshop 10

### Primary Care Informatics Working Group Workshop: Where Will Our Patients Go? An Exploration into the Medical Home

*S. Morgan, Partners HealthCare; C. Norlin, University of Utah; J. Finkelstein, Johns Hopkins University School of Medicine; K. Kochendorfer, University of Missouri; R. Colligan, Private practice*

Building from the experiences of the past ten years of the Primary Care Informatics Working Group's pre-conference meetings, this session will highlight the ongoing work of the membership. The Medical Home is not a new concept in patient care. First developed by the American Academy of Pediatrics in 1967, the Medical Home has evolved to include all aspects of medicine, trying to shift the paradigm from acute care episodes to one that comprehensive and focused on the long term needs of the patient. This session will be an interactive dialogue between the attendees and presenters and will include topics centered on the application of information technology to the support and fostering of the Medical Home.

## Workshop 11

### Second Annual Workshop Faculty Development for Informatics: Education Working Group Workshop on Objective, Methods, Assessment in Informatics Education

*L. Taylor, Johns Hopkins University School of Nursing*

There is an increasing need to support and educate the faculty of the future healthcare workforce. The expanding array of educational technologies and pedagogies can guide faculty in creating education paradigms to best meet needs of learners

from a wide array of disciplines, presenting with multiple levels of expertise. Who will train the thousands of learners expected to enter our field? Who will train the trainers?

## Workshop 12

### Writing for Publication in Biomedical Informatics

*D. Aronsky, Vanderbilt University; T. Leong, National University of Singapore; J. Talmon, Maastricht University; R. Haux, University of Braunschweig - Institute of Technology; C. Safran, Harvard University*

Writing for publication can be a rewarding activity for researchers at all levels of experience. However, many students and researchers are less familiar with the various aspects of the publication process. The purpose of this workshop is to provide participants with the knowledge, skills, and practical advice that can lead to successful scientific publications.

## Workshop 13

### Social Networking Applications at AMIA & Beyond

*R. Hsiung, University of Chicago; S. Adams, Erasmus MC*

Social networking applications bring people together and facilitate knowledge exchange and collaboration. Wikis and blogs are examples. The AMIA Ethical, Legal, and Social Issues Working Group started a wiki in June 2008 and in 9 months, 71 members registered and wiki pages were viewed 3102 times and edited 367 times. AMIA is now introducing new social networking applications on its web site. Beyond AMIA, professionals blog to educate other professionals and consumers blog to educate other consumers—sometimes about professionals. Substantial time in this workshop is reserved for participants to share their own experiences with social networking applications and to break up into small groups to explore and to learn to contribute to wikis, blogs, LinkedIn, Facebook, and Twitter. Participants then reconvene to brainstorm future directions for AMIA and in their own work.

## 7:00 PM-10:00 PM SPECIAL EVENTS

### AMIA Leadership Dinner

*(by invitation)*

# SUNDAY, NOVEMBER 15

7:00 am-6:00 pm  
8:00 am-12:00 pm  
8:00 am-12:00 pm  
8:00 am-12:00 pm  
8:00 am-12:00 pm  
8:00 am-12:00 pm  
8:30 am-12:00 pm

**Registration Open**  
**10x10 at OHSU In-person Session**  
**10x10 at UAB In-person Session**  
**10x10 at University of Utah In-person Session**  
**Nursing Informatics WG Special Event**  
**Student Paper Competition**  
**Half-day Tutorials**

T18 Discovering Knowledge: An Introduction to Data Mining Principles and Practice  
T19 Introduction to Translational Bioinformatics  
T20 Practical Guide to Clinical Computing Systems: Design, Operations, and Infrastructure  
T21 Approaches to Clinical Computer-based Documentation  
T22 Building Bayesian Decision Support Systems  
T23 Ontologies in Biomedicine  
T24 Clinical Decision Support: A Practical Guide to Developing Your Program to Improve Outcomes  
T25 Paradigm Shift – A Fresh Approach to the EHR  
T26 Overview of Public Health Informatics  
T27 The eXtensible Markup Language (XML)  
T28 Clinical Classifications and Biomedical Ontologies: Terminology Evolution, Principles, and Practicalities

10:00 am-10:30 am  
1:00 pm-3:00 pm  
3:30 pm-5:00 pm

**Coffee Break**  
**Opening Session and Keynote Address**  
**Scientific Sessions**

S01 Experiences and Challenges in Global Health Informatics  
S02 A Model for Sharing Knowledge and Tools for Clinical Decision Support Driven by a Use Case Requiring Interoperable Delivery in the AHLTA Environment: A Collaborative Partnership of the Morningside Initiative with the Department of Defense  
S03 Development, Selection, and Adoption of Clinical Research Eligibility Representation Standards and Screening Methods: Current and Future Directions  
S04 Can the Economic Stimulus and Other National Programs Lead to Better Health Quality through HIT? Progress and Update from Program Leaders  
S05 Advances in Predictive Modeling  
S06 Users and Uses of Clinical Data Systems  
S07 Integrating Clinical Data  
S08 Natural Language Processing and Data Mining  
S09 Tools for Simulation in Public Health  
S10 Terminologies and Ontologies

5:00 pm-7:00 pm  
5:30 pm-7:00 pm

**Welcome Reception – Innovation & Information Center Open**  
**Working Group Business Meetings (Dental Informatics, Formal (Bio)Medical Knowledge Representation, Knowledge Discovery & Data Mining, Pharmacoinformatics, People & Organizational Issues**

6:30 pm-7:30 pm  
7:30 pm-10:00 pm  
7:30 pm-10:00 pm

**ACMI Reception (by invitation)**  
**ACMI Dinner and Induction of Fellows (by invitation)**  
**Working Group Business Meeting (Student)**

## SUNDAY, NOVEMBER 15, 2009

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### 7:00 AM-6:00 PM REGISTRATION OPEN

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### 8:00 AM-12:00 PM SPECIAL EVENTS

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**10x10 at OHSU In-person Session** (students only)

**10x10 at University of Utah In-person Session**  
(students only)

**Student Paper Competition**

**Nursing Informatics WG Special Event**

For more information on NIWG activities see box on page 72.

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### 8:30 AM-12:00 PM TUTORIALS

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#### **T18: Primer Series**

##### **Discovering Knowledge: An Introduction to Data Mining Principles and Practice**

*John Holmes, University of Pennsylvania*

This interactive tutorial will introduce attendees to the theory, tools, and techniques for discovering knowledge in biomedical data. Using a well-known data mining life cycle as a conceptual framework, attendees will experience first-hand, thorough demonstration and direct participation, the techniques of mining clinical data. These techniques include data preparation, description and visualization, mining association, classification, and prediction rules, clustering. The capstone of the tutorial will be the application of mined data to informing traditional statistical analysis. The tutorial will include experience in using Weka, a well-known open-source data mining software suite. Although not required, attendees will get the most out of the tutorial if they bring a laptop to the session to participate in the hands-on sessions. Instructions for downloading and installing Weka will be sent to registrants approximately one week prior to the tutorial.

#### **By the end of the tutorial, participants will be able to:**

- Understand the basic principles of data mining
- Apply appropriate data mining techniques in clinical research
- Interpret data mining results and how they inform statistical analysis

#### **Outline of Topics:**

- Biomedical databases
- Data visualization
- Intelligent data analysis
- Explanatory data mining
- Predictive data mining

- Data mining software
- Applications of data mining in biomedical domains
- Data preparation: methods for cleaning, reduction, and coding
- Association rule discovery
- Classification and prediction
- Clustering and visualization
- When to data mine
- Evaluating data mining software
- Ethical concerns in data mining

**Intended Audience:** Scientists; researchers; physicians, nurses, and other health care professionals; and computer scientists, system developers, and programmers.

**Content level:** 100% Basic

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#### **T19: Primer Series**

##### **Introduction to Translational Bioinformatics**

*Atul Butte, Stanford University*

In 2005, Dr. Elias Zerhouni, former Director of the National Institutes of Health (NIH), wrote "It is the responsibility of those of us involved in today's biomedical research enterprise to translate the remarkable scientific innovations we are witnessing into health gains for the nation... At no other time has the need for a robust, bidirectional information flow between basic and translational scientists been so necessary." Clearly evident in Dr. Zerhouni's quote is the role biomedical informatics needs to play in facilitating translational medicine. American Medical Informatics Association (AMIA) recently added Translational Bioinformatics as one of its three major domains of informatics. This tutorial is designed around the successful curriculum used in Stanford's course in Translational Bioinformatics, one of the first courses to be offered in this field. This tutorial is designed to teach the basics of the various types of molecular data and methodologies currently used in bioinformatics and genomics research, and how these can interface with clinical data. This tutorial will address the hypotheses one can start with by integrating molecular biological data with clinical data, and will show how to implement systems to address these hypotheses. The tutorial will cover real-world case-studies of how genetic, genomics, and proteomic data has been integrated with clinical data.

#### **By the end of the tutorial, participants will be able to:**

- Understand why biologists and clinicians use each measurement technology, and the advantages of each.
- Be able to explain which genomic and genetic methods are most appropriate for studying diseases.
- Be able to list high-level requirements for an infrastructure relating research and clinical genetic and genomic data.

### Outline of Topics:

- Basic understanding of various genome-scale measurement modalities: sequencing, polymorphisms, haplotypes, proteomics, gene expression, metabolomics, and others
- Crucial difference between genetic and genomic data
- Nature and format of expression, polymorphism, proteomics, and sequencing data
- Overview of the most commonly used structured vocabularies, taxonomies, and ontologies used in genomics research
- Description of the most frequently used analysis and clustering techniques
- How the genetic predisposition to disease is studied
- Use of genetic information across medical specialties
- How to find clinical genetic tests
- Genomic and clinical data to study patient disease-free status and survival
- How informatics can be used to identify potential drug targets
- Types of biomarkers
- Parallels between research methods in medical informatics and bioinformatics
- Relating clinical measurements with molecular measurements

**Intended Audience:** Academic faculty or professionals setting up bioinformatics facilities and/or relating these to clinical data repositories, or to data from General Clinical Research Centers or Clinical and Translational Science Awards; health information professionals responsible for clinical databases or data warehouses and tying these to researchers; informaticians, clinicians, and scientists interested in genetics, functional genomics, and microarray analysis; physicians interested in how medicine is advancing through the use of genomics and genetics; and students.

**Content level:** 20% Basic, 50% Intermediate, 30% Advanced

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### T20: EHR Series

#### Practical Guide to Clinical Computing Systems: Design, Operations, and Infrastructure

*Thomas Payne, University of Washington; Soumitra Sengupta, Columbia University*

This tutorial is intended for those who find themselves adding informatics to their existing responsibilities, those in graduate or fellowship training in informatics who intend to have informatics careers, and anyone who wants to learn more about the practical side of clinical computing. We will cover the architecture of clinical computing systems in medical centers, the realities of building HL7 interfaces, interface engines, maintaining a stable technical infrastructure, medical record requirements, providing ongoing user training and support, and what it takes to keep clinical computing systems continuously available. There are many good articles and books covering implementation of clinical computing systems. However, most of our time and energy will be spent keeping existing systems operating so that EMRs, CPOE systems, decision support systems, and other clinical computing systems can be used efficiently and reliably. That is the focus of this tutorial.

### By the end of the tutorial, participants will be able to:

- Understand architecture of clinical computing systems in a medical center
- Know approaches and challenges to interfacing clinical computing systems
- Understand options for supporting clinician users during routine operations and downtimes.
- Appreciate importance and complexity of supporting hosts, networks, workstations and other infrastructure required for dependable clinical computing system operations
- Understand how clinical computing systems fit into medical center governance and oversight
- Feel better prepared to assume membership or leadership of clinical computing operations in your medical center.

### Outline of Topics:

- Introduction and Overview of Clinical Computing Systems within a Medical Center
- Architecture of Clinical Computing Systems
- Creating and Supporting Interfaces
- Infrastructure and Security
- Troubleshooting: What Can Go Wrong and How to Fix It
- Working with the User Community
- Health Information Management and Legal Aspects of the Electronic Medical Record
- Working with Organizational Leadership

**Intended Audience:** Physicians, nurses, and other health care professionals; informatics trainees; anyone who wants to learn more about the practical side of clinical computing.

**Content level:** 70% Basic, 20% Intermediate, 10% Advanced

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### T21: EHR Series

#### Approaches to Clinical Computer-based Documentation

*S. Trent Rosenbloom, Kevin Johnson, Vanderbilt University Medical Center*

Health care professionals have increasingly adopted electronic health record (EHR) systems, especially in larger practices or health care settings. Many currently available EHR systems include modules to support direct clinical computer-based documentation (CBD), and traditional documentation methods can be made to support EHR system adoption and use. The tutorial will outline different methods for documenting clinical care, will review existing literature covering the history and evaluations of CBD systems, will discuss factors contributing to documentation content, will address how templates can impact documentation, and will conclude with summary recommendations for developers and adopters.

Different documentation methods have varying strengths and weaknesses related to quality, usability, efficiency and data availability. It is likely that each note-capture mechanism will find a clinical niche, with different clinicians and different sites each using the type that best fits the practice situation. The proposed tutorial will outline different methods for documenting clinical care, will review existing literature covering the history and

evaluations of CBD systems, will discuss factors contributing to documentation content, will address how templates can impact documentation, and will conclude with summary recommendations for developers and adopters.

**By the end of the tutorial, participants will be able to:**

- Understand the different methods for clinical documentation and their rationale
- Understand the history and near-term future of clinical documentation tools
- Characterize functional considerations that are important when selecting a clinical documentation tool

**Outline of Topics:**

- Types of Clinical Documentation
- External Drivers of Clinical Documentation Content
- History of Computer Based Documentation Systems
- Different Approaches for Templating Notes
- An Approach for Selecting Documentation Systems

**Intended Audience:** Computer-based documentation system developers and evaluators, healthcare providers, electronic health record system users, evaluators and purchasers.

**Content Level:** 30% Basic, 50% Intermediate, 20% Advanced

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**T22: Methods Series**

**Building Bayesian Decision Support Systems**

*Peter Haug, Intermountain Health Care; Dominik Aronsky, Vanderbilt University*

Medical decision support systems are often required to classify patients in accordance with patterns recognized in their data. Uncertainty and missing information are an inherent characteristic of the medical domain. In contrast to rule-based systems, Bayesian systems are able to model uncertainty and missing information explicitly. The availability of large databases makes Bayesian systems attractive for creating decision support systems in the medical domain. The tutorial gives attendees a theoretical and practical introduction to Bayesian systems. Participants are provided with some basic theoretical background that is necessary for developing and understanding Bayesian systems. Theory will be balanced with hands-on experience in the construction of simple Bayesian systems (with an emphasis on Bayesian belief networks). Database requirements and evaluation techniques to assess the systems' accuracy will be discussed. A demonstration of more complicated Bayesian models as well as systems currently in use, gives participants an idea how and where systems can be applied. To participate in the hands-on exercises participants need to bring an IBM-compatible laptop with a fully charged battery.

**By the end of the tutorial, participants will be able to:**

- Understand the theoretical background of probabilistic reasoning
- Review of existing Bayesian systems and understanding their advantages and disadvantages
- Become familiar with the requirements for building, implementing and evaluating Bayesian systems

**Outline of Topics:**

- Introduction to Bayesian systems
- Technical Background including Bayes theorem
- Definitions for common terms
- Introduction to Netica, a Windows-based application for building Bayesian systems
- Basic software functionality
- Different models of Bayesian systems
- Performance and accuracy of decision support
- Evaluation of Bayesian systems
- Using databases for creating applications with Bayesian systems

**Intended Audience:** Scientists, researchers; physicians, nurses and other health care professionals; system developers, and programmers.

**Content level:** 20% Basic, 50% Intermediate, 30% Advanced

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**T23: Primer Series**

**Ontologies in Biomedicine**

*Mark Musen, Stanford University and the National Center for Biomedical Ontology*

Ontologies are at the core of biomedical informatics. The ability to describe formally the entities in an application area and the relationships among those entities is a fundamental skill in informatics and an essential prerequisite to the development of complex software systems. From systems for annotating experimental data (such as the Gene Ontology), to large terminological systems (such as SNOMED), to descriptions of medical knowledge for decision support (such as in the case of guideline-based care), ontologies have become pervasive in biomedicine. This tutorial will provide an overview of what ontologies are and why they are important. Participants will learn to distinguish ontologies from controlled terminologies and from knowledge bases. They will learn how ontologies are used in biomedical practice and the role of informatics in the construction, management, and application of ontologies. Participants will learn about the role of ontologies in applications for decision support, electronic health records, information retrieval, knowledge management, and the Semantic Web.

**By the end of the tutorial, participants will be able to:**

- Know what ontologies are and how they are structured and developed
- Know about some important ontologies used in biomedical informatics
- Know how ontologies are used to build representative types of application systems in biomedical informatics

**Outline of Topics:**

- What is an ontology?
- Kinds of ontologies
- Applications of ontologies
  - Structured-data entry for EHR
  - Information retrieval
  - Data annotation and integration
  - Knowledge-based systems
- Languages for building ontologies
- Principles of ontology development
- Tools for building and managing ontologies
- Future trends
  - Collaborative ontology engineering
  - Model-Driven Architecture
  - The Semantic Web

**Intended Audience:** Scientists, educators, and researchers; Biomedical engineers and workers in bioinformatics; Administrators and CIOs; Computer scientists, system developers, and programmers; and Medical librarians and other information professionals.

**Content level:** 100% Basic

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**T24: EHR Series**

**Clinical Decision Support: A Practical Guide to Developing Your Program to Improve Outcomes**

*Jerome Osheroff, Thomson Reuters; Jonathan Teich, Brigham and Women's Hospital and Harvard University; Dean Sittig, University of Texas at Houston; Robert Jenders, UCLA School of Medicine*

This tutorial will provide attendees with a practical approach to developing and deploying clinical decision support (CDS) interventions that measurably improve outcomes of interest to a health care delivery organization. The following key steps, including overcoming barriers, will be examined in detail: selecting appropriate CDS goals and enhancing organizational structures needed for CDS success; surveying available organizational information systems pertinent to delivering CDS; selecting appropriate CDS interventions to accomplish the goals from a broad array of options; and developing and launching the interventions and measuring their effects. The systematic approach to CDS implementation will be presented in an interactive, case-oriented fashion, incorporating examples provided by tutorial leaders and participant's experiences.

**By the end of the tutorial, participants will be able to:**

- Understand a systematic approach to addressing key health care organizational goals through a clinical decision support program.
- Understand the broad range of potential clinical decision support interventions, and opportunities to use them to accomplish specific objectives.
- Describe individual techniques and considerations for overcoming organizational and technical barriers to successful clinical decision support.

**Outline of Topics:**

- A 6-step process for improving outcomes with CDS
- Key tasks and lessons for accomplishing each step in successful CDS implementation
- Case example of building a successful CDS program to accomplish your objectives using CDS program development worksheets
- Interactive discussion addressing questions you've always wanted to ask about CDS
- Developing an action plan to bring back to your organizations
- Overcoming organizational and technical barriers to successful CDS

**Intended Audience:** Individuals from health care organizations interested in CDS deployment, including both those contemplating and undertaking the process. Pertinent roles include those responsible for CDS such as managers and directors of clinical information systems, and clinicians and administrators associated with CDS projects. Representatives from organizations both with and without robust clinical information systems (e.g. EHR and CPOE). CDS researchers and CIS vendors will also find the material of interest.

**Content level:** 100% intermediate

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**T25: EHR Series**

**Paradigm Shift – A Fresh Approach to the EHR**

*William Stead, Vanderbilt University; Ed Hammond, Duke University Medical Center*

Interoperable health information is essential to engineering a system of healthcare delivery. However, a recent National Research Council (NRC) committee found "current efforts aimed at nationwide deployment of healthcare information technology will not be sufficient to achieve the vision of 21st century healthcare, and may even set back the cause" (Stead & Lin, 2009).

This tutorial introduces a fresh approach to achieving the goal of interoperable health information. The key is to shift the paradigm, from thinking of the electronic health record as a by-product of automating practice, to thinking of it as a visualization of signals accumulated about patients and populations across scales of biology, time and geography.

The participants will leave with an understanding of the gap between expectations for EHRs as the foundation of an engineered system of healthcare and the reality of today's deployed systems. They will appreciate the roots of this gap - a mismatch between the computational approach to today's EHRs and the nature of both the individuals those records are trying to describe and the clinical work they are trying to document. They will appreciate how the proposed shift in the paradigm has the potential to overcome this gap, breaking the EHR into its component parts, with the scope of each component and computational technique matched to the breadth of coverage and depth of function supported. These understandings will help them make decisions about how to deploy today's EHR technologies and when to look for alternative approaches.

### **By the end of the tutorial, participants will be able to:**

- Have an understanding of the splitter's view of the benefit of EHRs
- Have an understanding of the power of loosely coupled components when supporting different but overlapping roles
- Have an approach to breaking up the EHR problem to deliver benefit earlier and less expensively

### **Outline of Topics:**

- Granular benefit framework
  - Measurable quality or cost return
  - Changes required (Process, Role, Technology) for that return
  - Shortest path to that return
- Putting pieces together to gain speed and flexibility:
  - Case example: How decoupled PHRs and EMRs might work together
- Staging implementation of EHR components to deliver benefit in excess of cost
  - Examples of how this might be done in a mall practice or health system

**Intended Audience:** Individuals responsible for quality/cost improvement in a health system or responsible for implementing or developing information technology to enable those improvements.

**Content level:** 10% Basic, 80% Intermediate, 10% Advanced

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## **T26: Selected Topics Series**

### **Overview of Public Health Informatics**

*Laura Franzke, Centers for Disease Control and Prevention (CDC) National Center for Public Health Informatics (NCPHI)*

This tutorial will provide an overview of Public Health Informatics and will begin with a description of Public Health Informatics and the variations from medical and nursing informatics. An overview of the federal government's organizational structure as it pertains to Public Health Informatics will be provided with a description of Health and Human Services (HHS) Nationwide Health Information Network

(NHIN), and the Centers for Disease Control and Prevention's (CDC) National Center for Public Health Informatics (NCPHI) Public Health Information Network (PHIN). CDC's NCPHI strategy for educating and involving the public health community will be demonstrated during this tutorial, and CDC will also highlight its current and future research and programmatic initiatives. Finally, Public Health Informatics challenges, potential solutions, and next steps will be discussed. The faculty for this tutorial will feature several employees from CDC's NCPHI.

### **By the end of the tutorial, participants will be able to:**

- Describe the federal public health informatics structure and endeavors, national partners, and audience;
- Understand and describe the various public health initiatives;
- Explain the strategies to get involved at the federal level for public health informatics; and,
- List at least two Public Health Informatics challenges as well as next steps .

### **Outline of Topics:**

- Federal Infer-structure for Public Health Informatics
- Communities of Practice
- Workforce Development
- Standards
- Vocabulary & Messaging
- PHIN Certification
- Surveillance
- GRID technology
- Electronic Health Records
- Privacy
- Social & cultural acceptance of public health informatics

**Intended Audience:** Scientists; researchers; educators; physicians, nurses, and other health care professionals; and computer scientists, system developers, and programmers.

**Content level:** 30% basic; 50% intermediate; 20% advanced

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## **T27: Primer Series**

### **The eXtensible Markup Language (XML)**

*Gretchen Purcell Jackson, Vanderbilt Children's Hospital*

The eXtensible Markup Language (XML) is a standard for characterizing the content and structure of documents and data. Both standards organizations and technology groups have adopted this language. In health care, XML has been used for diverse applications from representing and exchanging patient data in medical record systems to publishing clinical knowledge in electronic information resources. This tutorial provides a rapid, but comprehensive introduction to the concept of markup languages and the syntax of XML.

Participants will learn to encode documents with the basic components of XML and to define information structures using document type definitions (DTDs) and schemas. Tools for processing and displaying XML documents, including cascading style sheets (CSS) and the eXtensible Style Language (XSL), will be described. Attendees will participate in short exercises to reinforce XML concepts, and the lessons will incrementally develop a small XML application. This tutorial will be valuable to individuals who are involved in sharing, distributing, or processing clinical information and want a thorough understanding of the syntax and functionality of XML.

**By the end of the tutorial, participants will be able to:**

- Understand and author simple to moderately complex documents using XML
- Define document structures using XML DTDs and schemas
- Format, display, and process information from XML documents using CSSs and XSL

**Outline of Topics:**

- Markup languages
- XML tags, elements, attributes, and entities
- Document type definitions
- XML schemas
- Well-formedness and validity
- Cascading style sheets (CSS)
- Extensible style language (XSL)
- XML development tools

**Intended Audience:** Scientists, educators, and researchers; physicians, nurses, and other health care professionals; biomedical engineers and workers in bioinformatics; computer scientists, system developers, and programmers; and medical librarians and other information professionals.

**Content level:** 25% Basic, 50% Intermediate, 25% Advanced

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**T28: Selected Topics Series**

**Clinical Classifications and Biomedical Ontologies: Terminology Evolution, Principles, and Practicalities**

*Christopher Chute, Mayo Clinic College of Medicine; James Cimino, NIH/National Library of Medicine*

Standardized terminologies and classification systems are an essential component of the information infrastructure that supports health care delivery and evaluation. Despite significant advances and increased motivation for the use of terminology systems, widespread integration of standardized terminologies into computer-based systems has not yet occurred. In this tutorial, we provide an overview of the state of the science related to terminologies and classification systems and demonstrate application of selected terminologies to a patient case study to highlight the strengths and weaknesses of various terminologies. Standardized

terminologies alone are insufficient to achieve semantic interoperability. Consequently, the tutorial will include content designed to elucidate the relationships among standards for terminologies, information models, messages, and document and record structures. In addition, we will demonstrate the use of advanced terminology tools that facilitate the use of standardized terms in computer-based systems and provide an overview of significant international and national initiatives related to terminology systems.

**By the end of the tutorial, participants will be able to:**

- Understand the motivation and challenges to standardized coding of clinical data from local, national, and international perspectives
- Identify a minimum of five desiderata for high-quality controlled terminologies and describe the extent to which existing controlled terminologies meet these desiderata
- Discuss the relationships among standards for terminologies, information models, messages, and document and record architectures and the role of advanced terminology tools in achieving semantic interoperability

**Outline of Topics:**

- Types of terminology systems
- National and international contexts (motivations and challenges) for the development and dissemination of terminologies and classifications
- Desiderata for high-quality controlled terminologies
- Overview of selected terminologies such as ICD, SNOMED CT, LOINC, NANDA and application to a patient case study
- Relationships among standards for terminologies, information models, messages, and document and record architectures
- Demonstration of advanced terminology tools and discussion of their role in achieving semantic interoperability
- International and national initiatives

**Intended Audience:** Scientists, educators, and researchers; Physicians, nurses, and other health care professionals; Computer scientists, system developers, and programmers.

**Content level:** 50% Basic, 50% Intermediate

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**10:00 AM-10:30 AM COFFEE BREAK**

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**1:00 PM-3:00 PM PLENARY**

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**Opening Session and Keynote Presentation**

**Mark D. Smith**

*President and CEO, California HealthCare Foundation*

*(for more information on Mark Smith, please see page 3)*

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## 3:30 PM-5:00 PM SCIENTIFIC SESSIONS

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### S01 - Panel

*Theme: 20/20 Global e-Health Informatics Capacity Building*

#### **Experiences and Challenges in Global Health Informatics**

*A. Advani, Children's Hospital Boston and CDC; S. McNabb, CDC; A. Kanter, Columbia University; T. Kass-Hout, InSTEDDT; C. Safran, Beth Israel Deaconess Medical Center*

We present four panel presentations around the theme of the experiences and challenges of global health informatics. Dr. McNabb will discuss a project of the Global Public Health Informatics Program of The National Center for Public Health Informatics at the Centers for Disease Control and Prevention called the Saudi Arabia National Guard Electronic Disease Surveillance Systems (NGEDSS). Dr. Kanter will discuss the Millennium Global Village-Network (MGV-Net) which was first conceived as a multi-lingual, multi-national health information, research and communications network to support the Millennium Villages Projects in ten countries throughout Africa. Dr. Kass-Hout will discuss a project on mobile e-health in the Mekong Basin of Southeast Asia for the detection and reporting of public health events. Dr. Safran will discuss the clinical computing environment in Dubai, the state of diabetic care in Dubai, and their informatics strategy to support the new Joslin Dubai Diabetes Center.

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### S02 - Panel

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **A Model for Sharing Knowledge and Tools for Clinical Decision Support Driven by a Use Case Requiring Interoperable Delivery in the AHLTA Environment: A Collaborative Partnership of the Morningside Initiative with the Department of Defense**

*D. Fridsma, Arizona State University; E. Fry, Balboa Naval Medical Center; M. Goldstein, GRECC, VA Palo Alto Health Care System; P. Haug, University of Utah; R. Greenes, Arizona State University*

Many organizations have developed clinical decision support (CDS) content, but sharing of the work among different organizations has been limited. Several groups are exploring the many reasons for these collaborative difficulties. The Morningside Initiative is a public-private partnership to develop a model for generalizing, sharing, and reusing best available clinical decision support content. The Knowledge Management Repository (KMR) project a research program sponsored by the Department of Defense seeking to develop the infrastructure required for the Military Health System to accept and execute computable guidelines within its runtime environment.

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This panel describes a unique collaboration between the Morningside Initiative and the KMR project to combine their initiatives to jointly determine the functional requirements developing interoperable CDS capabilities. We describe the current implementation, its relationship to the National Health Information Network (NHIN) infrastructure, and the goal of demonstrating a functional prototype using the Department of Defense clinical data repository and bedside client.

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### S03 - Panel

*Theme: Clinical Research Informatics*

#### **Development, Selection, and Adoption of Clinical Research Eligibility Representation Standards and Screening Methods: Current and Future Directions**

*J. Niland, City of Hope National Medical Center; G. El Saadawi, University of Pittsburg School of Nursing; C. Weng, Columbia University; V. Huser, Marshfield Clinic/Univ. of Wisconsin-Madison; J. Jones, Intermountain Healthcare; R. Richesson, University of South Florida College of Medicine*

Recruitment for clinical trials remains a challenging and costly aspect of clinical research. Automated programs that can identify potentially eligible subjects to maximize recruitment and decrease associated costs are attractive to groups that are conducting clinical trials - especially as the size and scope of Electronic Medical Record (EMR) data continues to increase. Patients and their families also desire more efficient rapid mechanisms to identify potential trials that may benefit them. Automating the process of matching patients to available trials will require standardized representations for eligibility criteria. This panel will characterize the emerging work on representing eligibility standards in a manner that allows computer-based decision support for subject recruitment. Speakers will address the current status of standards development and adoption. The features and use of applications for standardized clinical research eligibility criteria will be described. Additionally, the panel will propose a research agenda for the AMIA Clinical Research Informatics Working Group that will increase the utility and adoption of study recruitment standards and systems that process EMR data relative to protocol-specific eligibility criteria.

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### S04 - Panel

*Theme: Policy and Ethical Issues*

#### **Can the Economic Stimulus and Other National Programs Lead to Better Health Quality through HIT? Progress and Update from Program Leaders**

*J. Teich, Elsevier and Harvard University; C. Friedman, Department of Health and Human Services; F. Eisenberg, National Quality Forum; J. White, AHRQ; M. Leavitt, Certification Commission for Health Info Technology*

The American Recovery and Reinvestment Act (ARRA), commonly known as the economic stimulus act, has generated great interest and activity among health care providers, the informatics community, quality and safety organizations, the health care information technology (HIT) industry, and more. Its significant funding and wide-ranging provisions for

enhancing HIT's role in improving healthcare quality - such as incentive payments for "meaningful" EHR use, implementation guidance, research priorities, informatics training, security and confidentiality - are altering research, business, and adoption agendas across the country. Other legislation and national programs, including additional research funding opportunities and efforts to improve access to clinical guidelines, have further increased this attention. Fully understanding the provisions of these programs, and keeping track of the many workstreams that come from them, are difficult for any individual. What are the important developments that have occurred since the passage of ARRA and other programs, and what steps are planned for the next year? In this panel, leaders from some of the most centrally involved agencies and organizations - ONC, NQF, CCHIT, and AHRQ - present their perspectives on the current status of these programs, progress and pitfalls, and take a look at the road ahead.

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### **S05 - Papers: Advances in Predictive Modeling**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **Using Bayesian Networks and Rule-based Trending to Predict Patient Status in the Intensive Care Unit**

*C. Crump, S. Saxena, B. Wilson, P. Farrell, AFrame Digital, Inc.; A. Rafiq, Virginia Commonwealth University; C. Silvers, Children's Hospital Informatics Program*

#### **ICU Acuity: Real-time Models versus Daily Models**

*C. Hug, P. Szolovits, Massachusetts Institute of Technology*

#### **Uncovering the Predictive Value of Minimum Blood Glucose Through Statistical Analysis of A Large Clinical Dataset**

*Y. Zhang, Harvard-MIT*

#### **Early Prediction of Reading Disability using Machine Learning**

*H. Varol, S. Mani, D. Compton, L. Fuchs, D. Fuchs, Vanderbilt University*

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### **S06 - Papers: Users and Uses of Clinical Data Systems**

*Theme: Consumer Informatics and PHRs*

#### **Cancer Patients' Patterns of Use of an Internet System to Support them in Illness Management**

*C. Ruland, Oslo University Hospital; A. Krahn, T. Andersen, Oslo University Hospital, Rikshospitalet*

#### **Use of Clinical Alerting to Improve the Collection of Clinical Research Data**

*K. Haerian, J. McKeeby, G. Dipatrizio, J. Cimino, NIH Clinical Center*

#### **Exploring Variation in User Adoption of Personalized Risk Calculator Estimates**

*C. Harle, University of Florida*

### **Using Electronic Data Sources to Understand the Determinants of Psychiatric Visit Non-Adherence**

*P. Alafaireet, H. Houghton, Y. Gong, University of Missouri*

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### **S07 - Papers: Integrating Clinical Data**

*Theme: Data Integration and Exchange*

#### **Architecture of a Federated Query Engine for Heterogeneous Resources**

*R. Bradshaw, S. Matney, O. Livne, B. Bray, J. Mitchell, S. Narus, University of Utah*

#### **Two Approaches to Integrating Phenotype and Clinical Information**

*A. Burgun, Laboratoire d'Informatique Medicale; F. Mouglin, LESIM; O. Bodenreider, U.S. National Library of Medicine*

#### **Supporting Retrieval of Diverse Biomedical Data using Evidence-aware Queries**

*E. Cadag, P. Tarczy-Hornoch, University of Washington*

#### **Care Coordination and Electronic Health Records: Connecting the Medical Home with the Rest of the Village**

*I. Graetz, Kaiser Permanente and UC Berkeley; M. Reed, Kaiser Permanente; T. Rundall, UC Berkeley; J. Bellows, J. Hsu, Kaiser Permanente*

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### **S08 - Papers: Natural Language Processing and Data Mining**

*Theme: Data Mining, NLP, and Information Extraction*

#### **Semantic Relations for Problem-Oriented Medical Records**

*O. Uzuner, Middle East Technical University, Northern Cyprus Campus; J. Mailoa, T. Sibanda, MIT*

#### **Mayo Clinic Smoking Status Classification System: Extensions and Improvements**

*S. Sohn, Mayo Clinic; G. Savova, Mayo College of Medicine, Mayo Clinic*

#### **Semantic Relations for Interpreting DNA Microarray Data**

*D. Hristovski, University of Ljubljana, Medical Faculty; A. Kastrin, B. Peterlin, University Medical Centre; T. Rindflesch, National Library of Medicine*

#### **Perplexity Analysis of Obesity News Coverage**

*D. McFarlane, N. Elhadad, R. Kukafka, Columbia University*

**S09 - Papers: Tools for Simulation in Public Health**  
Theme: Public Health Informatics and Biosurveillance

**Interactive Agent Based Modeling of Infectious Disease: Decision Making in Public Health**

A. Parks, University of Utah; W. Pettey, University of Utah School of Medicine; J. Benuzillo, VA Health Care Salt Lake City; J. Grant, University of Alaska - Anchorage; P. Gesteland, B. Walker, F. Drews, University of Utah; M. Samore, SLCVA/Univeristy of Utah

**Impact of Precautionary Behaviors During Outbreaks of Pandemic Influenza: Modeling of Regional Differences**

J. Ekberg, H. Eriksson, Linköping University; M. Morin, VSL Research Labs; E. Holm, M. Strömberg, Umeå University; T. Timpka, Linköping University

**Assumptions Management in Simulation of Infectious Disease Outbreaks**

H. Eriksson, Linköping University; M. Morin, VSL Research Labs; J. Ekberg, Dept. of Medicine and Health Sciences; J. Jenvald, VSL Research Labs; T. Timpka, Linköping University

**The Development and Validation of a Simulation Tool for Health Policy Decision Making**

S. Panchanathan, D. Petitti, D. Fridsma, Arizona State University

**S10 - Papers: Terminologies and Ontologies**  
Theme: Terminology and Standards

**Comparing and Evaluating Terminology Services APIs: RxNav, UMLS, and LexBIG**

J. Pathak, Mayo Clinic; L. Peters, National Library of Medicine; C. Chute, Mayo Clinic; O. Bodenreider, National Library of Medicine

**iSMART: Ontology-based Semantic Query of CDA Documents**

S. Liu, Y. Ni, J. Mei, H. Li, G. Xie, G. Hu, H. Liu, X. Hou, Y. Pan, IBM China Research Laboratory

**Collaborative Authoring of Biomedical Terminologies Using A Semantic Wiki**

S. He, University of Utah; S. Nachimuthu, S. Shakib, L. Lau, 3M HIS

**A Network-theoretic Approach for Translation across Open Biological Ontologies**

C. Patel, Columbia University; J. Cimino, NIH Clinical Center

**5:00 PM-7:00 PM INNOVATION & INFORMATION CENTER**

**Welcome Reception – Innovation & Information Center Open**

Registrants are invited for hors d'oeuvres and a cash bar in the Innovation & Information Center. This provides an opportunity to see the exhibits and the first networking opportunity.

**5:30 PM-7:00 PM BUSINESS MEETINGS**

**Dental Informatics WG Business Meeting**

**Formal (Bio)Medical Knowledge Representation WG Business Meeting**

**Knowledge Discovery and Data Mining WG Business Meeting**

**People and Organization Issues WG Business Meeting**

**Pharmacoinformatics WG Business Meeting**

**6:30 PM-7:30 PM SPECIAL EVENTS**

**ACMI Reception**  
(by invitation)

**7:30 PM-10:00 PM SPECIAL EVENTS**

**ACMI Dinner and Induction of Fellows**  
(by invitation)

**7:30 PM-10:00 PM BUSINESS MEETINGS**

**Student WG Business Meeting**

# MONDAY, NOVEMBER 16

7:00 am-7:00 pm  
7:00 am-8:15 am  
8:30 am-10:00 am

**Registration Open**  
**Committee Meetings (Awards, Ethics, Finance, Meetings, Working Group Steering)**  
**Semi-plenary Sessions**

S11 Address from AMIA President and CEO  
S12 National eHealth Collaborative – Setting National Priorities for HIT

10:00 am-10:30 am  
10:30 am-12:00 pm

**Coffee Break**  
**Scientific Sessions**

S13 Informatics Roles in Industry: What are they and How to Succeed?  
S14 Accelerating the Translation of Knowledge into Clinical Decision Support: Three National Demonstration Projects  
S15 Advancing Integration Between the Biomedical Informatics and Clinical and Translational Science Communities  
S16 Reflecting on the CCHIT Experience: How Far Have we Come?  
S17 Evaluation of Decision Support Systems  
S18 User Perspectives on Health Information Systems  
S19 Structuring Data to enhance Clinical System Use  
S20 Applications of Natural Language Processing  
S21 Data and Communication Patterns in Communities and Populations  
S22 Collaborative Technologies  
LB1 Late Breaking Session

10:00 am-1:30 pm  
10:30 am-1:30 pm  
12:30 pm-1:30 pm  
1:45 pm-3:15 pm

**Innovation & Information Center Open**  
**Poster Preview (Poster Session 1)**

**Keynote Address – David Blumenthal**

**Scientific Sessions**

S23 The Role of Informatics in Commercial Industry: How Does Informatics Add Value?  
S24 Interdisciplinary Communication and Patient Safety: Fall and Injury Prevention across the Care Continuum  
S25 Access Policies for Clinical Data Repositories  
S26 National Center for Public Health Informatics (NCPHI) and its Board of Scientific Counselors (BSC): Roles, Responsibilities, and Challenges  
S27 Analyzing Patient-Specific Data for Quality Improvement  
S28 Using Informatics to Manage Clinical Research  
S29 Training for Improved Consumer Health  
S30 Techniques for De-identification of Patient Data  
S31 Systems for User Education and Behavioral Change  
S32 Consumer Informatics and EHRs  
S33 ACMI Senior Member Presentations: Education and Training

3:15 pm-7:00 pm  
3:30 pm-5:00 pm

**Innovation & Information Center Open**

**Scientific Sessions**

S34 Advancing Transitional Care through Informatics Research, Development, and Applications  
S35 Phenotyping Using the Electronic Medical Record - Experiences from the eMERGE Network  
S36 Informaticians, Innovations, Opportunities and Challenges: The Science Behind the Sizzle.  
S37 Clinical Decision Support and Surveillance  
S38 Impact of Electronic Medical Records  
S39 Consumers as Users of Health Information Systems  
S40 Semantic Modeling and Mapping  
S41 Use of Electronic Medical Records  
S42 Advancement in the Use of SNOMED-CT  
S43 Partnerships in Innovation I  
LB2 Late Breaking Session

5:00 pm-6:00 pm  
5:00 pm-6:30 pm

**AMIA Mentorship Program In-person Meeting**  
**Committee Meetings (Education, Industry Advisory Council, 2010 Summit on Translational Bioinformatics Scientific Program)**

5:15 pm-7:00 pm  
5:30 pm-7:00 pm

**Poster Session 1**

**Working Group Business Meetings (Biomedical Imaging Informatics, Clinical Information Systems, Ethical, Legal, & Social Issues, Genomics, Nursing Informatics, Primary Care Informatics, Public Health Informatics)**

6:30 pm-7:30 pm  
6:30 pm-7:30 pm  
6:30 pm-10:00 pm  
7:30 pm-10:00 pm

**International Reception (by invitation)**

**Corporate Reception (by invitation)**

**JAMIA Editorial Board Meeting (Board members only)**

**Working Group Business Meetings (Clinical Research Informatics, Evaluation, Knowledge in Motion, Natural Language Processing, Open Source)**

**Clinical Research Informatics WG Expo (held in conjunction with the business meeting)**

## MONDAY, NOVEMBER 16, 2009

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### 7:00 AM-8:15 AM COMMITTEE MEETINGS

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**Awards Committee Meeting**

**Ethics Committee Meeting**

**Finance Committee Meeting**

**Meetings Committee Meeting**

**Working Group Steering Committee Meeting**

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### 7:00 AM-7:00 PM REGISTRATION OPEN

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### 8:30 AM-10:00 AM SEMI-PLenary SESSIONS

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#### S11 - Featured Session

##### **Address from AMIA President and CEO**

*Edward H. Shortliffe, President and CEO, American Medical Informatics Association*

Edward H. Shortliffe assumed the role of President & CEO of AMIA in July 2009. In this session he will describe his vision for the future direction of the organization. Dr. Shortliffe comes to AMIA from the University of Arizona, where he is Professor of Basic Medical Sciences, Professor of Medicine, and (at Arizona State University) Professor of Biomedical Informatics. Founding dean of the Phoenix campus of the University of Arizona's College of Medicine, he stepped down from his dean's role to return to the faculty in May 2008. Until March 2007 he was the Rolf A. Scholdager Professor and Chair of the Department of Biomedical Informatics at Columbia College of Physicians and Surgeons in New York City and was previously Professor of Medicine and of Computer Science at Stanford University (1979-2000). He spearheaded the formation of the Stanford graduate degree program in biomedical informatics in the early 1980s and throughout his Stanford career divided his time between internal medicine practice and biomedical informatics research. In January 2000 he assumed his new post at Columbia University, where he was also Deputy Vice President for Strategic Information Resources, Professor of Medicine, Professor of Computer Science, and Director of Medical Informatics Services for the New York-Presbyterian Hospital. Dr. Shortliffe's research interests include the broad range of issues related to integrated decision-support systems, their effective implementation, and the role of the Internet in health care.

Dr. Shortliffe is a founding member of AMIA and one of the five fellows who created the American College of Medical Informatics, elected in 1984. He is also an elected member of the Institute of Medicine of the National Academy of Sciences (where he has served on the IOM executive council), the American Society for Clinical Investigation, the Association of American Physicians, and the American Clinical and Climatological Association. Dr. Shortliffe has also been elected a Master of the American College of Physicians, a fellow of the American Association for Artificial Intelligence, and has authored over 300 articles and books in the fields of medical computing and artificial intelligence.

#### S12- Panel

*Theme: Policy and Ethical Issues*

##### **National eHealth Collaborative - Setting National Priorities for HIT**

*P. Tang, Palo Alto Medical Foundation; L. Evans, New York Department of Health; J. Glaser, Partners HealthCare; J. Tooker, American College of Physicians*

The National eHealth Collaborative (NeHC) is an independent, collaborative public-private organization that leads the creation and use of a secure interoperable nationwide health information system to advance the public's interest in health and the quality, safety, efficiency, and accessibility of health care. NeHC is structured as a voluntary consensus standards body to bring together consumers, the public health community, health care professionals, government, and industry to accelerate health IT adoption by providing a credible and transparent forum to help establish priorities and leverage the value of both the public and private sectors. As a public private partnership, it is able to reach broadly into all sectors of health care, including health professionals, government agencies, health systems, academic medicine, patient advocates, major employers, non-profits, technology providers, and others. A critical activity for NeHC is a national prioritization process built around the development and analysis of Value Cases: proposals which identify a specific information exchange, framework, process, or other breakthrough strategies that add value and increase the adoption and effective use of health IT.

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### 10:00 AM-10:30 AM COFFEE BREAK

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### 10:00 AM-1:30 PM INNOVATION & INFORMATION CENTER OPEN

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### 10:30 AM-12:00 PM SCIENTIFIC SESSIONS

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#### S13 - Featured Session

##### **Informatics Roles in Industry: What are They and How to Succeed?**

*Jaap Seurmondt, Hewlett-Packard; Dan Martich, University of Pittsburgh Medical Center; Steve Labkoff, Pfizer Inc; Joe Bormel, Quadramed; Jeff Rose, Ascension Health*

When leaving a career in medicine or academia to enter into the world of business, there are all kinds of things you need to know. When entering as a health care informatician, the equation gets even more complex. The panelists all are long time informaticians. They work across a wide array of industries that all have the use of information as a keystone of their businesses. The Panel will discuss their role at their companies from both an informatics and business perspective. They will discuss the capabilities they needed to develop to be successful in their positions. Additional emphasis will be placed on dealing with understanding corporate culture coming from an academic and/or a clinical career.

## S14 - Panel

Theme: *Clinical Decision Support, Outcomes, and Patient Safety*

### **Accelerating the Translation of Knowledge into Clinical Decision Support: Three National Demonstration Projects**

*B. Middleton, Partners HealthCare; R. Shiffman, Yale School of Medicine; R. Greenes, Arizona State University*

Electronic health records (EHRs), when used effectively, can improve the safety and quality of health care. For maximum benefit, however, EHRs must be paired with clinical decision support (CDS) systems to effectively influence physician behavior. Personal health records (PHRs) also provide the opportunity to incorporate CDS aimed at patients/consumers directly. Wider adoption of decision support has been held back by a variety of issues, including: a. Difficulty translating medical knowledge and guidelines into an executable form that can be used by EHRs and PHRs; b. Technical challenges in developing a standard representation for CDS content; c. Absence of a central knowledge repository where human readable and executable guideline knowledge can be shared and stored; d. Challenges in integrating decision support into the clinical workflow and other barriers to IT adoption; e. Limited capabilities for clinical decision support in commercially available EHR systems, or as yet in emerging PHRs. We will present the work of three initiatives targeted at accelerating the translation of knowledge into practice via clinical decision support in healthcare information technology (HIT): the CDS Consortium, GLIDES, and the Morningside Initiative. Lead investigators from each will provide an update on progress and identification of challenges as well as opportunities to coordinate activities.

## S15 - Panel

Theme: *Clinical Research Informatics*

### **Advancing Integration Between the Biomedical Informatics and Clinical and Translational Science Communities**

*P. Payne, The Ohio State University; S. Murphy, Massachusetts General Hospital; P. Embi, University of Cincinnati; M. Weiner, University of Pennsylvania; E. Bernstam, University of Texas Health Sciences Center at Houston*

With the emergence of clinical and translational science as a focal point of the national biomedical research enterprise, the role of informatics within that domain has become the topic of increasing interest. Programs such as the CTSA (Clinical and Translational Science Award) consortium have demonstrated the critical role of informatics platforms and techniques in terms of integrating and supporting complex, multidisciplinary research models and methods. However, the broader question of the role the informatics community should and must play throughout the clinical and translational science spectrum remains largely unaddressed. This panel will explore multiple facets of informatics as both an applied and basic science that is integral to advancing translational research, and how those characteristics influence its integration into the clinical and translational science community.

## S16 - Panel

Theme: *Terminology and Standards*

### **Reflecting on the CCHIT Experience: How far Have we Come?**

*P. Tang, Palo Alto Medical Foundation; M. Leavitt, Certification Commission for Health Info Technology; M. Dent, GE; D. Bates, Brigham and Women's Hospital; J. Starren, Marshfield Clinic Research Foundation; W. Stead, Vanderbilt University*

Certification of EHRs is now a major and increasing part of the Healthcare IT landscape in the US. The Certification Commission for Health Information Technology (CCHIT) represents the largest effort to date to certify EHRs. Launched in 2005 with the help of a 3-year contract from HHS, certification by CCHIT is accepted as a fact of life by most EHR vendors and clinicians. Enough time has passed that it is appropriate to ask some thought provoking questions: 1) What has been the experience to date of EHR developers, vendors, and users with regard to certification?; 2) What have been the impacts of certification, both positive and negative?; 3) How will the role of certification need to evolve under the American Recovery and Reinvestment Act? The panelists assembled look at these and other questions from the perspectives of: CCHIT itself, vendors, providers, internal developers, and the informatics community.

## S17 - Papers: Evaluation of Decision Support Systems

Theme: *Clinical Decision Support, Outcomes, and Patient Safety*

### **Examining the Relationship between Clinical Decision Support and Performance Measurement**

*D. Haggstrom, J. Saleem, VA HSR&D Center on Implementing Evidence-Based Practice; L. Militello, N. Arbuckle, University of Dayton Research Institute; M. Flanagan, Indiana University; B. Doebbeling, VA HSR&D Center on Implementing Evidence-Based Practice*

### **Provider Perceptions of Colorectal Cancer Screening Clinical Decision Support at Three Benchmark Institutions**

*J. Saleem, Veterans Health Administration; L. Militello, N. Arbuckle, University of Dayton Research Institute; M. Flanagan, Indiana University (IU) Center for Health Services & Outcomes Research; D. Haggstrom, Indianapolis VA; J. Linder, Brigham and Women's Hospital/Harvard Medical School; B. Doebbeling, Indiana University Center for Health Services & Outcomes Research; B. Doebbeling, Indianapolis VA*

### **A Clinical Use Case to Evaluate the i2b2 Hive: Predicting Asthma Exacerbations**

*S. Meystre, V. Deshmukh, J. Mitchell, University of Utah*

### **Generalized AMOC Curves For Evaluation and Improvement of Event Surveillance**

*X. Jiang, University of Pittsburgh; D. Neill, Carnegie Mellon University; G. Cooper, University of Pittsburgh*

## **S18 - Papers: User Perspectives on Health Information Systems**

*Theme: Consumer Informatics and PHRs*

### **Facilitating Consumer Clinical Information Seeking by Maintaining Referential Context: Evaluation of a Prototypic Approach**

*D. Lobach, Duke University; A. Waters, G. Silvey, S. Clark, Duke University Medical Center; S. Kalyanaraman, University of North Carolina; K. Kawamoto, I. Lipkus, Duke University Medical Center*

### **Building a Shared Vision for an Online Cancer Survivorship Community**

*J. Weiss, N. Lorenzi, Vanderbilt University Medical Center*

### **Video-mediated Communication in Hospice Interdisciplinary Team Meetings: Examining Technical Quality and Content**

*G. Demiris, University of Washington; D. Parker Oliver, University of Missouri; E. Wittenberg-Lyles, University of North Texas; K. Washington, University of Missouri*

### **"It's Time for your Life": How Should we Remind Patients to Take Medicines Using Short Text Messages?**

*W. Curioso, University of Washington and Universidad Peruana Cayetano Heredia; D. Quistberg, University of Washington; R. Cabello, Via Libre; E. Gozzer, P. Garcia, Universidad Peruana Cayetano Heredia; K. Holmes, A. Kurth, University of Washington*

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## **S19 - Papers: Structuring Data to enhance Clinical System Use**

*Theme: Data Integration and Exchange*

### **A Multi-lingual Web Service for Drug Side-effect Data**

*S. Bedrick, Oregon Health & Science University; A. Mauro, Hospital Italiano de Buenos Aires*

### **Using Clinical Questions to Structure the Content of a Web-based Information Resource for Primary Care Physicians**

*C. Norlin, University of Utah; L. Kerr, Utah Department of Health; R. Rocha*

### **Enhancing Laboratory Report Contents to Improve Outpatient Management of Test Results**

*K. Chang, J. Overhage, Regenstrief Institute; S. Hui, Indiana University School of Medicine; M. Were, Regenstrief Institute*

### **A Systematic Approach to Using Case Studies in Health Informatics Education**

*Y. Kagolovsky, K. Brillinger, Conestoga College Institute of Technology and Advanced Learning*

## **S20 - Papers: Applications of Natural Language Processing**

*Theme: Data Mining, NLP, and Information Extraction*

### **Detection of Blood Culture Bacterial Contamination using Natural Language Processing**

*M. Matheny, F. FitzHenry, Veterans Administration/Vanderbilt University, T. Speroff, Vanderbilt University; J. Hathaway, H. Murff, Veterans Administration; S. Brown, Vanderbilt University; E. Fielstein, R. Dittus, Veterans Administration; P. Elkin, Mount Sinai School of Medicine*

### **Development of a Natural Language Processing System to Identify Timing and Status of Colonoscopy Testing in Electronic Medical Records**

*J. Denny, Vanderbilt University; J. Peterson, N. Choma, H. Xu, R. Miller, L. Bastarache, N. Peterson, Vanderbilt University Medical Center*

### **Extract Medication Information from Clinical Narratives**

*H. Xu, Vanderbilt University; S. Stenner, S. Doan, Vanderbilt University Medical Center; K. Johnson, Vanderbilt University; L. Waitman, Vanderbilt University Medical Center; J. Denny, Vanderbilt University*

### **FigSum: Automatically Generating Structured Text Summaries for Figures in Biomedical Literature**

*S. Agarwal, H. Yu, University of Wisconsin - Milwaukee*

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## **S21 - Papers: Data and Communication Patterns in Communities and Populations**

*Theme: Public Health Informatics and Biosurveillance*

### **Supporting Creativity and Appreciation of Uncertainty in Exploring Geo-coded Public Health Data**

*S. Thew, A. Sutcliffe, O. De Bruijn, J. McNaught, R. Procter, I. Buchan, University of Manchester*

### **Network Analysis of Cancer Patients and Symptoms: Implications for Symptom Management and Treatment**

*S. Bhavnani, G. Bellala, A. Ganesan, R. Krishna, P. Saxman, C. Scott, M. Silveira, University of Michigan; C. Given, Michigan State University*

### **Social Network Analyses of Patient-healthcare Worker Interactions: Implications for Disease Transmission**

*A. Gundlapalli, University of Utah School of Medicine; X. Ma, J. Benuzillo, University of Utah; W. Pettey, University of Utah School of Medicine; R. Greenberg, J. Hales, M. Leecaster, University of Utah; M. Samore, SLCA/University of Utah*

### **Evaluation of a Prototype Search and Visualization System for Exploring Scientific Communities**

*M. Bales, D. Kaufman, S. Johnson, Columbia University*

## **S22 - Demonstrations: Collaborative Technologies**

*Theme: Public Health Informatics and Biosurveillance*

### **A Web Site for Informatics Implementation Lessons and Research Outcomes**

*B. Dixon, Regenstrief Institute; A. Zafar, Indiana University*

The Agency for Healthcare Research and Quality (AHRQ) has made a major investment in health information technology implementation and research, including the creation of a National Resource Center for Health IT (NRC). The primary goal of the NRC is to disseminate lessons learned and research outcomes from AHRQ-funded health IT projects. To effectively achieve its mission, the NRC created a public Web site (<http://healthit.ahrq.gov>). The site features up-to-date information on each AHRQ-funded project, and it synthesizes knowledge across the portfolio. Newer functionality includes the ability to download artifacts (e.g., surveys, decision support rules) created and used during the course of these projects. This web site has the potential to inform future informatics application implementation and research.

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## **LB1 Late Breaking Session**

*(to be announced)*

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### **10:30 AM-2:00 PM POSTERS**

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#### **Poster Session 1 Preview**

The poster preview runs from 10:30 am to 1:30 pm with attendance by authors optional and is designed to allow registrants to browse posters at their leisure. The poster session, with all authors present, will take place from 5:15 pm to 7:00 pm.

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#### **Theme: 20/20 Global e-Health Informatics Capacity Building**

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#### **Avatars: A Review of Their Use in Patient or Provider Education**

*K. Hopkins, H. Donovan, University of Pittsburgh; J. Osborn, Carnegie Mellon University*

#### **Connecting the One Laptop per Child (OLPC) Computer to the Internet: A Model for Developing Countries**

*K. Kasiviswanathan, University of Maryland; P. Fontelo, National Library of Medicine*

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#### **Theme: Clinical Decision Support, Outcomes, and Patient Safety**

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#### **Affect of an EHR Based Early Warning System for Potentially Critically Ill Ward Patients on Patient Outcomes**

*B. Aaronson, D. Stone, G. Fletcher, M. Schaft, D. McMahon, L. Nelson, University of Washington*

#### **"Smart" Electronic Discharge Summary to Improve Care of Heart Failure and Myocardial Infarction Patients at Discharge**

*A. Agrawal, I. McFarlane, S. Weiss, K. Rones, Kings County Hospital*

#### **A Fuzzy Logic-based Decision Support System for the Pathologic Diagnosis of Small B-cell Lymphomas**

*G. Arthur, M. Popescu, Y. Gong, C. Caldwell, University of Missouri*

#### **Improving Recognition of Children at Risk of Cardiopulmonary Arrest through EHR-Integrated Pediatric Rapid Response Team Activation Criteria**

*C. Bonafide, R. Keren, V. Nadkarni, The Children's Hospital of Philadelphia; J. Holmes, University of Pennsylvania School of Medicine*

#### **Laddering as a Technique for Ontology Evaluation**

*T. Bright, E. Furuya, Columbia University; G. Kuperman, Columbia University and NewYork-Presbyterian Hospital; S. Bakken, Columbia University*

#### **An Interface Solution for a Decision Support Tool for the Neonatal ICU**

*K. Cato, L. Currie, A. Wilcox, B. Sheehan, P. Graham, III, S. Trembowelski, Columbia University*

#### **A Bayesian Probability Model for Breast Ultrasound Elastography**

*M. Chih, A. Sommer, T. Hall, G. Sisney, L. Salkowski, E. Burnside, University of Wisconsin Madison*

#### **Risk of Hospitalization Among Patients Receiving Specialized Outpatient HIV Services: A New Risk Stratification Tool**

*C. Clark, R. Amarasingham, Parkland Health & Hospital System*

#### **Improving Mortality Prediction Among Patients with Subarachnoid Hemorrhage**

*G. Davidzon, L. Celi, Massachusetts General Hospital; M. Villarroel, Massachusetts Institute of Technology; W. Lester, Massachusetts General Hospital*

#### **An Electronic Tool to Improve Efficiency of Diagnosis Error Screening**

*R. El-Kareh, O. Hasan, C. Keohane, L. Rodman, G. Schiff, Brigham and Women's Hospital*

#### **Assessing Quality of a Hospital-wide Inpatient Glucose Management Program Using Glucometrics**

*J. Finkelstein, J. Dintzis, E. Cha, S. Golden, Johns Hopkins University School of Medicine*

#### **The Electronic Medical Records as a Tool for Assessment and Clinical Decision Support for Physiotherapeutic**

*C. Fronza, UNIFESP; F. Fronza, USP; A. Castro, D. Alves, UNIFESP*

**A Clinical Decision Support System to Reduce Prescribing of Warfarin-Interacting Antimicrobials**

*P. Greco, M. Eisen, S. Williams, N. Murphy, M. Constantiner, The MetroHealth System*

**An Informatics Oriented Taxonomy for Black Box Warnings (BBWs)**

*M. Ikezugu, E. Yang, A. Daghtani, Case Western Reserve University; D. Kaelber, The MetroHealth Center*

**The Renal Population Management System - a New Model of Specialty Care**

*B. Lee, Kaiser Permanente, Hawaii Region*

**A Command-line Interface for Antibiotic Prescribing at the Point of Care**

*R. Lucero, J. Muraskin, B. Sheehan, L. Currie, Columbia University*

**A Web-based Data Collection and Reporting System for Tracking Sepsis Bundle Compliance**

*C. Martial, N. Nelson, W. Watson, Intermountain Healthcare*

**Creating a Falls Reporting System Using Commercial Off-The-Shelf Technology**

*Y. Mei, J. Marquard, C. Jacelon, University of Massachusetts Amherst; B. MacDonald, A. DeFeo, Jewish Geriatric Services, Inc.*

**Evaluating the Effectiveness of Health Information Technology Using Community-based Participatory Research**

*L. Mercincavage, L. Kern, V. Patel, D. Amara, R. Dhopeswarkar, R. Kaushal, Weill Cornell Medical College*

**Designing a Data Collection System for Reporting, Analyzing, and Communicating Nurse-collected Rapid Response Team Data**

*N. Nelson, C. Martial, W. Watson, Intermountain Healthcare*

**Novel Representation of Clinical Information in the Intensive Care Unit Utilizing Context Specific Display/Dashboard.**

*B. Pickering, C. Trillo Alvarez, O. Gajic, V. Herasevich, Mayo Clinic*

**Assessment of an Integrated Drug/Disease Management System on Completeness of Drug Information in the Emergency Department**

*L. Poissant, University of Montreal; R. Tamblyn, A. Huang, M. Béique, McGill University*

**Implementation of Infobutton Functionality using HL7 Infobutton API: A Case Study with Clin-eguide™**

*L. Rasmussen, V. Huser, J. Starren, Marshfield Clinic Research Foundation*

**An Electronic Inference and Alerting Tool to Reduce Unnecessary Use of Urinary Catheters in Hospitalized Patients**

*M. Rubin, University of Utah; M. Rubin, VA Salt Lake City Health Care System; M. Samore, University of Utah; M. Samore, VA Salt Lake City Health Care System; C. Taylor, S. Sumner, K. Dascomb, Intermountain Medical Center; R. Kleckner, J. Lloyd, LDS Hospital; J. Jernigan, Centers for Disease Control and Prevention; J. Howell, University of Utah; S. Evans, Intermountain Healthcare*

**An Adaptive, Population-sensitive Trauma Triage Decision Support Model**

*D. Talbert, M. Honeycutt, A. Smith, Tennessee Technological University; S. Talbert, University of Central Florida*

**Comparative Effectiveness Information at the Point-of-Care Presented as Actual Pathways Integrated with Reference Maps of Medicine**

*M. Tringali, Regione Lombardia; M. Agnello, ASL Milano 2 - Melegnano; C. Cerra, M. Dellagiovanna, D. Montermini, ASL Pavia; A. Scocco, Scocco Consulting*

**Integration of a Touchscreen System for Patient Registration and Primary Care Data Collection with OpenMRS at Neno District Hospital, Malawi**

*E. Waters, Partners In Health; J. Rafter, R. Maganga, Baobab Health Partnership, Inc.; H. Fraser, Brigham & Women's Hospital; G. Douglas, Baobab Health Partnership, Inc.; D. Jazayeri, Partners In Health*

**Templated Notes: One Size Does Not Fit All**

*T. Windle, M. McCormick, S. Duffy, J. McClay, J. Windle, University of Nebraska Medical Center*

**Simple 2D Barcode Technology, Safer Patient Identity Verification**

*K. Wong, Hospital Authority*

**The First Step to Build A Patient Based Alert Information Structure for Clinical Decision Support - a Sampling Study**

*W. Wong, Health Informatics*

**Significant Variances Identification Method for Improving Clinical Pathways**

*S. Yui, H. Sasaki, T. Kamiyama, M. Morishita, A. Hashizume, Hitachi, Ltd.; H. Nagaoka, Hitachi Systems & Services, Ltd.; H. Ooyama, Y. Nagai, Y. Oka, Hitachi, Ltd.*

**Mitigating Malpractice Risk with Clinical Decision Support**

*G. Zuccotti, Partners Information Systems; F. Maloney, Partners HealthCare; L. Sato, CRICO/RMF; A. Wright, Brigham and Women's Hospital*

**Clustering to Create User Profiles of Clinical and Translational Researchers**

*S. Bakken, Y. Senathirajah, S. Johnson, Columbia University*

**Risk of Re-identification: Privacy Implications for Rare Mutation Data**

*C. Cassa, Harvard Medical School; K. Mandl, Children's Hospital Boston*

**Introducing On-line Repository of Questionnaires, Surveys, and Tools (ReQueST)**

*E. Cha, I. Yablochnikov, J. Finkelstein, Johns Hopkins University*

**Designing a Data Capture and Sharing Infrastructure for the Minnesota Congenital Heart Network.**

*S. Crow, O. Gajic, J. Dearani, H. Burkhart, Mayo Clinic; J. St Louis, University of Minnesota; V. Herasevich, Mayo Clinic*

**Resilience Enhancement: A Psychoeducational Intervention using Psychosocial and Physiological Heart Rate Variability Training to Improve Psychological Health in Rural OEF/OIF and other Veterans**

*R. Drury, T. Bates, Hot Springs VAMC; K. Anderson, School of Medicine; G. Csik, J. Flores, S. Fuentes, University of California; M. Gonzales, DHCS; H. Johl, M. Khalsa, P. Pannu, R. Pisk, W. Malyj, University of California; S. Tandon, Centers for Disease Control; M. Polusny, Minneapolis VA Medical Center*

**Validation of Treatment Indication Documented with an Electronic Prescribing System in Primary Care Setting**

*T. Eguale, R. Tamblyn, N. Winslade, J. Hanley, D. Buckeridge, McGill University*

**Lightweight Distributed XML-Based Integration of Translational Data**

*J. Franklin, L. Detwiler, J. Brinkley, University of Washington*

**Development of a Multi-Agent Simulation of a Level-One Trauma Center**

*J. Goodwin, University of Texas School of Health Information Science*

**Enhancing Quality of Healthcare Information System via Enhanced Requirement.**

*R. Haltam, UMIT*

**Patterns of Cooperative Search for Patient Data**

*D. Hanauer, K. Zheng, University of Michigan*

**Genomic Distance: A Mechanism for miRNA Regulation?**

*L. Hinske, Brigham and Women's Hospital; P. Galante, Ludwig Institute for Cancer Research; L. Ohno-Machado, Harvard Medical School*

**Direct Data Capture from PDA for Drug Compliance Checking**

*E. Kim, Inje University Busan Paik Hospital; E. Kim, Clinical Trial Center; E. Kim, E. Kim, E. Kim, Inje University Busan Paik Hospital*

**A Clinical Research Information System: Two Years Experience of Prospective Observational Study in Oncology**

*B. Leskosek, Faculty of Medicine*

**BiomarkerCard: A Knowledge-based System for Clinical Annotation of Biomarkers**

*V. López Alonso, F. Martín Sánchez, E. De Andrés, G. López Campos, L. Salamanca, Institute of Health Carlos III*

**Development of a Semantically Interoperable Disease Registry Framework**

*M. Natter, Children's Hospital Informatics Program; B. Adida, K. Mandl, Children's Hospital, Boston*

**Leveraging a Shared Ontology Service for Semantic Data Integration**

*M. Palchuk, Harvard Medical School; R. Frost, T. Bashor, VectorC; P. Trevett, K. Lee, T. Monaghan, M. Sullivan, M. Cervone, D. MacFadden, A. McCray, Harvard Medical School*

**Extending a Clinical Patient Portal for Research Data Collection**

*P. Siegler, L. Rasmussen, K. Jordan, P. Levande, E. Belongia, J. Starren, Marshfield Clinic Research Foundation*

**EHR Based Adaptation of a Prognostic Index for 4-Year Mortality in Older Adults**

*M. Synnestvedt, University of Pennsylvania*

**An ActiveX Component Developed Using C++ Boost, ATL and Win32 Hooks to Facilitate Building Javascript Desktop Applications With Uniform Integrated Interfaces (Mashups) to Disparate Underlying Oncology & Health Information Systems**

*F. Vali, K. Albuquerque, S. Nagda, E. Kielhorn, C. Chollet, S. Hernandez, N. Comsia, J. Roeske, Loyola Medical Center*

**A Comparison of Two Approaches for Identifying Negations in Radiology Reports**

*J. Womack, Veterans Health Administration; M. Scotch, Yale University; C. Gibert, George Washington University Medical Center and Veterans Affairs Medical Center; W. Chapman, University of Pittsburgh; M. Yin, Columbia University; A. Justice, C. Brandt, VA Healthcare System and Yale University*

**Information Management of Vast Volume of Patient Visits : A Case Study of Hospital Information System in West China Hospital of Sichuan University**

*M. Wu, University of Wisconsin-Milwaukee; J. Liu, J. Pu, R. Zhang, West China Hospital of Sichuan University*

**More Than a Database: How Informatics Can Foster Fidelity in Delivery of Behavioral Interventions and Translation to Future Clinical Settings**

*H. Zheng, M. Rosal, University of Massachusetts Medical School; C. Oatis, Arcadia University; W. Li, P. Franklin, University of Massachusetts Medical School*

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**Theme: Clinical Workflow and Human Factors**

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**Doctor-friendly Automated System to Reduce Patient Injury Due to Prescription Ordering and Filling Errors**

*W. Arensman, Southwest Research Institute; R. Jimenez, Santa Clara Valley Health & Hospital System; J. Wood, Southwest Research Institute; C. Ho, Santa Clara Valley Health & Hospital System; S. Mohanty, Southwest Research Institute*

**Review of In-hospital Cardiac Arrest Documentation**

*A. Au, B. Ross, F. Wolf, University of Washington*

**Embedded Handoff: The Influence of Provider Shift Change on Multi-professional Information Exchange during Patient Handoff between Units**

*M. Benham-Hutchins, Northeastern University*

**Interdisciplinary Communication of Common Goals in the ICU**

*S. Collins, L. Currie, Columbia University*

**Utilization of Usability Testing to Improve Training for a Tablet PC CPOE Application**

*J. Dawson, University of Victoria*

**A Knowledge Base of Referrals to Improve Electronic Communication: A Qualitative Approach**

*A. Esquivel, S. Hysong, Michael E. DeBaakey VA Medical Center; D. Sittig, University of Texas School of Health Information Sciences at Houston; D. Espadas, L. Wilson, M. Watford, H. Singh, Michael E. DeBaakey VA Medical Center*

**A Qualitative Study of the Electronic Medical Record**

*L. Grabenbauer, J. Windle, A. Skinner, University of Nebraska Medical Center*

**Mental Health Patient and Clinician Opinions about Changing from a Paper-based Record to an EMR**

*D. Hu, J. Nelan, Dartmouth-Hitchcock Medical Center*

**Computerized Patient Vital Signs Charting Method Enhances Real-time Record Keeping in ICU**

*P. Hu, S. Kahraman, A. Lindell, K. Liu, M. Mitrou, L. Gettings, D. Stein, Y. Xiao, University of Maryland Medical School*

**Inaccurate Clinical Documentation in an Electronic Health Record**

*K. Kehler, S. Rosenbloom, J. Snell, R. Ossoff, J. Jirjis, Vanderbilt University Medical Center*

**A Model for Predicting End User Acceptance and Use of HIT**

*K. Lesh, MITRE*

**A Usability Study of Transactional Electronic Diary: Results from Expert Evaluation to Participants Use**

*J. Lin, DHHS, M. Vahabzadeh, DHHS, NIH, National Institute on Drug Abuse; M. Mezghanni, Johns Hopkins Bayview Medical Center; D. Epstein, K. Preston, DHHS, NIH, National Institute on Drug Abuse*

**Problem List Usage with Observational Techniques**

*F. Maloney, Partners HealthCare; A. Wright, Brigham and Women's Hospital/Harvard Medical School*

**Applying Adoption Theory and Q-sort Methods to Human Factors Challenges in Handheld Sensor**

*M. Naiman, A. Boyd, A. Valenta, University of Illinois at Chicago*

**Development of an Agile Data-Anchored Workflow Modeling Methodology**

*P. Payne, T. Borlawsky, Ohio State University*

**Beyond Wikis for Open Source Software-Based Scientific Collaboration Web Sites**

*M. Rethlefsen, O. Gajic, V. Herasevich, Mayo Clinic*

**Discharge Procedures on a Geriatrics Service: Desiderata for an Electronic Geriatric Patient Discharge Assistant**

*S. Stenner, A. Ozdas, R. Miller, Vanderbilt University Medical Center*

**Making a Clinical IT System safe and usable by Usability Test**

*E. Tong, Hospital Authority*

**Barriers and Facilitators to Use of a Continuity of Care Document (CCD) in HIV/AIDS Care: Persons Living With HIV/AIDS (PLWH) and Health Care Provider Perspectives**

*D. Wantland, M. Odlum, R. Schnall, P. Teixeira, Columbia University; P. Gordon, E. Camhi, NewYork-Presbyterian; S. Bakken, Columbia University*

**Fitting Computerized Support into the Workflow: Enhancing Paper-based Cognitive Aid in a Pediatric Intensive Care Unit**

Y. Xiao, V. Vaidya, P. Hu, M. Kelemen, J. Martz, W. Chang, J. Straumanis, University of Maryland; P. Gorman, OHSU

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**Theme: Consumer Informatics and PHRs**

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**HealthATM: Interactive Services for Underserved Populations**

N. Botts, T. Horan, B. Thoms, Claremont Graduate University

**Consumers' Privacy and Security Preferences for Electronic Health Information**

R. Dhopeswarkar, Weill Cornell Medical College; H. O'Donnell, Children's Hospital at Montefiore; V. Patel, L. Kern, Y. Barron-Vaya, Weill Cornell Medical College; P. Teixeira, Columbia University; R. Kaushal, Weill Medical College of Cornell University

**Usability Testing on the Prenatal Genetic Education Program**

Y. Hsieh, Harvard-MIT

**Consumer Health Informatics: Components of Present and Future Possibilities**

C. LeRouge, C. Van Slyke, S. Vijaykuman, J. Niu, Saint Louis University

**Infobuttons Linked to Indivo, a Patient Controlled Health Record**

F. Liu, P. Fontelo, National Library of Medicine

**Tagging Web-based Health Content Using Terms From Health Behavior Theories to Provide Individually Tailored Recommendations**

J. Mark, S. Khan, R. Kukafka, Columbia University

**Understanding Cognitive and Social Barriers to Health Literacy in Older Adults**

L. Mathews, C. Chan, L. Currie, Columbia University; Q. Zeng, Harvard University Medical School; D. Kaufman, Columbia University

**Veterans use of the Internet for Health Related Information**

D. McInnes, Veterans Affairs; T. Wagner, Stanford University; L. Kazis, Boston University; A. Gifford, VA Bedford Medical Center; A. Gifford, Boston University School of Public Health

**Patient Attitudes Toward Electronic Data Entry of Symptoms: Survey Development and Preliminary Results**

D. Pieczkiewicz, P. Siegler, H. Liang, E. Belongia, J. Starren, Marshfield Clinic Research Foundation

**Asthma Symptom Diary Utilizing the iPhone Platform**

M. Rodriguez, J. Wood, J. Finkelstein, Johns Hopkins University

**Accuracy of Clinical Information Entered by Patients through Health Information Kiosks Compared to Patient Charts and Claims Data**

G. Silvey, J. Willis, J. Barbour, D. Lobach, Duke University

**Designing Personal Health Records for Parents of Infants: An Application Developed Using Google Health APIs**

B. Tulu, M. Mani, E. Archambault, K. Nariyshkin, Worcester Polytechnic Institute

**Requests for Cancer Information using the LiveHelp and E-mail Services: A Preliminary Analysis**

K. Wen, L. Fleisher, S. Raivitch, A. Corrigan, J. Kearney, S. Torres, Fox Chase Cancer Center

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**Theme: Data Integration and Exchange**

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**Toward a Comprehensive Knowledge Management Infrastructure for an Academic Healthcare Enterprise**

T. Borlawsky, T. Cain, J. Frost, D. Smaltz, Ohio State University

**Medication Categories in Pharmacy Dispensing Histories Delivered to an Ambulatory Clinic**

G. Cravens, L. Simonaitis, J. Overhage, Regenstrief Institute

**An Efficient Recursively Blocking Fellegi-Sunter Implementation for Automated Medical Record Linkage**

B. Eckart, J. Ey, D. Talbert, Tennessee Technological University

**Collaboration Process and Tools for Developing Clinical Content**

D. Goldman, D. Dubois, T. Hongsermeier, J. Lewis, L. Zhou, A. Barley, K. Tsivkin, S. Smith, R. Rocha, Partners Healthcare

**Development of a Portable Data Collection Tool for Improved Management of Patient Records: Establishing the Central Patient Care Database**

C. Jao, University of Illinois at Chicago

**Veterans Administration Data Extractor**

S. Martin, Veterans Administration

**The Consistency of Annotation Retrieval Systems: Uniprot to AffyProbeset**

K. McDade, U. Chandran, M. Sun, R. Day, University of Pittsburgh

**An Extensible Open Source Enterprise Master Person Index**

O. Pentakalos, Y. Xie, SYSNET International, Inc.

### **A Framework for Integrating Electronic Patient Record Systems**

*M. Rogers, S. Ghafoor, J. Graves, Tennessee Technological University*

### **Initial Experience with Opt-in Consent at the New York Clinical Information Exchange (NYCLIX)**

*J. Shapiro, Mount Sinai Medical Center; J. Bartley, MedPlus; G. Kuperman, New York-Presbyterian Hospital*

### **Pioneer Radiological Image Sharing Beyond Hospital Authority for Quality Patient-centric Care**

*J. Tan, Hong Kong Hospital Authority*

### **Identifying Acute Coronary Syndrome Rule-out Patients: Comparing the Effectiveness of the Presence of Troponin Testing With ICD-9 Codes**

*S. Vaidya, Columbia University; G. Kuperman, P. Lovett, New York Presbyterian Hospital; J. Shapiro, Columbia University and Mount Sinai Medical Center*

### **New York Care Connect: A Hospital-anchored Health Information Exchange for Community Physicians**

*A. Wilcox, Columbia University; J. Liss, C. Hilliman, New York Presbyterian Hospital*

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**Theme: Data Mining, NLP, and Information Extraction**

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### **Adding Automatically Generated Summaries to Biomedical Figures to Improve Literature Search**

*S. Agarwal, H. Yu, University of Wisconsin Milwaukee*

### **A Scalable Architecture for Medical Report Driven Information Retrieval**

*C. Arnold, UCLA; M. Davis, S. Knoop, D. Gruhl, IBM*

### **AskHERMES: An Online Clinical Question Answering System**

*Y. Cao, University of Wisconsin Milwaukee; J. Ely, University of Iowa; J. Cimino, NIH Clinical Center; C. Gaudioso, H. Yu, University of Wisconsin Milwaukee*

### **Natural Language Processing to Assess Venous Thromboembolism Risk**

*D. Dine, P. Stetson, Columbia University*

### **Exploring Active Learning in Medical Text Classification**

*R. Figueroa, Universidad de Concepción; Q. Zeng, Harvard University Medical School*

### **Creation Of A Natural Language Processing System Framework Using Propositional Logic To Represent Knowledge In Radiology**

*J. Friedlin, Regenstrief Institute; P. Jamieson, Logical Semantics*

### **Identifying Obesity and Co-morbidities from Medical Records**

*R. Guillen, California State University San Marcos*

### **Is there Added Value in Continuous Vital Signs and Video Collection linked to Trauma Patient Outcomes?**

*P. Hu, C. Mackenzie, Y. Xiao, S. Seebode, M. Wong, K. Murdock, R. Dutton, University of Maryland Medical School*

### **Automatically Assessing Evidence of Foot Exam for Diabetic Care by Natural Language Processing of Unstructured Electronic Clinical Notes**

*R. Kost, Fletcher Allen Health Care; E. Chen, B. Littenberg, J. Bond, University of Vermont, S. Pakhomov, University of Minnesota; S. Smith, Mayo Clinic Rochester*

### **Development of a Semantic Type Based WSD Tool**

*C. Lu, W. Rogers, MSD/LM/NLM/NIH; S. Humphrey, A. Browne, National Library of Medicine*

### **Development of an Automated Detection Tool for Healthcare-associated Infections Based on Screening Natural Language Medical Reports**

*M. Metzger, Q. Gicquel, Université Lyon 1; D. Proux, F. Segond, Xerox Research Centre Europe; S. Pereira, E. Serrot, Vidal; I. Kergourlay, S. Darmoni, University of Rouen*

### **Mining MRI Auditory Inner Canal Radiology Reports for the Detection of Vestibular Schwannomas**

*C. Morioka, UCLA Medical Informatics and VA Greater Los Angeles Healthcare System; F. Meng, G. Hathout, J. Huang, S. El-Saden, VA Greater Los Angeles; V. Bashyam, UCLA*

### **Automated Fleischner Classification of Lung Nodules by Text Processing of CT Reports: A Screening Tool for Follow-up of Suspected Lung Cancer**

*P. Mutalik, C. Brandt, Yale University School of Medicine; C. Taylor, F. Levin, VA Medical Center*

### **Hierarchical Modeling of the Inflammatory Pathway to Estimate Robust Genetic Predictors of Colorectal Cancer**

*D. Petrochilos, N. Abernethy, C. Ulrich, University of Washington; L. Hsu, C. Ulrich, Fred Hutchinson Cancer Research Center; R. Kulmacz, University of Texas*

### **Annotation Schema for Anaphoric Relations in the Clinical Domain**

*G. Savova, Mayo College of Medicine, Mayo Clinic; W. Chapman, M. Castine, R. Crowley, University of Pittsburgh; J. Zheng, Mayo Clinic*

### **Risk Modeling of Colorectal Cancer Using Machine Learning Algorithms on a Hybridized Genealogical and Clinical Dataset**

*D. Taylor, L. Cannon-Albright, University of Utah; R. Burt, University of Utah and Huntsman Cancer Institute; J. Jones, M. Williams, P. Haug, Intermountain Healthcare*

**Stability and Workload Index for Transfer (SWIFT) Score Calculation: Validating Accuracy of an Automatic Tool.**

*J. Vedre, B. Pickering, A. Hanson, O. Gajic, J. Farmer, V. Herasevich, Mayo Clinic*

**Implications of Differences in Disease Prevalence in Two Population-based Clinical Data Warehouses**

*C. Weng, Columbia University; A. Lai, Ohio State University*

**CitHit - An Automatic Citation Recognition System**

*Q. Zhang, Y. Cao, H. Yu, University of Wisconsin Milwaukee*

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**Theme: Education**

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**Online Information Prescriptions: Referring Patients with Metabolic Conditions to Genetics Home Reference**

*D. Beaudoin, N. Longo, J. Jones, J. Mitchell, University of Utah; R. Logan, National Library of Medicine*

**Professional Masters in Health Informatics: A Multidisciplinary Approach**

*J. Buerck, J. Smith, S. Slavin, G. Staines, H. Schmitz, C. Van Slyke, Saint Louis University*

**The Integration of Informatics in the Curricula of Nursing Schools**

*A. Cleveland, J. Philbrick, University of North Texas*

**POGOe: A National Repository of Geriatric Education Materials**

*J. Denny, G. Stein, R. Carnevale, P. Speltz, R. Miller, A. Spickard III, Vanderbilt University; R. Soriano, K. Sauvigne, Z. Hurd, J. Rajeski, R. Leipzig, Mount Sinai School of Medicine*

**Trends in Collaborative Approaches in Medical Informatics Over the Past Three Decades**

*Y. Dong, M. Rethlefsen, C. Chute, O. Gajic, V. Herasevich, Mayo Clinic*

**TB-SMS: A Short Messaging Service (SMS) Medication Reminder Application for DOTS**

*E. Ducut, F. Liu, P. Fontelo, National Library of Medicine; N. Quion, Children's National Medical Center*

**Informatics Education for Health Professionals**

*L. Franzke, L. Gibbs-Scharf, J. Anderton, CDC*

**Use of Cognitive Interviewing to Optimize Patient Comprehension of an EMR Generated After Visit Summary**

*J. Gossey, V. Shah, V. Pavlik, Baylor College of Medicine*

**Continuing Education in Informatics among Registered Nurses in the United States**

*M. Kleib, A. Sales, I. Lima, M. Baylon, A. Beath, University of Alberta*

**Comparing Users' Acceptance and Performance with Different Technical Learning Devices**

*Z. Lin, Tzu-Chi College of Technology*

**Profiling the Inpatient Experiences of Internal Medicine Residents: A Web-based Tool to Support Training in Practice-Based Learning and Improvement**

*J. Lyman, J. Voss, University of Virginia School of Medicine*

**Analysis of the ACEP-AMIA 10X10 Program to Train Emergency Physicians in Medical Informatics**

*J. McClay, UNMC; J. Nielson, Northeastern Ohio Universities College of Medicine; W. Hersh, Oregon Health & Science University*

**Literal Similarity of Report Assignments between Nursing and Radiologic Technology Major Students Based on tf•idf**

*N. Nishimoto, A. Yagahara, M. Uesugi, K. Ogasawara, Hokkaido University; Y. Yokooka, Clark Hospital, Japan*

**Prototype of a Regional Healthcare Knowledge Centre for Integrated Continuous Learning and Practice Improvement**

*M. Tringali, Regione Lombardia; M. Cavazza, EIPA-CEFASS*

**Promoting Safety and Effectiveness in Medical Interns Use of Clinical IT Systems by a Pre-internship Training Program**

*S. Wu, W. Wong, E. Tong, S. Tsang, T. Li, V. Fung, A. Sek, A. Tong, K. Wong, N. Cheung, Hospital Authority*

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**Theme: EHR and CPOE Systems**

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**Bellevue Hospital's Integrated EHR: Local Customization of a Vendor System for Signouts, Quality Reporting, and Online Documentation**

*J. Chelico, A. Elliott, NYU School of Medicine; M. Cantor, Pfizer, Inc.*

**Supporting Clinical Care and Improving Research Capabilities for the Multiple Sclerosis Population by Use of an Information Warehouse**

*S. Eaton, J. Kamal, OSU Medical Center; K. Rammohan, OSU College of Medicine*

**Measuring the Improvement in Time to Pain Reassessment via EMR**

*F. FitzHenry, J. Doran, M. Matheny, R. Blackwell, N. Wells, Vanderbilt University*

**Cohort Effect on Physician Adoption and Usage Patterns of a Mobile Accessible Clinical Portal in a Community Hospital**

*H. Hao, R. Padman, R. Telang, Carnegie Mellon University*

**Managing Changes of Health Information System by a Conflict Viewpoint**

*L. Hua, Y. Gong, University of Missouri*

**Provider Satisfaction with a New Electronic Health Record System**

*R. Kaushal, Weill Cornell Medical College and New York-Presbyterian Hospital*

**Automated Risk Assessment for Prediction of Pediatric Adverse Events**

*A. Kogelnik, A. Butte, Stanford University School of Medicine; P. Sharek, C. Longhurst, Lucile Packard Children's Hospital; J. Suermondt, HP Labs*

**An Implementation Strategy for EHR in Small Primary Care Offices: Incorporating Human Factors Engineering**

*S. Mendel, OHSU*

**Standardization of Health Care Delivery Processes: A Qualitative Study of the Effects of Electronic Health Record Systems**

*L. Pelletier, S. Johnson, D. Strong, B. Tulu, I. Bar-On, Worcester Polytechnic Institute; L. Garber, N. Kashyap, J. Trudel, Fallon Clinic*

**MedWISE: Clinical Mashups Development**

*Y. Senathirajah, S. Bakken, Columbia University*

**What's Age Got To Do With It? Provider Characteristics and Satisfaction with Electronic Health Records Among Primary Care Providers**

*A. Wilcox, P. Neri, L. Volk, H. Ramelson, Partners Healthcare; D. Williams, D. Bates, Brigham and Women's Hospital*

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**Theme: Informatics, Discovery, Innovation, and Industry**

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**Information Warehouse Process Improvement Using Lean Principles**

*S. Boinepally, M. Ostrander, Ohio State University Medical Center*

**A Breakthrough of Electronic Patient Record via Integration of Clinical Image For Better Clinical Care**

*J. Chan, Hospital Authority*

**uQuery: HIPAA-Compliant Web Query Tool for Retrieving Patient Clinical Data from a Data Warehouse**

*J. Ding, J. Liu, J. Kamal, The Ohio State University Medical Center*

**Cellular Automata Model to Consider the Effectiveness of Tuberculosis Vaccine in Different Stages of Life**

*C. Fronza, A. Castro, D. Alves, UNIFESP*

**Automated Medical Underwriting Program Evaluation**

*M. Islam, Nova Southeastern University*

**Personalized Nutrition and Medicine: A Venue for Long-Term High-Precision Heart Rate Variability Capture Augmented with GSR and Accelerometry**

*J. Kaput, FDA; K. Anderson, G. Csik, J. Flores, S. Fuentes, H. Juhl, M. Khalsa, P. Pannu, R. Pisk, W. Malyj, University of California; M. Gonzales, DHCS; S. Tandon, Centers for Disease Control*

**Patient Centered Design: Conceptually Modeling the Health Care Consumer**

*J. Ma, Saint Louis University*

**Association of Increased Admissions with the Extent of Hospital HIT Use**

*Y. Park, S. Speedie, University of Minnesota*

**A Drug Information Portal in Europe**

*S. Sakji, C. Letord, Biomedical Research Institute and CISMef, Rouen University Hospital; S. Pereira, CISMef, Rouen University Hospital; S. Pereira, Vidal, B. Dahamna, Biomedical Research Institute, B. Dahamna, CISMef, Rouen University Hospital; I. Kergourlay, Biomedical Research Institute and CISMef, Rouen University Hospital; S. Darmoni, Biomedical Research Institute and CISMef, Rouen University Hospital*

**Using Social Network Image Animator to Visualize Transformation of the Atlanta Clinical and Translational Science Institute's Collaboration Network**

*C. Tsui, T. Morris, I. Smith, Emory University*

**Generating a Matched Patient Control Set in a Clinical Data Warehouse**

*N. Wattanasin, Z. Peng, V. Gainer, C. Raine, A. Dubey, S. Murphy, Partners HealthCare System, Inc.; G. Weber, Harvard Medical School*

**Development of the Medical Mobile Phone with Emergency Rescue Functions (ER Keitai®)**

*Y. Yano, K. Hayashi, H. Kataoka, H. Kannan, K. Takamiya, University of Miyazaki*

## Theme: Policy and Ethical Issues

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### **Medical Evidence Information Flows for Disability Determination: An In-depth Claimant Perspective**

N. Lytle, Claremont Graduate University and California State University, San Bernardino; S. Feldman, T. Horan, Claremont Graduate University

### **"Green" Health IT**

T. Patton, University of Wisconsin

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## Theme: Public Health Informatics and Biosurveillance

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### **Understanding the Potential Role of Cell Phones and the Internet to Support Care for Diabetic Patients and Caregivers in Peru**

W. Curioso, University of Washington and Universidad Peruana Cayetano Heredia; E. Gozzer, M. Valderrama, J. Villena, A. Villena, Universidad Peruana Cayetano Heredia; J. Rodriguez-Abad, Voxiva

### **Acute Diarrheal Syndromic Surveillance Model and the Effect of Weather**

H. Kam, Ajou University, School of Medicine

### **Syndromic Surveillance through HIE: ROI or Altruism**

J. McGowan, Indiana University School of Medicine; S. Grannis, Regenstrief Institute

### **Biosurveillance Challenges and Grid Computing Architecture: AEGIS - A Case Study**

M. Mirza, S. Katz, Centers for Disease Control and Prevention; T. Savel, CDC; J. Stinn, BearingPoint; A. McMurry, K. Mandl, Children's Hospital Boston

### **Technical Development and Evolution of a Trauma Registry in the UAE**

S. Shaban, UAEU

### **A Novel Neural Network Approach for Real-Time RSV Outbreak Prediction**

N. Walton, J. Facelli, M. Poynton, P. Gesteland, C. Maloney, C. Staes, University of Utah

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## Theme: Terminology and Standards

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### **Evaluation of Conformity and Regularity of Structured Product Labels**

N. Agrawal, N. Rayner, D. Maier, Portland State University; R. Bhupatiraju, P. Gorman, OHSU

### **caBIG® Vocabulary Knowledge Center**

R. Freimuth, C. Nintemann, C. Chute, Mayo Clinic

### **Semantic Visualization of UMLS Chemical Intersection Types**

J. Geller, C. Morrey, Y. Perl, New Jersey Institute of Technology

### **Measuring Semantic Richness of Biomedical Ontologies Using OWL Constructs**

G. Jiang, C. Tao, C. Chute, Mayo Clinic

### **The HITSP Webinar Series: Translating for Widespread Adoption**

V. Lorenzi, The New York-Presbyterian Hospital/Columbia University; J. Duke, HCIC, LLC; R. Raiford, Eclipsys Corporation; G. Killian, Siemens Healthcare; S. Nachimson, Nachimson Advisors, LLC; W. Suarez, Kaiser Permanente/Public Health Data Standards Consortium

### **Use of Standard Vocabulary on the Environmental Public Health Tracking Network**

G. Namulanda, P. Wall, G. Kesarinath, CDC; S. Ganesan, SAIC Consultant to CDC

### **TermLink: A Web-based Service to Translate, Map and Link Multiple Biomedical Terminologies**

C. Patel, Columbia University; J. Cimino, NIH Clinical Center

### **An Approach for Representing Ontologies Modeled in LexGrid in OWL**

C. Tao, J. Pathak, H. Solbrig, C. Chute, Mayo Clinic

### **Mapping SNOMED CT Pharmaceutical and Biological Products to an Existing Clinical Drug Code Set**

M. Totzke, 3M-HIS

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## Theme: Translational Bioinformatics

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### **Goal-directed Design Applied: Evidenced-based R&D in the Genesis of Collaborative Grant-writing Software, GrantCentral**

J. Abbett, E. Pankey, W. Crawford, Children's Hospital Boston; D. MacFadden, A. McCray, I. Kohane, Harvard Medical School

### **Characterizing EHR Laboratory Data with Information Theoretic Predictability**

D. Albers, G. Hripcsak, Columbia University

### **Where's The Beef? Assessing Information Access in a Health Information Exchange**

C. Davison, K. Johnson, V. Estrin, J. King, K. Yang, L. Tang, M. Frisse, Vanderbilt University

### **Enhanced Image Computer Aided Detection of Intracranial Aneurysms**

K. Diedrich, J. Roberts, D. Parker, University of Utah

### **A Collaborative Research Portal for Clinical and Translational Science**

C. Finneran, D. Xu, G. Stevens, C. Laucher, J. Kamal, Ohio State University Medical Center; R. Rice, P. Payne, The Ohio State University; D. Smaltz, OSUMC

## 12:30 PM-1:30 PM PLENARY

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### Keynote Address

#### David Blumenthal

National Coordinator for Health Information Technology, US  
Department of Health and Human Services

(for more information on Dr. Blumenthal, see page 3).

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## 1:45 PM-3:15 PM SCIENTIFIC SESSIONS

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### S23 - Featured Session

#### The Role of Informatics in Commercial Industry: How Does Informatics Add Value?

Steven Labkoff, Pfizer Inc, Mike Cantor, Pfizer Inc, Jaap Seurmondt, Hewlett-Packard, Manuel Lowenhaupt, Accenture, and Joe Bormel, Quadramed

When you are part of a large business, you are measured by the value you bring your organization. As an informatician, value can be expressed in many different ways. This panel will explore how different industries value informatics in their business. Each speaker, an executive from an array of industries including: Biopharmaceuticals, Information Technology, Consulting and EHR Vendor, will describe how informatics plays a role in the industries represented, what their companies find valuable from informatics, and what kinds activities they perform as part of their job from an informatics point of view. They will also explore how the things they do drive business value.

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### S24 - Panel

Theme: Clinical Decision Support, Outcomes,  
and Patient Safety

#### Interdisciplinary Communication and Patient Safety: Fall and Injury Prevention across the Care Continuum

L. Currie, Columbia University; P. Dykes, Partners HealthCare; J. Murphy, Aurora Health Care; C. Weaver, Gentiva® Health Services; M. Reynolds, Trinity Health

Effective communication amongst the interdisciplinary team is critical for safe patient care across the care continuum. Nurses have historically been responsible for managing and monitoring patients at risk for falls and related injuries, however, all members of the team must be part of the fall prevention effort. Well-designed information and communication technologies have the potential to improve patient safety; however, challenges to using information technology to facilitate interdisciplinary communication across the care continuum persist. A model of communication in health care put forth by Coeira is the Communication Information Continuum. The overarching goal of the model is to identify the best tool to facilitate communication and information transfer at specific stages of individual and shared understanding (common ground). This panel will address the issues related to interdisciplinary communication across the care continuum for

fall and injury prevention in the context of patient safety and will present outcomes from each panel members' project. Using Coiera's Communication-Information Continuum to frame the problem, these four presentations will discuss barriers and facilitators to interdisciplinary communication across the care continuum for fall and injury prevention.

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### S25 - Panel

Theme: Clinical Research Informatics

#### Access Policies for Clinical Data Repositories

J. Cimino, E. Ayres, NIH Clinical Center; M. Kamerick, UCSF; S. Murphy, Partners HealthCare; A. Wilcox, Columbia University

Data collected as part of routine patient care are increasingly being viewed as valuable for supporting clinical research. However, the repurposing of these data raises a host of policy issues, including those related to patient privacy and data ownership. Many institutions across the country are now confronting these issues, especially as they apply for, and receive Clinical and Translational Science Awards (CTSA) from the NIH National Center for Research Resources. The purpose of this panel is to bring together representatives from leading academic healthcare institutions that have experience with developing and implementing policies that facilitate the reuse of clinical health record data for research purposes.

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### S26 - Panel

Theme: Public Health Informatics and Biosurveillance

#### National Center for Public Health Informatics (NCPHI) and its Board of Scientific Counselors (BSC): Roles, Responsibilities, and Challenges

N. Lorenzi, Vanderbilt University Medical Center; L. Lenert, Centers for Disease Control and Prevention; M. LaVenture, Minnesota Department of Health; C. Friedman, Department of Health and Human Services

This panel is designed to update participants on the roles, responsibilities, and challenges of creating the National Center for Public Health Informatics (NCPHI). It is also designed to share the roles, responsibilities, and challenges of the advising body (the Board of Scientific Counselors [BSC]) as it works to guide and support the creation and success of NCPHI.

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### S27 - Papers: Analyzing Patient-specific Data for Quality Improvement

Theme: Clinical Decision Support, Outcomes,  
and Patient Safety

#### Early Warning and Risk Estimation Methods based on Unstructured Text in Electronic Medical Records for Improving Patient Adherence and Care

J. Sairamesh, R. Rajagopal, 360Fresh; R. Nemana, CITRIS; K. Argenbright, Moncrief Cancer Resources

**Automating Quality Measurement: A System for Scalable, Comprehensive, and Routine Care Quality Assessment**

B. Hazlehurst, M. McBurnie, R. Mularski, Kaiser Permanente Northwest; J. Puro, S. Chauvie, OCHIN, Inc.

**A Highly Specific Algorithm for Identifying Asthma Cases and Controls for Genome-wide Association Studies**

J. Pacheco, P. Avila, J. Thompson, M. Law, J. Quraishi, A. Greiman, E. Just, A. Kho, Northwestern University; A. Kho, Regenstrief Institute, Inc

**A General Framework for Dose Optimization**

R. Turcott, H. Sagreya, E. Ashley, R. Altman, A. Das, Stanford University School of Medicine

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**S28 - Papers: Using Informatics to Manage Clinical Research**

Theme: Clinical Research Informatics

**Development and Evaluation of a Study Design Typology for Human Subjects Research**

S. Carini, University of California, San Francisco; B. Pollock, University of Texas Health Science Center at San Antonio; H. Lehmann, Johns Hopkins University; S. Bakken, Columbia University; E. Barbour, The Rockefeller University; D. Gabriel, University of California, Davis; H. Hagler, The University of Texas Southwestern Medical Center at Dallas; C. Harper, University of Texas Southwestern Medical Center; S. Mollah, The Rockefeller University; M. Nahm, Duke University; H. Nguyen, University of California, Davis; R. Scheuermann, The University of Texas Southwestern Medical Center at Dallas; I. Sim, University of California at San Francisco

**Embedding the Guideline Elements Model in Web Ontology Language**

N. Tran, Yale University; G. Michel, Yale Center for Medical Informatics; M. Krauthammer, Yale University; R. Shiffman, Yale Center for Medical Informatics

**Extracting Cancer Quality Indicators from Electronic Medical Records: Evaluation of an Ontology-based Virtual Medical Record Approach**

W. Lee, S. Tu, A. Das, Stanford University

**Semantic Reasoning with Image Annotations for Tumor Assessment**

M. Levy, M. O'Connor, D. Rubin, Stanford University

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**S29 - Papers: Training for Improved Consumer Health**

Theme: Consumer Informatics and PHRs

**An Evidence-based Decision Aid to Help Patients Set Priorities for Selecting Among Multiple Health Behaviors**

R. Kukafka, S. Khan, D. Kaufman, J. Mark, Columbia University

**GetHealthyHarlem.org: Developing a Web Platform for Health Promotion and Wellness Driven by and for the Harlem Community**

S. Khan, J. Ancker, J. Li, D. Kaufman, C. Hutchinson, Columbia University; A. Cohall, Harlem Health Promotion Center; R. Kukafka, Columbia University

**Experiences with Web Search on Medical Concerns and Self Diagnosis**

R. White, E. Horvitz, Microsoft Research

**Automatic Home Nursing Activity Recommendation**

G. Luo, C. Tang, IBM T.J. Watson Research Center

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**S30 - Papers: Techniques for De-identification of Patient Data**

Theme: Data Mining, NLP, and Information Extraction

**Inductive Creation of an Annotation Schema to Build a Reference Standard for De-identification of VA Electronic Clinical Notes**

J. Mayer, S. Shen, B. South, University of Utah; J. Friedlin, Regenstrief Institute; S. Meystre, W. Ray, University of Utah; M. Samore, SLCVA/University of Utah

**Using a Pipeline to Improve De-identification Performance**

F. Morrison, S. Sengupta, G. Hripcsak, Columbia University

**Toward a Fully De-identified Biomedical Information Warehouse**

J. Liu, S. Erdal, S. Silvey, J. Ding, J. Riedel, C. Marsh, OSU College of Medicine; J. Kamal, The Ohio State University Medical Center

**Assuring the Privacy and Security of Transmitting Sensitive Electronic Health Information**

C. Peng, SAIC; G. Kesarinath, National Center for Public Health Informatics/CDC, Tom Brinks, J. Young, D. Groves, SAIC

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**S31 - Papers: Systems for User Education and Behavioral Change**

Theme: Education

**TLC: An Informatics Approach to Enable Patients to Initiate Tailored Lifestyle Conversations with Providers at the Point of Care**

J. Li, S. Khan, J. Mark, P. Nivarthi, D. Kaufman, R. Misra, C. Chan, R. Kukafka, Columbia University

**From Prototype to Production: Lessons Learned from the Evolution of an EHR Educational Portal**

E. Borycki, B. Armstrong, A. Kushniruk, University of Victoria

**Improving Healthy Behaviors of Type 1 Diabetic Patients by Interactive Frameworks**

H. Kharrazi, Indiana University

## Is Web-only Self-care Education Sufficient for Heart Failure Patients?

A. Jovicic, M. Chignell, University of Toronto; R. Wu, University Health Network; S. Straus, Li Ka-Shing Knowledge Institute

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### S32 - Demonstrations

Theme: Consumer Informatics and PHRs

#### MyMedicationList & MyRxPad: Personal Medication Records in the Providers' Offices

S. Nelson, K. Zeng, J. Kilbourne, National Library of Medicine

MyMedicationList helps users manage their medication lists and make the records readily available when needed. MyRxPad helps prescribers lower some of the e-prescribing adoption barriers and encourages an early positive experience of e-prescribing. Both applications are developed at the National Library of Medicine. We present an integrated approach with personal medication records: patients play an active role in their health care by maintaining up-to-date and accurate medication lists. Prescribers make well-informed and safe prescribing decisions based on personal medication records contributed by patients. In particular, we demonstrate this collaborative approach between patients using MyMedicationList and physicians using MyRxPad.

#### MedWISE: A Highly Configurable Web 2.0 EHR Interface

Y. Senathirajah, S. Bakken, Columbia University

The complex, variable nature of health information system requirements and vendor-controlled development has resulted in systems that frequently neither reflect users' domain knowledge nor meet their needs. 'Web 2.0' approaches have transformed the commercial/public internet world. We previously described MedWISE, a 'web 2.0' EHR interface which allows users to create, select, configure, and share information, displays and tools, via simple drag/drop interfaces, without programmers. Possible advantages include greater suitability to user needs, incorporation of multiple information sources, interoperability, agile reconfiguration, capture of user tacit knowledge, efficiencies due to workflow and Human-Computer Interaction (HCI) improvements, and greater user acceptance.

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### S33 - ACMI Sponsored: ACMI Senior Member Presentations

Theme: Education

#### Informatics in the Era of ARRA: What Workforce is Needed and What Education and Certification Should They Have?

W. Hersh, Oregon Health & Science University

The American Recovery and Reinvestment Act (ARRA) of 2009 allocates substantial funding for incentives and other programs aimed to spur adoption of health information technology (HIT) to improve the quality and safety and reduce the costs of health care. Some, however, have expressed concern that this bolus of money could be wasted if the health care system is

not ready for HIT adoption. Part (though certainly not all) of that readiness will be to have a workforce capable of applying knowledge and best practices for that adoption. This talk will describe our current state of knowledge of the HIT workforce and its readiness to lead adoption. It will also describe existing and planned educational and certification initiatives in the United States and beyond.

#### The Silent Crisis

D. Covvey, University of Waterloo

Success in just about every area of human endeavor demands leaders and practioners with the appropriate knowledge, skills, experience, and attitudes - competencies. E-health requires professionals with competencies in a wide variety of domains. It's worth mentioning here that the huge technical challenges we faced in the early days of e-health have been superseded by humungous human-related challenges and many of our practioners are not prepared to deal with these. Without trained professionals we will waste great gobs of our money and huge amounts of time addressing the realities that confront us in ehealth. To address this challenge, we need to become more honest about our failures, in addition to our real successes. So far we have paid far too much lip service to the wonders and promises of technology and, in doing so, we have avoided some real opportunities for improvement. I examine the effects an inadequate complement of competent professionals and indicate what we must do to address the human resources crisis.

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### 3:15 PM-7:00 PM INNOVATION & INFORMATION CENTER

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### 3:30 PM-5:00 PM SCIENTIFIC SESSIONS

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#### S34 - Panel

Theme: Data Integration and Exchange

#### Advancing Transitional Care through Informatics Research, Development, and Applications

M. Weiner, Regenstrief Institute, Inc. and Indiana University Center for Aging Research; M. Peifer, Lehigh Valley Health System/Partners HealthCare; M. Were, Regenstrief Institute; A. Tien, Medical Decision Logic, Inc. and Johns Hopkins University School of Medicine; G. Nace, University of Illinois College of Medicine at Peoria

As patients traverse multiple sites of care, they experience transitions in places, providers, and plans of care. In parallel, their health care providers experience handoffs, which involve the transfer of duties and responsibilities. Transitions in care represent particularly weak junctures and are associated with increased risk of medical errors and adverse events for patients. Medical informatics offers hope to improve many of these transitions. Information technologies can help to transmit key follow-up information to the right provider at the right time. They can also assist in capturing patients' preferences and making them available when the patient presents for care. Such technologies can use electronic health records, can use standard protocols for transmitting and storing data, and

can facilitate research about transitional care. In this panel, four experts discuss their investigations, developments, and applications related to transitional care in diverse environments. They focus particularly, but not exclusively, on the transition from hospital to ambulatory followup care. Topics discussed include the following four areas: managing medications during patients' transitions, improving follow-up of laboratory tests, targeting patients receiving palliative care, and helping trainees to manage handoffs. This work has the potential to improve patient safety, quality of care, communication, and satisfaction with care.

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### **S35 - Panel**

*Theme: Data Mining, NLP, and Information Extraction*

#### **Phenotyping Using the Electronic Medical Record - Experiences from the eMERGE Network**

*P. Peissig, Marshfield Clinic Research Foundation; J. Denny, Vanderbilt University; C. Chute, Mayo Clinic; A. Kho, Northwestern University; D. Carrell, Group Health Center for Health Studies*

With the wide spread adoption of Electronic Medical Records, large amounts of clinical data are becoming available for research. The Electronic Medical Records & Genomics Network (eMERGE) consists of five leading institutions involved with Electronic Medical Record (EMR) phenotyping and biobanking. Each eMERGE institution has a different population and approach to phenotyping. These institutions include Group Health, Marshfield Clinic, Mayo Clinic, Northwestern University and Vanderbilt University. Each site has used electronic algorithms to identify both site-specific phenotypes as well as a network-wide phenotype (applied at all five sites) for genome analysis. Specifically, the panel will compare and contrast the biorepository populations, available EMR data sources, phenotyping approaches, algorithms and validation results. The panel will also discuss the limitations of each approach and present the lessons learned from this effort. By assembling representatives from each of these institutions into a single "expert" panel, others will be able to evaluate multiple approaches and identify trade-offs associated with each of the EMR phenotyping strategies with the eventual goal of developing "best practices" for their environment.

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### **S36 - Panel**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **Informaticians, Innovations, Opportunities, and Challenges: "The Science Behind the Sizzle."**

*F. Naeymi-Rad, IMO*

Learn new challenges and entrepreneurial opportunities available for informatics professionals. Panelists will share their experiences and highlights future opportunities and challenges. The panel will cover topics including the generation of ideas within an academic and corporate setting; the harvesting of intellectual property; the raising of capital; development of business plans; and the marketing and sale of disruptive technology. Each panel member will also provide you with their view of future entrepreneurship opportunities.

### **S37 - Papers: Clinical Decision Support and Surveillance**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **Computer Surveillance of Hospital-acquired Infections: A 25 year Update**

*S. Evans, Intermountain Healthcare; R. Abouzelof, Primary Childrens Hospital; C. Taylor, Intermountain Medical Center; V. Anderson, Alta View Hospital; S. Sumner, Intermountain Medical Center; S. Soutter, Primary Children's Hospital; R. Kleckner, LDS Hospital; J. Lloyd, Intermountain Healthcare*

#### **Development of an Asthma Management System in a Pediatric Emergency Department**

*J. Dexheimer, D. Arnold, T. Abramo, D. Aronsky, Vanderbilt University*

#### **Using Medication Data and Association Rule Mining for Automated Patient Problem List Enhancement**

*A. Wright, Brigham and Women's Hospital; E. Chen, University of Vermont; F. Maloney, Partners HealthCare*

#### **Implementing Broad Scale Childhood Immunization Decision Support as a Web Service**

*V. Zhu, S. Grannis, M. Rosenman, Regenstrief Institute; S. Downs, IU School of Medicine*

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### **S38 - Papers: Impact of Electronic Medical Records**

*Theme: Clinical Workflow and Human Factors*

#### **The Impact of Electronic Medical Records on a Clinical Quality Trigger Tool**

*M. Kahn, University of Colorado; D. Ranade, The Children's Hospital*

#### **Enhancing an Existing Clinical Information System to Improve Study Recruitment and Census Gathering Efficiency**

*F. Nkoy, University of Utah (Primary Children's Medical Center); D. Wolfe, J. Hales, Primary Children's Medical Center; G. Lattin, M. Rackham, C. Maloney, University of Utah*

#### **Impact of Prior Clinical Information in an EHR on Care Outcomes of Emergency Patients**

*N. Theera-Ampornpunt, S. Speedie, Institute for Health Informatics, University of Minnesota; J. Du, Division of Health Policy and Management, University of Minnesota; Y. Park, B. Kijsanayotin, D. Connelly, Institute for Health Informatics, University of Minnesota*

#### **Opportunities for Informatics to Improve Discharge Planning: A Systematic Review of the Literature**

*R. Archie, S. Boren, University of Missouri*

**S39 - Papers: Consumers as Users of Health Information Systems**

Theme: Consumer Informatics and PHRs

**Persuading Consumers to Form Precise Search Engine Queries**

G. Leroy, Claremont Graduate University

**Scenario-based User Testing to Guide Consumer Health Informatics Design**

T. Zayas Cabán, Agency for Healthcare Research and Quality; J. Marquard, K. Radhakrishnan, N. Duffey, D. Evernden, University of Massachusetts - Amherst

**A Taxonomy Characterizing Complexity of Consumer eHealth Literacy**

C. Chan, L. Matthews, D. Kaufman, Columbia University

**Residential Accessibility to Information Technology Retailers and Self Reported Computer use Among Patients Attending Community Clinics**

P. Robinson, M. Shaheen, J. Smith, D. Ryan, R. Baker, Charles Drew University of Medicine and Science

**S40 - Papers: Semantic Modeling and Mapping**

Theme: Data Mining, NLP, and Information Extraction

**The Evolution of MetaMap, a Concept Search Program for Biomedical Text**

A. Aronson, F. Lang, National Library of Medicine

**Predication-based Semantic Indexing: Permutations as a Means to Encode Predications in Semantic Space**

T. Cohen, R. Schvaneveldt, Arizona State University; T. Rindflesch, NLM

**A Large-scale Knowledge Management Method Based on the Analysis of the Use of Online Knowledge Resources**

G. Del Fiol, Duke University; J. Cimino, NIH Clinical Center; S. Maviglia, Partners HealthCare; H. Strasberg, Wolters Kluwer Health; B. Jackson, ARUP Laboratories; N. Hulse, Intermountain Healthcare

**S41 - Papers: Use of Electronic Medical Records**

Theme: EHR and CPOE Systems

**Persistent Paper: The Myth of "Going Paperless"**

R. Dykstra, J. Ash, Oregon Health & Science University; D. Sittig, University of Texas School of Health Information Sciences at Houston; E. Campbell, Oregon Health & Science University; K. Guappone, J. Carpenter, Providence Portland Medical Center; J. Richardson, Oregon Health & Science University; A. Wright, Brigham and Women's Hospital; C. McMullen, Kaiser Permanente Center for Health Research

**A Closer Look at Nursing Documentation on Paper Forms: Preparation for Computerizing a Nursing Documentation System**

H. Kim, P. Dykes, D. Thomas, L. Winfield, R. Rocha, Partners Healthcare System

**CISearch: What Do Clinicians Search for within the EHR?**

K. Natarajan, D. Stein, N. Elhadad, Columbia University

**Peripheral Activities during EMR Use in Emergency Care: A Case Study**

J. Abraham, T. Kannampallil, M. Reddy, The Pennsylvania State University

**S42 - Papers: Advancement in the Use of SNOMED-CT**

Theme: Terminology and Standards

**Using SNOMED CT in Combination with MedDRA for Reporting Signal Detection and Adverse Drug Reactions Reporting**

O. Bodenreider, U.S. National Library of Medicine

**Auditing SNOMED Relationships Using a Converse Abstraction Network**

D. Wei, New Jersey Institute of Technology; M. Halper, Kean University; G. Elhanan, New Jersey Institute of Technology; Y. Chen, Borough of Manhattan Community College, CUNY; Y. Perl, J. Geller, New Jersey Institute of Technology; K. Spackman, IHTSDO

**Detection of Underspecifications in SNOMED CT: Concept definitions Using Language Processing**

E. Pacheco, PUCPR; S. Schulz, H. Stenzhorn, University Medical Center Freiburg; J. Paetzold, AVERBIS GmbH; P. Nohama, PUCPR

**Assisting the Translation of SNOMED CT into French using UMLS and four Representative French-language Terminologies**

M. Joubert, Faculte de Medecine

**S43 - Partnerships: Partnerships in Innovation I**

Theme: Informatics Discovery, Innovation and Industry

**Innovative Partnering in Implementing Voice-assisted Care in Acute Care Settings: Moving from Vision to Testing to Reality**

M. Wilson, University of Maryland School of Nursing

Within the complex, nonlinear workflows of health care organizations, developing efficient mechanisms to obtain data that drives clinical, financial and operational improvements is a constant challenge. Recent advances in voice technology (speech recognition and synthesis) are making it possible to use this technology as a method of capturing data. Improved data capture helps increase quality, better manage risk, and reduce paperwork,

resulting in increased reimbursement. While physicians have experimented with voice in the past, nursing and allied clinicians have not. Working with Nurse Clinicians to utilize technology at the point of care requires a carefully orchestrated approach that further supports the adoption of technology. This presentation showcases how a technology development company, an academic institution and an acute care hospital partnered to test, trial and assess the impact of voice technology within an acute care environment. The trial provided valuable experience to the development company regarding the reception, response and acceptance of the technology by both graduate level students in a school of nursing and experienced RNs in an acute care hospital. The process resulted in outcomes that were useful for all parties, and also established a roadmap for successful voice deployment for nursing and allied clinicians at point of care

### **Use of Natural Language Processing to Extract Encoded Information From Notes in a Commercial Electronic Medical Record System**

*T. Payne, University of Washington; M. Ash, Cerner Corporation*

Nearly all inpatient notes and most outpatient notes are entered into an electronic medical record (EMR) within UW Medicine. Though this makes them available for review by authorized clinicians, much of the note content is in narrative text form. We are working with Cerner Corporation to use natural language processing (NLP) techniques to encode terms and phrases within notes with SNOMED CT, permitting use of note content for automated review and extraction. This is accomplished using an automated text tagging module governed by a rules engine to identify phrases of interest, improve performance of SNOMED CT tag assignment, handle negation, and other tasks. Our joint work also integrates NLP into workflow in nearly real-time, so that review of coding and interventions are practical within the current encounter if desired. Concepts identified using NLP are useful for quality measurement and improvement and for compliance purposes.

### **LB2 Late Breaking Session** *(to be announced)*

### **5:00 PM-6:00 PM SPECIAL EVENT**

#### **AMIA Mentorship Program**

For the second year, we will have a dedicated time for mentors and mentees of the AMIA Mentorship program to meet in person at the Annual Symposium. It will be an opportunity to connect closer and to work on the mentoring plan for the rest of the year. Mentees are suggested to have read Six Habits of Highly Effective Mentees. Please contact Chris Lehmann, MD (clehmann@jhmi.edu) with any questions.

### **5:00 PM-6:30 PM COMMITTEE MEETINGS**

**2010 Summit on Translational Bioinformatics SPC Meeting**  
**Education Committee Meeting**  
**Industry Advisory Council Meeting**

### **5:15 PM-7:00 PM POSTERS**

#### **Poster Session – 1**

The authors are present at this poster session. Posters and authors in this session are listed on page 39.

### **5:30 PM-7:00 PM BUSINESS MEETINGS**

**Biomedical Imaging Informatics WG Business Meeting**  
**Clinical Information Systems WG Business Meeting**  
**Ethical, Legal, and Social WG Business Meeting**  
**Genomics WG Business Meeting**  
**Nursing Informatics WG Business Meeting**  
**Primary Care Informatics WG Business Meeting**  
**Public Health Informatics WG Business Meeting**

### **6:30 PM-7:30 PM SPECIAL EVENTS**

**Corporate Reception** *(by invitation)*  
**International Reception** *(by invitation)*

### **6:30 PM-10:00 PM BUSINESS MEETINGS**

**JAMIA Editorial Board Meeting** *(Board members only)*

### **7:30 PM-10:00 PM BUSINESS MEETINGS**

**Clinical Research Informatics WG Expo and Business Meeting**  
**Evaluation WG Business Meeting**  
**Knowledge in Motion WG Business Meeting**  
**Natural Language Processing WG Business Meeting**  
**Open Source WG Business Meeting**

## TUESDAY, NOVEMBER 17

7:00 am-8:15 am

**Committee Meetings (ACMI Executive, International Affairs, Publications, 2010 Spring Congress Scientific Program)**

7:00 am-8:30 am

**CARING Breakfast (additional registration required)**

7:00 am-6:00 pm

**Registration Open**

8:30 am-10:00 am

**Semi-plenary Sessions**

S44 ONC Federal HIT Town Hall

S45 Year in Review

S46 The Future of Nursing Informatics: Technology Informatics Guiding Education Reform (TIGER)

10:00 am-10:30 am

**Coffee Break**

10:30 am-12:00 pm

**Scientific Sessions**

S47 Highlights from the Year in Review

S48 Governance for Clinical Decision Support

S49 A Framework for Clinical Research Standards: The BRIDG Project

S50 Spontaneous Electronic Adverse Event Reporting: Perspectives from Clinicians, EHR Vendors, Biopharma, and the FDA

S51 Implementation of Clinical Practice Guidelines

S52 Human Computer Interaction

S53 Issues in the Management of Personal Health Data

S54 UMLS-NLP

S55 Advancements in Information Retrieval

S56 Clinical Research and Discovery

LB3 Late Breaking Session

10:00 am-1:30 pm

**Innovation & Information Center Open**

10:30 am-1:30 pm

**Poster Preview (Poster Session 2)**

12:30 pm-1:30 pm

**State of the Association Meeting**

1:45 pm-3:15 pm

**Scientific Sessions**

S57 ONC-2

S58 Applications of Biomedical Informatics in Clinical Drug Development

S59 Applying Natural Language Processing in the Clinical Setting: an Overview

S60 Medical Vocabularies, Knowledge Representation and the Semantic Web – Best of Breed or a Recipe for Failure?

S61 Knowledge Management

S62 Modeling Temporal Data

S63 EMR Usefulness

S64 Evaluations of Biosurveillance Methods

S65 Genomic Tools and their Evaluation

S66 Management of Populations

S67 ACMI Senior Member Presentations

3:15 pm-7:00 pm

**Innovation & Information Center Open**

3:30 pm-5:00 pm

**Scientific Sessions**

S68 Clinical Informatics as Medical Specialty

S69 Electronic Self-management Support in the Community

S70 Careers in Medical Informatics: Perspectives from Recent Job Searches

S71 Informatics Opportunities and Challenges for Improving Drug Safety

S72 Decision Support for Prescribing Therapy

S73 Assessing Adoption and Acceptance of Information Technology

S74 Focus on Medication Management

S75 Information Retrieval

S76 Focus on Laboratory Data

S77 Partnerships in Innovation II

LB4 Late Breaking Session

5:00 pm-6:30 pm

**Committee Meetings (AMIA 2010 Annual Symposium Scientific Program, Membership, Public Policy)**

5:15 pm-7:00 pm

**Poster Session 2**

5:30 pm-6:30 pm

**ACMI Business Meeting**

5:30 pm-7:00 pm

**Working Group Business Meetings (Consumer Health Informatics, Education)**

6:30 pm-7:30 pm

**AMIA 2009 Scientific Program Committee Reception (by invitation)**

7:30 pm-9:00 pm

**Chairman's Club Reception (by invitation)**

9:00 p.m.-12:00 am

**Dance Party**

**TUESDAY, NOVEMBER 17, 2009**

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**7:00 AM-8:15 AM COMMITTEE MEETINGS**

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**2010 Spring Congress SPC Meeting**  
**ACMI Executive Committee Meeting**  
**International Affairs Committee Meeting**  
**Publications Committee Meeting**

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**7:00 AM-8:30 AM AFFILIATE EVENTS**

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**CARING Breakfast** *(additional registration required)*

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**7:00 AM-6:00 PM REGISTRATION OPEN**

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**8:30 AM-10:00 AM SCIENTIFIC SESSIONS**

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**S44 - Featured Session**

**Town Hall on ONC Strategic Initiatives**

Join the senior staff of the ONC to explore the initiatives and projects that are fundamental to the national health IT agenda: standards, certification, meaningful use and incentives, grants programs, and the Nationwide Health Information Network. This town hall will begin with a series of brief presentations to bring everyone up to date on the latest developments in each area, and will provide opportunity for questions from attendees and discussions.

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**S45 - Featured Session**

**Informatics Year in Review**

*Daniel Masys, Vanderbilt University Medical Center*

This popular session has become a regular feature of the Annual Symposium. This session will review a sample of notable events that have occurred in the past twelve months. Included will be new findings from the published literature, achievements in operational applications of informatics, changes in public policy and government, and emerging new technologies. The implications of these events for the future of bioinformatics, clinical informatics and health care will be addressed. Dr. Daniel R. Masys is Professor and Chair of the Department of the Department of Biomedical Informatics and Professor of Medicine at Vanderbilt University Medical Center.

**S46 - Featured Session**

**The Future of Nursing Informatics: Technology Informatics Guiding Education Reform (TIGER)**

*Marion Ball, IBM, Patricia Flatley Brennan, University of Wisconsin-Madison, Connie Delaney, University of Minnesota, Patricia Hinton Walker, Uniformed Services University of the Health Sciences, and Heimar Marin, Federal University of Sao Paulo*

Technology Informatics Guiding Education Reform (TIGER) is working to help the United States realize its 10-year goal of electronic health records for all its citizens. TIGER, which started as a grass-roots initiative, now involves over 70 professional nursing organizations, vendors, and government entities. The TIGER Initiative aims to enable practicing nurses and nursing students to fully engage in the unfolding digital electronic era in health care. The purpose of the initiative is to identify information/knowledge management best practices and effective technology capabilities for nurses. TIGER's goal is to create and disseminate local and global action plans that can be duplicated within nursing and other multidisciplinary healthcare training and workplace settings.

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**10:30 AM-12:00 PM SCIENTIFIC SESSIONS**

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**S47 - Featured Session**

*Theme: Education*

**Biomedical Informatics Research: A Retrospective from the Literature, 1960 to Present**

*William Hersh, Oregon Health and Science University*

This invited session will provide an overview of the research literature in the field of biomedical informatics from 1960 to the current period. The aim of this featured session is to recognize seminal work in the field covering items such as major publications and themes through a literature review covering the last half-century. William Hersh is Professor and Chair of the Department of Medical Informatics & Clinical Epidemiology (DMICE) in the School of Medicine at Oregon Health & Science University (OHSU) in Portland, Oregon. Dr. Hersh has been at OHSU since 1990, where he has developed research and educational programs in biomedical and health informatics. He is internationally recognized for his contributions to the field. He is a Fellow of the American College of Medical Informatics and a Fellow of the American College of Physicians (ACP). Dr. Hersh has also served as Secretary of the American Medical Informatics Association (AMIA) as Chair of the ACP Medical Informatics Subcommittee. He is currently Chair of the International Medical Informatics Association (IMIA) Working Group on Education.

#### **S48 - Panel**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

##### **Governance for Clinical Decision Support**

*A. Wright, D. Bates, Brigham and Women's Hospital; B. Middleton, Partners HealthCare; P. Nichol, Veterans Health Administration; D. Sittig, University of Texas School of Health Information Sciences at Houston*

Good clinical decision support (CDS) is critical for achieving the maximum potential of electronic health records (EHRs). Without CDS, EHRs are passive repositories of patient information, but with CDS they can be potent tools for improving the quality, safety and efficiency of health care. Developing CDS often forces an organization to achieve consensus on a variety of clinical issues (disease definitions, medication choice, etc.) that, in many cases, did not require consensus previously. Many organizations have found that achieving consensus on these content issues is extremely challenging (as is recognizing when variation is permissible) and have developed governance systems to help make these decisions. In this panel, we will present an overview of CDS and governance through three case studies: UT/Memorial Hermann, an organization with a commercial EHR and a nascent governance process; the Veterans Health Administration, a large and complex federal system with interlocking local, regional and national governance structures and Partners HealthCare, a large system with advanced CDS and a mature, well-developed governance system. We will conclude with a discussion of issues in and best practices for CDS governance. These lessons will be useful for organizations interested in developing or improving their CDS governance structures.

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#### **S49 - Panel**

*Theme: Clinical Research Informatics*

##### **A Framework for Clinical Research Standards: The BRIDG Project**

*C. Chute, Mayo Clinic; C. Mead, NCI/caBIG; J. Jones, NIH; C. Jaffe, HL7; R. Kush, CDISC*

The BRIDG (Biomedical Research Integrated Domain Group) project progresses toward a shared, information-standards framework for protocol driven research. Founding members include the FDA, NCI, HL7, and CDISC. The BRIDG project has been active since 2004, and is now embedded within many FDA submission messages, caBIG information models, and comprises the domain model for the HL7 RCRIM (Regulated Clinical Research) Working Group. It also forms the core model for clinical research information specified by the CDISC standard. Version 3 of this collaborative effort will introduce a two-tiered view; one layer optimized for human understanding while the second layer comprises an HL7 RIM compliant, formal model of shared semantics for biomedical research. BRIDG is in the process of being adopted by the ISO Health Informatics Technical Committee (TC215) as an international standard. This panel will update the community on progress, implementation, and challenges.

#### **S50 - Panel**

*Theme: Public Health Informatics and Biosurveillance*

##### **Spontaneous Electronic Adverse Event Reporting: Perspectives from Clinicians, EHR Vendors, Biopharma, and the FDA**

*J. Linder, Brigham and Women's Hospital/Harvard Medical School; M. Klompas, Harvard Medical School; B. Cass, Cerner; K. Kinchen, Eli Lilly; N. Marks, Food and Drug Administration*

Adverse events from drugs and vaccines are common, but underreported. Although 25% of ambulatory patients experience an adverse drug event, less than 0.3% of all adverse drug events and 1-13% of serious events are reported to the Food and Drug Administration (FDA). Likewise, less than 1% of vaccine adverse events are reported. Low reporting rates preclude or slow the identification of "problem" drugs and vaccines that can endanger public health. New surveillance methods for drug and vaccine adverse effects are needed. Proactive, automated adverse event reporting seamlessly imbedded within electronic health records (EHRs) and other information systems has the potential to ease the burden of reporting for clinicians and provide timely, high quality information required by the pharmaceutical industry and regulators. However, each of the key stakeholders in such a system - clinicians, EHR vendors, the pharmaceutical industry, and the FDA - has diverse needs and focus. Understanding each stakeholder's perspective will allow the development of reporting systems that can more rapidly identify problems with new drugs and more carefully quantify the risks of older drugs. This panel will explore the perspective of clinicians, EHR vendors, the pharmaceutical industry, and the FDA towards proactive, automated adverse event reporting systems.

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#### **S51 - Papers: Implementation of Clinical Practice Guidelines**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

##### **Implementing Pneumonia Quality Care Measures with an Informatics-driven Intervention**

*D. Aronsky, I. Jones, J. Starmer, Vanderbilt University; L. Waitman, Vanderbilt University Medical Center; B. Haarbrandt, D. Giuse, T. Slusser, J. Block, S. Russ, Vanderbilt University*

##### **Fall TIPS: Strategies to Promote Adoption and Use of a Fall Prevention Toolkit**

*P. Dykes, Partners HealthCare/Brigham & Women's Hospital; D. Carroll, Massachusetts General Hospital; A. Hurley, R. Gersh-Zaremski, Brigham & Women's Hospital; A. Kennedy, Massachusetts General Hospital; J. Kurowski, North Shore Medical Center; K. Tierney, Faulkner Hospital; A. Benoit, F. Chang, Partners HealthCare; S. Lipsitz, J. Pang, R. Tsurkova, Brigham & Women's Hospital; B. Middleton, Partners HealthCare and Brigham & Women's Hospital*

**Consequences of the Verification of Completeness in Clinical Practice Guideline Modeling: a Theoretical and Empirical Study with Hypertension**  
J. Bouvau, Assistance Publique-Hopitaux de Paris/INSERM; B. Séroussi, Université Paris and Assitance Publique-Hôpitaux de Paris; J. Julien, Assitance Publique-Hôpitaux de Paris HEGP; C. Simon, Silk Informatique; D. Denké, H. Falcoff, Université Paris/SFTG

**QA-driven Guidelines Generation for Bacteriotherapy**  
E. Pasche, D. Teodoro, University Hospitals of Geneva; J. Gobeill, P. Ruch, University of Applied Sciences; C. Lovis, University Hospitals of Geneva

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**S52 - Papers: Human Computer Interaction**  
Theme: Clinical Workflow and Human Factors

**Quantifying Temporal Documentation Patterns in Clinician Use of AHLTA—the DoD’s Ambulatory Electronic Health Record**  
K. Bohnsack, Air Force; D. Parker, Northrop-Grumman; K. Zheng, The University of Michigan

**Logfile Analysis of CIS Use to Inform Creation of a User-configurable Web Widget-based Web 2.0 CIS Interface: A Feasibility Study**  
Y. Senathirajah, S. Bakken, Columbia University

**Enhancing the Informatics Evaluation Toolkit with Remote Usability Testing**  
B. Dixon, Regenstrief Institute

**Selecting Information in EHRs for Knowledge Acquisition**  
X. Wang, H. Chase, M. Markatou, G. Hripcsak, C. Friedman, Columbia University

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**S53 - Papers: Issues in the Management of Personal Health Data**  
Theme: Consumer Informatics and PHRs

**Survey Analysis of Patient Experience using a Practice-linked PHR for Type 2 Diabetes Mellitus**  
J. Wald, Partners HealthCare; R. Grant, Massachusetts General Hospital; J. Schnipper, T. Gandhi, E. Poon, A. Businger, E. Orav, D. Williams, Brigham and Women’s Hospital; L. Volk, B. Middleton, Partners HealthCare

**MyChildren’s: Integration of a Personally Controlled Health Record with a Tethered Patient Portal for a Pediatric and Adolescent Population**  
F. Bourgeois, D. Nigrin, K. Mandl, D. Shaw, D. Flemming, Children’s Hospital, Boston

**Measuring Population Health Using Personal Health Messages**  
B. Chee, R. Berlin, B. Schatz, University of Illinois at Urbana-Champaign

**Do Clinical Profiles Constitute Privacy Risks for Research Participants?**  
G. Loukides, J. Denny, B. Malin, Vanderbilt University

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**S54 - Papers: UMLS-NLP**  
Theme Data Mining, NLP, and Information Extraction

**Using a Statistical Natural Language Parser Augmented with the UMLS Specialist Lexicon to Assign SNOMED CT Codes to Anatomic Sites and Pathologic Diagnoses in Full Text Pathology Reports**  
H. Lowe, Stanford University; Y. Huang, Kaiser Permanente Southern California; D. Regula, Stanford University

**UMLS Content Views Appropriate for NLP Processing of the Biomedical Literature vs. Clinical Text**  
D. Demner-Fushman, J. Mork, S. Shooshan, A. Aronson, US National Library of Medicine

**Comparing Inconsistent Relationship Configurations Indicating UMLS Errors**  
J. Geller, C. Morrey, J. Xu, New Jersey Institute of Technology; M. Halper, Kean University; G. Elhanan, Y. Perl, New Jersey Institute of Technology; G. Hripcsak, Columbia University

**UMLS-interface and UMLS-similarity : Open-source Software for Measuring Paths and Semantic Similarity**  
B. McInnes, University of Minnesota, Twin Cities; T. Pedersen, University of Minnesota, Duluth; S. Pakhomov, University of Minnesota

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**S55 - Papers: Advancements in Information Retrieval**  
Theme: Data Mining, NLP, and Information Extraction

**Finding Query Suggestions for PubMed**  
Z. Lu, W. Wilbur, J. McEntyre, A. Iskhakov, L. Szilagyi, NCBI/NLM/NIH

**Enriching PubMed Related Article Search with Sentence Level Co-citations**  
N. Tran, P. Alves, S. Ma, M. Krauthammer, Yale University

**Exploitation of Speculation Markers to Identify the Structure of Biomedical Scientific Writing**  
N. Grabar, Inserm UMRS; T. Hamon, LIM&BIO

**Reflective Random Indexing for Semi-automatic Indexing of the Biomedical Literature**  
V. Vasuki, T. Cohen, Arizona State University

## **S56 - Demonstrations: Clinical Research and Discovery**

*Theme: Clinical Research Informatics*

### **Semantic Web Technologies for Assessing Clinical Trial Eligibility**

*R. Richesson, University of South Florida College of Medicine; V. Kashyap, CIGNA Healthcare; E. Prud'hommeaux, W3C; H. Chen, Agfa Healthcare; J. Pathak, Mayo Clinic; H. Stenzhorn, University Medical Center Freiburg*

The re-use of EMR data to support clinical trial recruitment can only be realized if clinical observations are semantically interoperable with eligibility representations found in clinical research protocols. Interoperability between clinical care and research data standards is an activity of the W3C Healthcare and Life Sciences Interest Group. As a use-case for integrating heterogeneous data using Semantic Web technologies, we developed a prototype application leveraging existing EMR data to automatically identify patients eligible for clinical trials. We present this prototype, introduce Semantic Web technologies as a means to integrate heterogeneous data, and describe our challenges and future direction.

### **Ontology Services for Semantic Applications in Health and Life Sciences**

*N. Shah, N. Noy, C. Jonquet, A. Coulet, P. Whetzel, N. Griffith, C. Youn, B. Dai, M. Dorf, M. Musen, Stanford University*

Recently, researchers have turned to the Semantic Web to integrate, summarize, and interpret disparate knowledge. Ontologies provide the domain knowledge to drive such data integration and information retrieval on the Semantic Web. The successful creation of semantic applications in the health and life sciences requires services that provide software applications with access to bioontologies over the Web. The National Center for Biomedical Ontology, one of the seven National Centers for Biomedical Computing created under the NIH Roadmap, has developed BioPortal, which provides access to one of the largest repositories of biomedical ontologies both via Web browsers and Web services. BioPortal enables ontology users to visualize, browse and search ontologies. The BioPortal Web services allow programmatic access, download and traversal of ontologies in software applications; such as in the recently released Microsoft word 2007 Ontology add-in. The Web services also allow submission of textual metadata from public databases to automatically "tag" the text with ontology terms as well as allow users to access annotated elements from public data resources.

### **LB3 Late Breaking Session**

*(to be announced)*

## **10:30 AM-1:30 PM POSTERS**

### **Poster Session 2 Preview**

The poster preview runs from 10:30 am to 1:30 pm with attendance by authors optional and is designed to allow registrants to browse posters at their leisure. The poster session, with all authors present, will take place from 5:15 pm to 7:00 pm.

## **Theme: 20/20 Global e-Health Informatics Capacity Building**

### **The Development of the Tele-healthcare Electronic Health Record in Taiwan**

*T. Lai, ITRI*

### **Training Software Developers for Electronic Medical Records in Rwanda**

*A. Tang, R. Seymour, J. DeRiggi, C. Munyaburanga, Partners In Health; H. Fraser, Brigham & Women's Hospital*

## **Theme: Clinical Decision Support, Outcomes, and Patient Safety**

### **Pre-operative Medication Management Infobutton**

*T. Adam, University of Minnesota*

### **An Automated Model That Predicts Risk of Readmission for Heart Failure: Importance of Social Factors and Implications for Pay-for-Performance**

*R. Amarasingham, Parkland Health & Hospital System*

### **Using Quality Electronic Patient Data to Improve Care in Rural Rwanda**

*C. Amoroso, P. Manyika, D. Jazayeri, Partners In Health; H. Fraser, Brigham & Women's Hospital*

### **Forecasting Emergency Department Diversion with a Bayesian Network: A Prospective Evaluation**

*D. Aronsky, I. Jones, A. Tsitsior, G. Hubbard, T. Slusser, C. Zhou, Vanderbilt University*

### **Development of Glucometer Data Collection Software for a Diabetes Health Intervention Program**

*C. Barnes, M. Barnes, J. Nogle, Y. Li, J. Sposato, Univ. of Florida*

### **Using Semantic Web Technologies to Extract Knowledge About Adverse Drug Reactions from PubMed**

*C. Bousquet, CHU de Saint-Etienne; F. Amardeilh, Mondeca; S. Guillemin-Lanne, M. Plantefol, M. Wiss-Thebaut, Temis; L. Guillot, D. Delamarre, A. Burgun, Université de Rennes 1; A. Lillo-Le Lou, Hôpital européen Georges Pompidou*

### **Representation of a Simple and Unambiguous Clinical Guideline in a Computer Interpretable Language**

*D. Capurro, I. Kalet, University of Washington*

### **Impact of A Computerized Tooth Survival Predicting Index On Dental Clinical Decision-Making: A Preliminary Study**

*X. Chen, University of North Carolina at Chapel Hill; L. Gatewood, S. Shuman, J. Hodges, University of Minnesota*

### **Distributed Cognition for Interdisciplinary Fall-Injury Prevention**

L. Currie, B. Sheehan, Columbia University; A. St. John, G. Bufe, M. Brous, New York-Presbyterian Hospital

### **Cognitive Biases in Decision Making by Clinicians**

A. Dragotoni, V. Patel, Arizona State University; D. Robinson, University of Texas Health Science Center at Houston; B. Patel, Mayo Clinic Arizona

### **Delivering Images and Searching PACS Metadata: The Data Warehouse Approach**

S. Erdal, J. Liu, S. Silvey, J. Kamal, OSU Medical Center; N. Hall, OSU College of Medicine

### **Consensus TBL Summaries for Clinical Decision-making**

P. Fontelo, F. Liu, National Library of Medicine

### **Conquering Stroke Care through Meaningful Use of CPOE and EMR**

L. Gleespen, P. Enos, Summa Health System Hospitals; S. Shaha, University of Utah

### **Developing an Early Warning for Sepsis Alert**

K. Heard, R. Reichley, BJC HealthCare; S. Thiel, M. Kollef, T. Bailey, Washington University School of Medicine; J. Rosini, Christiana Care Health System; S. Micek, A. Sawyer, Barnes-Jewish Hospital

### **Shift in Harm Scores after Implementing Positive Patient Identification**

T. Higgins, L. Douglass, B. Spath, N. Kudler, Baystate Health; M. Heelon, B. Siano, P. Liebro, G. Kerr, Baystate Medical Center

### **CPP/ICP Dose Index: Dynamic 3-D Scoring in the Assessment of TBI**

S. Kahraman, P. Hu, Y. Xiao, R. Dutton, T. Scalea, University of Maryland Medical School

### **Identifying the Data Required for Automated Pressure Ulcer Risk Assessment**

H. Kim, Partners Healthcare System; L. Meeker, S. Thompson, Brigham and Women's Hospital

### **Comparison of Two Sign-out Systems at a Pediatric Residency Program**

J. Levin, Children's Hospital of Pittsburgh of UPMC; S. Visweswaran, University of Pittsburgh; J. Bickel, University of Pittsburgh and Children's Hospital of Pittsburgh of UPMC

### **Simulation Sniffer Engine to Expedite New Algorithms Development in Clinical Alerts System**

M. Li, A. Hanson, O. Gajic, V. Herasevich, Mayo Clinic

### **Visual Analytics Approach to Practice Evidence-based Medicine**

K. Mane, Renaissance Computing Institute, UNC; C. Schmitt, C. Bizon, Renaissance Computing; K. Gersing, B. Burchett, R. Pietrobon, Duke University Medical Center

### **User Response to Warfarin Initiation and Modification Dosing Support Tools**

J. McCoy, Vanderbilt University; D. Johnson, S. Strom, L. Waitman, Vanderbilt University Medical Center

### **Projeny: An Open Source Toolkit for Probabilistic Temporal Reasoning**

S. Nachimuthu, University of Utah

### **Predicting Abnormal Clinical Events Using Non-wearable Sensors in Elderly**

M. Popescu, M. Rantz, M. Skubic, U of Missouri

### **Measuring Semantic Density of Nursing Practice Recommendations**

K. Ravvaz, T. Patrick, University of Wisconsin-Milwaukee

### **Content-based Mammograms Retrieval**

D. Tahmoush, University of Maryland

### **A Randomized Trial of a Smart Alert System to Reduce the Risk of Injury Due to Psychotropic Drugs in the Elderly**

R. Tamblyn, D. Buckeridge, K. Reidel, A. Huang, S. Shi, McGill University; V. Patel, Weill Cornell Medical College; L. Mallet, University of Montreal

### **Exploring Medical Error Detection and Recovery in Nursing Practice**

W. Wilkinson, T. Cohen, V. Patel, Arizona State University

### **Predicting Sepsis in the ICU using Dynamic Bayesian Networks**

A. Wong, S. Nachimuthu, P. Haug, University of Utah

### **Realizing the Benefits of Patient Alert Information for Clinical Decision Support - Alert Framework and Automation**

W. Wong, Health Informatics

### **Improving Diabetes Care at the Portland VA Medical Center (PVAMC) - A Diabetes Registry and Point of Care (POC) Clinical Tools**

J. Yang, J. McConnachie, L. Winterbottom, Portland VA Medical Center

### **A Methodology for the Design, Development, and Maintenance of Enterprise Clinical Decision Support Rules**

L. Zhou, S. Maviglia, D. Goldman, A. Barley, J. Lewis, T. Hongsermeier, R. Rocha, Partners Healthcare System

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## **Theme: Clinical Research Informatics**

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### **Evaluation of Heart Rate Variability (HRV) Biofeedback Using High-Resolution, High-Density HRV Capture**

K. Anderson, G. Csik, J. Flores, S. Fuentes, H. Johl, M. Khalsa, P. Pannu, R. Pisk, W. Malyj, University of California; M. Gonzales, DHCS; S. Tandon, Centers for Disease Control

**A Methodology to Collect Opinions from A Comprehensive List of End Users of Clinical Research Informatics Systems**

A. Boyd, T. Johnson, A. Valenta, University of Illinois at Chicago

**Exploring the Quality of Data Captured by Structured Data Entry in an Electronic Medical Records**

I. Cho, Inha University

**Use of Geographical Information Systems to Examine Clinic Access among HIV Veterans**

M. Duggal, K. Ebisu, Yale University, C. Brandt, Yale University/VA Connecticut Healthcare System; D. Cohen, VA Connecticut Healthcare System, M. Skanderson, Yale University, K. Mattocks, Michael Rambo, VA Connecticut Healthcare System; A. Justice, Yale University/VA Connecticut Healthcare System

**Improving Research Team Workflow by an Automated Employee Attendance System**

O. Dyadyura, J. Wood, Johns Hopkins University; J. Finkelstein, Johns Hopkins University School of Medicine

**Characterizing Clinical and Translational Researchers and Their Research Needs: Survey Development and Psychometric Analysis**

M. Graham, S. Johnson, C. Cortland, S. Bakken, Columbia University

**Enhancing Quality of Healthcare Information System via Traceability Matrix**

R. Haltam, UMIT

**Enhancing Security of Healthcare Information System via Security Zoning**

R. Haltam, UMIT

**Enrollment to Time Sensitive Clinical Trial in the Critical Care Setting: Results from Computerized Septic Shock Sniffer Implementation**

V. Herasevich, J. Pulido, M. Li, A. Hanson, R. Kashyap, A. Ahmed, O. Gajic, Mayo Clinic

**Understanding Communication for Critical Care Incidents**

S. Khairat, Y. Gong, University of Missouri

**Guided Sequential Meta-Searching for Evidence-based Medicine**

H. Lehmann, D. Zhang, P. Bolotov, Johns Hopkins University

**Modeling Cancer Clinical Trial Outcomes Using the Ontology of Clinical Research**

M. Levy, S. Tu, Stanford University; S. Carini, I. Sim, University of California, San Francisco; A. Rector, University of Manchester; B. Pollock, University of Texas Health Science Center at San Antonio

**Developing an Interventions Ontology for Federated Sharing of Human Studies Data**

S. Mollah, E. Barbour, A. Maurer, The Rockefeller University; H. Hagler, R. Scheuermann, The University of Texas Southwestern Medical Center at Dallas; H. Lehmann, Johns Hopkins University; I. Sim, University of California at San Francisco; S. Tu, Stanford University

**Visualization and Statistical Pharmacovigilance Methods in i2b2**

S. Murphy, V. Gainer, J. Colecchi, M. Sordo, A. Dubey, J. Glaser, Partners HealthCare; J. Brownstein, I. Kohane, Children's Hospital

**Size Matters: Satisfaction with Patient-reported Electronic Surveys at Two Breast Centers**

J. Nelan, D. Collins, S. Kearing, Dartmouth-Hitchcock Medical Center; L. Weiss, Dynamic Clinical Systems; M. Melisko, University of California, San Francisco; M. Donaldson, MSD Health Care Consulting Group

**A Data Warehouse Based Post-marketing Surveillance Method: Comparison of Adverse Effect Before and After Drug Administration**

M. Park, Ajou University and Gachon University

**Specialized Program of Research Excellence (SPORE) Head and Neck Neoplasm Virtual Biorepository: A Clinical Data and Tissue Resource to Accelerate Translational Research for Malignancies**

H. Singh, W. Amin, A. Egloff, K. Trent, J. Hetrick (Ridge), University of Pittsburgh; A. Parwani, University of Pittsburgh Medical Center

**Automatic Calculation of APACHE Admission Diagnoses: Natural language Processing (NLP) vs. "Natural Brain Processing"**

C. Trillo Alvarez, A. Hanson, M. Tsapenko, R. Kashyap, O. Gajic, V. Herasevich, Mayo Clinic; B. Trusko, Mount Sinai School of Medicine

**A Preliminary Correlation Assessment on Email Information Delivery and Website Traffic within the Context of Clinical & Translational Research**

D. Wang, M. Hazard, University of Rochester Medical Center

**Pulmonary Portal: Study Management through Web Portals**

C. Waugh, S. Erdal, R. Deiter, J. Buskirk, R. Dyta, J. Liu, J. Kamal, OSU Medical Center; C. Marsh, K. Wood, J. Mastronarde, OSU College of Medicine

**Designing a Family Health History Datamart for Clinical Research**

G. Wood, Intermountain Healthcare Clinical Genetics Institute; M. Kolbe, N. Hulse, Intermountain Healthcare

**Patient Information Search for Breast Cancer Clinical Trials**

J. Zhang, T. Zhao, X. Mu, W. Liu, W. Hu, Y. Gu, UW-Milwaukee; J. Marx, F. Frost, C. Halliday, J. Tjoe, Aurora Healthcare

## Theme: Clinical Workflow and Human Factors

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### **Modeling Medical Team Behavior**

A. Ashby, K. Kahol, Arizona State University; K. Kahol, Banner Good Samaritan Medical Center

### **An Assessment of the Implementation of Mobile Solutions at a State Hospital in Turkey**

N. Baykal, M. A. Mizani, S. Yucesbas, METU

### **SitBACReasoner: Reasoning about Access-Control Situations with OWL**

D. Beimel, Ruppin Academic Center; M. Peleg, University of Haifa

### **User-centered Design of a Mobile Device Interface to Support Oral Health Self-monitoring**

O. Coker, UTHSC School of Health Information Sciences; M. Walji, University of Texas Health Science Center Houston

### **A Human Factors Framework for Analyzing Miscommunication in an Air Medical Transport Setting**

J. Dalto, Intermountain Medical Center

### **Managing for Safety: How Do Nurse Managers Do It?**

J. Effken, M. Logue, Y. Hsu, J. Verran, The University of Arizona

### **Developing a Census Tracking System to Improve the Real Time Reporting Capability in the Cleveland Clinic Informatics System**

R. Gomez, Cleveland Clinic Florida; J. Lou, Nova Southeastern University

### **Developing a Human-centered Interface for Sensor Data Display**

Y. Gong, M. Popescu, University of Missouri

### **A Store-and-Forward Teledermatology Ichthyosis Expert Advisory System**

J. Han, M. Rowilson, J. Dyer, C. Shyu, University of Missouri

### **EHR Data Pre-processing Facilitating Process Mining: an Application to Chronic Kidney Disease**

V. Huser, Marshfield Clinic/Univ. of Wisconsin-Madison; J. Starren, Marshfield Clinic

### **Knowledge Resource Selection in Expert Librarian Search**

D. Kaufman, M. Sengupta, H. Chase, Columbia University; E. Mendonca, University of Chicago

### **Innovative Applications to Support and Improve Clinical Processes**

A. Klare, S. Silvey, The Ohio State University Medical Center

## **Towards a Work Domain Model of the Emergency Department**

Z. Li, Y. Liu, J. Goodwin, J. Zhang, University of Texas School of Health Information Sciences at Houston

### **Clinician Characteristics and their Association with Efficient Electronic Health Record Documentation**

E. McPeck Hinz, Cleveland Clinic; D. Kaelber, The MetroHealth Center

### **Primary Care Providers' Clinical Documentation Method and Electronic Health Record Satisfaction**

P. Neri, A. Wilcox, L. Volk, H. Ramelson, Partners Healthcare; D. Williams, G. Schiff, D. Bates, Brigham and Women's Hospital

### **Informing Health IT Design and Implementation through Analysis of Organizational Communication Genres**

L. Novak, N. Lorenzi, Vanderbilt University Medical Center; C. Gadd, Vanderbilt University

### **Medication Reconciliation in the NICU: Evaluation of a Bedside Electronic Documentation System**

P. Porcelli, Wake Forest University

### **Healthcare Intelligence: Beyond the Scope of Traditional Business Intelligence**

S. Silvey, C. Ma, J. Tark, J. Kamal, S. Eaton, D. Smaltz, Ohio State University Medical Center

### **Risk Management of Hospital Information Systems using Information Security Management Systems (ISMS)**

T. Tanikawa, G. Kobashi, K. Ohta, M. Mukai, A. Kobayashi, Y. Ando, National Institute of Radiological Sciences

### **Analysis of User Interface Issues for a Handheld Decision Support Depression Screening Application**

O. Velez, D. Kaufman, S. Bakken, Columbia University; N. Lee, Seoul National University

### **Investigating Information-User-Task Fit of the VA Diabetes Cube**

K. Zheng, M. Souden, R. Keith, The University of Michigan; J. Lowery, The Department of Veteran Affairs

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## Theme: Consumer Informatics and PHRs

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### **Secure Messaging Effect on Health Outcomes for Diabetic Patients**

C. Bredfeldt, A. Compton-Phillips, M. Snyder, Kaiser Permanente

### **Usability Assessment of Web-based Resources for Depression Management**

S. Hyun, S. Patel, Columbia University; L. Currie, M. Joyce, S. Bakken, Columbia University School of Nursing; K. Matsoukas, Columbia University Health Sciences Library; J. Oliver, Columbia University Health Sciences

### **Perceptions of Koreans Regarding Personal Health Records (PHR)**

S. Kim, Center for Interoperable EHR and Seoul National University College of Medicine

### **A Content Analysis of Information Exchange in an Online Support Group**

N. Lapshina, P. Stozhkov, J. Finkelstein, Johns Hopkins University

### **Supporting Clinical Information Seeking across Users with Diverse Educational Backgrounds**

D. Lobach, A. Waters, G. Silvey, S. Clark, K. Kawamoto, I. Lipkus, Duke University; S. Kalyanaraman, University of North Carolina

### **Eliciting Design Requirements for Commercial Off-The-Shelf Consumer Health Informatics (CHI) Interventions**

J. Marquard, University of Massachusetts - Amherst

### **Consumers' Potential Usage of PHRs**

V. Patel, R. Dhopeswarkar, A. Edwards, Y. Barron-Vaya, L. Kern, R. Kaushal, Weill Cornell Medical College; J. Sparenborg, Rochester Regional Health Information Organization; R. Kaushal, New York-Presbyterian Hospital

### **Internet Health Information Seeking Behavior in HIV Positive Patients**

L. Samal, G. Chander, R. Moore, M. Beach, Johns Hopkins University School of Medicine; T. Korthius, S. Saha, Oregon Health and Science University; V. Sharp, St. Luke's Roosevelt; J. Cohn, Wayne State University

### **Urban PLWH's Willingness to Share Personal Health Information**

P. Teixeira, S. Bakken, Columbia University; E. Camhi, P. Gordon, New York-Presbyterian

### **Creating a Foundation for the Design of Culturally-informed Personal Health Records: Development of a Methodology**

R. Valdez, University of Wisconsin

### **ToothVault: Helping Patients Make Informed Dental Health Decisions**

M. Walji, University of Texas Health Science Center Houston; D. Taylor, J. Valenza, The University of Texas Dental Branch at Houston

### **Acceptance and Usability of Computer Kiosks that Enable Patients to Contribute Personal Health Information Directly into a Health Information Exchange for Use in Clinical Decision Support**

J. Willis, G. Silvey, D. Lobach, Duke University

### **Interactive Fitness Diary Utilizing the Nintendo Wii**

J. Wood, A. Orlov, Johns Hopkins University; J. Finkelstein, Johns Hopkins University School of Medicine

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## **Theme: Data Integration and Exchange**

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### **Evaluating and Refining Record Matching Algorithms in the MidSouth eHealth Alliance**

R. Breece, J. Ey, B. Eckart, D. Talbert, Tennessee Technological University; M. Assink, Vanderbilt University

### **Specification of an Inter-operability Platform for the Integration and Exploitation of Distributed Clinical Data**

R. Choquet, M. Jaulent, INSERM; D. Kalra, CHIME

### **Web Service Architecture for Management of Reportable Condition Reporting and Rules**

N. Dykman, C. Staes, J. Facelli, University of Utah

### **Leveraging the Continuity of Care Document (CCD) Standard to Support an Emergency EHR Backup System**

J. Finbraaten, Marshfield Clinic; J. Starren, Marshfield Clinic Research Foundation

### **Validation of An Addressing String for DICOM Content**

D. Guo, Oracle Corp

### **A Longitudinal Study of Electronic Result Viewing and Quality of Care in Small Group Practices**

L. Kern, Y. Barron-Vaya, R. Dhopeswarkar, R. Kaushal, Weill Cornell Medical College

### **Health Outcomes for Motor Vehicle Accident Victims Treated at the Mayo Clinic**

R. McClintock, B. Schooley, Claremont Graduate University

### **A Viewer of Patient Information using Google Visualization API**

M. Nakayama, A. Shibuya, R. Inoue, Y. Kondo, Tohoku University Hospital

### **An XML-driven Data Integration Engine for Data Transformation, Loading and Validation**

Y. Qin, B. Savage, M. Zmuda, S. Cantor, M. DeLatta, D. Simoni, RTI International

### **Public Health Informatics for a National Infrastructure: The Case of the U.S. Health Care System**

A. Séror, eResearch Collaboratory

### **Homophily in Collaboration of Translational Science**

M. Thomason, C. Weir, University of Utah

### **Optimizing an Electronic Outpatient Whiteboard Through Analysis of Incoming HL7 Scheduling Messages**

S. Weinberg, Vanderbilt University School of Medicine

### **Standardizing Data Collection Across Multiple EMR Systems**

A. Zbib, M. Moy Lum-Kwong, K. Kandukur, Heart and Stroke Foundation of Ontario; K. Keshavjee, InfoClin Inc.; R. Sebaldt, Fig.P Software Inc

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**Theme: Data Mining, NLP, and Information Extraction**

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### **Reconstituting Genealogical Information from a Multipurpose Data Resource**

F. Albright, College of Pharmacy, University of Utah; C. Teerlink, J. Farnham, S. Backus, UUSOM; L. Cannon-Albright, University of Utah

### **Detecting Race and Ethnicity Using Natural Language Processing**

L. Bastarache, M. Ritchie, D. Crawford, M. Basford, Vanderbilt University Medical Center; J. Denny, Vanderbilt University

### **Data Warehousing and Markov Modeling of Children Admitted with Respiratory Complaints**

J. Bickel, J. Levin, Children's Hospital of Pittsburgh of UPMC; S. Visweswaran, J. Levin, Y. Hsu, Y. Kang, V. Zadorozhny, University of Pittsburgh

### **Indexing Key Concepts from Biomedical Descriptions for Image Retrieval in Medical Education**

C. Cimino, Albert Einstein College of Medicine of Yeshiva University; S. Mollah, The Rockefeller University

### **The Use of Field Dissimilarity Transformation Rules in a Regional Health Information Organization Simulator**

J. Ey, D. Talbert, Tennessee Technological University

### **Semantically-assisted Search for Biomedical Research Portal**

H. Frost, T. Bashor, VectorC; P. Trevvett, D. Hummel, K. Lee, T. Monaghan, M. Cervone, D. MacFadden, M. Palchuk, Harvard Medical School

### **Acute Physiology and Chronic Health Evaluation (APACHE IV) Prediction Mortality Score: Automatic Mapping of Chronic Conditions**

A. Hanson, M. Tsapenko, O. Gajic, V. Herasevich, Mayo Clinic

### **Discovering Knowledge Frontiers in Trauma Triage Data**

M. Honeycutt, D. Talbert, Tennessee Technological University

### **Situational Effects on ADHD Children's Activity at School: A Comparative Study Using 3-axial Accelerator (Actigraph)**

H. Kam, Ajou University, School of Medicine

### **Dynamic Multi-facets to Support Searching Health Web sites**

J. Klinginsmith, M. Mahoui, School of Informatics; J. Jones, Indiana University - Purdue University at Indianapolis

### **Predicting Emergency Department Diversion using an Artificial Neural Network With Temporal Trends: A Preliminary Study**

J. Leegon, I. Jones, C. Zhou, D. Aronsky, Vanderbilt University

### **Analyzing Large, Multicenter DRG Datasets: The Impact of OLAP-Tools**

M. Müller, University Medical Center Freiburg

### **Building a Domain Information Schema using Semi-supervised Machine Learning**

O. Patterson, J. Hurdle, University of Utah

### **Pediatric Adverse Drug Event Surveillance with Natural Language Processing**

R. Reichley, M. Gysbers, BJC HealthCare; L. Noiro, T. Bailey, P. Kilbridge, Washington University School of Medicine; C. Schneider, M. Nelson, St. Louis Children's Hospital

### **Matching Clinical Observations in Published Cardiology Case Reports to LOINC**

C. Sneiderman, G. Roseblat, M. Fiszman, T. Rindfleisch, National Library of Medicine; B. Bray, University of Utah

### **Automated Ranking of the Patient Past Medical History**

T. Van Vleck, N. Elhadad, Columbia University

### **Identification of Type 2 Diabetes Mellitus Patients by SNOMED CT Concept Frequency**

W. Wei, University of Minnesota, Twin Cities; C. Chute, Mayo Clinic

### **CervigramFinder: A Tool for Uterine Cervix Cancer Research**

Z. Xue, S. Antani, R. Long, G. Thoma, National Library of Medicine; M. Schiffman, National Cancer Institute

### **Breast Cancer Data Extraction from Operative Notes and Pathology Reports Using Natural Language Processing**

Y. Zhang, G. Melton, A. Arrington, T. Tuttle, University of Minnesota

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**Theme: Education**

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### **Teaching Evidence-based Research: A Systematic Approach to Reviewing the Literature**

S. Boren, University of Missouri

### **Relationship between Semantic Complexity of Residents' Clinical Questions and Source for Satisfactory Answers**

H. Chase, D. Kaufman, Columbia University; E. Mendonca, University of Chicago

### **Building Informatics Content into the Pre-licensure Nursing Curriculum**

*K. Courtney, S. Foley, H. Burns, University of Pittsburgh*

### **Pamoja Mtaani: A Multi-person Online Roleplaying Game to Teach HIV/AIDS Prevention Behavior**

*P. Dev, Innovation in Learning Inc.*

### **Development of a Virtual Slide Library in a Developing Country**

*M. Encinas, J. Avila, M. Diwa, University of the Philippines College of Medicine; E. Ducut, F. Liu, P. Fontelo, National Library of Medicine*

### **Infrastructure for Dynamic Interactive Self-Management of Chronic Disease**

*M. Gaynor, C. LeRouge, Saint Louis University*

### **Video Summarization of Laparoscopic Cholecystectomies**

*M. Grasso, T. Finin, X. Zhu, A. Joshi, Y. Yesha, UMBC*

### **Web Logs: Blogging as a Means of Informatics Education and Information-sharing**

*N. Kudler, T. Higgins, P. Brown, E. Moriarty, Baystate Health*

### **Impact of Electronic Health Record Implementation and Wireless Internet Availability on Medical Student Clinical Questions**

*D. Little, Boonshoft School of Medicine*

### **How to Podcast Long Lectures: Reflections from e-Learning Context**

*J. Mancini, Aix-Marseille Université, Faculté de Médecine and AP-HM, Hôpital de la Timone; J. Dufour, Aix-Marseille Université, Faculté de Médecine and AP-HM, Hôpital de la Timone, M. Fieschi, Aix-Marseille Université, Faculté de Médecine and AP-HM, Hôpital de la Timone*

### **REEL in the Students! (Rigorous Electronic Educational Learning)**

*S. Mitchell, R. Love, University of Maryland; F. Albright, University of Utah*

### **Online Biomedical Informatics Education for Internal Medicine Residents**

*D. Norwood, University of Tennessee; M. Fiszman, National Library of Medicine*

### **Approaches to Tagging Resources: A Design Exploration with Physicians**

*R. Patel, K. Shinohara, L. Marshall, W. Curioso, University of Washington*

### **Curricular and Technology Change as Part of Planning and Design of a New Dental School Building**

*J. Valenza, D. Taylor, The University of Texas Dental Branch at Houston; M. Walji, University of Texas Health Science Center Houston*

### **Theme: EHR and CPOE Systems**

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### **Electronic Health Record Disease Footprint: The Case of Influenza Test-performance Characteristics of Controlled-vocabulary Entry in AHLTA in Support of Population-based Syndromic Surveillance**

*J. Aaronson, H. Lehmann, Johns Hopkins University*

### **Facilitating Order Set Management in a CPOE Implementation**

*J. Cramer, J. Windle, S. Duffy, L. Grabenbauer, J. McClay, University of Nebraska Medical Center*

### **Effect of Computerized Physician Order Entry on Nurses and Nurses' Work**

*W. Fields, San Diego State University, Sharp Memorial Hospital and Sharp Healthcare*

### **The Effect of Computerized Resident Sign-Out on Clarity**

*M. Grasso, UMBC*

### **Imminent Adopters of Electronic Health Records: Do Things Go as Planned?**

*C. Jenter, L. Zhou, D. Bates, Brigham and Women's Hospital; C. Soran, L. Volk, L. Zhou, Partners Healthcare; R. Kaushal, Weill Medical College of Cornell University; S. Simon, Harvard Pilgrim Health Care*

### **EHR Eval KB: a Collaborative Web-based Knowledgebase to Support EHR Evaluation Research**

*S. Khan, P. Nivarthi, J. Merrill, R. Kukafka, Columbia University*

### **A New Security Model for Mental Health Information in an EHR**

*G. Klein, K. Heermann-Do, Vangent*

### **WebWiz: Porting a Java-based Care Provider Order Entry Client to the Web**

*F. Ong, VA Tennessee Valley Healthcare System and Vanderbilt University; T. Champion, J. Grande, S. Brown, Vanderbilt University; S. Brown, VA Tennessee Valley Healthcare System; L. Waitman, Vanderbilt University Medical Center*

### **Physician Response to Psychoactive Drug Alerts Among Older Persons**

*V. Patel, Weill Cornell Medical College; K. Reidel, R. Tamblyn, McGill University*

### **Cognitive Evaluation of Case Managers' Use of a Continuity of Care Document for Persons Living with HIV**

*R. Schnall, D. Kaufman, S. Hyun, S. Bakken, Columbia University*

### **Electronic Health Record System Implementation: Where are Physicians Spending Their Time in a Pre-EHR Work Environment?**

*E. Uwimana, P. Winkelstein, University at Buffalo*

**Theme: Informatics, Discovery, Innovation, and Industry**

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**Going Postal - A Practical Use of Geo-spatial Mapping in Psychiatry**

*P. Alafaireet, H. Houghton, B. Anderson, Y. Gong, University of Missouri*

**SMTS: A French Health Multi-terminology Server**

*S. Darmoni, B. Dahamna, CISMef, Rouen University Hospital & LITIS, EA 4108, Biomedical Research Institute; M. Joubert, M. Fieschi, LERTIM, Faculty of Medicine, University of Aix-Marseille II; J. Delahousse, MONDECA*

**A Mathematical Model of Cell Dynamics to Simulate Viral Mutations and its Influence on the Memory Reservoir**

*C. Fronza, A. Castro, D. Alves, UNIFESP*

**HIWAS: A System to Facilitate the Analysis of XML Healthcare Data**

*J. Hui, P. Schwarz, S. Knoop, IBM Almaden Research Center*

**Comparing the Usability of Apple and Palm Handheld Computing Devices among Physicians: A Randomized Crossover Study**

*A. Joseph, Duke University; J. Loo, University of North Carolina at Chapel Hill; M. Adams, Duke University Medical Center*

**Creating an Informatics Framework for Shared Decision-making for Patient and Physician: Integration of Reasoned Action and Informatics Model for Shared Decision-making for a Patient and Physician to Assure Quality When Dealing with Medical Uncertainty**

*R. Maffei, UT Health Science Center; J. Holmes, University of Pennsylvania School of Medicine*

**Cognitive Study of Scientists' Use of a Knowledge Discovery Tool**

*K. Mukund, G. Gonzalez, T. Cohen, ASU*

**Monitoring Load Job Performance Using Business Intelligence Technologies**

*M. Ostrander, S. Boinepally, Ohio State University Medical Center*

**A Perceptual Spectral Coloring System for Computed Tomography Image Representation**

*E. Sadhu, J. Silverstein, University of Chicago*

**Creating a Technology Hybrid for Efficient Data Management and Analysis in Pre-clinical and Clinical Research**

*P. Tokachichu, G. Beilman, J. Chipman, S. Parente, University of Minnesota*

**Profiling Procedural-based Clinical Data Using Illustrative-inspired Visualization**

*E. Watt, A. Bui, University of California Los Angeles*

**Maximizing Patient Benefits Right from the Start - A Collaborative Approach to Clinical-IT Project Prioritization**

*J. Wong, Hospital Authority*

**Issues in Documentation and Use of Psychosocial Information: The Socio-Technical Perspective**

*X. Zhou, M. Ackerman, K. Zheng, University of Michigan*

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**Theme: Policy and Ethical Issues**

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**Macroinformatics, Microinformatics, and the Dialectic of Health**

*T. Patrick, University of Wisconsin-Milwaukee; J. Andrews, University of South Florida*

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**Theme: Public Health Informatics and Biosurveillance**

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**Development of a Public Health Case Report Implementation Guide: Enabling the Exchange of Electronic Health Record Data using HL7 Clinical Document Architecture Format**

*J. Abellera, G. Kesarinath, CDC; C. Staes, University of Utah; R. Altamore, Washington Department of Health; G. Giannone, Alschuler Associates, LLC; R. Dolin, Semantically Yours, LLC*

**Reaching Syndromic Surveillance's Last Mile via Health Information Exchange**

*B. Dixon, H. Xiao, S. Grannis, Regenstrief Institute*

**A Case Information Management System for Active Surveillance of Clostridium Difficile Infection**

*W. Li, R. Albalak, J. Tolson, F. Lessa, S. Fridkin, R. Pinner, Centers for Disease Control and Prevention; P. Kale, T. Carter, Northrop Grumman; J. Cohen, Atlanta Research & Education Foundation*

**Developing a Decision Support Tool for the Preparedness Emergency Response System for Oversight, Reporting and Management Services (PERFORMS)**

*P. Mehta, Centers for Disease Control and Prevention*

**Profiling Women's Breast Cancer Screening Practices using Data Mining**

*K. Pasupathy, University of Missouri*

**An On-line Hemovigilance System Complying with the Requirements of the Directive 2005/61/EC Concerning Transfusion Medicine in Europe**

*B. Spyropoulos, M. Botsivaly, Technological Education Institute of Athens*

**Tracking Progress in Tobacco Control: Bringing Together Data in the State Tobacco Activities Tracking and Evaluation (STATE) System**

*M. Wittie, M. Engstrom, A. MacNeil, P. Mariolis, Centers for Disease Control and Prevention*

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**Theme: Terminology and Standards**

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**Post-coordinating Orthogonal Ontologies for Data Annotation**

*L. Detwiler, M. Shaw, D. Cook, J. Gennari, J. Brinkley, University of Washington*

**Proposal for Yet Another Desideratum for Terminologies and the UMLS: Uniqueness of Preferred Terms, and Problems Detected Assuming it Holds**

*J. Geller, New Jersey Institute of Technology*

**Potential Utility of Fuzzy Logic Constructs in the Arden Syntax**

*R. Jenders, UCLA School of Medicine*

**Toward Harmonizing ICNP and ICF**

*T. Kim, A. Coenen, University of Wisconsin-Milwaukee*

**An Analysis of Free Text Entry within a Structured Data Entry System**

*S. Madani, E. Shultz, Vanderbilt University Medical Center*

**Representing Knowledge from Radiology Reports in an Ontology**

*C. Ombac, T. Fitzpatrick, S. Iyer, J. Jones, Indiana University - Purdue University at Indianapolis*

**Representing Clinical Practice Guideline Knowledge with Protégé SWRLTab**

*J. Peace, University of North Carolina at Chapel Hill*

**Adoption Issues of a Top-level Ontology in Dentistry**

*M. Torres-Urquidy, University of Pittsburgh; T. Schleyer, University of Pittsburgh, School of Dental Medicine*

**Data Standards and Their Implementations in Health Care Sector in China**

*W. Xu, H. Cao, M. Lu, Second Military Medical University*

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**Theme: Translational Bioinformatics**

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**Development of an Extensible Knowledge Management Infrastructure for the Translational Research Informatics and Data Management Grid (TRIAD)**

*R. Dhaval, S. Hastings, C. Melean, T. Borlawsky, P. Payne, The Ohio State University*

**Found in Translation: Tracking and Tagging Translational Research**

*A. Donahue, P. Fontelo, F. Liu, National Library of Medicine; K. Cravedi, Catholic University of America*

**Collaboration Using Wired-marker: a Browser Add-on to Highlight Text on Web Pages**

*T. Hishiki, S. Park, N. Sugiura, Toho University; M. Takaki, Medical U&A Inc.; K. Takano, Kyushu University*

**The i2b2-Pavia Project: Integrating Clinical and Research Data for Studying Severe Headaches**

*C. Larizza, G. Milani, L. Rojas Barahona, R. Bellazzi, Università di Pavia; E. Guaschino, C. Cereda, G. Sances, IRCCS Fondazione Mondino*

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**12:30 PM-1:30 PM BUSINESS MEETINGS**

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**State of the Association Meeting**

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**1:45 PM-3:15 PM SCIENTIFIC SESSIONS**

**S57 - Featured Session**

**Science and Innovation at the ONC and Its Partners**

*Charles Friedman, Vish Sankaran, Office of the National Coordinator for Health IT (ONC); Jonathan Teich, Contractor to ONC; Gregory Downing, Office of the Assistant Secretary for Planning and Evaluation, DHSS; Wil Yu, ONC; Jonathan White, Agency for Healthcare Research and Quality*

Complementing the current focus on EHR adoption and related policies, the ONC and its partner agencies are advancing health information technology through research, development, and a focus on innovation. This panel will begin by introducing ONC's strategic agenda relating to science and innovation. It will then showcase specific initiatives that are key components of this agenda. Projects under discussion will include: CONNECT, an open-source gateway to the Nationwide Health Information Network; a broad-spectrum effort to promote "meaningful use" of clinical decision support; activities to support interoperability in clinical research; and efforts to monitor innovation in the health IT industry.

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**S58 - Panel**

*Theme: Clinical Research Informatics*

**Applications of Biomedical Informatics in Clinical Drug Development**

*Z. Cai, AstraZeneca Pharmaceuticals; J. Shon, A. Kamauu, Roche Palo Alto LLC; J. Weatherall, AstraZeneca Pharmaceuticals*

Pharmaceutical industry, especially clinical development is facing many challenges today, including the need to lower attrition rates, increase product safety, and reduce development costs and timelines. To meet these challenges, we must keep in mind that we live in an information age, but we are not using all the data/information to generate knowledge for the best decision makings in clinical development, as demonstrated by drop in NMEs and increase in cost. We believe that Biomedical Informatics is a key emerging discipline in clinical development that will help us meet the challenges above. Our panel will feature speakers from pharmaceutical companies with years of

experience of applying Biomedical Informatics to solve problems and support decision-makings in clinical development. The goal of this panel is to introduce current status of Biomedical Informatics in clinical development focusing on its applications, including translational medicine, clinical trial design, safety surveillance, biomarker discovery and development, knowledge management, and decision support. The panel will end with a discussion on challenges and opportunities we face and how to demonstrate business value of Biomedical Informatics in drug development industry.

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### **S59 - Panel**

*Theme: Data Mining, NLP, and Information Extraction*

#### **Applying Natural Language Processing in the Clinical Setting: An Overview**

*J. Pestian, Cincinnati Children's Hospital Medical Center, University of Cincinnati; W. Chapman, University of Pittsburgh; C. Friedman, Columbia College of Physicians and Surgeons; J. Hurdle, University of Utah; G. Savova, Mayo Clinic*

Between 1940 and today there has been substantial intellectual churning around Natural Language Processing (NLP). This churning is increasing by the rapid adoption of electronic medical record systems that capture incalculable amounts of clinical free text. Now, more than ever, NLP can be an enabling technology that will enhance the functionality of clinical decision supports systems. This panel discusses some of the steps necessary for this to occur. In particular, a definition of clinical NLP will be formalized. Then three presentations will provide: information about the emerging tools for researchers, the fundamental role of annotation and evaluation, and emerging uses of NLP in clinical decision support. Finally, there will be an open discussion about issues regarding NLP becoming mainstream to the clinical workflow.

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### **S60 - Panel**

*Theme: Terminology and Standards*

#### **Medical Vocabularies, Knowledge Representation and the Semantic Web - Best of Breed or a Recipe for Failure?**

*R. Cornet, AMC; S. Schulz, University Medical Center Freiburg; C. Chute, Mayo Clinic; C. Golbreich, University of Versailles Saint-Quentin; M. Musen, Stanford University; A. Rector, University of Manchester*

Web 2.0 and the Semantic Web are maturing. Slowly, they are entering the realm of medicine. SNOMED CT is now released in a way that facilitates formal reasoning based on the Semantic Web standard OWL. Finally, reasoners are appearing that are capable of handling terminologies of the size of SNOMED CT (i.e., hundreds of thousands of concepts), and web-based services (such as CTS 2 and the OWLAPI) are being specified. Much benefit is to be expected from these developments, but caution is necessary. This panel addresses developments in the areas of representations, applications, and terminologies, but also sheds light on the risks that are involved.

### **S61 - Papers: Knowledge Management**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **The Contribution of Observational Studies and Clinical Context Information for Guiding the Integration of Infobuttons into Clinical Information Systems**

*J. Cimino, NIH Clinical Center*

#### **ClinRefLink: Implementation of Infobutton-like Functionality in a Commercial Clinical Information System Incorporating Concepts from Textual Documents**

*M. Oppenheim, North Shore-LIJ Health System; D. Rand, Long Island Jewish Medical Center; C. Barone, R. Hom, North Shore-LIJ Health System*

#### **Key Standards Recommended for Achieving a National Repository of Clinical Decision Support Interventions**

*D. Sittig, University of Texas School of Health Information Sciences at Houston; A. Wright, Brigham & Women's Hospital; J. Ash, Oregon Health & Science University; B. Middleton, Partners HealthCare*

#### **A Clinical Rule Editor in an Electronic Medical Record setting: Development, Design, and Implementation**

*R. Regier, R. Gurjar, R. Rocha, Partners Healthcare System*

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### **S62 - Papers: Modeling Temporal Data**

*Theme: Data Mining, NLP, and Information Extraction*

#### **A Temporal Abstraction Framework for Classifying Clinical Temporal Data**

*I. Batal, University of Pittsburgh; L. Sacchi, R. Bellazzi, University of Pavia; M. Hauskrecht, University of Pittsburgh*

#### **Towards Temporal Relation Discovery from the Clinical Narrative**

*G. Savova, Mayo College of Medicine, Mayo Clinic; S. Bethard, W. Styler, J. Martin, M. Palmer, University of Colorado; J. Masanz, Mayo Clinic; W. Ward, University of Colorado*

#### **Temporal Data Mining for the Assessment of the Costs Related to Diabetes Mellitus Pharmacological Treatment**

*S. Concaro, University of Pavia; S. Concaro, ASL of Pavia; L. Sacchi, University of Pavia; C. Cerra, ASL of Pavia; M. Stefanelli, University of Pavia; P. Fratino, ASL of Pavia; R. Bellazzi, University of Pavia*

#### **Medical Temporal Knowledge Discovery via Temporal Abstraction**

*R. Moskovitch, Y. Shahar, Ben Gurion University*

## S63 - Papers: EMR Usefulness

Theme: EHR and CPOE Systems

### Physician Productivity and the Ambulatory EHR in a Large Academic Multi-specialty Physician Group

A. Cheriff, A. Kapur, M. Qiu, Weill Cornell Physician Organization; C. Cole, Weill Cornell Medical College

### Quantifying Clinical Narrative Redundancy in an Electronic Health Record

J. Wrenn, D. Stein, S. Bakken, Columbia University; P. Stetson, Columbia University Medical Center

### Duplicate Medical Records: A Survey of Twin Cities Healthcare Organizations

M. McClellan, University of Minnesota

### Functional Analysis of Interfaces in U.S. Military Electronic Health Record System using UFuRT Framework

Z. Zhang, M. Walji, University of Texas School of Health Information Sciences at Houston; V. Patel, Arizona State University; R. Gimbel, Uniformed Services University of the Health Sciences; J. Zhang, University of Texas School of Health Information Sciences at Houston

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## S64 - Papers: Evaluations of Biosurveillance Methods

Theme: Public Health Informatics and Biosurveillance

### A Bayesian Network Model for Analysis of Detection Performance in Surveillance Systems

M. Izadi, D. Buckeridge, A. Okhmatovskaia, McGill University; M. Musen, S. Tu, M. O'Connor, C. Nyulas, Stanford University

### Bayesian Modeling of Unknown Diseases for Biosurveillance

Y. Shen, G. Cooper, University of Pittsburgh

### Evaluation of Two Spatial Algorithms for Detection of Disease Outbreaks in Two States

J. Que, F. Tsui, University of Pittsburgh

### A Comparison of Automated Methicillin-resistant Staphylococcus aureus Identification with Current Infection Control Practice

D. Shepherd, J. Friedlin, S. Grannis, Regenstrief Institute; S. Hui, Indiana University School of Medicine; A. Kho, Northwestern University

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## S65 - Papers: Genomic Tools and their Evaluation

Theme: Translational Bioinformatics

### DSGeo: Software Tools for Cross-platform Analysis of Gene Expression Data in GEO

R. Lacson, Brigham & Women's Hospital; E. Pitzer, Upper Austria University of Applied Sciences; J. Kim, UCSD; P. Galante, Ludwig Institute for Cancer Research; C. Hinske, Ludwig-Maximilians University; L. Ohno-Machado, UCSD

### Evaluation of the PharmGKB Knowledge Base as a Resource for Efficiently Assessing the Clinical Validity and Utility of Pharmacogenetic Assays

K. Kawamoto, L. Orlando, D. Voora, D. Lobach, S. Joy, A. Cho, G. Ginsburg, Duke University

### A Bayesian Method for Identifying Genetic Interactions

S. Visweswaran, I. Wong, M. Barmada, University of Pittsburgh

### Genome-wide Association Analysis of the ADNI Cohort Identifies a Putative Susceptibility Locus for Alzheimer's Disease

K. Nho, Regenstrief Institute; L. Shen, S. Kim, S. Risacher, T. Foroud, Indiana University School of Medicine; D. Craig, M. Huentelman, TGen; S. Potkin, University of California, Irvine; A. Saykin, N. Pankratz, Indiana University School of Medicine; B. Dechairo, Medco Health Solutions; M. Weiner, VA Medical Center

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## S66 - Demonstrations: Management of Populations

Theme: Public Health Informatics and Biosurveillance

### Mesh4x Synchronization Platform: Epi Info™ Prototype

T. Kass-Hout, InSTEDD; A. Advani, D. Nitschke, Centers for Disease Control and Prevention; E. Jezierski, J. Tondato, D. Israelski, E. Rasmussen, InSTEDD; L. Lenert, Centers for Disease Control and Prevention

Modern management of multi-state outbreaks requires collaborative assessments across jurisdictional and organizational boundaries. However, current epidemiological tools do not allow many-to-many data sharing or aggregation among investigation groups, making analysis of disease surveillance and outbreaks more time consuming for epidemiologists. InSTEDD's Mesh4x (<http://mesh4x.org>); a light-weight synchronization platform, allows for synchronous integration of data among many different sources regardless of technology platform or network connectivity. Designing for that mesh-like environment provides a low-cost, quickly implemented and flexible model which allows users to move beyond the limitations of current reporting systems, especially in acute settings (e.g., disease outbreak investigation, disaster response) with little or no connectivity. While Epi Info™, CDC's suite of tools for field collection of disease surveillance and outbreak information, has over 1 million instances worldwide, there exists no easy way to collaborate or exchange data among different instances. Working with CDC's National Center for Public Health Informatics, InSTEDD expanded the architecture of Epi Info™, using Mesh4x, to allow for synchronization over Internet cloud and SMS.

## **An Automated Detection and Notification System of Infectious Diseases Clusters Using Threshold Algorithms and Decision Support**

*M. Behta, B. Ross, NewYork-Presbyterian Hospital; R. Chaudhry, Columbia University*

Monitoring of positive microbiology cultures is an essential Infection Control (IC) activity. It provides early detection of changing infectious diseases pattern and clusters, helps minimize patient and/or staff exposure to resistant pathogens, and can decrease Healthcare-Acquired Infections (HAI). It has been estimated that 2 million HAIs develop in hospitalized patients every year, leading to ~100,000 deaths/year and a management cost of \$ 5.5 billion. Additionally, HAIs rates have become the basis for measuring the quality of care and determining reimbursement rates. Early detection of clusters/outbreaks requires a detailed evaluation of daily culture reports and historical microbiology data. Many IC teams rely on manual processes and the volume of data and challenging review processes has forced their surveillance activities to be limited to epidemiologically significant organisms. Automated surveillance systems are available, however, are costly, often utilize complex mathematical calculations, are vendor dependent thus not easily customizable to the institution's needs, and may have delays in implementing new/revised guidelines. We propose a less complex solution that can be utilized by other institutions. In this session we will present the process used to determine the threshold detection algorithms and build the decision support rules. We will also demonstrate the system and alerts developed.

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### **S67 - ACMI Sponsored: ACMI Senior Member Presentations**

*Theme: Clinical Workflow and Human Factors*

#### **Requirements for New Human Abilities in Today's Technological Healthcare Environment**

*V. Patel, Arizona State University*

In this presentation, the speaker will argue that we must avoid allowing one's knowledge or skills to diminish as technology becomes a ubiquitous part of the health care work environment. Individuals will have to be capable of discerning relevant information (filtering) and interpreting it within a particular context, requiring a need for much higher-level skills in this area than what has previously been required. A clear lesson from a number of years of cognitive science and artificial intelligence research is that prior knowledge critically shapes one's perception of new information. In general, the better one's understanding of the domain, the more useful and powerful information-finding resources are likely to be. In today's world of rapid technological change, no workplace has individuals with all the skills that will be needed 20 years from now. However, we have to begin preparing for these new skills today, such that they are continually being updated as society changes. Using data from specific studies, and accepted theories that have emerged from such work, this talk will summarize pertinent findings regarding the education and training of health professionals and biomedical informaticians, proposing a reorganized curriculum with focus on more generalizable higher-order knowledge and skills.

## **Studying Clinical Decision Support in the Field**

*J. Ash, Oregon Health & Science University*

Clinical decision support (CDS) is key to computerized provider order entry (CPOE) success and safer, more efficient health care. However, CPOE with CDS is not used in most community hospitals, which account for approximately 96% of all U.S. hospitals, nor is it used in most physician practices. To discover barriers and facilitators related to implementation of CPOE with CDS and to identify best practices for CDS, the Provider Order Entry Team (POET) of researchers at Oregon Health & Science University has conducted fieldwork at two community hospitals and in five multi-clinic outpatient settings dispersed across the U.S. Eleven themes have emerged: the varying meanings of CDS; data as a foundation for CDS; content library management; new kinds of special people; cultural translation for collaboration; usability; workflow; communication, training, and support; measures and metrics; champion management; and governance. This presentation will focus on the need for those involved in CDS to carefully consider issues related to these themes to optimize the use and usefulness of decision support in pursuit of safer health care.

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### **S68 - Featured Session**

#### **Clinical Informatics as Medical Specialty Progress Report**

*Edward H. Shortliffe, American Medical Informatics Association, Benson S. Munger, University of Arizona, Clyde Schechter, Albert Einstein College of Medicine, and James M. Vanderploeg, University of Texas Medical Branch at Galveston*

The American Medical Informatics Association (AMIA) has completed the development of a clinical informatics core content document necessary to certify the competency of physicians and has recently finished documenting a process for the accreditation of training programs in clinical informatics. The AMIA Board has endorsed both as official policy and published the documents in JAMIA. The goal of this session is to continue sharing the latest developments from this project as AMIA seeks to enable the establishment of clinical informatics as a medical subspecialty.

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### **S69 - Panel**

*Theme: Consumer Informatics and PHRs*

#### **Electronic Self-management Support in the Community**

*M. Jenkins, NYC Department of Health and Mental Hygiene; A. McDaniel, Indiana University; T. Check, Visiting Nurse Service of New York; J. Derman, Kaiser Permanente*

Self-management is recognized as a key ingredient in preventing and controlling the most deadly and most expensive chronic diseases in the U.S. The recipe for self management includes educated patient decisions shared with providers, evidence-based care, and close and ongoing behavioral and physiological monitoring. This panel discussion will present

privately- and publicly-funded projects in community nursing—cancer care, home care, and primary health care—including: 1) software design and fit with clinical systems infrastructure; 2) self-management implementation and integration into care for vulnerable populations; and 3) evaluation. Lessons learned and ideas to enhance clinical and consumer information systems will be presented.

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## **S70 - Panel**

*Theme: Education*

### **Careers in Medical Informatics: Perspectives from Recent Job Searches**

*D. Kaelber, The MetroHealth Center*

Each year, hundreds of informaticians with different background, training, and job goals graduate from informatics training programs or are otherwise looking for informatics-related jobs. Despite the fact that “informaticians are in high demand” sometimes it is difficult for people to find the “right” job. A panel of six individuals with different informatics background and who have changed jobs in the last 5 years will discuss their job search experiences and answer questions regarding what they learned from their job search experiences.

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## **S71 - Panel**

*Theme: Public Health Informatics and Biosurveillance*

### **Informatics Opportunities and Challenges for Improving Drug Safety**

*J. Overhage, Regenstrief Institute; K. Mandl, Children's Hospital Boston; J. Brown, Harvard Pilgrim Health Care/ Harvard Medical School; E. Pezalla, Aetna; A. Hartzema, US Food and Drug Administration*

The Observational Medical Outcomes Partnership (OMOP) is a public-private partnership designed to contribute to our insights into the use of existing data to improve the monitoring of drugs for safety and effectiveness. The Partnership began in the fall of 2008 and is conducting a two-year research initiative to determine the contribution and utility of using existing healthcare databases to identify and evaluate safety issues of drugs that are on the market. The panelists (representing various segments - academic and research, industry, and government) will stimulate dialogue and share their experiences with the AMIA audience concerning: 1) strengths and limitations of the use of observational data for pharmacovigilance; 2) common data models and terminologies being used in drug safety work; and 3) how observational data from different data providers can allow for systematic analyses across disparate databases.

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## **S72 - Papers: Decision Support for Prescribing Therapy**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

### **An Unintended Consequence of Electronic Prescriptions: Prevalence and Impact of Internal Discrepancies**

*M. Palchuk, Harvard Medical School; E. Fang, Johns Hopkins Hospital; J. Cygielnik, Partners HealthCare; M. Labreche, Northeastern University; M. Shubina, Brigham and Women's Hospital; H. Ramelson, Partners HealthCare; C. Hamann, Massachusetts General Hospital; C. Broverman, J. Einbinder, A. Turchin, Partners HealthCare and Brigham and Women's Hospital*

### **A Human Factors Investigation of Medication Alerts: Barriers to Prescriber Decision-Making and Clinical Workflow**

*A. Russ, A. Zillich, M. McManus, B. Doebbeling, J. Saleem, Veterans Health Administration*

### **Cognitive Analysis of Decision Support for Antibiotic Prescribing at the Point of Ordering in a Neonatal Intensive Care Unit**

*B. Sheehan, D. Kaufman, Columbia University; P. Stetson, Columbia University Medical Center; L. Currie, Columbia University*

### **Decision Making and Physician Prescribing Characteristics: A Pilot Study of Japanese Physicians**

*A. Shibuya, Tohoku University Hospital; A. Shibuya, Tohoku University Graduate School of Medicine; M. Nakayama, R. Inoue, Tohoku University Hospital; Y. Imai, Tohoku University; Y. Kondo, Tohoku University Graduate School of Medicine*

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## **S73 - Papers: Assessing Adoption and Acceptance of Information Technology**

*Theme: Clinical Workflow and Human Factors*

### **Intention to Use and Actual Use of Electronic Information Resources: Further Exploring Technology Acceptance Model (TAM)**

*D. Tao, Saint Louis University*

### **A Comparison of Usability Evaluation Methods: Heuristic Evaluation versus End-user Think-aloud Protocol - An Example from a Web-based Communication Tool for Nurse Scheduling**

*P. Yen, S. Bakken, Columbia University*

### **Visualization and Analysis of Activities in Critical Care Environments**

*M. Vankipuram, K. Kahol, T. Cohen, V. Patel, Arizona State University*

### **Clinician Adoption of Genetic Testing for Drug Metabolizing Enzymes: Is Patient Safety The Low-hanging Fruit of Personalized Medicine?**

*H. Enchin, Oregon Health & Science University*

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## **S74 - Papers: Focus on Medication Management**

*Theme: Data Integration and Exchange*

### **Challenges in Exchanging Medication Information: Identifying Gaps in Clinical Document Exchange and Terminology Standards**

*S. Phansalkar, G. Robinson, G. Getty, J. Shalaby, Partners Healthcare; D. Tao, Siemens Healthcare; C. Broverman, Partners Healthcare*

### **Building a Production-ready Infrastructure to Enhance Medication Management: Early Lessons from the Nationwide Health Information Network**

L. Simonaitis, B. Dixon, A. Belsito, T. Miller, J. Overhage, Regenstrief Institute

### **Can Dosing Practices Bridge the Knowledge Gap in Pediatric Medication Recommendations?**

E. Scheufele, Massachusetts General Hospital; A. Dubey, Partners HealthCare System, Inc.

### **Tracking Medication Information Across Medical Records**

J. Iglesias, K. Rocks, N. Jahanshad, E. Frias-Martinez, L. Andrada, A. Bui, UCLA

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### **S75 - Papers: Information Retrieval**

Theme: Data Mining, NLP, and Information Extraction

#### **LigerCat: Using "MeSH Clouds" from Journal, Article, or Gene Citations to Facilitate the Identification of Relevant Biomedical Literature**

I. Sarkar, University of Vermont; R. Schenk, H. Miller, C. Norton, Marine Biological Laboratory

#### **Multi-terminology Indexing for the Assignment of MeSH Descriptors to Medical Abstracts in French**

S. Pereira, Vidal; S. Sakji, Rouen university; A. Névéol, NLM; I. Kergourlay, CISMef; G. Kerdelhué, CISMef; E. Serrot, Vidal; M. Joubert, LERTIM; S. Darmoni, CHU

#### **Hierarchical Image Classification in the Bioscience Literature**

D. Kim, H. Yu, University of Wisconsin-Milwaukee

#### **Generating Quality Word Sense Disambiguation Test Sets Based on MeSH Indexing**

J. Fan, C. Friedman, Columbia University

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### **S76 - Papers: Focus on Laboratory Data**

Theme: Terminology and Standards

#### **A Characterization of Voluntary LOINC Mapping for Laboratory Tests in Three Large Institutions**

M. Lin, The University of Utah; D. Vreeman, Regenstrief Institute; C. McDonald, National Library of Medicine; S. Huff, Intermountain Healthcare

#### **Evaluation of LOINC for Representing Constitutional Cytogenetic Test Result Reports**

Y. Heras, Intermountain Healthcare; J. Mitchell, University of Utah; M. Williams, Intermountain Healthcare; A. Brothman, ARUP Laboratories; S. Huff, Intermountain Healthcare

#### **Terminology Modeling for an Enterprise Laboratory Orders Catalog**

L. Zhou, H. Goldberg, D. Pabbathi, Partners HealthCare; A. Wright, Brigham and Women's Hospital; D. Goldman, C. Van Putten, A. Barley, R. Rocha, Partners Healthcare System

### **A Recommendation Algorithm for Automating Corollary Order Generation**

J. Klann, Regenstrief Institute; J. Klann, Indiana University; G. Schadow, J. McCoy, Regenstrief Institute/Indiana University

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### **S77 - Partnerships: Partnerships in Innovation II**

Theme: Informatics Discovery, Innovation and Industry

#### **Improving Chronic Disease Management through an Innovative Partnership**

K. Allain, Cerner Corporation; K. Kochendorfer, University of Missouri

A collaboration between the University of Missouri School of Medicine (MU) and Cerner Corporation has led to the development, clinical use, and commercial availability of innovations to improve the care of patients with chronic conditions. This effort has also served as a basis for MU's selection as an Agency for Healthcare Research and Quality (AHRQ) grant recipient to study the effectiveness of electronic medical records for managing chronic conditions. The College of Healthcare Information Management Executives (CHIME) awarded the "2008 CHIME Collaboration Award" to MU and Cerner for this work, recognizing it as a strong example of a successful partnership between industry and academic healthcare. This presentation will describe the innovation and its clinical significance, as well as the key insights and recommendations for others in building successful innovation partnerships between industry and health care providers.

#### **Collaborative Research on an Intensive Care Decision Support System Utilizing Physiological Data Streams**

C. McGregor, University of Ontario Institute of Technology; D. Sow, IBM T J Watson Research Center; A. James, The Hospital for Sick Children; A. James, University of Toronto; M. Blount, M. Ebling, IBM T J Watson Research Center; J. Eklund, K. Smith, University of Ontario Institute of Technology

Abstract research teams from an industrial research laboratory, a university health informatics research centre and a children's hospital have formed a collaboration to investigate a novel decision support system for clinicians in a neonatal intensive care environment. The research focuses on the early detection of subtle changes in physiological data that might be condition onset predictors for selected conditions that make a major contribution to neonatal morbidity and impact both neonatal mortality and long-term outcomes. The research involves real-time streaming of dynamic, high fidelity physiological data from bedside medical devices, temporal data mining for new hypotheses to discover patterns that predict the onset of conditions of interest, and the development of robust algorithms to detect medically significant events in near real-time. The combined team has designed and implemented a framework that supports the acquisition, real-time processing, storage and data mining of physiological data streams, laboratory results and observations. In addition, the team designed, implemented, and parameterized analysis algorithms based on clinical practice in Neonatal Intensive Care Units. The framework has been deployed in a Neonatal Intensive Care Unit in order to collect data and to serve as a test bed.

**LB4 - Late Breaking Session**  
*(to be announced)*

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**5:00 PM-6:30 PM COMMITTEE MEETINGS**

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**AMIA 2010 Annual Symposium SPC Meeting  
Membership Committee Meeting  
Public Policy Committee Meeting**

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**5:15 PM-7:00 PM POSTER SESSION**

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**Poster Session – 2**

The authors are present at this poster session. Posters and authors in this session are listed on page 58.

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**5:30 PM-6:30 PM BUSINESS MEETINGS**

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**ACMI Business Meeting**

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**5:30 PM-7:00 PM BUSINESS MEETINGS**

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**Consumer Health Informatics WG Business Meeting  
Education WG Business Meeting**

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**6:30 PM-7:30 PM SPECIAL EVENTS**

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**AMIA 2009 SPC Reception** *(by invitation)*

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**7:30 PM-9:00 PM SPECIAL EVENTS**

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**Chairman's Club Reception** *(by invitation)*

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**9:00 PM-10:00 PM SOCIAL EVENTS**

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**Dance Party**

Join your colleagues for festivities on the penultimate day of AMIA 2009. This dance party is a can't miss event of the Annual Symposium, so put on your dancing shoes and join us for lots of fun on the dance floor.

**PLEASE JOIN AMIA NIWG FOR THE FOLLOWING NIWG-SPONSORED EVENTS:**

**NIWG Tutorial (T09)**

**Saturday, November 14th, 8:30am - 4:30pm**  
**Topic: Nursing Sensitive Quality Indicators:**

Informatics Research & Practice: This tutorial will present a critical analysis of the NQF's nursing sensitive care measures and will discuss integrating nursing quality measures into automated clinical information systems to ensure data capture as a by-product of care delivery. (Additional registration required).

**Speakers & Topics in order of presentation:**  
**Moderator: Patti Dykes, RN, DNSc**

- *NQF Performance Measures: Norma Lang, RN, PhD*
- *Fall and Injury Prevention: Leanne Currie, RN, DNSc*
- *Pressure Ulcer Prevention: Colleen Frey, RN, BSN*
- *Severe Sepsis Bundle/VAP: Nancy Nelson, RN, MS*
- *Rapid Response Teams: Judy Murphy, RN, BSN*
- *Continuity of Care: Charlotte Weaver, RN, PhD*
- *Standardized Terminologies for Nurse Sensitive Measures: Kaija Saranto, RN, PhD*
- *Mining Data for Nurse Sensitive Measures: Panel of all presenters, Jackie Moss, RN, PhD (Moderator)*

**NIWG Special Event**

**Sunday, November 15th, 8:00 am – 12:00 pm**

**Topics & Speakers in order of presentation:**

- *AMIA/NIWG/ANI goals: Bonnie Westra & Charlotte Weaver*
- *NI09 Post Conference Book on PHIMs: Patti Brennan & Kaija Saranto*
- *History Project: Bonnie Westra, Barbara Covington & Susan Newbold*
- *TIGER Update: Donna Dulong*
- *Standards/Federal Update/NQF Update: Rosemary Kennedy, Connie Delaney & Judy Murphy*
- *Competency/Certification: Brian Gugerty*
- *NI2012 Update: Patti Abbott & Judy Murphy*

**Education & Networking Suite**

**Sunday, November 15 – Tuesday, 17th**  
**(hours will be posted in the On-site Program)**

- *Meet NIWG board & committee members*
- *Tools to navigate AMIA*
- *History Project video presentations*
- *Meet Faculty from Schools with Nursing Informatics*

**CARING Breakfast**

**Tuesday, November 17, 7:00 am – 8:30 am**

## WEDNESDAY, NOVEMBER 18

**7:00 am-8:30 am**  
**7:30 am-8:30 am**  
**7:30 am-11:30 am**  
**8:30 am-10:00 am**

**Academic Forum Meeting**  
**NIWG Leadership Meeting**  
**Registration Open**  
**Scientific Sessions**

S78 Health IT Policy and Politics  
S79 Newborn Screening as the Model for Interoperable Genetic Data  
S80 Dealing with Time in Biomedical Data Repositories and Clinical Databases: Applications of Temporal Data Mining  
S81 Health Information Exchange (HIE) and Public Health Interactions: A Model for Improving Surveillance and Case Reporting  
S82 Assisting Physicians in Patient Care  
S83 Clinical Data Warehouses and Repositories  
S84 Ethnographic Studies  
S85 Applications of Ontologies in Research and Clinical Settings  
S86 Advances in Natural Language Processing  
LB5 Late Breaking Session

**10:00 am-10:30 am**  
**10:30 am-12:00 pm**

**Coffee Break**

S87 A Vision of Advanced Technologies for HIT  
S88 Health Information Technology-induced Errors: Identification and Prevention  
S89 50 Years in the Making - The Nursing Informatics Working Group History Project  
S90 The Electronic Medical Record and the Health of Your Privacy  
S91 Telecommunications Methods and Tools for Health and Health Care  
S92 Cognitive and Human Factors in the Clinical Setting  
S93 Representing Family Health History  
S94 Health Information Exchange  
S95 Encoding, Retrieving and Analyses of Patient Data  
S96 Innovative Systems

**12:15 pm-1:00 pm**

**Closing Session**

**WEDNESDAY, NOVEMBER 18, 2009**

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**7:00 AM-8:30 AM BUSINESS MEETINGS**

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**Academic Forum**

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**7:30 AM-8:30 AM BUSINESS MEETINGS**

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**Nursing Informatics WG Leadership Meeting**

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**7:30 AM-11:30 AM REGISTRATION OPEN**

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**8:30 AM-10:00 AM SCIENTIFIC SESSIONS**

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**S78 - Featured Session: Public Policy 101**

*Theme: Policy and Ethical Issues*

**Health IT Policy and Politics: A Primer on Moving Policy into Action**

*Don E. Detmer, American Medical Informatics Association, Margo Edmunds, Booz Allen Hamilton, Doug Peddicord, Washington Health Strategies Group, Paul Tang, Palo Alto Medical Foundation, and Edward H. Shortliffe, American Medical Informatics Association*

Health IT policy has evolved rapidly in the last several months, spurred by the \$19 billion investment in modernizing health IT systems through the American Recovery and Reinvestment Act. All over the country, initiatives are underway to save time and money and improve quality by moving from paper to electronic health information, building smarter electronic decision support systems for clinicians, and getting more competing health systems to start exchanging electronic health information as a public good. The sea change in visibility for our field has created new opportunities to put ideas into action. It also ramps up expectations and raises concerns about how to ensure that our workforce, communications infrastructure, and thought leaders are ready to meet these new challenges in a strategic and coordinated way.

This multidisciplinary panel will discuss current Health IT policy trends and opportunities for our field. We will review the policy process, including the role of government and the private sector in policy development, and review key roles played by Congressional committees and professional organizations. Panelists will discuss case examples of policy development through Institute of Medicine (IOM) reports, National Committee on Vital and Health Statistics (NCVHS) testimony, and other means. The panel will conclude with a discussion about opportunities for AMIA.

**S79 - Panel**

*Theme: Data Integration and Exchange*

**Newborn Screening as the Model for Interoperable Genetic Data**

*A. Zuckerman, Georgetown University; S. Downs, IU School of Medicine; C. McDonald, National Library of Medicine; J. Weisman, Department of Health and Human Services; D. Ross, Public Health Informatics Institute*

Each year over 4 million infants undergo mandated Newborn Screening to identify a wide range of genetic disorders. The Newborn Screening Use Case is introducing standards for interoperability to this important and challenging juncture of inpatient, public health and ambulatory practice settings. Special coding and terminology issues for these rare disorders have led to development of new LOINC codes and integration of work of the Personalized Healthcare Workgroup into the NLM UMLS. The birth of a new infant is an ideal time for families to provide interoperable family health histories collected using the Internet based Surgeon General's Family Health Portrait Tool that can be incorporated into a lifetime child health record beginning at the time of newborn hospital discharge. Privacy issues surrounding the transmission of genetic data must be addressed and the policy implications for newborn screening of the Genetic Information Nondiscrimination Act of 2008 (GINA) as well as HIPAA, CLIA, and state laws will be discussed. Effective newborn screening requires sharing of results with non-ordering providers and sharing results across state lines. Research uses of newborn screening are fundamental to population health improvement through program evaluation and gathering evidence about effective approaches to newborn screening and assessment of outcomes.

**S80 - Panel**

*Theme: Data Mining, NLP, and Information Extraction*

**Dealing with Time in Biomedical Data Repositories and Clinical Databases: Applications of Temporal Data Mining**

*R. Bellazzi, Università di Pavia; A. Das, Stanford University; A. Abu-Hanna, University of Amsterdam; Y. Shahar, Ben Gurion University; M. Hauskrecht, Pittsburgh University*

Time plays a crucial role in biomedical informatics. Over the last few years, the automatic collection of time-oriented data from hospitals, GPs and local healthcare agencies, has increased dramatically. Recently, a number of interesting approaches have been proposed within the data mining community for explicitly dealing with time-oriented data. These approaches are collectively called "temporal data mining algorithms" (TDM). The goal of this panel is to summarize the main approaches used in TDM and to show their practical applications to the medical informatics community. The panel

will discuss: i) the nature of temporal biomedical data, which involves measurements, events, time points and time intervals; ii) the data mining methods that can be used to analyze temporal data; iii) the clinical and research applications in which temporal data mining is essential. The panelists will provide the audience with some practical guidelines for approaching time-oriented data analysis in Biomedicine and point out unresolved problems.

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### **S81 - Panel**

*Theme: Public Health Informatics and Biosurveillance*

#### **Health Information Exchange (HIE) and Public Health Interactions: A Model for Improving Surveillance and Case Reporting**

*L. Le, I. Gotham, New York State Department of Health; S. Grannis, Regenstrief Institute; D. Dobbs, Science Applications International Corporation; C. Magruder, Centers for Disease Control and Prevention*

In February, 2008 the Centers for Disease Control and Prevention (CDC) developed and implemented five-year agreements with three collaboratives in New York, Indiana and Washington/Idaho, to explore the role of Health Information Exchange (HIE) in public health activities. A recent report indicated that New York health information technology programs could serve as models for HIE initiatives throughout the nation. It stands to be the first state in the nation with a contiguous set of regional health information organizations (RHIOs) that serve under a common governance model. The Indiana Network for Patient Care, supported by the Regenstrief Institute, an international leader in health technology research, has developed and implemented many advancements to enhance medicine and public health through their HIE. The Washington/Idaho HIE has led the way in implementing the NHIN biosurveillance data feeds to public health and has established an operational, sustainable HIE in the Washington/Idaho area. Together, these collaboratives are working together to create models and standards to support developing HIE's across the nation, including advancements in surveillance and bi-directional communication. Each collaborative, in conjunction with the CDC, will describe a series of innovative solutions in development or implementation that will serve to enhance health care and public health.

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### **S82 - Papers: Assisting Physicians in Patient Care**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **Visualized Data Speeds Review of Potential Adverse Drug Events in Patients on Multiple Medications**

*J. Duke, Regenstrief Institute; X. Li, Indiana University School of Medicine; S. Grannis, Regenstrief Institute*

### **Creation and Evaluation of EMR-based Clinical Summaries to Support HIV-Care in Uganda, Africa**

*M. Were, Regenstrief Institute/Indiana University School of Medicine; C. Shen, Indiana University School of Medicine; M. Bwana, Mbarara University of Science and Technology ISS Clinic; N. Emenyonu, UCSF; N. Musinguzi, Mbarara University of Science and Technology ISS Clinic; F. Nkuyahaga, Makerere University; A. Kembabazi, Mbarara University of Science and Technology ISS Clinic; W. Tierney, Indiana University School of Medicine/Regenstrief Institute*

### **Changing Course to Make Clinical Decision Support Work in an HIV Clinic in Kenya**

*S. Noormohammad, Regenstrief Institute and Indiana University-Purdue University Indianapolis; B. Mamlin, P. Biondich, B. McKown, M. Were, Regenstrief Institute*

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### **S83 - Papers: Clinical Data Warehouses and Repositories**

*Theme: Clinical Research Informatics*

#### **The Enterprise Data Trust at Mayo Clinic: A Semantically Integrated Warehouse of Biomedical Data**

*C. Chute, S. Beck, D. Mohr, Mayo Clinic*

#### **STRIDE - An Integrated Standards-based Translational Research Informatics Platform**

*H. Lowe, P. Hernandez, S. Weber, T. Ferris, Stanford University*

#### **Serving the Enterprise and Beyond with Informatics for Integrating Biology and the Bedside (i2b2)**

*S. Murphy, Massachusetts General Hospital; G. Weber, Harvard University; M. Mendis, V. Gainer, R. Kuttan, W. Pan, L. Phillips, Partners HealthCare; S. Churchill, Harvard University; J. Glaser, Partners HealthCare; I. Kohane, Children's Hospital, Boston*

#### **The Evolving Use of a Clinical Data Repository: Facilitating Data Access Within an Electronic Medical Record**

*A. Wilcox, D. Vawdrey, Y. Chen, B. Forman, G. Hripcsak, Columbia University*

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### **S84 - Papers: Ethnographic Studies**

*Theme: Clinical Workflow and Human Factors*

#### **PROSPEC: An Ethnographic Approach to Design and Implementation of a Patient-centered Intervention to Reduce Disparities in Prostate Cancer Screening Discussions**

*J. Holmes, C. Guerra, University of Pennsylvania School of Medicine; D. Frosch, University of California Los Angeles; J. Shea, R. Auten, A. Chung, University of Pennsylvania School of Medicine; R. Maffei, UT Health Science Center*

**What "To-Do" with Physician Task Lists: Clinical Task Model Development and Electronic Health Record Design Implications**

*D. Stein, J. Wrenn, Columbia University; P. Stetson, Columbia University Medical Center; S. Bakken, Columbia University*

**Hypothesis-driven Story Building Framework: Enhancing Iterative Process Support in Clinical Diagnostic Decision Support Systems**

*S. Zhu, M. Reddy, J. Yen, The Pennsylvania State University*

**Task Analysis in Action: The Role of Information Systems in Communicable Disease Reporting**

*J. Pina, A. Turner, University of Washington; T. Kwan-Gett, J. Duchin, Public Health - Seattle & King County*

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**S85 - Papers: Applications of Ontologies in Research and Clinical Settings**

*Theme: Data Integration and Exchange*

**Creating Mappings for Ontologies in Biomedicine: Simple Methods Work**

*A. Ghazvinian, N. Noy, M. Musen, Stanford University*

**Automated Mapping of Pharmacy Orders from Two Electronic Health Record Systems to RxNorm within the STRIDE Clinical Data Warehouse**

*P. Hernandez, T. Podchiyska, S. Weber, T. Ferris, H. Lowe, Stanford University*

**Nursing Knowledge Representation Ontology Development: Translation to Other Disciplines**

*S. McLane, J. Turley, The University of Texas School of Health Information Sciences at Houston*

**Parsing Citations Using Conditional Random Fields**

*Q. Zhang, Y. Cao, H. Yu, University of Wisconsin Milwaukee*

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**S86 - Papers: Advances in Natural Language Processing**

*Theme: Data Mining, NLP, and Information Extraction*

**A Practical Method for Transforming Free-text Eligibility Criteria into Computable Criteria**

*S. Tu, Stanford University; M. Peleg, University of Haifa; S. Carini, M. Bobak, J. Ross, University of California at San Francisco; D. Rubin, Stanford University; I. Sim, University of California at San Francisco*

**Methodology to Develop and Evaluate a Semantic Representation for NLP**

*J. Irwin, H. Harkema, L. Christensen, University of Pittsburgh; T. Schleyer, University of Pittsburgh, School of Dental Medicine; P. Haug, University of Utah; W. Chapman, University of Pittsburgh*

**Unsupervised Method for Extracting Machine Understandable Medical Knowledge from a Large Free Text Collection**

*R. Xu, A. Garber, A. Das, Stanford University*

**Tailoring Vocabularies for NLP in Sub-domains: A Method to Detect Unused Word Sense**

*R. Figueroa, Universidad de Concepción; Q. Zeng, Harvard University Medical School; S. Goryachev, Brigham and Women's Hospital; E. Wiechmann, Universidad de Concepción*

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**LB5 - Late Breaking Session**

*(to be announced)*

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**10:00 AM-10:30 AM COFFEE BREAK**

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**10:30 AM-12:00 PM SCIENTIFIC SESSIONS**

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**S87 - Featured Panel**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

**A Vision of Advanced Technologies for HIT**

*L. Sweeney, Carnegie Mellon University*

With significant funding recently approved by Congress, America should soon enjoy a national patient health information network. Initial uses and architectural decisions are rooted in past technology and practices, making the time ripe to consider opportunities for innovation, especially in privacy protection, patient involvement, economic accountability, and public health.

### **S88 - Panel**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **Health Information Technology-induced Errors: Identification and Prevention**

*J. Anderson, Purdue University; D. Sittig, University of Texas School of Health Information Sciences at Houston*

Abstract Health information technology such as electronic medical records and e-prescribing are widely regarded as technical solutions to medical errors. Despite their potential benefits, use of information technology has the unintended potential of increasing medical errors if not designed and implemented properly. This panel will review the types and causes of technology-induced errors; the use of a socio-technical model to identify potential problems during the design and development stages of HIT projects; the use of usability engineering to evaluate information systems and user interfaces; and the use of clinical and computer simulation to evaluate the effects of interface design upon technology-induced errors.

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### **S89 - Panel**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **50 Years in the Making-The Nursing Informatics Working Group History Project**

*J. Brixey, Kansas University Medical Center; B. Westra, University of Minnesota; B. Covington, Texas State University; E. Shortliffe, Arizona State University; S. Bakken, Columbia University*

Nursing informatics is emerging as an essential discipline to improve patient safety and care quality in the delivery of health care services. Focusing on a flourishing field, the American Medical Association Informatics Nursing Working Group (NIWG) deemed it imperative that contributions made by the leaders in the field be preserved. As the largest group of health professionals, technology must support nursing practice to provide safe patient care. This panel will address the process of capturing the history of nursing informatics, the web-based videotaped stories of 33 pioneers in nursing informatics. Lessons learned from interviews of the pioneers will be shared during the presentation. Additionally the use of the web-based history tools will be explored as sharing lessons learned in this evolving nursing specialty. The website is evolving as both a critical instructional and research resource. A critique of the project will be provided by both a nurse and health informatician regarding the value and usefulness of the historical documentation effort to inform the future of healthcare informatics and healthcare leadership.

### **S90 - Panel**

*Theme: Policy and Ethical Issues*

#### **The Electronic Medical Record and the Health of Your Privacy**

*V. Nichols-Johnson, SIU School of Medicine; R. Koppel, University of Pennsylvania; K. Goodman, University of Miami; E. Zych, Geisinger Medical Center; G. Wiederhold, Stanford University*

The issue of privacy seems to pervade every aspect of our lives. We are asked to sign statements stating we recognize our rights to privacy at every new physician's visit, and every bill from a creditor seems to contain a privacy notice. But privacy involves more than a simple "I won't tell anything I don't have to." The notices contain statements about who an entity will release information to, but patients may not be fully aware of the consequences of such releases. Keeping information private has implications for future clinical care, medical research on treatment outcomes, drug surveillance, and health care system effectiveness analysis. Our panel will probe a range of issues such as the relationship of security and privacy, the importance of the new The American Recovery and Reinvestment Act of 2009 (ARRA) to privacy, the legal perspective, and the technical aspects involved with this important issue. We also hope to enable the audience to think about how we as members of AMIA might improve upon solutions to some of these problems.

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### **S91 - Papers: Telecommunications Methods and Tools for Health and Health Care**

*Theme: Clinical Decision Support, Outcomes, and Patient Safety*

#### **The Effectiveness of a Secure Email Reminder System for Colorectal Cancer Screening**

*D. Muller, Kaiser Permanente; J. Logan, D. Dorr, Oregon Health & Science University; D. Mosen, Kaiser Permanente*

#### **Using Mobile & Personal Sensing Technologies to Support Health Behavior Change in Everyday Life: Lessons Learned**

*P. Klasnja, University of Washington; S. Consolvo, Intel Research Seattle; D. McDonald, J. Landay, W. Pratt, University of Washington*

#### **Reliable Real-time Clinical Monitoring Using Sensor Network Technology**

*O. Chipara, C. Brooks, S. Bhattacharya, C. Lu, R. Chamberlain, G. Roman, Washington University in St. Louis; T. Bailey, Washington University School of Medicine*

**Heralding New Ringtones of Patient Safety: Blackberry-based Clinical Communication and Telementoring in Laparoscopic Surgery**

*O. Azuh, Wayne State University School of Medicine; A. Sen, I. Rubinfeld, Henry Ford Hospital; N. Shah, A. Broady, Wayne State University; A. Parker, D. Blyden, V. Velanovich, A. Falvo, P. Patton, Henry Ford Hospital*

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**S92 - Papers: Cognitive and Human Factors in the Clinical Setting**

*Theme: Clinical Workflow and Human Factors*

**The Human Factor in Medical Emergency Simulation**

*L. Hinske, B. Sandmeyer, B. Urban, P. Hinske, C. Lackner, M. Lazarovici, Ludwig-Maximilians University*

**Assessing Performance of an Electronic Health Record (EHR) Using Cognitive Task Analysis**

*H. Saitwal, University of Texas Health Science Center Houston; X. Feng, Arizona State University; M. Walji, University of Texas Health Science Center Houston; V. Patel, Arizona State University; J. Zhang, University of Texas School of Health Information Sciences at Houston*

**User Centered Design in Complex Healthcare Workflows: The Case of Care Coordination and Care Management Redesign**

*N. Behkami, Portland State University; D. Dorr, OHSU*

**The Cognitive Basis of Effective Team Performance: Features of Failure and Success in Simulated Cardiac Resuscitation**

*P. Shetty, T. Cohen, Arizona State University; B. Patel, Mayo Clinic; V. Patel, Arizona State University*

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**S93 - Papers: Representing Family Health History**

*Theme: Consumer Informatics and PHRs*

**Evaluation of Family History Information within Clinical Documents and Adequacy of HL7 Clinical Statement and Clinical Genomics Family History Models for Its Representation**

*G. Melton, N. Raman, University of Minnesota; E. Chen, I. Sarkar, University of Vermont; S. Pakhomov, R. Madoff, University of Minnesota*

**The Family Health History Ontology: Representing Real Families**

*J. Peace, The University of North Carolina at Chapel Hill*

**Development of a Consumer-facing Problem List for Family Health Histories**

*N. Hulse, Intermountain Healthcare; G. Wood, Intermountain Healthcare Clinical Genetics Institute; P. Haug, Homer Warner Center for Informatics Research; M. Williams, Intermountain Healthcare*

**Evaluation of Risk Scores Derived from the Health Family Tree Program**

*Y. Jiang, C. Staes, T. Adams, S. Hunt, University of Utah*

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**S94 - Papers: Health Information Exchange**

*Theme: Data Integration and Exchange*

**Laying the Groundwork for Enterprise-wide Medical Language Processing Services: Architecture and Process**

*E. Chen, University of Vermont; F. Maloney, E. Shilmayster, H. Goldberg, Partners HealthCare*

**Assessment of Collaboration and Interoperability in an Information Management System to Support Bioscience Research**

*S. Myneni, V. Patel, Arizona State University*

**Towards a Smart Object Network for Clinical Services**

*M. Sedlmayr, A. Becker, Friedrich-Alexander-University Erlangen-Nuremberg; U. Muench, F. Meier, Fraunhofer-Center for Applied Research on Technologies for the Logistics Service Industries; H. Prokosch, T. Ganslandt, Friedrich-Alexander-University Erlangen-Nuremberg*

**Mission-driven Priorities: Public Health in Health Information Exchange**

*B. Nangle, W. Xu, D. Sundwall, Utah Department of Health*

### **S95 - Papers: Encoding, Retrieving, and Analyses of Patient Data**

*Theme: Data Mining, NLP, and Information Extraction*

#### **Profile-based Retrieval of Records in Medical Databases**

*A. Kementsietsidis, L. Lim, M. Wang, IBM T.J. Watson Research Center*

#### **Automated Metastasis Stage Classification for Lung Cancer Patients using Free Text Radiology Reports**

*A. Nguyen, M. Lawley, D. Hansen, CSIRO; R. Bowman, University of Queensland; S. Colquist, Queensland Health*

#### **Support Vector Machine-based Mucin-type O-linked Glycosylation Site Prediction Using Enhanced Sequence Feature Encoding**

*M. Torii, H. Liu, Z. Hu, Georgetown University Medical Center*

#### **Measuring Stability of Feature Selection in Biomedical Datasets**

*J. Lustgarten, V. Gopalakrishnan, S. Visweswaran, University of Pittsburgh*

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### **S96 - Demonstrations: Innovative Systems**

*Theme: Education*

#### **Kaiser Permanente's Archimedes Pilot: Getting the Right Treatment to the Right Patient**

*N. Atkins, K. Woods, Kaiser Permanente; P. Alperin, M. Morris, Archimedes Inc.*

Archimedes, Inc., a San Francisco-based health care modeling company, created an application that provides patient-specific benefit scores to help get the right treatment to the right patient. Specifically, the application provides individualized benefit scores to providers for patients at risk for CVD or diabetes. This application was piloted in two Kaiser Permanente Hawaii clinics for six months, by physicians and care managers, for population outreach and shared decision-making with members. This presentation includes an overview of the application, a summary of the pilot at Kaiser Permanente, a demonstration of how scores are integrated into the clinician workflow via Kaiser's electronic medical record, and the elements of the pilot evaluation plan.

### **OpenMRS: Success and Challenges for EHRs in Resource-Poor Settings**

*A. Kanter, Columbia University; H. Fraser, Brigham & Women's Hospital; C. Seebregts, Medical Research Council; P. Biondich, Regenstrief Institute*

OpenMRS is a highly configurable, but standards-based open source medical record architecture and application that is currently implemented in over 29 sites in 19 countries (mostly in the developing world). Over the last several years, significant progress has been made in both the development of the software and its implementation. Not only has OpenMRS grown from being primarily an HIV-focused application to one encompassing TB and Primary Care, but the role of the system has evolved from just a medical record into a tool for both provision of care and research. This panel will discuss specific case studies to elaborate on challenges in several different contexts, focusing on the shift to primary care, the incorporation of new data entry tools, the management of multinational implementation, and the need for building capacity in the field along. It will also describe the successes and future application of this exciting technology.

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### **12:15 PM-1:00 PM PLENARY**

#### **Closing Session**

Join us at the concluding session of AMIA 2009 for the presentation of awards and closing ceremonies for your final symposium experience. The session will include remarks by Lucila Ohno-Machado, David W. Bates, and Edward H. Shortliffe, as well as a review on the breadth and depth of symposium sessions. AMIA provides a series of merit awards each year for research work submitted to its Annual Symposium through the rigorous submission and review process that will also be presented during the session.

## REGISTRATION INFORMATION

Advanced rates apply August 28 through October 29.  
On-site rates apply October 29 and after. To register, please go to <http://symposium2009.amia.org/>

	Advance	On-site
Author: AMIA Member	\$625	\$725
Author: Non-member	\$775	\$875
Full: AMIA Member	\$675	\$775
Full: Non-member	\$825	\$925
Student: AMIA Member	\$345	\$395
Student: Non-member	\$445	\$495
Single-day: Member	\$330	\$355
Single-day: Non-member	\$355	\$405
Innovation and Information Center only	\$100 (per day)	\$100 (per day)

## TUTORIAL REGISTRATION RATES

Registration for tutorials is additional to the general symposium registration. Please note many tutorials are being held at the same time, so make sure to watch the times on the tutorials you choose to attend.

	Advance	On-site
<b>Full Day Tutorials</b>		
Member	\$325	\$350
Non-member	\$350	\$395
Student	\$245	\$265
<b>Half Day Tutorials</b>		
Member	\$195	\$225
Non-member	\$215	\$250
Student	\$180	\$195

**Full registration** fees for members, non-members, and students cover all events except for tutorials, designated affiliate events, and selected special events. Registration includes CD-ROM proceedings, and registration bag with materials.

**Author Rates** apply to primary authors of all AMIA 2009 accepted papers, theater-style demonstrations, partnerships in innovation, workshops, posters, and all panel participants. Author rates do not apply to tutorial presenters or secondary authors.

**Student Rates** are for full-time students. They do not apply to part-time students. All students MUST present proof of student status by providing a letter from the university/college registrar's office verifying current full-time enrollment in a degree or post-doctoral program at the time of the AMIA 2009 Annual Symposium as well as expected graduation date.

**Single-day Registration** covers all programs and events for that day and includes CD-ROM proceedings, and registration bag with materials. Registrants who wish to attend an event or program on another day must register for additional day.

**Innovation and Information Center Only Registration** covers one-day attendance only at activities held in the Exhibit Hall, which includes exhibits and poster sessions. Innovation and Information Center Only registrants are not eligible to attend scientific program sessions, opening or closing session, or any other event held outside of the Exhibit Hall. No bag or CD-ROM included.

### Cancellation Policy

Cancellation of a conference registration does not constitute cancellation of a hotel room. Please be sure to handle both separately. Cancellation and refund requests must be received by AMIA in writing. By September 25, 2009: Full refund minus \$50 processing fee. Between September 26, 2009 and October 26, 2009: 50% refund. After October 26, 2009: No refund will be issued. However, registrations can be transferred to another member of your organization.

### Transfer of Paid Registrations Policy

Registrants who are unable to attend the meeting may transfer their registration to another person. Transfer of registration must be in writing and received by the AMIA office by October 19 or presented on-site. If a member registration is transferred to a non-member, that person will have to pay the difference between the member and the non-member rates.

## HOTEL INFORMATION:

### Hilton San Francisco and Towers

333 O'Farrell Street  
San Francisco, CA 94102-2116

With its premier location in the heart of city, you will find yourself within walking distance to the famous San Francisco Neighborhoods like Chinatown, Nob Hill, the famous Cable Cars, shopping, dining and much more. Also blocks away is the Powell Street station of the BART transit line which is a great transportation alternative to and from the San Francisco or Oakland Airports.

**Room rate:** \$250 single, \$270 double

Hotel rooms may be reserved on-line through the hotel's on-line booking site (<http://www.hilton.com/en/hi/groups/personalized/SFOFHMH-MIA-20091114/index.html>) You can also make reservations by calling the hotel directly at: 415-771-1400. Reservations received after October 22, 2009 or after AMIA's block is filled (whichever comes first), are subject to availability and prevailing rates.



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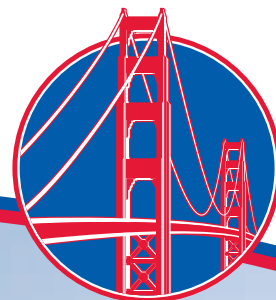
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