COMPLEX
Adaptive Systems

°BALTIMORE

Emerging Technologies for Evolving Systems:
Socio-technical, Cyber and Big Data

Baltimore, Maryland
November 13 - 15, 2013

2013 Conference Program

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International Journal
of General Systems
Intelligent Systems Area Editor
dagli@mst.edu

Welcome

Welcome to this year's Complex Adaptive Systems Conference. Over the next three days, we will share our ideas, tools, methodologies and research results in the domains of cyberspace physical systems, socio-technical systems and healthcare. Contributions to this conference, in the form of paper presentations, plenary sessions and panel discussions, will cultivate new ideas and advance all of our understanding of complex systems of today.

We are pleased to announce that we have authors from 16 countries presenting 83 papers. On behalf of the organizing committee, I wish to thank all our authors for their contributions to the proceedings and to this conference.

A special recognition goes to our distinguished plenary speakers, and those who serve as panelists during the discussion sessions.

Further, I want to mention our conference sponsors, whose financial contributions and support allow us to continue to offer this annual conference. Their involvement enhances the collaboration between industry and academia.

In closing, I wish to express my gratitude to the conference organizing committee and paper referees. Your comments, suggestions and diligence in creating each track ensures a successful conference.

Sincerely,

Opening Welcome
Speaker: Attorney General of Maryland Douglas F. Gansler

Douglas F. Gansler was elected to a second term as the Attorney General of Maryland on November 2, 2010. Attorney General Gansler recently ended his tenure as President of the National Association of Attorneys General (NAAG) and served as Chair of the Democratic Attorneys General Association (DAGA) until accepting his post at the national organization. Since taking office in 2006, Attorney General Gansler has focused on environmental, public safety, and consumer issues. Prior to becoming Maryland's Attorney General, Gansler served for eight years as the chief prosecutor in the largest jurisdiction in Maryland. Prior to being elected State's Attorney, Gansler served as an Assistant United States Attorney. In addition to his prosecutorial experience, Gansler practiced civil litigation. He began his legal career as a law clerk for the Honorable John F. McAuliffe, Judge on the Maryland Court of Appeals. Attorney General Gansler received his law degree from the University of Virginia School of Law and graduated cum laude from Yale University. He is married to Laura Leedy Gansler and they have two sons.

Conference Schedule at a Glance

Full Schedule starts on pg. 9

Wednesday, Nov. 13, 2013

7:00 a.m. – 5:00 p.m.
Registration *(Pre-function Foyer)*

7:30 a.m. – 8:30 a.m.
Continental Breakfast *(Stadium 5)*

8:00 a.m. – 9:00 a.m.
Opening Session & Welcome
Speaker: Attorney General of Maryland
Douglas F. Gansler
Morning Plenary – "Modeling Complex
Socio-Technical Enterprises"
Speaker: William B. Rouse
(Stadium 1 & 2)

9:00 a.m. – 10:30 a.m.
Concurrent Technical Sessions
Systems Behavior Modeling I *(Stadium 1)*
Data Science & Analytics I *(Stadium 2)*
Intelligent & Adaptive Systems I *(Stadium 3)*

10:30 a.m. – 11:00 a.m.
Break *(Stadium 5)*

11:00 a.m. – 12:30 p.m.
Concurrent Technical Sessions
Socio-Technical Systems I *(Stadium 1)*
Data Science & Analytics II *(Stadium 2)*
Intelligent & Adaptive Systems II *(Stadium 3)*

12:30 noon – 1:30 p.m.
Luncheon Plenary – The Century of Biology –
A Multi-Disciplinary Approach for Attacking
Grand Challenges in Systems Biology
Speaker: Charles Goldblum *(Stadium 4 & 5)*

1:30 p.m. – 3:00 p.m.
Concurrent Technical Sessions
Socio-Technical Systems II *(Stadium 1)*
Data Science & Analytics III *(Stadium 2)*
Intelligent & Adaptive Systems III *(Stadium 3)*

3:00 p.m. – 3:30 p.m.
Break *(Stadium 5)*

3:30 p.m. – 5:00 p.m.
Panel Session - Cyber Physical Systems
(Stadium 1 & 2)

Thursday, Nov. 14, 2013

7:00 a.m. – 5:00 p.m.
Registration *(Pre-function Foyer)*

7:30 a.m. – 8:30 a.m.
Continental Breakfast *(Stadium 5)*

8:00 a.m. – 9:00 a.m.
Session Convenes – Announcements
Morning Plenary – Taming Complexity:
A Challenge for Systems of Systems
Speaker: Judith Dahmann *(Stadium 1 & 2)*

9:00 a.m. – 10:30 a.m.
Concurrent Technical Sessions
Systems Modeling & Design I *(Stadium 1)*
Data Science & Analytics IV *(Stadium 2)*
Intelligent & Adaptive Systems IV *(Stadium 3)*

10:30 a.m. – 11:00 a.m.
Break *(Stadium 5)*

11:00 a.m. – 12:30 p.m.
Concurrent Technical Sessions
Systems Modeling & Design II *(Stadium 1)*
Data Science & Analytics V *(Stadium 2)*
Intelligent & Adaptive Systems V *(Stadium 3)*

12:30 p.m. – 1:30 p.m.
Luncheon Plenary – Information Security
as a Source of Innovation
Speaker: David A. Cass *(Stadium 4 & 5)*

1:30 p.m. – 3:00 p.m.
Concurrent Technical Sessions
Systems Modeling & Design III *(Stadium 1)*
Cyber Physical Systems I *(Stadium 2)*
Intelligent & Adaptive Systems VI *(Stadium 3)*

3:00 p.m. – 3:30 p.m.
Break *(Stadium 5)*

3:30 p.m. – 5:00 p.m.
Panel Session - Systems of Systems as
Complex Adaptive Systems *(Stadium 1 & 2)*

6:30 p.m. – 7:00 p.m.
Cash Bar *(Pre-function Foyer)*

7:00 p.m. – 9:30 p.m.
Banquet & Awards *(Stadium 4 & 5)*
Banquet Plenary – Speaking of the Future
Speaker: Haden A. Land

Friday, Nov. 15, 2013

7:00 a.m. – 12:00 noon
Registration *(Pre-function Foyer)*

7:30 a.m. – 8:30 a.m.
Continental Breakfast *(Stadium 5)*

8:00 a.m. – 9:00 a.m.
Session Convenes – Announcements
Morning Plenary – The Wisdoms and Follies
of Managing by Numbers in Healthcare
Speaker: Joseph Francis *(Stadium 1 & 2)*

9:00 a.m. – 10:30 a.m.
Concurrent Technical Sessions
Healthcare Medical Innovation I *(Stadium 1 & 2)*
Intelligent & Adaptive Systems VII *(Stadium 3)*

10:30 a.m. – 11:00 a.m.
Break *(Stadium 5)*

11:00 a.m. – 12:30 p.m.
Concurrent Technical Sessions
Healthcare Medical Innovation II *(Stadium 1 & 2)*
Distributed Education Systems *(Stadium 3)*

12:30 p.m. – 1:30 p.m.
Luncheon Plenary – Advanced CAS
and CAS-Like Tool Use by Healthcare
Regulatory Agencies
Speaker: John A. Norris *(Stadium 4 & 5)*

1:30 p.m. – 3:00 p.m.
Concurrent Tutorial Sessions
Topics in Statistical Decision Theory: Does the
**   Decision Mechanism Matter?"** *(Stadium 1)*
On Principles of Complex Systems Engineering
**   – Complex Systems Made Simple** *(Stadium 2)*
Systems Engineering Risk Analysis *(Stadium 3)*

3:00 p.m. – 3:30 p.m.
Break *(Stadium 5)*

3:30 p.m. – 5:00 p.m.
Panel Session – Overcoming Massive Cost,
Complexity, and Non-Coordination Problems
in Health Care Systems – the Serious
Challenge We Face *(Stadium 1 & 2)*

5:00 p.m.
Conference Adjourns

Thank you sponsors

On behalf of the Complex Adaptive Systems Conference Organizing Committee, we would like to express our appreciation to this year's esteemed sponsors.

Platinum
LOCKHEED MARTIN

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Conference Plenary Speakers

Wednesday, November 13, 2013
8:00 a.m. – 9:00 a.m.
Stadium 1 & 2

Morning Plenary Speaker: *William B. Rouse, PhD*

Title: Modeling Complex Socio-Technical Enterprises

Abstract: Socio-technical systems involve behavioral and social aspects of people and society that interact with technical aspects of organizational structure and processes – both engineered and natural – to create organizational outcomes and overall system performance. These types of systems are often also characterized as complex adaptive systems where independent agents pursue their individual objectives while learning and adapting to evolving system structures and behaviors. Design and evaluation of such systems can be addressed using a multi-level modeling approach that explicitly represents the different levels of abstraction underlying system behaviors and performance. Within each level, there can also be levels of aggregation enabling consideration of more or less detail. This presentation will outline the theoretical basis of multi-level modeling and illustrate how such models can provide the basis for "flight simulators" for enterprise policy, strategy, planning and management.

Biography:

Bill Rouse is the Alexander Crombie Humphreys Chair within the School of Systems & Enterprises at Stevens Institute of Technology and Director of the Center for Complex Systems and Enterprises. He is also Professor Emeritus, and former Chair, of the School of Industrial and Systems Engineering at the Georgia Institute of Technology. His research focuses on understanding and managing complex public-private systems such as healthcare, energy and defense, with emphasis on mathematical and computational modeling of these systems for the purpose of policy design and analysis. Rouse has written hundreds of articles and book chapters, and has authored many books. He has edited or co-edited numerous books. Among many advisory roles, he has served as Chair of the Committee on Human Factors of the National Research Council, a member of the U.S. Air Force Scientific Advisory Board, and a member of the DoD Senior Advisory Group on Modeling and Simulation. Rouse is a member of the National Academy of Engineering and has been elected a fellow of four professional societies – Institute of Electrical and Electronics Engineers (IEEE), the International Council on Systems Engineering (INCOSE), the Institute for Operations Research and Management Science (INFORMS), and the Human Factors and Ergonomics Society (HFES). Rouse received his B.S. from the University of Rhode Island, and his S.M. and Ph.D. from M.I.T.

Wednesday, November 13, 2013
12:30 p.m. – 1:30 p.m.
Stadium 4 & 5

Luncheon Plenary Speaker: *Charles Goldblum, PhD*

Title: The Century of Biology – A Multi-Disciplinary Approach for Attacking Grand Challenges in Systems Biology

Abstract: Reflecting upon the past three centuries in math and science, we can bin each of these centuries by its dominant field of scientific endeavor. In this framework, the 18th Century was the Century of Mathematics, the 19th Century was the Century of Chemistry, and the 20th Century was the Century of Physics. Freeman Dyson declared the 21st Century to be the Century of Biology, based on the current and anticipated societal and socio-economic impact of research in biology. The Research and Exploratory Development Department at the Johns Hopkins University Applied Physics Laboratory has embraced Dyson's worldview. We at APL rely on the convergence of disciplines (EE, physics, systems engineering, etc.) to address some of the large systems biology problems that face the nation. I will address specific research, for instance, using femtosecond lasers to bind hydroxides to protein to better understand their 3D instantiation, and our work with Harvard on DARPA's Prophecy Program. I will also address some of the grand challenges in systems biology and how these challenges can be best addressed with interdisciplinary research.

Biography:

Charles Goldblum is currently the Business Area Executive for JHU/APL's Research and Exploratory Development Department. In this capacity, he is responsible for managing a large and diverse research portfolio in the physical, informational, and biological sciences supporting many elements of DoD and the Intelligence Community. Dr. Goldblum joined APL in 2007 with over 20 years of research and development experience. Dr. Goldblum received his M.S. and Ph.D. in Physics from the University of Virginia and a B.A. in Physics and English Literature from The George Washington University. He is a Fellow of the Massachusetts Institute of Technology's Seminar XXI: Foreign Politics, International Relations and the National Interest (2010-2011). Dr. Goldblum also serves as a Special Government Employee (SGE) in the capacity of a science advisor to operational elements in the DoD.

Thursday, November 14, 2013
8:00 a.m. – 9:00 a.m.
Stadium 1 & 2

Morning Plenary Speaker: *Judith Dahmann, PhD*

Title: Taming Complexity: A Challenge for Systems of Systems

Abstract: Increasingly key elements of society – defense, energy, transportation, water resources, telecommunications, others – critically depend on the coordinated functioning of multiple independent systems which are designed, operated, and maintained by separate organizations with their own objectives, stakeholders, operating models, and constraints. These 'systems of systems' by their very nature are complex, dynamic, and not only depend on multiple autonomous engineered systems which may be complex systems themselves, but also on the complex human and organizational environments in which they are developed and operated. This presentation will explore the nature of systems of systems and their complexity and will consider the technical challenges of systems of systems for the complex adaptive systems research community.

Biography:

Judith Dahmann is a principal senior scientist in the MITRE Corporation Center for Advanced Systems Analysis and Acquisition. Dr. Dahmann is currently the technical director for Systems Analysis in the Office of the Director of Systems Engineering in the US DOD Office of the Under Secretary of Defense for Acquisition, Technology and Logistics. In this capacity, she is part of a team working to develop approaches to the acquisition, development and systems engineering of integrated user capabilities with a focus on early systems engineering, advanced systems engineering applications and systems of systems, where she is the technical lead for the office. She leads the development of the US DoD guide for systems engineering of systems of systems (SoS) and ongoing SoS engineering guidance, oversight and research. Prior to this, Dr. Dahmann was the Chief Scientist for the Defense Modeling and Simulation Office for the US Director of Defense Research and Engineering (1995-2000) where she led the development of the High Level Architecture, a general-purpose distributed software architecture for simulations, now an IEEE Standard (IEEE 1516). Dr. Dahmann holds a bachelor's degree from Chatham College in Pittsburgh, PA (1972), spent a year as a special student at Dartmouth College (1971-72), a master's degree from The University of Chicago (1973), and a doctorate from Johns Hopkins University (1984).

Thursday, November 14, 2013
12:30 p.m. – 1:30 p.m.
Stadium 4 & 5

Luncheon Plenary Speaker: *David A. Cass, MSE, MBA*

Title: Information Security as a Source of Innovation

Abstract: Emerging technologies are becoming more complex and cyber-attacks ever more sophisticated. In addition, privacy and regulations are adding to the challenging business environment. Information security must be a business enabler and help the business innovate. We will discuss strategies to navigate this environment, leverage new technology, and help the business innovate.

Biography:

David A. Cass is the Chief Information Security Officer for Elsevier. He leads an organization of experienced legal, risk and security professionals that provide data protection, privacy, security, and risk management guidance on a global basis for Elsevier. David has extensive experience in IT security, risk assessment, risk management, business continuity and disaster recovery, developing security policies and procedures. He has played a key role in leading and building corporate risk & governance and information security organizations in the financial sector. As the Senior Director of Information Security Risk and Governance for Freddie Mac, David rebuilt the risk and governance function and developed a team to provide risk assessments, methodologies, tools, services, and training to improve the maturity and capabilities of Freddie Mac's information security, risk and governance programs. Prior to that he was Vice President of Risk Management for JPMorgan Chase, and was responsible for providing an accurate assessment of the current risk management state, contributing to the future direction of risk management, continuity and disaster recovery capabilities for the organization. David has a MSE from Penn Engineering and The Wharton School of Business. In June of 2012, he received his MBA from MIT.

Conference Plenary Speakers

Thursday, Nov. 14, 2013
7:00 p.m. – 9:30 p.m.
Stadium 4 & 5

Banquet Plenary Speaker: *Haden A. Land*

Title: Speaking of the Future

Abstract: The explosion of computing technology and the associated business demand require industry and academia leaders to keep up with the fast-paced world of change while also predicting what's coming next. This phenomenon has thrust technology professionals into the business limelight, opening new doors for both exciting business potential and increased risks. The unpredictable nature of today's global, political, economic and technological landscape provides both opportunity and challenge. Advancing and enabling innovation across the business landscape and ensuring our academia programs are aligned as well as ensuring protection from cyber security threat vectors is essential for global competitiveness. Technology is now pervasive in almost every aspect of our professional and personal lives, and what was once considered magic is now common practice. Join Haden Land as he examines global trends and key technologies for adaption science, big data, cyber security, mobility, and the associated implications on the future workforce.

Biography:

Haden A. Land is vice president of Engineering and CTO for Lockheed Martin IS&GS Civil. He serves U.S. government agencies, allied nations, and regulated commercial industries. Mr. Land, a certified systems architect, is responsible for technical solutions, strategic partnerships, engineering performance, talent development, research and development, and emerging technology planning. Previously, Land was vice president of Technical Operations and CTO/CIO for Lockheed Martin Enterprise Solutions, has over twenty years of technical experience performing several chief architect/engineer roles and has held various technical/engineering director positions.

Friday, November 15, 2013
8:00 a.m. – 9:00 a.m.
Stadium 1 & 2

Morning Plenary Speaker: *Joseph Francis, MD, MPH*

Title: The Wisdom and Follies of Managing by Numbers in Healthcare

Abstract: Healthcare payers, providers, and systems have embraced performance measurement as a key means of improving quality, controlling cost, and demonstrating accountability. However, measures behave, in many ways, as "models" of reality – "all are wrong – some are useful". While a powerful tool for driving change and shaping the change of clinicians, performance measurement introduces new challenges for clinicians and managers including the possibility of unintended negative consequences for patients. This presentation will evoke principles of measurement theory and behavioral economics, backed up by empiric studies within the Veterans Health Administration and other health systems, that demonstrate the positive and negative aspects of performance measurement within healthcare. The presentation will conclude with a set of recommendations for appropriate use of measurement in clinical care settings.

Biography:

Joseph Francis is the director for Clinical Analytics and Chief Quality and Performance Office for the Veterans Healthcare Administration (VHA). Dr. Francis joined the VA in 1991, continuing his research and assuming progressive clinical leadership responsibilities in geriatrics and extended care. He was later appointed as chief medical officer of Veterans Integrated Service Network (VISN) 9, where he managed and oversaw clinical operations, medical education and research, and contributed to the design and implementation of key VA policy initiatives. Dr. Francis has served as vice president for data management and quality at St. Vincent Hospital in Indianapolis. Dr. Francis returned to VA in June 2004 to direct its Quality Enhancement Research Initiative (QUERI). He began serving as the acting deputy chief research and development officer in 2006 and was responsible for the overall administration and policy development for VA's $1.7 billion research operations. In May 2008, Dr. Francis was appointed VA's deputy chief quality and performance officer. A year later he assumed the role of chief quality and performance officer. Board-certified in internal medicine, geriatrics, and medical management, Dr. Francis has been on the medical faculty of the University of Pittsburgh, University of Tennessee, and Vanderbilt University. Dr. Francis received his MD from Washington University in St. Louis and completed his residency and fellowship in general internal medicine, as well as his master's in public health, at the University of Pittsburgh.

Friday, November 15, 2013
12:30 p.m. – 1:30 p.m.
Stadium 4 & 5

Luncheon Plenary Speaker: *John A. Norris, JD, MBA*

Title: "Advanced CAS and CAS-Like Tool" Use by Healthcare Regulatory Agencies, Such as the US FDA, Especially While Reviewing and Approving Market Access to CAS and CAS-Like Products for Use in the Care of Humans

Abstract: As a former Deputy Chief of the US FDA, John Norris is eager to see that the US FDA, and other healthcare regulatory agencies remain current in their use of "the world's most advanced regulatory and regulatory-science standards and methods." Especially, when regulatory agencies are reviewing and approving market access for CAS or CAS-like technologies, systems, platforms, products, and/or services to soon be used in improving the healthcare of humans – while dramatically driving down the cost of such care. In such cases, he argues, "advanced CAS or CAS-like tools" themselves must often be used by the regulatory agencies to review the adequacy of their brother and sister "CAS or CAS-like products," (1) faster, (2) better, (3) cheaper, and (4) safer, as well as (5) more ethical, and (6) equitable (better), than would otherwise be possible to do. Only in this way, can we reach, our goals (1) of reducing many areas of healthcare costs, some ten-fold, over the next decade and (2) of improving worldwide access to care that (a) is sustainably more safe, effective, and cost-effective, as well as more thoughtful and optimal, and that (b) simultaneously fulfills our goals related to the four "Ps": Better care that is also more (i) personalized, (ii) predictive, (iii) preventive, and/or (iv) preemptive, such as iPS-based regenerative organ adjunct-therapy (or replacement-therapy) might be, or as Big-Data-Analytics-based detections of pre-diabetes or pre-cancerous states might be.

Biography:

John A. Norris is a former Principal Deputy FDA Commissioner, FDA COO, business executive, editor, hands-on visionary, executive coach, philanthropist, and Harvard teacher, who views his work as a calling rather than a job or a career. Mr. Norris brings more than 20 years of life-sciences and healthcare industry leadership and consulting expertise to US and global employers/customers/clients. He has advised the senior executives, senior managers, and senior scientists/engineers/technicians of numerous global businesses. He received a B.A. in economics, with minors in political science, and engineering, from the University of Rochester, his M.B.A. and J.D. from Cornell University, and a Certificate in Government from Harvard University, where he later taught health policy and management for twelve years. He is also the founder and faculty-editor-in-chief emeritus of the *American Journal of Law and Medicine*.

4th Annual

COMPLEX Adaptive Systems

Mark Your Calendar
Oct. - Nov. 2014

Conference Panel Sessions

Wednesday, Nov. 13

Cyber Physical Systems

3:30 p.m. - 5:00 p.m.
Stadium 1 & 2

Moderator: Robert D. Rodriguez
Panel Members: David A. Cass | Jerry Archer |
Charlie Dagli | Michael H. Nance

These panelists will address the current threat landscape, the digital paradigm - its opportunities and challenges to include the transition on the need for continued R&D and collaboration in the cyber physical systems through public/private partnership initiatives. They will discuss leading change and the way ahead in Cyber and the evolving trends and the change agents who are embracing new models that are making a difference.

Moderator
Robert D. Rodriguez
Chairman & Founder, Security Innovation Network™ (SINET)

David A. Cass
Senior Vice President, Chief Information Security Officer, Elsevier

Jerry Archer
Founder & Board Member, Cloud Security Alliance

Charlie Dagli, PhD
Technical Research Staff, Massachusetts Institute of Technology Lincoln Laboratory

Michael Nance
CISO & Senior Fellow, Lockheed Martin IS&GS Civil

Thursday, Nov. 14

Systems of Systems as Complex Adaptive Systems

3:30 p.m. - 5:00 p.m.
Stadium 1 & 2

Moderator: Judith Dahmann
Panel Members: Dan DeLaurentis | Doug Bodner |
Mark Blackburn | Cihan Dagli

This panel will examine the research issues posed by complex enterprises and systems of systems and how these are being addressed by research by the SE Research Center (SERC), a DoD sponsored University Affiliated Research Center focused on systems engineering and exploratory development. The SERC has a major thrust in Enterprise Systems of Systems (ESoS) addressing methods, processes, and tools (MPTs) to address key challenges posed by complex ESoS [SERC 2014-2018 Technical Plan].

Moderator
Judith Dahmann, PhD
Principal Senior Scientist, MITRE Corporation Center for Advanced Systems Analysis & Acquisition

Dan DeLaurentis, PhD
Associate Professor Purdue University School of Aeronautics & Astronautics

Doug Bodner, PhD, PE
Principal Research Engineer, Tennenbaum Institute Georgia Institute of Technology

Mark Blackburn, PhD
Associate Professor Stevens Institute of Technology; Principal, T-VEC Technologies & KnowledgeBytes

Cihan H. Dagli, PhD
Professor, Engineering Management and Systems Engineering, Missouri University of Science and Technology

Friday, Nov. 15

Overcoming Massive Cost, Complexity, and Non-Coordination Problems in Health Care Systems–the Serious Challenge We Face

3:30 p.m. - 5:00 p.m.
Stadium 1 & 2

Moderator: Walker H. Land, Jr.
Panel Members: John A. Norris | J. David Schaffer |
Heather Woodward-Hagg | Michael Hultner

The health care panel discussion objectives are twofold: (1) to focus the discussion on suggestions on how to modify/upgrade the current health care system and (2) to examine important possible futuristic health care problems.

Moderator
Walker H. Land, Jr.
Research Professor, Binghamton University, Principal Investigator and Director, Computational Intelligence Group

John A. Norris, JD, MBA,
Chairman, Norris Capital, Inc.; FDDH, Inc.; Senior US Advisor

J. David Schaffer, PhD
Research Professor, Department of Bioengineering Binghamton University

Heather Woodward-Hagg
Director, VA - Center for Applied Systems Engineering (VA-CASE)

Michael Hultner, PhD
Chief Scientist, Health & Life Sciences, Lockheed Martin IS&GS-Civil

Conference Schedule

Wednesday, Nov. 13, 2013 *Presentations are noted by corresponding page number in proceedings.*

Registration Desk Open
7:00 a.m. – 5:00 p.m.
Pre-function Foyer

Continental Breakfast
7:30 a.m. – 8:30 a.m.
Stadium 5

Opening Session
8:00 a.m. – 9:00 a.m.
Stadium 1 & 2

Opening Welcome: Attorney General of Maryland Douglas F. Gansler

Morning Plenary Speaker: William B. Rouse, PhD

Modeling Complex Socio-Technical Enterprises

William B. Rouse, PhD
Director of the Center for Complex Systems and Enterprises
Stevens Institute of Technology

Speaker details on page 4

Concurrent Sessions
9:00 a.m. – 10:30 a.m
(See schedule at right)

Break
10:30 a.m. – 11:00 a.m.
Stadium 5

Concurrent Sessions   9:00 a.m. – 10:30 a.m.

Systems Behavior Modeling I
Stadium 1

Session Chair: Kristin Giammarco
Naval Postgraduate School, USA

277 - Well, You Didn't Say Not to! A Formal Systems Engineering Approach to Teaching an Unruly Architecture Good Behavior
Kristin Giammarco | Mikhail Auguston, *Naval Postgraduate School, USA*

270 - Behavioral Modeling of Software Intensive System Architectures
Monica Farah-Stapleton, *Interagency Program Office, OSD, USA*; Mikhail Auguston, *Naval Postgraduate School, USA*

283 - A Theory of Emergence and Entropy in Systems of Systems
John Johnson, IV | Andres Sousa-Poza, *Old Dominion University, USA*; Andreas Tolk, *SimIS Inc., USA*

Data Science and Analytics I
Stadium 2

Session Chair: Gursel Serpen
University of Toledo, USA

406 - AI-WSN: Adaptive and Intelligent Wireless Sensor Network
Gursel Serpen | Jiakai Li | Linqian Liu, *University of Toledo, USA*

414 - A Comparative Analysis of Data Privacy and Utility Parameter Adjustment, Using Machine Learning Classification as a Gauge
Kato Mivule | Claude Turner, *Bowie State University, USA*

421 - The Solution According Finite Mixture Distribution by GMM Problem as One of the Modes of Expression of a Probability Density Function
Kiyoshi Tsukakoshi | Kenichi Ida | Takao Yokota, *Ashikaga Institute of Technology, Japan*

427 - A Delay Based MILP for Network Planning in Optical Networks
Sasikanth Pagadrai | Muhittin Yilmaz | Pratyush Valluri, *Texas A&M University-Kingsville, USA*

Intelligent and Adaptive Systems I
Stadium 3

Session Chair: David Enke
Missouri S&T, USA

115 - Type-2 Fuzzy Clustering and a Type-2 Fuzzy Inference Neural Network for the Prediction of Short-Term Interest Rates
David Enke, *Missouri S&T, USA*; Nijat Mehdiyev, *Technical University of Munich and The University of Augsburg/Germany*

39 - Performance Analysis of Kernel Adaptive Filters Based on LMS Algorithm
Ibtissam Constantin, *Lebanese University, Lebanon*; Regis Lengellé, *Troyes University of Technology, France*

156 - Using High Performance Computing to Explore Large Complex Bioacoustic Soundscapes: Case Study for Right Whale Acoustics
Peter J. Dugan | Mohammad Pourhomayoun | Yu Shiu | Aaron Rice | Christopher Clark, *Cornell University, USA*; Rosemary Paradis, *Independent Consultant, USA*

46 - Employing Learning to Improve the Performance of Meta-RaPS
Fatemah Al-Duoli | Ghaith Rabadi, *Old Dominion University, USA*

Conference Schedule

Wednesday, Nov. 13, 2013
Presentations are noted by corresponding page number in proceedings.

Concurrent Sessions

11:00 a.m. – 12:30 p.m.
(See schedule at right)

Luncheon Plenary
Speaker: Charles Goldblum
12:30 p.m. – 1:30 p.m.
Stadium 4 & 5

The Century of Biology – A Multi-Disciplinary Approach for Attacking Grand Challenges in Systems Biology

Charles Goldblum, PhD
Business Area Executive
Research and Exploratory
Development
Johns Hopkins University
Applied Physics Laboratory

Speaker details on page 4

Concurrent Sessions   11:00 a.m. – 12:30 p.m.

Socio-Technical Systems I
Stadium 1

Session Chair: Holly Handley
Old Dominion University, USA

306 - **Using Architecture Models to Design Adaptive Socio-Technical Systems**
Holly Handley, *Old Dominion University, USA*

312 - **Thinking Systemically About Complex Systems**
Patrick T. Hester, *Old Dominion University, USA;* Kevin MacG. Adams, *University of Maryland University College, USA*

318 - **Accounting for Errors When Using Systems Approaches**
Kevin MacG. Adams, *University of Maryland University College, USA;* Patrick T. Hester, *Old Dominion University, USA*

325 - **The Root Cause of Failure in Complex IT Projects: Complexity Itself**
Charles Daniels | Kaitlynn Whitney, *Old Dominion University, USA*

Data Science and Analytics II
Stadium 2

Session Chair: Rose Paradis
Lockheed Martin, USA

433 - **Knowledge Extraction From Survey Data Using Neural Networks**
Arun Kulkarni | Imran Khan, *The University of Texas at Tyler, USA*

439 - **Analyzing Structural & Temporal Characteristics of Keyword System in Academic Research Articles**
Arjun Duvvuru | Sivarit Sultornsanee, *University of Thai Chamber of Commerce, Thailand;* Srinivasan Radhakrishnan | Dipali More, *Symbiosis Institute of Management Studies, India;* Sagar Kamarthi, *Northeastern University, USA*

446 - **Use of Big Data and Knowledge Discovery to Create a Data Backbones for Manufacturing Decision Support Systems**
Rahul Renu | Gregory Mocko | Abhiram Koneru, *Clemson University, USA*

454 - **Finding Semantic Equivalence of Text Using Random Index Vectors**
Rosemary Paradis | Jinhong K. Guo | Jack Moulton | David Cameron, *Lockheed Martin, USA;* Pentti Kanerva, *Stanford Center for the Study of Language and Information, USA*

Intelligent and Adaptive Systems II
Stadium 3

Session Chair: Nil Ergin
Penn State University, USA

52 - **Initialization Issues in Self-Organizing Maps**
Iren Valova | Jacob Olson, *University of Massachusetts, USA;* George Georgiev, *University of Wisconsin, USA;* Natacha Gueorguieva, *College of Staten Island, USA*

14 - **Information-Preserving Transforms: Two Graph Metrics for Simulated Neural Networks**
Alexander Duda | Stephen Levinson, *University of Illinois, USA*

183 - **The Impact of Agent Activation on Population Behavior in an Agent-based Model of Civil Revolt**
Kenneth Comer | Andrew Loerch, *George Mason University, USA*

177 - **Team-Based Learning and Leadership Effect in Multi-Agent System of Mixed Personalities**
Aleksandar Stefanovski | Peter Bock, *Washington University, USA*

Conference Schedule

Wednesday, Nov. 13, 2013

Presentations are noted by corresponding page number in proceedings.

Concurrent Sessions
1:30 p.m. – 3:00 p.m.
(See schedule at right)

Break
3:00 p.m. – 3:30 p.m.
Stadium 5

Panel Session
3:30 p.m. – 5:00 p.m.
Stadium 1 & 2

Cyber Physical Systems

Moderator: Robert D. Rodriguez
Panel: David A. Cass | Charlie Dagli | Jerry Archer | Michael H. Nance

Concurrent Sessions   1:30 p.m. – 3:00 p.m.

Socio-Technical Systems II
Stadium I
Session Chair: Ricardo Pineda
Stevens Institute of Technology, USA

331 - Predictive Safety Analytics for Complex Aerospace Systems
James T. Luxhoj, *LCR, USA*

337 - Determining Stakeholder Influence Using Input-Output Modeling
Patrick T. Hester, *Old Dominion University, USA;* Kevin MacG. Adams, *University of Maryland University College, USA*

290 - Research and Appliance of the Zero-Burden Based SoS Comprehensive Evaluation Method
Jing Zhang | He Yan | Wang Ming-yang | Liu Zhiqiang | Li Wei, *Beijing Institution of System Engineering, China*

298 - Integration, Verification, Validation, Test, and Evaluation (IVVT&E) Framework for System of Systems (SoS)
Sergio Luna | Ricardo Pineda | Hoong Yan See Tao, *Stevens Institute of Technology, USA;* Francisco Zapata | Amit Lopes, *University of Texas at El Paso, USA*

Data Science and Analytics III
Stadium 2
Session Chair: Ahmet Ozbayoglu
TOBB University of Economics and Technology, Turkey

460 - Phase Synchronization Based Minimum Spanning Trees for the Analysis and Visualization of Currency Exchange Markets
Arjun Duvvuru | Sivarit Sultornsanee, *University of Thai Chamber of Commerce, Thailand;* Srinivasan Radhakrishnan | Harnita Chowdhary, *Symbiosis Institute of Management Studies, India;* Sagar Kamarthi, *Northeastern University, USA*

466 - Time-series Analysis for Detecting Structure Changes and Suspicious Accounting Activities in Public Software Companies
Zhen Zhang | Theodore Trafalis, *University of Oklahoma, USA*

472 - A Two-Level Cascade Evolutionary Computation Based Covered Call Trading Model
Ahmet Ozbayoglu | Ilknur Bayram | Mustafa Ucar, *TOBB University of Economics and Technology, Turkey*

478 - Comparing the Forecasts of Money Demand
Anthony Joseph | Maurice Larrain | Richard Ottoo, *Pace University, USA*

Intelligent and Adaptive Systems III
Stadium 3
Session Chair: Arit Thammano
King Mongkut's Institute of Technology, Thailand

77 - Predicting the Behavior of Robotic Swarms in Search and Tag Tasks
Joseph Lancaster | David Gustafson, *Kansas State University, USA*

90 - A Novel Optimization Algorithm Based on the Natural Behavior of the Ant Colonies
Jiraporn Kiatwuthiamorn | Arit Thammano, *King Mongkut's Institute of Technology, Thailand*

71 - The Genetic Flock Algorithm
Jeffrey Brooks | David Hibler, *Christopher Newport University, USA*

96 - A Hybrid Artificial Bee Colony Algorithm with Local Search for Flexible Job-shop Scheduling Problem
Arit Thammano | Ajchara Phu-ang, *King Mongkut's Institute of Technology, Thailand*

Conference Schedule

Thursday, Nov. 14, 2013 *Presentations are noted by corresponding page number in proceedings.*

Registration Desk Open
7:00 a.m. – 5:00 p.m.
Pre-function Foyer

Continental Breakfast
7:30 a.m. – 8:30 a.m.
Stadium 5

Session Convenes
8:00 a.m. – 9:00 a.m.
Stadium 1 & 2

Announcements

Morning Plenary
Speaker: Judith Dahmann, Ph.D.

**Taming Complexity:
A Challenge for Systems
of Systems**

Judith Dahmann, PhD
Principal Senior Scientist,
MITRE Corporation
Center for Advanced
Systems Analysis & Acquisition

Speaker details on page 5

Concurrent Sessions
9:00 a.m. – 10:30 a.m.
(See schedule at right)

Break
10:30 a.m. – 11:00 a.m.
Stadium 5

Concurrent Sessions   9:00 a.m. – 10:30 a.m.

Systems Modeling and Design I
Stadium 1

Session Chair: Fred Highland
Lockheed Martin IS&GS Civil, USA

203 - Theory of Modularity, a Hypothesis
Peter Gentile, *Northrop Grumman Aerospace Systems, USA*

210 - A Formal Method for Evaluation of a Modeled System Architecture
Matthew Rodano | Kristin Giammarco, *Stevens Institute of Technology, USA*

216 - An Approach to Advanced Higher Order Cross-Cultural Awareness in Dismounted Soldiers
Siddhartha Agarwal | Cihan H. Dagli, *Missouri S&T, USA;* Gianluca Reale, *Universita di Napoli Federico II, Italy*

Data Science and Analytics IV
Stadium 2

Session Chair: Mika Sato-Ilic
University of Tsukuba, Japan

484 - Demystifying MapReduce
Christopher Garcia, *University of Mary Washington, USA*

490 - Fuzzy Dissimilarity Based Multidimensional Scaling and Its Application to Collaborative Learning Data
Mika Sato-Ilic, *University of Tsukuba, Japan;* Peter Ilic, *University of Tokyo, Japan*

496 - CaptchAll: An Improvement on the Modern Text-Based CAPTCHA
Charlie Obimbo | Andrew Halligan | Patrick De Freitas, *University of Guelph, Canada*

502 - Homomorphic Encryption
Monique Ogburn | Claude Turner | Pushkar Dahal, *Bowie State University, USA*

Intelligent and Adaptive Systems IV
Stadium 3

Session Chair: Mitsuo Gen
Fuzzy Logic Systems Institute, Japan

102 - Effective Estimation of Distribution Algorithm for Stochastic Job Shop Scheduling Problem
Xinchang Hao, *Waseda University, Japan;* Mitsuo Gen, *Fuzzy Logic Systems Institute, Japan;* Lin Lin, *Dalian University of Technology, China;* Katsuhisa Ohno, *Aichi Institute of Technology, Japan*

148 - Classification of Changes in Extreme Heat Over Southeastern Australia
Michael B. Richman | Lance Leslie, *University of Oklahoma, USA*

169 - Ant-Inspired Decentralized Task Allocation Strategy in Groups of Mobile Agents
Sifat Momen, *University of Liberal Arts Bangladesh, Bangladesh*

140 - On the Investigation of Nonlinear Dynamics of a Rotor with Rub-Impact Using Numerical Analysis and Evolutionary Algorithms
Issam Abu Mahfouz | Amit Banerjee, *Penn State University, USA*

Conference Schedule

Thursday, Nov. 14, 2013
Presentations are noted by corresponding page number in proceedings.

Concurrent Sessions
11:00 p.m. – 12:30 p.m.
(See schedule at right)

**Luncheon Plenary
Speaker: David Cass**
12:30 p.m. – 1:30 p.m.
Stadium 4 & 5

**Information Security as a
Source of Innovation**

David A. Cass, MSE, MBA
*Senior Vice President and
Chief Information Security
Officer, Elsevier*

Speaker details on page 5

Concurrent Sessions   11:00 a.m. – 12:30 p.m.

Systems Modeling and Design II
Stadium 1

Session Chair: Kenneth M. Bryden
Iowa State University, USA

223 - **A Proposed Implementation of
Tarjan's Algorithm for Scheduling
the Solution Sequence of Systems
of Federated Models**
Gabriel S. McNunn | Kenneth M. Bryden,
Iowa State University, USA

229 - **Simulation Modeling and Analysis
of Complex Port Operations with
Multimodal Transportation**
Mariam Kotachi | Ghaith Rabadi |
Mohammad F. Obeid, *Old Dominion
University, USA*

235 - **Autonomic Computing:
A Framework to Identify Autonomy
Requirements**
Ajantha Dahanayake | Mona Yahya | Manal
A Yahya, *Prince Sultan University-College
for Women, Saudia Arabia*

Data Science and Analytics V
Stadium 2

Session Chair: Stephen Anderson
University of Missouri, USA

189 - **Chemical Transport in Undisturbed
Soils Estimated Using Transfer
Function Models**
Stephen Anderson | R.L. Peyton, *University
of Missouri, USA;* Horng-Jer Shieh, *Taiwan
Shofu University, Taiwan*

195 - **Chemical Dispersivity Affected by
Homogenous and Fractal Porous
Media**
Stephen Anderson | R.L. Peyton, *University
of Missouri, USA;* Brian Haeffner, *Missouri
Department of Transportation, USA*

399 - **An Alternative Approach to
Reduce Massive False Positives
in Mammograms Using Block
Variance of Local Coefficients
Features and Support Vector
Machine**
M.P. Nguyen | Q.D. Truong | D.T. Nguyen |
T.D. Nguyen | V.D. Nguyen, *Hanoi University
of Science and Technology, Vietnam*

Intelligent and Adaptive Systems V
Stadium 3

Session Chair: Iveta Mrazova
Charles University, Czech Republic

121 - **Fast and Reliable Detection of
Hockey Players**
Iveta Mrazova | Matej Hrincar, *Charles
University, Czech Republic*

83 - **Multi–objective Evolutionary
Algorithm with Strong
Convergence of Multi-area for
Assembly Line Balancing Problem
with Worker Capability**
Wenqiang Zhang | Weitao Xu, *Henan
University of Technology, China;* Mitsuo Gen,
Fuzzy Logic Systems Institute, Japan

134 - **A H–infinity Control Approach for
Oil Drilling Processes**
Muhittin Yilmaz, *Texas A&M University-
Kingsville, USA*

65 - **Using the PORS Problems to
Examine Evolutionary Optimization
of Multiscale Systems**
Zachary Reinhart | Vaelan Molian | Kenneth
M. Bryden, *Iowa State University, USA*

Conference Schedule

Thursday, Nov. 14, 2013
Presentations are noted by corresponding page number in proceedings.

Concurrent Sessions
1:30 p.m. – 3:00 p.m.
(See schedule at right)

Break
3:00 p.m. – 3:30 p.m.
Stadium 5

Panel Session
3:30 p.m. – 5:00 p.m.
Stadium 1 & 2

Systems of Systems as Complex Adaptive Systems

Moderator: Judith Dahmann, Ph.D.
Panel: Dan DeLaurentis | Doug Bodner | Mark Blackburn | Cihan Dagli

Cash Bar
6:30 p.m. – 7:00 p.m.
Pre-function Foyer

Banquet & Awards Plenary Speaker:
Haden A. Land
7:00 p.m. – 9:30 p.m.
Stadium 4 & 5

Speaking of the Future

Haden A. Land
Vice President, Engineering & Chief Technology Officer, Lockheed Martin, IS&GS Civil Product Line, USA

Speaker details on page 6

Concurrent Sessions   1:30 p.m. – 3:00 p.m.

Systems Modeling and Design III
Stadium 1

Session Chair: Vernon Ireland
The University of Adelaide, Australia

242 - Autonomous Systems Modeling During Early Architecture Development
Roteslaw (Rusty) Husar | Jerrell Stracener, *Southern Methodist University, USA*

248 - Exploration of Complex Systems Types
Vernon Ireland, *The University of Adelaide, Australia*

256 - Basis Path Analysis for Testing Complex System of Systems
Francisco Zapata | Aditya Akundi | Ricardo Pineda | Eric Smith, *University of Texas at El Paso, USA*

262 - Assessing Robustness in Systems of Systems Meta-Architectures
Louis E Pape, II | Cihan H Dagli, *Missouri S&T, USA*

Cyber Physical Systems I
Stadium 2

Session Chair: Gunes Ercal
Southern Illinois University Edwardsville, USA

510 - Resilience Notions for Scale-free Networks
Gunes Ercal | John Matta, *Southern Illinois University Edwardsville, USA*

516 - Estimating Hidden Information for Self-Organization and Self-Healing in Modern Wireless Networks
Julio Aráuz, *Ohio University, USA*

522 - On the Quality of Sampling From Geographic Networks
Gunes Ercal | John Matta | William Stimson | Dominic Eccher, *Southern Illinois University Edwardsville, USA*

528 - Complexity Analysis of Chaotically Encrypted rate-1/n Convolutional Encoders
Davoud Arasteh, *Southern University and A&M College, USA*

Intelligent and Adaptive Systems VI
Stadium 3

Session Chair: Thomas Sandidge
Saldirgan, LLC, USA

108 - Toward Theory and Practice of Continuous Imprecise Numbers and Categories
Thomas E. Sandidge, *Saldirgan, LLC, USA*

128 - Warm-Season Thermodynamically-Driven Rainfall Prediction with Support Vector Machines
Andrew Mercer | Jamie Dyer | Song Zhang, *Mississippi State University, USA*

163 - Domain Ontology of Hand-Drawn Avatars as Online Self-Representations for Cyber Forensics
Dianne Lee | Mei Cheong | Nor Adzlan Jamaludin, *University Teknologi MARA Malaysia, Malaysia*

58 - EA-EMA Optimization Applied to Killer Sudoku Puzzles
David Haynes, *Aclara, USA;* Steven Corns, *Missouri S&T, USA*

Conference Schedule

Friday, Nov. 15, 2013

Presentations are noted by corresponding page number in proceedings.

Registration Desk Open
7:00 a.m. – 12 noon
Pre-function Foyer

Continental Breakfast
7:30 a.m. – 8:30 a.m.
Stadium 5

Session Convenes
8:00 a.m. – 9:00 a.m.
Stadium 1 & 2

Announcements

**Morning Plenary Speaker:
Joseph Francis, MD, MPH**
8:00 a.m. – 9:00 a.m.
Stadium 1 & 2

The Wisdoms and Follies of Managing by Numbers in Healthcare

Joseph Francis, MD, MPH
Director - Clinical Analytics & Chief Quality & Performance Office Veterans Healthcare Administration

Concurrent Sessions
9:00 a.m. – 10:30 a.m.
(See schedule at right)

Break
10:30 a.m. – 11:00 a.m.
Stadium 5

Concurrent Sessions   9:00 a.m. – 10:30 a.m.

Healthcare Medical Innovation I
Stadium 1 & 2

Session Chair: Walker H. Land, Jr.
Binghamton University, USA

379 - **Clinical Decision Support System (CDSS) for the Classification of Atypical Cells in Pleural Effusions**
David Bassen | Saurabh Nayak | Xia Chong Li | Mitchell Sam | Walker H. Land, Jr., *Binghamton University, USA;* Jagmohan Sidhu | Martha F. Nelson, *UHS Wilson Medical Center, USA*

368 - **Prediction of Mortality and Survival of Patients After Cardiac Surgery Using Fuzzy EuroSCORE System and Reliability Analysis**
Sina Khanmohammadi | Harold Lewis | Chun-An Chou, *State University of New York at Binghamton, USA;* Hassan Sadeghpour Khameneh, *University of Tabriz, Iran*

374 - **Investigating the GRNN Oracle as a Method for Combining Multiple Predictive Models of Colon Cancer Recurrence From Gene Microarrays**
Aaron S. Campbell | Walker Land, Jr. | Dan E. Margolis | J. David Schaffer, *Binghamton University, USA;* Ravi Mathur, *North Carolina State University, USA*

362 - **An OpenCL Framework for Fuzzy Associative Classification and Its Application to Disease Prediction**
Erhan Guven | Anna Buczak, *Johns Hopkins University Applied Physics Laboratory, USA*

Intelligent and Adaptive Systems VII
Stadium 3

Session Chair: Corey Hart
Lockheed Martin, USA

22 - **Variable Time Delays and Representational Capacity in Sparsely Connected Populations of Spiking Neurons**
Corey Hart, *Lockheed Martin, USA*

27 - **Evolving Spike Neural Network Sensors to Characterize the Alcoholic Brain Using Visually Evoked Response Potential**
Arnab Roy | J. David Schaffer | Craig Laramee, *State University of New York at Binghamton, USA*

348 - **A Multi-class Probabilistic Neural Network for Pathogen Classification**
William Ford | Kun Xiang | Walker Land, Jr. | Robert Congdon | Yinglei Li | Omowunmi Sadik, *Binghamton University, USA*

342 - **Development of a Complex Adaptive PNN System for the Rapid Detection of E.coli**
Yinglei Li | William Ford | Kun Xiang | Walker Land, Jr. | Robert Congdon | Omowunmi Sadik, *State University of New York at Binghamton, USA*

Proceedings
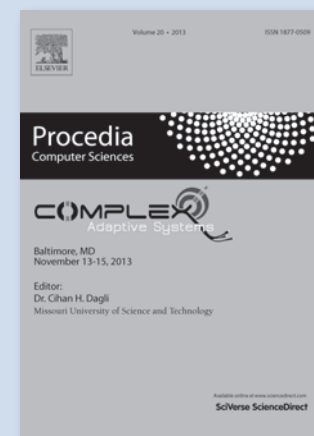
Papers presented at the 2013 Complex Adaptive Systems Conference are published in the *Procedia Computer Sciences*, which is an online publication hosted by SciVerse Science Direct. Content is freely available worldwide in perpetuity.

In addition, papers are submitted for indexing to **Scopus** at **www.scopus.com** and **Engineering Village (Ei)** at **www.engineeringvillage.com**

Conference Schedule

Friday Nov. 15, 2013
Presentations are noted by corresponding page number in proceedings.

Concurrent Sessions
11:00 a.m. – 12:30 p.m.
(See schedule at right)

**Luncheon Plenary
Speaker: John A. Norris**
12:30 p.m. – 1:30 p.m.
Stadium 4 & 5

"Advanced CAS and CAS-Like Tool" Use by Healthcare Regulatory Agencies, Such as the US FDA, Especially While Reviewing and Approving Market Access to CAS and CAS-Like Products for Use in the Care of Humans

John A. Norris, JD, MBA
Chairman, Norris Capital, Inc., and FDDH, Inc. and Senior US Advisor

Speaker details on page 7

Concurrent Sessions

Healthcare Medical Innovation II
Stadium 1 & 2

Session Chair: John A. Norris
Norris Capital, Inc. and FDDH, Inc. and Senior US Advisor, USA

354 - **A Novel Application for Combining CASs and Datasets to Produce Increased Accuracy in Modeling and Predicting Cancer Recurrence**
John Norris, *Health Discovery Corp, USA;* Erin Barns | Olivia Schultz | Walker Land, Jr., *Binghamton University, USA;* Timothy Masters, *TMAIC, USA*

391 - **Parallelization of a Bio-Inspired Computational Model for the Simulation of 3-D Multicellular Tissue Growth**
Belgacem Ben Youssef, *King Saud University, Saudi Arabia*

33 - **Biologically Inspired Olfactory Learning Architecture**
George Georgiev, *University of Wisconsin, USA;* Mrinal Gosavi | Iren Valova, *University of Massachusetts Dartmouth, USA;* Natacha Gueorguieva, *City University of New York, USA*

385 - **Complex Adaptive Systems Drive Innovations in Synthetic Biology**
Melvin Greer, *Lockheed Martin, USA;* Manuel Rodriguez-Martinez | Jaime Seguel, *University of Puerto Rico-Mayaguez, Puerto Rico*

11:00 a.m. – 12:30 p.m.

Distributed Education Systems
Stadium 3

Session Chair: Jason Cadwallader
Roudebush VAMC, USA

535 - **Self-Organizing Evolving Education**
Julio Aráuz, *Ohio University, USA*

541 - **Rethinking STEM Education: An Interdisciplinary STEAM Curriculum**
Margaret Madden | Marsha Baxter | Heather Beauchamp | Kimberley Bouchard | Derek Habermas | Mark Huff | Brian Ladd | Jill Pearon | Gordon Plague, *State University of New York at Potsdam, USA*

547 - **Full STEAM Ahead: The Benefits of Integrating the Arts Into STEM**
Michelle H. Land, *Stratford Landing Elementary, USA*

Demonstration: Transforming Medical Education Through an Interactive Case Based System
Jason Cadwallader, *Roudebush VAMC, USA*

Conference Schedule

Friday Nov. 15, 2013
Presentations are noted by corresponding page number in proceedings.

Concurrent Tutorial Sessions
1:30 p.m. – 3:00 p.m.
(See schedule at right)

Break
3:00 p.m. – 3:30 p.m.
Stadium 5

Panel Session
3:30 p.m. – 5:00 p.m.
Stadium 1 & 2

Overcoming Massive Cost, Complexity, and Non–Coordination Problems in Health Care Systems – the Serious Challenge We Face

Moderator: Walker H. Land, Jr.
Panel: John A. Norris | J. David Schaffer | Heather Woodward-Hagg | Michael Hultner

Concurrent Tutorial Sessions   1:30 a.m. – 3:00 p.m.

Tutorial I
Stadium 1

Topics in Statistical Decision Theory: Does the Decision Mechanism Matter?
Walker H. Land Jr., *Research Professor, Binghamton University, USA*

Tutorial II
Stadium 2

On Principles of Complex Systems Engineering – Complex Systems Made Simple
Brian E. White, *Principal, Complexity Are Us, Systems Engineering Strategies (CAUSES), USA*

Tutorial III
Stadium 3

Systems Engineering Risk Analysis
Ariel Pinto, *Associate Professor, Old Dominion University, USA*

Notes

Notes

Hotel Floor Plan

SECOND FLOOR

STADIUM BALLROOM 1 2 3 4 5

PRE-FUNCTION FOYER

RESTROOMS

BUSINESS CENTER

ELEVATORS

B&O RAILROAD

CAMDEN ROOM

ORIOLES ROOM
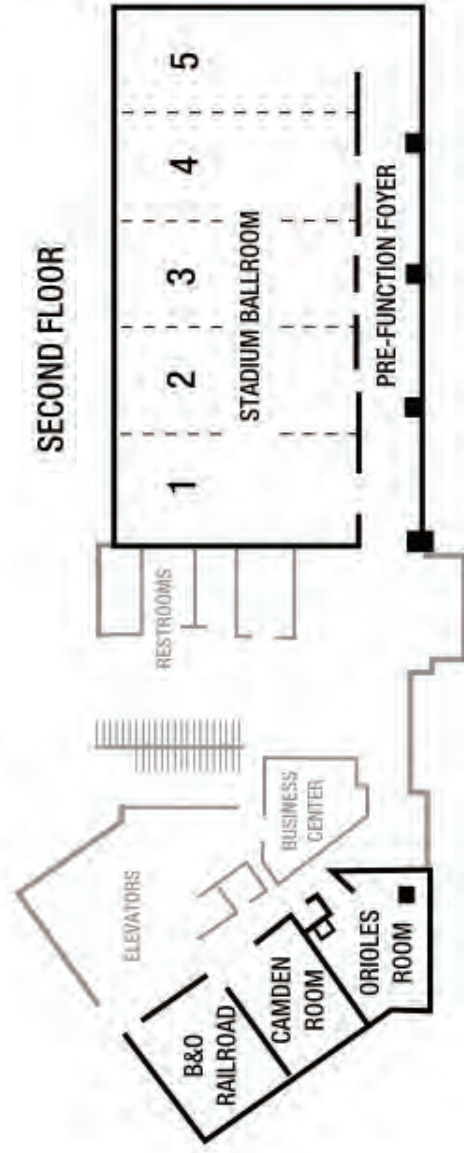
Registration – *Pre-function Foyer*
Continental Breakfast – *Stadium 5*
Welcome/Morning Plenary – *Stadium 1 & 2*
Concurrent Sessions – *Stadiums 1, 2 & 3*
Breaks – *Stadium 5*
Luncheon Plenary – *Stadium 4 & 5*

Panel Discussions – *Stadium 1 & 2*
Cash Bar – *Pre-function Foyer*
Banquet (Thursday Evening) – *Stadium 4 & 5*
Tutorial Presentations – *Stadiums 1, 2 & 3*

TO REACH GREAT HEIGHTS,
START WITH A GREAT PURPOSE.

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