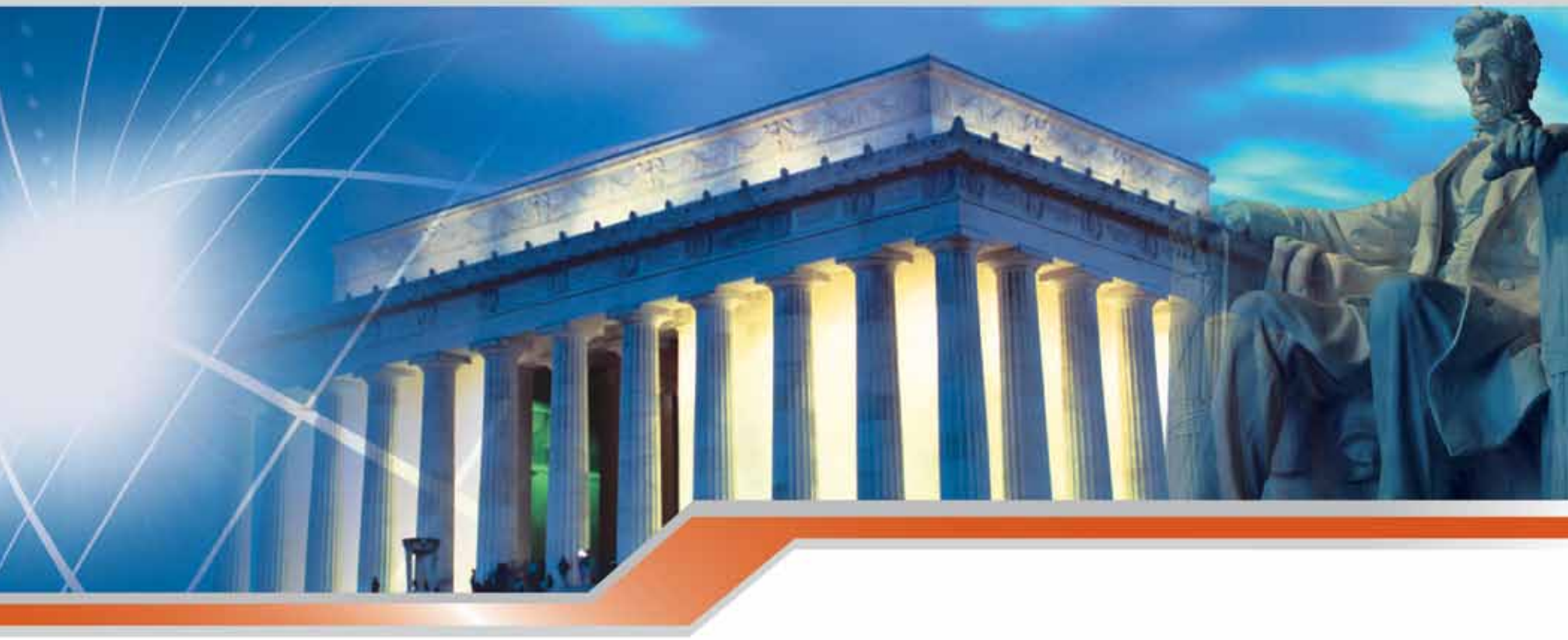

COMPLEX Adaptive Systems

Embracing Complexity and Harnessing Big Data for Cyber Security, Distributed Networks and Smart Grid Systems

Washington Dulles Airport Marriott
Nov. 14-16, 2012

2012 Conference Program

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Professor
Engineering Management
and Systems Engineering
Founder of Systems
Engineering Graduate Program
INCOSE and IIE Fellow
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 cyber security, big data analytics and complex systems of healthcare. Contributions to this conference, in the form of paper presentations, plenary sessions and panel discussions, will cultivate in new ideas and advance all of our understanding of complex systems of today.

We are pleased to announce that we have authors from 10 countries presenting 73 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 financialcontributions 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: U.S. Representative Jo Ann Emerson

U.S. Representative Jo Ann Emerson has represented the Eighth Congressional District in Congress since 1996 under the principle of putting people before politics. In Washington, D.C., she is a high-profile leader on agriculture, energy, health care and other issues that disproportionately affect Americans in rural parts of the country. From her position on the House Appropriations Committee, Representative Emerson conducts oversight of the U.S. Department of Agriculture, the U.S. Treasury and agencies charged with oversight of the nation's financial system; she works closely with those agencies and her colleagues in Congress to structure federal policy that benefits the country while maintaining its obligation to U.S. taxpayers. Representative Emerson chairs the Financial Services Appropriations Subcommittee where she is an advocate for lower spending and greater accountability from federal agencies, including the IRS, GSA and the Securities and Exchange Commission. She lives in Cape Girardeau.

Conference Schedule at a Glance

Wednesday, Nov. 14, 2012

7:00 a.m. – 5:00 p.m.
Registration

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

8:30 a.m. – 8:45 a.m.
Opening Session & Welcome
Speaker: U.S. Representative Jo Ann Emerson

8:45 a.m. – 10:00 a.m.
Morning Plenary - Cyber Security
Speaker: Robert D. Rodriguez

10:00 a.m. – 10:30 a.m.
Break

10:30 a.m. – 12:00 noon
Concurrent Technical Sessions
Computational Intelligence and Machine Learning I
Adaptive Big Data Analytics I
Smart Grid

12:00 noon – 1:15 p.m.
Luncheon Plenary - Big Data Analytics
Speaker: Vasant Honavar

1:30 p.m. – 3:00 p.m.
Concurrent Technical Sessions
Computational Intelligence and Machine Learning II
Adaptive Big Data Analytics II
Energy Systems

3:00 p.m. – 3:30 p.m.
Break

3:30 p.m. – 5:00 p.m.
Panel Session - Cyber Security

Thursday, Nov. 15, 2012

7:00 a.m. – 5:00 p.m.
Registration

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

8:30 a.m. – 8:45 a.m.
Session Convenes
Announcements & Introductions

8:45 a.m. – 10:00 a.m.
Morning Plenary - Complexity
Speaker: John A. Norris

10:00 a.m. – 10:30 a.m.
Break

10:30 a.m. – 12:00 noon
Concurrent Technical Sessions
Computational Intelligence and Machine Learning III
Complex Systems I
Adaptive Big Data Analytics III

12:00 noon – 1:15 p.m.
Luncheon Plenary – Big Data Analytics
Speaker: Karr W. Farrell

1:30 p.m. – 3:00 p.m.
Concurrent Technical Sessions
Computational Intelligence and Machine Learning IV
Complex Systems II
Biologically Inspired Paradigms

3:00 p.m. – 3:30 p.m.
Break

3:30 p.m. – 5:00 p.m.
Panel Session - Complex Systems of Healthcare

6:30 p.m. – 7:00 p.m.
Cash Bar

7:00 p.m. – 9:30 p.m.
Banquet & Awards Presentation
Plenary Session – Complex Systems
Speaker: Haden A. Land

Friday, Nov. 16, 2012

7:00 a.m. – 12:00 noon
Registration

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

8:30 a.m. – 8:45 a.m.
Session Convenes
Announcements & Introductions

8:45 a.m. – 10:00 a.m.
Morning Plenary - Cyber Security
Speaker: Ralph Martinez

10:00 a.m. – 10:30 a.m.
Break

10:30 a.m. – 12:00 noon
Concurrent Technical Sessions
Computational Intelligence and Machine Learning V
Distributed Networks

12:00 noon – 1:15 p.m.
Luncheon Plenary – Big Data Analytics
Speaker: Viswa Sharma

1:30 p.m. – 3:00 p.m.
Concurrent Technical Sessions
Computational Intelligence and Machine Learning VI
Tutorial: Topics in Statistical Decision Theory: Does the Decision Mechanism Matter?

3:00 p.m. – 3:30 p.m.
Break

3:30 p.m. – 5:00 p.m.
Panel Session
Big Data: The Vectors of Volume, Velocity, Variety and Value

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.

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Conference Plenary Speakers

Wednesday, November 14, 2012
8:45 a.m. – 10:00 a.m.
Salon A & B

Morning Plenary - Cyber Security

Speaker: Robert D. Rodriguez

Title: Looking Back to Advance the Future - Leading Change

Abstract: Are you a Change Agent? In the dynamic and infantile world of the internet we must continue to innovate, embrace change, lead change, re-evaluate risk and learn from past public private partnerships (PPPs) models that have been successful. The Manhattan Project & the birth of Silicon Valley are examples of effective PPPs. The Federal Government was instrumental in Silicon Valley's early growth but is sadly forgotten and lost in the lure of startups that quickly rose to be overnight corporate giants; Hewlett Packard, Oracle, Google, Cisco all university spin outs. Cyber security touches everything and the "Beltway" has an opportunity to lead change. As a nation, both industry and government must continue to innovate or our national security and status as the world's most innovative country will be at risk.

Biography:

Robert D. Rodriguez is the Chairman & Founder of the Security Innovation Network™ (SINET) www.security-innovation.org whose mission is to advance innovation and enable global collaboration between the public and private sectors to defeat cyber security threats. In his previous career, Mr. Rodriguez served twenty-two years as a Special Agent with the United States Secret Service where he held a number of executive leadership positions within the Presidential Protection, Protective Intelligence, Inspection and Criminal Investigation Divisions.

Wednesday, November 14, 2012
12 noon – 1:15 p.m.
Salon E & F

Luncheon Plenary - Big Data Analytics

Speaker: Vasant Honavar

Title: Learning Predictive Models from Large Distributed Autonomous Data

Abstract: Recent advances in high throughput data acquisition, distributed sensors, and networked information systems offer unprecedented opportunities in collaborative, integrative data analysis (e.g., for discovery of a priori unknown complex relationships, construction of predictive models from data), hypothesis generation, and knowledge creation. However, realizing these opportunities presents several challenges in practice: Data and knowledge repositories are autonomous, large, distributed. Semantic differences, differences in scope, intended use, and privacy considerations further complicate the effective use of such data sources in practice. In this talk, I will summarize recent progress on algorithms for constructing predictive models from distributed, semantically disparate data in settings where centralized access to data is neither feasible, nor desirable. I will briefly outline some approaches to selective reuse of knowledge from multiple autonomous knowledge bases; and the automated composition of autonomous software services into complex workflows. I will conclude the talk with some open research challenges in Discovery Informatics that need to be addressed in order to be able to fully realize the promise of Big Data in scientific discovery. Much of this research has been carried out in collaboration with current and former members of the Iowa State University Artificial Intelligence Research Laboratory and has been supported in part by grants from the National Science Foundation.

Biography:

Vasant Honavar is on the faculty of Iowa State University (ISU) where he is currently a Professor of Computer Science and of Bioinformatics and Computational Biology. He directs the Artificial Intelligence Research Laboratory (which he founded in 1990) and the Center for Computational Intelligence, Learning & Discovery (which he founded in 2005). He is currently on an assignment as a Program Director for the Information Integration and Informatics Program within the Division of Information & Intelligent Systems of the Computer and Information Science and Engineering Directorate of the National Science Foundation.

Thursday, November 15, 2012
8:45 a.m. – 10:00 a.m.
Salon A & B

Morning Plenary - Complexity
Speaker: John A. Norris

Title: Industry-Led True Reform of the U.S. Healthcare Delivery System

Abstract: Under both the Big Data and the Computational Intelligence categories, the speaker, who is experienced in healthcare-reform/healthcare-IT-reform (having led or co-led the reform of three government agencies, including the US FDA) will call on the leaders of Big-Data-platform-companies, such as IBM, SAS, GE, and Lockheed Martin, to embrace the use of new best-of-breed high-end Analytics on their healthcare BI platforms. Such use would, in the speaker's vision, greatly benefit both the platform companies and the nation. The Where, the How, and the Why of preemptive moves by platform-companies in this direction of Big Data best-of-breed high-end Analytics would be identified and then explored. Finally, selected analytics for performing (A) very precise and thoughtful text analytics of all unstructured text sources, such as (1) emails, (2) voice-mails, and (3) physicians', nurses', and technicians' notes posted to EMRs by the trillions, and (B) predictive analytics deep mining and high-end, advanced analyses of (1) EMR-based data, (2) Internet-based data, and (3) clinical-trials-report-based data, as well as (4) streaming data from healthcare remote sensors, monitors, and other medical devices/machines, will be identified, explained, and critiqued.

Biography:

John A. Norris is a former Principal Deputy FDA Commissioner, FDA COO, senior business executive, CEO, editor, hands-on visionary, executive coach, philanthropist, and Harvard teacher, who views his work as a calling rather than a job or a career, Dr. Norris brings more than 20 years of life-sciences and healthcare industry leadership and consulting expertise to US and Global employers/customers/clients.

Thursday, November 15, 2012
12 noon – 1:15 p.m.
Salon E & F

Luncheon Plenary – Big Data Analytics
Speaker Karr W. Farrell

Title: Economic Value Emerging from Communities of Big Data Analytical Practice

Abstract: Anticipated and unanticipated changes to business processes have begun to appear from analytical practices that apply 'big data' technologies to address operational governance. Early successful analytical methods may be forming socially reinforced methodological pathways that groove in and provide economic advantage to both first-movers and fast-following adopters. Recombining an evolving set of technological building blocks into shared workflows appears to create and sustain communities of practice that lever 'big data' investments. Value may emerge when machine-led collaborative methods manufacture a means for humans to preferentially sense the 'big data' world for their strategic advantage.

Biography:

Karr W. Farrell is vice president, strategy and business development for Kestrel, a group within Boeing Network and Space Systems that provides analytics and information management solutions in support of the national security and intelligence community. In the late 1990's at PriceWaterhouseCoopers LLP, Farrell led a software development and consulting group that applied multi-agent simulation for companies in the high technology, entertainment, and consumer product sectors. Farrell's work has been profiled in Forbes, Business Week, and The Wall Street Journal. He authored How Hits Happen in 1998 that describes the value of the application of complex adaptive systems in understanding consumer behavior.

Banquet Presentation

Thursday, Nov. 15, 2012
7:00 p.m. – 9:30 p.m.
Salon E & F

Morning Plenary - Complex Systems
Speaker: Haden A. Land

Title: Advanced Innovation is Indistinguishable from Magic

Abstract: The unpredictable nature of today's political, economic and technology landscape provides both opportunity and challenge. Advancing and enabling innovation across the collective Complex Adaptive Systems landscape is essential for Global Competitiveness. One thing for certain is technology plays an unprecedented role in almost every aspect of our professional and personal lives. What was once considered magic in the past, is now today common practice through enduring technology innovation. Join Haden Land as he examines trends in population, energy, health sciences, mobility, social media, big data, cyber security, nano and related technologies

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.

Conference Plenary Speakers

Friday, November 16, 2012
8:45 a.m. – 10:00 a.m.
Salon A & B

Morning Plenary - Cyber Security
Speaker: Ralph Martinez

Title: Cross-Cutting Domain Challenges and Solutions in Smart Grids

Abstract: The Smart Grid, as defined by the Smart Grid Interoperability Panel (SGIP), had its origins in early 2000's in EPRI's Intelligrid Project, DOE's Modern Grid Program, and in several progressive utilities that embraced new technology and system of systems methodologies. Today, the Smart Grid is defined in several SGIP and agency documents that emphasize systems architecture, complex domain definition characterization, cross-cutting interfaces, and potential technology solutions. This presentation describes the salient technology, cultural, and operational challenges and potential solutions in Smart Grid environments. The presentation presents system of systems methodologies that can be applied to solve complex problems with cross-cutting domain interfaces. The main challenging problems include 1) aging infrastructure and workforce, 2) cyber security threats and vulnerability, 3) energy security architectures, 4) big data mining and fusion, 5) cultural awareness, and 6) renewable energy technology integration and financing. System of systems methodologies and modeling tools are used to solve these problems. The presentation presents a Utility Stack that represents a systems view of the communications networks in utility operations and points out problems in system security and big data analytics for Advanced Metering Infrastructure (AMI) deployments. It also emphasizes cyber and energy security threats and vulnerability in Smart Grid environments. The paper should be of interest to system engineers, utility management and operators, and cyber security scientisits.

Biography:

Ralph Martinez is Director of Energy Initiatives and Distinguished Professor (George W. Edwards, El Paso Electric Award) at the University of Texas at El Paso, and Director of the Regional Cyber and Energy Security (RCES) Center. Dr. Martinez is responsible for UTEP campus renewable energy projects and modeling projects, academic support to teaching departments, energy community outreach, and supporting traditional energy.

Friday, November 16, 2012
12 noon – 1:15 p.m.
Salon E & F

Luncheon Plenary - Big Data Analytics

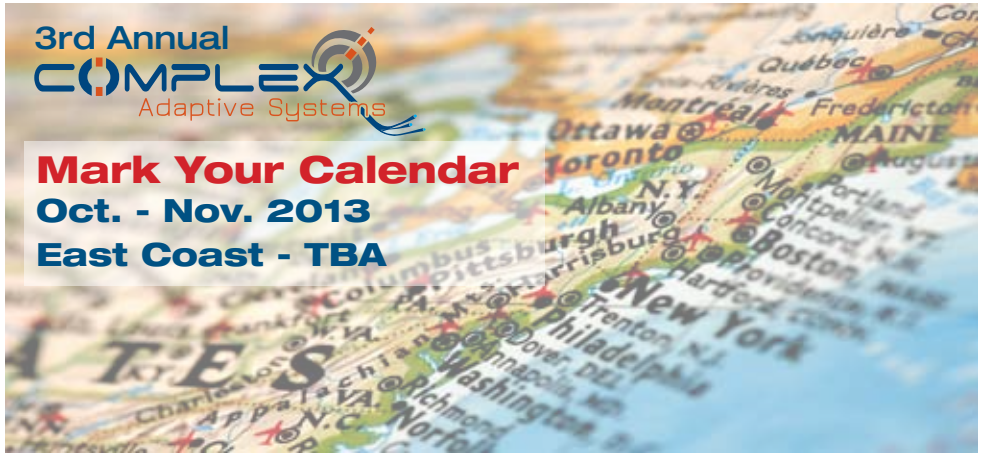
Speaker: Viswa Sharma

Title: Hadoop Beyond Hype

Abstract: The hype of harnessing multi-structured data, known as big-data, for actionable business intelligence erupted with Hadoop in 2008. Although Google File System and Map Reduce Programming environment were the fuse for the Hadoop Hype to erupt, Google is venturing into 'incremental indexing' based on incremental processing using Percolator. In the meanwhile, Hadoop distributed database and distributed processing technology has matured through the hype-cycle and several useful enterprise data center solutions have been deployed. We examine these distributed processing solutions based on commodity hardware and open source software, across several vertical market segments.

Biography:

Viswa Sharma is a Senior Solutions Architect (Big Data) for TCS, Santa Clara. He has broad based experience architecting and developing Fault Tolerant Parallel Computing systems, Reconfigurable Computing systems, Active Networking, Packet and Data Communications systems. Viswa has Eleven Patents issued, nine patents approved or pending in Multi core Processor Chip and system architecture, efficient bidirectional Power conversion, In-memory processing systems and DSL switching system.



Conference Panel Sessions

Wednesday, Nov. 14

Challenges to Cyber Security

3:30 p.m. - 5:00 p.m.
Salon A & B

Moderator: Charles Croom
Panel Members: William "Vic" Maconachy | Jandria Alexander | William "Rick" Geritz | Gregg Cobb | Saju Skaria

The panel will look at the different challenges to cyber security: Mobility, Privacy versus Sharing, Securing versus Enabling, Globalization versus Protection.

Moderator
Charles Croom
Vice President of Cyber Security Solutions, Lockheed Martin IS&GS

Dr. William "Vic" Maconachy
Vice President for Academic Affairs Chief Academic Officer Capitol College

Jandria Alexander
Principal Director Cyber Security Subdivision The Aerospace Corporation

William "Rick" Geritz
Chief Executive Officer Cyberhive

Gregg Cobb
VP Global Business Development Mocana

Saju Skaria
Director and Head of Aerospace and Defense Business Tata Consultancy Services (TCS)

Thursday, Nov. 15

Using Complex Adaptive Systems Approaches to Solve the Massive and Growing Cost Problems of Healthcare Providers

3:30 p.m. - 5:00 p.m.
Salon A & B

Moderator: John A. Norris
Panel Members: Glenn A. Kurowski | Heather Woodward-Hagg | Sandra Dunnington

This panel will cover "More on Industry-Led True Reform of the US Healthcare Delivery System," "Bending the Health Care Cost Curve – With Data you Already Have," "Integration of Operational and Systems Engineering with Veteran's Health Administration (VHA) Healthcare Delivery," and "Preparing Health Care Providers for Today's Complex Health Care System: A Community College Perspective."

Moderator
John A. Norris, JD, MBA
Chief Technology and Regulatory Officer Health Discovery Corp

Glenn A. Kurowski
Vice President Health and Life Sciences (HLS) Solutions Lockheed Martin IS&GS -Civil

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

Sandra Dunnington, RN
Vice President for Academic Affairs Prince George's Community College

Friday, Nov. 16

The Vectors of Volume, Velocity, Variety and Value

3:30 p.m. - 5:00 p.m.
Salon A & B

Moderator: Greg Kaple
Panel Members: Chad Fulgham | Viswa Sharma | Karr W. Farrell

Organizations are struggling with big data and often speak about their frustrations with the three to four vectors of big data. This panel will reflect on the day's sessions and provide an open forum to discuss related topics of interest. Big data... a big opportunity or just another big overhyped headache...

Moderator
Gregory J. Kaple
Founder GAK3 Venture Startup

Chad Fulgham
Vice President and Program Manager Next Generation Enterprise Network (NGEN) Lockheed Martin IS&GS-Defense

Viswa Sharma
Senior Solutions Architect (Big Data) Tata Consultancy Services

Karr W. Farrell
Vice President – Strategy, Boeing Kestrel

Conference Schedule

Wednesday, Nov. 14, 2012

Presentations are noted by corresponding page number in proceedings.

Registration Desk Open
7:00 a.m. – 5:00 p.m.
Assembly Corridor

Continental Breakfast
7:30 a.m. – 8:30 a.m.
Salon E & F

Opening Welcome U.S. Representative Jo Ann Emerson
8:30 a.m. – 8:45 a.m.
Salon A & B

Morning Plenary Speaker: Robert D. Rodriguez
8:45 a.m. – 10:00 a.m.
Salon A & B

Looking Back to Advance the Future – Leading Changes

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

Speaker details on page 4

Break
10:00 a.m. – 10:30 a.m.
Assembly Corridor

Concurrent Sessions
10:30 a.m. – 12 noon
(See schedule at right)

Concurrent Sessions 10:30 a.m. – 12:00 noon

Computational Intelligence and Machine Learning I
Salon A & B

Session Chair: Rosemary D. Paradis
Lockheed Martin IS&GS Advanced Technology Operations, USA

90 - Approximate Policy Iteration for Markov Control Revisited
Abhijit Gosavi, *Missouri S&T, USA*

96 - Hybrid Sampling Strategy-Based Multiobjective Evolutionary Algorithm
Wenqiang Zhang, *Henan University of Technology, China,* Lin Lin | Mitsuo Gen, *Fuzzy Logic Systems Institute, Japan;* Chen-Fu Chien, *National Tsing Hua University, Taiwan*

102 - A New Ensemble Learning Method for Temporal Pattern Identification
Wenjing Zhang | Xin Feng, *Marquette University, USA*

110 - A Hybrid EA for Reactive Flexible Job-Shop Scheduling
Lin Lin | Mitsuo Gen, *Fuzzy Logic Systems Institute, Japan,* Yan Liang, *Dalian University of Technology, China;* Katsuhisa Ohno, *Aichi Institute of Technology, Japan*

116 - A Post-Pareto Approach for Multi-Objective Decision Making Using a Non-Uniform Weight Generator Method
Victor M. Carrillo | Heidi Taboada, *The University of Texas at El Paso, USA*

Adaptive Big Data Analytics
Salon C

Session Chair: Fred Highland
Lockheed Martin, USA

212 - Fitting the Problem to the Paradigm: Algorithm Characteristics Required for Effective Use of MapReduce
Fred Highland | John Stephenson *Lockheed Martin, USA*

218 - Modeling Temporal Pattern and Event Detection Using Hidden Markov Model with Application to a Sludge Bulking Data
Naveen K. Bansal | Xin Feng | Wenjing Zhang | Wutao Wei | Yuanhao Zhao *Marquette University, USA*

230 - On Fuzzy Clustering Based Correlation
Mika Sato-Ilic, *University of Tsukuba, Japan*

367 - Fuzzy Architecture Assessment for Critical Infrastructure Resilience
George Muller, *Pacific Northwest National Laboratory, USA*

236 - Transfer Function Model for Pollutant Breakthrough in Geomedia
S.H. Anderson | R.L. Peyton, *University of Missouri, Columbia , USA;* Horng-Jer Shieh, *Taiwan Shoufu University, Taiwan*

Smart Grid
Salon D

Session Chair: Muhittin Yilmaz
Texas A&M University-Kingsville, USA

301 - A Smart Grid Robust Optimization Framework
Muhittin Yilmaz | Naren Reddy Dhansri, *Texas A&M University-Kingsville, USA*

307 - Parallel Dual Tabu Search for Capacitor Placement in Smart Grids
Yoshihiro Ogita | Hiroyuki Mori, *Meiji University, Japan*

314 - Autonomic Computing Drives Innovation of Energy Smart Grids
Melvin Greer, *Lockheed Martin, USA;* Manuel Rodriguez-Martinez, *University of Puerto Rico at Mayaguez, Puerto Rico*

320 - Performance Evaluation of Different Optimization Algorithms for Power Demand Forecasting Applications in a Smart Grid Environment
Ashraf Ul Haque | Julian Meng, *University of New Brunswick, Canada;* Paras Mandal | Ricardo L. Pineda, *The University of Texas at El Paso, USA*

326 - An Integer Programming Power Optimization in Storage Systems
Muhittin Yilmaz | Pratyush Valluri | Sasikanth Pagadrai, *Texas A&M University-Kingsville, USA*

Conference Schedule

Wednesday, Nov. 14, 2012

Presentations are noted by corresponding page number in proceedings.

Luncheon Plenary
Speaker: Vasant Honavar
12:00 noon – 1:15 p.m.
Salon E & F

Learning Predictive Models from Large Distributed Autonomous Data

Vasant Honavar
Program Director | National Science Foundation

Speaker details on page 4

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

Break
3:00 p.m. – 3:30 p.m.
Assembly Corridor

Panel Session
3:30 p.m. – 5:00 p.m.
Salon A & B

Challenges to Cyber Security

Moderator: Charles Croom
Panel: William "Vic" Maconachy | Jandria Alexander | William "Rick" Geritz | Gregg Cobb | Saju Skaria

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

Computational Intelligence and Machine Learning II
Salon A & B

Session Chair: Gürsel A. Süer
Ohio University, USA

129 - Evaluation of Feedback Among Multiple Scheduler Profiles in Fuzzy Genetic Scheduling
Gürsel A. Süer | Arkopaul Sarkar | Aslican Arinsoy | Philip Appiah Kubi | Kevin Plis | Melih Altun, *Ohio University, USA*

135 - A General Iterative Procedure of the Non-Numerical Ranking Preferences Method for Multiple Objective Decision Making
Victor M. Carrillo | Heidi Taboada
The University of Texas at El Paso, USA

140 - An Evolutionary Game Theory Approach for Intelligent Patrolling
Oswaldo Aguirre | Heidi Taboada
The University of Texas at El Paso, USA

146 - Effect of Potential Model Pruning on Different-Sized Boards in Monte-Carlo GO
Makoto Oshima | Koji Yamada | Satoshi Endo
University of the Ryukyus, Japan

152 - The GA-ACO Method Applied to Engineering Design
David Hibler, *Christopher Newport University, USA*

Adaptive Big Data Analytics II
Salon C

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

224 - Analysis of Web Survey Data Based on Similarity of Fuzzy Clusters
Ryunosuke Chiba | Mika Sato-Ilic
University of Tsukuba, Japan

242 - Influence of Scale on Chemical Dispersivity in Geomedia
S.H. Anderson | R. L. Peyton, *University of Missouri, Columbia, USA;* Brian Haeffner, *Missouri Department of Transportation, USA*

248 - Subspace Hierarchical Clustering for Three-Way Three-Mode Data Using Quadratic Regularization
Kensuke Tanioka | Hiroshi Yadohisa
Doshisha University, Japan

254 - Design of Hadoop-Based Framework for Analytics of Large Synchrophasor Datasets
Matthew Edwards | Aseem Rambani | Yifeng Zhu | Mohamad Musavi, *University of Maine, USA*

265 - A Fuzzy Inference Model for Predicting Irregular Human Behaviour During Stressful Missions
Sina Khanmohammadi, *Binghamton University, USA;* Cihan H. Dagli , *Missouri S&T, USA;* Farnaz Zamani Esfahlani, *University of Tabriz, Iran*

Energy Systems
Salon D

Session Chair: Ricardo L. Pineda
University of Texas at El Paso, USA

332 - Forecasting Power Output of Solar Photovoltaic System Using Wavelet Transform and Artificial Intelligence Techniques
Paras Mandal | Surya Teja Swarroop Madhira | Ricardo L. Pineda, *The University of Texas at El Paso, USA;* Ashraf Ul Haque | Julian Meng, *University of New Brunswick, Canada*

338 - Optimizing the Transmission Line Cost of a Fault Tolerance Network to Promote Green Power Usage
Wen-Li Wang | Robert Weissbach, *Penn State University, USA;* Mei-Huei Tang, *Gannon University, USA*

344 - Using the Monkey Algorithm for Hybrid Power Systems Optimization
Carlos M. Ituarte-Villarreal | Nicolas Lopez | Jose F. Espiritu, *The University of Texas at El Paso, USA*

350 - Evolutionary Agent Based Microstorage Management for a Hybrid Power System
Nicolas Lopez | Carlos M. Ituarte-Villarreal | Jose F. Espiritu, *The University of Texas at El Paso, USA*

361 - A Hybrid Intelligent System for Designing a Contract Model for Weather Derivatives
Hajime Fujita | Hiroyuki Mori, *Meiji University, Japan*

Conference Schedule

Thursday, Nov. 15, 2012

Presentations are noted by corresponding page number in proceedings.

Registration Desk Open
7:00 a.m. – 5:00 p.m.
Assembly Corridor

Continental Breakfast
7:30 a.m. – 8:30 a.m.
Salon E & F

Session Convenes Announcements
8:30 a.m. – 8:45 a.m.
Salon A & B

Morning Plenary Speaker: John Norris
8:45 a.m. – 10:00 a.m.
Salon A & B

Industry-Led True Reform of the US Healthcare Delivery System

John A. Norris
Chief Technology & Regulatory Officer | Health Discovery Corp, *USA*

Speaker details on page 5

Break
10:00 a.m. – 10:30 a.m.
Assembly Corridor

Concurrent Sessions
10:30 a.m. – 12 noon
(See schedule at right)

Concurrent Sessions 10:30 a.m. – 12:00 noon

Computational Intelligence and Machine Learning III
Salon A & B

Session Chair: Selahattin Ozcelik
Texas A&M University – Kingsville, USA

158 - Analysis of Viewer EEG Data to Determine Categorization of Short Video Clip
Paul A. Nussbaum | Alfred Herrera | Rounak Joshi | Rosalyn Hargraves, *Virginia Commonwealth University, USA*

164 - Industrial Robotic System with Adaptive Control
Marko Švaco | Bojan Šekoranja | | Bojan Jerbić, *University of Zagreb, Croatia*

170 - Design of a Highly Maneuverable Mobile Robot
R. Shah | S. Ozcelik | R. Challoo, *Texas A&M University – Kingsville, USA*

176 - Towards A Differential Privacy and Utility Preserving Machine Learning Classifier
Kato Mivule | Claude Turner | Soo-Yeon Ji, *Bowie State University, USA*

182 - Note and Timbre Classification by Local Features of Spectrogram
Erhan Guven, *The George Washington University, USA;* A. Murat Özbayolu, *TOBB University of Economics and Technology, Turkey*

Complex Systems I
Salon C

Session Chair: Cihan H. Dagli
Missouri S&T, USA

13 - Computational System Architecture Development Using a Holistic Modeling Approach
Renzhong Wang | Cihan H. Dagli, *Missouri S&T, USA*

63 - Optimal System's Complexity, An Architecture Perspective
Babak Heydari | Kia Dalili
Stevens Institute of Technology, USA

69 - Effect of Unfolding on the Spectral Statistics of Adjacency Matrices of Complex Networks
Sherif M. Abuelenin | Adel Y. Abul-Magd, *Sinai University, Egypt*

21 - Understanding System of Systems Development Using an Agent-Based Wave Model
Paulette Acheson | Louis Pape | Cihan H. Dagli | Khaled Haris, *Missouri S&T, USA;* Nil Kilicay-Ergin, *Penn State University, USA;* John Colombi, *Air Force Institute of Technology, USA*

75 - UML Profile and Extensions for Complex Approval Systems with Complementary Levels of Abstraction
Aditya Akundi | Francisco Zapata | Eric Smith, *The University of Texas at El Paso, USA*

Adaptive Big Data Analytics III
Salon D

Session Chair: David Enke
Missouri S&T, USA

259 - A New Hybrid Approach for Forecasting Interest Rates
David Enke, *Missouri S&T, USA;* Nijat Mehdiyev, *Technical University of Munich, Germany*

288 - Assessing Atmospheric Variability Using Kernel Principal Component Analysis
Andrew E. Mercer, *Mississippi State University, USA;* Michael B. Richman, *The University of Oklahoma, USA*

276 - Adaptive Machine Learning Approaches to Seasonal Prediction of Tropical Cyclones
Michael B. Richman | Lance M. Leslie, *The University of Oklahoma, USA*

271 - Housing Starts Forecast of Retail Sales Through the 2007-2009 Recession
Anthony Joseph | Maurice Larrain, *Pace University, USA*

282 - Estimation of the Burned Area in Forest Fires Using Computational Intelligence Techniques
A. Murat Özbayolu | Recep Bozer, *TOBB University of Economics and Technology, Turkey*

Conference Schedule

Thursday, November 15, 2012

Presentations are noted by corresponding page number in proceedings.

Luncheon Plenary
Speaker: Karr W. Farrell
12:00 noon – 1:15 p.m.
Salon E & F

Economic Value Emerging from Communities of Big Data Analytical Practice

Karr W. Farrell
Vice President – Strategy | Boeing Kestrel, USA

Speaker details on page 5

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

Break
3:00 p.m. – 3:30 p.m.
Assembly Corridor

Panel Session
3:30 p.m. – 5:00 p.m.
Salon A & B

Complex Systems of Healthcare
Moderator: John A. Norris
Panel: Glenn A. Kurowski | Heather Woodward-Hagg | Sandra Dunnington

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

Computational Intelligence and Machine Learning IV
Salon A & B

Session Chair: Iveta Mrazova
University in Prague, Czech Republic

188 - Cognitive Category Learning
Rosemary D. Paradis | John Olden-Stahl | Jack Moulton, *Lockheed Martin, IS&GS, USA;* Jinhong K. Guo, *Lockheed Martin, Advanced Technology Laboratories, USA*

194 - Can Deep Neural Networks Discover Meaningful Pattern Features?
Iveta Mrazova | Marek Kukacka, *Charles University in Prague, Czech Republic*

122 - Modified Genetic Algorithm for Flexible Job-Shop Scheduling Problems
Wannaporn Teekeng | Arit Thammano, *King Mongkut's Institute of Technology Ladkrabang,Thailand*

206 - A Formal Semantics for Ciset and Ciset Relation Operators
Premchand S. Nair, *Maharishi University of Management, USA*

Complex Systems II
Salon C

Session Chair: Nil Ergin
Penn State University, USA

31 - Enabling Systems and the Adaptability of Complex Systems-of-Systems
Charles O. Adler | Cihan H. Dagli, *Missouri S&T, USA*

37 - RQ-Tech, A Strategic-Level Approach for Conceptualizing Enterprise Architectures
Christine A. Hoyland, *Old Dominion University, USA*

43 - Understanding the Dynamics of System-of-Systems in Complex Regional Conflicts
Barbara Rapaport | Vernon Ireland, *The University of Adelaide, Australia*

49 - Addressing Wicked Problems in a Range of Project Types
Vernon Ireland | Barbara Rapaport | Amina Omarova, *The University of Adelaide, Australia*

Biologically Inspired Paradigms
Salon D

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

420 - Simulating Voltage-Gated Na and K Ion Channel Kinetics Using Hodgkin-Huxley Model
Iren Valova, *University of Massachusetts, USA;* Natacha Gueorguieva, *City University of New York, USA;* George Georgiev, *University of Wisconsin, USA*

426 - QRS Complex Detector Implementing Orthonormal Functions
George Georgiev, *University of Wisconsin, USA; Iren Valova, University of Massachusetts, USA;* Natacha Gueorguieva | Leo Lei, *City University of New York, USA*

444 - Classifying Lung Cancer Recurrence Time Using Novel Ensemble Method with Gene Network Based Input Models
William Ford | Jin Woo Park | Aaron S. Campbell | Walker H. Land Jr., *Binghamton University, USA;* Youping Deng | Yan Li, *Rush University Cancer Center, USA*

450 - GRNN Ensemble Classifier for Lung Cancer Prognosis Using Only Demographic and TNM Features
J. David Schaffer | Jin Woo Park | Erin Barnes | Qiyi Lu | Xingye Qiao | Walker H. Land Jr., *Binghamton University, USA;* Youping Deng | Yan Li, *Rush University Cancer Center, USA*

Concurrent Sessions presentations continue on the next page.

Conference Schedule

Thursday, Nov. 15, 2012, Continued

Presentations are noted by corresponding page number in proceedings.

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

Computational Intelligence and Machine Learning IV
Salon A & B

200 - Utilizing Depth Based Sensors and Customizable Software Frameworks for Experiential Application
Brian Moriarty | Frank DiCola | Kyle Buzby | Morisa Manzella | Emily Hromada, *Stevens Institute of Technology, USA;* Elizabeth Lennon, *University of Southern California, USA*

Complex Systems II
Salon C

56 - An Alternative Approach to Identifying and Appraising Adaptive Loops in Complex Organizations
Amina Omarova | Vernon Ireland | Alex Gorod, *The University of Adelaide, Australia*

Biologically Inspired Paradigms
Salon D

438 - PNN/GRNN Ensemble Processor Design for Early Screening of Breast Cancer
Walker H. Land Jr. | Xinpei Ma | Erin Barnes | Xingye Qiao | Jin Woo Park, *Binghamton University, USA;* John Heine, *H. Lee Moffitt Cancer Center & Research Institute, USA;* Timothy Masters, *TMAIC, USA*

Cash Bar
6:30 p.m. – 7:00 p.m.
Assembly Corridor

Banquet & Awards Presentation
Plenary Speaker: Haden A. Land
7:00 p.m. – 9:30 p.m.
Salon E & F

Advanced Innovation is Indistinguishable from Magic

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

Speaker details on page 6

Questions? Contact Us

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Conference Schedule

Friday, November 16, 2012

Presentations are noted by corresponding page number in proceedings.

Registration Desk Open
7:00 a.m. – 12 noon
Assembly Corridor

Continental Breakfast
7:30 a.m. – 8:30 a.m.
Salon E & F

Session Convenes
8:30 a.m. – 8:45 a.m.
Salon A& B

Morning Plenary Speaker: Ralph Martinez
8:45 a.m. – 10:00 a.m.
Salon A & B

Cross-Cutting Domain Challenges and Solutions in Smart Grids

Ralph Martinez
Director of Energy Initiatives & Distinguished Professor | The University of Texas at El Paso, USA

Speaker details on page 6

Break
10:00 a.m. – 10:30 a.m.
Assembly Corridor

Concurrent Sessions
10:30 a.m. – 12 noon
(See schedule at right)

Concurrent Sessions 10:30 a.m. – 12 noon

Computational Intelligence and Machine Learning V
Salon A & B

Session Chair: Alper Murat
Wayne State University, USA

456 - Promoting Search Diversity in Ant Colony Optimization with Stubborn Ants
Ashraf M. Abdelbar, *American University in Cairo, Egypt;* Donald C. Wunsch II, *Missouri S&T, USA*

463 - Swarm Theory Applied to Air Traffic Flow Management
Sergio Torres, *Lockheed Martin, USA*

432 - Promoter Analysis with Wavelets and Support Vector Machines
Makihiko Sato, *Maebashi Institute of Technology, Japan*

294 - Assessing Metacognitive Skills Using Adaptive Neural Networks
Justin Anderson | Kouider Mokhtari | Arun Kulkarni, *The University of Texas at Tyler, USA*

356 - Traffic Simulation System Based on Fuzzy Logic
Mohammad A. Taha | Laheeb Ibrahim, *University of Mosul, Iraq*

Distributed Networks
Salon C

Session Chair: Gursel Serpen
University of Toledo, USA

374 - Simulating Heterogeneous and Larger-Scale Wireless Sensor Networks with TOSSIM TinyOS Emulator
Jiakai Li | Gursel Serpen, *University of Toledo, USA*

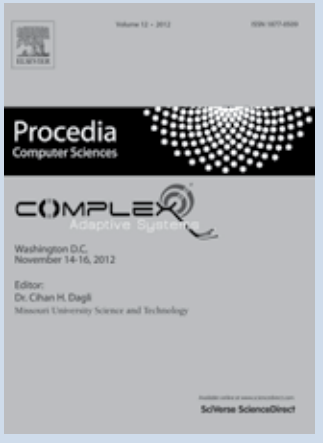
398 - Security Through Behavioral Biometrics and Artificial Intelligence Benjamin Purgason | David Hibler, *Christopher Newport University, USA*

380 - Assessing Time Complexity of Applications for TinyOS-Mica Wireless Sensor Networks in TOSSIM Emulator Gursel Serpen | Jiakai Li, *University of Toledo, USA*

404 - An Approximation Algorithm for Computing a Tipping Set in Super Modular Games for Interdependent Security B. Cremeans | S. Lakshmivarahan | S. K. Dhall, *University of Oklahoma, USA*

386 - An Overview and Assessment of Wireless Technologies and Co-existence of ZigBee, Bluetooth and Wi-Fi Devices
R. Challoo | A. Oladeinde | N. Yilmazer | S. Ozcelik | L. Challoo, *Texas A&M University-Kingsville, USA*

Proceedings



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Conference Schedule

Friday Nov. 16, 2012

Presentations are noted by corresponding page number in proceedings.

Luncheon Plenary Speaker: Viswa Sharma

12:00 noon – 1:15 p.m.
Salon E & F

Hadoop Beyond Hype

Viswa Sharma
Senior Solutions Architect | Tata Consultancy Services, USA

Speaker details on page 7

Concurrent Sessions

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

Break

3:00 p.m. – 3:30 p.m.
Assemby Corridor

Panel Session

3:30 p.m. – 5:00 p.m.
Salon A & B

Big Data: The Vectors of Volume, Velocity, Variety and Value
Moderator: Greg Kaple
Panel: Chad Fulgham | Viswa Sharma | Karr W. Farrell

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

Computational Intelligence and Machine Learning VI

Salon A & B

Session Chair: Michael H. Nance
Lockheed Martin IS&GS, USA

412 - Detection of Groups in Non-Structured Data
Rosemary D. Paradis | Daniel Davenport | David Menaker, *Lockheed Martin, IS&GS, USA;* Sarah M. Taylor, *Sarah M. Taylor Consulting, LLC, USA*

392 - Predicting the Type of Nanostructure Using Data Mining Techniques and Multinomial Logistic Regression
Mahmoud Shehadeh | Nader Ebrahimi | Abel Ochigbo, *Northern Illinois University, USA*

81 - Moon Plants as Model System for Life Support to Enable Human Exploration
Robert N. Bowman | Arwen I. Davé, *Lockheed Martin, USA;* Christopher P. McKay, *NASA Ames Research Center, USA*

Company White Paper

Managing Big Data in the Aerospace and Defense Enterprise and Supporting the Vision for Business Insight
Berry Gibson, *SAP, USA*

Tutorial

Salon C

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

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