
THE UNIVERSITY of TENNESSEE at CHATTANOOGA
COLLEGE of BUSINESS
presents
sharp
2014
Symposium on Healthcare and Analytics in Research and Practice

Ashish Gupta, PhD
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Message from SHARP 2014 Conference Chair

Welcome to SHARP 2014- the 3rd Symposium on Healthcare & Analytics in Research and Practice! I am excited to bring this unique 3-day conference to Chattanooga, TN! SHARP 2014 is hosted by UTC College of Business and the newly founded Big Data & analytics Research Center (BDARC).

Big Data and Analytics is the way to go for the future growth and development that has tremendous positive implications on society and business!

The use of big data and analytics approaches in the fields of science, technology and business is promising and set to grow phenomenally over the next several years. The adoption of such approaches should lead toward the development of next-generation innovation that is widely adopted in organizations and localized communities but are also sharable over high-speed, gigabit cyber-networks. Analytics-driven developments in various spheres such as healthcare, smart grid, public health, consumer, etc. strongly influence the technological evolution, guide policy making, while reshaping the future and catalyze the innovation culture at the global, regional and metropolitan levels. Various private and public open-data initiatives will be key drivers for this change. Such an approach requires a new thinking blended with state-of-art new business, technology and analytics skills and strong scientific research.

In the spirit of supporting his open innovation, the conference offers unique opportunities to learn from, contribute your knowledge to, and brainstorm with the key movers and shakers. The conference has numerous keynotes, invited talks, panels, training sessions and research talks. It brings together academics, leading industry and visionaries who share a common passion for application, research, and education innovation in the field of Big Data, Analytics and Informatics. The 2014 conference focuses on the application of analytics to healthcare, smart grid and other cutting-edge areas related to analytics.

The SHARP 2014 Conference identifies opportunities and presents various mechanisms that could make contributions in the field of applied analytics while taking us on an integrated, technology driven, innovation path for the future.

I am very pleased that SHARP conference attendees have the opportunity to avail CPAs and CISAs to increase their understanding of the latest data analytics tools and research and also earn CPE credits. The two-day conference can provide a total of 15 CPE Credits and the one-day pre-conference is recommended for an additional 7.5 CPE Credits.

My sincere thanks to the conference and center sponsors- (IBM, Teradata, The Enterprise center, Noon Management, Colab, EPB, Market Street Solutions and PYA Analytics), the steering committee, logistics & organizing committee, student volunteers for making this conference happen. Finally, I want to thank Dean Robert Dooley for providing the support that translated the vision of bringing this conference into reality in Chattanooga!

We hope that you will find this conference of great learning value!

Sincerely,

Ashish Gupta, PhD
SHARP 2014 Conference Chair
gupta@utc.edu

Big Data and Analytics Research Center (BDARC)

The Big Data and Analytics Research Center (BDARC) is proud to bring SHARP 2014 conference to Chattanooga! BDARC is a new state-of-the-art multidisciplinary research center at the University of Tennessee (UTC) that focuses on developing UTC's niche research expertise and recognition in the area of applying analytics-oriented methodologies to study critical and timely problems of high global and national value with an increased emphasis on Chattanooga/TN region.

Center's core strength involves developing innovative and smart solutions to high-impact and high-value problems while leveraging the true capabilities of cutting edge analytics, informatics methodologies and gigabit networks. Center's current core research initiatives involve developing next-generation solutions in the areas of healthcare and smart grid.

BDARC houses core domain specific expertise and partners with other UTC units and beyond. Center fosters internal collaboration with various other UTC colleges and research centers such as College of Engineering, SimCenter, UT College of Medicine Chattanooga, College of Health Education and Professional Studies while benefitting from extensive external collaboration through its pre-existing relationships with other national research institutes/centers and regional healthcare companies. This offers a central platform for a wide faculty base at UTC, in collaboration with other UTC units and external partners, to pursue high-impact and applied research.

One of the primary goals of the proposed center is to provide opportunities for students to engage in living industry scale projects with active faculty mentoring.

Center seeks to build meaningful collaboration and ties with the community and stakeholders by working on projects contribute to the economic development and welfare of the society as well as businesses in the region while keeping the scientific and academic goals in perspective!

For more details, Please visit www.utc.edu/bdarc or contact center director, Ashish Gupta (gupta@utc.edu) (423)-425-4156

Center Activities:

- SHARP 2014 conference, Chattanooga TN www.utc.edu/sharp
- Big Data & Analytics Distinguished Speaker Series
- Analytics Workshop and Seminar series – alternates with distinguished speaker series.
- Annual Analytics student competition
- International Conference On Big Data & Analytics for Business, New Delhi, India., Dec 28 – 29, 2014; http://www.serd.org.in/bdab2014/
- Big Data and Analytics Congress, 2015, Dallas
- SIGDSA A Pre-ICIS SIGDSA Workshop, Auckland, New Zealand, Dec 2014 on
    - "Building a better World through Analytics and Collaboration"
    - https://sites.google.com/a/uncg.edu/sigdsa/

Center Affiliates:

SHARP 2014 Partners and Sponsors

The conference chair and committee members thank the program partners and sponsors of SHARP 2014:

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SPECIAL THANKS TO:

BlueCross BlueShield of Tennessee
Chattanooga Technology Council
Chattanooga Area Convention and Visitors Bureau

SHARP 2014

October 15-17, 2014
University of Tennessee Chattanooga

Wednesday, October 15, 2014
Pre-Conference Event: IBM Big Data and Analytics Development Day
(A separate link for no-cost registration with be sent to conference registrants)

Location: Community Hall, BlueCross BlueShield of Tennessee, 1 Cameron Hill Circle, Chattanooga, TN 37402

Program Outline

9:00 am - 9:30 am- Breakfast, Registration and Introductions
9:30 am to 10:30 am - Welcome and Keynote - Big Data Overview
10:30 am to 11:30 am - Adding Value to your Organization Beyond Hadoop:
An Enterprise View of Big Data
11:30 am to 12:30 pm - Analytics for Everyone: Addressing the Analytic needs of the Enterprise
12:30 pm to 1:30 pm - Lunch & Demo Overview of BlueMix
1:00 pm to 5:00 pm - BigInsights Quick Start Edition Hands-on Lab (please bring your own laptop if you plan to participate)
OR
- Analytics Hands-on Lab (limited number of machines available)
5:00 pm
- Close & Thank You for Attending

*Breakfast & Lunch are complimentary

Thursday, October 16, 2014
Chattanooga Marriott Downtown, 2 Carter Plaza, Chattanooga, TN 37402

7:30-8:15 am	Registration, Breakfast and Coffee	
8:15-8:45 am	**Welcome Remarks** • Dr. Steve Angle, Chancellor, University of Tennessee at Chattanooga • Mayor Jim Coppinger, Hamilton County Tennessee	**Plaza A/B** Set-up: Banquet Capacity: 110
8:45-9:00 am	**Big Data & Analytics Research Center (BDARC)** Ashish Gupta, PhD, SHARP 2014 Conference Chair	**Plaza A/B** (cont.)
9:00-10:00 am	**Keynote Speaker** Dr. Michael Haydock 2014 IBM Fellow, Partner, Chief Scientist - Business Analytics and Optimization, Application Architect: AIX/UNIX *"Broad Data and Attribution of Consumer Patterns"*	**Plaza A/B** (cont.)
10:00 am	Break	
10:15-11:45 am	**Session 1: Training and Tutorial** SAS Visual Analytics Training workshop • Lakshmi Iyer, PhD, University of North Carolina at Greensboro	**East Room** Set-up: Theatre Capacity: 35
10:15-11:45 am	**Session 2: Smart Healthcare Systems** & **Infrastructure** Session Chair: Surendra Sarnikar 1. The smart EMR platform for Clinical Decision Making in ICU (Invited Talk) • Vitaly Herasevich, MD, PhD, Mayo Clinic, Rochester 2. Data Architecture to Drive a Successful Analytics Platform • Divyes Patel, BlueCross BlueShield of Tennessee • Josh Bell, BlueCross BlueShield of Tennessee 3. Comparative Analysis of Feature Sets and Algorithms for Data Fusion based Decision Support in ICU • Sarin Shrestha, Dakota State University • Surendra Sarnikar, PhD, Dakota State University	**Plaza C** Set-up: Crescent Rounds Capacity: 50
10:15-11:45 am	**Session 3: Analytics for Population Health and Innovation** Session Chair: Raj Sharman 1. Population Health Analytics • Lesia Stuart, BlueCross BlueShield of Tennessee Abstract: In this session, the attendees will learn how BCBST created a best-in-class Total Population Health Management program by utilizing traditional and non-traditional data to create a 360-degree member view. This 360 degree view enables a comprehensive program offering to each unique individual across the care continuum,	**Tennessee River Room** Set-up: Theatre Capacity: 50

	personalized outreach,, and sustained engagement with our health plan. 2. Mobile Phone Datasets in Public Health and Healthcare Research • Jonathan Leidig, PhD, Grand Valley State University • Jerry Scripps, PhD, Grand Valley State University • Greg Wolffe, PhD, Grand Valley State University • Nikko Vogel, Grand Valley State University • Christopher Theisen, Grand Valley State University 3. Using Social Media Analytics to Understand e-Cigarette's Usage (Student Presentation) • Madhuri Siddulagari, University of Tennessee at Chattanooga • Rupinder Kaur, University of Tennessee at Chattanooga • Ashish Gupta, PhD, University of Tennessee at Chattanooga • Scott Leischow, PhD, Mayo Clinic, Scottsdale 4. Homophily and Information Credibility in Online Health Communities • Srikanth Venkatesan, State University of New York at Buffalo • Wencui Han, State University of New York at Buffalo • Raj Sharman, PhD, Statue University of New York at Buffalo	**Tennessee River Room** (cont.)
10:15-11:45 am	**Session 4: Smart Grid** Session Chair: Sreenivas Kidambi 1. Smart Grid and Analytics at Electric Power Board (EPB) (Invited Talk) • William Copeland and Andy Campbell, EPB 2. Smart Grid & Utilities Analytics: Using Public Data to Investigate Energy Resources & Energy Efficiency • Ashwini Wani, University of North Carolina at Greensboro • Derek Moore, University of North Carolina at Greensboro 3. Towards Computational Simulation of Wind Farms • Sreenivas Kidambi, PhD, University of Tennessee at Chattanooga • Anshul Mittal, University of Tennessee at Chattanooga • Lafayette Taylor, University of Tennessee at Chattanooga	**West Room** Set-up: Theatre Capacity: 35
11:45 am-1:30 pm	**Luncheon Keynote Speaker** Bill Franks Chief Analytics Officer, Teradata Corporation *"Making Big Data Actionable"*	**Plaza A/B** Set-up: Banquet Capacity: 110
1:30-3:00 pm	**Session 5: Training and Tutorial** Using Analytics To Detect Possible Fraud: Overview of Tools and Techniques • Pam Mantone, CPA, Senior Manager, Decosimo	**East Room** Set-up: Theatre Capacity: 35
1:30-3:00 pm	**Session 6: Consumer Analytics** Session Chair: Gary Wilkerson 1. Analytics for Consumer Engagement (Invited Talk) • Sherri Zink, BlueCross BlueShield of Tennessee	**Plaza C** Set-up: Crescent Rounds Capacity: 50

	2. Towards a Framework for Predictive Models of Socio-Economic Interactions of Autonomous Population Units: A Case Study on Predictive Model Ecosystem for Interpersonal Violence • Fortune Mhlanga, PhD, Lipscomb University • E. L. Perry, PhD, Faulkner University 3. A Retail Approach to Maintaining Health and Wellness • Leigh McCormack, BlueCross BlueShield of Tennessee 4. Development of a Prediction Model for Identification of High-Cost Sport Injury Cases • Gary Wilkerson, PhD, University of Tennessee at Chattanooga	**Plaza C** (cont.)
1:30-3:00 pm	**Session 7: Transdisciplinary Issues in Healthcare** **Session Chair:** Olivera Marjanovic 1. Innovating Healthcare: Wave 2 – Analytics (Invited Talk) • Rubin Pillay, MD, PhD, University of Alabama at Birmingham (College of Business/College of Medicine) 2. Transdisciplinary Medicine: Bringing Together Existing Resources to Elevate Care • Christopher Young, PhD, Siskin Hospital for Physical Rehabilitation 3. Provider Transparency and Pay for Performance Analytics • Pete Vanvalkinburgh, BlueCross BlueShield of Tennessee • Marc Loizeaux, BlueCross BlueShield of Tennessee 4. Advanced Analytics in Transformative Services • Olivera Marjanovic, PhD, University of Sydney, Australia	**West Room** Set-up: Theatre Capacity: 35
3:00 pm	Break	
3:15-4:30 pm	**Panel Session 1: New Frontiers in Healthcare Analytics** Panel Moderator & Chair: Jeff Wade, CEO, Market Street Solutions • Sherri Zink, Vice President of Medical Informatics, BCBST • Dr. Vitaly Herasevich, MD, PhD, Assistant Professor of Medicine and Anesthesiology, Mayo Clinic, Rochester • Dr. Chris Young, PhD, Clinical Neuropsychologist and Tod Chain, Vice President of Administration, Siskin Rehab • Dr. Rubin Pillay, MD, PhD, Professor of Healthcare Innovation and Entrepreneurship, Collat School of Business, Assistant Dean for Global Health Innovation, University of Alabama at Birmingham	**Plaza A/B** Set-up: Banquet Capacity: 110
4:30 pm	Adjourn	
5:30-7:30 pm	Reception	**Tennessee River Room** Set-up: Reception Capacity: 150

Friday, October 17, 2014
Chattanooga Marriott Downtown, 2 Carter Plaza, Chattanooga, TN 37402

8:00-8:30	Breakfast and Coffee	
8:30-9:00 am	**Welcome Remarks** • Dr. Jerald Ainsworth, Provost, University of Tennessee at Chattanooga • Dr. Robert Dooley, Dean, UTC College of Business	**Plaza A/B** Set-up: Banquet Capacity: 110
9:00-10:00 am	**Keynote Speaker** Dr. Ramesh Sharda Vice Dean and Director, Executive PhD in Business Program Regents Prof. & Watson/ConocoPhillips Chair of Mgmt. Sc. & Info Systems Watson Graduate School of Management Spears School of Business, Oklahoma State University *"Exposure, Explore, Experience: Analytics Journey"*	**Plaza A/B** (cont.)
10:00 am	Break	
10:15-11:30 am	**Panel Session 2: Executive Panel: Role of Big Data, Analytics & Smart Technologies: A Path for Innovative Future** • Moderator & Chair: Mike Bradshaw, Director, CO.LAB • Brian Worley, President & CEO, PYA Analytics • Bob Leo, Vice President of Enterprise Data and Technical Architecture, UNUM • Christopher Orban, Covenant Transportation Group-Advanced Analytics Group • Laurene Vamprine, Vice President & CIO, Erlanger Health System	**Plaza A/B** (cont.)
11:30 am-1:00 pm	**Luncheon Keynote Speaker** Dr. Katharine Frase, Vice President and Chief Technology Officer, IBM Public Sector *" Big Data -- It's everywhere, but how does it help our cities and our citizens?"*	**Plaza A/B** (cont.)
1:00 pm	Break	
1:15-2:30 pm	**Panel Session 3: Analytics Powering Smart Cities** • Chair and Moderator: Dr. Glenn Ricart, Founder and CTO, US Ignite • David Wade, Executive Vice President and COO, EPB • Dr. Kathrine Frase, Vice President & Chief Technology Officer, IBM Public Sector • Dr. David Lary, Professor of Physics, University of Texas at Dallas	**Plaza A/B** (cont.)
2:30-4:00 pm	**Session 8: Smart and Connected Cities** 1. Real-time Analytics for Constrained Resources in Smart Cities (Invited Talk) • Glenn Ricart, PhD, US Ignite 2. Holistics 3.0: Multiple Big Datasets and Machine Learning in Smart Cities of the Future (Invited Talk)	**Plaza C** Set-up: Crescent Rounds Capacity: 50

	• David Lary, PhD, University of Texas at Dallas	
2:30-4:00 pm	**Session 9: Analytics for Productivity and Important Issues** Session Chair: Mohammad Ahmadi and Parthasarati Dileepan 1. Empowering Employer Groups with Real Time Insights with the Blue Insights Mobile App • Mike McPherson, BlueCross BlueShield of Tennessee 2. Unveiling the Importance of Key Requirements of Business Analytics 3.0. proposed by Thomas H. Davenport: An Empirical Study • Samuel Fosso Wamba, PhD, NEOMA Business School and UNISA, France 3. Using Business Analytics to Determine Investment Strategy (Student Presentation) • Marsha McClure, University of Tennessee at Chattanooga • Ashish Gupta, PhD, University of Tennessee at Chattanooga 4. Can Big Data Get More Educational Funding? • Mohammad Ahmadi, PhD and Parthasarati Dileepan, PhD University of Tennessee at Chattanooga	**West Room** Set-up: Theatre Capacity: 35
2:30-4:00 pm	**Session 10: Innovative Application of Analytics** Session Chair: Han Li 1. Prediction of Core and Lower Extremity Sprains & Strains in College Football • Gary Wilkerson, PhD, University of Tennessee at Chattanooga 2. An Explanatory Study of Free Tools for Big Data Predictive Analytics • Thomas Ngo-Ye, PhD, Dalton State University 3. A Visual Analytics Application for Effective Patient-Provider Matchmaking • Gregory Ramsey, PhD, Morgan State University • Ashish Gupta, PhD, University of Tennessee at Chattanooga • YoungOk Kwon, PhD, Sookmyung Women's University, Seoul, S. Korea 4. Privacy-Preserving Scalar Product Algorithm for Vertically Partitioned Data • Han Li, PhD, Minnesota State University Moorhead • Rathindra Sarathy, PhD, Oklahoma State University • Krish Muralidhar, PhD, University of Oklahoma	**East Room** Set-up: Theatre Capacity: 35
4:00 pm	Adjourn	

SHARP 2014

October 15-17, 2014
University of Tennessee Chattanooga

Wednesday, October 15, 2014
Pre-Conference Event: IBM Big Data and Analytics Development Day

Location: Community Hall, BlueCross BlueShield of Tennessee, 1 Cameron Hill Circle, Chattanooga, TN 37402

Program Outline

9:00 am - 9:30 am- Breakfast, Registration and Introductions
9:30 am to 10:30 am - Welcome and Keynote - Big Data Overview
10:30 am to 11:30 am - Adding Value to your Organization Beyond Hadoop: An Enterprise View of Big Data
11:30 am to 12:30 pm - Analytics for Everyone: Addressing the Analytic needs of the Enterprise
12:30 pm to 1:30 pm - Lunch & Demo Overview of BlueMix
1:00 pm to 5:00 pm - BigInsights Quick Start Edition Hands-on Lab (please bring your own laptop if you plan to participate) OR Analytics Hands-on Lab (limited number of machines available)
5:00 pm - Close & Thank You for Attending

*Breakfast & Lunch are complimentary

Instructions for Training workshop
Your laptop is required if you plan to participate in the hands-on lab. The hands-on labs will be performed using a VMWare image.
Laptop Configuration:

1. Ensure you can access a public wired/wireless network (eg: Can you use your laptop in StarBucks?)

2. Minimum Hardware Requirements:
*Processor: 2 GHz or higher, 64-bit, 2 cores(Recommended: 4 cores)
*Memory: 8 GB RAM (Recommended: 16 GB RAM)
*Disk space: 50 GB
*Display 1024 x 768 display minimum using 256 Colors (or higher)

3. Software Requirements - Insight (please install before the event):
- Operating System: Current Linux (any distro) or Windows 7 and above, or Mac OS
- VMWare Player - (Free, pick latest version): vmware.com/go/downloadplayer/
- InfoSphere BigInsights Quick Start Edition VMWare image (free): ibm.co/QuickStart
- InfoSphere Biginsights Quick Start YouTube guides available here:
**Getting Started with BigInsights Quick Start Edition - Single Node - http://youtu.be/imIVJjUhrVo
**Getting Started with BigInsights Quick Start Edition - Multi-Node Cluster - http://youtu.be/gUal2orKVSY
-InfoSphere Streams Quick Start Edition VMWare image (free):
http://www-01.ibm.com/software/data/infosphere/streams/quick-start/

4. Optional Software:
- Use 7zip to extract zip/tar files:http://www.7-zip.org/
(Note: Uncompressing with WinRar returns an incorrect "Image corrupted" message, so we recommend to use 7zip)
- If you are using a MAC, you will have to download Fusion in order to access the VMWare QuickStarts.

Thursday, October 16, 2014
Chattanooga Marriott Downtown, 2 Carter Plaza, Chattanooga, TN 37402

7:30-8:15 am	Registration, Breakfast and Coffee
8:15-8:45 am	**Welcome Remarks** **Plaza A/B** • Dr. Steve Angle, Chancellor, University of Tennessee at Chattanooga • Mayor Jim Coppinger, Hamilton County Tennessee
8:45-9:00 am	**Big Data & Analytics Research Center (BDARC)** **Plaza A/B** Ashish Gupta, PhD, SHARP 2014 Conference Chair
9:00-10:00 am	**Keynote Speaker** **Plaza A/B** Dr. Michael Haydock 2014 IBM Fellow, Partner, Chief Scientist - Business Analytics and Optimization, Application Architect: AIX/UNIX *"Broad Data and Attribution of Consumer Patterns"* Abstract: Many retailers are finding that transaction data alone are usually not enough to be able to adequately explain an individual consumer's behavior. We can see that a customer bought a particular product, but the transaction itself doesn't necessarily explain "why" the product was bought. What lifestyle does that product fit into, what drove the consumer to select "that" particular product at this particular time? This session will articulate how the use of broad external data sources, combined with internal transaction history, may be able to explain some of the "forces" at work and operating on individual consumers. More sources of data usually increase the chance of a logical behavioral attribution explanation. Many of these broad data sources are readily available and can be acquired at low to no cost. Through the use of Bayesian statistics, we can also help determine the probabilities that a particular consumer is sensitive to a particular force. The forces highlighted will be weather, economic variables (5), and events. Social media data will also be highlighted as a valuable source of information. Keywords: Bayesian posteriors, forces, weather effects, economic effects, event effects, behavioral attribution, social media.
10:00 am	Break
10:15-11:45 am	**Session 1: Training and Tutorial** **East Room** SAS Visual Analytics Training workshop • Lakshmi Iyer, PhD, University of North Carolina at Greensboro Abstract: Visual Analytics is a data mining task that relates to the display of information in a visual format that aids in analysis or reporting of relationship among data items. Visualization allows analysts to explore complex, multidimensional data in one screen. It can display data using parallel coordinates, scatter plots, glyphs, dimensional stacking, and graphical elements such as shapes, color, lines and points. Visual analytics tools help in speeding up the time to insight through the use of visualizations interactively incorporating best practices in visual. Goal of visualization is to enable the end user to create a mental model of the domain knowledge making it easier to interpret the data. Visualization is also sometimes called as Visual Data Mining. These visualization tools can complement business agility and self-service BI through technological innovations such as in-memory processing, mashing of multiple data sources and use of

	multiple visual indicators. Visualization techniques such as bar plots, histograms, stem and leaf plots, pie charts, box plots, contour plots, waterfall, trellis, network, tag clouds, surface plots, vector field plots, heat maps, visual hills, news maps, dimensional slices, animation, and matrices are often used depending upon the type of data being analyzed. SAS Visual Analytics (SAS VA) is one of the latest offerings of data visualization tools that enable users with varying levels of technical literacy and expertise to analyze and understand complex data to make informed decisions and projections. This workshop will introduce SAS Visual Analytics to participants who wish to incorporate a data visualization module to their existing Business Intelligence/Big Data/Analytics courses. This workshop segment will provide a brief overview of data visualization and introduce features and capabilities of SAS VA through a step by step scripted demo using a hosted SAS VA solution available through Teradata University Network. The features discussed will include charts and graphs, other visualization options, forecasting, correlations and regression, and report design. Using modestly large data set the presenters will demonstrate assignments that can easily be adopted to the class room for student use. In addition, further resources to be used in BI through Teradata University Network will be shared. NOTE: • Attendees are requested to bring their own laptop if they want to follow through with the activities. Live access to data and performing analytics will be dependent on speed of internet access available in the room. • Faculty are requested to register with Teradata University Network (teradatauniversitynetwork.com, free registration required for using SAS VA which is available for free through TUN). Faculty registrations are verified and hence we recommend establishing the account a few days before the conference workshop. • Students can register on site. A password will be provided to do so.
10:15-11:45 am	**Session 2: Smart Healthcare Systems** & **Infrastructure** **Plaza C** Session Chair: Surendra Sarnikar 1. The smart EMR platform for Clinical Decision Making in ICU (Invited Talk) • Vitaly Herasevich, MD, PhD, Mayo Clinic, Rochester Abstract: The quantity of information encountered in a hospital equipped with a comprehensive electronic health record (EHR) can quickly overwhelm the processing abilities of bedside providers. This is particularly true in the moments of stress and time pressure frequently encountered in the ICU setting. AWARE is a data integration and decision support tool for intensive care, designed by health care providers, for health care providers to increase the efficiency and accuracy of data assimilation and communication with goal to improve patient outcomes. AWARE is tested and validated to increase stress free compliance with best clinical practice in ICU. During this presentation, speaker will outline concepts and application of clinical informatics in intensive care and will present some potential steps for dealing with information overload and improvement EMR in this area using AWARE. Learning Objective 1: Identify major problems with current EMR interfaces Learning Objective 2: Define patient-centered user interfaces Learning Objective 3: Summarize methods for EMR interfaces evaluation 2. Data Architecture to Drive a Successful Analytics Platform • Divyes Patel, BlueCross BlueShield of Tennessee • Josh Bell, BlueCross BlueShield of Tennessee 3. Comparative Analysis of Feature Sets and Algorithms for Data Fusion based Decision Support in ICU • Sarin Shrestha, Dakota State University • Surendra Sarnikar, PhD, Dakota State University

	Abstract: Rapid advancement in information technology is being leveraged in healthcare to develop many innovative systems for measuring and monitoring health to provide decision support. However, there is limited integration of the data from the devices into a unified clinical decision support infrastructure. Clinicians typically employ multiple devices and interfaces to access information from multiple sensors and many medical instrumentation alarms to monitor and understand patient health status often leading to severe information overload and alarm fatigue. The paper presents a comparative analysis of alternative feature sets and six algorithms to help build a data fusion-based decision support system that aims to reduce the false alarms, and information overload in clinicians. Keywords: Alarm fatigue, Information overload, Data Fusion, Decision support, Feature set
10:15-11:45 am	**Session 3: Analytics for Population Health and Innovation** **Tennessee River Room** Session Chair: Raj Sharman 1. Population Health Analytics • Lesia Stuart, BlueCross BlueShield of Tennessee 2. Mobile Phone Datasets in Public Health and Healthcare Research • Jonathan Leidig, PhD, Grand Valley State University • Jerry Scripps, PhD, Grand Valley State University • Greg Wolffe, PhD, Grand Valley State University • Nikko Vogel, Grand Valley State University • Christopher Theisen, Grand Valley State University Abstract: Call detail records assist in capturing human behavior, trends, and needs that are not efficient or otherwise possible to collect. They are especially useful for studying developing countries due to widespread adoption of mobile devices and the general lack of governmental resources. These datasets allow researchers to build models of the underlying population. Simulation software can then be utilized to produce predictions of epidemics and optimize mitigation strategies. The resulting experiments assist in planning healthcare infrastructure and public health response. Keywords: mobile health, planning, infrastructure 3. Using Social Media Analytics to Understand e-Cigarette's Usage (Student Presentation) • Madhuri Siddulagari, University of Tennessee at Chattanooga • Rupinder Kaur, University of Tennessee at Chattanooga • Ashish Gupta, PhD, University of Tennessee at Chattanooga • Scott Leischow, PhD, Mayo Clinic, Scottsdale Abstract: Electronic cigarettes or E-Cigarettes are battery-operated devices that turn nicotine and other chemicals into a vapor, which simulates tobacco smoking. This is a billion dollar plus industry and is a controversial technology with an incomplete understanding of its usage. There are various discussions going on about the usage and experience of this e-cigarette vaping on social media. This study applies analytics to understand the opinion of online user community regarding prominent features of e-cigarettes, usage and effects. In this study, different websites, blogs or social networking sites are analyzed to gather required information. Data is collected from these online sources using Text analytics. Obtained data sets will be organized and studied for different relationships among terms. Results will then be integrated and presented using visual reporting tools for graphical representation of outcomes to depict some strong

	opinions about e-cigarettes. Keywords: e-cigarette, social media, text analytics, big data 4. Homophily and Information Credibility in Online Health Communities • Srikanth Venkatesan, State University of New York at Buffalo • Wencui Han, State University of New York at Buffalo • Raj Sharman, PhD, Statue University of New York at Buffalo Abstract: This study explores the factors that affect credibility of information in online health forums. In an era where patients (and family members) increasingly seek medical information through online social networks, concerns are being raised about the credibility of information in such setting. In this study, we explore Homophily (or source-receiver similarity) as an important antecedent of Information Credibility. Perceptions of similarity among online support group users also drive credibility perception of information. The contribution of this study stems from extending the notion of Homophily to the online health network setting. Apart from analyzing general Homophily we introduce two aspects of Homophily namely Medical Homophily and Structural Homophily. Keywords: Online Health Communities, Homophily, Analytics
10:15-11:45 am	**Session 4: Smart Grid** **West Room** Session Chair: Sreenivas Kidambi 1. Smart Grid and Analytics at Electric Power Board (EPB) (Invited Talk) • William Copeland and Andy Campbell, EPB Abstract: We focus on providing a high level overview of different data types that are collected and stored at EPB, a smart grid based utility company that provides internet and electricity to the Chattanooga region. We will describe how various data visualization and mapping techniques are used to enhance operational and strategic decision-making. In particular, we will describe use cases on analytics as applied to fiber optic sales and energy usage density. Finally, we will illustrate the future of the utility industry and the modern grid of the future (i.e. - distributed generation, storage, Micro-grids, renewables, etc.) Keywords: smart Grid, Analytics, utility 2. Smart Grid & Utilities Analytics: Using Public Data to Investigate Energy Resources & Energy Efficiency • Ashwini Wani, University of North Carolina at Greensboro • Derek Moore, University of North Carolina at Greensboro Abstract: Smart grid analytics allows energy stakeholders the ability to measure, quantify, and predict energy utilization within an electric transmission “grid”. This project uses advanced analytics techniques for smart grid and utilities applications. The analysis was conducted on publicly available industry data and data generated through computer simulations. In the project, pattern discovery techniques helped determine effective locations for producing photovoltaic power and determining efficient areas for high power transmission lines based on segmentation. Predictive analytics was applied to meter data through auto neural networking to target interval reads per hour of consumption of electric power. Keywords: Smart Grid, AMI, Big Data, Demand Response, Analytics, Utility 3. Towards Computational Simulation of Wind Farms

	• Sreenivas Kidambi, PhD, University of Tennessee at Chattanooga • Anshul Mittal, University of Tennessee at Chattanooga • Lafayette Taylor, University of Tennessee at Chattanooga Abstract: Computational simulation can be used to study the wind flow through a wind farm. These simulations can take into account the terrain of the wind farm and thus produce realistic wind flow patterns. This information can then be used to develop an optimal layout for the wind turbines; one that maximizes power production while minimizing maintenance issues. These simulations can be coupled with mesoscale weather models in order to predict the power generation capacity for the next day or week, which allows utilities to provision their power sources optimally. Keywords: wind turbine, wind farm layout, power generation, optimization, mesoscale
11:45 am-1:30 pm	**Luncheon Keynote Speaker** **Plaza A/B** Bill Franks Chief Analytics Officer, Teradata Corporation *"Making Big Data Actionable"* Abstract: There is a lot of hype and misinformation about big data in the marketplace. Many companies are confused about how to get started, what actions to take, and what pitfalls to avoid. Additionally, focus is shifting from simply capturing and discovering new insights with big data to operationalizing those insights. The industrial revolution took manufacturing processes from an artisanal practice to a modern technological marvel that is able to manufacture quality items at massive scale. The same type of revolution must happen with analytics and big data. This talk will address technological, organizational, and cultural points that must be considered to succeed in making big data actionable and operational. Most important, the talk will aim to provide attendees a solid direction to take their big data analytics initiatives.
1:30-3:00 pm	**Session 5: Training and Tutorial** **East Room** Using Analytics To Detect Possible Fraud: Overview of Tools and Techniques • Pam Mantone, CPA, Senior Manager, Decosimo This overview of tools and techniques for the purpose of fraud analytics will focus on following key topics: Discussion of cash flow and net income ratio Discussion of operating performance ratio Use of vertical analysis Discussion of the Beneish M- Score model and its importance in forensic accounting Use of the Dechow-Dichev Accrual Quality Use of Sloan's Accruals Use of Jones Nondiscretionary Accruals Lev-Thiagarajan's 12 Signals Piotroski's F-Score Model
1:30-3:00 pm	**Session 6: Consumer Analytics** **Plaza C** Session Chair: Gary Wilkerson 1. Analytics for Consumer Engagement (Invited Talk) • Sherri Zink, BlueCross BlueShield of Tennessee

2. Towards a Framework for Predictive Models of Socio-Economic Interactions of Autonomous Population Units: A Case Study on Predictive Model Ecosystem for Interpersonal Violence
   - Fortune Mhlanga, PhD, Lipscomb University
   - E. L. Perry, PhD, Faulkner University

Abstract:
This paper presents our work towards development of predictive models of the socio-economic interactions of autonomous population units (APUs). Our goal is to develop APU interaction models (AIM) that are general enough to apply to various socio-economic domains. While our passion is to build an AIM system for predicting current or emergent pandemic situations, we are initially investigating experimental ideas towards development of a Big Data and geospatially-enabled predictive model ecosystem for interpersonal violence. Our approach combines a robust big data management and analytics capability with predictor / corrector methods to forecast interpersonal violence.

Keyword: AIM (APU interaction models), APU (autonomous population units), Big Data, Discrete Event Simulation, Geospatial Modeling, Interpersonal Violence, Predictive Model, Regression

3. A Retail Approach to Maintaining Health and Wellness
   - Leigh McCormack, BlueCross BlueShield of Tennessee

Abstract:
As the landscape of healthcare changes, so must the perspective of the health plan. Analytics comes front and center as this perspective becomes more retail oriented. The Predictive Analytics team at BlueCross BlueShield of Tennessee was formed to engage in proactive research and analytics for the purposes of supporting the new retail strategy. Major initiatives include micro-segmentation, predictive modeling and geo-spatial analytics—all geared towards cost containment and improving the quality of healthcare our members receive.

Keywords: personalization, segmentation, lifestyle, clinical

4. Development of a Prediction Model for Identification of High-Cost Sport Injury Cases
   - Gary Wilkerson, PhD, University of Tennessee at Chattanooga

Abstract:
Context: College athletic programs spend thousands of dollars each year for treatment of musculoskeletal injuries. Athletes identified as having elevated injury risk prior to sport participation may ultimately receive medical services that comprise a high proportion of such expenditures. Objective: To develop a prediction model for identification of athletes who are likely to incur high treatment costs on the basis of core musculature endurance test results and self-ratings of joint function. Design: Prospective cohort study. Participants: 191 NCAA Division I athletes who participated in 11 different sports. Methods: Pre-participation measures included the Wall Sit Hold (WSH) test, Trunk Flexion Hold (TFH) test, Horizontal Trunk Hold (HTH) test, Oswestry Disability Index (ODI), Foot and Ankle Ability Measure – Sports Subscale (FAAM-S), Kerlan Jobe Orthopedic Clinic (KJOC) shoulder and elbow survey, and International Knee Documentation Committee (IKDC) knee survey. High-cost versus low-cost classification was based on the 80th percentile for secondary insurance medical claim costs paid by the university athletic program, which were ≥ $100 versus < $100. Data for football players (n=83) and non-football athletes (n=108) were analyzed separately. Logistic regression analysis was used to develop prediction models for high-cost status. Results: The total amount of secondary insurance payments made by university for the 191 athletes was $52,559. The football prediction model for high-cost status was ≥ 2 of the following factors: KJOC score ≥ 98, IKDC score ≥ 95, and HTH ≥ 41 seconds. Among 24 football players predicted to be high-cost cases, 42% (10/24) incurred cost ≥ $100. Among 59 football players predicted to be low-cost 90% (53/59) incurred cost < $100. Football players predicted to be high-cost generated 4.5 X more expenditures than those predicted to be low-cost (Sensitivity = .63; Specificity = .79; Odds Ratio = 6.31 [90% CI: 2.36-16.86]). Among 16 athletes predicted to be high-cost, 44% (7/16) incurred cost ≥ $100. The high-cost

	status prediction model for athletes participating in sports other than football was ≥ 2 of the following factors: FAAM-S score ≥ 79, IKDC score ≥ 92, and WSH average of right and left extremities ≥ 22 seconds. Among 16 non-football athletes predicted to be high-cost cases, 44% (7/16) incurred cost ≥ $100. Among 92 non-football athletes predicted to be low-cost, 83% (76/92) incurred cost < $100 (Sensitivity = .30; Specificity = .89; Odds Ratio = 3.70 [90% CI: 1.44-9.50]. Non-football athletes predicted to be high-cost generated 2.8 X more expenditures than those predicted to be low-cost. Conclusions: Differing prediction model components for football players and non-football athletes suggest that injury-related costs result from differing injury susceptibility factors. Identification of athletes who possess elevated musculoskeletal injury risk and individualized risk reduction training may reduce secondary cost incurred by college athletic programs. Keyword: Secondary Insurance Cost, Pre-Participation Injury Risk Screening, Individualized Risk Reduction
1:30-3:00 pm	**Session 7: Transdisciplinary Issues in Healthcare** **West Room** **Session Chair:** Olivera Marjanovic 1. Innovating Healthcare: Wave 2 – Analytics (Invited Talk) • Rubin Pillay, MD, PhD, University of Alabama at Birmingham (College of Business/College of Medicine) Abstract: The stakes have never been higher for healthcare. Costs are on the rise. Quality appears to be waning and access continues to be suboptimal. Legislation is creating uncertainty and payment models are changing. How can healthcare address these challenges? The answers are in your data! Healthcare analytics is the next imperative in the disruptive healthcare transformation environment. However, despite the opportunity this poses, confusion abounds and challenges need to be surmounted if we are to leverage the full potential that analytics offers. 2. Transdisciplinary Medicine: Bringing Together Existing Resources to Elevate Care • Christopher Young, PhD, Siskin Hospital for Physical Rehabilitation Abstract: Delivery of efficacious medical care is heavily dependent upon both the doctor and the patient being critical consumers of personal and environmental/clinical resources. From the provider side, utilization of a transdisciplinary model is a relatively new approach in which specialties collaborate in highly cohesive manner to deliver medical services in an expedient and effective manner. Such a model also provides the opportunity for hospital systems to reduce difficult to cover costs while not necessarily reducing revenue-generating procedures delivered by the individual specialties. The present talk will explore strengths and weaknesses encountered in establishing transdisciplinary clinics in two very different hospital systems and how utilization of big data can inform providers and institutions in refining the care that is provided to the patient. Keywords: Transdisciplinary Care, Medicine, Integrated Care 3. Provider Transparency and Pay for Performance Analytics • Pete Vanvalkinburgh, BlueCross BlueShield of Tennessee • Marc Loizeaux, BlueCross BlueShield of Tennessee Abstract: In 2013 BlueCross BlueShield of Tennessee engaged with Information Builders, Inc. to construct two web dashboards for internal users. These dashboards, one for clinician information and one for facility information, were conceived and designed to assemble information from multiple departments into a

	common, easily accessed web location. The intent was to operate more efficiently and effectively by 1) providing "self-serve" information with immediate one-stop-shop access, 2) creating a global view of a provider across multiple domains, and 3) reducing the need for time-consuming ad hoc analytics across multiple domains or departments. Executives, network contractors, and others currently use these dashboards across the company who need provider information on a regular basis. 4. Advanced Analytics in Transformative Services • Olivera Marjanovic, PhD, University of Sydney, Australia Abstract: This research focuses on innovative applications of advanced analytics in transformative services. Recently identified as one of the top ten research priorities in the emerging service science research, transformative services are human-centered services that transform human lives. Examples include healthcare, education, welfare and aged-care services. In this context we are particularly interested to further advance and transform the existing Business Analytics "know-how" (including models, systems, strategies) into a new form of "Human-centered" Analytics envisaged to be more suitable for transformative services. This paper will present an exploratory case study research of advanced applications of analytics in a transformative service in Australia and will discuss interesting challenges and opportunities for future research and practice. Keyword: Advanced Analytics, Human-centric services, Transformative services, Case study
3:00 pm	Break
3:15-4:30 pm	**Panel Session 1: New Frontiers in Healthcare Analytics** **Plaza A/B** Panel Moderator & Chair: Jeff Wade, CEO, Market Street Solutions • Sherri Zink, Vice President of Medical Informatics, BCBST • Dr. Vitaly Herasevich, MD, PhD, Assistant Professor of Medicine and Anesthesiology, Mayo Clinic, Rochester • Dr. Chris Young, PhD, Clinical Neuropsychologist and Tod Chain, Vice President of Administration, Siskin Rehab • Dr. Rubin Pillay, MD, PhD, Professor of Healthcare Innovation and Entrepreneurship, Collat School of Business, Assistant Dean for Global Health Innovation, University of Alabama at Birmingham
4:30 pm	Adjourn
5:30-7:30 pm	Reception **Tennessee River Room**

Friday, October 17, 2014
Chattanooga Marriott Downtown, 2 Carter Plaza, Chattanooga, TN 37402

8:00-8:30	Breakfast and Coffee
8:30-9:00 am	**Welcome Remarks** **Plaza A/B** • Dr. Jerald Ainsworth, Provost, University of Tennessee at Chattanooga • Dr. Robert Dooley, Dean, UTC College of Business
9:00-10:00 am	**Keynote Speaker** **Plaza A/B** Dr. Ramesh Sharda Vice Dean and Director, Executive PhD in Business Program Regents Prof. & Watson/ConocoPhillips Chair of Mgmt. Sc. & Info Systems Watson Graduate School of Management Spears School of Business, Oklahoma State University *"Exposure, Explore, Experience: Analytics Journey"* Abstract: We will discuss a path that many analytics journeys take: Exposure, Explore, and Experience. We will first learn about interesting analytics applications in healthcare to be exposed to that our other pioneers are doing. Then selected tools that enable such explorations are introduced. Finally, a few lessons learned from other analytics journeys to improve the experience are shared.
10:00 am	Break
10:15-11:30 am	**Panel Session 2: Executive Panel: Role of Big Data, Analytics & Smart Technologies: A Path for Innovative Future** **Plaza A/B** • Moderator & Chair: Mike Bradshaw, Director, CO.LAB • Brian Worley, President & CEO, PYA Analytics • Bob Leo, Vice President of Enterprise Data and Technical Architecture, UNUM • Christopher Orban, Covenant Transportation Group-Advanced Analytics Group • Laurene Vamprine, Vice President & CIO, Erlanger Health System
11:30 am-1:00 pm	**Luncheon Keynote Speaker** **Plaza A/B** Dr. Katharine Frase, Vice President and Chief Technology Officer, IBM Public Sector *" Big Data -- It's everywhere, but how does it help our cities and our citizens?"* Abstract: Everywhere we turn, we hear about the explosion of data of all kinds: data from sensors, data from social media, data that is the "exhaust from the processes of our lives". The discussions of data often bring with them an assumption that useful insight, appropriate actions, and tangible improvements will automatically follow. In this talk we'll explore how to make that assumption become reality -- what must we do with the data, how do we need to transform our decision making processes, how do we keep the human leaders and citizens firmly in the center of the progress we are making? We will look at specific examples from cities around the world on how it can be, and is being, done.

1:00 pm	Break
1:15-2:30 pm	**Panel Session 3: Analytics Powering Smart Cities** **Plaza A/B** • Chair and Moderator: Dr. Glenn Ricart, Founder and CTO, US Ignite • David Wade, Executive Vice President and COO, EPB • Dr. Kathrine Frase, Vice President & Chief Technology Officer, IBM Public Sector • Dr. David Lary, Professor of Physics, University of Texas at Dallas
2:30-4:00 pm	**Session 8: Smart and Connected Cities** **Plaza C** 1. Real-time Analytics for Constrained Resources in Smart Cities (Invited Talk) • Glenn Ricart, PhD, US Ignite Abstract: The livability of cities is, in large factor, influenced by the successful smart management of constrained resources such as transportation ways, power distribution, storm water management, wireless spectrum, health care capacity, etc. For many of these, real-time understand of the situation can result in improved service delivery at lower cost. Real-time analytics is a big factor in putting the "smart" in smart cities. This talk will focus on these and several related issues 2. Holistics 3.0: Multiple Big Datasets and Machine Learning in Smart Cities of the Future (Invited Talk) • David Lary, PhD, University of Texas at Dallas Abstract: Human health, business systems, the environment and more are part of an interdependent multifaceted system. More than ever, we have increasingly large amounts of data on the body, both spatial and non-spatial, its systems, disease and our social and physical environment, and business. An exciting new era is dawning where we are simultaneously collecting multiple datasets to describe many aspects of health, wellness, human activity, environment and disease. Valuable insights from these datasets can be extracted using massively multivariate computational techniques, such as machine learning, coupled with geospatial techniques. These computational tools help us to understand the topology of the data and provide insights for scientific discovery, decision support and policy formulation. We will outline a holistic paradigm called Holistics 3.0 for analyzing big data with a set of examples. Holistics 3.0 combines multiple big datasets anchored in their geospatial context describing as many areas of a problem as possible with machine learning and causality, to both learn from the data and to construct tools for data-driven decisions.
2:30-4:00 pm	**Session 9: Analytics for Productivity and Important Issues** **West Room** Session Chair: Mohammad Ahmadi and Parthasarati Dileepan 1. Empowering Employer Groups with Real Time Insights with the Blue Insights Mobile App • Mike McPherson, BlueCross BlueShield of Tennessee Abstract: BCBST's newest employer group reporting solution 'BlueInsights' was developed to promote collaboration with our customers, providing more timely information updates regarding their health plan performance. BlueInsights is a mobile client reporting application built to deliver insights through key 'trend' drivers to plan performance across the population perspectives of financial, service utilization, risk, health status, clinical program engagement and clinical outcomes. The performance indicators provide graphic display, color-coded and directional messaging to assist our customers with quick and easy identification of significant findings regarding performance results.

2. Unveiling the Importance of Key Requirements of Business Analytics 3.0. proposed by Thomas H. Davenport: An Empirical Study

- Samuel Fosso Wamba, PhD, NEOMA Business School and UNISA, France

Abstract: This study tests and validates the ten key requirements proposed by Thomas H. Davenport that will help firm capitalize on business analytics 3.0. Using data collected from 33 experts in the field, the study unveils the relative importance of each requirement and proposes a set of complementary requirements. Finally, implications for business analytics research, theory and practice are discussed.

Keywords: Requirement, Business value, Empirical study, Survey

3. Using Business Analytics to Determine Investment Strategy (Student Presentation)

- Marsha McClure, University of Tennessee at Chattanooga
- Ashish Gupta, PhD, University of Tennessee at Chattanooga

Abstract:
The business world is a diverse network that connects all sizes of companies all over the world. In addition to established companies from established countries, many companies that are now emerging from developing countries are expanding rapidly both in growth and as an opportunity for investment. At the same time, big data analysis has grown and uses its sophistication to target these emerging companies by gathering the same exhaustive data from them as from traditional companies in an effort to provide diverse and reliable investment opportunities. This project uses financial data gathered from 19,083 of these emerging companies from 95 countries. The data include both strength factors, like Return on Equity and Value of Firm, and risk factors, like Beta and Standard Deviation of Stock Price, for analysis. The results are that the important variables were identified, ten companies were ranked, the money was partitioned. The conclusions are 1) Since all model types had difficulty in finding a robust, viable model, that a Data Set with this many variables, and this many similar variables, needs to be first carefully weeded to use only those most important variables. 2) Any experience with financial data and SAS programs is very helpful, and financial analysts need to be consulted for a project like this, and 3) There are limitations as to the efficacy of even these sophisticated tools for analysis.

Keywords: Emerging companies, emerging countries, financial analysis, investment analysis, big data, financial data

4. Can Big Data Get More Educational Funding?

- Mohammad Ahmadi, PhD and Parthasarati Dileepan, PhD
  University of Tennessee at Chattanooga

Abstract:
The traditional funding formula for higher education is based on credit hour production. The more seats a college can fill in a classroom, the more state funding they are awarded. Under this funding formula, there is no incentive for colleges even to track how many of their students successfully graduate. However, in recent years, there is an increasing awareness that higher education funding must be based on output, not input. In a White Paper written for Complete College America ,the author, Dennis P. Jones, states, "… more than a quarter of the states are implementing outcomes-based funding in at least one segment of higher education, and numerous other states are moving in that direction." Among these states, Tennessee is one of the early adopters of the policy that has come to be known as Outcomes-Based funding. In January 2010, Tennessee passed the Complete College Tennessee Act (CCTA). One important part of CCTA is the outcomes-based funding formula. This formula links allocation of state funding to institutions to several outcomes including but not limited to degree production, research funding, graduation rates, student remediation, job placements, student transfers, both at universities and community colleges. Further, the CCTA rewards those institutions that excel in these outcomes and penalizes those who fail to achieve benchmarks. Therefore, improving degree production and graduation rates are critical for institutions to get their fair share of shrinking education dollars. Big Data can help institutions track student performance and identify at risk students at an early enough stage so that remedial efforts may be taken to

	support the students success and prevent them from dropping out. This paper describes one such attempt using real data. Keywords: Big Data, Higher Education, Student Performance
2:30-4:00 pm	**Session 10: Innovative Application of Analytics** **East Room** Session Chair: Han Li 1. Prediction of Core and Lower Extremity Sprains & Strains in College Football • Gary Wilkerson, PhD, University of Tennessee at Chattanooga Abstract: Context: A preliminary analysis of a single season of data for a college football team (NCAA Division I-FCS) identified a high level of exposure to game conditions, a relatively low level of low back dysfunction, and poor endurance of the core musculature as strong predictors for occurrence of sprains and strains. Objective: To refine the prediction model developed from a preliminary analysis of a single season of data through analysis of 3 consecutive seasons of data. Design: Prospective cohort study. Participants: All football players who were present for a mandatory physical examination on the day prior to initiation of pre-season practice sessions (n=152) for one or more of 3 consecutive seasons. Methods: Associations between preseason measurements and subsequent occurrence of a core or lower extremity sprain or strain were established for 256 player-seasons of data. Receiver operating characteristic analysis was used to identify optimal cut-points for dichotomous categorizations of cases as high-risk versus low-risk. Both logistic regression and Cox regression analyses were used to assess the discriminatory power of a multivariable injury prediction model that included the 3 factors previously identified by the preliminary single-season analysis. Results: Exceptionally good discrimination between injured and non-injured cases was found for a 3-factor prediction model that included ≥ 1 game as a starter, Oswestry Disability Index score ≥ 4, and poor Wall-Sit Hold performance. The existence of ≥ 2 of the 3 risk factors demonstrated 56% sensitivity, 80% specificity, odds ratio = 5.28 (90% CI: 3.31, 8.44), and hazard ratio = 2.97 (90% CI: 2.14, 4.12). Conclusions: High exposure to game conditions was clearly established as the dominant injury risk factor for college football players, but a surprisingly mild degree of low back dysfunction and poor core muscle endurance appear to be important modifiable risk factors that should be identified and addressed prior to participation. Keywords: Clinical Decision-Making, Primary Injury Prevention, Low Back Pain 2. An Explanatory Study of Free Tools for Big Data Predictive Analytics • Thomas Ngo-Ye, PhD, Dalton State University Abstract: The advancement of free/open source data analytics package makes it possible for small business, non-profit organizations, and academic researchers to experiment Big Data predictive analytics. In this study we report the empirical challenges and potential solutions for Big Data predictive analytics with free data mining tools (Weka, Rapidminer, R, KNIME, Sipina, and Tanagra). We explore the practical limitations, such as memory, operating systems (OS), and Java Virtual Machine (JVM). Most free/open source data mining tools load the whole dataset in main memory. Therefore, the amount of physical memory is often the bottleneck. Moreover, many organizations are still using 32-bit OS, which poses further limitation of up to 4GB main memory. To mitigate the problem, memory-hard drive swap is an alternative strategy for handling big data. KNIME and R have memory-disk swap feature. However, they have some limitations as some data mining algorithms are not adapted for the swap. Sipina is a 32 bit application and its swap mechanism works. However, the price to pay for lower burden on memory is longer CPU processing time. Other strategies, sampling and incremental learning such as incremental Naive Bayes, for performing big data predictive analytics are also discussed. Keyword: Higher education, predictive analytics, tools

	3. A Visual Analytics Application for Effective Patient-Provider Matchmaking • Gregory Ramsey, PhD, Morgan State University • Ashish Gupta, PhD, University of Tennessee at Chattanooga • YoungOk Kwon, PhD, Sookmyung Women's University, Seoul, S. Korea Abstract: Caring for patients with the chronic disease of type 2 diabetes mellitus (T2DM) is costly. T2DM patients are often initially assigned to primary care physicians based on physician availability rather than expected outcomes. Using data available within EHRs, we combine agent simulations with visual analytics to intelligently match patients with physicians. Through simulation experiments we show that this matching process results in improved clinical outcomes and reductions in treatment errors and costs. Keyword: patient provider, diabetes, EHR 4. Privacy-Preserving Scalar Product Algorithm for Vertically Partitioned Data • Han Li, PhD, Minnesota State University Moorhead • Rathindra Sarathy, PhD, Oklahoma State University • Krish Muralidhar, PhD, University of Oklahoma Abstract: Privacy-preserving data sharing is important for commercial organizations and governmental agencies to uncover new knowledge involving confidential data belonging to multiple parties. This paper proposes an algorithm that can be used to securely share scalar products and correlations of confidential variables owned by two parties. The algorithm can compute accurate correlations. At the same time, exact value disclosure can be completely avoided with partial value disclosure controlled below a desired risk level. Keywords: privacy-preserving data sharing, perturbation, secure scalar product, confidentiality
4:00 pm	Adjourn

Keynote Speaker

Bill Franks
Chief Analytics Officer, Teradata Corporation

Bill Franks is the Chief Analytics Officer for Teradata, where he provides insight on trends in the analytics and big data space and helps clients understand how Teradata and its analytic partners can support their efforts. His focus is to translate complex analytics into terms that business users can understand and work with organizations to implement their analytics effectively. His work has spanned many industries for companies ranging from Fortune 100 companies to small non-profits. Franks also helps determine Teradata's strategies in the areas of analytics and big data.

Franks is the author of the book *Taming The Big Data Tidal Wave* (John Wiley & Sons, Inc., April, 2012). In the book, he applies his two decades of experience working with clients on large-scale analytics initiatives to outline what it takes to succeed in today's world of big data and analytics. The book made Tom Peter's list of 2014 "Must Read" books and also the Top 10 Most Influential Translated Technology Books list from CSDN in China.

Franks' second book *The Analytics Revolution* is coming from Wiley in Fall 2014. He is a faculty member of the International Institute for Analytics, founded by leading analytics expert Tom Davenport, and an active speaker who has presented at dozens of events in recent years. His blog, Analytics Matters, addresses the transformation required to make analytics a core component of business decisions.

Franks earned a Bachelor's degree in Applied Statistics from Virginia Tech and a Master's degree in Applied Statistics from North Carolina State University.

Keynote Speaker

Katharine Frase, Ph.D.
Vice President and Chief Technology Officer, IBM Public Sector

Katharine Frase was appointed Vice President and Chief Technology Officer, IBM Public Sector, in March 2013. As CTO, she provides thought leadership for IBM and its customers on innovation and strategic transformation specific to government, education, life sciences, healthcare and cities, driving the creation of new solutions. Prior to this role, she was Vice President, Industry Solutions Research, working across IBM Research on behalf of IBM clients, to create transformational industry-focused solutions, including the application of IBM Watson technologies to business applications and the realization of Smarter Planet solutions. Earlier roles included technical and business strategy for IBM's software business, corporate assignments on technology assessment and strategy, and roles in IBM Microelectronics in the management of process development, design/modeling methodology and production of chip carriers, assemblies and test. In 2006, she was elected as a member of the (U.S.) National Academy of Engineering. Dr. Frase received an A.B. in chemistry from Bryn Mawr College and a Ph.D. in materials science and engineering from the University of Pennsylvania. She is a member of the IBM Academy of Technology and sits on numerous external committees and boards.

Keynote Speaker

Michael P. Haydock
IBM Fellow & Chief Scientist, GBS

From designing the most efficient way to butcher cattle stock, to creating an original dynamic pricing model for airline fares, to when in the planting cycle is the optimal time to spray weed killer on a soybean field, Haydock has worked his magic with applied mathematical methods for a diverse set of clients across industries ranging from agriculture to aerospace. His brainchild—an analytics-based forecast of electronics and appliance sales in the United States—has become a staple of predicting holiday sales trends.

Currently, Mike is leading an IBM analytics team on a deep dive engagement with a food and beverage retailer, and is in the process learning more about java than a Seattle barista. “We’ve been devising algorithms based on appending data from millions of customer purchases with variables drawn from 1,811 weather stations around North America,” the analytics guru explained. “We’ve developed correlations between consumer coffee-buying patterns and weather patterns, and our client is now directly connecting with their customers through targeted promotions on social media to keep consumers coming to purchase on days they might not otherwise—like when it’s 90 degrees.”

After earning a graduate degree in marketing management, Mike earned a doctorate in operations research and joined IBM in 1989 in Minnesota, where he and wife still live. Over the past 25 years, Mike has seen his specialty of applied mathematics evolve from an obscure field to the essential passkey for unlocking the power of data, the world’s new natural resource.

Keynote Speaker

Ramesh Sharda, Ph.D.

Vice Dean and Director, Executive PhD in Business Program
Regents Prof. & Watson/ConocoPhillips Chair of Mgmt. Sc. & Info Systems
Watson Graduate School of Management
Spears School of Business, Oklahoma State University

Ramesh Sharda is Director of the Institute for Research in Information Systems (IRIS) , ConocoPhillips Chair of Management of Technology, and a Regents Professor of Management Science and Information Systems in the Spears School of Business at Oklahoma State University. He received his B. Eng. degree from University of Udaipur, M.S. from The Ohio State University and an MBA and Ph. D. from the University of Wisconsin-Madison.

His research has been published in major journals in management science and information systems including Management Science, Information Systems Research, Decision Support Systems, Interfaces, INFORMS Journal on Computing, Production Operations Management, Computers and Operations Research, and many others. He serves on the editorial boards of journals such as the INFORMS Journal on Computing, Decision Support Systems, ACM Transactions on Management Information Systems, and Information Systems Frontiers,. He is Co-Editor-in-Chief of Annals of Information Systems and two other Springer book series: Integrated Series in Information Systems and Operations Research Computer Science Interfaces. His research interests are in decision support systems, especially neural network applications, and technologies for managing information overload. His team's work on forecasting box office revenue of movies has received a lot of press.

Defense Ammunition Center, NSF, the US Department of Education, Marketing Science Institute, and other organizations have funded his research. Ramesh is also a cofounder of a company that produces virtual trade fairs, iTradeFair.com.

Invited Speaker

Vitaly Herasevich, MD, PhD
Assistant Professor of Medicine & Anesthesiology, Mayo Clinic

Dr. Herasevich is Assistant Professor of Medicine and Anesthesiology in Department of Anesthesiology at Mayo Clinic. He received medical degree in Belarus, finished Cardiology Fellowship and obtained Ph.D. in Interventional Cardiology. In 2007-2010 he was NIH CTSA KL2 scholar and received MSc in clinical research degree at Mayo Clinic.

His interest in the area of clinical informatics extends back more than 15 years and organized around computerized systems in the fast-paced hospital environment such as OR and ICU. He has specific interest in clinical syndromic surveillance alerting systems ("sniffers"), clinical data representation (novel patient-centered EMR), data warehousing for clinical analytics and reporting. He is author of more than 40 Pubmed cited articles and wrote two editions of books "Computer for Physician".

As a part of education effort Dr. Herasevich serves newly established one of the first in USA Clinical Informatics Fellowship program as Associate Program Director and appointed with full faculty privileges in Mayo Graduate School.

He is active within national informatics societies serves number committees at AMIA as well as established and chairing Intensive Care Informatics Working Group. Dr. Herasevich is Certified Professional in Healthcare Management Systems (CPHIMS).

More information available at lab page: http://www.mayo.edu/research/labs/clinical-informatics-intensive-care/

Invited Speaker

David Lary
Professor of Physics, Hanson Center for Space Sciences at the University of the Texas at Dallas

David Lary is a Physics Professor in the Hanson Center for Space Sciences at UTD, receiving a First Class Double Honors B.Sc. in Physics and Chemistry from King's College London (1987), and a Ph.D. from the University of Cambridge, Churchill College (1991). The thread running through all the research is the use of observation and automation to facilitate scientific discovery. A key part of this is the analysis of massive data sets (BigData) using machine learning for Remote Sensing, Health Applications and Unmanned Aerial Vehicles.

David held positions at Cambridge University from 1991-2001, including being a faculty member and receiving a Royal Society University Research Fellowship. In 2001 he was invited to join NASA as the first distinguished Goddard fellow in Earth Science and stayed at NASA till 2010 when he joined UTD where he is the founding director of the Multi-Scale Integrated Intelligent Interactive Sensing Center (MINTS) at the University of Texas at Dallas. He is also adjunct professor in the University of Texas at Dallas Department of Electrical Engineering, Baylor University, Center for Astrophysics, Space Physics & Engineering Research, and the School of Public Health, University of North Texas Health Science Center. David is also a Scholar of The Institute for Integrative Health and working group Co-Chair of the International Society for Photogrammetry and Remote Sensing (ISPRS) Working Group on Health.

Invited Speaker

Bob Leo
Vice President of Enterprise Transformation for Unum Group

With more than 26 years of industry experience and leadership, Bob Leo is an information management visionary who specializes in the development of business and information solutions using an integrated customer services and engineering approach to design and development. Bob believes in a customer driven approach to information management that includes coupling industry best practices, with customer needs, creating a process to build application, infrastructure, information management and integration solutions. He is currently the VP of Enterprise Transformation for Unum Group and is responsible for the company's Enterprise Architects, IT Strategy and Consulting and The Innovation Center.

As a former CIO and Information Strategy Consultant for IBM, Bob has, in the last 10 years, advised over 100 companies in the Fortune 500 on using information as a strategic asset. He has led IBM's North American Information Governance Practice – a team of highly skilled, business savvy professionals that assist clients in business driven strategies for information quality, security & privacy and information lifecycle management. He is a 2004 Computerworld Premier 100 IT Leaders honoree.

Invited Speaker

Pam Mantone, CPA CFF, CFE, FCPA, CITP, CGMA, MAFF
Senior Manager, Decosimo Certified Public Accountants

Pam Mantone is a forensic certified public accountant (FCPA) and a certified fraud examiner (CFE), and has earned the certified in financial forensics (CFF) designation from the American Institute of Certified Public Accountants (AICPA), as well as a certified information technology professional (CITP) and a chartered global management accountant (CGMA).

Pam is also a master analyst in financial forensics (MAFF), as designated by the National Association of Certified Valuators and Analysts (NACVA). She is a senior manager providing litigation support services with emphasis on forensic accounting and fraud examinations and also practices in areas of audit and attestation primarily serving not-for-profits, governments and financial institutions.

A book she authored, titled *Using Analytics to Detect Possible Fraud – Tools and Techniques*, was published in 2013 and is a practical overview of the first stage of forensic accounting, providing a common source of analytical techniques used for both efficiency and effectiveness in forensic accounting investigations. She presents to various organizations on a variety of topics including fraud and forensic techniques, use of statistics both in audits and forensic investigations, internal control design and weaknesses and auditing techniques, including assessing risk and sampling techniques.

Invited Speaker

Christoper Orban,
Vice President of Advanced Analytics, Covenant Transportation Group

Christopher Orban brings to Covenant Transportation Group more than sixteen years of experience in data analytics and technology, primarily in early stage and high growth companies.

Mr. Orban is a veteran of four startups and played a key role in developing and executing growth strategies for companies in the business services, biotechnology, and software sectors. He has experienced firsthand the challenges of translating high-level vision and strategy into daily operations.

As Covenant Transportation Group's Vice President of Advanced Analytics, Mr. Orban is responsible for the predictive modeling and advanced analytics group, which seeks to identify those areas of the business that are most at need of proactive intervention, and implement solutions for those areas.

Before Covenant Transportation Group, Mr. Orban was Vice President of Technical Services at FleetRisk Advisors (a Qualcomm Company). Mr. Orban was responsible for the development of the business intelligence platform, which included a data warehouse, analytics services, and predictive modeling capabilities. Mr. Orban handled the implementation of predictive models, and clients see an average reduction in accident rate of 22% year over year.

Prior to FleetRisk Advisors, Mr. Orban was head of program management and technology at ActivBiotics Inc., a biotechnology company focused on the development of novel antibiotics. Mr. Orban was responsible for all technology systems and overall program management, including Phase I, Phase II, and Phase III clinical trials.

Mr. Orban holds a Bachelor of Arts degree from Amherst College.

Invited Speaker

Rubin Pillay, PhD, MD,MBA,MSc,BSc(Hon)Pharm
Medical Futurist and Professor of Healthcare Innovation and Entrepreneurship, Collat School of Business, Assistant Dean for Global Health Innovation, University of Alabama at Birmingham

Rubin Pillay is a medical futurist and Professor of Healthcare Innovation and Entrepreneurship at the Collat School of Business and the Assistant Dean for Global Health Innovation at the School of Medicine, at the University of Alabama in Birmingham. He was previously the Daniel White Jordan Chair and the founding Executive Director of the Center for Health Systems Innovation in the Spears School of Business and Center for Health Sciences at Oklahoma State University. He is a Family Physician and Clinical Pharmacologist who holds a PhD in Business Administration, an MBA and an MSc in Health Management.

Prior to taking up his current position, he headed up programs in Health Leadership (with a focus on Operational Excellence) at the McKenna School of Business, Economics and Government (Pennsylvania, USA) and the School of Business and Finance (Cape Town, South Africa). He has extensive international teaching and consulting experience and has published widely in the field of Strategic Health Leadership. His current work is focused on the role of Creativity, Innovation and Entrepreneurship in the transformation of health and healthcare. He is the first President of the International Society of Healthcare Entrepreneurship Education and Research (ISHEER) and a Harvard Advanced Leadership Fellow in Health Innovation. In addition to starting several successful biomedical ventures of his own, he has also invested in several others.

Invited Speaker

Glenn Ricart, PhD
Founder and CTO, US Ignite

Glenn Ricart is founder and CTO of US Ignite, an organization which catalyzes new gigabit and SDN applications with public benefit. Glenn is an Internet pioneer who implemented the first Inter-net interconnection point (the FIX in College Park, Maryland) and was recognized for this achievement by being inducted into the Internet Hall of Fame. Glenn was principal investigator for SURAnet, the first TCP/IP (Internet) network of academic and commercial institutions.

Dr. Ricart has also held other senior management positions including Executive Vice President and CTO for Novell in the 1990s, Managing Director of PricewaterhouseCoopers, and CEO and President of National LambdaRail. Dr. Ricart is also the founder or co-founder of five startups.

Glenn's formal education includes degrees from Case Institute of Technology and Case Western Reserve University, and his Ph.D. in Computer Science is from the University of Maryland, College Park. His inventions have resulted in more than a dozen patents. Dr. Ricart has served on the boards of three public companies in addition to numerous non-profits

Invited Speaker

David Wade
Executive Vice President and COO, EPB of Chattanooga

As EPB's Executive Vice President and Chief Operating Officer, David Wade leads the company's effort to build one of the country's most sophisticated smart electric distribution systems.

David holds a Bachelor of Science in Engineering from the University of Tennessee at Chattanooga and has 27 years of experience in the electrical industry ranging from hands-on construction to engineering.

Using a 100% fiber optic network as its backbone, EPB is constructing a "Smart Grid," a next-generation electric system that includes communication capabilities designed to reduce the impact of power outages, improve response time and allow customers greater control of their electric power usage. This exclusive capability has attracted worldwide attention and earned Chattanooga, TN the nickname "Gig City."

Invited Speaker

Sherri Zink
Vice President, Medical Informatics, BlueCross BlueShield of Tennessee

As vice president of medical informatics within the operations division of BlueCross BlueShield of Tennessee, Sherri Zink has corporate-wide responsibility for providing the day-to-day leadership, accountability and long term vision for medical informatics operations.

Medical informatics is an emerging discipline that applies information and computer science to advance patient care. In her current role, Sherri is charged with implementing a strategic vision to better align medical informatics initiatives with current and emerging business needs. Her focus is on relationship management with both internal and external customers to ensure that critical business needs are met for multiple stakeholders.

Sherri has more than 25 years of experience in the health care industry serving in multiple roles at two large national health care players, UnitedHealth Group (UHG) and CIGNA. Her background is primarily in the areas of clinical and financial data integration, clinical value based reporting, customer consultation and account management.

Prior to joining BlueCross in August 2010, Sherri served as vice president of clinical reporting and analytics for OptumHealth. In that role she was responsible for establishing enterprise-wide clinical reporting solutions for pre-sale analytics, value measurement analytics and customer reporting. She also drove the business design strategies for data infrastructure and architecture to support internal and external clinical reporting initiatives. In addition, Sherri served in the UnitedHealthcare National Accounts division for two years in a consultative capacity for many large national employers. Sherri spent 21 years at CIGNA Healthcare serving in multiple roles including data analytics, report development, network evaluation, and client consultation.

Sherri graduated with a Bachelor of Science with an emphasis in organizational management from Covenant College. She also holds an Associate of Science with an emphasis in information systems technology from Chattanooga State Technical Community College.

Invited Speaker

Laurene Vamprine, MHA
Vice President & CIO at Erlanger Health System

As Vice President & CIO at Erlanger Health System, Laurene is responsible for all aspects of technology throughout the Health System. This includes traditional IT functions as well as Clinical Informatics, Bio-Medical Engineering and an in-house Imaging Equipment Management program. Laurene has a Bachelor of Science Degree in Business and Human Resources Management and a Master's degree in Health Administration. She is actively involved with the Chattanooga Regional Health Innovation Coalition, a grass-roots coalition of health care providers in the Chattanooga area who have developed a Community-based Care Transitions Program.

Laurene is also very involved with industry professional associations and serves on the Boards of Directors for both the TN-HIMSS state chapter and the Chattanooga Technology Council.

Invited Speaker

Brian Worley
PYA Analytics, President & Chief Executive Officer

Brian brings 35 years of scientific leadership experience to his role at PYA Analytics. For the past eleven years at Oak Ridge National Laboratory, Brian developed and directed the most prestigious science agenda within the U.S. Department of Energy national laboratory system devoted to knowledge discovery from disparate and dynamic data. His division staff included 170 research scientists and engineers and another 100 associated staff from academia and private industry subcontractors. The research and development spanned the broad areas of data systems, data analytics, modeling and simulation, and cyber security. As a national lab with national mission scope, the applications included national security, energy assurance, and most recently national healthcare challenges.

For the past two years, Brian has overseen a strategic collaboration between ORNL and the Centers for Medicare & Medicaid Services to develop and prototype a Knowledge Discovery Infrastructure to address the current and future big data needs of the national healthcare systems, including aligning not only claims data across the national Medicare system and the states' Medicaid systems, but also to include the data from the Veterans Administration, Social Security, and others.

Prior to devoting his research and management interests toward knowledge discovery and big data, Brian led the ORNL Computational Sciences Section in the application of high-performance computing to basic and applied sciences and was Group Leader for the Reactor Physics Group. Brian was trained as a nuclear engineer and earned a Ph.D. degree from the Massachusetts Institute of Technology.

Acknowledgements

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