



BHI-2016 International Conference on Biomedical and Health Informatics

“Integrative informatics for precision and preventive medicine”

Las Vegas 24th-27th Feb 2016



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Workshop #3 on “Big Data, SDN and Healthcare”

Feb. 27, 9:30 am -12:30 pm, Room Mesquite 4, Westin Las Vegas Hotel

Sponsor: Celia Desmond

Workshop #3: Keynote Speakers and Panelists

Session Chair

Fawzi Behmann, IEEE Communications Society NA Vice Chair and President, TelNet Management Consulting Inc.

Keynote Speaker/Panelist 1

Scott Mark,
Director of Healthcare Innovation & Technical Fellow, Medtronic

Keynote Speaker/Panelist 2

David Lary, PhD, Hanson Center for Space Science, Professor at University of Dallas, Texas

Keynote Speaker/Panelist 3

Thomas Penzel, MD, PhD, Technical committee chair for IEEE EMBS, and Medical Informatics, Charité Universitätsmedizin, Berlin, Germany

Keynote Speaker/Panelist 4

Suku Nair, PhD, University Distinguished Professor and Chair, Computer Science and Engineering at SMU, Dallas/Forth Worth

Keynote Speaker/Panelist 5

Danda B. Rawat, PhD, Assistant Professor, Director of CWiNs & NetCPS Labs, Department of Electrical Engineering, Georgia Southern University





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Workshop #3 on “Big Data, SDN and Healthcare”

27 February, 9:30 am -12:30 pm, Room Mesquite 4, Westin Las Vegas Hotel

Workshop #3
Keynote speakers – Title & Abstracts

Workshop #3 on “Big Data, SDN and Healthcare”, 27 February

Keynote Speaking Session, Fawzi Behmann (Session Chair)

- Introduction** Fawzi Behmann, IEEE Communications Society NA Vice Chair and President, TelNet Management Consulting Inc.
“Scaling Healthcare Applications and Services”
- Speaker 1** Scott Mark, PhD, Director of Healthcare Innovation & Technical Fellow Medtronic, plc
“Commercialization & Innovation in a Value-Based Healthcare Economy”
- Speaker 2** David Lary, PhD, Hanson Center for Space Science, Professor at University of Dallas, Texas
“Data Driven Insights for Environmental Population Health”
- Speaker 3** Thomas Penzel, MD, PhD, Technical committee chair for IEEE EMBS, and Medical Informatics, Charité Universitätsmedizin, Berlin, Germany
“Big data for Sleep medicine transitioning to Sleep wellness”
- Speaker 4** Suku Nair, PhD, University Distinguished Professor and Chair, Computer Science and Engineering at SMU, Dallas/Forth Worth
“SDN Connecting the big dots for Healthcare – Big Data, Virtualization, and Assurance”
- Speaker 5** Danda B. Rawat, PhD, Assistant Professor, Director of CWiNs & NetCPS Labs, Department of Electrical Engineering, Georgia Southern University
“Wireless Virtualization with SDN for Big Data Communications”

Workshop #3 on “Big Data, SDN and Healthcare”, 27 February

Panel Session, Fawzi Behmann (Moderator)

- Introduction** Fawzi Behmann, IEEE Communications Society NA Vice Chair and President, TelNet Management Consulting Inc.
“Scaling Healthcare Applications and Services”
- Panelist 1** Scott Mark, PhD, Director of Healthcare Innovation & Technical Fellow Medtronic, plc
“Commercialization & Innovation in a Value-Based Healthcare Economy”
- Panelist 2** David Lary, PhD, Hanson Center for Space Science, Professor at University of Dallas, Texas
“Data Driven Insights for Environmental Population Health”
- Panelist 3** Thomas Penzel, MD, PhD, Technical committee chair for IEEE EMBS, and Medical Informatics, Charité Universitätsmedizin, Berlin, Germany
“Big data for Sleep medicine transitioning to Sleep wellness”
- Panelist 4** Suku Nair, PhD, University Distinguished Professor and Chair, Computer Science and Engineering at SMU, Dallas/Forth Worth
“SDN Connecting the big dots for Healthcare – Big Data, Virtualization, and Assurance”
- Panelist 5** Danda B. Rawat, PhD, Assistant Professor, Director of CWiNs & NetCPS Labs, Department of Electrical Engineering, Georgia Southern University
“Wireless Virtualization with SDN for Big Data Communications”

Workshop #3 on “Big Data, SDN and Healthcare”, 27 February



Executive Forum Session (#323) Chair/Moderator

Fawzi Behmann

Vice Chair, IEEE Communications Society for North America, and
President, TelNet Management Consulting, Inc.

Title:

“Scaling Healthcare Applications and Services”

Session Abstract:

This Session will focus on how the underpinnings of SDN can provide nimble applications that leverage Big Data in the world of healthcare.

We have already experienced a decade of progress in digitizing medical records, as pharmaceutical companies and other organizations aggregate years of research and development data in electronic databases. Healthcare stakeholders now have access to promising new threads of knowledge. This information is a form of “big data,” so called not only for its sheer volume but for its complexity, diversity, and timeliness. When big data is synthesized and analyzed—and those aforementioned associations, patterns and trends revealed—healthcare providers and other stakeholders in the healthcare delivery system can develop more thorough and insightful diagnoses and treatments, resulting, one would expect, in higher quality care at lower costs and in better outcomes overall.

Using Big Data, security functions are required to work over the heterogeneous composition of diverse hardware, operating systems, and network domains. In this puzzle-type computing environment, the abstraction capability of Software-Defined Networking (SDN) seems a very important characteristic that can enable the efficient deployment of Big Data secure services on-top of the heterogeneous infrastructure.

Subject matter experts and senior speakers will address this timely topic, share results of their findings and provide opportunities through a Q&A panel session for interaction with the audience.

Workshop #3 on “Big Data, SDN and Healthcare”, 27 February



Keynote Speaker/Panelist

Scott Mark

Director of Healthcare Innovation & Technical Fellow
Medtronic

Title:

“Commercialization & Innovation in a Value-Based Healthcare Economy”

Abstract:

The U.S. healthcare market is in a state of rapid economic change, as public and private payors seek to rationalize outcomes and quality with steadily increasing spend. U.S. Secretary of Health & Human Services (HHS) Sylvia Burwell declared that by the end of 2016, 30% of Medicare payments will be tied to quality or value through alternative payment models, with a target of 50% of payments by the end of 2018. Systemic interventions from payment model changes (accountable care organizations, bundled payments, value-based purchasing) to technology updates (ICD 10, meaningful use) seek to increase the quality of care while moving away from a fee-for-service model. The implications for scientists & engineers developing medical technology for industry are a new hybrid of increasing clinical excellence combined with economic effectiveness.

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Keynote Speaker/Panelist

David Lary, PhD

Hanson Center for Space Science, Professor at University of Dallas, Texas

Title:
“Data Driven Insights for Environmental Population Health”

Abstract:

A wide range of health outcomes are affected by environmental context. In 2014 the World Health Organization (WHO) released a report that in 2012 alone, a staggering 7 million people died as a result of air pollution exposure, one in eight of total global deaths. A major component of this pollution is airborne particulate matter, with approximately 50 million Americans have allergic diseases. We show how using Big Data and Machine Learning can provide invaluable insights for proactive health care not readily available by other means. The access to these massive datasets can be greatly facilitated by software defined networks.

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Keynote Speaker/Panelist

Suku Nair, PhD

University Distinguished Professor and Chair,
Computer Science and Engineering at SMU
Dallas/Fort Worth

Title:

“SDN Connecting the big dots for Healthcare – Big Data, Virtualization, and Assurance”

Abstract

Application virtualization along with big data analytics in healthcare segment is throttling conventional networks. In response, Software Defined Networks (SDNs) are being deployed for high velocity provisioning and management, enhanced performance, and for security and disaster tolerance. In addition to discussing salient features of SDN innovation that help accomplish this, the talk will present views on information centric network architectures necessary for future healthcare applications.

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Keynote Speaker/Panelist

Thomas Penzel, MD, PhD

Technical committee chair for IEEE EMBS, and
Medical Informatics, Charité Universitätsmedizin, Berlin, Germany

Title:
“Big data for Sleep medicine transitioning to Sleep wellness”

Abstract

General interest on sleep is a big part of our well being. Professional sleep physicians recognize a high and increasing prevalence for sleep disorders in the population. Commonly reported symptoms and complaints are insomnia during the night, excessive sleepiness during daytime, and undesirable events or sensations during sleep.

This keynote will address sleep disorder and characteristics, dive into big data to gain insights of sleep disorders and contrast with sleep for wellness in healthcare. All related concerns such as Privacy, data access rights, networking, data structures, and analyses will be examined.

Currently, sleep centers perform sleep investigations, both in-lab or at home with cardiorespiratory polysomnography. Many sensors collect signals to characterize normal and disturbed sleep. To reduce costs, technical development has driven sleep investigations occurring at home. These systems use portable equipment with a reduced number of sensors on the body. New sensors promise a sufficient diagnosis for sleep disordered breathing. In addition, wearables, smartphone, and other gadgets collect data to quantify and potentially optimize sleep.

However, going forward, a rethinking of the role of medical care and personal wellness has to take place and has to consider the different laws and regulations applicable for health care and for wellness applications

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Keynote Speaker/Panelist

Danda B. Rawat, PhD

Assistant Professor, Director of CWiNs & NetCPS Labs, Department of Electrical Engineering, Georgia Southern University GA

Title:

“Wireless Virtualization with SDN for Big Data Communications”

Abstract:

The number of wireless subscriptions has already reached over 6 billion and is increasing exponentially with lightweight handheld mobile devices and is expected to be 50 billion by 2020 due to Internet-of-Things (IoT) applications and devices. Wireless network virtualization is envisioned to support billions of devices for wireless subscriptions and incorporate new wireless services for IoT and Cyber-Physical Systems (e.g. eHealth). We will discuss about architecture, requirements, implementation and approaches for wireless virtualization with SDN and cognitive radios where infrastructures, software and spectrum are combined into a single software-based virtual network entity, which then can be offered to different parties for big data communications. Wireless network virtualization combines different wireless networks with different access technologies and network topologies which makes the convergence, sharing and abstraction difficult to achieve. Furthermore, wireless networks operate in different spectrum bands ranging from MHz to GHz, unlicensed and licensed RF bands, and different geographic coverage (e.g., wide, local and personal areas). Thus far, there is no unified and universal architecture for wireless network virtualization available for commercial use. We will discuss about state of the research, challenges, implementation, and future perspectives of wireless Virtualization with SDN for Big Data Communications



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Workshop #3 – Speaker's Bios

- **Fawzi Behmann**
- **Scott Mark**
- **David Lary, PhD**
- **Thomas Penzel, PhD, MD**
- **Suku Nair, PhD**
- **Danda B. Rawat, PhD,**

Workshop #3 on “Big Data, SDN and Healthcare”, 27 February

Bio: Fawzi Behmann,

Vice Chair, IEEE Communications Society for North America,
President, TelNet Management Consulting, Inc.

Fawzi is a visionary, thought leader, author and is currently the president of TelNet Management Consulting, Inc. He holds a Bachelor of Science with honors and distinction from Concordia University, Montreal, QC, Masters in Computer Science from University of Waterloo, Waterloo, ON, and Executive MBA from Queens University, ON, Canada.

The academic foundation empowered Fawzi in his career path in the areas of communications and networking spanning supply-chain from service provider with Teleglobe Canada, equipment vendor with Nortel Networks, and semiconductor with Motorola/Freescale in Canada and USA. Fawzi started offering consulting services in the areas of corporate governance, Technology positioning for IoT/GIS/mobile/wearables technology positioning and solution roadmap in key markets such as healthcare & fitness, smart homes/building, smart energy, smart infrastructure and smart cities. Recently, Fawzi collaborated with consortiums and offered consultation for GIS/IoT risk-based approach in the area of public safety for the ministry of Environment & Water.

Fawzi has been a keynote & distinguished speaker, and presenter at several domestic and international conferences. He is active in international forums and standards activities with ITU, ITRS and IEEE. Fawzi is a senior member of IEEE and is the NA and chair of the IEEE Computer Society Chapter in Austin. Fawzi was a recipient of several awards including IEEE Communications Society Chapter Achievement Award and Chapter of the Year Award for 2015, and IEEE Region 5 Outstanding member service award for 2013 and 2014

Finally, Fawzi is a recent co-author of a new book on the future of IoT “Collaborative Internet of Things for Future Smart Connected Life and Business “ published by Wiley (June 2015) and is available with Wiley, Amazon, Barnes & Noble and others.

Workshop #3 on “Big Data, SDN and Healthcare”, 27 February

Bio: Scott Mark

Director of Healthcare Innovation & Technical Fellow, Medtronic

Scott Mark is Director of the Healthcare Innovation team and a Technical Fellow at Medtronic, with over 20 years of professional experience in software development and information technology. Scott's background in information technology covers a broad technology continuum, including enterprise application architecture, database design, and optimization, software quality engineering, and application development for distributed, web-based systems. Throughout his career at Medtronic, Scott has identified opportunities to lead teams at Medtronic into new technology areas that enable better quality and more rapid delivery of information solutions. Scott has a Master of Science degree in Predictive Analytics from Northwestern University and a BA from University of Missouri-Columbia.

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Bio: David Lary, PhD

Hanson Center for Space Science, Professor at University of Dallas, Texas

Prof. David Lary received a First Class Double Honors B.Sc. in Physics and Chemistry from King's College London (1987) with the Sambrooke Exhibition Prize in Natural Science, and a Ph.D. in Photochemical Computer Modeling of Atmospheric Chemistry from the University of Cambridge, Churchill College (1991). The thread running through all the research is the use of **data driven insights** using observation and automation to facilitate discovery. A key part of this is the analysis of massive data sets (BigData) using machine learning and high performance computing. David held positions at Cambridge University from 1991-2001, including being a faculty member and receiving a Royal Society University Research Fellowship. In 1998 David was awarded the first Alon Fellowship in the Department of Geophysics and Planetary Space Science at the University of Tel-Aviv. In 2001 David was invited to join NASA for his work on **data assimilation** as the first distinguished Goddard fellow in Earth Science and stayed at NASA till 2010, receiving six NASA awards for his research and technology development. In 2010 David joined the Hanson Center for Space Science at the University of Texas at Dallas where he has focused on Big Data and Machine Learning from remote sensing in service of society using satellites, smart cities, the internet of things, remote control aerial vehicles and machine learning. He is about to deploy a network of airborne allergen sensors across Chattanooga, TN, for a smart city asthma and allergy early warning system. He also has a position in the Veterans Administration North Texas Health Care System for Big Data, Machine Learning and Health Informatics, and is adjunct professor in the University of Texas at Dallas Department of Electrical Engineering. David is 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 and founding director of the The Multi-Scale Integrated Intelligent Interactive Sensing Center (MINTS) at the University of Texas at Dallas.

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Bio: Thomas Penzel, MD, PhD

Technical committee chair for IEEE EMBS, and
Medical Informatics, Charité Universitätsmedizin, Berlin, Germany

Prof. Dr. Thomas Penzel graduated from physics (1986), human biology (1991), and physiology (1995) at the University Marburg, Germany. In 1997 he received a certificate for sleep medicine and for medical informatics. In 2001 he received the title Professor from the University of Marburg. He was with the University of Marburg since 1982 and installed the first sleep lab in a Department for Internal Medicine in Germany. In 2006 he moved to Berlin as a Professor to join the interdisciplinary sleep medicine center at the Charité university hospital. At this center he is the scientific director of the sleep center.

He received several awards for neurotelemedicine, innovations in sleep research and related subjects. He is a senior member of IEEE and chair of EMB TC cardiorespiratory systems. He is the treasurer of the World Association for Sleep Medicine (WASM), president of the International Sleep Science and technology association (ISSTA), the secretary of the German Sleep Society (DGSM).

He is the editor-in-chief of the German journal Somnologie, associate editor of Physiological Measurement, and member of the editorial board of more journals, among them the new IEEE J Translational Eng Health Medicine. His research is on sleep and sleep disorders and biomedical engineering and medical informatics related to this application.

Workshop #3 on “Big Data, SDN and Healthcare”, 27 February

Bio: Suku Nair, PhD

University Distinguished Professor and Chair,
Computer Science and Engineering at SMU, Dallas/Fort Worth

Suku Nair is a University Distinguished Professor and the Chair of Computer Science and Engineering Department at the Southern Methodist University at Dallas. His research interests include Cyber Security, Fault Tolerance, Software Defined Networks and Virtualization Technologies. He is the founder of the Cyber Security program at SMU, which currently enjoys the NSA/DHS Center of Excellence in Information Assurance Education designation and \$10 mil in endowment support. He has published extensively in the area of high assurance computing and networking. His research has been supported through funds from National Science Foundation (NSF), National Security Agency (NSA), National Institute for Standards and Technology (NIST), Office of Naval Research (ONR), and various industry including Lockheed Martin, Alcatel, Raytheon, IBM, and AT&T. He has been a consultant to various IT, Telecom and Cyber Security Companies. Some of his recent awards include the University Distinguished Professorship, IBM faculty award, Distinguished University Citizen award, and the SMU Ford Research Fellowship. Prof. Nair received the M.S. and Ph.D. in Electrical and Computer Engineering from the University of Illinois at Urbana in 1988 and 1990, respectively.

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Bio: Danda B. Rawat, PhD

Director of CWiNs & NetCPS Labs, and Asst. Professor, Department of Electrical Engineering, Georgia Southern University Texas

Danda B. Rawat is an Assistant Professor in the Department of Electrical Engineering at Georgia Southern University. He received the Ph.D. in Electrical and Computer Engineering from Old Dominion University, Norfolk, Virginia. His research focuses on design, analysis and evaluation of cognitive radio networks, cyber physical systems, software defined networks, cyber-security, smart grid systems, and vehicular/wireless ad hoc networks. His research is supported by US National Science Foundation, Center for Sustainability and Georgia Southern University grants. Dr. Rawat has published over 120 scientific/technical articles. He has authored 8 books and over 15 book chapters. He has been serving as an Editor/Guest Editor for over 10 international journals. He serves as webmaster for IEEE INFOCOM 2016 and 2017, Student Travel Grant Co-chair of IEEE INFOCOM 2015, Track Chair for IEEE CCNC 2016 and 2017, Track Chair IEEE AINA 2015, and so on. He served as a program chair, general chair, and session chair for numerous international conferences and workshops, and served as a technical program committee (TPC) member for several international conferences including IEEE GLOBECOM, IEEE CCNC, IEEE GreenCom, IEEE AINA, IEEE ICC, IEEE WCNC and IEEE VTC conferences. He has received the Best Paper Awards at the International Conferences. He is the recipient Outstanding Research Faculty Award (Award for Excellence in Scholarly Activity) 2015, Allen E. Paulson College of Engineering and Technology, Georgia Southern University, August 11, 2015. He is the Founder and Director of the Cyber-security, Wireless Systems and Networking Innovations (CWiNs) Research Lab (<http://www.CWiNs.org>) and NetCPS lab at GSU.