IEEE Rochester Section

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March 2018

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ENGINEERING SYMPOSIUM ROCHESTER

This year's Engineering Symposium provides an opportunity for Professional Engineers to acquire up to 7 Professional Development Hours in just one day. In its fourteenth consecutive year, the symposium will feature 37 accredited courses for Professional Engineers. This year's event will be held on Tuesday, April 24th at the Rochester Riverside Convention Center in Downtown Rochester.

Speakers from the Rochester IEEE Section are:
High Voltage Power Supplies for Medical X-Ray generators, ***Dr. Ram Dhurjaty***
What Is And How Will Machine Learning Change Our Lives, ***Dr. Raymond Ptucha***
Optical Packaging of Photonic Chips, ***Prof. Jaime Cardenas, Ph. D***
Do machine learning algorithms really learn? ***Dr. Yossi Nygate***
Shading Effects on Photovoltaic Systems, ***Rick Church, P.E.***
TM-30-15 A New Standard for Measuring Light Quality, ***Mark Shrader***

For more information and to register, visit the Engineering Symposium Rochester web site.

NEXT Rochester Section EXCOM Meeting

Join us for the next monthly Rochester Section IEEE Executive Committee meeting. All current and prospective IEEE members may attend! We are always looking for new members and volunteers. If that describes you, please attend to learn more about the section and how you may contribute. (Cost: $5 members, $3 student members.)

Date and time	March 6, 2016 @ 11:45 – 13:00
Location	Tandoor of India (Across from South Town Plaza) 376 Jefferson Rd, Henrietta, NY 14623

2018 IEEE Rochester Section - Joint Chapters Meeting

Rochester Institute of Technology Louise Slaughter (SLA) Building, Rochester, NY

The IEEE Rochester Section is having its joint meeting, open to the general public, for all IEEE chapters on March 28th, 2018. The meeting will feature a keynote presentation and two parallel sessions with technical presentations from different chapters and societies. Abstracts and biographies follow.

CHAPTER TECHNICAL PRESENTATIONS SESSION I (4:30 – 5:25 PM):

IEEE Computer Society & Computational Intelligence Society (SLA 2120)

PHY-Layer Encryption and Modulation Obfuscation: Challenges and Solutions, Hanif Rahbari, RIT

IEEE Technology and Engineering Management Society (SLA 2130)

Patent Licensing, William Fowlkes, IP.com

IEEE Geoscience and remote Sensing Society (SLA 2140)

MX1: A New Multi-modal UAS Payload System with High Accuracy GPS and IMU, David Bauch, RIT

CHAPTER TECHNICAL PRESENTATIONS SESSION II (5:30 – 6:25 PM):

IEEE Microwave Theory and Techniques Society & Antennas and Propagation Society (SLA 2120)

Metamaterials for Microwave Applications, Jun (Brandon) Choi, SUNY University at Buffalo

IEEE Engineering in Medicine and Biology Society (SLA 2130)

Photoacoustic Imaging: Technology Development and Application for Cancer Diagnosis, Navalgund Rao, RIT

IEEE Photonics Society (SLA 2140)

(Title TBD) Sujatha Ramanujan, Luminate Inc.

CHAPTER POSTER SESSION (5:30 – 7:00 PM)

Local research will be on display. Best student poster prize of $100.

NETWORKING-cash bar: (6:15 – 7:15 PM)

DINNER AND KEYNOTE PRESENTATION (7:30 – 8:30 PM):

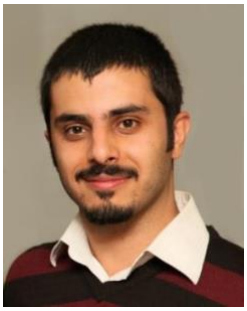
Static Control for the Flexible Packaging Industry, Kelly Robinson, PE, PhD | Owner, Electrostatic Answers

For details, registration, and fees please visit: **https://events.vtools.ieee.org/m/157596.** PayPal payments with credit card are accepted. **Registration Fees increase after March 21st, 2018**..

DINNER: ALL AMERICAN BUFFET with strip loin, roasted salmon, vegetarian penne arrabiata and much more.

2018 IEEE ROCHESTER SECTION JOINT CHAPTERS MEETING

IEEE COMPUTER SOCIETY AND
COMPUTATIONAL INTELLIGENCE SOCIETY



PHY-LAYER ENCRYPTION AND MODULATION OBFUSCATION: CHALLENGES AND SOLUTIONS

Dr. Hanif Rahbari

Computing Security, Rochester Institute of Technology

Wed, March 28th, 2018 @ 4:30 PM

Rochester Institute of Technology – Louise Slaughter Hall

RIT Center for Integrated Manufacturing Studies (CIMS)

The technical sessions are free to attend for IEEE members. Reservations are required to attend the dinner and keynote. Details and registration: https://events.vtools.ieee.org/m/157596

Abstract: The broadcast nature of wireless communications exposes various transmission attributes, such as the packet size, traffic volume, and the modulation scheme. Common (upper-layer) cryptographic methods fail to provide adequate security and privacy, as they leave low-level transmission attributes open to traffic analysis. An adversary can exploit these attributes to launch passive (e.g., traffic fingerprinting) or selective jamming attacks. In this talk, I will discuss various challenges in hiding such attributes. These include sender identification dilemma in physical (PHY) layer header encryption and high sensitivity to residual carrier-frequency-offset (CFO) in payload's modulation obfuscation. Modulation obfuscation aims at decorrelating the modulation scheme from other attributes by embedding information symbols into the constellation map of the highest-order modulation supported by the system. I will then present a novel full-frame encryption and modulation obfuscation approach that employs preamble identifier and adaptive (CFO-aware) demodulation techniques to overcome those challenges.

Bio: Hanif Rahbari is currently an assistant professor in the Department of Computing Security, Rochester Institute of Technology (RIT) and a member of the Center for Cybersecurity at RIT. He received the Ph.D. degree in electrical and computer engineering from The University of Arizona, Tucson in May 2016. He joined Rochester Institute of Technology in January 2018, after a short-term affiliation with The University of Arizona as a Senior Research Specialist and then a brief experience as a postdoctoral associate at Virginia Tech. He also holds the B.Sc. degree in information technology engineering from Sharif University of Technology and the M.Sc. degree in computer networks from AmirKabir University of Technology, Iran. Dr. Rahbari's research interests include wireless networks, security issues in wireless communications and IoT, hardware experimentation, and secure vehicle-to-vehicle communications.

2018 IEEE ROCHESTER SECTION JOINT CHAPTERS MEETING

IEEE TECHNOLOGY AND ENGINEERING MANAGEMENT SOCIETY

PATENT LICENSING

Dr. William Fowlkes

VP Analytics and Workflow Solutions, IP.com

Wed, March 28th, 2018 @ 4:30 PM

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Abstract: Licensing is one of several ways to extract value from your patent portfolio. We will put patent licensing in context and then discuss types of licensing agreements, a process for licensing patents, and discuss some tools to assist with licensing efforts.

Bio: Bill is the VP, Analytics and Workflow Solutions at IP.com, a software and services company featuring deep data cognitive computing and semantic analytics to enable organizations to discover hidden insights and rapidly evaluate the commercial potential of their intellectual property. Prior to that, at Eastman Kodak Company, Bill led a team of technologists that work with Inventors, Business Unit leaders and Legal to support all aspects of Kodak's patent portfolio life cycle (generation, maintenance and monetization). Bill is also a Six Sigma Black Belt, author of Engineering Methods for Robust Product Design: Using Taguchi Methods in Technology and Product Development and has been a trainer and consultant of TRIZ and statistics.

2018 IEEE ROCHESTER SECTION JOINT CHAPTERS MEETING

IEEE GEOSCIENCES AND REMOTE SENSING SOCIETY

MX1: A NEW MULTI-MODAL UAS PAYLOAD SYSTEM WITH HIGH ACCURACY GPS AND IMU

Dr. Timothy Bauch

Center for Imaging Science, Rochester Institute of Technology

Wed, March 28th, 2018 @ 4:30 PM

Rochester Institute of Technology – Louise Slaughter Hall

RIT Center for Integrated Manufacturing Studies (CIMS)

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Abstract: Remote sensing is becoming increasingly popular in the UAV market. Research is being conducted across the world using all types of imaging modalities to gather higher resolution data. As sensors have become smaller, and UAV payload capacities have become larger, the ability to create payload combinations of multiple modalities has risen. For many research projects the use of multiple modalities is needed. In remote sensing, the weather conditions and time of collection play a major role in the success of the collected data. This presentation outlines a new multi-modal payload system that allows for simultaneous collection of four different types of imaging modalities; RGB, LWIR, LiDAR and Hyperspectral. By collecting all modalities simultaneously, we can collect data with the same weather conditions and light levels. This also eliminates the need to change gimbals in the field and reduce the wear and tear on the equipment from multiple payload changes. This talk will highlight the process taken to create this multi-modal UAS payload and some challenges met along the way.

Bio: Timothy Bauch is an engineering in the Digital Imaging and Remote Sensing lab in the Center for Imaging Science at Rochester Institute of Technology, where he is responsible for conducting and overseeing instrumentation activities. Specifically, he oversees the operation, maintenance and calibration of imaging sensors and systems, and conducts field operations of unmanned aircraft systems (UAS) and ground sensing platforms for the purpose of research. Also, he provides support in maintaining optical calibration laboratory (integration sphere facility) in order to maintain proper calibration of all sensors and cameras for the laboratory, as well as, outside entities.

2018 IEEE ROCHESTER SECTION JOINT CHAPTERS MEETING

IEEE MICROWAVE THEORY AND TECHNIQUES &
IEEE ANTENNAS AND PROPAGATION SOCIETY

METAMATERIALS FOR MICROWAVE APPLICATIONS

Dr. Jun (Brandon) Choi

Electrical Engineering, SUNY University at Buffalo

Wed, March 28th, 2018 @ 5:30 PM

Rochester Institute of Technology – Louise Slaughter Hall

RIT Center for Integrated Manufacturing Studies (CIMS)

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Abstract: Recent research advances in passive and active metamaterials for microwave applications will be presented. First part of the talk will cover antennas and arrays based on 1D metamaterial also known as Composite Right/Left-Handed (CRLH) transmission lines. CRLH structures provide unique dispersion responses that can be systematically controlled. Such dispersion engineering technique allows the design of antenna elements or phased-array feed networks that support frequency-scanning over a wide spatial angle. This technology may eventually serve in enhancing next-generation radars and imaging sensor by alleviating ever increasing technological demand for higher spatial resolution, faster information acquisition speed, and smaller circuit dimensions. For the second half of this talk, passive and tunable low-profile 2D metamaterial (metasurface) based on inverter layers will be presented.

Bio: Jun (Brandon) Choi received Ph.D. degree in Electrical Engineering from the University of California at Los Angeles, in 2014. He is currently an Assistant Professor with the Department of Electrical Engineering, University at Buffalo, The State University of New York. His research interests include planar antennas, frequency selective surfaces, and microwave devices based on CRLH and metamaterial structures. He was a recipient of the 2017 AFOSR Young Investigator Award.

2018 IEEE ROCHESTER SECTION JOINT CHAPTERS MEETING

IEEE ENINEERING IN MEDICINE AND BIOLOGY SOCIETY

PHOTOACOUSTIC IMAGING: OUR EXPERIENCES WITH TECHNOLOGY DEVELOPMENT AND APPLICATION FOR CANCER DIAGNOSIS

Dr. Navalgund Rao

Center for Imaging Science, Rochester Institute of Technology

Wed, March 28th, 2018 @ 5:30 PM

Rochester Institute of Technology – Louise Slaughter Hall

RIT Center for Integrated Manufacturing Studies (CIMS)

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Abstract: Photoacoustic Imaging is a new promising medical imaging modality that is mapping its path from research to clinical applications. It is a hybrid technique, where light goes into the body and ultrasound comes out. Therefore it combines the superior optical absorption based oxy and de-oxy hemoglobin (blood) contrast with good spatial resolution afforded by ultrasound for cancer diagnosis. For volumetric Photoacoustic imaging, the traditional method of computed tomography based image reconstruction is expensive, cumbersome and time consuming. We have developed an innovative acoustic lens based imaging camera system that addresses many of these challenges. Alongside the technology development, we have performed ex-vivo imaging of over 100 freshly excised human prostate, thyroid and kidney specimens. With statistical pattern recognition and convolution neural network based analysis of the multispectral photoacoustic imaging data, we are able to demonstrate superiority in differentiating malignant cancer region from normal and benign tissue, when compared to state of the art clinical ultrasound evaluation of thyroid and prostate glands.

Bio: Recently retired as a tenured Professor from the Center for Imaging Science at Rochester Institute of Technology, Dr. Rao is now working as a research professor at RIT and also holds an adjunct appointment in Imaging Sciences department, University of Rochester Medical center. He has been primarily involved in graduate teaching and research for the past 25 years. His research interests are in Physics and engineering of medical imaging, digital image and signal processing, with emphasis on ultrasound imaging. Since 2006, he has worked in collaboration with Dr. Vikram Dogra, MD and Dr. Wayne Knox at U of R. Development of Photoacoustic Imaging technology and its application for thyroid, prostate and breast cancer disease management has been the major thrust of his research for the past decade.

2018 IEEE ROCHESTER SECTION JOINT CHAPTERS MEETING

KEYNOTE LECTURE: STATIC CONTROL FOR THE FLEXIBLE PACKAGING INDUSTRY

Dr. Kelly Robinson

Owner, Electrostatic Answers

Wed, March 28th, 2018 @ 7:30 PM

Rochester Institute of Technology – Louise Slaughter Hall

RIT Center for Integrated Manufacturing Studies (CIMS)

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Abstract: Worldwide growth in flexible packaging is driven by technical advances including improving barrier properties to extend food shelf life and implementing value adding, emerging, "smart packaging" technologies that, for example, indicate spoilage and provide inventory control via embedded RFID tags. The economically important flexible packaging market is projected to exceed $100B USD worldwide by 2020. Static electricity causes a number of problems in the flexible packaging industry including igniting solvent vapors, shocking operators, damaging sensitive layers, attracting dust and debris to finished product, and causing cut-sheets to stick together. Reducing annual static losses of 1% to 4% is a multimillion dollar opportunity in North America and exceeds $1B worldwide. After a brief review of the flexible packaging industry, the major sources of static charging for moving films are presented as well as methods for measuring static and techniques for controlling static. After a demonstration of the neutralizing performance of several commercial static dissipaters, several best-practice, static control examples are presented including a gravure, solvent coater and an unwinding roll of bare polymer film.

Bio: In 2007, Kelly Robinson founded Electrostatic Answers, an engineering consulting company dedicated to eliminating injury and waste from static electricity that has served over 100 clients including many Fortune 500 companies. Kelly has over 35 years of industrial problem-solving experience including restoring manufacturing lines to service and commercializing new products. Dr. Robinson is a Professional Engineer licensed in New York State, holds the PhD in electrical engineering from Colorado State University, and he is a Patent Agent. Kelly is an accomplished engineer. In 2011 he was names IEEE Fellow (2011) cited for contributions to the static performance of manufacturing operations. He has been a NFPA (National Fire Protection Assoc.) Static Electricity Committee Member (2015-present). He is an inventor on 14 US patents, a member of the IEEE-IAS Electrostatic Processes Committee (EPC) Chair (1987-89), and served as ESA (Electrostatics Society of America) President (2005-08). Kelly is also an active technical writer and speaker on static control. H serves as associate editor for the Journal of Electrostatics, a contributing editor on static control to the Paper, Film & Foil Converter (PFFC), and an International Converting Exhibition (ICE USA) "Ask the Experts" static control contributor (2013 – present).