

IEEE North Jersey Advanced Communications Symposium (IEEE NJACS-2016)

Stevens Institute of Technology, Hoboken, NJ

Saturday, September 17, 2016

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The 2016 IEEE North Jersey Advanced Communications Symposium (NJACS-2016) will be held at the Babbio Center, Stevens Institute of Technology, in Hoboken, NJ, on Saturday, September 17, 2016. The symposium consists of four keynote presentations and a parallel poster session. The symposium program will cover advanced topics in communications, including 5th generation wireless networks, network security, and big data applications. The posters will be presented by graduate students and postdocs. Poster presentations will be on display all day and special dedicated exhibition times are scheduled for all attendees. There will be plenty of opportunities to interact with presenters and network with peers.

Symposium Program

09:30–10:00 **Registration, Meet and Greet, Poster Set-Up**

10:00–10:15 **Opening Remarks**

10:15–11:00 **Ultra-Reliability and Low-Latency Communications in 5G: Challenges and Opportunities**
Dr. Chong Li, Qualcomm, Inc.

11:00–11:45 **Technology Evolution Steps towards 5G**
Dr. Amit Mukhopadhyay, Bell Labs Consulting

11:45–13:00 **Lunch and Poster Presentations**

13:00–13:45 **How Deep Learning Changes the World**
Dr. Rensheng Wang, Stevens Institute of Technology

13:45–14:30 **Friends or Foe? Your Wearable Devices Reveal Your Personal PIN**
Dr. Yingying Chen, Stevens Institute of Technology

14:30–14:45 **Poster Competition and Awards**

14:45–15:00 **Closing Remarks**

Co-Sponsored by

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Registration	
IEEE member	\$ 10.00
Non-member	\$ 20.00
Student/graduate student/life member	Free



For more information and registration, please check: <https://meetings.vtools.ieee.org/m/41156>

PRESENTATION ABSTRACTS AND SPEAKER BIOGRAPHIES

Ultra-Reliability and Low-Latency Communications in 5G: Challenges and Opportunities

Dr. Chong Li, Qualcomm, Inc.

Abstract – 5G is envisioned to support more diverse and challenging scenarios than current mobile network generations do. Ultra-Reliability and Low-Latency Communications (URLLC) with stringent requirements in reliability and latency is one of the agreed important scenarios in 5G. In this talk, we will introduce motivating use cases for URLLC, discuss fundamental URLLC PHY/MAC design (e.g. numerology, frame structure, HARQ, etc), and identify challenges and opportunities down the road.

Dr. Chong Li is a staff engineer/researcher at Qualcomm Research & Development. He received a Ph.D degree in Electrical and Computer Engineering, with minor in Mathematics, from Iowa State University (ISU) in 2013. He holds 40 U.S. patents (granted & pending), published 15+ academic papers and served as TPC and reviewers for most prestigious journals and conferences in the field. He received Research Excellent Award from ISU in 2013. His research interests includes information theory, feedback control under communication constraints and optimization.

Technology Evolution Steps towards 5G

Dr. Amit Mukhopadhyay, Bell Labs Consulting

Abstract – While there are a lot of activities going on around the globe related to 5G technical standardization and technology trials, critical questions remain about use cases requiring 5G features, while the standards are not finalized yet. Operators have quite recently invested large amounts of money in 4G technologies and they wonder why they have to again start investing in another technology so soon. Advancements in 4G (e.g., LTE to LTE-Adv to LTE-Pro) are blurring the line between 4G and the planned 5G. This talk will explain the technology evolution steps towards 5G and point out why the evolution is necessary.

Dr. Amit Mukhopadhyay is a Partner in Bell Labs Consulting where he leads the group Future Wireless Network Modeling. His current work focuses on next generation wireless technologies (LTE-Adv, 5G), including Small Cells, Heterogeneous Networks and Self-Organizing Networks. He is also involved in converged IMS networks along with other broadband access technologies including xDSL, Fiber and HFC Cable. He holds a Ph. D. in Operations Research from the University of Texas, Dallas. He is a Senior Member of IEEE and has received the IEEE Region 1 award. He has 20+ publications in refereed journals and has received four patent awards.

How Deep Learning Changes the World

Dr. Rensheng Wang, ECE Department, Stevens Institute of Technology

Abstract – We live in a world where technologies are changing — and changing very quickly. Machine learning is one of the fastest-growing and most exciting fields out there, and deep learning represents its true bleeding edge. In this talk, we present some application examples in real-world to understand the motivations for deep learning, explore the astonishing achievements obtained from deep learning and foresee some potential influences in the relevant fields.

Dr. Rensheng Wang is an Adjunct Faculty at Stevens Institute of Technology. His research interests lie in the areas of machine learning, data mining, big-data processing platform, predictive modeling and recommender systems. He obtained his Ph.D degree from the Electrical and Computer Engineering department in Stevens Institute of Technology.

Title: Friend or Foe? Your Wearable Devices Reveal Your Personal PIN

Dr. Yingying Chen, ECE Department, Stevens Institute of Technology

Abstract – The proliferation of wearable devices, e.g., smartwatches and activity trackers, with embedded sensors has already shown its great potential on monitoring and inferring human daily activities. Our work reveals a serious security breach of wearable devices in the context of divulging secret information (i.e., key entries) while people accessing key-based security systems. Existing methods of obtaining such secret information relies on installations of dedicated hardware (e.g., video camera or fake keypad), or training with labeled data from body sensors, which restrict use cases in practical adversary scenarios. In this work, we show that a wearable device can be exploited to discriminate mm-level distances and directions of the user's fine-grained hand movements, which enable attackers to reproduce the trajectories of the user's hand and further to recover the secret key entries. In particular, our system confirms the possibility of using embedded sensors in wearable devices, i.e., accelerometers, gyroscopes, and magnetometers, to derive the moving distance of the user's hand between consecutive key entries regardless of the pose of the hand. Our Backward PIN-Sequence Inference algorithm exploits the inherent physical constraints between key entries to infer the complete user key entry sequence. Extensive experiments are conducted with over 5000 key entry traces collected from 20 participants for key-based security systems (i.e. ATM keypads and regular keyboards) through testing on different kinds of wearables. Results demonstrate that such a technique can achieve 80% accuracy with only one try and more than 90% accuracy with three tries, which to our knowledge, is the first technique that reveals personal PINs leveraging wearable devices without the need for labeled training data and contextual information.

Dr. Yingying Chen is a Professor in the Department of Electrical and Computer Engineering at Stevens Institute of Technology. Her research interests include cyber security and privacy, Internet of Things, smart healthcare and mobile computing and sensing. She has published over 100 journals and referred conference papers in these areas. She received her Ph.D. degree in Computer Science from Rutgers University. Prior to joining Stevens, she was with Alcatel-Lucent at Murray Hill, New Jersey. She is the recipient of the NSF CAREER Award and Google Faculty Research Award. She also received NJ Inventors Hall of Fame Innovator Award. She is the recipient of the Best Paper Awards from ACM AsiaCCCS 2016, IEEE CNS 2014 and ACM MobiCom 2011. She also received the IEEE Outstanding Contribution Award from IEEE New Jersey Coast Section each year 2005 - 2009. Her research has been reported in numerous media outlets including MIT Technology Review, Fox News Channel, Wall Street Journal, and National Public Radio. She serves on the editorial boards of IEEE Transactions on Mobile Computing (IEEE TMC), IEEE Transactions on Wireless Communications (IEEE TWireless), and IEEE Network Magazine.