Center for Embedded Systems for Critical Applications

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CESCA Newsletter
Center for Embedded Systems for Critical Applications

CESCA • 302 Whittemore Hall • Dept. of ECE • Virginia Tech • Blacksburg • 24061 • USA

October 2014▪ No.012

The **Center for Embedded Systems for Critical Applications** is a research center within the Bradley Department of Electrical and Computer Engineering. CESCA addresses the major challenges in the conception, the design, and the implementation of next-generation embedded systems. CESCA bundles the efforts of eight faculty and their students in a cross-disciplinary setting. CESCA generates know-how, expert advice, and skilled researchers who tackle the needs of tomorrow's industry and academia.

Featured News

Haibo Zeng joins ECE and CESCA

Haibo Zeng

Dr. **Haibo Zeng** has joined the Bradley Department of Electrical and Computer Engineering as an assistant professor. Zeng will work with the department's Center for Embedded Systems for Critical Applications. His research interests include design methodology, analysis and optimization for embedded systems, real-time systems, and cyber physical systems.

Zeng has co-authored two books, "Embedded Systems Development–From Functional Models to Implementations," and "Understanding and Using the Controller Area Network Communication Protocol: Theory and Practice," and has co-authored 17 peer-reviewed articles.

He has more than 30 conference publications and earned three best paper citations, two at the IEEE Symposium on Industrial Embedded Systems in 2009 and 2011, and one at the Euromicro Conference on Real-Time Systems in 2013. He served as editor for two special IEEE publications: "System Level Design of Automotive Electronics/Software" in 2012 and "Automotive Embedded Systems" in 2010.

Zeng earned his Ph.D. at the University of California at Berkeley. He previously served as an assistant professor at McGill University in Montreal, Quebec, Canada, from 2011 - 2014 and was a researcher and then a senior researcher at General Motors from 2008 - 2011.

From the Director's Desk

Michael Hsiao

There have been many developments since the last newsletter. First, we welcome a new CESCA faculty member, Haibo Zeng, who joins us from McGill University. Dr. Zeng's expertise is in embedded and cyber-physical systems and has had experience in both academia and industry. Though junior in his rank, he already has several best paper awards! We look forward to many collaborative opportunities within the center in the days to come!

There are several new, exciting projects starting. From software verification to cognitive radios to hardware validation, the range of activities

will both incite cross-disciplinary discussions and fuel innovation. I'm particularly proud of the excellent work put forth by the faculty and students in the center, and may the dedication and hard work bring much fruit in the coming years!

We appreciate Dr. Zeng's taking up the role of organizing the CESCA seminars this year, and we already have an excellent line-up for the talks this semester! The seminars serve as a platform where external perspectives enable CESCA members to not only build bridges, but also combine various ideas to formulate new approaches. We appreciate all the speakers' efforts in putting excellent talks for the seminars!

Finally, it's a great honor for me to have this opportunity to serve as CESCA Director for the next couple of years. I'm humbled to work among such an outstanding group of researchers. I particularly want to applaud the excellent work of the most recent CESCA director, Patrick Schaumont, who has provided outstanding leadership in the past two years. Dr. Schaumont is taking a sabbatical leave this year in Japan, and we wish him an exciting and rewarding time there.

Enjoy this issue of the CESCA newsletter, and should you have any comments, please do not hesitate to contact us.

Michael Hsiao
CESCA Director

New Projects

Wang and Schaumont are Awarded a Grant from ICTAS

Chao Wang

Patrick Schaumont

Drs. **Chao Wang** and **Patrick Schaumont** started a joint project on automatically eliminating dangerous side-channel information leakage in embedded software code. The project is funded by a Junior Faculty Collaboration (JFC) grant from Virginia Tech's Institute of Critical Technology and Applied Science ($120K, 2014-2016).

Embedded computing devices often leak information about the software code they execute, e.g. via power and heat dissipation and electromagnetic radiation. Such leaks may be exploited by an adversary to break otherwise secure systems, such as cryptographic software. Since the current practice of manually mitigating side-channel leaks is labor intensive and error prone, this project aims to develop fully automated techniques for generating side-channel leak countermeasures. The team brings together expertise from two traditionally different fields -- software engineering (Wang) and cryptographic engineering (Schaumont) -- to solve a burning issue in embedded systems security.

Park and colleagues are Awarded a Grant from the Army Research Office

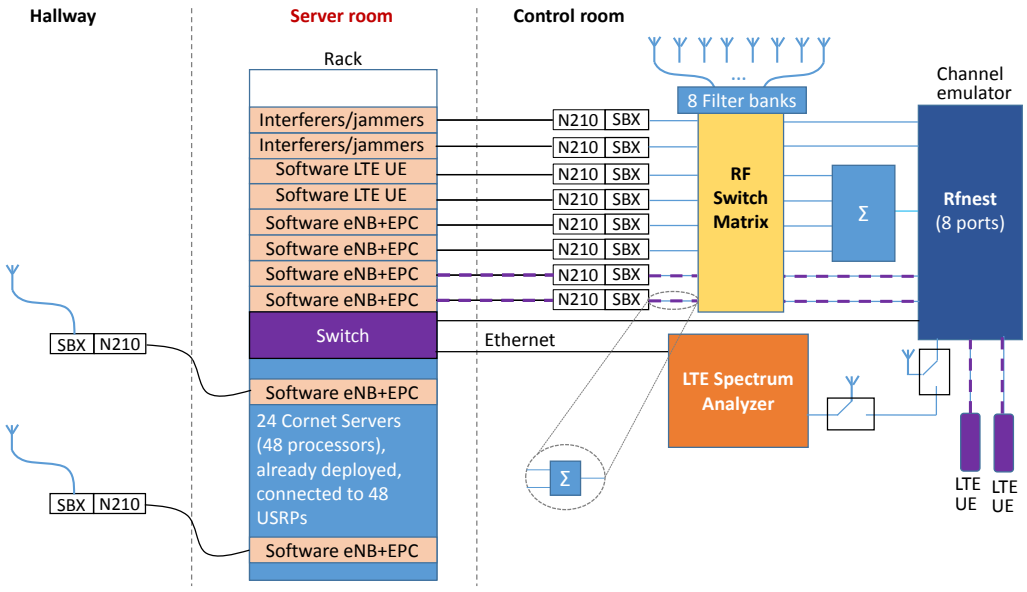


Figure 1: LTE-enabled CORNET testbed.

Recently, Drs. **Jerry Park**, Carl Dietrick, Vuk Marojevic, and Jeff Reed were awarded a grant for $250K from the Army Research Office (ARO) to design and build a LTE-enhanced cognitive radio testbed (see Figure 1). Testbeds play a major role in developing and testing new wireless communications technologies and systems. Virginia Tech's COgnitive Radio NETwork (CORNET) is a large-scale testbed featuring forty-eight remotely accessible software radio nodes that are used in education and research. The CORNET nodes enable dynamic spectrum access (DSA) and cognitive radio (CR) related research and education using open-source software and flexible hardware. CORNET is unique in that it offers a wide range of experimental research and educational tools, including an FCC experimental license agreement for several frequency bands. As communications systems gradually move towards 4G using long-term evolution (LTE) technology, LTE nodes need to be integrated into the CORNET testbed to be able to train engineers and students on this emerging technology and its evolution.

This project aims to extend and augment the capabilities of the existing testbed so that it can support LTE-related experiments relevant to the Dept. of Defense (DoD). LTE-CORNET will provide a flexible platform that leverages commercial off-the-shelf (COTS) equipment and enables research and education with emphasis on rapid prototyping and quick evaluation of new ideas that improve the robustness of LTE. The solicited equipment will be an enabler for developing and testing sophisticated wireless communications systems, initially following the recommendations of LTE and LTE Advanced (LTE-A) as milestones for bringing 4G and eventually 5G to the soldier. LTE-CORNET may then become an extremely valuable tool for planning, developing, and analyzing the communication needs of future DoD missions. It allows generating multiple signals, emulating natural and man-made interference, in a safe operating environment. The flexible and modular setup together with the mobile nodes allows attaching and detaching LTE-CORNET from the core CORNET testbed, enabling the easy relocation of part of the LTE-CORNET equipment to other testing sites.

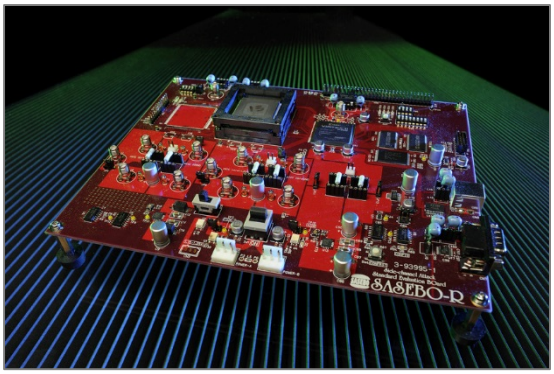
Park to Start a New Collaborative Project Funded by NSF

Jerry Park

Marwan Krunz

Recently, Drs. **Jerry Park** and Marwan Krunz were awarded a $200K grant from the National Science Foundation (NSF) to study the coexistence of heterogeneous secondary networks in spectrum sharing scenarios. Dr. Krunz is a professor in the Dept. of ECE at the University of Arizona. The U.S. government has been aggressively pushing new initiatives to identify and make available new swaths of spectrum to support the development of new wireless applications. It has also been promoting the development of new technologies and regulatory policies for enhancing spectrum utilization. Spectrum sharing plays a key role in realizing the government's plans. We cannot fully reap the benefits of spectrum sharing without addressing interference among coexisting heterogeneous secondary networks. Although coexistence issues in the ISM bands have been studied before, the situation in the TV bands and other shared access spectrum (e.g., 3.5 GHz band) is more complex and challenging due to the signal propagation characteristics, incumbent protection rules, and the disparity of PHY/MAC strategies of secondary systems. To date, most research efforts have focused on incumbent protection, and little attention has been given to the coexistence of secondary systems in the context of spectrum sharing. Through the proposed research, we aspire to fill this void and stimulate more research in this important area.

Schaumont and Nazhandali awarded a new NSF/SRC grant in Hardware Security



A $460K grant, jointly funded by the National Science Foundation and the Semiconductor Research Corporation, will support a research project by Drs. **Patrick Schaumont** and **Leyla Nazhandali** over the coming three years. The project addresses fault attacks - attacks in which an adversary performs physical manipulation of the electronic operating environment of a secure electronic circuit.

The major outcome of this project is FAME, a collection of hardware techniques for microprocessor architectures to detect these fault injection attacks, and to mitigate fault analysis through an appropriate response in software. The FAME processor is developed both as an architecture concept as well as a chip prototype. The FAME processor uses fault countermeasures that combine fault detection in microprocessor hardware with fault response in the software application. The fault detection in hardware uses static (design-time) and dynamic (runtime) techniques for in-situ fault detection. The FAME processor chip demonstrates these techniques, as well as novel forms of fault analysis that are investigated in tandem with the development of FAME.

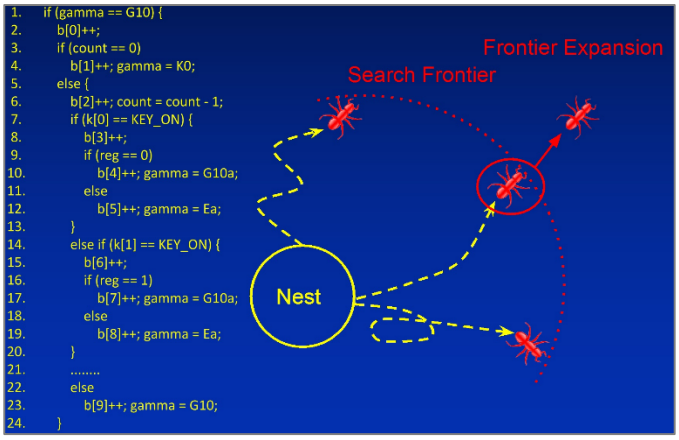
The impacts of this project are safer, more trustworthy microprocessors that are aware of their physical environment and the threats it poses to their internal processing. Such microprocessors offer the basis for cyber-security applications that can handle both logical as well as physical threats.

Wang to Start a Collaborative Project on Improving Big Data Systems

National Science Foundation (NSF) awarded $750K grant to a Virginia Tech team consisting of Dr. Ali Butt (PI), associate professor of computer science, and Dr. **Chao Wang** (co-PI), assistant professor of electrical and computer engineering, to develop innovative resource management tools for big data systems such as Hadoop. The NSF review panel also highlighted the strength of the team, which "bring strong, complementary expertise to the project and are highly qualified to perform the proposed research." Big data processing systems provide the computing substrate for a large and growing number of critical data-driven applications. Sustaining these systems at scale and in the presence of emerging technologies such as multicore processors, GPUs, and hybrid storage systems, is crucial for computing-based scientific discovery.

"Current systems treat the user-provided code as a black box, which leads to lost opportunities for performance optimization," said Dr. Wang. The project will employ static/dynamic analyses to examine the software code and build an informative application model. The model is then used to create a runtime performance oracle and help devise resource management strategies for big data systems. The overall goal is to design and develop Pythia, an online application-aware framework for fine-tuning such systems on emerging heterogeneous resources. "Imagine if you can see into the future and know how an application would behave, you can schedule resources to maximize performance. This is the vision behind Pythia," said Dr. Butt.

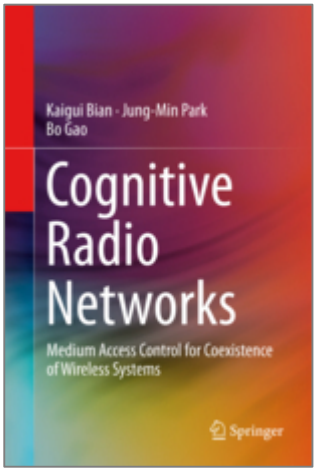
Hsiao is Awarded a Grant from NSF on Design Validation



Dr. **Michael Hsiao** has received a new $418K NSF grant on design validation to tackle the critical bottleneck in the design of large, complex hardware systems. An ill-verified design compromises not only functionality and reliability, but also security of the system. However, the exponential growth in design complexity over the past few decades has made verification and validation an extremely daunting task. Thus, much-needed verification and validation breakthroughs hold the key to ease this mounting challenge.

The proposed research combines swarm-aggregate learning with parallel search to significantly reduce the computational costs. It is anticipated that the synergy from simulation, swarm intelligence, multiple abstractions, and parallel search will bring out the best from each domain to achieve a common goal.

Faculty Highlights



Bian, Park, and Bo Publish a Book on Medium Access Control of Cognitive Radio Networks

Drs. **Kaigui Bian** (CESCA alumnus), **Jerry Park** (CESCA faculty), and **Bo Gao** (CESCA alumnus) recently published a book entitled "***Cognitive Radio Networks: Medium Access Control for Coexistence of Wireless Systems***" (Springer, 2014, print ISBN: 978-3-319-07328-6, online ISBN: 978-3-319-07329-3). This book provides a comprehensive overview of the medium access control (MAC) principles in cognitive radio networks, with a specific focus on how such MAC principles enable different wireless systems to coexist in the same spectrum band and carry out spectrum sharing. From algorithm design to the latest developments in the standards and spectrum policy, readers will benefit from leading-edge knowledge of how cognitive radio systems coexist and share spectrum resources. Coverage includes cognitive radio rendezvous, spectrum sharing, channel allocation, coexistence in TV white space, and coexistence of heterogeneous wireless systems. For more details, see:

http://www.springer.com/engineering/circuits+%26+systems/book/978-3-319-07328-6

Park is Working with the NTIA and NSF to Organize a Wireless Spectrum R&D Senior Steering Group Workshop

Dr. **Jerry Park** is a member of the planning committee for the *Wireless Spectrum R&D (WSRD) Senior Steering Group (SSG) Workshop VI: Federal-Commercial Spectrum Data: Understanding Information Exchange Needs, Issues, and Approaches*, which will be held in Arlington, VA on Oct. 21, 2014. This workshop, which is partially sponsored by the National Science Foundation (NSF), is being organized by the National Telecommunications and Information Administration (NTIA), the National Coordination Office (NCO), and selected representatives from academia. This invitational workshop will bring together highly-visible experts on wireless systems and spectrum management from the Federal Government, academia, and the private sector. The primary goal of the workshop is to assist in developing recommendations for the Federal spectrum research portfolio.

In 2010, the Wireless Spectrum R&D (WSRD) Senior Steering Group (SSG) was formed to coordinate spectrum-related research and development activities across the Federal government and with academia and the private sector. The primary goal of the WSRD SSG is to help coordinate and inform ongoing activities across Federal agencies and to facilitate efficient and effective investment in spectrum sharing technologies and systems. For details, visit:

https://www.nitrd.gov/nitrdgroups/index.php?title=Wireless_Spectrum_Research_and_Development_(WSRD)

Schaumont is visiting researcher at NICT (JP) 2014-2015

Dr. **Patrick Schaumont** is spending a sabbatical year as a visiting researcher in the Secure Architectures Group at the National Institute for Information and Communications Technology (NICT) in Koganei, Japan. The objective of this collaboration is joint research in PUF structures for FPGA and their application in cryptographic protocols.

CESCA Training and Seminars

CESCA Seminars in Fall 2014

CESCA seminars are held on weekly basis during the semester, and are held in Lavery Hall 320 from 11:15 AM to 12:05 PM on Fridays. The speakers are faculty members of CESCA, ECE, and Virginia Tech as well as external speakers, and cover a broad range of topics in electronic system design. The speakers are open to everybody. Please join us!

- 8/29/14: All CESCA faculty members
- 9/5/14: Haibo Zeng, Electrical & Computer Engineering, Virginia Tech, "ONAIR: An Online Algorithm for Automotive Idling Reduction with Effective Statistics"
- 9/12/14: Lin Ma, Aerospace and Ocean Engineering, Virginia Tech, "Diagnostic and Data Processing Needs for Combustion and Propulsion Systems"
- 9/19/14: Hassan Salmani, Electrical & Computer Engineering, Howard University, "How Vulnerable is your Design to Hardware Trojan Insertion?"
- 9/26/14: Harold Trease, Computer Science, Virginia Tech, "Building A Metadata-Free Unstructured Search Platform".
- 10/3/14: Harpreet S. Dhillon, Electrical & Computer Engineering, Virginia Tech, "Fundamentals of Self-Powered Heterogeneous Cellular Networks"
- 10/10/14: Hesham Rakha, Civil & Environmental Engineering, Virginia Tech, "Transportation Sustainability: What can Intelligent Transportation Systems Offer?"
- ***Upcoming 10/17/14***: Zac Doerzaph, Virginia Tech Transportation Institute, Virginia Tech
- ***Upcoming 10/24/14***: Walid Saad, Electrical & Computer Engineering, Virginia Tech
- ***Upcoming 10/31/14***: Krishnaraj Ravindranathan, Computer Science, Virginia Tech
- ***Upcoming 11/07/14***: Aydin Aysu, Electrical & Computer Engineering, Virginia Tech
- ***Upcoming 11/14/14***: Linbing Wang, Civil & Environmental Engineering, Virginia Tech

There will be no seminar on 11/21/14 (the Friday before Thanksgiving) and 11/28/14 (Thanksgiving). On 12/5/14, there will be a distinguished lecture at CS department, by Michael Littman from Brown University.

Student News & Highlights

New Students

- Ahmed Gahnem, PhD student (Advisor: Chao Wang)
- Chungha Sung, PhD student (Advisor: Chao Wang)
- He Li, PhD student (Advisors: Jerry Park and Yaling Yang)

- Jinshan Liu, PhD student (Advisor: Jerry Park)
- Markus Kusano, PhD student (Advisor: Chao Wang)
- Meng Wu, PhD student (Advisor: Chao Wang)
- Sarmad Tanwir, PhD student (Advisor: Michael Hsiao)
- Sean Thweatt, MS student (Advisor: Lynn Abbott)

Summer Interns

- Ahmed Ibrahim, Edge Networks in Reston, VA (Advisor: Lynn Abbott)
- Aydin Aysu, Security Research Center of Qualcomm in San Diego, CA (Advisor: Patrick Schaumont)
- Dinesh Ganta, Intel Corporation in Hillsboro, OR (Advisor: Leyla Nazhandali)
- Mahmoud Elbayoumi, Intel (summer), Real Intent (fall) (Advisor: Michael Hsiao)
- Markus Kusano, NEC Laboratories in Princeton, NJ (Advisor: Chao Wang)
- Meeta Srivasta, Samsung Austin R&D center (SARC), Austin, TX (Advisor: Leyla Nazhandali)
- Moein Pahlavan Yali, National Instruments in Austin, TX (Advisor: Patrick Schaumont)
- Prateek Puri, Juniper Networks in Sunnyvale, CA (Advisor: Michael Hsiao)
- Seungmo "Mo" Kim, Broadcom in Matawan, NJ (Advisor: Jerry Park)
- Sudeep Bhattarai, AT&T Labs in San Ramon, CA (Advisor: Jerry Park)

Recent Graduates

- Arijit Chattopadhyay (MS, Advisor: Chao Wang), joined Bloomberg, NY
- Bo Gao (Ph.D., Advisors: Jerry Park and Yaling Yang), joined University of Chinese Academy of Science
- Deepak Hamanant Mane (MS, Advisor: Patrick Schaumont), joined Intel, OR
- Krishna Chandrakant Pabbuleti (MS, Advisor: Patrick Schaumont), joined CISCO Systems, CA
- Mostafa Taha (Ph.D., Advisor: Patrick Schaumont), joined as a post-doctoral scholar at the Worcester Polytechnic Institute
- Shuchi Pandit (MS, Advisor: Michael Hsiao), joined CISCO

Publications

Please click the title in blue to view the abstract.

Monograph and Textbook:

K. Bian, J. Park, and B. Gao, *Cognitive Radio Networks: Medium Access Control for Coexistence of Wireless Systems*, Springer, 2014, print ISBN: 978-3-319-07328-6, online ISBN: 978-3-319-07329-3.

Journal and Conference Proceeding Papers:

- Z. Al-Bayati, Q. Zhao, A. Youssef, H. Zeng, and Z. Gu. “Enhanced Partitioned Scheduling of Mixed-Criticality Systems on Multicore Platforms.” 20th Asia and South Pacific Design Automation Conference (ASP-DAC), January 2015.
- S. Aly, A. Youssef, and A. L. Abbott, “Adaptive Feature Selection and Data Pruning for 3D Facial Expression Recognition using the Kinect,” to appear in *Proceedings: IEEE International Conference on Image Processing (ICIP 2014),* Paris, France, Oct. 2014.
- M. Awadallah, A. L. Abbott, and S. Ghannam, “Segmentation of Sparse Noisy Point Clouds using Active Contour Models,” to appear in *Proceedings: IEEE International Conference on Image Processing (ICIP 2014),* Paris, France, Oct. 2014.
- B. Bahrak and J. Park, “Coexistence decision making for spectrum sharing among heterogeneous wireless systems,” IEEE Transactions on Wireless Communications, Vol. 13, Issue 3, 2014, pp. 1298–1307.
- B. Bahrak, S. Bhattarai, A. Ullah, J. Park, J. Reed, and D. Gurney, “Protecting the primary users’ operational privacy in spectrum sharing,” 2014 IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN), April 2014. ***Awarded the Best Paper Award***
- M. Befrouei, C. Wang, and G. Weissenbacher. "Abstraction and mining of traces to explain concurrency bugs," *International Conference on Runtime Verification (RV'14).* Toronto, Canada. 2014. ***Best Paper Award Finalist***
- K. Bian, J. Park, L. Chen, and X. Li, “Addressing the hidden terminal problem for heterogeneous coexistence between TDM and CSMA networks in white space,” IEEE Transactions on Vehicular Technology, to appear.
- S. Bhunia, M. S. Hsiao, M. Banga, and S. Narasimhan, "Hardware trojan attacks: threat analysis and countermeasures," in Proceedings of the IEEE, vol 102, no. 8, August 2014, pp. 1229-1247.
- L. Chen, K. Bian, L. Chen, C. Liu, J. Park, and X. Li, “A group-theoretic framework for rendezvous in heterogeneous cognitive radio networks,” 2014 ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), Aug. 2014.
- G. A. Christie, K. B. Kochersberger, and A. L. Abbott, “Image-based 3D Reconstructions for Stockpile Volume Measurement,” to appear in *Mining Engineering Magazine*.

- P. Deng, Q. Zhu, M. Di Natale, and H. Zeng. “Task Synthesis for Latency-sensitive Synchronous Block Diagrams.” *9th IEEE International Symposium on Industrial Embedded Systems (SIES),* June 2014. ***Best Paper Award Finalist***
- C. Dong, H. Zeng, and M. Chen. “A Cost Efficient Online Algorithm for Automotive Idling Reduction.” *51st ACM/IEEE Design Automation Conference (DAC),* June 2014.
- M. Elbayoumi, M. Choudury, V. Kravets, M. S. Hsiao, and M. Elinainay, "TACUE: A Timing-Aware Cuts Enumeration Algorithm for Parallel Synthesis," in Proceedings of the IEEE Design Automation Conference, June 2014.
- H. Eldib and C. Wang. "An SMT based method for optimizing arithmetic computations in embedded software code," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems,* accepted (2014).
- H. Eldib, C. Wang, and P. Schaumont. "Formal verification of software countermeasures against side-channel attacks," ACM Transactions on Software Engineering and Methodology, accepted (2014).
- H. Eldib and C. Wang. "Synthesis of masking countermeasures against side channel attacks," *International Conference on Computer Aided Verification (CAV'14)*: 114-130. Vienna, Austria. July 2014.
- B. Gao, J. Park, and Y. Yang, “Supporting mobile users in database-driven opportunistic spectrum access,” 2014 ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), Aug. 2014.
- B. Gao, J. Park, and Y. Yang, “Uplink soft frequency reuse for self-coexistence of cognitive radio networks,” IEEE Transactions on Mobile Computing, Vol. 13, No. 6, June 2014, pp.1366–1378.
- B. Gao, Y. Yang, and J. Park, “A credit-token-based spectrum etiquette framework for coexistence of heterogeneous cognitive radio networks,” 2014 IEEE Int’l Conference on Computer Communications (INFOCOM), April–May, 2014.
- K. Gent and M. S. Hsiao, "Dual-purpose mixed-level test generation using swarm intelligence," in Proceedings of the IEEE Asian Test Symposium, November 2014.
- N. F. Ghalaty, B. Yuce, M. Taha, P. Schaumont, "Differential Fault Intensity Analysis," 11th Workshop on Fault Diagnosis and Tolerance in Cryptography (FDTC 2014), Busan, Korea, September 2014.
- S. Ghannam and A. L. Abbott (2013), “Cross Correlation versus Mutual Information for Image Mosaicing,” International Journal of Advanced Computer Science and Applications (IJACSA), 4(11).
- E. Gulcan, A. Aysu, P. Schaumont, "A Flexible and Compact Hardware Architecture for the SIMON Block Cipher," Third International Workshop on Lightweight Cryptography for Security & Privacy (LightSec 2014), Istanbul, Turkey, September 2014.

- G. Han, H. Zeng, M. Di Natale, X. Liu, and W. Dou. “Experimental Evaluation and Selection of Data Communication Mechanisms in Multicore Platforms.” *IEEE Transactions on Industrial Informatics (TII)* 10(2): 903-918, May 2014.
- J. S. Hiller and J. Park, “Spectrum sharing and privacy: A research agenda,” 42nd Research Conference on Communication, Information, and Internet Policy (TPRC), Arlington, VA, Sep. 2014.
- S. Kim, J. Park, and K. Bian, “PSUN: An OFDM Scheme for Coexistence with Pulsed Radar,” 2015 Int’l Conference on Computing, Networking, and Communications (ICNC), California, USA, Feb. 2015.
- F. Kong, C. Dong, X. Liu, and H. Zeng. “Blowing Hard Is Not All We Want: Quantity vs Quality of Wind Power in the Smart Grid.” *32nd IEEE International Conference on Computer Communications (INFOCOM),* April 2014.
- F. Kong, C. Dong, X. Liu, and H. Zeng. “Quantity vs Quality: Optimal Harvesting Wind Power for the Smart Grid.” *Proceedings of the IEEE,* to appear.
- V. Kumar, J. Park, and K. Bian, “Blind transmitter authentication for spectrum security and enforcement,” 2014 ACM Conference on Computer and Communications Security (CCS), Arizona, USA, Nov. 2014.
- M. Kusano and C. Wang. "Assertion guided abstraction: a cooperative optimization for dynamic partial order reduction," IEEE/ACM International Conference on Automated Software Engineering (ASE'14). Vasteras, Sweden. 2014.
- K.-Y. Liao, A.-F. Lin, J. C.-M. Li, M. S. Hsiao, and L.-T. Wang, "GPU-based timing-aware test generation for small delay defects," in Proceedings of the IEEE European Test Symposium, May 2014.
- K. Pabbuleti, D. Mane, P. Schaumont, "Energy Budget Analysis for Signature Protocols on a Self-Powered Wireless Sensor Node," 10th Workshop on RFID Security (RFIDSec 2014), Oxford, UK, July 2014.
- J. Park, J. Reed, A. A. L. Beex, T. C. Clancy, V. Kumar, and B. Bahrak, “Security and enforcement in spectrum sharing (invited paper),” Proceedings of the IEEE, Vol. 102, Issue 3, 2014, pp. 270–281.
- S. Prabhu, V. V. Acharya, S. Bagri and M. S. Hsiao, "Property-checking based LBIST for improved diagnosability," in Proceedings of the IEEE European Test Symposium, May 2014.
- S. Prabhu, V. V. Acharya, S. Bagri, and M. S. Hsiao, "A diagnosis-friendly LBIST architecture with property checking", in Proceedings of the IEEE International Test Conference, October 2014.
- A. Sarkar, A. L. Abbott, and Z. Doerzaph, “Assessment of Psychophysiological Characteristics Using Heart Rate from Naturalistic Face Video Data,” *Proceedings: International Joint Conference on Biometrics (IJCB 2014),* Clearwater, FL, Sept. 2014.

- E. Wozniak, M. Di Natale, H. Zeng, C. Mraidha, S. Tucci-Piergiovanni, and S. Gerard. "Assigning Time Budgets to Component Functions in the Design of Time-Critical Automotive Systems" *29th IEEE/ACM International Conference on Automated Software Engineering (ASE),* September 2014.
- Y. Xu, I. Kim, P. Schaumont, "Adaptive Bayes sum test for the equality of two nonparametric functions," Journal of Applied Statistics, 41(12), 2639-2657.
- A. E. Youssef, A. S. Ibrahim, and A. L. Abbott, "Automated Gender Identification for Arabic and English Handwriting," *Proceedings: Fifth International Conference on Imaging for Crime Detection and Prevention* (ICDP-13), London, UK, Dec. 2013. ***Best poster award***
- J. Zhang, Y. Yang, "Hardware-Software Co-design for Heterogeneous Multiprocessor Sensor Nodes", IEEE Globecom 2014.
- J. Zhang, Z. Pan, P. Schaumont, and Y. Yang, "Application Design and Performance Evaluation For Multiprocessor Sensor Nodes", WCNC 2014.
- L. Zhang and C. Wang. "Runtime prevention of concurrency related type-state violations in multithreaded applications," International Symposium on Software Testing and Analysis (ISSTA'14). San Jose, CA. 2014.
- H. Zeng and M. Di Natale. "Computing periodic request functions to speed-up the analysis of non-cyclic task models." *Real-Time Systems Journal*, to appear.
- H. Zeng, M. Di Natale, and Q. Zhu. "Minimizing Stack and Communication Memory Usage in Real-time Embedded Applications." *ACM Transactions on Embedded Computing Systems (TECS)* 13(5s): 1-25, July 2014.
- K. Zeng, S. K. Ramesh and Y. Yang, "Location Spoofing Attack and Its Countermeasures in Database-Driven Cognitive Radio Networks," 2014 IEEE Conference on Communications and Network Security (CNS), October 2014.
- K. Zeng, S. K. Ramesh and Y. Yang. "Location Robustness in Database-Driven White Spaces Network", Proceedings of the 2014 IEEE Symposium on Dynamic Spectrum Access Networks (Dyspan), April 2014, pp. 354-357.