Sixth Annual
Cyber-Physical Systems
Principal Investigators' Meeting

November 16-17, 2015
Renaissance Arlington Capital View Hotel
Arlington, Virginia

cps-vo.org/group/cps-pimtg15

The Sixth Annual

NSF Cyber-Physical Systems Principal Investigators' Meeting

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Arlington, Virginia, USA | November 16-17, 2015

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NSF Sponsors:
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Program Organizers:
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Dear CPS Community Members:

The 2015 Cyber-Physical Systems (CPS) Principal Investigators' (PI) Meeting marks the sixth annual gathering of our community, and as we approach ten years since the beginning of the CPS program, it offers an opportunity for us to both reflect on past accomplishments and plan for future growth.

The CPS program has evolved tremendously since its inception, embracing new areas of core science and technology in concert with meeting the demands of an ever-growing set of application domains. CPS research will figure prominently in enabling future Smart and Connected Communities (S&CC), manufacturing, transportation, healthcare, autonomous systems, and the burgeoning Internet of Things (IoT). Considerations of the human element are more important than ever, and addressing issues of dependability, security, privacy, and safety will be central to creating a world where our quality of life is dramatically enhanced by cyber-physical systems.

We have an engaging two day agenda. The first day will feature a keynote address by Dan Correa, Senior Advisor on Innovation Policy from the White House Office of Science and Technology Policy. Dan will provide a vision for Smart and Connected Communities. On the second day, Dr. Ethan Jackson of Microsoft Research will present a highly creative new project called "Premonition," which integrates Unmanned Air Vehicles with a CPS software stack to trace the flow of infectious diseases. Project Premonition is being developed through a partnership between Microsoft Research, academic teams, and IARPA.

Throughout the PI meeting we will emphasize our future vision of the CPS program. We will also present details on the transformation of the CPS Virtual Organization (CPS VO) from an information repository into an active destination for facilitating collaboration and research across the community, serving as an essential hub in addressing the grand challenges of the future.

The heart of the CPS program is its community, and this year's PI Meeting agenda is built to reflect that. The main part of the agenda has been turned over to you all – our CPS Principal Investigators. The talks span a diversity of technologies and application domains; some of these projects are just starting while others are well into the research activities and have exciting results to share. There will be great opportunities to network with our research community and see the progress being made through poster sessions and demonstrations.
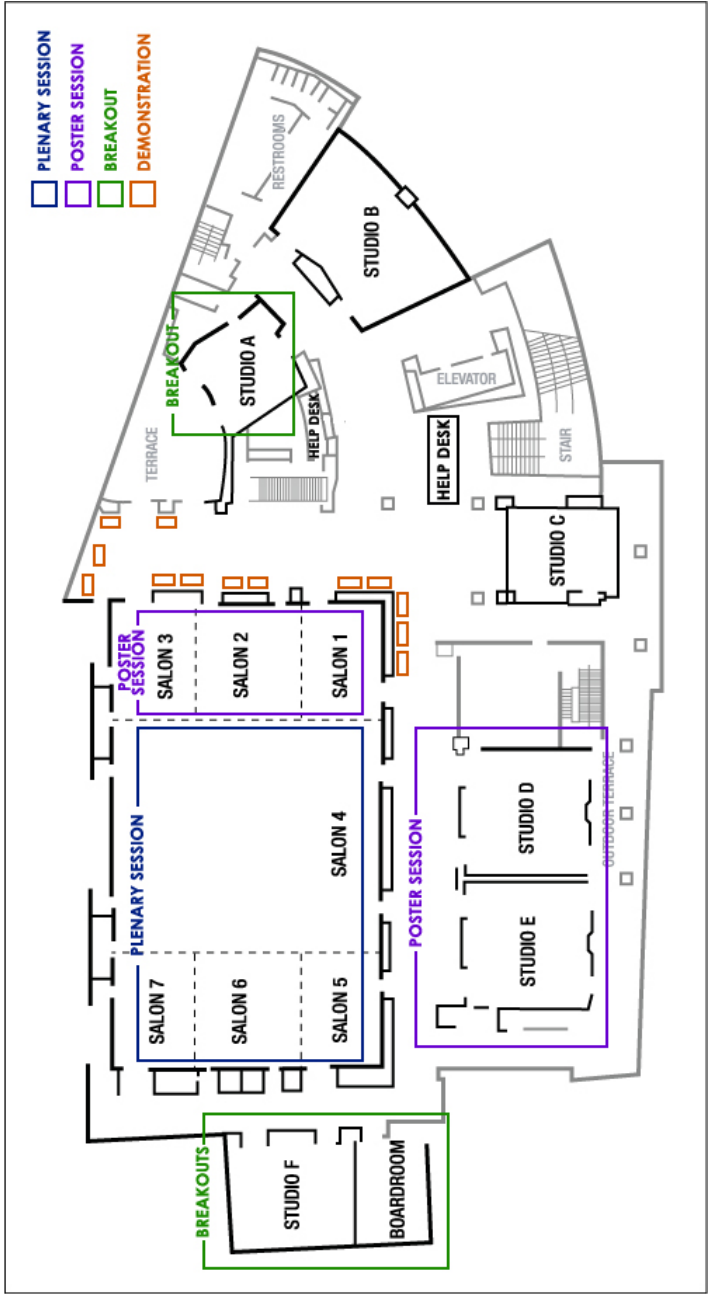
We are pleased to acknowledge the contributions of all of our Federal agency partners (U.S. Department of Homeland Security, U.S. Department of Transportation, National Aeronautics and Space Administration, National Institutes of Health, and the National Institute of Standards and Technology) to the CPS program. Furthermore, we are energized to witness the continued growth of collaborations spanning government, academia, and industry. These partnerships will be central to the future of CPS as the program continues to advance transformative impacts that will benefit society for decades to come.

Sincerely,
The NSF CPS Team

2015 NSF CPS PI MEETING – PROGRAM LAYOUT

Renaissance Arlington Capital View
2nd Floor

Legend:
- PLENARY SESSION
- POSTER SESSION
- BREAKOUT
- DEMONSTRATION

Rooms shown: RESTROOMS, STUDIO B, STUDIO A, BREAKOUT, HELP DESK, ELEVATOR, HELP DESK, STAIR, TERRACE, STUDIO C, POSTER SESSION, SALON 3, SALON 2, SALON 1, PLENARY SESSION, SALON 4, SALON 7, SALON 6, SALON 5, POSTER SESSION, STUDIO D, STUDIO E, OUTDOOR TERRACE, BREAKOUTS, STUDIO F, BOARDROOM

PROGRAM
AGENDA

Sunday, November 15

6:00 p.m. – 9:00 p.m.   **Early Registration**   *[Registration Table in Foyer]*

Monday, November 16

7:30 a.m. – 5:00 p.m.   **Registration**   *[Registration Desk in Foyer]*

7:30 a.m. – 8:30 a.m.   **Continental Breakfast**   *[Foyer and Hallways]*

8:00 a.m. – 5:00 p.m.   **CPS VO Help Desk**   *[Foyer]*

8:30 a.m. – 8:50 a.m.   **NSF Welcome and Introduction**   *[Salons 4-7]*
James Kurose - AD CISE (NSF)
Pramod Khargonekar - AD ENG (NSF)
David Corman (NSF)

8:50 a.m. – 9:20 a.m.   **SESSION 1: Keynote**   *[Salons 4-7]*
Session Chair – David Corman (NSF)

8:50 a.m. – 9:20 a.m.   **Smart and Connected Communities**
Dan Correa (OSTP)

9:20 a.m. – 11:20 a.m.   **SESSION 2: CPS & Smart and Connected Communities**   *[Salons 4-7]*
Session Chair – Gurdip Singh (NSF)

9:20 a.m. – 9:35 a.m.   **Prototyping a Scalable and Evolvable Urban Sensing Platform for Smart Cities**
Rajesh Sankaran (ANL)
Charlie Catlett (Chicago)

9:35 a.m. – 9:50 a.m.   **Exploring Resilience in Smart City Water Infrastructure**
Nalini Venkatasubramanian (UC-Irvine)

9:50 a.m. – 10:05 a.m.   **Autonomy-Enabled Shared Vehicles for Mobility on Demand and Urban Logistics**
Sertac Karaman (MIT)

10:05 a.m. – 10:20 a.m.   **BREAK**   *[Foyer and Hallways]*

10:20 a.m. – 10:35 a.m.	**Population Analytics Through a WiFi-Based Edge Computing Platform**
	Suman Banerjee (Wisconsin)

10:35 a.m. – 10:50 a.m.	**Fingerprinting for Internet of Things Authentication: Accelerating IoT Research and Education Under the Global City Teams Challenge**
	Walid Saad (VA Tech)

10:50 a.m. – 11:05 a.m.	**Advanced Peak Demand Forecast and Battery Dispatch Algorithms to Integrate Storage-Based Demand Response with Building Automation Systems**
	Christoph Meinrenken (Columbia)

11:05 a.m. – 11:20 a.m.	**Transit Hub: An Extensible and Smart Decision Support System for Public Transportation**
	Abhishek Dubey (Vanderbilt)

11:20 a.m. – 1:50 p.m.	**SESSION 3: Working Lunch 2014-2015 CPS Program Activities/Frontiers Panel**	*[Salons 4-7]*
	Session Chair – Sankar Basu (NSF)	

11:20 a.m. – 11:35 a.m.	**BioCPS for Engineering Living Cells**
	Calin Belta (Boston)
	Vijay Kumar (UPenn)
	Ron Weiss (MIT)

11:35 a.m. – 11:50 a.m.	**Compositional, Approximate, and Quantitative Reasoning for Medical Cyber-Physical Systems**
	Scott Smolka (SUNY-Stony Brook)
	Rahul Mangharam (UPenn)
	Rance Cleaveland (Maryland)
	Arnab Ray (Fraunhofer CESE)
	Edmund Clarke (Carnegie Mellon)
	Elizabeth Cherry (Rochester)
	Flavio Fenton (GA Tech)

11:50 a.m. – 12:10 p.m. | **ROSELINE**
Mani Srivastava (UCLA)
Anthony Rowe (Carnegie Mellon)
Joao Hespanha (UCSB)
Rajesh Gupta (UCSD)

12:10 p.m. – 12:30 p.m. | **LUNCH PICK-UP** *[Foyer and Hallways]*

12:30 p.m. – 12:50 p.m. | **FORCES**
S. Shankar Sastry (UC-Berkeley)
Saurabh Amin (MIT)
Xenofon Koutsoukos (Vanderbilt)
Demosthenis Teneketzis (Michigan)

12:50 p.m. – 1:10 p.m. | **Correct-by-Design Control Software Synthesis for Highly Dynamic Systems**
Jesse Grizzle (Michigan)
Hartmut Geyer (Carnegie Mellon)
Aaron Ames (GA Tech)
Paulo Tabuada (UCLA)

1:10 p.m. – 1:30 p.m. | **Science of Integration**
Janos Sztipanovits (Vanderbilt)
Shige Wang (GM)
John Baras (Maryland)
Panos Antsaklis (Notre Dame)
Xenofon Koutsoukos (Vanderbilt)

1:30 p.m. – 1:50 p.m. | **Panel: What Makes a Good Frontiers Project and Lessons Learned**

1:50 p.m. – 3:50 p.m. | **SESSION 4:** *[Salons 4-7]*
PI Reports and Academic Panel
Session Chair – Anindya Banerjee (NSF)

DHS and CPS Security Projects:

1:50 p.m. – 2:05 p.m. | **High-Fidelity, Scalable, Open-Access Cyber Security Testbed for Accelerating Smart Grid Innovations and Deployments**
Mani Govindarasu (Iowa State)

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2:05 p.m. – 2:20 p.m.	**A Verifiable Framework for Cyber-Physical Attacks and Countermeasures in a Resilient Electric Power Grid** *Lalitha Sankar (Arizona State)*
2:20 p.m. – 2:35 p.m.	**Security of Distributed Cyber-Physical Systems with Connected Vehicle Applications** *Pierluigi Pisu (Clemson)*
2:35 p.m. – 2:50 p.m.	**BREAK** *[Foyer and Hallways]*
2:50 p.m. – 3:05 p.m.	**CPS-Security: End-to-End Security for the Internet of Things** *Prabal Dutta (Michigan)* *Philip Levis (Stanford)* *Björn Hartmann (UC-Berkeley)*
3:05 p.m. – 3:20 p.m.	**Security and Privacy-Aware Cyber-Physical Systems** *Insup Lee (UPenn)* *Miroslav Pajic (Duke)* *Kang Shin (Michigan)*
3:20 p.m. – 3:35 p.m.	**Secure Perception for Autonomous Systems** *Todd Humphreys (UT-Austin)*
3:35 p.m. – 3:50 p.m.	**Distributed Just-Ahead-Of-Time Verification of Cyber-Physical Critical Infrastructures** *Saman Aliari Zonouz (Rutgers)* *Katherine Davis (UIUC)*
3:50 p.m. – 5:05 p.m.	**SESSION 5: CPS Projects** *[Salons 4-7]* *Session Chair – Sylvia Spengler (NSF)*
3:50 p.m. – 4:05 p.m.	**21st Century CPS Education** *Jack Stankovic (UVA)*

4:05 p.m. – 4:20 p.m.	**Enabling the Usage of Multicore Platforms in Real-Time Safety-Critical Systems**
	James Anderson (UNC-Chapel Hill)
	Frank Mueller (NCSU)
4:20 p.m. – 4:35 p.m.	**Triggered Control of Cyber-Physical Systems with Communication Channel Constraints**
	Massimo Franceschetti (UCSD)
4:35 p.m. – 4:50 p.m.	**Human-Machine Interaction with Mobility Enhancing Soft Exosuits**
	Conor Walsh (Harvard)
4:50 p.m. – 5:05 p.m.	**A Signal-Aware-Based Low-Power, Fully Human Implantable Brain-Computer Interface System to Restore Walking after Spinal Cord Injury**
	An Do (UC-Irvine)
	Payam Heydari (UC-Irvine)
	Zoran Nenadic (UC-Irvine)
	Charles Liu (USC)
5:05 p.m. – 5:15 p.m.	**WRAP-UP** *[Salons 4-7]*

| 5:15 p.m. – 6:45 p.m. | **SESSION 6:** *[Studios D & E, Salons 1-3, & Foyer/Hallway]* **Refreshments + Poster Session + Demonstration Session (Show & Tell)** |
| | *Session Chair: Zachary Hayden (NSF)* |

| 6:45 p.m. | **End of Day One Sessions** |

Tuesday, November 17

7:00 a.m. – 5:00 p.m.	**Registration**	*[Registration Desk in Foyer]*
7:00 a.m. – 8:00 a.m.	**Continental Breakfast**	*[Foyer and Hallways]*
8:00 a.m. – 5:00 p.m.	**CPS VO Help Desk**	*[Foyer]*

8:00 a.m. – 8:10 a.m. **Opening Remarks**
Erwin Gianchandani (NSF)
Peter Arzberger (NSF)
David Corman (NSF)

8:10 a.m. – 8:50 a.m. **SESSION 7: Special Topics** *[Salons 4-7]*
Session Chair – David Corman (NSF)

8:10 a.m. – 8:30 a.m. **Short Talk on Food, Energy, Water Solicitation**
Thomas Torgersen (NSF)

8:30 a.m. – 8:50 a.m. **Accessible Remote Testbeds Workshop Summary**
Radhakishan Baheti (NSF)
Magnus Egerstedt (GA Tech)

8:50 a.m. – 9:35 a.m. **SESSION 8: Plenary Session Talk** *[Salons 4-7]*
Session Chair – Radhakishan Baheti (NSF)

8:50 a.m. – 9:35 a.m. **Premonition Project**
Ethan Jackson (Microsoft Research)

9:35 a.m. – 9:50 a.m **BREAK** *[Foyer and Hallways]*

9:50 a.m. – 11:05 a.m.	**SESSION 9: PI Reports**	*[Salons 4-7]*
	Session Chair – David Corman (NSF)	

**Cyber Manufacturing Projects
(new and continuing):**

9:50 a.m. – 10:05 a.m. **Converting Multi-Axis Machine Tools into Subtractive 3D Printers by Using Intelligent Discrete Geometry Data Structures Designed for Parallel and Distributed Computing**
Thomas Kurfess (GA Tech)

10:05 a.m. – 10:20 a.m. **Securing Manufacturing Systems**
Jaime Camelio (VA Tech)
Jules White (Vanderbilt)
Robert Parker (VA Tech)

10:20 a.m. – 10:35 a.m. **Foundations of Cyber-Physical Infrastructure for Creative Design and Making of Cyber-Physical Products**
Karthik Ramani (Purdue)

10:35 a.m. – 10:45 a.m. **Design of an Agile and Smart Manufacturing Exchange: Enabling Small Businesses Through Standardized Protocols and Distributed Optimization**
Krishnendu Chakrabarty (Duke)

10:45 a.m. – 10:55 a.m. **Enabling Production as a Service**
Kira Barton (Michigan)

10:55 a.m. – 11:05 a.m. **Software/Hardware Combined Acceleration for 3D Printing in Mass Customization**
Wenyao Xu (SUNY-Buffalo)

11:05 a.m. – 12:35 p.m.	**SESSION 10: PI Reports**	*[Salons 4-7]*
	Session Chair – Gurdip Singh (NSF)	

11:05 a.m. – 11:20 a.m.	**In-Silico Functional Verification of Artificial Pancreas Control Algorithms**
	Sriram Sankaranarayanan (Colorado at Boulder)
	Fraser Cameron (RPI)

11:20 a.m. – 11: 35 a.m.	**A Fractal Calculus Approach to the Modeling and Optimization of Medical Cyber-Physical Systems**
	Paul Bogdan (USC)

11:35 a.m. – 11:50 a.m.	**Towards Effective and Efficient Sensing-Motion Co-Design of Swarming Cyber-Physical Systems**
	Wencen Wu (RPI)
	Zhi Sun (SUNY-Buffalo)
	Pu Wang (Wichita State)

11:50 a.m. – 12:05 p.m.	**Engineering Safety-Critical Cyber-Physical-Human Systems**
	Alex Kirlik (UIUC)
	Xiaofeng Wang (South Carolina at Columbia)

12:05 p.m. – 12:20 p.m.	**Coordinated Resource Management of Cyber-Physical-Social Power Systems**
	Duncan Callaway (UC-Berkeley)
	John Harris (Florida)
	Eilyan Bitar (Cornell)

12:20 p.m. – 12:35 p.m.	**Distributed Asynchronous Algorithms and Software Systems for Wide-Area Monitoring of Power Systems**
	Yufeng Xin (RENCI, UNC-Chapel Hill)
	Nitin Vaidya (UIUC)
	Aranya Chakrabortty (NCSU)

12:35 p.m. – 2:30 p.m.	**SESSION 11: Working Lunch and Poster & Demonstration (Show & Tell) Sessions** *Session Chair – Phil Regalia (NSF)*
12:35 p.m. – 1:00 p.m.	**LUNCH PICK-UP** *[Foyer and Hallways]*
1:00 p.m. – 2:30 p.m.	**Poster Session + Demonstration Session (Show & Tell)** *[Studios D & E, Salons 1-3, and Foyer/Hallway]*
2:30 p.m.-3:55 p.m.	**SESSION 12: Transportation CPS** *[Salons 4-7]* *Session Chair – Kevin Dopart (DOT ITS/JPO)*
2:30 p.m. – 2:50 p.m.	**Center for Autonomous Transportation Systems** *Raj Rajkumar (Carnegie Mellon)*
2:50 p.m. – 3:05 p.m.	**Efficient Traffic Management: A Formal Methods Approach** *Murat Arcak (UC-Berkeley)* *Calin Belta (Boston)*
3:05 p.m. – 3:20 p.m.	**Collaborative Vehicular Systems** *Ümit Özgüner (Ohio State)* *Georgios Fainekos (Arizona State)*
3:20 p.m. – 3:35 p.m.	**Control of Vehicular Traffic Flow Via Low Density Autonomous Vehicles** *Dan Work (UIUC)* *Jonathan Sprinkle (Arizona State)* *Benjamin Seibold (Temple)*
3:35 p.m. – 3:55 p.m.	**Overview of Connected Vehicle and Automation Programs** *Kevin Dopart (DOT ITS/JPO)*
3:55 p.m. – 4:10 p.m.	**BREAK** *[Foyer and Hallways]*

4:10 p.m. – 5:00 p.m.	**SESSION 13:** **Evolving CPS Program** *Session Chair – David Corman (NSF)*	*[Salons 4-7]*

4:10 p.m. – 5:00 p.m.	**New CPS Thrusts**	
	Smart and Connected Communities DCL	
	New Visions of the CPS VO *Janos Sztipanovits (Vanderbilt)*	
	Panel Discussion: Solved CPS problems – What have we made progress on in our 10th year of CPS research, what are successes, and what are new emerging challenges?	
5:00 p.m. – 5:10 p.m.	**CLOSING** *David Corman (NSF)*	*[Salons 4-7]*
5:10 p.m.	**2015 CPS PI Meeting Adjourned**	

SPEAKER BIOGRAPHIES
in order of program

Monday, November 16

8:30 a.m. – 8:50 a.m.   Welcome and Opening Remarks

Jim Kurose is the Assistant Director of the National Science Foundation (NSF) for Computer and Information Science and Engineering (CISE). He leads the CISE Directorate, with an annual budget of more than $900 million, in its mission to uphold the nation's leadership in scientific discovery and engineering innovation through its support of fundamental research in computer and information science and engineering, state-of-the-art cyberinfrastructure, and education and workforce development. Dr. Kurose is on leave from the University of Massachusetts, Amherst (UMass Amherst), where he has served as Distinguished Professor at the School of Computer Science since 2004. He has also served in a number of administrative roles at UMass and has been a Visiting Scientist at IBM Research; INRIA; Institut EURECOM; the University of Paris; the Laboratory for Information, Network and Communication Sciences; and Technicolor Research Labs. His research interests include network protocols and architecture, network measurement, sensor networks, multimedia communication, and modeling and performance evaluation. Dr. Kurose has served on many national and international advisory boards and panels and has received numerous awards for his research and teaching. With Keith Ross, he is the co-author of the textbook, Computer Networking, a top down approach (6th edition) published by Addison-Wesley/Pearson. Dr. Kurose received his Ph.D. in computer science from Columbia University and a Bachelor of Arts degree in physics from Wesleyan University. He is a Fellow of the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronic Engineers (IEEE).

Pramod Khargonekar was appointed by the National Science Foundation (NSF) to serve as Assistant Director for the Directorate of Engineering (ENG) in March 2013. In this position, Khargonekar leads the ENG Directorate with an annual budget of more than $890 million. Khargonekar received B. Tech. Degree in electrical engineering from the Indian Institute of Technology, Bombay, India, in 1977, and M.S. degree in mathematics and Ph.D. degree in electrical engineering from the University of Florida in 1980 and 1981, respectively. He has held faculty positions at the University of Florida, University of Minnesota, and The University of Michigan. He was Chairman of the Department of Electrical Engineering and Computer Science from 1997 to 2001 and also held the position of Claude E. Shannon Professor of Engineering Science at The University of Michigan. From 2001 to 2009, he was Dean of the College of Engineering at the University of Florida and is currently Eckis Professor of Electrical and Computer Engineering there.

8:50 a.m. – 9:20 a.m.   SESSION 1: Keynotes

Session Chair: David Corman (NSF)

David Corman is a Program Director and leader of the Cyber-Physical Systems program at the National Science Foundation. Dr. Corman is a Research Associate Professor at Washington University St. Louis in the Department of Electrical and Systems Engineering. Dr. Corman has a broad range of research interests spanning many technologies fundamental to CPS application areas including transportation, energy, medical devices, and manufacturing. Dr. Corman has extensive industrial experience in the development, design, and manufacture of CPS systems. Dr. Corman received the Ph.D. degree in electrical engineering from the University of Maryland.

Dan Correa is Senior Advisor for Innovation Policy at the White House Office of Science and Technology Policy, where his work focuses on a range of innovation issues, including entrepreneurship, government innovation, and smart cities. Prior to working at the White House, Correa served as an analyst at the Information Technology and Innovation Foundation, a Washington, D.C. think tank, where he authored reports on innovation, entrepreneurship, and broadband policy, which have been cited in publications including The Atlantic, The New York Times, and The Washington Post. Correa has also consulted for the Connecticut Technology Council on state entrepreneurship policies and technology-based economic development, and worked on several political campaigns. Correa is a graduate of Yale Law School, holds an M.A. in Economics from Yale University, and a B.A. from Dartmouth College. At Yale Law School he served as a Kauffman Fellow in Law, Economics and Entrepreneurship.

9:20 a.m. – 11:20 a.m.   SESSION 2: CPS & Smart and Connected Communities
Session Chair – Gurdip Singh (NSF)

Gurdip Singh is a Program Director in the Division of Computer and Network Systems in the CISE Directorate at National Science Foundation. Within the Division of Computer and Network Systems, he works with the Cyber-Physical Systems and Computer Systems Research program. He is also a Professor of Computing and Information Sciences (CIS) at Kansas State University. From 2009 and 2014, he was the Head of CIS Department at Kansas State University. His research interests include real-time embedded systems, sensor networks, network protocols and distributed computing. His research has been funded by NSF, ARO, DARPA and Lockheed Martin. He has been involved in developing software tools to design large-scale, distributed safety critical systems. He is working on developing methodologies and tools for building integrated sensor systems and analysis tools for automated optimization of distributed middleware.

Rajesh Sankaran is an Assistant Scientist in the Mathematics and Computer Science division at Argonne National Laboratory. He co-leads the research, engineering and design efforts in the Waggle and Array of Things projects at Argonne. With over a decade of experience in Embedded Systems research, his current focus is on Attentive Sensing, Embedded Computing Systems, Sensor Driven Computation and Computationally Steered Sensing. Rajesh collaborates closely with environmental, urban, high-performance computing, and weather/climate researchers. He received his Ph.D. in Electrical and Computer Engineering from Louisiana State University in 2011.

Nalini Venkatasubramanian is currently a Professor in the School of Information and Computer Science at the University of California Irvine. She has had significant research and industry experience in the areas of distributed systems, adaptive middleware, pervasive and mobile computing, cyberphysical systems, distributed multimedia and formal methods and has over 200 publications in these areas. As a key member of the Center for Emergency Response Technologies at UC Irvine, Nalini's recent research has focused on enabling resilient, sustainable and scalable observation and analysis of situational information from multimodal input sources; dynamic adaptation of the underlying systems to enable information flow under massive failures and the dissemination of rich notifications to members of the public at large. She is the recipient of the prestigious NSF Career Award, multiple Undergraduate Teaching Excellence Awards and best paper awards. Prof. Venkatasubramanian has served in numerous program and organizing committees of conferences on middleware, distributed systems and multimedia and on

the editorial boards of journals. She received and M.S and Ph.D in Computer Science from the University of Illinois in Urbana-Champaign. Her research is supported both by government and industrial sources such as NSF, DHS, ONR, DARPA, Novell, Hewlett-Packard and Nokia. Prior to arriving at UC Irvine, Nalini was a Research Staff Member at the Hewlett-Packard Laboratories in Palo Alto, California.

Sertac Karaman received his Ph.D. in Computer Science from Brown University in 1983 is the Charles Stark Draper Assistant Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology (since Fall 2012). He has obtained B.S. degrees in mechanical engineering and and in computer engineering from the Istanbul Technical University, Turkey, in 2007, an S.M. degree in mechanical engineering from MIT in 2009, and a Ph.D. degree in electrical engineering and computer science also from MIT in 2012. His research interests lie in the broad areas of robotics and control theory. In particular, he studies the applications of probability theory, stochastic processes, stochastic geometry, formal methods, and optimization for the design and analysis of high-performance cyber-physical systems.

Suman Banerjee has strong expertise in various aspects of designing mobile and wireless systems. He has published more than 100 papers on related topics in leading technical conferences and journals. He is the winner of several award papers from these conferences including from ACM MobiCom, ACM CoNEXT, and IEEE Dyspan. He has published various papers on vehicular systems, the Internet of Things, and wireless systems in general in conferences such as ACM MobiSys, ACM MobiCom, ACM Sigcomm, NSDI, ACM CoNEXT, SOSP, IEEE Infocom, ACM IMC, and many more. Research results of Prof. Banerjee has also seen success beyond technical publications. For instance, his research results have won awards at the Interdigital Innovation Challenge and at the Wisconsin Governor's Business Plan Competition. Prof. Banerjee is a recipient of the inaugural ACM SIGMOBILE Rockstar award for early career achievement in the field of mobile and wireless systems. He has served as the technical program chair of multiple leading conferences in the field including ACM MobiCom, IEEE SECON, and more. He is currently serving as the chair of ACM SIGMOBILE.
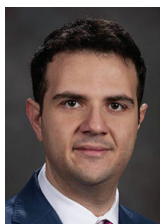
Walid Saad (S'07, M'10, SM'15) received his Ph.D. degree from the University of Oslo in 2010. Currently, he is an Assistant Professor at the Bradley Department of Electrical and Computer Engineering at Virginia Tech, where he leads the Network Science, Wireless, and Security (NetSciWiS) laboratory. His research interests include wireless and social networks, game theory, cybersecurity, and cyber-physical systems. Dr. Saad is the recipient of the NSF CAREER award in 2013, the AFOSR summer faculty fellowship in 2014, and the Young Investigator Award from the Office of Naval Research (ONR) in 2015.

He was the author/co-author of four conference best paper awards at WiOpt in 2009, ICIMP in 2010, IEEE WCNC in 2012, and IEEE PIMRC in 2015. He is the recipient of the 2015 Fred W. Ellersick Prize from the IEEE Communications Society. Dr. Saad serves as an editor for the IEEE Transactions on Wireless Communications, IEEE Transactions on Communications, and IEEE Transactions on Information Forensics and Security.

Christoph Meinrenken is an adjunct assistant professor in Columbia University's Department of Earth and Environmental Engineering, associate research scientist at the Earth Institute, and affiliate of the Foundations of Data Science Center at Columbia University's Data Science Institute. His research focuses on computer modeling to elucidate and improve the technological and economic performance of low carbon energy systems. Recent and current research projects include electricity arbitrage in smart buildings (NSF, NYSERDA, NIST), electrification of the transportation sector, synthetic fuels (ABB, Electricity de France), and automated product carbon footprinting (PepsiCo Inc.). Before joining Columbia, Meinrenken worked on modeling molecular spectra (M.S.E., Princeton University, 1996) and computational neuroscience (Ph.D. Physics, Max Planck Institute, 2001). In addition to academic research and teaching, Meinrenken spent several years in the private sector, specializing in financial engineering and risk management.

Abhishek Dubey is a Research Scientist at the Institute for Software Integrated Systems and an Adjunct Assistant Professor in the Computer Science department at Vanderbilt University. His research interests include tools, platforms and analytical techniques required for dynamic and resilient cyber-physical platforms. Abhishek completed his Ph.D. in Electrical Engineering from Vanderbilt University in 2009. He received his M.S. in Electrical Engineering from Vanderbilt University in August 2005 and completed his undergraduate studies in electrical engineering from the Indian Institute of Technology, Banaras Hindu University, India in May 2001. He is a senior member of IEEE.

11:20 a.m.–1:50 p.m. **SESSION 3: Working Lunch/2014 -2015 CPS Program Activities/Frontiers Panel**

Session Chair – Sankar Basu (NSF)

Sankar Basu a permanent member of NSF scientific staff and is a program Director. He came to NSF from the IBM T. J. Watson Research Center at the beginning of fiscal year 2003. After receiving a Ph.D. from the University of Pittsburgh he served on the faculty of Stevens Institute of Technology, where he taught and conducted funded research (Air Force, NSF), and for a brief period was with the Naval Underwater Systems Center, CT as a visiting senior scientist. He has visited the Ruhr University, Bochum, Germany as an Alexander von

Humboldt fellow, and the MIT Laboratory for Information and Decision Systems (LIDS) for extended periods. During the summer of 2012 he was a science advisor to the US Embassy in Berlin, Germany as a State Department Embassy Science Fellow. At NSF his primary responsibilities include Design automation for Micro and Nano-systems, which includes nano-computing architectures, VLSI CAD, Cyber-Physical Systems (CPS) etc. In addition, he participates in interdisciplinary NSF program on the National Nanotechnology Initiative (NNI), and in the past has participated in the Interactions between Mathematics and Computer Science (MCS), Science of Learning Centers (SLC) Program and the Information Technology Research (ITR) program.

Calin Belta is a Professor in the Department of Mechanical Engineering, Department of Electrical and Computer Engineering, and the Division of Systems Engineering at Boston University, where he is also affiliated with the Center for Information and Systems Engineering (CISE) and the Bioinformatics Program. His research focuses on dynamics and control theory, with particular emphasis on hybrid and cyber-physical systems, formal synthesis and verification, and applications in robotics and systems biology. Calin Belta is a Senior Member of the IEEE and an Associate Editor for the SIAM Journal on Control and Optimization (SICON) and the IEEE Transactions on Automatic Control. He received the Air Force Office of Scientific Research Young Investigator Award and the National Science Foundation CAREER Award.

Scott Smolka is a Professor of Computer Science at Stony Brook University. His research interests include model checking, runtime verification, and the modeling and analysis of cardiac tissue. He is the Lead PI for the newly awarded multi-institutional NSF CPS Frontiers project on CyberCardia: Compositional, Approximate, and Quantitative Reasoning for Medical Cyber-Physical Systems. He is perhaps best known for the algorithm he and Paris Kanellakis invented for deciding bisimulation. Smolka's research has resulted in more than 160 publications, generating more than 7,300 citations. He has also been PI/Co-PI on grants totaling more than $22M.

Mani Srivastava received both the M.S. and Ph.D. degrees from the University of California, Berkeley, in 1987 and 1992, respectively. His graduate research was on silicon compilation, and hardware-software rapid prototyping and co-design of embedded VLSI systems for signal processing and control applications. Prior to joining the UCLA Electrical Engineering Department faculty in 1996, Dr. Srivastava worked on mobile and wireless multimedia networking at the Networked Computing Research Department at AT&T/Lucent Bell Labs at Murray Hill, NJ. At UCLA, Prof. Srivastava directs the Networked and Embedded Systems Laboratory, where his students work on diverse aspects of embedded and cyber-physical systems, distributed sensing, mobile computing, wireless

networking, and pervasive communications. His research spans hardware, software, and algorithms, and emphasizes experimental systems and applications in domains such as mobile health, sustainability, participatory sensing, and defense. His group draws upon graduate and undergraduate student researchers from both Electrical Engineering and Computer Science. Ph.D. and post-doctoral alumni from his group currently hold successful positions at top academic and industrial research institutions such as Purdue, Utah, Yale, ETH Zurich, Microsoft Research, and IBM Research. Prof. Srivastava has published extensively on his research with more than 240 papers many of which have been highly cited, holds five patents for his work on low-power and wireless networking, and has received many awards from top conferences.

S. Shankar Sastry is currently the Dean of Engineering at University of California, Berkeley and the faculty director of the Blum Center for Developing Economies. From 2004 to 2007 he was the Director of CITRIS (Center for Information Technology in the Interests of Society) an interdisciplinary center spanning UC Berkeley, Davis, Merced and Santa Cruz. He has served as Chairman, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley from January, 2001 through June 2004. From 1999-early 2001, he was on leave from Berkeley as Director of the Information Technology Office at the Defense Advanced Research Projects Agency (DARPA). From 1996-1999, he was the Director of the Electronics Research Laboratory at Berkeley. Dr. Sastry received his Ph.D. degree in 1981 from the University of California, Berkeley. He was on the faculty of MIT as Asst. Professor from 1980-82 and Harvard University as a chaired Gordon McKay professor in 1994. His areas of personal research are resilient network control systems, cybersecurity, autonomous and unmanned systems (especially aerial vehicles), computer vision, nonlinear and adaptive control, control of hybrid and embedded systems, and software. Most recently he has been concerned with critical infrastructure protection, in the context of establishing a ten year NSF Science and Technology Center, TRUST (Team for Research in Ubiquitous Secure Technologies).

Jessy Grizzle received the Ph.D. in electrical engineering from The University of Texas at Austin in 1983 and in 1984 held an NSF-NATO Postdoctoral Fellowship in Science in Paris, France at the CNRS. Since September 1987, he has been with The University of Michigan, Ann Arbor, where he is the Jerry and Carol Levin Professor of Engineering and is a Professor of Electrical Engineering and Computer Science. His research interests have often focused on theoretical aspects of nonlinear systems and control, including geometric methods for continuous- and discrete-time systems, and observer design in discrete time. He has been a consultant in the automotive industry since 1986, where he jointly holds sixteen patents dealing with emissions reduction through improved controller design. His current interest in bipedal locomotion grew out of a sabbatical in Strasbourg, France. Prof. Grizzle was elected Fellow of the IEEE in 1997. His awards include: with K.L. Dobbins and J.A. Cook (Ford Motor Company), 1992 Paper of the Year Award from the IEEE Vehicular Technology Society; with G. Abba (Univ. of Metz, France) and F. Plestan (Ecole Centrale,

Nantes, France), the 2002 Axelby Award from the IEEE Control Systems Society; and with J. Sun (Univ. of Michigan) and J. Cook (Ford), the 2003 IEEE Control Systems Society Technology Award. He has served as Associate Editor for the Transactions on Automatic Control and Systems & Control Letters, Publications Chairman for the 1989 CDC, on the Control Systems Society's Board of Governors in 1997-1999, Associate Editor for Automatica 2002-2005, AACC Award Committee (2003-2005), and is currently a Senior Editor for the IEEE Transactions on Automatic Control.

Janos Sztipanovits is currently the E. Bronson Ingram Distinguished Professor of Engineering at Vanderbilt University and he also holds the Joe B. Wyatt Distinguished University Professor title in 2012/2013. He is founding director of the Institute for Software Integrated Systems (ISIS). His research areas are at the intersection of systems and computer science and engineering. His current research interest includes the foundation and applications of Model-Integrated Computing for the design of Cyber-Physical Systems. His other research contributions include structurally adaptive systems, autonomous systems, design space exploration and systems-security co-design technology. He was founding chair of the ACM Special Interest Group on Embedded Software (SIGBED). He served as program manager and acting deputy director of DARPA/ITO between 1999 and 2002 and he was member of the US Air Force Scientific Advisory Board between 2006–2010. He is member of the Academic Executive Board of Cyber-Physical Systems Virtual Organization and he is member of the national steering group. Dr. Sztipanovits was elected Fellow of the IEEE in 2000 and external member of the Hungarian Academy of Sciences in 2010. He won the National Prize in Hungary in 1985 and the Golden Ring of the Republic in 1982. He graduated (Summa Cum Laude) from the Technical University of Budapest in 1970 and received his doctorate from the Hungarian Academy of Sciences in 1980.

1:50 p.m. – 3:50 p.m.	SESSION 4: PI Reports and Academic Panel Session Chair – Anindya Banerjee (NSF)

Anindya Banerjee is a Program Director at the National Science Foundation in the CISE Directorate in the Division of Computing and Communication Foundations (CCF) where he focuses on the issues of Software and Hardware Foundations; Exploiting Parallelism for Scalability; Cyber-physical Systems; Research Experience for Undergraduates; CISE Research Initiation Initiatives. Banerjee's research interests span software security, software verification, probabilistic programming, semantics and logics of programs, abstract interpretation, program analysis and program transformation.

He received his Ph.D. from Kansas State University, USA, in 1995. After his Ph.D., Anindya was a postdoctoral researcher, first in the Labaratoire d'Informatique (LIX) of Ecole Polytechnique, Paris and subsequently at the University of Aarhus. He joined the IMDEA Software Institute in February 2009 as Full Professor. Immediately prior to this position, Anindya was Full Professor of Computing and Information Sciences at Kansas

State University, USA. He was an Academic Visitor in the Advanced Programming Tools group, IBM T. J. Watson Research Center in 2007 and a Visiting Researcher in the Programming Languages and Methodology group at Microsoft Research in 2007–2008. He was a recipient of the Career Award of the US National Science Foundation in 2001.

Manimaran Govindarasu is currently a Professor in the Dept. of Electrical and Computer Engineering at Iowa State University (ISU). He received his Ph.D. in Computer Science and Engineering from Indian Institute of Technology (IIT) Madras, India in 1998, and Masters in Computer Technology from IIT Delhi in 1994. His research expertise is in the areas of cyber-physical security of smart grid, cyber security, real-time systems, and QoS/overlay networks. He has published over 150 peer-reviewed research publications in international journals and conferences. He is co-author of the text "Resource Management in Real-Time Systems and Networks", MIT Press, 2001. He has given tutorials in reputed conferences, including IEEE Infocom 2004, IEEE ComSoc TutorialsNow (2004), and IEEE ISGT 2012. He serves in the editorial board of IEEE Trans. on Smart Grid, served as guest co-editor for several journal special issues (IEEE Power & Energy - Jan. 2012, IEEE Network, Journal Systems and Software, Journal of High Speed Networks), and served as workshops/symposium chair, technical program vice-chair, and session chair for several IEEE conferences. He serves as the chair of the Cyber Security Task Force at IEEE PES PSACE-CAMS and Chair of CAMS Subcommittee. He is a Fellow of the IEEE.

Lalitha Sankar received the B. Tech degree from the Indian Institute of Technology, Bombay, the M.S. degree from the University of Maryland, and the Ph.D. degree from Rutgers University. She is presently an Assistant Professor in the ECEE department at Arizona State University. Prior to this, she was an Associate Research Scholar at Princeton University. Following her doctorate, Dr. Sankar was a recipient of a three year Science and Technology Teaching Postdoctoral Fellowship from the Council on Science and Technology at Princeton University. Her research interests include information privacy and cyber-security in distributed and cyber-physical systems, network information theory and its applications to model and study large data systems. She received the NSF CAREER award in 2014.

Pierluigi Pisu is currently an Associate Professor with the Department of Automotive Engineering at Clemson University, Clemson, SC and he is part of the Clemson University International Center for Automotive Research (CU-ICAR) since July 2006. Dr. Pisu also holds a joint appointment with the Electrical and Computer Engineering Department at Clemson University. Dr. Pisu received is Ph.D. in Electrical and Computer Engineering from The Ohio State University in 2002. Prior to joining Clemson University, he was Senior Researcher at the Center for Automotive Research at The Ohio State University between 2003

and 2006. His research interests lie in the general areas of fault diagnosis and prognosis with application to vehicle electrical systems, batteries and fuel cells, energy management control of hybrid electric vehicles, vehicle systems optimization, and connected vehicle technologies. He is a member of the IEEE, ASME, SAE, and Associate Editor of the SAE Journal on Alternative Powertrains. Dr. Pisu holds two patents and has published over 70 papers in international journals and refereed conference proceedings.

Prabal Dutta is a Morris Wellman Faculty Development Associate Professor of Electrical Engineering and Computer Science at the University of Michigan. He is a systems builder who creates new technology to attack challenging societal problems. His work has yielded dozens of hardware and software systems, has won four best paper awards, has received several design awards, has been directly commercialized by a dozen companies and indirectly by many dozens more, and has been utilized by thousands of researchers and practitioners worldwide. His work has been recognized with an NSF CAREER award, an Alfred P. Sloan Research Fellowship, an Intel Early Career Award, and Popular Science Magazine's Brilliant Ten Award. He holds a B.S. in Electrical & Computer Engineering and an M.S. in Electrical Engineering, both from The Ohio State University, and a Ph.D. in Computer Science from UC Berkeley.
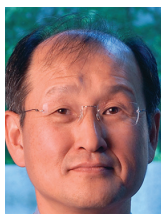
Insup Lee is Cecilia Fitler Moore Professor of Computer and Information Science and Director of PRECISE Center, which he co-founded in 2008 at the University of Pennsylvania. His research interests include cyber-physical systems (CPS), real-time systems, embedded systems, high-confidence medical device systems, formal methods, run-time verification, assurance cases, CPS security, and trust management. The theme of his research activities has been to assure and improve the safety, security, and timeliness of life-critical embedded systems. His papers received the best paper awards in IEEE RTSS 2003, CEAS 2011, IEEE RTSS 2012, and ACM/IEEE ICCPS 2014, and the best student paper in IEEE RTAS 2012. Recently, he has been working in medical cyber-physical systems and security of cyber-physical systems. He has served on numerous program committees, chaired many international conferences and workshops and served on various steering and advisory committees of technical societies. He has served on the editorial boards on the several scientific journals, including ACM Transactions on CPS, Journal of ACM, IEEE Transactions on Computers, Formal Methods in System Design, and Real-Time Systems Journal. He is a founding co-Editor-in-Chief of KIISE Journal of Computing Science and Engineering (JCSE). He is Chair of ACM SIGBE (2015-2017) and was Chair of IEEE TCRTS (2003-2004). He was a member of Technical Advisory Group (TAG) of President's Council of Advisors on Science and Technology (PCAST) Networking and Information Technology (2006-2007). He is a member of the National Research Council's committee on 21st Century Cyber-Physical Systems Education (2013-2015). He received an appreciation plaque from Ministry of Science, IT and Future Planning, South Korea, for speaking at the Universal Linkage for Top Research Advisor (ULTRA) Program Forum in 2013. He is IEEE fellow and received IEEE TC-RTS Outstanding Technical Achievement and Leadership Award in 2008.

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Todd E. Humphreys is an associate professor in the department of Aerospace Engineering and Engineering Mechanics at the University of Texas at Austin, and Director of the UT Radionavigation Laboratory. He received a B.S. and M.S. in Electrical and Computer Engineering from Utah State University and a Ph.D. in Aerospace Engineering from Cornell University. He specializes in the application of optimal detection and estimation techniques to problems in satellite navigation, autonomous systems, and signal processing. His recent focus has been on secure perception for autonomous systems, including navigation, timing, and collision avoidance, and on centimeter-accurate location for the mass market. Dr. Humphreys received the University of Texas Regeants' Outstanding Teaching Award in 2012, the National Science Foundation CAREER Award in 2015, and the Institute of Navigation Thurlow Award in 2015.

Saman Aliari Zonouz is an Assistant Professor in the Electrical and Computer Engineering Department at Rutgers University since September 2014 and the Director of the 4N6 Cyber Security and Forensics Laboratory. Before, he held a tenure-track position at the University of Miami for three years. His research has been awarded NSF CAREER Award in 2015, Google Security Reward in 2015, Top-3 Demos at IEEE SmartGridComm 2015, the Faculty Fellowship Award by AFOSR in 2013, the Best Student Paper Award at IEEE SmartGridComm 2013, the University EARLY CAREER Research award in 2012 as well as the Provost Research Award in 2011. The 4N6 research is currently funded by projects from National Science Foundation (NSF), Department of Homeland Security (DHS), Office of Naval Research (ONR), Department of Energy (DOE), Advanced Research Projects Agency Energy (ARPA-E), WinRiver, Google, and Fortinet Corporation including tech-to-market initiatives. Saman's current research focuses on cyber-physical systems security and privacy, industrial control and critical infrastructures, binary/malware analysis and reverse engineering, as well as adaptive intrusion tolerance architectures. Saman has served as the chair, program committee member, guest editor and a reviewer for top international conferences and journals. He obtained his Ph.D. in Computer Science, specifically, intrusion tolerance architectures for the cyber-physical infrastructures, from the University of Illinois at Urbana-Champaign in 2011.

3:50 p.m. – 5:05 p.m.   SESSION 5: CPS Projects
Session Chair – Sylvia Spengler (NSF)

Sylvia Spengler is a program director in the Division of Information and Intelligent System (IIS) within the CISE Directorate at the National Science Foundation. She also served as program officer for the Biological Databases and Informatics in BIO/DBI. Prior to joining NSF, she was a Director of Department of Energy (DOE) Human Genome Program Field Operations. She served as Co-Director of the Program in Mathematics and Molecular Biology at the University of California, Berkeley, Lawrence Berkeley National Laboratory. Her many honors include Senior Fellow of the American Cancer Society, and National Institutes of Health (NIH) Postdoctoral Fellow. As a member of DOE ELSI panels, she has been involved in evaluating the ethical, legal and social implications of human genome research. Dr. Spengler's many publications include co-authorship of the DOE's Primer of Molecular Biology. As part of her work with the Human Genome Project, Dr. Spengler has been involved in many types of public outreach including lectures given to college students, judges, and appearances on public television. Her current NSF programs include: Information and Intelligent Systems-Advancing Human-Centered Computing, Information Integration and Informatics, and Robust Intelligence; CISE Pathways to Revitalized Undergraduate Computing Education (CPATH); Domestic Nuclear Detection Office/National Science Foundation Academic Research Initiative (ARI); Explosives and Related Threats: Frontiers in Prediction and Detection (EXP).

John Stankovic is the BP America Professor in the Computer Science Department at the University of Virginia. He served as Chair of the department for 8 years. He is a Fellow of both the IEEE and the ACM. He has been awarded an Honorary Doctorate from York University in the U.K. He won the IEEE Real-Time Systems Technical Committee's Award for Outstanding Technical Contributions and Leadership. He also won the IEEE Technical Committee on Distributed Processing's Distinguished Achievement Award (inaugural winner). He has six Best Paper awards, including one for ACM SenSys 2006. He also has two Best Paper Runner Up Awards, including one for IPSN 2013. Stankovic has an h-index of 100 and over 36,000 citations. He has also won Distinguished Faculty Awards at the University of Massachusetts and at the University of Virginia. He has given more than 35 Keynote talks at conferences and many Distinguished Lectures at major Universities. Currently, he serves on the National Academy's Computer Science Telecommunications Board. He was the Editor-in-Chief for the IEEE Transactions on Distributed and Parallel Systems and was founder and co-editor-in-chief for the Real-Time Systems Journal. His research interests are in real-time systems, distributed computing, wireless sensor networks, wireless health, and cyber-physical systems. Prof. Stankovic received his Ph.D. from Brown University.

James H. Anderson is a Kenan Professor in the Department of Computer Science at the University of North Carolina at Chapel Hill. He received a B.S. degree in Computer Science from Michigan State University in 1982, an M.S. degree in Computer Science from Purdue University in 1983, and a Ph.D. degree in Computer Sciences from the University of Texas at Austin in 1990. In 1995, Dr. Anderson received the U.S. Army Research Office Young Investigator Award, and in 1996, he was named Alfred P. Sloan Research Fellow. He won the Computer Science Department's teaching award in 1995, 2002, 2005, 2012 and 2014. He is also a 2012 Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and a 2013 Fellow of the Association for Computing Machinery (ACM). He is Chair Elect of the IEEE Technical Committee on Real-Time Systems. Dr. Anderson's main research interests are within the areas of concurrent and distributed computing and real-time systems.

Massimo Franceschetti is Professor of Electrical and Computer Engineering at University of California at San Diego. He received the Laurea degree, magna cum laude, in Computer Engineering from the University of Naples in 1997, M.S. and Ph.D. degrees in Electrical Engineering from the California Institute of Technology in 1999, and 2003. Before joining UCSD, he was a post-doctoral scholar at University of California at Berkeley for two years. He was awarded: the C. H. Wilts Prize in 2003 for best doctoral thesis in Electrical Engineering at Caltech, the IEEE Transactions on Antennas and Propagation society S. A. Schelkunoff best paper award in 2005, the IEEE Communications society best tutorial paper award in 2010 and the IEEE Control theory society Ruberti young researcher award in 2012. He received an NSF CAREER award in 2006, and an ONR Young Investigator award in 2007. His research interests are in physical and information-based foundations of communication and control systems.

Conor Walsh is Assistant Professor of Mechanical and Biomedical Engineering at the Harvard John A. Paulson School of Engineering and Applied Sciences and a Core Faculty Member at the Wyss Institute for Biologically Inspired Engineering at Harvard. He is the founder of the Harvard Biodesign Lab, which brings together researchers from the engineering, industrial design, apparel, clinical and business communities to develop new technologies and translate them to industrial partners. His research focuses on applying disruptive technologies to the development of robotic devices for augmenting and restoring human performance. His current research interests include new approaches to design, manufacture and control of wearable robotic devices and characterizing their performance through biomechanical and physiological studies. He leads a team of researchers on the DARPA Warrior Web project to develop a soft exosuit that can assist with locomotion that can perform small levels of assistance to a wearer. The exosuit's function is based on a detailed understanding of human walking and is soft and pliable, unlike traditional exoskeletons that use rigid components. The long term goal is to develop fully portable wearable

robots to assist the disabled and able-bodied and further the scientific understanding of how humans interact with such machines. His group is also working on the modeling and design of fluidic-based soft robotics for cardiac applications and applying emerging meso-scale manufacturing approaches to the design of smart medical tools for the minimally invasive diagnosis and treatment of disease. Given his broad interests in medical devices and robotics, he collaborates closely with Wyss staff in the Biorobotics and Anticipatory Medical and Cellular Devices platforms. In addition, he is passionate about educating future innovators and he has established the Harvard Medical Device Innovation Initiative that provides students with the opportunity to collaborate with clinicians in Boston and emerging regions such as India. Conor received his B.A.I and B.A. degrees in Mechanical and Manufacturing engineering from Trinity College in Dublin, Ireland, in 2003, and M.S. and Ph.D. degrees in Mechanical Engineering from the Massachusetts Institute of Technology in 2006 and 2010.
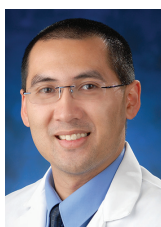
An H. Do, M.D. received his M.D. at the University of California, Riverside/Los Angeles Thomas Haider Biomedical Sciences Program in 2006. He completed his residency training in neurology in 2010 at the University of California, Irvine. He next undertook fellowship training in spinal cord injury medicine in a joint program at the University of California, Irvine/Long Beach Veterans Affairs Medical Center/Rancho Los Amigos National Rehabilitation Center. He then joined the faculty in the Department of Neurology at the University of California, Irvine, first as a clinical instructor in 2011, and then as an assistant professor in 2013. Dr. Do's area of research is in developing and applying brain computer interfaces (BCIs) to help people with paralysis due to neurological injuries to improve or regain motor function. For example, his work includes the development of a BCI-controlled functional electrical stimulation system that enabled a person with paraplegia due to spinal cord injury to regain basic brain-controlled overground walking. He was the recipient of the American Academy of Neurology Clinician-Scientist Training Fellowship research grant, and his research is currently supported by the National Science Foundation and the National Institutes of Health.

5:15 p.m. – 6:45 p.m.	**SESSION 6: Poster Session + Demonstration Session (Show & Tell) Session Chair – Zachary Hayden (NSF)**

Zachary (Zack) Hayden is a AAAS Science and Technology Policy Fellow in the Division of Computer and Network Systems at the National Science Foundation. He works on the Cyber-Physical Systems (CPS) program and on new initiatives related to Smart and Connected Communities (S&CC) and Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS). Zack has a background in agricultural systems research – investigating precision management of tillage, water, and nutrients to improve farmer profitability and reduce environmental impacts. He earned a B.S. in biology and environmental science from the College of William and Mary in Virginia, and his Ph.D. in horticulture from Michigan State University.

Tuesday, November 17
8:00 a.m. – 8:10 a.m.   Opening Remarks

Erwin Gianchandani is the Acting Deputy Assistant Director of the Directorate for Computer and Information Science and Engineering (CISE) at the National Science Foundation (NSF), where he contributes to all aspects of the directorate's management, including strategic planning and oversight of day-to-day operations. Most recently, Dr. Gianchandani has been the deputy division director for the CISE Division of Computer and Network Systems (CNS). Before joining NSF in 2012, Dr. Gianchandani served as the inaugural director of the Computing Community Consortium (CCC), providing leadership to the computing research community in identifying and pursuing audacious, high-impact research directions. Prior to the CCC, Dr. Gianchandani was an AAAS Science and Technology Policy Fellow at NSF and contributed to the launch of NSF's smart and connected health program. Previously, he was director of innovation networking at the University of Virginia, reporting to the university's vice president for research. Dr. Gianchandani has published extensively and presented at numerous international conferences on the subject of computational systems modeling of cellular reaction networks, with the goal of better understanding disease mechanisms and identifying therapeutic targets. Dr. Gianchandani received his Ph.D. in biomedical engineering, M.S. in biomedical engineering, and B.S. in computer science from the University of Virginia.

Peter Arzberger is currently serving as acting Division Director for Computer and Network Systems (CNS) in the Directorate for Computer and Information Science and Engineering (CISE) at the United States National Science Foundation. In addition he is serving as a Senior Advisor for Research Cyberinfrastructure in CISE. Since 1988 he has spent 11 years at NSF, in three tours of duty: first as Program Officer in Statistics and Probability, and later in Computational Biology; later as Division Director in the Division of Biological Infrastructure, and as acting Assistant Director CISE; and most recently he served as Senior Science Advisor in Office of the Director before assuming his current responsibilities.

He is serving at NSF, on assignment from his home institution of the University of California San Diego (UCSD). At UCSD he has served as the founding Chair of the Pacific Rim Application and Grid Middleware Assembly (PRAGMA), co-director of the Pacific Rim Experiences for Undergraduates (PRIME) program, and as a founding member of the Steering Committee for the Global Lake Ecological Observatory Network (GLEON).

In addition, he has also served as Chair of the National Advisory Board of the US Long Term Ecological Research (LTER) network, as the Executive Director of the San Diego Supercomputer Center, and as the Director of the National Biomedical Computation Resource (NBCR). In addition, he has served as a member of the NSF Advisory Committee for International Science and Engineering (2012 - 2013). His research has received wide-ranging support from NSF, NIH, and the Gordon and Betty Moore Foundation, and is interested in promoting models of international collaboration for research and students.

8:10 a.m. – 8:50 a.m.   SESSION 7: Special Topics
Session Chair – David Corman (NSF)

David Corman is a Program Director and leader of the Cyber-Physical Systems program at the National Science Foundation. Dr. Corman is a Research Associate Professor at Washington University St. Louis in the Department of Electrical and Systems Engineering. Dr. Corman has a broad range of research interests spanning many technologies fundamental to CPS application areas including transportation, energy, medical devices, and manufacturing. Dr. Corman has extensive industrial experience in the development, design, and manufacture of CPS systems. Dr. Corman received the Ph.D. degree in electrical engineering from the University of Maryland.

Tom Torgersen is a Program Officer at the National Science Foundation with responsibilities for Hydrologic Sciences and "Water Sustainability and Climate". His research expertise includes isotopic tracers and dating of groundwater, hydrogeology, coastal ocean processes, limnology, and paleoclimate. Tom is the co-chair of the NSF Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS) initiative. Tom also leads the NSF-wide Water Sustainability and Climate initiative. Tom has a broad academic background including past appointments as Professor of Marine Sciences at the University of Connecticut, along with Visiting Faculty / Scientists appointments at University of Oslo, University of Tokyo, Australian National University, and University of Nevada – Reno. Tom earned his B.S. in chemical engineering from the University of Illinois and a Ph.D. and Masters degrees in Geological Sciences from Columbia University.

Kishan Baheti is a Program Director for Energy, Power, Control and Networks Program in the Division of Electrical, Communications, and Cyber Systems at the National Science Foundation. Dr. Baheti received the B.S. and M.S. in Electrical Engineering in India from VRCE Nagpur, and from BITS Pilani, respectively. In 1970, he came to USA and received M.S. in Information and Computer Science from University of Oklahoma and Ph.D. in Electrical and Computer Engineering from Oregon State University. In 1976, Dr. Baheti joined the Control Engineering Laboratory of GE Corporate Research and Development Center in Schenectady, NY. His work focused on advanced multivariable control for jet engines, computer- aided control system design, vision-based robots for precision welding, and Kalman filtering. Dr. Baheti and his colleagues received IR-100 award for robotic welding vision system. He has organized a series of educational workshops for GE engineers that resulted in innovative product developments and contributed to enhance university collaborations with GE business divisions. In 1989, Dr. Baheti joined NSF as a Program Director in the Division of Electrical and Communications Systems. His contributions include the development of NSF initiatives on "Combined Research and Curriculum Development", "Semiconductor Manufacturing", and NSF/EPRI Program

on "Intelligent Control". In addition, he started NSF Program "Research Experience for Teachers (RET)" to involve middle and high school teachers in engineering research that can be transferred to pre-college classrooms. Recently he is involved in cyber-physical systems, science of learning, and Robotics. He has served as associate editor for IEEE Transactions on Automatic Control, member of the Control Systems Board of Governors, chair for Public Information Committee, and awards chair for the American Automatic Control Council (AACC). He received "Distinguished Member Award" from the IEEE Control Systems Society. In 2013, he received "Outstanding Leadership and Service Award" from the Electrical and Computer Engineering Department Head Association. He was elected a Fellow of IEEE and a Fellow of AAAS.

Magnus Egerstedt is the Schlumberger Professor in the School of Electrical and Computer Engineering at the Georgia Institute of Technology, where he serves as Associate Chair for Research. He received the M.S. degree in Engineering Physics and the Ph.D. degree in Applied Mathematics from the Royal Institute of Technology, Stockholm, Sweden, the B.A. degree in Philosophy from Stockholm University, and was a Postdoctoral Scholar at Harvard University. Dr. Egerstedt is the director of the Georgia Robotics and Intelligent Systems Laboratory (GRITS Lab), a Fellow of the IEEE, and a recipient of a number of research and teaching awards, including the Ragazzini Award from A2C2.

**8:50 a.m. – 9:35 a.m.   SESSION 8: Plenary Session Talks
Session Chair – Radhakishan Baheti (NSF)**

Ethan Jackson is a researcher in The Research in Software Engineering (RiSE) Group at Microsoft Research focusing on formal methods for safe cyber-physical systems (CPS). His is the creator of the FORMULA system for formalizing modeling languages and enabling formal analysis of complex software, which has been used in large academic and industrial settings. He is also the co-creator of the P programming language which allows developers to specify complex systems of communicating asynchronous components, and has been used to design critical components of Microsoft Windows. Ethan leads a Microsoft Research program focusing on safe and robust autonomous systems, and has been exploring CPS for disease surveillance. Ethan joined Microsoft Research 2007 after receiving his Ph.D. from Vanderbilt University in Computer Science.

**9:50 a.m. – 11:20 a.m.   SESSION 9: PI Reports
Session Chair – David Corman (NSF)**

Thomas R. Kurfess received his S.B., S.M. and Ph.D. degrees in mechanical engineering from M.I.T. in 1986, 1987 and 1989, respectively. He also received an S.M. degree from M.I.T. in electrical engineering and computer science in 1988. Following graduation, he joined Carnegie Mellon University where he rose to the rank of Associate Professor. In 1994 he moved to the Georgia Institute of Technology where he rose to the rank of Professor in the George W. Woodruff School of Mechanical Engineering. In 2005 he was named Professor and BMW Chair of Manufacturing in the Department of Mechanical Engineering at Clemson University's International Center for Automotive Research. In 2012 he returned to Georgia Tech where he was appointed the HUSCO/Ramirez Distinguished Chair in Fluid Power and Motion Control and Professor of Mechanical Engineering. During 2012-2013 he was on leave serving as the Assistant Director for Advanced Manufacturing at the Office of Science and Technology Policy in the Executive Office of the President of the United States of America. In this position he had responsibility for engaging the Federal sector and the greater scientific community to identify possible areas for policy actions related to manufacturing. He was responsible for coordinating Federal advanced manufacturing R&D, addressing issues related to technology commercialization, identifying gaps in current Federal R&D in advanced manufacturing, and developing strategies to address these gaps. He has served as a special consultant of the United Nations to the Government of Malaysia in the area of applied mechatronics and manufacturing, and as a participating guest at the Lawrence Livermore National Laboratory in their Precision Engineering Program. He currently serves on the Board of Directors for the Society of Manufacturing Engineers, the National Center for Defense Manufacturing and Machining, and the National Center for Manufacturing Sciences, and on the Board of Trustees for the MT Connect Institute. His research focuses on the design and development of advanced manufacturing systems targeting digital manufacturing, additive and subtractive processes, and large-scale production enterprises. He has significant experience in high precision manufacturing and metrology systems. He has received numerous awards including a National Science Foundation (NSF) Young Investigator Award, an NSF Presidential Faculty Fellowship Award, the ASME Pi Tau Sigma Award, SME Young Manufacturing Engineer of the Year Award, the ASME Blackall Machine Tool and Gage Award, the ASME Gustus L. Larson Award, an ASME Swanson Federal Award, and the SME Education Award. He is a Fellow of the AAAS, the SME and the ASME.

Jaime Camelio is currently the Rolls-Royce Commonwealth Professor for Advanced Manufacturing in the Grado Department of Industrial and Systems Engineering at Virginia Tech. Dr. Camelio obtained his B.S. and M.S. in Mechanical Engineering from the Catholic University of Chile in 1994 and 1995, respectively. In 2002, he received his Ph.D. from the University of Michigan. His professional experience includes working as a consultant in the Automotive/Operations Practice at A.T. Kearney Inc. and as a Research Scientist in the Department of Mechanical Engineering at The University of Michigan, Ann Arbor. His research interests are in cyber-physical security for manufacturing systems, intelligent manufacturing, process monitoring and control, and technology transfer. He has authored or co-authored more than 80 technical papers and holds one patent. He teaches undergraduate and graduate courses related to manufacturing processes, manufacturing systems, intelligent manufacturing, and data mining. He has supervised the research of 7 M.S. and 6 Ph.D. students. Dr. Camelio is the founder and director of the Center for Innovation Based Manufacturing at Virginia Tech. He is also the Virginia Tech Manufacturing Systems Director for the Commonwealth Center for Advanced Manufacturing and a board member for Virginia Manufacturing Advisory Council. Currently, he serves as Associate Editor ASME Journal of Manufacturing Science and Engineering. He is part of the Scientific Committee for the North American Manufacturing Research Institute of SME. He has received multiple awards including, 2013 Illuminator Award at Virginia Tech, 2010 Outstanding Assistant Professor at Virginia Tech, 2007 SME Outstanding Young Manufacturing Engineer Award, and 2001 Best Paper Award from the ASME Design Engineering Technical Conference.

Karthik Ramani is a Professor in the School of Mechanical Engineering at Purdue University. He earned his B.Tech from the Indian Institute of Technology, Madras, in 1985, an M.S. from The Ohio State University, in 1987, and a Ph.D. from Stanford University in 1991, all in Mechanical Engineering. Among his many awards he received the National Science Foundation (NSF) Research Initiation and Career Award, the Ralph Teetor Educational Award from the SAE, and the Outstanding Young Manufacturing Engineer Award from SME. In 2006 he won the innovation of the year award from TechPoint. He serves in the editorial board of Elsevier Journal of Computer-Aided Design (CAD) and ASME Journal of Mechanical Design. In 2008 he was a visiting Professor at Stanford University (computer sciences) as well as a research fellow at PARC (formerly Xerox PARC). He also serves on the NSF advisory board for the SBIR/STTR program. In 2006 and 2007, he won the Most Cited Journal Paper award from CAD and the Research Excellence award in the College of Engineering at Purdue University. He was the co-founder of the world's first commercial shape-based search engine (VizSeek). In 2009, he won the Outstanding Commercialization award from Purdue University. He has won several best paper awards from ASME and in 2014 the Outstanding Research Excellence Award from ASME Computers and Information Sciences in Engineering Division. NSF recently invited him for a distinguished lecture in cyber-learning and invited lecture in the future of maker technologies. In 2015 he won the most cited researcher for 2005-15 in Elsevier CAD journal. His recent papers have been published in ACM: SIGCHI, UIST, SPM, IDC; IEEE: CVPR, ICCV, VAST, ASME Journal of Mechanical Design as well as Design Studies. He recently co-founded ZeroUI based on a simple premise: our Hands are the most natural User Interface.

Krishnendu Chakrabarty received the B. Tech. degree from the Indian Institute of Technology, Kharagpur, in 1990, and the M.S.E. and Ph.D. degrees from the University of Michigan, Ann Arbor, in 1992 and 1995, respectively. He is now the William H. Younger Distinguished Professor of Engineering in the Department of Electrical and Computer Engineering and Professor of Computer Science at Duke University. He also serves as Director of Graduate Studies for Electrical and Computer Engineering. Prof. Chakrabarty is a recipient of the National Science Foundation Early Faculty (CAREER) award, the Office of Naval Research Young Investigator award, the Humboldt Research Award from the Alexander von Humboldt Foundation, Germany, the IEEE Transactions on CAD Donald O. Pederson Best Paper award (2015), and 11 best paper awards at major IEEE conferences. He is also a recipient of the IEEE Computer Society Technical Achievement Award (2015) and the Distinguished Alumnus Award from the Indian Institute of Technology, Kharagpur (2014). Prof. Chakrabarty's current research projects include: testing and design-for-testability of integrated circuits; digital microfluidics, biochips, and cyber-physical systems; optimization of enterprise systems and smart manufacturing. Prof. Chakrabarty is a Fellow of ACM, a Fellow of IEEE, and a Golden Core Member of the IEEE Computer Society. He holds six US patents, with several patents pending. He was a 2009 Invitational Fellow of the Japan Society for the Promotion of Science (JSPS). He is a recipient of the 2008 Duke University Graduate School Dean's Award for excellence in mentoring, and the 2010 Capers and Marion McDonald Award for Excellence in Mentoring and Advising, Pratt School of Engineering, Duke University. He served as a Distinguished Visitor of the IEEE Computer Society during 2005-2007 and 2010-2012, and as a Distinguished Lecturer of the IEEE Circuits and Systems Society during 2006-2007 and 2012-2013. Currently he serves as an ACM Distinguished Speaker. Prof. Chakrabarty served as the Editor-in-Chief of IEEE Design & Test of Computers during 2010-2012. Currently he serves as the Editor-in-Chief of ACM Journal on Emerging Technologies in Computing Systems and IEEE Transactions on VLSI Systems. He is also an Associate Editor of IEEE Transactions on Computers, IEEE Transactions on Biomedical Circuits and Systems, IEEE Transactions on Multi-scale Computing Systems, and ACM Transactions on Design Automation of Electronic Systems.

Kira Barton is an Assistant Professor in the Department of Mechanical Engineering at the University of Michigan. She received her B.Sc. in Mechanical Engineering from the University of Colorado at Boulder in 2001. She continued her education in mechanical engineering at the University of Illinois at Urbana-Champaign and completed her M.Sc. and Ph.D. degrees in 2006 and 2010, respectively. She held a postdoctoral research position at the University of Illinois from Fall 2010 until Fall 2011, at which point she joined the Mechanical Engineering Department at the University of Michigan at Ann Arbor. Kira conducts research in modeling, sensing, and control for applications in advanced manufacturing and robotics, with specializations in Learning Control, advanced manufacturing, and agent-based systems. Kira is the recipient of an NSF CAREER Award in 2014, 2015 SME Outstanding Young Manufacturing Engineer Award, and the 2015 University of Illinois, Department of Mechanical Science and Engineering Outstanding Young Alumni Award.

Wenyao Xu is an Assistant Professor of Computer Science and Engineering Department in the State University of New York (SUNY) at Buffalo since 2013, where he directs the ESC (Embedded Sensing and Computing) Lab). He received his Ph.D. degree from the Electrical Engineering Department, University of California Los Angeles (UCLA) in 2013. He received his M.S. degree in 2008 and B.S. degree in 2006 from Zhejiang University, China. His research foci include efficient embedded sensing and computing technologies for health and sustainability.

11:05 a.m.–12:35 p.m.   Session 10: PI Reports
Session Chair – Gurdip Singh (NSF)

Gurdip Singh is a Program Director in the Division of Computer and Network Systems in the CISE Directorate at National Science Foundation. Within the Division of Computer and Network Systems, he works with the Cyber-Physical Systems and Computer Systems Research program. He is also a Professor of Computing and Information Sciences (CIS) at Kansas State University. From 2009 and 2014, he was the Head of CIS Department at Kansas State University. His research interests include real-time embedded systems, sensor networks, network protocols and distributed computing. NSF, ARO, DARPA and Lockheed Martin have funded his research. He has been involved in developing software tools to design large-scale, distributed safety critical systems. He is working on developing methodologies and tools for building integrated sensor systems and analysis tools for automated optimization of distributed middleware.

Sriram Sankaranarayanan an associate professor of Computer Science at the University of Colorado, Boulder. His research interests include automatic techniques for reasoning about the behavior of computer and cyber-physical systems. Sriram obtained a Ph.D. in 2005 from Stanford University where Zohar Manna and Henny Sipma advised him. Subsequently he worked as a research staff member at NEC research labs in Princeton, NJ. He has been on the faculty at CU Boulder since 2009. Sriram has been the recipient of awards including the President's Gold Medal from IIT Kharagpur (2000), Siebel Scholarship (2005), the CAREER award from NSF (2009), Dean's award for outstanding junior faculty (2012), outstanding teaching (2014), and the Provost's faculty achievement award (2014).

Paul Bogdan is an Assistant Professor in the Ming Hsieh Department of Electrical Engineering at University of Southern California. He received his Ph.D. degree in Electrical and Computer Engineering from Carnegie Mellon University. His work has been recognized with a number of distinctions, including the 2015 NSF CAREER Award, the 2012 A.G. Jordan Award from the Electrical and Computer Engineering Department, Carnegie Mellon University for outstanding Ph.D. thesis and service, the 2012 Best Paper Award from the Networks-on-Chip Symposium (NOCS), the 2012 D.O. Pederson Best Paper Award from IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, the 2012 Best Paper Award from the International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS), the 2013 Best Paper Award from the 18th Asia and South Pacific Design Automation Conference, and the 2009 Roberto Rocca Ph.D. Fellowship. His research interests include the theoretical foundations of cyber-physical systems, complex yet compact mathematical modeling of spatio-temporal interdependent systems, performance analysis and design methodologies for many core systems, modeling and analysis of molecular communication and cellular interactions, and the modeling and analysis of biological systems.
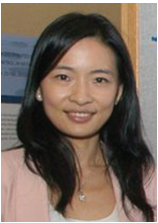
Wencen Wu has been an Assistant Professor of the Department of Electrical, Computer, and Systems Engineering (ECSE) at Rensselaer Polytechnic Institute (RPI) since 2013. She received her Ph.D. and M.S. degrees from the School of Electrical and Computer Engineering, Georgia Institute of Technology, in 2013 and 2010, respectively, and M.S. and B.S. degrees from Shanghai Jiao Tong University in 2009 and 2006, respectively. Her research centers around systems and control, with applications in mobile sensor networks, autonomous systems, and robotics. She has been working on the design of cooperative control and sensing algorithms for multi-robot systems with the goal of answering the challenge of monitoring large areas with limited sensing resources and limited power.
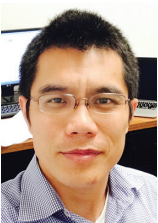
Xiaofeng Wang received his BS and MS degree in Mathematics from East China Normal University, China, in 2000 and 2003, respectively, and obtained his Ph.D. degree in Electrical Engineering from the University of Notre Dame in 2009. He worked as postdoctoral research associate in the Department of Mechanical Science and Engineering at the University of Illinois at Urbana-Champaign from 2009 to 2012. Then he joined the Department of Electrical Engineering at the University of South Carolina. His research interests include event-based control, networked control systems, robust adaptive control, cooperative control, and robotics.

Duncan Callaway is an Assistant Professor of Energy and Resources at the University of California, Berkeley and a faculty scientist at Lawrence Berkeley Laboratory. He received his Ph.D. from Cornell University. He has held engineering positions at Davis Energy Group and PowerLight Corporation, and academic positions at UC Davis, the University of Michigan and UC Berkeley. Duncan teaches courses on electric power systems and energy efficiency in buildings. His research focuses on grid integration of renewable electricity; models and control strategies for demand response, electric vehicles and electricity storage; and energy efficiency in buildings.

Yufeng Xin is a senior networking researcher at Renaissance Computing Institute (RENCI) at University of North Carolina, Chapel Hill, NC USA. Before joining RENCI, he was a Scientist at MCNC, RTP, NC and a Research Associate at University of Maryland, College Park. His research focuses on high-speed networks, cloud, semantic web, and wireless sensor networks and their applications to CPS. He obtained his Ph.D. from North Carolina State University, Raleigh NC, USA.

12:35 p.m. – 2:30 p.m. Session 11: Working Lunch/Poster Session +
Demonstration Session (Show & Tell)
Session Chair – Phil Regalia (NSF)

Phil Regalia serves as a Program Director with the National Science Foundation in Arlington, Virgina, within the Directorate for Computer & Information Science & Engineering (CISE). He joined the Department of Electrical Engineering and Computer Science at The Catholic University of America in October 2004 and, from August 2008 through December 2011, served as Chair of that department. Prior to that he was Professor and founding Department Chair of the Communications, Image and Information Processing department of the Institut National des Télécommunications (now "Telecom SudParis"). He obtained his Ph.D. in Electrical Engineering from the University of California at Santa Barbara in 1988, and the Habilitation à Diriger des Recherches from the University of Paris-Orsay in 1994. His research interests include signal processing, information theory, communications, circuits, and matrix/tensor algebra.

2:30 p.m. – 3:55 p.m.	Session 12: Transportation CPS
	Session Chair – Kevin Dopart (USDoT)

Kevin Dopart is the USDOT's Intelligent Transportation Systems (ITS) Joint Program Office's Program Manager for Vehicle Safety and Automation. His research program develops connected vehicle communications technologies and applications to increase the safety and mobility of surface transportation users while reducing their environmental impacts. Previously, Kevin worked for Noblis, Inc. and the (now defunct) Congressional Office of Technology Assessment, and began his career flying P-3 Orion aircraft worldwide for a U.S. Navy oceanographic research squadron. Kevin has B.S. and M.S. degrees from the Massachusetts Institute of Technology in Aeronautical and Astronautical Engineering.

Raj Rajkumar is the George Westinghouse Professor in the Department of Electrical and Computer Engineering at Carnegie Mellon University. He also holds a courtesy appointment in the Robotics Institute at Carnegie Mellon. In addition, he serves as the Director, USDOT National University Transportation Center on Safety; Co-Director, General Motors-Carnegie Mellon Connected and Autonomous Driving Collaborative Research Lab; and Director, Real-Time and Multimedia Systems Lab. He was the Primary Founder of Ottomatika, Inc. (recently acquired by Delphi) and of TimeSys Corporation. He is an IEEE Fellow, an ACM Distinguished Engineer, has won 7 Best Paper Awards among others. His work has been globally featured on mainstream TV, newspapers, magazines and online articles. His interests span all aspects of cyber-physical systems.

Murat Arcak received the B.S. degree from the Bogazici University, Istanbul, Turkey (1996) and the M.S. and Ph.D. degrees from the University of California, Santa Barbara (1997 and 2000). His research is in dynamical systems and control theory with applications to synthetic biology, multi-agent systems, and transportation. Prior to joining Berkeley in 2008, he was a faculty member at the Rensselaer Polytechnic Institute. He received a CAREER Award from the National Science Foundation in 2003, the Donald P. Eckman Award from the American Automatic Control Council in 2006, the Control and Systems Theory Prize from the Society for Industrial and Applied Mathematics (SIAM) in 2007, and the Antonio Ruberti Young Researcher Prize from the IEEE Control Systems Society in 2014. He is a member of SIAM and a fellow of IEEE.

Ümit Özgüner is Professor Emeritus of Electrical and Computer Engineering at The Ohio State University. He is the Director of the "Crash Imminent Safety" University Transportation Center at OSU, funded by DoT. His areas of research interest are in ITS, decentralized control and autonomy in large scale and Cyber-Physical Systems. He is the author or co-author of over 400 publications including a 2011 book on Autonomous Ground Vehicles. He was the first President of the IEEE ITS Council in 1999 as it transformed into The IEEE ITS Society. Teams he coordinated participated successfully in many autonomous vehicle technology demonstrations in the US and around the world. Professor Özgüner is the Editor-in-Chief of the new IEEE Transactions of Intelligent Vehicles, to appear in 2016. He is a Life Fellow of the Institute of Electrical and Electronic Engineers.

Georgios Fainekos is an Associate Professor at the School of Computing, Informatics and Decision Systems Engineering (SCIDSE) at Arizona State University (ASU). He is director of the Cyber-Physical Systems (CPS) Lab and he is currently affiliated with the NSF I/UCR Center for Embedded Systems (CES) at ASU. He received his Ph.D. in Computer and Information Science from the University of Pennsylvania in 2008 where he was affiliated with the GRASP laboratory. He holds a Diploma degree (B.Sc. & M.Sc.) in Mechanical Engineering from the National Technical University of Athens and an M.Sc. degree in Computer and Information Science from the University of Pennsylvania. Before joining ASU, he held a Postdoctoral Researcher position at NEC Laboratories America in the System Analysis & Verification Group. He is currently working on Cyber-Physical Systems (CPS) and robotics. In particular, his expertise is on formal methods, logic, artificial intelligence, optimization and control theory. His research has applications on automotive systems, medical devices, autonomous (ground and aerial) robots and human-robot interaction (HRI). In 2013, Dr. Fainekos received the NSF CAREER award. He was also recipient of the SCIDSE Best Researcher Junior Faculty award for 2013 and of the 2008 Frank Anger Memorial ACM SIGBED/SIGSOFT Student Award.

Daniel Work is an assistant professor in the Department of Civil and Environmental Engineering, the Department of Electrical and Computer Engineering (courtesy), and the Coordinated Science Laboratory at the University of Illinois at Urbana-Champaign. Prof. Work earned his bachelor of science degree (2006) from The Ohio State University, and a master of science (2007) and Ph.D. (2010) from the University of California, Berkeley, each in civil engineering. Prof. Work has research interests in control, estimation, and optimization of transportation systems, mobile sensing, and inverse modeling and data assimilation. Work was a research intern at Nokia Research Center, Palo Alto from 2008-2009. Prof. Work has won a number of awards including the CAREER Award from the National Science Foundation in 2014 and the IEEE ITSS Best Dissertation Award in 2011.

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Jonathan Sprinkle is an Assistant Professor of Electrical and Computer Engineering at the University of Arizona. In 2013 he received the NSF CAREER award, and in 2009, he received the UA's Ed and Joan Biggers Faculty Support Grant for work in autonomous systems. Until June 2007, he was the Executive Director of the Center for Hybrid and Embedded Software Systems at the University of California, Berkeley. His research is in the area of intelligent autonomous systems, including UAVs, UGVs, and hybrid systems. Building blocks for this are in domain-specific modeling, meta-modeling, and generative programming. Dr. Sprinkle was the co-Team Leader of the Sydney-Berkeley Driving Team, a collaborative entry into the DARPA Urban Challenge with partners Sydney University, University of Technology, Sydney, and National ICT Australia (NICTA). In 2004, he led a team from UC Berkeley, which autonomously flew against an Air Force pilot in autonomous pursuit/evasion games in the Mojave Desert at Edwards Air Force Base (the UAV successfully targeted the human pilot). In his teaching career spanning Arizona, Berkeley, and Vanderbilt, he has taught or largely assisted in the graduate courses on hybrid systems, unmanned systems, and model-integrated computing. Dr. Sprinkle graduated with the Ph.D. from Vanderbilt University in August 2003, and with his M.S. in August 2000. He graduated with his B.S.E.E. in cursu honorum, cum laude, from Tennessee Tech University in Cookeville, TN, in May 1999, where he was the first graduate of the Computer Engineering program, and the first Electrical Engineering double major. In 2005, Dr. Sprinkle was selected as one of 108 Regional Finalists for 11-19 highly competitive positions of White House Fellow. In 2002-2003, he was named a Master Teaching Fellow by the Vanderbilt University Center for Teaching, and in July 2002 he participated in the 52nd Meeting of the Nobel Laureates. As an undergraduate, in 1998-99, he served as the President of the Student Government Association and in 1997-98 was honored as Campus Leader of the Year and Legislator of the Year by the SGA of Tennessee Tech University.

Benjamin Seibold is an Associate Professor in the Department of Mathematics at Temple University. He works in Applied and Computational Mathematics, with specific focus on traffic modeling and simulation, computational fluid dynamics, radiative transfer, and bio-medical applications. Besides from CPS, he has received funding from NSF DMS Computational Mathematics (4 awards) and DMS Applied Mathematics. He is the 2013 recipient of the Greenshields Prize, awarded by the Transportation Research Board.

Kevin Dopart is the USDOT's Intelligent Transportation Systems (ITS) Joint Program Office's Program Manager for Vehicle Safety and Automation. His research program develops connected vehicle communications technologies and applications to increase the safety and mobility of surface transportation users while reducing their environmental impacts. Previously, Kevin worked for Noblis, Inc. and the (now defunct) Congressional Office of Technology Assessment, and began his career flying P-3 Orion aircraft worldwide for a U.S. Navy oceanographic research squadron. Kevin has B.S. and M.S. degrees from the Massachusetts Institute of Technology in Aeronautical and Astronautical Engineering.

4:10 p.m. – 5:00 p.m.	**Session 13: Evolving CPS Programs** **Session Chair – David Corman (NSF)**

Janos Sztipanovits is currently the E. Bronson Ingram Distinguished Professor of Engineering at Vanderbilt University and he also holds the Joe B. Wyatt Distinguished University Professor title in 2012/2013. He is founding director of the Institute for Software Integrated Systems (ISIS). His research areas are at the intersection of systems and computer science and engineering. His current research interest includes the foundation and applications of Model-Integrated Computing for the design of Cyber-Physical Systems. His other research contributions include structurally adaptive systems, autonomous systems, design space exploration and systems-security co-design technology. He was founding chair of the ACM Special Interest Group on Embedded Software (SIGBED). He served as program manager and acting deputy director of DARPA/ITO between 1999 and 2002 and he was member of the US Air Force Scientific Advisory Board between 2006–2010. He is member of the Academic Executive Board of Cyber-Physical Systems Virtual Organization and he is member of the national steering group. Dr. Sztipanovits was elected Fellow of the IEEE in 2000 and external member of the Hungarian Academy of Sciences in 2010. He won the National Prize in Hungary in 1985 and the Golden Ring of the Republic in 1982. He graduated (Summa Cum Laude) from the Technical University of Budapest in 1970 and received his doctorate from the Hungarian Academy of Sciences in 1980.

5:00 p.m. – 5:10 p.m.	**Closing – David Corman (NSF)**

REGISTRANTS
current as of 11/9/15

#	First Name	Last Name	Organization
1	Houssam	Abbas	University of Pennsylvania
2	Ossama	Abdelkhalik	Michigan Tech University
3	Tarek	Abdezaher	University of Illinois, Urbana Champaign
4	Kyler	Abernathy	National Geographic Society
5	Behcet	Acikmese	University of Texas, Austin
6	Abhishek	Agarwal	Massachusetts Institute of Technology
7	Mahima	Agumbe Suresh	Texas A&M University
8	Mohammad	Al Faruque	University of California, Irvine
9	Mahnoosh	Alizadeh	Stanford University
10	Aaron	Ames	Georgia Institute of Technology
11	Saurabh	Amin	Massachusetts Institute of Technology
12	James	Anderson	The University of North Carolina at Chapel Hill
13	Anuradha	Annaswamy	Massachusetts Institute of Technology
14	Panos	Antsaklis	University of Notre Dame
15	Fatima Muhammad	Anwar	University of California, Los Angeles
16	Murat	Arcak	University of California, Berkeley
17	Brenna	Argall	Northwestern University
18	Peter	Arzberger	National Science Foundation
19	Philip	Asare	Bucknell University
20	Aditya	Ashok	Iowa State University
21	Ella	Atkins	University of Michigan
22	Virginia	Bacon Talati	National Academy of Sciences
23	Jaehyun	Bae	Harvard University
24	Radhakishan	Baheti	National Science Foundation
25	Erwei	Bai	University of Iowa
26	Fan	Bai	General Motors Research and Development
27	Ou	Bai	Florida International University
28	Anindya	Banerjee	National Science Foundation
29	Nilanjan	Banerjee	University of Maryland, Baltimore County
30	Suman	Banerjee	University of Wisconsin, Madison

#	First Name	Last Name	Organization
31	Kira	Barton	University of Michigan
32	Sanjoy	Baruah	University of North Carolina
33	Sankar	Basu	National Science Foundation
34	Marco	Beccani	University of Pennsylvania
35	Calin	Belta	Boston University
36	Alexander	Berg	The University of North Carolina, Chapel Hill
37	Sarah	Bergbreiter	University of Maryland, College Park
38	Bir	Bhanu	University of California, Riverside
39	Saroj	Biswas	Temple University
40	Eilyan	Bitar	Cornell University
41	Ethan	Blanton	Fiji Systems Inc.
42	Paul	Bogdan	University of Southern California
43	Francesco	Borrelli	University of California, Berkeley
44	Alper	Bozkurt	North Carolina State University
45	Sukumar	Brahma	New Mexico State University
46	Philip	Brisk	University of California, Riverside
47	Linda	Bushnell	University of Washington
48	Greg	Byrne	Federal Food and Drug Administration
49	Duncan	Callaway	University of California, Berkeley
50	Jaime	Camelio	Virginia Polytechnic Institute and State University
51	Qing	Cao	University of Tennessee
52	Robert	Cartwright	Rice University
53	Christos	Cassandras	Boston University
54	M. Cenk	Cavusoglu	Case Western Reserve University
55	Siva Chaitanya	Chaduvula	Purdue University
56	Krishnendu	Chakrabarty	Duke University
57	Aranya	Chakrabortty	North Carolina State University
58	Tam	Chantem	Utah State University
59	Nilanjan Ray	Chaudhuri	North Dakota State University
60	Qian	Chen	The Ohio State University
61	Zheng	Chen	Wichita State University

#	First Name	Last Name	Organization
62	Maggie	Cheng	Missouri University of Science and Technology
63	Elizabeth	Cherry	Rochester Institute of Technology
64	Howard	Chizeck	University of Washington
65	Walter	Cleaveland	University of Maryland
66	Richard	Conroy	National Institutes of Health/National Institute of Biomedical Imaging and Bioengineering
67	David	Corman	National Science Foundation
68	Dan	Correa	White House Office of Science and Technology Policy
69	Jorge	Cortes	University of California, San Diego
70	Bo	Cui	Washington State University
71	David	Culler	University of California, Berkeley
72	Siyuan	Dai	Vanderbilt University / Institute for Software Integrated Systems
73	Sajal	Das	Missouri University of Science and Technology
74	Sanjoy	Das	Kansas State University
75	Katherine	Davis	University of Illinois
76	Omid	Dehzangi	University of Michigan-Dearborn
77	Domitilla	Del Vecchio	Massachusetts Institute of Technology
78	Douglas	Densmore	Boston University
79	Jyotirmoy	Deshmukh	Toyota Technical Center
80	Ashish	Deshpande	The University of Texas, Austin
81	Katie	Dey	Vanderbilt University
82	Suhas	Diggavi	University of California, Los Angeles
83	An	Do	University of California, Irvine
84	Adwait	Dongare	Carnegie Mellon University
85	Kevin	Dopart	U.S. Department of Transportation
86	Mark	Dowd	U.S. Department of Transportation
87	Abhishek	Dubey	Vanderbilt University/Institute for Software Integrated Systems
88	Geir	Dullerud	University of Illinois
89	Prabal	Dutta	University of Michigan
90	Shirley	Dyke	Purdue University
91	Magnus	Egerstedt	Georgia Institute of Technology

#	First Name	Last Name	Organization
92	Jon	Eisenberg	National Academies of Sciences, Engineering, and Medicine
93	Nicola	Elia	Iowa State University
94	Randall	Erb	Northeastern University
95	Georgios	Fainekos	Arizona State University
96	Yaser	Fallah	West Virginia University
97	Zhou	Fang	University of California, San Diego
98	Lu	Feng	University of Pennsylvania
99	Flavio	Fenton	Georgia Institute of Technology
100	Cornelia	Fermuller	University of Maryland
101	Eric	Feron	Georgia Institute of Technology
102	Massimo	Franceschetti	University of California, San Diego
103	Shengli	Fu	University of North Texas
104	Nathan	Fulton	Carnegie Mellon University
105	John	Gallagher	Wright State University
106	Subhashini	Ganapathy	Wright State University
107	Robert	Gao	Case Western Reserve University
108	Sicun	Gao	Massachusetts Institute of Technology
109	Chase	Garwood	U.S. Department of Homeland Security
110	Dennice	Gayme	Johns Hopkins University
111	Erwin	Gianchandani	National Science Foundation
112	Chris	Gill	Washington University
113	Helen	Gill	Retired
114	Eugene	Goldfield	Boston Children's Hospital/Harvard
115	Julian	Goldman	Massachusetts General Hospital and & Center for Integration of Medicine and Innovative Technology
116	Mani	Golparvar-Fard	University of Illinois, Urbana-Champaign
117	Manimaran	Govindarasu	Iowa State University
118	Richard	Gray	Food and Drug Administration
119	Paul	Green	University of Michigan
120	William	Griswold	University of California, San Diego
121	Jessy	Grizzle	University of Michigan

#	First Name	Last Name	Organization
122	Radu	Grosu	Technical University Vienna
123	Marco	Gruteser	Rutgers University
124	Rajesh	Gupta	University of California, San Diego
125	Vijay	Gupta	University of Notre Dame
126	Abhishek	Halder	Texas A&M University
127	Sean	Hamilton	University of California, San Diego
128	Andrew	Hassevoort	The University of North Carolina, Chapel Hill
129	John	Hatcliff	Kansas State University
130	John	Hauser	University of Colorado Boulder
131	Zachary	Hayden	National Science Foundation
132	Henry Zhihai	He	University of Missouri
133	Tian	He	University of Minnesota
134	Kevin	Heaslip	Virginia Polytechnic Institute and State University
135	Kory	Hedman	Arizona State University
136	Joao	Hespanha	University of California, Santa Barbara
137	Payam	Heydari	University of California, Irvine
138	Heath	Hofmann	The University of Michigan
139	Mohammad	Hossain	Georgia Institute of Technology
140	Tom	Hou	Virginia Polytechnic Institute and State University
141	Jianghai	Hu	Purdue University
142	Yu Hen	Hu	University of Wisconsin, Madison
143	Todd	Humphreys	University of Texas at Austin
144	Petros	Ioannou	University of Southern California
145	Ethan	Jackson	Microsoft
146	Shubham	Jain	Rutgers University
147	Prateek	Jaipuria	University of Southern California /Information Sciences Institute
148	Seongwoon	Jeong	Stanford University
149	Zhihao	Jiang	University of Pennsylvania
150	Taylor	Johnson	University of Texas, Arlington
151	Paul	Jones	Food and Drug Administration
152	Bharat	Joshi	University of North Carolina, Charlotte

#	First Name	Last Name	Organization
153	Temesghen	Kahsai	Carnegie Mellon University
154	Mehdi	Kalantari Khandani	Resensys LLC
155	Michael	Kane	Advanced Research Projects Agency-Energy/U.S. Department of Energy
156	Krishna	Kant	Temple University
157	Sertac	Karaman	Massachusetts Institute of Technology
158	Panagiota	Karava	Purdue University
159	Ali	Karimoddini	North Carolina Agricultural and Technical State University
160	Gabor	Karsai	Vanderbilt University
161	Ryan	Kastner	University of California, San Diego
162	Rajesh	Kavasseri	North Dakota State University
163	Priyanka Dattatri	Kedalagudde	University of Massachusetts Amherst
164	Pramod	Khargonekar	National Science Foundation
165	Namhoon	Kim	The University of North Carolina, Chapel Hill
166	Frankie	King	Vanderbilt University/ Institute for Software Integrated Systems
167	Alex	Kirlik	University of Illinois, Urbana Champaign
168	Soonho	Kong	Carnegie Mellon University
169	Oliver	Kosut	Arizona State University
170	Xenofon	Koutsoukos	Vanderbilt University
171	Hadas	Kress-Gazit	Cornell University
172	Mani	Krishna	University of Massachusetts
173	Srikanth	Krishnamurthy	University of California, Riverside
174	Venkat	Krovi	State University of New York, Buffalo
175	David	Kuehn	Federal Highway Administration/U.S. Department of Transportation
176	Sandeep	Kulkarni	Michigan State University
177	Panganamala	Kumar	Texas A&M University
178	Thomas	Kurfess	Georgia Institute of Technology
179	James	Kurose	National Science Foundation
180	Richard	La	University of Maryland
181	Stephane	Lafortune	University of Michigan
182	Sanjay	Lall	Stanford University

#	First Name	Last Name	Organization
183	David	Lary	University of Texas at Dallas
184	Kincho	Law	Stanford University
185	Edward	Lee	University of California, Berkeley
186	Insup	Lee	University of Pennsylvania
187	Xiaogong	Lee	Federal Aviation Administration
188	Michael	Lemmon	University of Notre Dame
189	Alexander	Lemon	Stanford University
190	Michael	Lewis	University of Pittsburgh
191	Baoxin	Li	Arizona State University
192	Husheng	Li	The University of Tennessee
193	Hai	Lin	University of Notre Dame
194	Michael	Lin	Massachusetts Institute of Technology Media Lab
195	Shan	Lin	Stony Brook University
196	Charles	Liu	University of Southern California
197	Jia	Liu	The Ohio State University
198	Zhenhua	Liu	Stony Brook University
199	Edgar	Lobaton	North Carolina State University
200	Raul	Longoria	University of Texas, Austin
201	Ernest	Lucier	National Coordination Office/Networking and Information Technology Research & Development
202	Srdjan	Lukic	North Carolina State University
203	Jack	Lutz	Iowa State University
204	Robyn	Lutz	Iowa State University
205	Jerome	Lynch	University of Michigan
206	Peter	Lyster	National Coordination Office
207	Steffen	Maass	Georgia Institute of Technology
208	Nina	Mahmoudian	Michigan Technological University
209	Ann	Majewicz	University of Texas, Dallas
210	Fillia	Makedon	University of Texas, Arlington
211	Enrique	Mallada	California Institute of Technology
212	Rahul	Mangharam	University of Pennsylvania

#	First Name	Last Name	Organization
213	Zhi-Hong	Mao	University of Pittsburgh
214	Patrick	Martin	Hampden-Sydney College
215	Nuno	Martins	The University of Maryland / University of Maryland, College Park
216	Margaret	Martonosi	Princeton University & U.S. Department of State
217	Keith	Marzullo	National Coordination Office/Networking and Information Technology R&D
218	Eric	Matson	Purdue University
219	Nicholas	Maxemchuk	Columbia University
220	Sudip	Mazumder	University of Illinois, Chicago
221	Ali	Mehmani	Columbia University
222	Ali	Mehrizi-Sani	Washington State University
223	Sharad	Mehrotra	University of California, Irvine
224	Christoph	Meinrenken	Columbia University
225	Sean	Meyn	University of Florida
226	Paul	Miner	National Aeronautics and Space Administration, Langley Research Center
227	Pitu	Mirchandani	Arizona State University
228	Urbashi	Mitra	University of Southern California
229	Hamed	Mohsenian-Rad	University of California, Riverside
230	Daniel	Morgan	U.S. Department of Transportation
231	Ted	Morris	University of Minnesota
232	Daniel	Moser	University of Texas, Austin
233	Hector	Munoz-Avila	National Science Foundation
234	Pamela	Murray-Tuite	Virginia Polytechnic Institute and State University
235	Srinivasa	Narasimhan	Carnegie Mellon University
236	Sandeep	Neema	Vanderbilt University
237	Tho	Nguyen	University of Virginia - Center for Automata Processing
238	Stefanos	Nikolaidis	Carnegie Mellon University
239	Meeko	Oishi	University of New Mexico
240	Ümit	Özgüner	The Ohio State University
241	Taskin	Padir	Northeastern University

#	First Name	Last Name	Organization
242	Vinay	Pai	National Institutes of Health/National Institute of Biomedical Imaging and Bioengineering
243	Miroslav	Pajic	Duke University
244	Piya	Pal	University of Maryland, College Park
245	George	Pappas	University of Pennsylvania
246	Fabio	Pasqualetti	University of California, Riverside
247	Justin	Pearson	University of California, Santa Barbara
248	Linh Thi Xuan	Phan	University of Pennsylvania
249	Benedetto	Piccoli	Rutgers University, Camden
250	Marcia	Pincus	U.S. Department of Transportation
251	Pierluigi	Pisu	Clemson University
252	Andre	Platzer	Carnegie Mellon University
253	Radha	Poovendran	University of Washington
254	Donna	Poulin	Defense Health Agency
255	Arun	Prakash	Purdue University
256	Sara	Preum	University of Virginia
257	Hairong	Qi	University of Tennessee
258	Zhen	Qian	Carnegie Mellon University
259	Anand	Rajan	Intel Labs
260	Raj	Rajkumar	Carnegie Mellon University
261	Umakishore	Ramachandran	Georgia Institute of Technology
262	Sanjay	Raman	Virginia Polytechnic Institute and State University
263	Parameswaran	Ramanathan	University of Wisconsin, Madison
264	Karthik	Ramani	Purdue University
265	Venkatesh-Prasad	Ranganath	Kansas State University
266	Sanjay	Ranka	University of Florida
267	Stephen	Rees	Vanderbilt University / Institute for Software Integrated Systems
268	Phillip	Regalia	National Science Foundation
269	Shangping	Ren	Illinois Institute of Technology
270	Sokwoo	Rhee	National Institute of Standards and Technology
271	Hanz	Richter	Cleveland State University
272	Jason	Rife	Tufts University

#	First Name	Last Name	Organization
273	Mardavij	Roozbehani	Massachusetts Institute of Technology
274	Nirmalya	Roy	University of Maryland Baltimore County
275	Sandip	Roy	Washington State University
276	Amit	Roy-Chowdhury	University of California, Riverside
277	Walid	Saad	Virginia Polytechnic Institute and State University
278	Murti	Salapaka	University of Minnesota, Twin Cities
279	Srinivasa	Salapaka	University of Illinois, Urbana Champaign
280	Venkatesh	Saligrama	Boston University
281	Eric	Salzman	U.S. Department of State
282	Ricardo	Sanfelice	University of California, Santa Cruz
283	Lalitha	Sankar	Arizona State University
284	Rajesh	Sankaran	Argonne National Laboratory
285	Sriram	Sankaranarayanan	University of Colorado, Boulder
286	Soumik	Sarkar	Iowa State University
287	Arif	Sarwat	Florida International University
288	S. Shankar	Sastry	University of California, Berkeley
289	Enrique	Saurez Apuy	Georgia Institute of Technology
290	Annalisa	Scacchioli	Stevens Institute of Technology
291	Gunar	Schirner	Northeastern University
292	Dan	Schmoldt	National Institute of Food and Agriculture/U.S. Department of Agriculture
293	Benjamin	Seibold	Temple University
294	Peter	Seiler	University of Minnesota
295	Mingoo	Seok	Columbia University
296	Lui	Sha	University of Illinois, Urbana-Champaign
297	Kai	Shen	University of Rochester
298	Kang	Shin	The University of Michigan
299	Sophie	Shulman	U.S. Department of Transportation
300	Mihail	Sichitiu	North Carolina State University
301	Dan	Siegal	Defense Advanced Research Projects Agency Biological Technologies Office/Schafer Corporation
302	Siddhartha	Sikdar	George Mason University

#	First Name	Last Name	Organization
303	Gurdip	Singh	National Science Foundation
304	Scott	Smith	Volpe Center / U.S. Department of Transportation
305	Scott	Smolka	Stony Brook University
306	Oleg	Sokolsky	University of Pennsylvania
307	Sylvia	Spengler	National Science Foundation
308	Jonathan	Sprinkle	University of Arizona
309	Ram	Sriram	National Institute of Standards and Technology
310	Mani	Srivastava	University of California, Los Angeles
311	John	Stankovic	University of Virginia
312	Edward	Steager	University of Pennsylvania
313	Radu	Stoleru	Texas A&M University
314	Peter	Stone	University of Texas, Austin
315	Douglas	Stuart	Boeing
316	Gookwon	Suh	Cornell University
317	Zhi	Sun	University at Buffalo
318	Mac	Schwager	Stanford University / Boston University
319	Katia	Sycara	Carnegie Mellon University
320	Andrew	Symington	University of California, Los Angeles
321	Janos	Sztipanovits	Vanderbilt University/Institute for Software Integrated Systems
322	Paulo	Tabuada	University of California, Los Angeles
323	Addisu	Taddese	Vanderbilt University
324	Robert	Tamburo	Carnegie Mellon University
325	Xiaobo	Tan	Michigan State University
326	Herbert	Tanner	University of Delaware
327	Brian	Teague	Massachusetts Institute of Technology Synthetic Biology Center
328	Thomas	Torgersen	National Science Foundation
329	Lang	Tong	Cornell University
330	Ufuk	Topcu	The University of Texas
331	Scott	Tousley	Department of Homeland Security
332	Matthew	Tresch	Northwestern University
333	Hung	Trinh	U.S. Public Health Service

#	First Name	Last Name	Organization
334	Stavros	Tripakis	University of California, Berkeley
335	Shih-Hao	Tseng	Cornell University
336	Panagiotis	Tsiotras	Georgia Institute of Technology
337	Frank	Vahid	University of California, Riverside
338	Nitin	Vaidya	University of Illinois, Urbana-Champaign
339	Umesh	Vaidya	Iowa State University
340	Prashant	Vaidyanathan	Boston University
341	Kimon	Valavanis	University of Denver
342	Chris	vanBuskirk	Vanderbilt University / Institute for Software Integrated Systems
343	Raj	Varadarajan	Siemens Corporate Technology
344	Patricio	Vela	Georgia Institute of Technology
345	Nalini	Venkatasubramanian	University of California, Irvine
346	Jesse	Walker	Intel Corporation
347	Conor	Walsh	Harvard University- Wyss Institute
348	Yan	Wan	University of North Texas
349	Junmin	Wang	Boston University
350	Le Yi	Wang	Wayne State University
351	Pu	Wang	Wichita State University
352	Shige	Wang	General Motors Research and Development
353	Xiaofeng	Wang	University of South Carolina
354	Emily	Wehby	Vanderbilt University/Institute for Software Integrated Systems
355	James	Weimer	University of Pennsylvania
356	Ron	Weiss	Massachusetts Institute of Technology
357	Jin	Wen	Drexel University
358	Jules	White	Vanderbilt University/ Institute for Software Integrated Systems
359	Vincent	White	U.S. Department of Transportation
360	Daniel	Work	University of Illinois, Urbana-Champaign
361	Teresa	Wu	Arizona State University
362	Wencen	Wu	Rensselaer Polytechnic Institute
363	Yufeng	Xin	Renaissance Computing Institute, The University of North Carolina, Chapel Hill
364	Wenyao	Xu	State University of New York, Buffalo
365	Mark	Yampolskiy	University of South Alabama

#	First Name	Last Name	Organization
366	Lily	Yang	Intel Corporation
367	Alec	Yasinsac	University of South Alabama
368	Mark	Yim	University of Pennsylvania
369	Yafeng	Yin	University of Florida
370	Wei	Yu	Towson University
371	Hitten	Zaveri	Yale University
372	Baosen	Zhang	University of Washington
373	Desheng	Zhang	University of Minnesota
374	Fumin	Zhang	Georgia Institute of Technology
375	Hongwei	Zhang	Wayne State University
376	Pei	Zhang	Carnegie Mellon University
377	Wei	Zhao	University of Macau
378	Minghui	Zhu	Pennsylvania State University
379	Quanyan	Zhu	New York University
380	Saman	Zonouz	Rutgers University

POSTER AND DEMONSTRATION SESSION

current as of 11/9/15

2015 NSF CPS PI MEETING – POSTER SESSION

November 16-17, 2015
Renaissance Arlington Capital View
Arlington, VA

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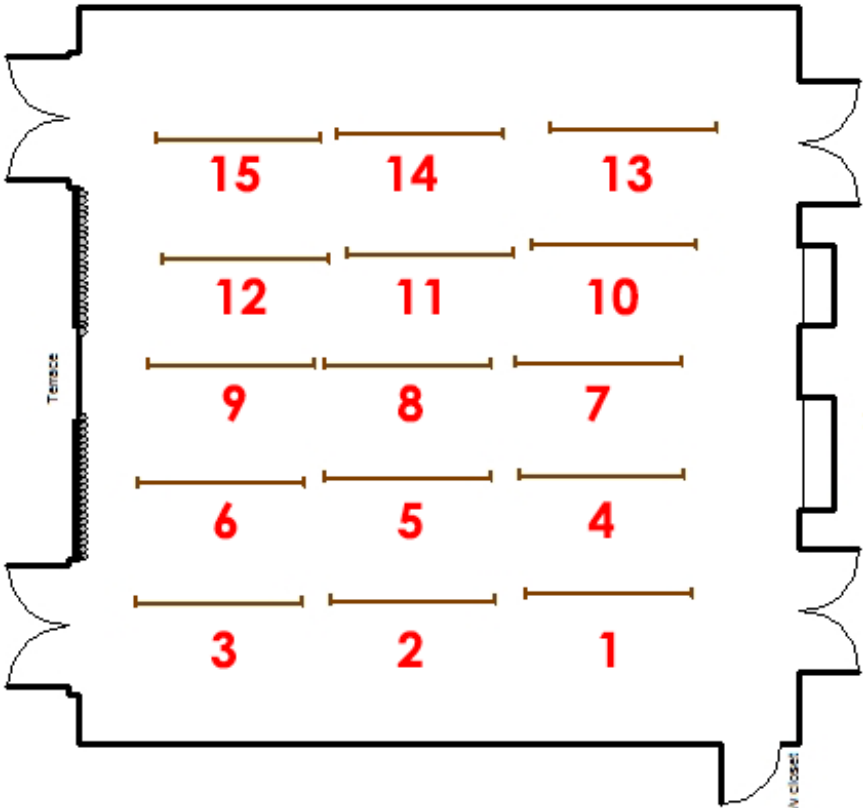
2015 NSF CPS PI MEETING – POSTER SESSION

November 16-17, 2015
Renaissance Arlington Capital View
Arlington, VA

STUDIO E
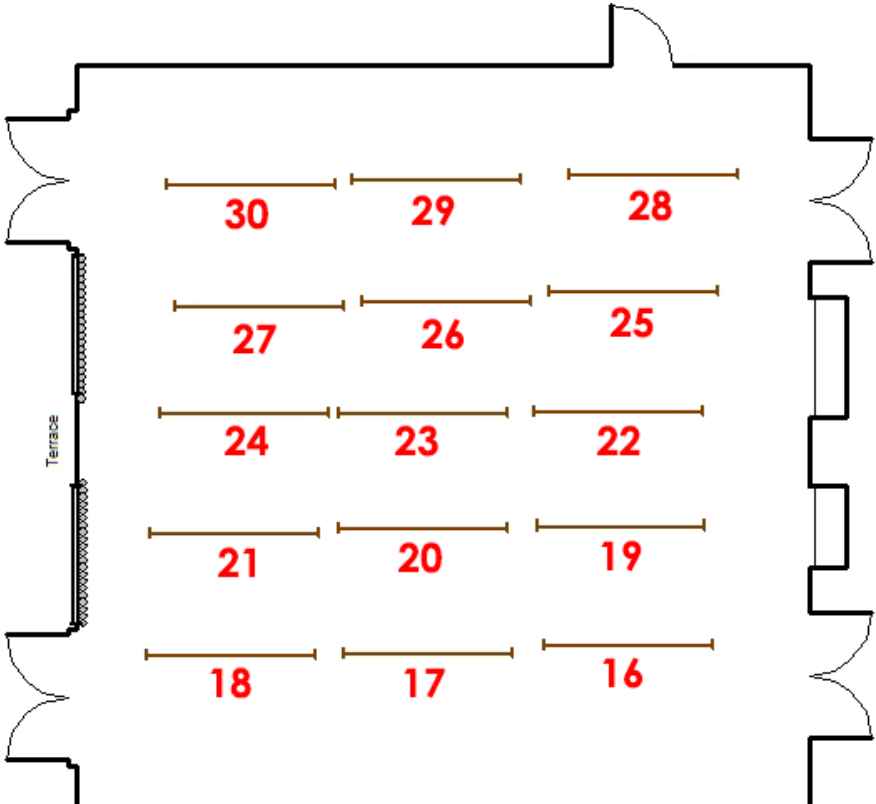
2015 NSF CPS PI MEETING – POSTER SESSION

November 16-17, 2015
Renaissance Arlington Capital View
Arlington, VA

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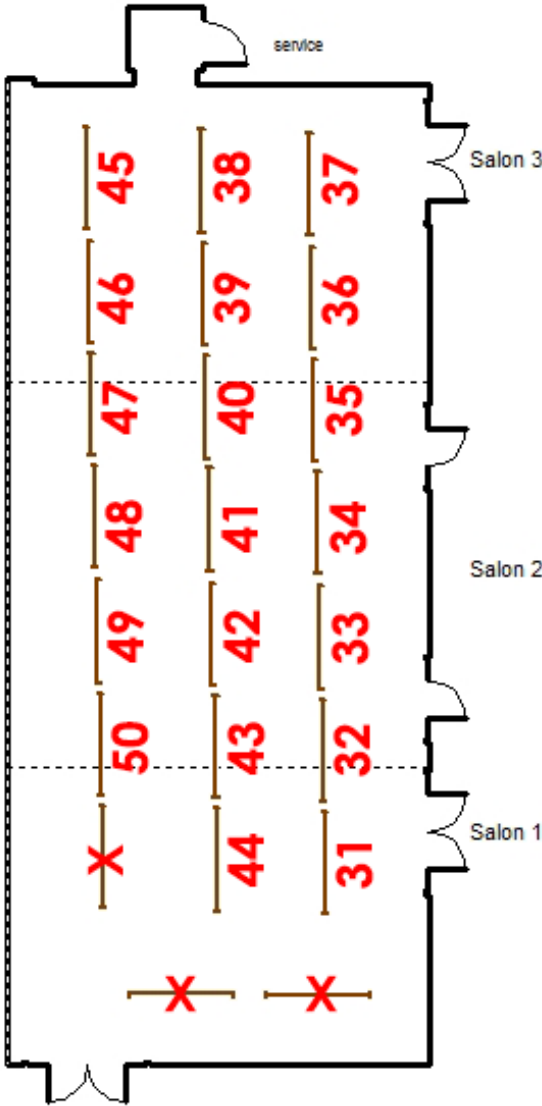
2015 National Science Foundation - Cyber-Physical Systems Principal Investigators' Meeting - Poster Session - Current as of 11/9/15

L= Left| R=Right		Fr=Front | B=Back				
Poster #	Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
1	Fr-L	Monday	Abdelkhalik	Ossama	Ossama Abdelkhalik	1446622	CPS: Breakthrough: Toward Revolutionary Algorithms for Cyber-Physical Systems Architecture Optimization
1	Fr-R	Monday	Ackimese	Behcet	Behcet Ackimese	1446578; 1446520; 1446812	CPS: Synergy: Collaborative Research: Autonomy Protocols: From Human Behavioral Modeling to Correct-By-Construction, Scalable Control
1	B-L	Monday	Al Faruque	Mohammad	Mohammad Al Faruque	15056644	Breakthrough: CPS-Security: Towards Provably Correct Distributed Attack-Resilient Control of Unmanned-Vehicle-Operator Networks
1	B-R	Monday	Anderson	James	Namhoon Kim	1239135; 1239246	Bringing the Multicore Revolution to Safety-Critical Cyber-Physical Systems
2	Fr-L	Monday	Anderson	James	Andrew Hassevoort	1446631	Doing More with Less: Cost-Effective Infrastructure for Automotive Vision Capabilities
2	Fr-R	Monday	Arcak	Murat	Murat Arcak	1446145; 1446151	Efficient Traffic Management: A Formal Methods Approach
2	B-L	Monday	Bai	Erwei	Erwei Bai	1239509	Source Localization by a Network of Imperfect Binary Sensors
2	B-R	Monday	Bai	Ou	Ou Bai	1446737	A Wireless, Smart EEG System for Volitional Control of Lower-Limb Prosthesis
3	Fr-L	Monday	Belta	Calin	Calin Belta	1446607; 1446592; 1446592	CPS Frontier "Collaborative Research bioCPS for Engineering Living Cells"
3	Fr-R	Monday	Bhanu	Bir	Bir Bhanu	1330110	CPS: Synergy: Distributed Sensing, Learning and Control in Dynamic Environments
3	B-L	Monday	Borrelli	Francesco	Francesco Borrelli	1239323	CPS: Synergy: Provably Safe Automotive Cyber-Physical Systems with Humans-in-the-Loop
3	B-R	Monday	Bozkurt	Alper	Alper Bozkurt	1239243	Collaborative Research: Cyborg Insect Networks for Exploration and Mapping (CINEMa)

Poster #	Day		PI Last Name	PI First Name	Presenter	Award #	Poster Title
4	Fr-L	Monday	Roberts	David	Alper Bozkurt	1329738	CPS: Synergy: Integrated Sensing and Control Algorithms for Computer-Assisted Training
4	Fr-R	Monday	Brisk	Philip	Philip	1035603; 1545097	Cyber-physical Digital Microfluidics: Software-programmable High-density Pixel Array
4	B-L	Monday	Bushnell	Linda	Linda Bushnell	1544173	CPS: Synergy: Certifiable, Attack-resilient Submodular Control Framework for Smart Grid Stability
4	B-R	Monday	Cassandras	Christos	Christos Cassandras	1239021; 1239102; 1239030	A Cyber-Physical Infrastructure for the "Smart City"
5	Fr-L	Monday	Cavusoglu	M. Cenk	M. Cenk Cavusoglu	1035602	A Framework for Validation and Monitoring of Robotic Surgery Systems
5	Fr-R	Monday	Chantem	Tam	Tam Chantem	1545091; 1544601	Semi-Automated Emergency Response Systems
5	B-L	Monday	Chaudhuri	Nilanjan Ray	Nilanjan Ray Chaudhuri	1464208	CRII: CPS: Architecture and Distributed Computation in the Networked Control Paradigm: An Autonomous Grid Example
5	B-R	Monday	Chizeck	Howard	Howard Chizeck	1329751	CPS: Breakthrough: Secure Telerobotics
6	Fr-L	Monday	Cleaveland	Rance	Rance Cleaveland	1446665	Generalized Synchronization Trees
6	Fr-R	Monday	Cortes	Jorges	Jorges Cortes	1329619	Robust team-triggered coordination for real-time control of networked cyber-physical systems
6	B-L	Monday	Culler	David	David Culler	1239552	CPS: Synergy: Software Defined Buildings
6	B-R	Monday	Das	Sanjoy	Sanjoy Das	1136040	Holonic Multi-Agent Control of Intelligent Power Distribution Systems
7	Fr-L	Monday	Das	Sajal	Sajal Das	1545037	CPS: Breakthrough: Collaborative: Securing Smart Grid by Understanding Communications Infrastructure Dependencies
7	Fr-R	Monday	Kant	Krishna	Krishna Kant & Sajal Das	1544904; 1545037	Securing Smart Grid by Understanding Communications Infrastructure Dependencies

Poster #		Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
7	B-L	Monday	Das	Sajal	Sajal Das	1545050	Collaborative Research: Threat Assessment Tools for Management-Coupled Cyber- and Physical-Infrastructures
7	B-R	Tuesday	Roy	Sandip	Sandip Roy	1544863; 1545050	CPS: Synergy: Collaborative Research: Threat-Assessment Tools for Management-Coupled Cyber and Physical Infrastructures
8	Fr-L	Monday	Diggavi	Suhas	Suhas Diggavi	1136114	Foundations of Secure Cyber-Physical Systems
8	Fr-R	Monday	Gajski	Daniel	Frank Vahid	1136146	Exploration of the Cyber-Physical Design Space
8	B-L	Monday	Del Vecchio	Domitilla	Domitilla Del Vecchio	1239182	Collaborative Research: Formal Design of Semi-Autonomous Cyberphysical Transportation Systems
8	B-R	Tuesday	Dullerud	Geir	Geir Dullerud	1329991	Verifying Continuous-time Stochastic Hybrid Systems via Mori-Zwanzig Model Reduction
9	Fr-L	Monday	Egerstedt	Magnus	Magnus Egerstedt	1544332	Safe and Secure Open-Access Multi-Robot Systems
9	Fr-R	Monday	Egerstedt	Magnus	Magnus Egerstedt	1239225	CPS: Synergy: Collaborative Research: Hybrid Control Tools for Power Management and Optimization in Cyber-Physical Systems
9	B-L	Monday	Eisenberg	Jon	Jon Eisenberg	1400278	Future Research Goals and Directions for Foundational Science in Cybersecurity, Phase Two
9	B-R	Monday	Elia	Nicola	Nicola Elia	1239319	CPS: Breakthrough: Distributed computing under uncertainty: a new paradigm for cooperative cyber-physical systems
10	Fr-L	Monday	Erb	Randall	Randall Erb	1329649	CPS: Breakthrough: A Cyber-Physical Framework for Magnetic Resonance Imaging (MRI) Guided Magnetic NanoParticles
10	Fr-R	Monday	Gallagher	John	John C. Gallagher	1239196; 1239171; 1239229	Methodologies for Engineering with Plug-and-Learn Components: Synthesis and Analysis Across Abstraction Layers
10	B-L	Monday	Ganapathy	Subhashini	Subhashini Ganapathy	1528550	CPS Eager: Intelligent Agent Incident Command System (ICS) Augmentation

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Poster #		Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
10	B-R	Monday	Gayme	Dennice	Dennice Gayme	1544771, 1544724; 1544761; 1545096	CPS: Synergy: Collaborative Research: Beyond Stability: Performance, Efficiency and Disturbance Management for Smart Infrastructure Systems
11	Fr-L	Monday	Goldfield	Eugene	Eugene Goldfield	1329363	Multi-Robot Cyberphysical System For Assisting Young Developmentally-Delayed Children in Learning to Walk
11	Fr-R	Monday	Golparvar-Fard	Mani	Mani Golparvar-Fard	1446765	Autonomous Vision-based Construction Project Monitoring
11	B-L	Monday	Govindarasu	Manimaran	Aditya Ashok	1446831	CPS: Synergy: High-Fidelity, Scalable, Open-Access Cyber Security Testbed for Accelerating Smart Grid Innovations & Deployments
11	B-R	Monday	Gupta	Vijay	Vijay Gupta	1239224; 1239408; 1312390	Architectural and Algorithmic Solutions for Large Scale PEV Integration into Power Grids
12	Fr-L	Monday	Hatcliff	John	John Hatcliff & Venkatesh Ranganath	1239543; 1239324	CPS: Synergy: Collaborative Research: Trustworthy Composition of Dynamic App-Centric Architectures for Medical Application Platforms
12	Fr-R	Monday	He	Tian	Tian He a& Desheng Zhang	CNS-1446640	coRide: Data-driven Ridesharing Service for Large-Scale Vehicle Networks
12	B-L	Monday	He	Henry Zhihai	Henry Zhihai He	1544794	CPS: Synergy: Collaborative Research: Cyber-Physical Sensing, Modeling, and Control for Large-Scale Wastewater Reuse and Algal Biomass Production
12	B-R	Monday	Hu	Jianghai	Jianghai Hu	1329875	CPS: Synergy: Plug-and-Play Cyber-Physical Systems to Enable Intelligent Buildings
13	Fr-L	Monday	Ioannou	Petros	Petros Ioannou	1545130	CPS: Synergy: Cyber-Physical Regional Freight Transportation System
13	Fr-R	Monday	Jiang	Hongrui	Hongrui Jiang	1329481	Smart Flexible Camera Sheet: Ultra-thin Semantic-guided Cooperative Micro-camera Array
Located adjacent to Demo		Monday and Tuesday	Johnson	Taylor	Taylor T. Johnson	1464311	CRII: CPS: Safe Cyber-Physical Systems Upgrades

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Poster #	Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
13	B-L	Monday	Kahsai	Temesghen	Temesghen Kahsai	1136008; 1135955	Credible Autocoding and Verification of Embedded Software (CrAVES)
13	B-R	Monday	Kavasseri	Rajesh	Rajesh Kavasseri	1544621; 1544645	WARP: Wide Area Resilient Protection
14	Fr-L	Tuesday	Mazumder	Sudip	Sudip Mazumder	1239118	Boolean Microgrid
14	Fr-R	Tuesday	Kumar	Panganamala	P.R. Kumar & Abhishek Halder	1239116	Boolean Microgrid
14	B-L	Monday	Karaman	Sertac	Sertac Karaman	1350685	CAREER: Practical Algorithms and Fundamental Limits for Complex Cyber-Physical Systems
14	B-R	Monday	Karaman	Sertac	Sertac Karaman	1523401	EAGER: Autonomy-enabled Shared Vehicles for Mobility on Demand and Urban Logistics
Located adjacent to Demo		Monday and Tuesday	Karaman	Sertac	Sertac Karaman & Mao Zhi-Hong	1544413	CPS: Synergy: Design and Control of High-performance Provably-safe Autonomy-enabled Dynamic Transportation
15	Fr-L	Monday	Kulkarni	Sandeep	Sandeep Kulkarni	1329807	Scalable Component-based Model Revision of Cyber-Physical Systems with Separation of Concerns
15	Fr-R	Monday	Kurfess	Thomas	Thomas Kurfess	1329742	Converting Multi-Axis Machine Tools into Subtractive 3D Printers by using Intelligent Discrete Geometry Data Structures
15	B-L	Monday	Karsai	Gabor	Abhishek Dubey	1329803	Diagnostics and Prognostics Using Temporal Causal Models for Cyber-Physical Systems – A Case of Smart Electric Grid
Located adjacent to Demo		Monday and Tuesday	Dubey	Abhishek	Abhishek Dubey	1528799	Experiments with Smart City Hubs: Integration Platform for Human Cyber-Physical Systems In Smart Cities
15	B-R	Monday	Kirlik	Alex	Alex Kirlik	1330077	CPS: Synergy: Collaborative Research: Engineering Safety-Critical Cyber-Physical-Human Systems
16	Fr-L	Monday	Kolmanovsky	Ilya	Ella Atkins	1544844	CPS:GOALI:Synergy: Maneuver and Data Optimization for High Confidence Testing of Future Automotive Cyberphysical Systems

Poster #	Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
16	Fr-R	Tuesday	Lafortune	Stephane	Stephane Lafortune	1446298	CPS: Breakthrough: Development of Novel Architectures for Control and Diagnosis of Safety-Critical Complex Cyber-Physical System
16	B-L	Tuesday	Lall	Sanjay	Alex Lemon	1544199	Sufficient Statistics for Team Decision Problems
Located adjacent to Demo	Monday and Tuesday	Lary	David	David Lary	1541227	GASP: Geolocated Allergen Sensing Platform
16	B-R	Tuesday	Law	Kincho	Seongwoon Jeong	1446330	Cyber Infrastructure for Bridge Lifecycle Monitoring
17	Fr-L	Tuesday	Lee	Insup	Lu Feng & James Weimer	1505799	Synergy: Collaborative Research: Security and Privacy-Aware Cyber-Physical Systems
17	Fr-R	Tuesday	Lee	Ji-Woong	Heath Hofmann	1329539	Digital Control of Hybrid Systems via Simulation and Bisimulation
17	B-L	Monday	Lee	Edward	Edward Lee	1446619	A Mathematical Theory of Cyber-Physical Systems
17	B-R	Tuesday	Lemmon	Michael	Michael Lemmon	1239222	Resilient Wireless Sensor Actuator Networks
18	Fr-L	Tuesday	Li	Husheng	Husheng Li	1543830	CPS: Breakthrough: An Entropy Framework for Communications and Dynamics Interdependency in Cyber-Physical Systems: Analysis, Design and Implementation
18	Fr-R	Tuesday	Tomsovic	Kevin	Husheng Li	1239366	CPS: Synergy: A Cyber-Physical Framework for Remedial Action Schemes in Large Power Networks
18	B-L	Tuesday	Li	Baoxin	Baoxin Li	1135616	GoingEasy® with Crowdsourcing – Building Cyber-Physical Systems for People with Visual Impairment
18	B-R	Tuesday	Lin	Hai	Hai Lin	1446288	Dependable Multi-Robot Cooperative Tasking in Uncertain and Dynamic Environments
19	Fr-L	Tuesday	Liu	Zhenhua	Zhenhua Liu	1464388	Enabling Demand Response from Cloud Data Centers -- from Sustainable IT to IT for Sustainability
19	Fr-R	Tuesday	Luong	Anh	Adwait Dongare	1329755; 1329644; 1329650	Research Platform for Quality of Time (QoT) Stack

Poster #		Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
19	B-L	Tuesday	Lutz	Robyn	Robyn R. Lutz	1545028	Detecting and Recovering from Faults in Programmed Molecular Systems
19	B-R	Tuesday	Lynch	Jerome	Jerome P. Lynch	1446521	Enhanced Structural Health Monitoring of Civil Infrastructure by Observing and Controlling Loads using Cyber-Physical Systems
20	Fr-L	Tuesday	Mahmoudian	Nina	Nina Mahmoudian	1453886	Power Distribution System for Continuous Operation
20	Fr-R	Tuesday	Makedon	Fillia	Fillia Makedon	1035913	A Novel Human Centric CPS to Improve Motor/Cognitive Assessment and Enable Adaptive Rehabilitation
Located adjacent to Demo		Monday and Tuesday	Gruteser	Marco	Shubham Jain	1330118	Harnessing the Automotive Infoverse
20	B-L	Tuesday	Maxemchuk	Nicholas	Nick Maxemchuk	1329593	Verification of Intelligent Driving Systems
20	B-R	Tuesday	Meinrenken	Christoph	Ali Mehmani	1524628	Advanced peak demand forecast and battery dispatch algorithms to integrate storage-based demand response with BAS
21	B-R	Tuesday	Martins	Nuno	Nuno Martins	1135726; 1135719	Remote Imaging of Community Ecology via Animal-borne Wireless Networks
21	Fr-L	Tuesday	Martins	Nuno	Nuno Martins	1446785	Designing semi-autonomous networks of miniature robots for inspection of bridges and other large infrastructures
21	Fr-R	Tuesday	Narasimhan	Srinivasa	Srinivasa Narasimhan	1446601	Synergy: Anytime Visual Scene Understanding of Heterogeneous and Distributed Cyber-Physical Systems
21	B-L	Tuesday	Fainekos	Georgios	Georgios Fainekos	1350420	CAREER: Robustness Guided Testing and Verification for Cyber-Physical Systems
22	Fr-L	Tuesday	Özgüner	Ümit	Ümit Özgüner	1446730; 1446735	CPS: Synergy: Collaborative Research: Collaborative Vehicular Systems
Located adjacent to Demo		Monday and Tuesday	Padir	Taskin	Taskin Padir	1509782	CARE: Cyber-Physical Systems for Advanced Response to Epidemics
22	Fr-R	Monday	Krogh	Bruce	Nathan Fulton	1035800; 1054246	The KeYmaera X Theorem Prover for Hybrid Systems

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Poster #		Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
Located adjacent to Demo		Monday and Tuesday	Platzer	Andre	Andre Platzer & Nathan Fulton	1446712	Knowledge-Aware Cyber-Physical Systems
22	B-L	Tuesday	Poovendran	Radha	Radha Poovendran	1446866	CPS: Breakthrough: Towards a Science of Attack Composition, Mitigation and Verification in CPS: A Passivity Based Approach
22	B-R	Monday	Qian	Zhen (Sean)	Sean Qian	1544826; 1544835; 1545043	Matching Parking Supply to Travel Demand towards Sustainability
23	Fr-L	Tuesday	Ren	Shangping	Shangping Ren & Lui Sha	1545008	Executable Distributed Medical Best Practice Guidance (EMBG) System for End-to-End Emergency Care from Rural to Regional Center
23	Fr-R	Tuesday	Richter	Hanz	Hanz Richter	1544702	Cyber-Enabled Repetitive Motions in Rehabilitation
23	B-L	Tuesday	Roy	Nirmalya	Nirmalya Roy	1544687	Low-cost Continuous Virtual Energy Audits in Cyber-Physical Building Envelope
23	B-R	Tuesday	Roy-Chowdhury	Amit	Amit Roy-Chowdhury	1544969	Extracting time-critical situational awareness from resource constrained networks
24	Fr-L	Tuesday	Saad	Walid	Walid Saad	1446621	Towards Secure Networked Cyber-Physical Systems: A Theoretic Framework with Bounded Rationality
24	Fr-R	Tuesday	Salapaka	Murti	Murti Salapaka	1544721; 1544635	Learning from Cells for transport at micron scale
24	B-L	Tuesday	Sarkar	Soumik	Soumik Sarkar	1464279	A Knowledge Representation and Information Fusion Framework for Decision Making in Complex Cyber-Physical Systems
24	B-R	Tuesday	Shin	Kang	Kang Shin	1446117	Adaptive management of large energy storage systems for vehicle electrification
25	Fr-L	Tuesday	Shin	Kang	C. M. Krishna	1329702	Thermal Management of Cyber-Physical Systems
25	Fr-R	Tuesday	Smolka	Scott	Greg Byrne	1445770	Closed-Loop Formal Verification of ICDs Using Cardiac Electrophysiological Models
Located adjacent to Demo		Monday and Tuesday	Banerjee	Suman	Suman Banerjee	1525586	Population Analytics through a WiFi-based Edge Computing Platform

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Poster #	Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
25	B-L	Tuesday	Smolka	Scott	Elizabeth Cherry	1446583; 1446664; 1446365; 1446832; 1446725; 1446312; 1446675	CPS: Frontier: Collaborative Research: Compositional, Approximate, and Quantitative Reasoning for Medical Cyber-Physical Systems
25	B-R	Tuesday	Srinivasa	Siddharta	Stefanos Nikolaidis	1544797	Learning control sharing strategies for assistive cyber-physical systems
26	Fr-L	Tuesday	Stone	Peter	Peter Stone	1330072	Reinforcement Learning Algorithms for CPS: The Open-Source TEXPLORE Code Release for Reinforcement Learning on Robots
26	Fr-R	Tuesday	Sprinkle	Jonathan	Sprinkle	1253334	Domain-Specific Modeling Techniques for Cyber-Physical Systems
26	B-L	Tuesday	Sprinkle	Jonathan	Sprinkle	1446435	Control of Vehicular Traffic Flow via Low Density Autonomous Vehicles
26	B-R	Tuesday	Sprinkle	Jonathan	Sprinkle	1544395	Collaborative Research: Computationally Aware Cyber-Physical Systems
27	Fr-L	Tuesday	Hespanha	Joao	Justin Pearson	1329650	Controller Design for Systems with Clock Offsets
27	Fr-R	Tuesday	Srivastava	Mani	Zhou Fang	1329755; 1329644; 1329644; 1329650	Go-RealTime: Knowledge and Control of Time in High Level Programming Language
27	B-L	Tuesday	Srivastava	Mani	Fatima Anwar	1329755	Quality of Time Architecture & APIs
Located adjacent to Demo	Monday and Tuesday	Srivastava	Mani	Andrew Symington	1329755; 1329644; 1329650	An End-to-end Quality of Time (QoT) Stack for Linux
Located adjacent to Demo	Monday and Tuesday	Stankovic	John	John Stankovic	1527563	Eager: Detecting and Addressing Adverse Dependencies Across Human-in-the-Loop In-Home Medical Apps
Located adjacent to Demo	Monday and Tuesday	Stankovic	John	John Stankovic	1239483	Multiple-Level Predictive Control of Mobile Cyber-Physical Systems with Correlated Context
27	B-R	Tuesday	Suh	Ed	Ed Suh	1544788	Safety Assurance of Cyber-Physical Systems Through Secure and Verifiable Information Flow Control
28	Fr-L	Tuesday	Taha	Walid	Corky Cartwright	1136099; 1136104	CPS: Medium: Collaborative Research: A CPS Approach to Robot Design

Poster #		Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
28	Fr-R	Tuesday	Tanner	Herbert	Herbert Tanner	103577; 103588	Efficient Control Synthesis and Learning in Distributed Cyber-Physical Systems
28	B-L	Tuesday	Sztipanovits	Janos	Chris vanBuskirk	1521617	CPS VO Active Resources
28	B-R	Tuesday	Sztipanovits	Janos	Siyuan Dai	1035655	Science of Cyber-Physical System Integration
29	Fr-L	Tuesday	Tripakis	Stavros	Stavros Tripakis	1329759	COSMOI - Compositional System Modeling with Interfaces
29	Fr-R	Tuesday	Vaidya	Umesh	Umesh Vaidya	1329915	A Unified System Theoretic Framework for Cyber Attack-Resilient Power Grid
29	B-L	Tuesday	Venkatasubramanian	Nalini	Nalini Venkatasubramanian	1450768	EAGER: SCALE 2 (Safe Community Awareness and Alerting) - Extending a SmartAmerica Challenge Project
29	B-R	Tuesday	Venkatasubramanian	Nalini	Nalini Venkatasubramanian	1528995	EAGER: Exploring Resilience in SmartCity Water Infrastructure
30	Fr-L	Tuesday	Valdastri	Pietro	Addisu Taddese	1239355	CPS: Synergy: Integrated Modeling, Analysis and Synthesis of Miniature Medical Devices
30	Fr-R	Tuesday	Walsh	Conor	Jaehyun Bae	1446464	Human-Machine Interaction with Mobility Enhancing Soft Exosuits
Located adjacent to Demo		Monday and Tuesday	Wan	Yan	Yan Wan	1453722	Co-Design of Networking and Decentralized Control to Enable Aerial Networks in an Uncertain Airspace
Located adjacent to Demo		Monday and Tuesday	Wan	Yan	Yan Wan & Shengli Fu	1522458	EAGER: Aerial Communication Infrastructure for Smart Emergency Response
30	B-L	Tuesday	White	Jules	Jules White	1446303	CPS: Synergy: Collaborative Research: Cyber-Physical Approaches to Advanced Manufacturing Security
30	B-R	Tuesday	Wu	Teresa	Jin Wen	1239247; 1239093; 1239257	SMARTER -Smart Manager for Adaptive and Real-Time decisions in building clustERs

Poster #		Day	PI Last Name	PI First Name	Presenter	Award #	Poster Title
31	Fr-L	Tuesday	Wu	Wencen	Wencen Wu	1446461; 1446557; 1446484	Collaborative Research: Towards Effective and Efficient Sensing-Motion Co-Design of Swarming Cyber-Physical Systems
31	Fr-R	Tuesday	Xin	Yufeng	Yufeng Xin	1329745; 1329780	CPS: Synergy: Collaborative Research: Distributed Asynchronous Algorithms and Software Systems for Wide-Area Mentoring of Power Systems
Located adjacent to Demo		Monday	Kress-Gazit	Hadas	Hadas Kress-Gazit	1329692	High-level perception and control for autonomous reconfigurable modular robots
Located adjacent to Demo		Monday	Yim	Mark	Mark Yim	1329620	High-level perception and control for autonomous reconfigurable modular robots
31	B-L	Tuesday	Yu	Wei	Wei Yu	1350145	Multistep Electricity Price in Electricity Market in Smart Grid
31	B-R	Tuesday	Zaveri	Hitten	Hitten Zaveri & Bharat Joshi	1544986; 1544633	Fault-Tolerant Brain Implantable Cyber-Physical System
32	Fr-L	Tuesday	Zhang	Hongwei	Hongwei Zhang, Le Yi Wang	1136007	A Cross-Layer Approach to Taming Cyber-Physical Uncertainties in Vehicular Wireless Networking and Platoon Control
32	Fr-R	Tuesday	Zhang	Baosen	Baosen Zhang	1544160	Active Regression for Cyberphysical Systems
32	B-L	Tuesday	Zhu	Minghui	Minghui Zhu	1505664	Breakthrough: CPS-Security: Towards Provably Correct Distributed Attack-Resilient Control of Unmanned-Vehicle-Operator Networks
32	B-R	Tuesday	Zink	Michael	Priyanka Dattatri Kedalagudde	1350752	CAREER: Sensing as a Service - Architectures for Closed-Loop Sensor Network Virtualization Applications
33	Fr-L	Tuesday	Schurgers	Curt	Ryan Kastner	1344291	SPIRE Track I: Distributed Sensing Collective to Capture 3D Soundscapes
33	Fr-R	Tuesday	Papanikolopoulos	Nikolas	Theodore Morris	1544887	Dynamic Methods of Traffic Control that Impact Quality of Life in Smart Cities
33	B-L	Monday	Grizzle	Jesse	Aaron Ames	1239055; 1239037; 1239085	Dynamic Methods of Traffic Control that Impact Quality of Life in Smart Cities
33	B-R	Monday	Pasqualetti	Fabio	Fabio Pasqualetti	1405330	Dynamic Methods of Traffic Control that Impact Quality of Life in Smart Cities

2015 National Science Foundation – Cyber-Physical Systems Principal Investigators' Meeting – Demonstration Session – Current as of 11/9/15

#	First Name	Last Name	Affiliation	Award #	Demonstration Abstract
1	Suman	Banerjee	University of Wisconsin-Madison	1525586	The demonstration will showcase how vehicle mounted wireless sensors track users on transit systems and provide feedback on utilization on transit vehicles. It provides unique data on transit usage behaviors, using passive, wireless-based techniques that are easy to obtain, preserves user privacy, and yet provides useful analytics to the transit operators.
2	Abhishek	Dubey	Vanderbilt University	1528799	Demonstration of CPS-EAGER- Experiments with Smart City Hubs: Integration Platform for Human Cyber-Physical Systems In Smart Cities
3	Zhou	Fang	University of California San Diego	1329766	We plan to demonstrate Go-RealTime programming language. We will run several testcases in Go-RealTime, show the real-time scheduler and tunable quality of time in our language runtime.
4	Marco	Gruteser	Rutgers University	1330118	Our demonstration will showcase several benefits of the use of vehicle sensors, together with cloud databases and phone sensors. Specifically, we will show examples of precise positioning, and analytics possible by instrumenting a fleet of vehicles.
5	Taylor	Johnson	University of Texas at Arlington	1464311	HyST is a source-to-source translation and transformation tool for cyber-physical systems modeled as networks of hybrid automata, which takes input in the SpaceEx model format, and translates to the formats of several other hybrid systems verification and design tools including Flow*, dReach, HyComp, and the MathWorks' Simulink/Stateflow(SLSF). HyST supports automatic abstractions including hybridization (which converts a continuous systems to a hybrid automaton with simpler dynamics), continuization (which converts a hybrid automaton to a purely continuous system), order reduction (which reduces the dimensionality of a hybrid system), and several others. HyST is being used to help standardize the plethora of hybrid systems formats to make objective comparisons between verification methods, and is available online: http://verivital.com/hyst/
6	Sertac	Karaman	MIT	1523401	We will display an autonomous tricycle that is capable of moving people and goods in urban environments. The tricycle itself will be on display. Videos of its operation will be displayed on a video screen.
7	David	Lary	University of Texas at Dallas	1541227	Pollen & Air Quality IoT sensors demonstration for GASP: Geolocated Allergen Sensing Platform.
8	Taskin	Padir	Northeastern University	1509782	We will demonstrate devices and subsystems from the design of a safe, reliable, and intuitive emergency treatment unit to facilitate a higher degree of safety and situational awareness for medical staff, leading to an increased level of patient care during an epidemic outbreak in an unprepared, underdeveloped, or disaster stricken area. We will also establish a live connection to the CPS testbed so participant can interact with some of the technology developed within the scope of this project.
9	Andre	Platzer	Carnegie Mellon University	1035800	KeYmaera X is a theorem prover for specifying and verifying correctness properties of hybrid systems (systems that mix discrete and continuous dynamics). KeYmaera X implements differential dynamic logic (dL) and provides a high degree of control over automated proof search. This demonstration will showcase how KeYmaera X can be used to analyze and design safe cyber-physical systems.

#	First Name	Last Name	Affiliation	Award #	Demonstration Abstract
10	John	Stankovic	University of Virginia	1527563	In this demo, we present one aspect of our proposed system that focuses on detecting conflicts from textual advice as suggested by different health and wellness medical apps. In particular, we consider over 400 statements of advice from 8 health apps. For a person receiving multiple collections of advice conflicts occur primarily in two ways: (i) direct conflicts that can be detected by identifying textual discrepancy among the parts of the advice (e.g., use of antonyms, negation, or numerical mismatches) and (ii) indirect conflicts that can be detected by understanding the semantics of each piece of advice using external knowledge bases and inferring the impact of the advice. We show only results from (i) since this EAGER project has just started.
11	Andrew	Symington	University of California Los Angeles	1329755	The vision of the RoseLine project is to develop a Quality of Time (QoT) stack for Linux that enables developers to easily write distributed applications that perform computation along a shared timeline, explicitly specifying what tick granularity and deviation from the timeline are considered acceptable. We demonstrate how this QoT stack can be used to write a controller that stabilizes a "distributed" inverted pendulum, where sensing and control/actuation are performed on different networked devices. The controller is resilient against queuing delays in the network, because the QoT stack enables sensing and control to be run in lock-step.
12	Yan	Wan	University of North Texas	1522458	The success of emergency response operations critically relies on the efficiency of on-demand emergency communication infrastructure. We will demonstrate a flexible, cost-effective, and UAV-carried on-demand communication infrastructure, which can support the missions of first responders and mission command and control centers. The specific demonstrations include the display of hybrid energy powered UAVs to support long-duration emergency communication missions, an interactive section of UAVs transmitting ground robot-captured videos, and taped videos of the on-demand deployment of the UAV-carried long-distance communication infrastructure.
13	Mark	Yim	University of Pennsylvania	1329620	We will show several SMORES robot modules driving around on a table docking together and reconfiguring into different shapes. We will also show video of other demonstrations and demonstration the simulation and behavior construction interface for this system.

DINING DIRECTORY
AREA ATTRACTIONS
DRIVING DIRECTIONS

dining

CRYSTAL CITY SHOPS
directory

Bailey's Pub & Grille   703.416.0452
A hardy menu, spectator bar and a bevy of big screens make this sports central.

Hamburger Hamlet   703.413.0422
Simply great food with a broad menu of American favorites and a lively bar.

Jaleo Crystal City   703.413.8181
A sampling of Spanish specialties by culinary legend José Andrés.

King Street Blues   703.415.2583
Old-fashioned comfort food, ribs, bar-b-que and a bar that's hopping.

Kora Restaurant|Bar|Lounge   571.431.7090
A new modern Italian concept from the team who brought you Farrah Olivia by Morou. Highly noted for the 3-course power lunch.

McCormick & Schmick's   703.413.6400
A Washington classic, serious seafood, with standards and service second to none.

Morton's The Steakhouse   703.418.1444
Aged beef, Maine lobster, fish, veal or chicken in a rich, club-like setting.

Neramitra Thai   703.413.8886
A contemporary take on traditional Thai, sophisticated and trendy.

Ruth's Chris Steak House   703.979.7275
Sophisticated New Orleans steakhouse with unbeatable food and beautiful city views.

San Antonio Bar & Grill   703.415.0126
Sizzling dishes from South of the Border and a can't miss margarita.

Ted's Montana Grill   703.416.8337
Ted Turner brings his Craftsman style restaurant of time-honored American fare to Washington.
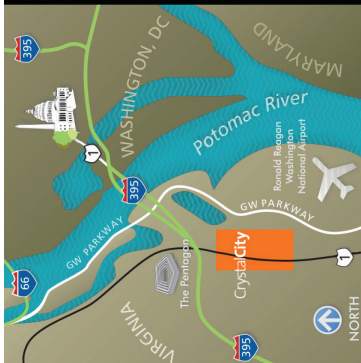
Getting to Crystal City
Crystal City is located in Arlington, Virginia, just off Jefferson Davis Highway, along Crystal Drive between 12th and 23rd Streets, five minutes from downtown Washington, DC, Old Town and Reagan National Airport.

Take Metro's yellow or blue line to the Crystal City stop.

Hours
CRYSTAL CITY SHOPS AT 1750
Weekdays 10am – 7pm   Saturday 10am – 6pm

CRYSTAL CITY SHOPS AT 2100
Monday – Saturday 10am – 6pm

All restaurants open longer.

Parking
Retail parking is free on weekends and after 4:00 PM weekdays.

For detailed driving directions or store hours visit us online at www.thecrystalcityshops.com

For information call (703) 922-INFO (4636).

www.thecrystalcityshops.com

Crystal City Directory Map

NORTH

To Washington, DC → · ← To Alexandria · To Reagan National Airport

Jefferson Davis Highway · Crystal Drive · South Clark Street · Eads Street · South Bell St.

12th Street · 15th Street · 18th Street · 20th Street · 23rd Street · 26th Street

The Water Park

legend
- **A** Shops at Crystal Park
- **B** Shops at 2100 Crystal Drive
- **C** Shops at the Mall
- **D** Shops at 1750 Crystal Drive
- **E** Shops at the Gateway
- Hotel Accommodations
- Interior Pedestrian Concourse
- Entrance/Exit
- Restroom
- Accessible Restroom
- ATM
- Free WiFi Hot Spot
- Information
- Parking

RESTAURANTS
Code	Name	Phone
B-50	Bailey's Pub & Grille	416-0852
B-49	Hamburger Hamlet	413-0422
B-39	Jaleo Crystal City	413-8181
D-50	King Street Blues	415-BLUE
B-40	Kora Restaurant	571-431-7090
B-51	Bar Lounge	
B-51	McCormick & Schmick's	413-6400
D-54	Morton's The Steakhouse	418-1444
B-45	Meramiera Thai	979-7275
A-20	Ruth's Chris Steak House	418-0226
D-42	San Antonio Bar & Grill	413-2233
B-41	Ted's Montana Grill	416-8337

FOOD SPECIALTY
Code	Name	Phone
D-18	Auntie Anne's Pretzels	413-6408
B-24	Au Bon Pain	418-0715
D-51	Café Jenna	415-0061
A-15	Café Mamma	418-0341
B-44	Chick-fil-A	415-7815
A-10	Chipotle Mexican Grill	920-8779
B-42	Cold Stone Creamery	418-2223
B-43	Corner Bakery Café	412-0131
A-2	Cosi	521-1504
D-26	Deli Works	415-1515
E-4	Dickey's Frozen Custard	416-2700
D-25	Dunkin' Donuts	412-8912
A-9	Fru.Zen.Yo	571-431-6103
B-46	Good Stuff Eatery	416-4663
E-10	Green Leaf Café	414-3788
E-23	Larry's Ice Cream & Cookies	418-2100
D-31	Lily Bubble Tea & Smoothie	Summer 2013
D-34	Market Basket & Grocery	412-3770
A-1	Noodles & Company	979-1525
A-18	The Perfect Pita	412-9440
B-22	The Perfect Pita	416-6656
D-38	Philadelphia Mike's	416-6640
B-9	Plaza Gourmet	414-3661
D-63	Potbelly Sandwich Works	415-0003
F-13	Quiznos	415-9900
D-27	Starmi Italian Buffet	413-9244
B-8	Slice N Dice	416-4444
E-11	Soho Café & Market	415-1301
B-23	Starbucks Coffee	418-6226
D-46	Starbucks Coffee	418-0236
B-33	Subway	413-2233
D-39E	Subway	571-257-7878
D-30	Sushi Garden	413-5477

JEWELRY & ACCESSORIES
Code	Name	Phone
D-5	Gina's Fine Jewelry & Gifts	412-1198
D-10	Han Time Center	412-1142
B-15	L.A. Jewels	415-4444
D-41	Réal Jewelers	413-7117
B-7	Time Zone	413-0990
D-56	Woman In Motion	

FASHION
Men's Wear
Code	Name	Phone
D-44	D.C. Men's Wear	413-3434
B-17	Executive Menswear	413-8888

Women's Wear
Code	Name	Phone
B-35	Crystal Boutique	415-1400
D-57	Coqui Boutique	415-5441
D-55	Daniel's Boutique	412-1121
D-61	Dressbarn, Dressbarn Woman	412-6006
D-36	Garden Fantasy	413-5008

Code	Name	Phone
B-28	L.A. Moves	415-6600
D-69	Possessions	416-7839

Shoes
Code	Name	Phone
B-2	Shoes By Lara	416-4162

ELECTRONICS & PHOTOGRAPHY
Code	Name	Phone
D-13	Cellular & Personal Safety	415-0169
D-29	Metro Camera	412-2808
D-47	Radio Shack	413-6529

HEALTH & BEAUTY
Code	Name	Phone
A-14	Crystal Park Sport & Health	418-1962
C-4	Dante's Barber	413-4247
D-37	General Nutrition Center	413-3223
D-45	Hair Cuttery	413-9269
C-1	Image Nalysdel	413-5550
B-2	La Nail & Skin Care	413-6913
D-39B	Mind Your Body Oasis Wellness Center	567-1290
B-36	Nahid Spa & Salon	416-7721
E-6	Ono Salon	415-4740
B-32	Over the Rainbow Nail & Skin	415-0388
D-7	Golden Horn Grits	571-216-1524
D-49	Perfume Paradise	412-0522
D-11	Relaxation Station	412-0698

HOTELS
Name	Phone
Americana	979-9772
Courtyard By Marriott	549-3434
Crowne Plaza	416-1600
Crystal Gateway Marriott	920-3230
Crystal City Marriott	413-5500
Doubletree Hotel	416-4100
Embassy Suites	979-9799
Hampton Inn	418-8181
Hilton	418-6800
Holiday Inn	684-7200
Hyatt Regency	418-1234
Radisson Hotel	920-8600
Renaissance Arlington Capital View	415-1300
Residence Inn Arlington	
Residence Inn by Marriott	413-6630
Ritz Carlton	415-5000
Sheraton	466-1111

GIFTS & SPECIALTY
Code	Name	Phone
D-70	A Touch of Art Framing	413-3427
B-17A	Art Works	412-3754
B-17	As Seen on TV	313-6753
D-29	Carroll Richard Silver & Gifts	412-6070
B-6	Crystal Framing Gallery	415-1112
B-25A	Gallery Underground	571-483-0652
D-3	Dollar Plus	415-0026
D-17	The Engraving Shop	412-4914
A-12	Flowers With Love	415-0777
D-40	Lulu's Hallmark	413-2280
D-7	Off the Wall Cards and Gifts	415-0042
D-8	Perfume Paradise	414-7885
D-60	Puppet Heaven	504-2200
D-24	Schokolad Chocolate Factory	413-6289
D-20	Ship's Hatch	

Studios Underground
Code	Name	Phone
B-30	Studios Underground BLUE	
B-37	Studios Underground CYAN	
	Studios Underground RED	

NEWS & VARIETY
Code	Name	Phone
D-26	Crystal City News	413-6699
C-5	Crystal Mall Convenience	418-0967
A-8	Crystal Park Sundries	271-2710
E-1	Gateway Sundries	412-1500
E-14	Korn's Lobby Shop	416-1111
S-23	Plaza News	415-8637
D-33	Rite Aid	413-5430

MEDICAL SERVICES
Code	Name	Phone
C-1	Alfred J. Gelani, OD	415-1300
B-19	Axis Rehab & Chiropractic	413-6630
D-67	Crystal City Dental	415-5000
	Arts Center	466-1111
D-48	Crystal Eye Care	571-267-1400
D-81	Dawne Carroll, MD – Family Practice & Weight Management	419-9001
B-20	Fiona W. Nasr, DDS	418-1870
D-79	Harvey Oaklander, PhD	415-0555
D-77	Holistic Point at Crystal City	323-8558
D-48	Jeff Chun, OD	413-6688
C-1	Northern Virginia Doctors of Optometry	413-9001
D-40	Richard D. Grantz, DDS	413-1400
D-39C	Professional Sports Care & Rehab	412-1122

BANKS
Code	Name	Phone
B-18	BB&T	415-0312
B-49	Capital One	418-3905
D-L	Navy Federal Credit Union	ATM
D-SL	Wells Fargo (on street level)	413-0844

SERVICES
Code	Name	Phone
A-21	Bright Horizons	416-0767
B-11	Buchanan Shoe Repair	416-3626
D-46	The Commuter Store	413-4267
D-9	Crystal Alterations & Formal Wear	413-2217
B-38	Crystal Cleaners	418-0090
B-1	Crystal Custom Tailor	418-1144
E-5	Crystal Gateway Cleaners	416-0469
D-75	FED-EX Office	413-8011
B-4	Minuteman Press	413-1400
A-19	Park Crystal Valet	414-3333
A-4	Power Space	682-6800
D-2	Shopping Center Mgt. Office	413-4380
E-15	Sparkles Child Care	571-312-1052
B-82	Crystal Square Valet	989-8338
D-66	Underground Cleaners	413-6015
D-19	Underground Shine	413-4111
B-3	University of Oklahoma	418-4800
D-53	U.S. Postal Service	416-0471
D-15	Village Cobbler	412-9881

THEATER
Code	Name	Phone
C-2	Synetic Theater	800-494-8497

SECURITY/LOST & FOUND/PARKING
Code	Name	Phone
D-74	Crystal City Security	413-0150
B-20	Crystal City Parking Office	892-0883

All numbers require a (703) area code unless otherwise noted.

CUSTOMER SEATING/WI-FI
Code	Name
D-39	The Landing

AREA ATTRACTIONS

THE PHILLIPS COLLECTION
1600 21st St NW, Washington, DC 20009
(202) 387-2151
Admission: $12.00 adults; $10.00 students
Hours: Tuesday -Saturday 10 AM- 5 PM; Thursday 10 AM-8:30 PM
Metro Stop: Dupont Circle Station - Q Street exit

INTERNATIONAL SPY MUSEUM
800 F St NW, Washington, DC 20004
(202) 393-7798
Admission: $20.95
Hours: Sunday-Saturday 10 AM-7 PM
Metro Stop: Gallery Place/Chinatown Metrorail Station

SMITHSONIAN NATIONAL ZOOLOGICAL PARK
3001 Connecticut Ave NW, Washington, DC 20008
(202) 633-4888
Admission: Free
Hours: Sunday-Saturday 10 AM-4:30 PM
Metro Stop: Woodley Park-Zoo/Adams Morgan or Cleveland Park

JOHN F. KENNEDY CENTER FOR THE PERFORMING ARTS
2700 F St NW, Washington, DC 20566
(202) 416-8000
Admission: Walk-in tours are free
Hours: Monday-Friday 10 AM-5 PM;
Saturday & Sunday 10 AM -5 PM
Metro Stop: The Foggy Bottom/George Washington
University Station

NATIONAL GALLERY OF ART
6th and Constitution Ave NW, Washington, DC 20565
(202) 737-4215
Admission: Free
Hours: Monday-Saturday 10 AM. - 5 PM.; Sunday: 11 AM - 6 PM
Metro Stop: Judiciary Square on the Red Line; Archives-Penn Quarter-
Navy Memorial on the Yellow/Green Lines; and Smithsonian on the
Blue/Orange Lines

SMITHSONIAN NATIONAL MUSEUM OF AMERICAN HISTORY
14th St and Constitution Ave, NW, Washington, DC 20001
(202) 633-1000
Admission: Free
Hours: Sunday-Saturday 10:00 AM - 5:30 PM
Metro Stop: The Federal Triangle and Smithsonian Stations

LINCOLN MEMORIAL
2 Lincoln Memorial Cir NW, Washington, DC 20037
(202) 426-6841
Admission: Free
Hours: Sunday-Saturday 24 Hours
Metro Stop: Foggy Bottom

WORLD WAR II MEMORIAL
17th St SW, Washington, DC 20006
(202) 426-6841
Admission: Free
Hours: Sunday-Saturday 24 Hours
Metro Stop: Smithsonian Station

THOMAS JEFFERSON MEMORIAL
900 Ohio Dr. SW, Washington, DC 20242
(202) 426-6841
Hours: Sunday-Saturday 24 Hours
Metro Stop: Smithsonian Station

FRANKLIN DELANO ROOSEVELT MEMORIAL
1850 West Basin Dr. SW, Washington, DC 20242
(202) 426-6841
Admission: Free
Hours: Sunday-Saturday 24 Hours
Metro Stop: Smithsonian Station

KOREAN WAR VETERANS MEMORIAL
900 Ohio Dr. SW, Washington, DC 20024
(202) 426-6841
Admission: Free
Hours: Sunday-Saturday 24 Hours
Metro Stop: Foggy Bottom Station

NATIONAL AIR AND SPACE MUSEUM
600 Independence Avenue SW, Washington DC 20560
(202) 633-2214
Admission: Free
Hours: Sunday-Saturday 10 AM-5:30 PM
Metro Stop: L'Enfant Plaza

LIBRARY OF CONGRESS
101 Independence Avenue SW, Washington DC 20540
Admission: Free
Hours: Monday-Saturday 8:30 AM-4:30 PM; Sunday, Closed
Metro Stop: Capitol South

FROM DULLES AIRPORT:

Dulles International Airport
Head west on Saarinen Cicle and keep left to stay on Saarinen Circle
0.5 mi
Continue onto Dulles Access Road and keep left to stay on Dulles Access Rd.
14.2 mi
Merge onto VA-267 E
2.3 mi
Merge onto I-66 E
7.4 mi
Take exit 75 for VA-110 S toward I-395/US-1/Pentagon City/Crystal City/Reagan National Airport/Alexandria
0.2 mi
Continue onto VA-110S
2.1 mi
Continue straight onto Jefferson Davis Highway
1.2 mi
Turn left on 27th Street South
446 ft.
Continue straight onto South Potomac Avenue
Destination will be on the right in 328 ft.

FROM REAGAN NATIONAL AIRPORT:

Head southeast on Aviation Circle
0.9 mi / 3 min
Turn right toward Airport Access Road and Continue to 27th Street South
0.8 mi/ 2 min
Continue on 27th Street South to South Potomac Avenue
0.1 mi /2 min

FROM BWI:

BWI-Thurgood Marshall Airport
Head southeast on Friendship Rd and continue straight onto Friendship Rd.
1.0 mi
Take MD-295 S and State Hwy 295 to N U.S. 1 S in Arlington. Take exit 8C from 1-395 S
35.4 mi
Continue on N US 1 S.
1.0 mi
Turn left onto 27th Street South
446 ft.
Continue straight onto South Potomac Avenue
Destination will be on the right
328 ft.

Renaissance Arlington Capital View Hotel
2800 South Potomac Avenue
Arlington, VA 22202