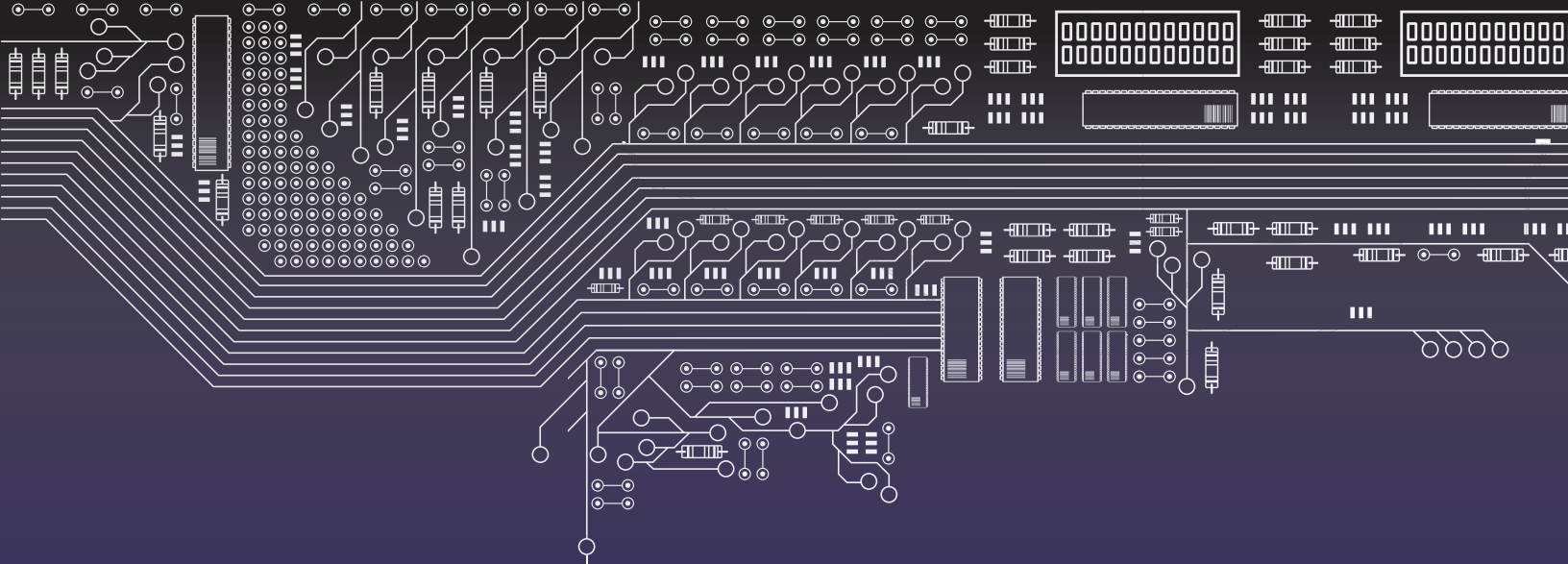


2013

UNIVERSITY OF PENNSYLVANIA

PRECISE

Cyber-Physical Systems Industry Day

Philadelphia, Pennsylvania
Friday, October 11th

WELCOME

Cummins, Inc.	Miguel Gonzalez
DSI, Inc.	Jack Stein
Edge Technical Associates LLC	Edward Segall
ET3 + Starkore City + Makabusi, Inc.	Graham Kaye-Eddie
GE Healthcare	Kenneth S. Kump
General Motors Company	Ramesh S.
Google X Lab	Dave Duff
Hospital of the University of Pennsylvania	Soojin Park
Lockheed Martin	Chuck Winters
MathWorks	Scott Tate
Medtronic, Inc.	Tom Fairlie
Mobiquity, Inc.	Scott A. Snyder
National Institute of Standards and Technology	Chris L. Greer
NEC Labs America	Franjo Ivancic
New York Power Authority	Gregory Lennon
OPEX Corporation	Alex Stevens
OPEX Corporation	Dave Stevens
Qualcomm Life	Rajeev Rajan
RDA, Inc.	Richard Goelz
Siemens AG	Xiping Song
U. S. Food and Drug Administration	Paul L. Jones
University of Pennsylvania - Radiology	Stephen Kadlecek
WET® Design	Tony Freitas

PRECISE

PENN RESEARCH IN EMBEDDED COMPUTING AND INTEGRATED SYSTEMS ENGINEERING

PRECISE's "Cyber-Physical Systems Industry Day" is an informal and intimate day-long symposium for leading executives and engineers involved in designing and developing cyber-physical systems, embedded systems, hybrid and control systems, and Internet of Things.

GOALS

- Act as a launch pad for conversations to tackle increasing technical challenges resulting from the rapidly growing demand for new capabilities and applications with regards to the smart grid, next-generation air transportation system, intelligent transportation systems, smart medical technologies, smart buildings and smart manufacturing
- Showcase PRECISE's research on real-time systems, control design, sensing, security and applications
- Facilitate the exploration of funding opportunities for private companies, public institutions and other research-based organizations devoted to the development of Cyber-Physical Systems
- Develop an infrastructure for industry to connect with PRECISE to mutually benefit each other to address current and future trends
- Explore the potential for joint technical articles
- Explore the creation of testing and validation tools for distribution to industry

AGENDA

8 am - 9 am	**REGISTRATION & BREAKFAST**
9 am - 9:15 am	**WELCOME & INTRODUCTORY REMARKS**
9:15 am - 9:45 am	**KEYNOTE SPEAKER** **Rajeev Rajan,** *Qualcomm Life - "Mobile Technology Shaping the Future of Health"*
9:45 am - 10:15 am	**INVITED SPEAKERS (PART 1)** **Dave Duff,** *Google X Lab - "Challenges & Opportunities with Self-Driving Vehicles"* **Scott Snyder,** *Mobiquity, Inc. - "Designing & Launching Successful Sensor-Based Systems for Consumers"*
10:15 am - 10:45 am	**COFFEE BREAK**
10:45 am - 12 noon	**INVITED SPEAKERS (PART 2)** **Tony Freitas,** *WET Design - "Experiencing Technology"* **Graham Kaye-Eddie,** *ET3 and Starkore City - "Smart Urban Planning & the Future of Transportation"* **David Stevens,** *OPEX Corporation - "Perfect Pick: IBOTs Deliver for Order Fulfillment"* **Kenneth Kump,** *GE Healthcare - "Embedded Systems Design Challenges for Medical Diagnostic Scanners"* **Chris Greer,** *NIST - "Working Together to Meet the Challenges of Cyber-Physical Systems"*
12 noon - 1 pm	**LUNCH**

AGENDA

1 pm - 2:10 pm — **RESEARCH HIGHLIGHTS (PART 1)**

Oleg Sokolsky, *PRECISE - "Challenges in Medical Cyber-Physical Systems"*

Alex Roederer, *PRECISE - "Using Machine Learning on Physiologic Data to Enable Clinical Decision Support"*

Andrew King, *PRECISE - "Safe Plug-and-Play Medical Systems"*

Zhihao Jiang, *PRECISE - "Model-Based Closed-loop Evaluation of Implantable Cardiac Devices"*

Soojin Park, *Penn Medicine - "Importance of Medical Cyber-Physical Systems to Workflow and Decision Making in the Intensive Care Unit"*

Paul Jones, *FDA - "Future Medical Devices"*

2:10 pm - 2:40 pm — **COFFEE BREAK**

2:40 pm - 3:30 pm — **RESEARCH HIGHLIGHTS (PART 2)**

Rahul Mangharam, *PRECISE - "Challenges in Automotive Cyber-Physical Systems & Green Buildings"*

Nicola Bezzo, *PRECISE - "Attack Resilient Autonomous Vehicles"*

Madhur Behl, *PRECISE - "Green Scheduling of Controllers for Peak Power Minimization of Energy-Efficient Buildings"*

Abhijeet Mulay & Parth Patel, *PRECISE - "ProtoDrive: An Experimental Platform for Electric Vehicle Energy Control and Scheduling"*

Abhishek Udupa, *PRECISE - "TRANSIT: A New Way of Specifying Distributed Protocols"*

3:30 pm - 3:45 pm — **EDUCATION**

Rajeev Alur, *PRECISE - "Workforce Training: The PRECISE Way"*

3:45 pm - 4 pm — **CLOSING REMARKS | Q&A**

4 pm - 5 pm — **RECEPTION / POSTER SESSION**

KEYNOTE SPEAKER

Rajeev Rajan
Qualcomm Life
Senior Director

Rajeev Rajan is the Senior Director of Product Management for Qualcomm Life. In his role, Rajeev drives product management and strategy, and provides technology leadership for wireless healthcare products and services. Rajeev co-founded the 2net business at Qualcomm Labs starting in 2010, leading the engineering and technology teams which created the core products and services that laid the foundation for Qualcomm Life. With 20 years of industry experience and leadership, Rajeev has spent his career building innovative software, systems and wireless technology products and services for global markets including North America, Europe, India, China and Southeast Asia. In his 16 years at Qualcomm, he has worked on various assignments, such as software and systems engineering activities in CDMA2000 1X, EV-DO, UMTS, International Roaming, location-based services and network assessment of carrier networks. His entrepreneurial spirit has seen him ideate and commercialize multiple in-house startup projects, operating in various leadership roles including Engineering, Product Management, Business Development, Program and Project Management.

Rajeev currently has several patents granted and pending at Qualcomm. He has authored multiple papers, spoken at forums and panels and is co-author of an upcoming textbook "Wireless Health: Remaking of Medicine by Pervasive Technologies". He holds a BS in Physics, an MS in Computer Science, an executive MBA from the University of California San Diego (UCSD), and a Graduate Certificate in Wireless Health. He is currently pursuing an MS in Biomedical Engineering focused on Wireless Health from Case Western Reserve University.

INVITED SPEAKERS

Dave Duff

Google X Lab
Technical Lead

Dave Duff has been developing cyber-physical systems and products for the defense, entertainment, robotics, and automotive industries his entire career. He has worked on research and concept definition, part design and fabrication, as well as process-tweaking on the manufacturing line. He has a passion for discovering creative, enabling solutions at all phases of development and for exploiting the synergies of complex cyber-physical systems.

Dave received his BSME from Oregon State University in 1985 and Masters in Engineering from Stanford in 1996. He has worked for Lockheed, WET Design, PARC, Tesla Motors and Google. He is currently a technical lead on Google's self-driving car project.

Tony Freitas

WET® Design
Project Director

Tony Freitas recently rejoined WET as a Project Director where he leads WET's interdisciplinary project teams through the challenges encountered in the development and realization of our installations.

Tony was previously with WET for ten years, serving as senior project engineer and later became manager of the Architecture and Facility Engineering Department. Tony was a key participant in many of WET's successes including the Fountains of Bellagio in Las Vegas, the Performance Lake at Wynn Macau in Macau, the Burj Al Arab in Dubai, the Brooklyn Museum in New York, the Grove in Los Angeles, and the Detroit Metro Airport and Compuware Headquarters in Detroit.

After leaving WET, Tony worked as project manager at Arup, leading multidisciplinary engineering teams and providing building engineering solutions for architectural clients. While at Arup, he managed projects including the Dr. P. Phillips Orlando Performing Arts Center in Orlando with Barton Myers Associates, the Clyfford Still Museum in Denver and the National Music Center in Calgary with Allied Works Architecture, and the Torre Reforma Tower in Mexico City with L. Benjamin Romano Arquitectos.

Earlier experience includes working for the Los Angeles Department of Water and Power and for Allied-Signal AiResearch.

Tony is a licensed professional engineer with over 25 years of technical leadership experience. He is a magna cum laude graduate from the University of Southern California with a Bachelor of Science degree in Mechanical Engineering, and is currently completing a Masters of Studies in Interdisciplinary Design at the University of Cambridge. Tony is an accredited professional in the US Green Building Council LEED program.

INVITED SPEAKERS

Chris L. Greer

National Institute of Standards and Technology (NIST)
Acting Director - Cyber Physical Systems and Smart Grid Program Office (Engineering Laboratory)

Chris Greer is the NIST Senior Executive for Cyber Physical Systems and the National Coordinator for Smart Grid Interoperability. He also serves as the lead for the NIST digital data activities. In these positions, he is responsible for strategic planning, program implementation and coordination with partners across the public and private sectors.

Prior to joining NIST, Dr. Greer served as Assistant Director for Information Technology R&D in the White House Office of Science and Technology Policy and Cybersecurity Liaison to the National Security Staff. His responsibilities there included networking and information technology research and development, cybersecurity, and digital scientific data access.

Chris has also served as the Director of the National Coordination Office for the Federal Networking and Information Technology Research and Development (NITRD) Program. This program coordinates IT R&D investments across the Federal government. Prior to undertaking government service, Chris was a member of the tenured faculty at the University of California, Irvine.

Paul L. Jones

U. S. Food and Drug Administration (FDA)
Senior Systems/Software Engineer

Paul L. Jones works at the U. S. Food and Drug Administration (FDA). He is a Senior Systems/Software Engineer in the Center for Devices and Radiological Health, Office of Science and Engineering Laboratories (OSEL) where he serves as an in-house consultant on regulatory matters involving medical device software system safety, software engineering, risk management, and safety assurance cases. He divides his time between transitioning high confidence software and systems research work into the FDA's regulatory science process and national & international standards development, and managing OSEL's software lab.

Prior to joining the FDA, Paul worked in industry for 20 years gaining extensive experience in systems/software engineering; developing business systems, operating systems, configuration management systems, and quality assurance systems.

Paul earned a BSE degree in Naval Architecture and Marine Engineering from the University of Michigan in 1974 and a MS degree in Computer Engineering from Loyola College in 1999.

INVITED SPEAKERS

Graham Kaye-Eddie

ET3 Global Alliance, Inc., Starkore City & Makabusi, Inc.
Master Urban Designer

Graham Kaye-Eddie excels in urban design, planning and development management of cities and communities of populations ranging from 10,000 to 250,000 households. He has an advanced degree in Architecture in the field of Urban Design and Macro Systems Engineering along with forty years of practical management experience. Graham has taken part in many important transportation projects. He provided CALTRANS with realistic options for five proposed on/off-ramps to service the north/west side of downtown Los Angeles. He reversed the decision of the Los Angeles County Transportation Commission to locate future transit lines through the area while convincing the Los Angeles Department of Transportation and their planning consultant to also build a south bound off-ramp from the Harbor Freeway to provide access to future development north of the freeway. He helped come up with the city of Johannesburg Motorway System Concept with Dean John Fassler and Professor E.W.N. Mallows, University of Witwatersrand. He also helped plan the City of Grand Forks Air Terminal Facilities with Professor Peter Kamnitzer. He expanded the services of photogrammetry at VTN. He invented the surveillance method with the VTN Planning Department toward utilizing video cameras in securing the rights-of-way on power corridors throughout Wyoming and Montana. He is also a founding member of the California Advanced Transportation System.

Graham has experience in urban planning management. As Vice-President, reporting directly to the Chief Executive Officer of the parent Kuwait International Investment Company, he controlled a $1.2MM annual budget for pre-development, design, planning and marketing. As Vice President for Perreira AIA, he managed a variety of Urban Design Projects both locally and internationally. He managed the Urban/Regional Planning Division involved in providing information services on Urban Renewal, Airport Planning, Environmental Studies and Zoning Changes in Subdivision for Merchant Developers and Builders for Voorhees, Trindle and Nelson. From 1973-1975, he was the Director of Urban Planning for Environmental Systems International in the Planning and Environmental Services Division. After graduation from UCLA, he worked for the Urban Laboratory Research at UCLA in 1970. He was employed by Daniel, Mann, Johnson & Mendenhall in the Departments of Urban Economics and Urban Planning Division, gaining experience in new towns, communities, ski resorts, regional shopping centers, transportation planning and politics affecting projects.

Kenneth S. Kump

GE Healthcare
Engineering Manager (PET Detection Technologies)

Kenneth Kump is the engineering leader for the Molecular Imaging/Positron Emission Tomography Business within GE Healthcare. With more than 20 years in the healthcare device arena, he has brought numerous medical products to life. Kenneth has a BS in Electrical Engineering from Bucknell University and an MS/PhD in Biomedical Engineering from CWRU.

INVITED SPEAKERS

Soojin Park

Hospital of the University of Pennsylvania
Assistant Professor of Neurology, Perelman School of Medicine
Director of NCC Monitoring and Informatics

Soojin Park is an Assistant Professor of Neurology, with secondary appointments in Neurosurgery, Anesthesiology & Critical Care, and Computer & Information Science at the University of Pennsylvania. She is the Director of Neuromonitoring and Informatics for the Division of Neurocritical Care at the University of Pennsylvania. In this position, she provides oversight and direction to the evaluation of existing and new neuromonitoring devices, as well as the implementation and testing of informatics tools for data acquisition, analysis, and visualization. The activities of this position have afforded Soojin with the opportunity to become well-versed with the regulatory and operational requirements of studying new devices and workflow processes in the complex clinical environment of an intensive care unit.

Soojin received her ScB from Brown University, and MD degree from Drexel University College of Medicine. She completed her Neurology Residency at Boston University and fellowships in both Vascular and Critical Care Neurology at Massachusetts General Hospital & Brigham and Women's Hospital. She is board-certified in Neurology, Stroke, and Critical Care Neurology.

Scott A. Snyder

Mobiquity, Inc.
President, Chief Strategy Officer & Co-founder

Scott is the President and Chief Strategy Officer of Mobiquity, a leader in delivering innovative wireless solutions for enterprises. He has over 25 years of experience in business leadership, strategic planning, and technology management for both Fortune 500 companies and start-up ventures. Dr. Snyder has held executive positions with several Fortune 500 companies including GE, Martin Marietta, and Lockheed Martin. He has been the CEO of a leading strategic planning firm, Decision Strategies International, and has also started business ventures in software including OmniChoice, a CRM/Analytics applications provider and Strategic Radar, a software-based solutions company focused on monitoring changes in the strategic environment.

Scott is the author of the popular book, "The New World of Wireless: How to Compete in the 4G Revolution", released by Wharton Publishing in July 2009. He is a chapter author in the books "The Network Challenge: Strategy, Profit, and Risk in the Interlinked World" (Wharton Publishing, 2009) and "Inside the Minds: Small Business Growth Strategies: Goals for Successful CEOs" (Apatore Books, December 2007) and contributed as a co-author to several future scenario studies including "The Future of BioSciences 2020" and "The Future of the US Energy Grid 2025" from DSI. He has also authored several recent articles on wireless innovation including "Unwiring the Enterprise: Are You Ready to Lose Control?" in Knowledge@Wharton and "An Adoption Model for Consumer Wireless Sensor Initiatives" in the IEEE Consumer Electronics Journal.

Scott is also a Senior Fellow in the Management Department at the Wharton School, an Adjunct Faculty Member in the School of Engineering and Applied Science at the University of Pennsylvania, and has lectured at MIT, Babson, Duke, Insead, and RIT on Decision-making, Business and IT Strategy, Telecommunications, Product Design and Development, and Business Intelligence. He founded and leads the Wireless Innovation Council made up of leading companies focused on cross-sector mobile innovation opportunities. He also sits on the Advisory Boards of Safeguard Scientific and several emerging growth companies. He holds two patents for on-line decision aids and has been quoted as a thought leader in numerous publications including Forbes, CNN, LA Times, Wall Street Journal, Tech Crunch, Philadelphia Inquirer, CIO Magazine, and Philadelphia Business Journal. Scott earned his BS, MS, and Ph.D. in Systems Engineering from University of Pennsylvania and has an executive degree from USC in Telecommunications Management.

Dave Stevens

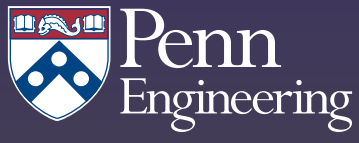
OPEX Corporation
President & CEO

Dave Stevens is the President and CEO of OPEX Corporation, a recognized global technology leader in high-speed mailroom automation, document imaging, and material handling. Dave assumed leadership of OPEX, a private family-owned business, in April 2011. Dave is responsible for setting the strategic direction of the company and ensuring that OPEX Values are implemented at every level throughout the company and reflected in its corporate culture.

Dave literally grew up with OPEX. Since 1973, when his parents bought the company and moved him and his brother Mark, OPEX's Chief Operating Officer, half-way across the country, Dave has been involved in one way or another with the day-to-day operations of the corporation. Starting out as the company janitor, Dave eventually moved on to work as Sales Manager, and then to Senior Vice President responsible for domestic operations and oversight of the Service division.

More recently, Dave has directed the efforts of the Advanced Development Team, the department within OPEX responsible for designing and deploying the company's new material handling technology, Perfect Pick™. Dave has personally overseen all aspects associated with the development and launch of Perfect Pick.

Dave graduated with a B.A. degree from Cedarville University in Ohio. From there, he studied at Dallas Theological Seminary where he earned a Th.M. in Christian Education. Today, Dave serves as a member of the Board of Directors at the seminary.


Penn
Engineering