NIWeek09

WORLDWIDE GRAPHICAL SYSTEM DESIGN

CONFERENCE

CONFERENCE PROGRAM

August 4–6 · Austin Convention Center

Austin, Texas · **ni.com**

NATIONAL INSTRUMENTS

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NIWeek at a Glance

"The breadth and depth of the technical seminars along with insight into future products is what keeps me coming back to NIWeek every year."

– Sean Donner,
Lockheed Martin

Dear Colleague,

Welcome to NIWeek 2009 – the world's leading graphical system design conference and exhibition. With these challenging economic times, it is more important than ever to learn the skills and technologies that can help you increase your productivity and improve efficiency. NIWeek delivers the technical training you need to do just that.

During the next three days, join me and more than 3,000 engineers, educators, scientists, and NI developers as we explore how the latest developments in graphical system design, virtual instrumentation, and commercial technologies can help you develop your applications faster, smarter, and more cost-efficiently. NIWeek 2009 provides more than 200 technical sessions, four technical summits, certification exams, and networking opportunities. The conference also features hundreds of demonstrations of the latest cutting-edge products and technologies from NI and our exhibitors. Detailed information on all that NIWeek has to offer can be found in the following pages or at **ni.com/niweek**.

Thank you for participating in the 15th annual NIWeek conference. I encourage you to take advantage of this ultimate learning environment so you can advance your skills, enhance your applications, and maintain your competitive advantage.

Sincerely,

James Truchard
President, CEO, and Cofounder
National Instruments

KEYNOTE PRESENTATIONS

Tuesday, August 4   *8:30–10:00 a.m.   Ballroom G*

Dr. James Truchard
President, CEO, and Cofounder
National Instruments

Dr. James Truchard, who has served as CEO of National Instruments for 33 years, coinvented NI LabVIEW graphical programming software. He also pioneered the graphical system design approach, helping engineers and scientists solve difficult problems by providing tools that take advantage of real-time, high-performance computing and field-programmable gate array (FPGA)-based signal processing. Join Dr. Truchard as he discusses how graphical system design will continue to take advantage of the latest advances in multicore and heterogeneous computing to meet complex challenges, from big physics to green engineering, as well as lower design costs.

Wednesday, August 5   *8:30–10:00 a.m.   Ballroom G*

Jeff Kodosky
Cofounder and Business and Technology Fellow
National Instruments

Jeff Kodosky coinvented LabVIEW graphical programming software and has developed more than 30 patented LabVIEW technologies. Hear from the "Father of LabVIEW" as he shares his vision on the future of graphical system design. Learn how LabVIEW is embracing new technologies, such as remote programming and data presentation, system-level design, and simulation, and explore the possibilities they are unlocking for engineers and scientists.

Thursday, August 6   *8:30–10:00 a.m.   Ballroom G*

Ray Almgren
Vice President of Academic Marketing
National Instruments

Ray Almgren, a 22-year NI veteran, is the visionary behind the company's efforts to create dynamic, hands-on engineering and science education that empowers the innovators of tomorrow. He pioneered the NI academic programs, including collaborations with LEGO® and *FIRST*, that have led to the creation of a graphical programming platform powered by LabVIEW that spans from elementary to graduate school. Join Almgren and student teams from around the world as they showcase innovative solutions using graphical system design to tackle socially relevant engineering challenges.

John Graff
Vice President of Marketing
National Instruments

John Graff has worked at National Instruments for 22 years and directs an integrated team of marketing professionals who educate and support thousands of engineering and scientific customers worldwide. Join Graff, NI engineers, and industry leaders as they highlight new technologies, products, and solutions that will help companies be more innovative and productive in these challenging times. From applications in test, design, and control to new technologies like wireless networks and FPGA-based control, learn how NI is setting new standards for improving system value, performance, and efficiency.

Mike Santori
Business and Technology Fellow
National Instruments

Mike Santori has worked at National Instruments for 23 years and helps drive the development of key NI software and hardware technologies. Watch as he and NI R&D engineers demonstrate cutting-edge technologies in areas such as system-level design, FPGA-based instrumentation, and wireless communication, and get a sneak peek at some "still in the lab" developments for advanced control, design, test, and data acquisition applications.

Dr. David Barrett, PhD
Director of SCOPE
Olin College

Dr. David Barrett, who has more than 25 years of robotics experience, is an influential voice and respected pioneer in the field of mobile robotics. Prior to his tenure at Olin College, Dr. Barrett served as vice president of engineering at the iRobot Corporation and director of the Walt Disney Imagineering Corporation. Join Dr. Barrett as he discusses how technological robotics advancements in industry and engineering education are poised to revolutionize the way we interact with technology in our daily lives.

CONFERENCE INFORMATION

On-Site Check-In Hours

Sunday, August 2	*7:30 a.m. – 5:00 p.m.*	*Wednesday, August 5*	*7:30 a.m. – 6:00 p.m.*
Monday, August 3	*7:00 a.m. – 7:00 p.m.*	*Thursday, August 6*	*7:30 a.m. – 1:00 p.m.*
Tuesday, August 4	*7:30 a.m. – 6:00 p.m.*		

Daily Continental Breakfast

8:00–10:00 a.m.   Ballroom Foyer

Daily Lunch

11:30 a.m. – 1:00 p.m.   Exhibition Hall

Lunch is provided at no charge to full-conference attendees and Expo Plus Pass holders. Conference name badges are required for admission.

Afternoon Breaks

Enjoy refreshments between sessions on the third floor outside Room 18.

Texas Day Luncheon and Networking Hour

Texas Day gives engineers and scientists from around the state the opportunity to network with colleagues and experience all that NIWeek offers. Join your fellow Texans to discuss application challenges and successes. Meet your local National Instruments field engineers and National Instruments Alliance Partners, and discover how you can use NI products to advance your application and retain your competitive advantage. Also stop by Exhibition Hall 5 outside the cafeteria from 10:00 a.m. to 5:00 p.m. to meet your local Texas field engineering team.

Tuesday, August 4   11:30 a.m.–1:00 p.m.   Exhibition Hall Cafeteria

National Instruments Campus Tour

Visit National Instruments headquarters to tour the manufacturing facilities and view the results of more than three decades of innovation. Discover how NI has integrated its campus into a native Texas landscape that promotes the NI culture. Also learn how NI reduces its environmental impact and creates a better world for employees, customers, and fellow global citizens. Transportation provided.

Shuttle runs from the Austin Convention Center to National Instruments from 10:15 a.m. to 12:30 p.m.

Thursday, August 6   10:15 a.m.–12:30 p.m.   Austin Convention Center Registration Area

CONFERENCE INFORMATION

Stay Connected at NIWeek and Beyond
NIWeek provides online networking opportunities so that you can keep in touch with colleagues, NI developers, and thousands of new friends during the conference and beyond. Visit ni.com/niweekcommunity to learn more ways to stay connected.

NIWeek Community Group
Visit ni.com/niweekcommunity to get real-time conference updates, read blog posts about new products, download code from the top NIWeek demos, and network with attendees.

Visit ni.com/community to share development techniques, collaborate on example code, learn about cutting-edge technologies, and connect with a worldwide community of LabVIEW and other NI product experts who work on similar applications.

Broadcast messages to colleagues and other attendees from your laptop or mobile phone and receive valuable conference information from the @NIWeek and @LabVIEW accounts. Type #niweek in your message to send updates to the entire NIWeek community on Twitter. Also participate in the Twitter scavenger hunt during the NIWeek Community Block Diagram Party.

Are you a fan of LabVIEW? Then show it on Facebook. After you become a fan, you will get the latest news and technical resources sent straight to your Facebook profile.

View videos contributed by NI staff and other NIWeek attendees of cool product demonstrations from the NIWeek exhibition hall as well as interviews with NI leadership and industry experts.

Did you make a lot of new contacts at NIWeek? Manage your network on LinkedIn and exchange information, ideas, and career opportunities.

EVENING ACTIVITIES

NIWeek Kickoff Happy Hour

Jump-start your NIWeek experience with an evening of drinks, music, and networking with NI sales engineers, NI Alliance Partners, the NI R&D team, LabVIEW Champions, other NIWeek attendees, and exhibitors.

The NIWeek Kickoff Happy Hour is sponsored by Intel Corporation.

Monday, August 3   5:30–7:30 p.m.   Exhibition Hall

NI Community *Block Diagram* Party

Enjoy food, drinks, music, and good company at the third annual NI Community Block Diagram Party! Exchange best practices with fellow engineers and scientists from a range of industries and companies, and meet with leaders in design, control, and test to discuss the latest technical innovations. Also visit with more than 100 exhibitors to see the newest tools, applications, and solutions using NI products.

*Tuesday, August 4   5:00–7:30 p.m.   Exhibition Hall*

Annual NIWeek Conference Party

Take a break from learning new skills and technologies and unwind Austin-style at this popular conference event. Enjoy Texas cuisine, cold drinks, and a memorable evening with thousands of new friends at the City Terrace at the Long Center, an outdoor venue with a breathtaking view of downtown Austin. Also dance the night away to the musical stylings of M80's, or simply kick back and listen to the hits you know and love.

Transportation provided. Conference name badges are required for admission.

Shuttle pick-up loops between the Austin Convention Center and the City Terrace at the Long Center from 5:45 to 11:30 p.m. Transportation to the event is sponsored by Reed Business Information.

Wednesday, August 5   7:00–10:30 p.m.   The City Terrace at the Long Center
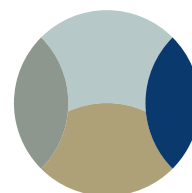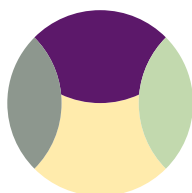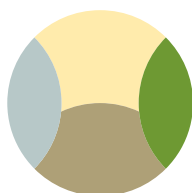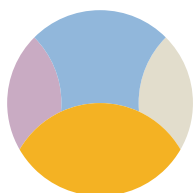
NETWORKING ACTIVITIES

Peer2Peer Roundtable

Network with your peers and NI developers and discuss best practices and challenges within your application, job position, or industry. Grab your lunch and meet at the designated tables in the dining area of the exhibition hall at noon. Roundtable topics vary by day.

Tuesday Roundtable

LabWindows™/CVI Developers Lunch (Tables 6–8)

NI TestStand Developers Lunch (Tables 2–3)

Waveform Acquisition on the CompactRIO Platform (Table 1)

Tuesday, August 4   Noon–1:00 p.m.   Exhibition Hall

Wednesday Roundtable

Best Practices for Machine Vision (Tables 9–10)

LabVIEW FPGA (Tables 4–5)

LabVIEW Champions and Enthusiasts Meet and Greet (Tables 2–3)

LabVIEW Product Partners (Tables 6-7)

Sound and Vibration: Acquiring and Analyzing Acoustical and Vibration Data (Tables 12-13)

Wednesday, August 5   Noon–1:00 p.m.   Exhibition Hall

Thursday Roundtable

NI Data Management (Table 1)

Thursday, August 6   Noon–1:00 p.m.   Exhibition Hall

ADVANCED TECHNICAL SESSIONS

NIWeek offers more advanced technical content than ever before to help you stay current on the technologies and trends impacting test, measurement, control, and design.

Industry Experts Panel: What Inspires Innovation?

What really inspires innovation? Is it mainstream media such as the IBM "Math Is Power" campaign, or is it something more innate? Explore what drives us to be a more innovative society in the areas of education, sustainability, and engineering. Also discuss how research ensures that fiction becomes reality; how new engineering disciplines such as robotics, biomedical, and green create a more innovative and compassionate society; and how we are inspiring the next generation of problem solvers to hone their innovation skills. Join us for an interactive discussion to discover the true origin of innovation.

Dr. David Barrett, Director of SCOPE, *Olin College*
Glenn Derene, Senior Technology Editor, Popular Mechanics
Jeanne Dietsch, CEO and Cofounder, *MobileRobots Inc.*
Dean Kamen, Founder, *FIRST (For Inspiration and Recognition of Science and Technology);*
President, *DEKA Research and Development Corporation*
John Pasquarette, Vice President of Product Marketing for Software, *National Instruments*
Ellen Purdy, Enterprise Director of Joint Ground Robotics, *U.S. Department of Defense*

Wednesday, August 5   4:30–5:45 p.m.   Ballroom G

HANDS-ON SESSIONS

Attend these popular NIWeek workshops to get hands-on experience with the latest technologies from National Instruments.

Sound and Vibration Sessions

Engineers, scientists, and researchers working on sound and vibration applications should attend these sessions, which highlight areas including noise, vibration, and harshness (NVH), MCM 3, and audio/acoustic test.

MILITARY AND AEROSPACE SUMMIT

Overview

The Military and Aerospace Summit engages industry and research experts across the fields of advanced research, flight research, defense and commercial aerospace test, ground vehicles, RADAR, signal intelligence, and unmanned vehicles. Learn about the latest technological advances, and find out which tools engineers use to design, develop, and implement systems in an evolving market. Hear from experienced users and top industry experts on their applications and real-life experiences, and network with your peers in a relaxed, informal setting.

Who Should Attend

Test system developers, systems engineers, researchers, and professors involved in developing, deploying, and supporting military/aerospace test, hardware-in-the-loop (HIL), control, and simulation systems.

Keynote

The Past, Present, and Future of Aerospace Flight Test

Flight test is a highly disciplined engineering process. From the historical NASA experiences in flight testing the X-38 to the Return to Flight, learn about the flight test process, how it has evolved, where it is going, the differences between aircraft and space flight test, and the critical role of measurement.

John F. Muratore, Research Associate Professor, *University of Tennessee Space Institute*

Tuesday, August 4   *10:30–11:30 a.m.*   *Room 17A*

3D Sound Mapping with PXI for Aircraft Noise Test

The aeroacoustic research complex at the White Sands Missile Range created the world's first 3D sound mapping application for mapping data from aircraft in-flight. Learn about the capabilities of this application and how PXI technology helped improve synchronization. Also see examples of the instrumentation architectures used for distributed and high-channel-count systems for testing quieter aircraft types and operations.

John Hall, ARC Project Leader, *U.S. Air Force*
Kurt Veggeberg, Business Development Manager, *National Instruments*

Tuesday, August 4   1:00–2:00 p.m.   Room 17A

Model-Based Diagnostic Test Systems

Learn how the U.S. Marine Corps implemented a model-based diagnostic test system for the Light Armored Vehicle (LAV) based on CompactRIO for line-replaceable units (LRUs) to determine how the real-life LRU performs against an ideal model in real time and suggests failure modes based on these measurements.

Curtis Williams, Electrical Engineer, *U.S. Marine Corps*

Tuesday, August 4   2:15–3:15 p.m.   Room 17A

F-35 Vehicle Systems Integration Facility Data Acquisition System

G Systems developed a high-channel-count system to acquire synchronized data from multiple sources including analog, discrete, video, and reflective memory. Lockheed Martin Aeronautics uses this system in the F-35 Vehicle Systems Integration Facility (VSIF) to log results for aircraft subsystem integration tests/simulations. Learn about the hardware and software architecture used to implement this system.

Dave Baker, Vice President of Engineering, *G Systems*

Tuesday, August 4   3:30–4:30 p.m.   Room 17A

INERTIA Application for Turbine Engine Test Systems and Iron Birds

Discover how Wineman Technology Inc. used its INERTIA Control Suite, an application based on LabVIEW, to integrate NI real-time control platforms for the control and data acquisition of turbine test facilities for Iron Birds, which are the assembly of actual flight components in a test cell that allow aircraft flight simulation.

Darryn La Zar, Vice President of Sales and Marketing, *Wineman Technology Inc.*

Tuesday, August 4   4:45–5:45 p.m.   Room 17A
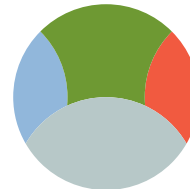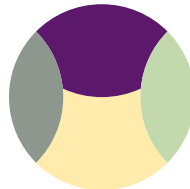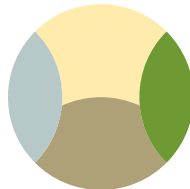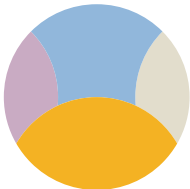
MILITARY AND AEROSPACE SUMMIT SESSIONS

Developing the Next Generation of Navy Automated Test and Calibration Systems Using LabVIEW, NI TestStand, and PXI

Explore how Orbis Inc. used NI TestStand to automate Navy test and calibration systems. Take an in-depth look at two systems – one fully automated and one that ventures "outside the box" to allow full operator participation in sequencing/execution. Look under the hood at some of the advanced concepts in these sequences.

Anthony Del Porto, Project Engineer,
David Kelley, Project Engineer, and
Skip Mulligan, Project Engineer, *Orbis Inc.*

Wednesday, August 5   10:30–11:30 a.m.   Room 17A

Twenty-First Century Flight Test Engineering Education Using LabVIEW

Modern flight test engineering is based on the use of data acquisition systems to gather validation for numerical models, and most flight data acquisition systems are custom designed. Discover ways to use LabVIEW, PXI-based instrumentation, and small off-the-shelf computers for flight test data acquisition systems that support modern flight test research and education.

John F. Muratore, Research Associate Professor,
University of Tennessee Space Institute

Wednesday, August 5   1:00–2:00 p.m.   Room 17A

PXI-Based Test Systems for Military Maintenance Support

The military requires low-cost, high-performance test systems for factory-to-field support. Explore how PXI instruments and NI industry-leading software offer scalable, open-architecture platforms for functional electronics testing while providing a reduced logistics footprint and excellent reliability.

Paul Salopek, President and CEO, *Advint LLC*

Wednesday, August 5   2:15–3:15 p.m.   Room 17A

Maintaining Systems for More Than 20 Years and Replacing Legacy VXI Instruments with PXI

Learn about three challenges in the military and aerospace market: maintaining and supporting test equipment with obsolescence issues, acquiring and managing large amounts of test data, and developing novel automated test equipment (ATE) architectures using LabVIEW Real-Time with FPGAs and PXI modules.

Ehud Shany, President and CEO, and
Gabriela Schwartzberg, Director of Engineering,
WinSoft Inc.

Wednesday, August 5   3:30–4:30 p.m.   Room 17A

GPS Synchronized RF Test System and Techniques for Synchronizing PXI Systems

Explore the architecture, tools, and techniques for synchronizing PXI systems. Learn about a test system for MIL-STD-188 integrated waveform RF generation and acquisition that combines the LabVIEW Real-Time Module, GPS, modulation, and NI RF products. Discover ways to use the NI PXI-6682 timing and synchronization module to generate real-time triggers for the continuous generation and acquisition of CPM modulated data packets while a separate PXI chassis houses a receiver based on the NI PXI-5660 RF vector signal analyzer and a transmitter based on the NI PXI-5671 RF vector signal generator.

Byron Butterfield Sr., Principal Systems Engineer, and
Brent O'Leary, Senior Systems Engineer,
L - 3 Communications
Patrick Webb, PXI Platform Product Manager,
National Instruments

Wednesday, August 5   4:45–5:45 p.m.   Room 17A

GLOBAL REACH

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RF AND WIRELESS COMMUNICATIONS SUMMIT

Overview

The RF and Wireless Communications Summit engages industry and research experts in the RF and wireless communications fields. Explore the latest advances in RF instrumentation, the design tools RF engineers are using, and wireless communications devices. Participate in technical sessions presented by top industry experts. Also view live demonstrations at the RF and Wireless Pavilion in the exhibition hall.

Who Should Attend

RF, communications systems, and wireless systems engineers; researchers; and professors.

Keynote

Where Wi-Fi Came From and the Lessons It Has Taught Us

While we would like to believe that the best wireless technology always wins, history has proven that public policy is often the catalyst driving market adoption. Learn about the effect of deregulation on the adoption of spread spectrum technologies such as Wi-Fi and 3G cellular. Also examine the regulatory hurdles that will affect future wireless technologies in 4G cellular communications and medical devices.

Michael Marcus, Director, *Marcus Spectrum Solutions,* and Former Associate Chief for Technology, *Federal Communications Commission Office of Engineering and Technology*

Tuesday, August 4   *10:30–11:30 a.m.*   *Room 19A*

Trends in the RF and Wireless World

Since Guglielmo Marconi transmitted the first radio waves across the Atlantic Ocean, the RF and communications industry has seen continual innovation. Even as the RF spectrum increases with new wireless standards, today's engineers continue to innovate with emerging technologies. Learn about the three key trends in the RF and wireless industry and how they affect consumers and engineers.

Louis Frenzel, Editor, Electronic Design, *Penton Media Inc.*

Tuesday, August 4   1:00–2:00 p.m.   Room 19A

Physical Layer Modeling of 3GPP LTE MIMO Spatial Multiplexing

The University of Texas at San Antonio Wireless Advanced Next-Generation Laboratory uses an NI vector signal analyzer and vector signal generator for a 3GPP Long Term Evolution (LTE) multiple input, multiple output (MIMO)-cellular software-defined radio. Hear about the precoding, 1.4-20 MHz scalable bandwidth support, and prototyping challenges of LTE cellular on NI RF equipment.

Dr. Brian Kelley, Assistant Professor, Department of Electrical and Computer Engineering, *The University of Texas at San Antonio*

Tuesday, August 4   2:15–3:15 p.m.   Room 19A

Using PXI and NI TestStand for Automated Test

Sennheiser New Mexico has adopted many NI products to develop a world-class manufacturing facility. Explore how Sennheiser New Mexico uses NI TestStand, NI LabVIEW, NI DIAdem, NI Multisim, and PXI to enable off-the-shelf tools and instrumentation, rapidly develop flexible test stations, and provide long-term solutions to increase manufacturing reliability and throughput.

Rodger Case, Senior Test Engineer, *Sennheiser*

Tuesday, August 4   3:30–4:30 p.m.   Room 19A

Reducing the Cost of PXI Field Testing

For companies that test and validate car radios and receivers, gaining laboratory repeatability for RF signals and impairments is important. Discover how one developer benefited from high-throughput PXI instruments in a record and playback system to capture and play back multiple real-world signals and to build a custom reference library that reduces costly field testing.

Etienne Frenette, Director of Business Development – Universal Radio Tester, *Averna*

Tuesday, August 4   4:45– 5:45 p.m.   Room 19A

RF AND WIRELESS COMMUNICATIONS SUMMIT SESSIONS

Simulating Real-World Channel Conditions with LabVIEW FPGA and the NI PXIe-5641R

After an RF signal leaves the antenna of a wireless device, it is affected by atmospheric conditions such as fading and multipath. Learn how device designers use LabVIEW FPGA and the NI PXIe-5641R RIO IF transceiver to simulate real-world channel conditions, and view a live demonstration of how to model a wireless channel with the instrument.

Joseph Kovacs, Director of New Products, and Andy Brown, Chief Architect, *Averna*

Wednesday, August 5   10:30 – 11:30 a.m.   Room 19A

Under the Hood of a Software-Defined RF Instrument

PXI software-defined RF instruments can perform many measurements five to 10 times faster than traditional instruments. Explore some of the core components of a software-defined instrument and learn how factors such as CPU clock speed and the number of processing cores can affect the overall measurement time for various measurements. Discuss a case study that illustrates the effect of measurement time on overall test costs.

David Hall, RF Communications Product Manager, *National Instruments*

Wednesday, August 5   1:00–2:00 p.m.   Room 19A

Improving RF System Accuracy with Methodical Calibration Techniques

While RF power meters are the most precise instruments in terms of absolute accuracy, they cannot match the measurement speeds of an RF vector signal analyzer. Discover ways to improve the amplitude accuracy on RF measurements by calibrating the vector signal analyzer and vector signal generator with an RF power meter. Learn about the variables that affect amplitude calibration and the procedure to achieve accurate and repeatable calibrated measurements.

Gerardo Orozco Valdes, RF and Communications Systems Engineer, *National Instruments*

Wednesday, August 5   2:15 – 3:15 p.m.   Room 19A

From Baseband to Bits: Under the Hood of the QPSK Demodulator

Explore how wireless devices turn RF signals into digital bit streams and the step-by-step signal processing methods required for quadrature phase shift keying (QPSK) demodulation. Learn about signal processing topics such as sampling, decimation, and pulse-shape filtering.

Craig Rupp, Senior Systems Engineer for RF and Communications, *National Instruments*

Wednesday, August 5   3:30– 4:30 p.m.   Room 19A

Four-Channel Synchronous RF Record and Playback System

In the past, building a multichannel RF record and playback solution required engineers to design their own custom RF front end. Learn how Cal-Bay Atlantic used current commerical off-the-shelf (COTS) technologies from NI to implement a four-channel synchronous RF recording and playback solution for direction finding, triangulation, beamforming, and other applications.

Sean Wallace, Senior RF Engineer, and Steve Seiden, President of Cal-Bay Atlantic, *Cal-Bay Systems*
Andy Hinde, RF and Communications Systems Engineer, *National Instruments*

Wednesday, August 5   4:45– 5:45 p.m.   Room 19A

ROBOTICS AND AUTONOMOUS SYSTEMS SUMMIT

Overview

Engineers and researchers from industry and academia worldwide have embraced LabVIEW graphical system design for a variety of robotics and autonomous vehicle applications. Hear from leaders in robotics who use LabVIEW and other NI technologies for cutting-edge robotics designs through interfacing with sensors and actuators, developing sophisticated algorithms, and targeting embedded hardware. Also explore the interactive Robotics Pavilion in the exhibition hall to view the latest robotics innovations.

Who Should Attend

Robotics, mechatronics, control, and embedded design engineers; entrepreneurs; and professors and students.

Keynotes

Building Robots to Inspire the Engineering World

Learn how robotics is improving engineering education through hands-on learning, the inspiration of young people, and gracious professionalism. Discuss the role of engineers in meeting the toughest global challenges.

Dean Kamen, Founder, *FIRST*, and President,
DEKA Research and Development Corporation

Tuesday, August 4   *4:45–5:45 p.m.*   *Room 17B*

Making Ground Robotics a Reality

Progress in autonomy and cognition is driving innovation and setting the stage for life-saving applications such as battlefield extraction and swarm robots. Explore the technology investments needed to make the future of robotics a reality.

Ellen Purdy, Enterprise Director of Joint Ground Robotics, *U.S. Department of Defense*

Wednesday, August 5   *10:30–11:30 a.m.*   *Room 17B*

ROBOTICS AND AUTONOMOUS SYSTEMS SUMMIT SESSIONS

Robot Analysis and Control

Discover how MIT designed several novel robots and actuators controlled with CompactRIO including a robot that can walk on the underside of surfaces for bridge inspection, a pendulum robot that can swing itself over an aircraft and follow the surface profile to look for defects, and a custom motor used for aircraft assembly.

Dr. H. Harry Asada, Ford Professor of Engineering and Director of the d'Arbeloff Laboratory for Information Systems and Technology, *MIT*

Tuesday, August 4   10:30–11:00 a.m.   Room 17B

Intelligent Mechatronics Systems

The UC Berkeley Mechanical Systems Control Laboratory adopted the LabVIEW Real-Time and FPGA platform including PXI, PCI, and CompactRIO for design and rapid control prototyping of mechatronic systems and robotic manipulators. Learn about the software and hardware architectures and applications in human-assistive systems, semiconductor manufacturing, and vehicle control.

Dr. Masayoshi Tomizuka, Cheryl and John Neerhout, Jr., Distinguished Professor, *UC Berkeley*

Tuesday, August 4   11:00–11:30 a.m.   Room 17B

Real-Time Quadrotor Flight Control

Quadrotor helicopters provide many advantages over conventional helicopters in small- and medium-scale unmanned aerial vehicle (UAV) applications. Learn how UC Berkeley used flexible LabVIEW development software to implement stability control on the microcontroller and high-level communication on the Luminary.

Dr. George Anwar, Instructor,
Colin Foe-Parker, Student Researcher, and
John McCarthy, Student Researcher, *UC Berkeley*

Tuesday, August 4   1:00–1:30 p.m.   Room 17B

Blind Driver Challenge and Other Innovative Robotics Research at Virginia Tech

The Robotics and Mechanisms Laboratory (RoMeLa) at Virginia Tech uses LabVIEW and NI hardware for research in novel, mobile robot locomotion. In addition to humanoid and other biomimetic robotics applications, learn how Virginia Tech used LabVIEW to help a blind person drive in the Blind Driver Challenge.

Dr. Dennis Hong, Assistant Professor
of Mechanical Engineering, and
Joseph Hays, Researcher, *Virginia Tech*

Tuesday, August 4   1:30–2:00 p.m.   Room 17B

iHop, iLean, iFling, iSee, and More – Multimodel Dynamic Robotic Systems

Students in the University of California, San Diego, Coordinate Robotics Lab study the design of highly agile mobile robots that can self-transform into hopping and climbing modes to overcome obstacles. Learn how NI Single-Board RIO and the LabVIEW Control Design and Simulation Module implement control and stabilization algorithms in these robots.

Dr. Thomas Bewley, Professor of Mechanical and Aerospace Engineering, *UCSD*

Tuesday, August 4   2:15–2:45 p.m.   Room 17B

Spatial Robotic Isotropy

Learn about KRAKEN, an autonomous underwater vehicle powered by LabVIEW and running on CompactRIO and a compact vision system that won the award for Best New Entry at the 11th Annual Student AUV Competition. The vehicle integrates a suite of sensors, two cameras, three standard propellers, and four custom-built bioinspired thrusters for maneuvering.

Bobby Hodgkinson, Student Researcher, and
Peter Klein, Student Researcher,
University of Colorado at Boulder

Tuesday, August 4   2:45–3:15 p.m.   Room 17B

ROBOTICS AND AUTONOMOUS SYSTEMS SUMMIT SESSIONS

Modular Machines: Reconfigurable Mobile Robots for Research and Education

The diverse applications of mobile robots lead to a variety of drive geometries and drive functionalities. To support diversity for robotics research, the Graz University of Technology created a modular platform for wheeled mobile robots that uses a six-edge honeycomb prism to realize robot drives of diverse geometry. Using this platform, researchers can deduce the inverse kinematics and infer the kinematic abilities for the specific drive configuration.

Dr. Michael Hofbaur, Professor, *Graz University of Technology*

Tuesday, August 4   3:30–4:00 p.m.   Room 17B

Building Cool, Complex Robots with LabVIEW and CompactRIO for *FIRST*

Can you build a complex robot that can easily navigate a frictionless surface in only six weeks? Learn how the CompactRIO embedded control platform helped high school teams design, prototype, and deploy a complete robotics system that integrates a variety of sensors and actuators, performs vision processing, and operates in autonomous and joystick-operated modes.

Austin High School Robotics Team

Tuesday, August 4   4:00–4:30 p.m.   Room 17B

The Past, Present, and Future of Robotics for the Rest of Us

Hear from one of the world's leading authorities on mobile robots as he shares his insight into the future of practical robot use and how you can be a part of that innovation.

Colin Angle, Chairman, CEO, and Cofounder, *iRobot*

Wednesday, August 5   1:00–2:00 p.m.   Room 17B

Autonomous Fish: Swarms, Surveillance, and Swimming

Boston Engineering created GhostSwimmer, a deployable aquatic robot, for the Office of Naval Research. GhostSwimmer uses two FlexStack systems, programmed with LabVIEW, to control, acquire, and communicate wirelessly. The data is used in a genetic algorithm to produce new parameters to send to GhostSwimmer.

Eric Atherton, Project Manager, *Boston Engineering*

Wednesday, August 5   2:15–2:45 p.m.   Room 17B

Drive 102 mph by Wire with CompactRIO, LabVIEW, and JAUS

The TORC Technologies ByWire XGV, the drive-by-wire converted Hybrid Escape platform, successfully operated at speeds of up to 102 mph in January 2009. Learn about the ByWire XGV and how the CompactRIO real-time system is used for closed-loop control of the steering, throttle, brake, and shifting for a tightly integrated system.

Andrew Culhane, Engineer, *TORC Technologies*

Wednesday, August 5   2:45–3:15 p.m.   Room 17B

U.S. Department of Defense Priorities and Reform under the Obama Administration

Examine the priorities of the U.S. Department of Defense as laid out by the Secretary of Defense, and learn about the momentum for defense acquisition reforms and how initiatives such as Future Vertical Lift help validate those reforms. Also discover how companies can pursue business with the U.S. Department of Defense.

Jaymie A. Durnan, Deputy Director of Joint Advanced Concepts, *Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics*

Wednesday, August 5   3:30–4:00 p.m.   Room 17B

ROBOTICS AND AUTONOMOUS SYSTEMS SUMMIT SESSIONS

From Movie Locations to Mars: Robotics Innovations with Reconfigurable I/O (RIO) and LabVIEW

Explore several Alliance Spacesystems projects that take advantage of the power and ease of use of NI products to provide innovative solutions for a range of problems. Learn how the company used NI technology in motion control, mechatronics, embedded systems, and robotics applications as well as projects in the aerospace, military, and movie industries.

Sean Dougherty, Senior Mechatronics and Aerospace Engineer, *Alliance Spacesystems*

Wednesday, August 5   4:00–4:30 p.m.   Room 17B

Industry Experts Panel: What Inspires Innovation?

What really inspires innovation? Is it mainstream media such as the IBM "Math Is Power" campaign, or is it something more innate? Explore what drives us to be a more innovative society in the areas of education, sustainability, and engineering. Also discuss how research ensures that fiction becomes reality; how new engineering disciplines such as robotics, biomedical, and green create a more innovative and compassionate society; and how we are inspiring the next generation of problem solvers to hone their innovation skills. Join us for an interactive discussion to discover the true origin of innovation.

Dr. David Barrett, Director of SCOPE, *Olin College*
Glenn Derene, Senior Technology Editor, Popular Mechanics
Jeanne Dietsch, CEO and Cofounder, *MobileRobots Inc.*
Dean Kamen, Founder of *FIRST* and President of *DEKA Research and Development Corporation*
John Pasquarette, Vice President of Product Marketing for Software, *National Instruments*
Ellen Purdy, Enterprise Director of Joint Ground Robotics, *U.S. Department of Defense*

Wednesday, August 5   4:30–5:45 p.m.   Ballroom G
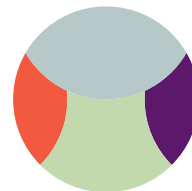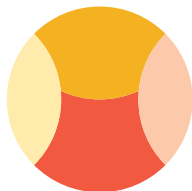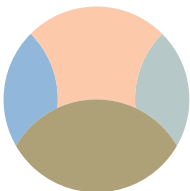
VISION SUMMIT

Overview

The Vision Summit at NIWeek is one of the most comprehensive vision conferences and exhibitions in North America. The summit pairs vision specialists from industry and academia with experts and developers of National Instruments vision products to deliver interactive presentations, hands-on workshops, and unique networking opportunities. Meet with experts from all realms of the machine vision industry to discuss the latest imaging technologies and specific strategies for increasing performance and reliability. The Vision Summit is complemented by the Vision Neighborhood in the exhibition hall.

Who Should Attend

Engineers, scientists, and machine builders interested in the latest technologies and methods in the machine vision and imaging industry.

Keynote

Understanding Human Visual Perception and How It Relates to Computerized Image Analysis

Many of the surprising properties of visual perception can be revealed through visual illusions that emphasize how perception is similar to, but also fundamentally different from, image analysis. Perception findings suggest algorithmic approaches to computerized image analysis.

Dr. Gregory Francis, Professor of Psychological Sciences, *Purdue University*

Tuesday, August 4   *1:00–2:00 p.m.*   *Room 19B*

Advances in Image Processing

Gain valuable background theory and useful programming techniques to get the most out of the new image processing algorithms in the latest NI Vision Development Module including geometric pattern matching and color classification.

Dr. Rob Giesen, Senior Group Manager, and Greg Stoll, Staff Software Engineer, *National Instruments*

Tuesday, August 4   *10:30–11:30 a.m.*   *Room 19B*

Design a Vision System You Can Trust

Slight variations in lighting, camera position, and a host of other system characteristics can have disastrous effects on the consistency of a machine vision system. Discover some revolutionary new tools for dynamically modeling these environmental variations to boost the reliability and repeatability of your next vision application.

Nicolas Vazquez, Principal Engineer, *National Instruments*

Tuesday, August 4   *2:15–3:15 p.m.*   *Room 19B*

Lessons for Understanding Color: Building a Better Multispectral Imaging System

Measuring color with a multispectral vision system offers, in principle, higher accuracy than an RGB-based camera. Discuss the lessons learned from developing such a system based on a tunable liquid crystal filter and a multimegapixel camera, and learn ways to overcome system sensitivity caused by optical effects, the spectrum of the lighting, and camera settings. Also explore the counter-intuitive effects of approximations on the measured CIE L*a*b* values.

Dr. Romik Chatterjee, Vice President of Engineering, *Graftek Imaging*

Tuesday, August 4   *3:30–4:30 p.m.*   *Room 19B*

Six Steps to Vision-Guided Industrial Robotics

Industrial robots have expanded into new types of applications that require flexible production, precision assembly, and delicate part handling. Discover how these types of vision-guided robotics applications can be developed with LabVIEW in six simple steps with a real-world example from the aerospace industry.

Carlton Heard, Vision Specialist, *National Instruments*
Michael Muldoon, Business Solution Engineer, *AV&R Vision and Robotics Inc.*

Tuesday, August 4   *4:45–5:45 p.m.*   *Room 19B*

Futureproof Your Vision System

Make sure the image processing applications you write today will work with the deployment hardware of tomorrow. Learn how to get the most from new technologies, such as 64-bit OSs, digital cameras, DSPs, and multicore vision systems, with only minor changes to your code.

Carlos Guzman, Group Manager, and Kamalina Srikant, Product Manager, *National Instruments*

Wednesday, August 5   *10:30–11:30 a.m.*   *Room 19B*

Improving Cell Phone Quality of Experience with LabVIEW

Quality of Experience (QoE) is a hot topic among designers and users of personal electronic devices. Explore the different concepts that contribute to QoE with a special focus on video quality and user interface latency. Learn how to successfully use NI vision software, camera interfaces, and NI Smart Cameras to develop an automated QoE test system.

Hans Kuosmanen, Senior Project Manager, *OptoFidelity Ltd.*

Wednesday, August 5   *1:00–2:00 p.m.*   *Room 19B*

VISION
SUMMIT SESSIONS

Processing Images with LabVIEW FPGA

FPGAs have emerged as a viable technology for computationally intensive image processing. Learn how to use FPGAs to enhance images, measure objects, make decisions, and output results for applications that demand results at high speeds and extremely low latencies.

Brent Runnels, Senior Systems Engineer, *National Instruments*

Wednesday, August 5   2:15–3:15 p.m.   Room 19B

Explore the Depths of 3D Vision

The theory behind 3D vision is not new, but many people still see it as a bleeding-edge technology that is difficult to set up and hard to use. Learn how National Instruments worked with SICK|IVP to simplify the development of 3D visual inspection systems, and discuss real-world examples that highlight both the potential benefits and the common pitfalls of 3D vision.

Matthew Slaughter, Vision Specialist, *Cyth Systems*
Jim Anderson, Product Manager, *SICK Inc.*

Wednesday, August 5   3:30–4:30 p.m.   Room 19B

Essential Techniques for Vision Timing and Synchronization

Explore various techniques for synchronizing vision systems with each other as well as other systems for part binning and rejection. Discover methods for pipelining high-speed inspections and queuing resulting actions as well as various technologies such as LabVIEW FPGA, IEEE 1588, and communication with third-party programmable logic controllers (PLCs).

Eric Gross, Staff Software Engineer, *National Instruments*

Wednesday, August 5   4:45–5:45 p.m.   Room 19B

Hands-On: NI Vision

Configure inspections on the latest NI vision systems with the latest version of NI Vision Builder for Automated Inspection (AI) and learn about the latest NI image processing algorithms.

Evan Dozier, Product Support Engineer, *National Instruments*

Tuesday, August 4   2:15–3:15 p.m.   Room 18A
Wednesday, August 5   1:00–2:00 p.m.   Room 18A
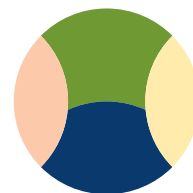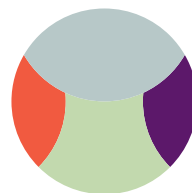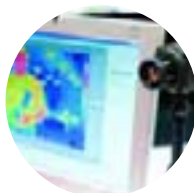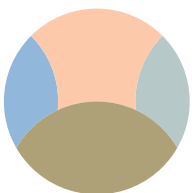
Adding a User Interface to Embedded Systems

Learn about multiple LabVIEW options for adding a user interface to NI embedded hardware including simple LCDs, intelligent color touch surfaces, touch panel PCs, and Web service thin clients.

Matt Spexarth, Product Manager, *National Instruments*

Thursday, August 6   10:30–11:30 a.m.   Room 12B

Build, Integrate, and Reuse FPGA IP

Nearly all complex FPGA applications require using, finding, integrating, creating, and reusing FPGA intellectual property (IP). Learn practical techniques for FPGA IP including the use of built-in IP from LabVIEW FPGA, toolkits, and IP creation guidelines. Discover how to use the Component-Level IP (CLIP) Node for external integration.

Matt Devoe, Digital Hardware Engineer, *National Instruments*

Wednesday, August 5   4:45–5:45 p.m.   Room 12A

Converting The MathWorks, Inc. MATLAB® Software to LabVIEW Graphical System Design

Learn how Boston Engineering used the graphical system design process to convert 10 proprietary MATLAB algorithms (including neural network and support vector machine) to the LabVIEW Embedded Module for Blackfin Processors for a handheld sensor including protocols such as serial peripheral interface (SPI), TWI, and universal asynchronous receiver/transmitter (UART).

Erik Goethert, Account Manager, *Boston Engineering*

Wednesday, August 5   2:15–3:15 p.m.   Room 12B

Custom Design 101 with CompactRIO C Series Modules and NI Single-Board RIO

Explore how to build custom C Series modules, accessories, breakout boards, or connectors for CompactRIO, NI Single-Board RIO, and NI FlexRIO. See application-oriented examples based on proof-of-concept reference designs that you can use in your custom integration.

Greg Crouch, Business Development Director, and Steven Romero, Technical Analyst, *National Instruments*

Wednesday, August 5   3:30–4:30 p.m.   Room 12A

Deploying and Replicating Embedded Systems

Examine the technical challenges engineers face when deploying and replicating NI embedded systems, and explore best practices for overcoming these challenges.

Elijah Kerry, Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 11A

Developing a PDA Platform Based on LabVIEW for Cochlear Implant Studies

The research team at The University of Texas at Dallas developed an interactive, portable, and low-cost platform based on LabVIEW and using PDAs for cochlear implant studies. Discover how the hybrid programming feature of LabVIEW helped the real-time implementation of two widely deployed signal processing strategies in commercial cochlear implants.

Nasser Kehtarnavaz, Engineer, *The University of Texas at Dallas*

Wednesday, August 5   1:00–2:00 p.m.   Room 12B

Fixed-Point Math Primer

Working with fixed-point math can be tricky. Learn about managing errors and understanding propagation through the system. Use this knowledge to work with the LabVIEW fixed-point data type for FPGAs and embedded targets. This session is beneficial for anyone implementing math or signal processing on embedded hardware.

Jim Lewis, Senior Software Engineer, and Ben Wiedman, Senior Software Engineer, *National Instruments*

Wednesday, August 5   3:30–4:30 p.m.   Room 12B

How CompactRIO Can Teach Babies to Suck

Up to one-third of the premature infants born in the United States each year have feeding problems when their brains struggle to coordinate sucking, swallowing, and breathing. They spend weeks with tubes taped to their faces or wearing masks to help them breathe, which hinders them from learning how to eat at a critical stage of brain development. Discover how KC BioMediX used LabVIEW to develop the NTrainer System to help premature babies learn to oral feed and greatly increase their chances for survival.

Kenny Aron, Software Engineering Manager, *KC BioMediX*

Wednesday, August 5   1:00–2:00 p.m.   Room 12A

EMBEDDED DESIGN TRACK

Introduction to LabVIEW FPGA

Learn how you can use LabVIEW FPGA for your applications and how you can efficiently evaluate and develop an application with this software.

Chris Delvizis, Product Manager, *National Instruments*

Wednesday, August 5   10:30–11:30 a.m.   Room 12A

Introduction to the LabVIEW Embedded Module for ARM Microcontrollers

Discover how to develop ARM-based embedded systems using the LabVIEW Embedded Module for ARM Microcontrollers, and view demonstrations on system simulation, communication protocols, and ANSI C code generation.

Jamie Brettle, Product Manager, *National Instruments*
Haydn Povey, CPU Marketing Program Manager, *ARM*

Tuesday, August 4   1:00–2:00 p.m.   Room 12A

Hands-On: Introduction to the LabVIEW Embedded Module for ARM Microcontrollers

Learn more about the LabVIEW Embedded Module for ARM Microcontrollers with a series of hands-on projects. Discover how to accelerate embedded system development using LabVIEW and low-power ARM microcontrollers.

Jamie Brettle, Product Manager, *National Instruments*

Tuesday, August 4   10:30–11:30 a.m.   Room 18B
Wednesday, August 5   2:15–3:15 p.m.   Room 18B

LabVIEW and Neuroscience

Explore how Boston Engineering is using LabVIEW to advance neuroscience research by building a brain slicing machine for Harvard University. The machine will be able to slice a sample block to a width of 20 nm and automatically collect and sequence the samples.

Eric Atherton, Principal Controls Engineer, *Boston Engineering*

Wednesday, August 5   4:45–5:45 p.m.   Room 12B

LabVIEW for Embedded Device Design and Prototyping

Discover how one company used the LabVIEW Embedded Module for ARM Microcontrollers and the LabVIEW Microprocessor SDK for a Gumstix device to overcome several design challenges including a pain-sensing prosthetic finger, a robotic greenhouse, and a scanning laser range finder.

Dr. Al Wicks, Associate Professor, *Virginia Tech*

Tuesday, August 4   4:45–5:45 p.m.   Room 12A

LabVIEW FPGA under the Hood

Have you ever wondered how LabVIEW FPGA actually runs LabVIEW code on an FPGA? View the LabVIEW block diagram synthesized down into the basic digital logic blocks of an FPGA.

Donovan Buck, Product Support Engineer, *National Instruments*

Tuesday, August 4   2:15–3:15 p.m.   Room 12B

LabVIEW Statechart Module Programming

Examine the LabVIEW Statechart Module, view a demonstration on how it further extends the LabVIEW state machine architecture, and learn about new features to maximize productivity.

Jamie Brettle, Product Manager, *National Instruments*

Tuesday, August 4   2:15–3:15 p.m.   Room 12A

★ Hands-On: NI CompactRIO

Are you new to CompactRIO? Learn how to get started quickly using CompactRIO Scan Mode. Gain hands-on experience programming CompactRIO to create industrial measurement and control systems.

Bob Hoffman, Engineering Leadership Program Engineer, and Nate Holmes, Applications Engineer, *National Instruments*

Tuesday, August 4   2:15–3:15 p.m.   Room 18B
Wednesday, August 5   1:00–2:00 p.m.   Room 18B
Wednesday, August 5   3:30–4:30 p.m.   Room 18B

★ Advanced

Prototyping and Verifying HDL Code with LabVIEW FPGA

Discuss how using LabVIEW and off-the-shelf FPGA hardware gives digital designers the ability to quickly connect a hardware description language (HDL) with real-world analog and digital I/O to prototype, test, validate, and optimize designs based on actual performance.

Ryan Brown, Senior Digital Design Engineer, and Rick Kuhlman, Product Manager, *National Instruments*

Thursday, August 6   10:30–11:30 a.m.   Room 12A

Hands-On: Run Windows and LabVIEW Real-Time in Parallel

Gain hands-on experience creating and deploying LabVIEW Real-Time and Windows host applications on the same PXI controller. Learn how to partition memory and I/O resources to different operating systems, and communicate between LabVIEW Real-Time and Windows using a virtual Ethernet connection. Come away with an understanding of how to use virtualization in practice.

Casey Weltzin, Product Manager, *National Instruments*

Tuesday, August 4   1:00–2:00 p.m.   Room 18A
Tuesday, August 4   3:30–4:30 p.m.   Room 18A
Wednesday, August 5   10:30–11:30 a.m.   Room 18A
Wednesday, August 5   3:30–4:30 p.m.   Room 18A

Seven Tips for Developing FDA-Friendly LabVIEW Code

Learn seven ways to reduce LabVIEW code validation efforts when developing medical devices. Explore the basic concepts of CFR 21 Part 820 and how to make LabVIEW code comply with these regulations.

P.J. Tanzillo, Medical Segment Lead, *National Instruments*

Wednesday, August 5   2:15–3:15 p.m.   Room 12A

★ The "Right" Development Process for LabVIEW FPGA

The FPGA development process differs somewhat from developing in Windows or LabVIEW Real-Time OS. Learn practical techniques and efficient development processes for creating FPGA systems including the "right" process, FPGA simulation, and special debugging techniques.

Newton Peterson, Senior Software Engineer, *National Instruments*

Tuesday, August 4   1:00–2:00 p.m.   Room 12B

Tips and Tricks for LabVIEW Microprocessor SDK Programming

As one of the earliest adopters of the LabVIEW Microprocessor SDK, Boston Engineering developed a unique portfolio of tips and tricks with numerous LabVIEW projects as well as a close relationship with NI developers. Gain insight into proper programming and debugging techniques.

Jason Burns, Senior Controls Engineer, *Boston Engineering*

Tuesday, August 4   3:30–4:30 p.m.   Room 12B

★ Transitioning from a PCI-Based System to CompactRIO

The Purdue University Rare Isotope Laboratory (PRIME Lab) uses a PCI-based control system to control the beam line elements for accelerator mass spectrometry (AMS). Explore how the lab transitioned from a PCI-based system to a new system based on CompactRIO that contains hundreds of analog, digital, and serial connections.

Tom Kubley, Chief Operator of PRIME Lab, *Purdue University*

Wednesday, August 5   10:30–11:30 a.m.   Room 12B

Using CompactRIO in the *FIRST* Robotics Competition

Hear from the architects who adapted the CompactRIO controller for use by 1,700 teams in the *FIRST* Robotics Competition, and learn about implementation details, nuances of competition robotics systems, and usability improvements targeted at 18-year-old developers.

Thomas Dohse, Software Engineer, *National Instruments*

Tuesday, August 4   4:45–5:45 p.m.   Room 12B

Using the New C Interface for LabVIEW FPGA

Discover how to develop ANSI C-based applications that communicate with the LabVIEW FPGA interface on desktop and real-time systems, and learn tips on how to get started and architect your applications.

Jamie Brettle, Product Manager, and Matt Spexarth, Product Manager, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 12A

EMBEDDED DESIGN TRACK

★ Virtualization Demystified

Virtualization is an important technology trend in the engineering world. Learn how key hardware and software technologies, such as Intel VT, make virtualization possible. Discuss topics including I/O partitioning and communication to gain an in-depth understanding.

Kevin Johnson, Senior Software Group Manager, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 12B

What's New in LabVIEW FPGA

Explore the new features of the LabVIEW FPGA Module and discover how NI responded to customer feedback with better compilation options, new FPGA IP, and more.

Rick Kuhlman, Product Manager, *National Instruments*

Tuesday, August 4   3:30–4:30 p.m.   Room 12A

What's New in LabVIEW Real-Time

Learn about the new features of the LabVIEW Real-Time Module including tools for implementing object-oriented design and using text-based math in real-time systems.

Kurt Williams, Product Manager, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 13B

INDUSTRIAL MEASUREMENTS AND CONTROL TRACK

A Regenerative Fuel Cell Backup Power Station Monitor and Control System

Infinity Fuel Cell and Hydrogen Inc. in Windsor, Connecticut, needed a monitoring and control system to manage the activities of a fuel cell backup power station including electrolyzer and fuel cell switching, power consumption, safety monitoring, and shutdown. Discover how Bloomy Controls used NI Compact FieldPoint and LabVIEW to develop an integrated control system for the power station.

Adrian Keister, Project Engineer, *Bloomy Controls Inc.*

Tuesday, August 4   2:15–3:15 p.m.   Room 13A/B

Hands-On: Adding HMI to CompactRIO with LabVIEW

Gain hands-on experience and learn about the new LabVIEW Datalogging and Supervisory Control and LabVIEW Touch Panel module features that can help you deploy a human machine interface (HMI) application to touch panel hardware based on Windows XP Embedded OSs. Also discover how to connect LabVIEW to a PLC and conduct data logging and alarming.

Andy Fenley, Product Support Engineer, and
Arun Veeramani, Product Manager, *National Instruments*

Tuesday, August 4   3:30–4:30 p.m.   Room 18B
Wednesday, August 5   4:45–5:45 p.m.   Room 18B

Architecting a Low-Power Wireless Sensor Network

Gain a detailed overview of wireless sensor networks and learn how to configure, install, and support these devices. Explore the networking layer, which topologies to use in specific applications, and how to use LabVIEW to improve system performance.

Robert Jackson, Senior Product Manager,
National Instruments

Thursday, August 6   1:00–2:00 p.m.   Room 11A

Choosing the Best Technology for Your Wireless Application

Your application requirements determine which wireless networking technology – Wi-Fi, ZigBee, or cellular – best suits your application. Examine the technologies and their differences to understand the selection and design process.

Robert Jackson, Senior Product Manager,
National Instruments

Thursday, August 6   2:15–3:15 p.m.   Room 19A

CompactRIO Scan Mode Tips and Tricks

Explore the new features in the CompactRIO Scan Mode and learn helpful tips and tricks for more effective CompactRIO programming. Discuss performance benchmarks and methods for integrating LabVIEW FPGA code into your CompactRIO Scan Mode application.

Kurt Williams, Product Manager, *National Instruments*

Tuesday, August 4   3:30–4:30 p.m.   Room 11A/B

Connecting LabVIEW to PLCs

Get an overview of the popular industrial communication protocols based on the Ethernet physical layer including EtherNet/IP and PROFINET, and learn how to connect LabVIEW to devices on these protocols.

Irene Bearly, Product Manager, *National Instruments*

Wednesday, August 5   4:45–5:45 p.m.   Room 11A/B

INDUSTRIAL MEASUREMENTS AND CONTROL TRACK

★Advanced

★ Deploying and Replicating LabVIEW Real-Time and LabVIEW Touch Panel Applications

Discuss tools and best practices to manage the replication and deployment of applications and systems developed for LabVIEW Real-Time and LabVIEW Touch Panel module targets. Explore a turnkey utility for automated system replication targeted at OEMs.

Christian Loew, Systems Engineering Group Manager, *National Instruments*

Tuesday, August 4   1:00–2:00 p.m.   Room 11A/B

Deploying Applications to Windows XP Embedded Targets

Learn about the Windows XP Embedded OS and how you can deploy your LabVIEW applications to XP Embedded targets. Discover new LabVIEW Datalogging Supervisory and Control and LabVIEW Touch Panel module features to help you develop HMIs quickly.

Arun Veeramani, Product Manager, *National Instruments*

Wednesday, August 5   1:00–2:00 p.m.   Room 13A/B

Hands-On: Develop Powerful Motion Applications with NI CompactRIO and SolidWorks

Learn about motion application development for CompactRIO from simple single-axis to complex-coordinated trajectories. Discover digital prototyping so that you can simulate, visualize, and validate your machine design early in development by connecting LabVIEW to a SolidWorks 3D CAD model.

Christian Fritz, Product Manager, *National Instruments*

Tuesday, August 4   4:45–5:45 p.m.   Room 18D
Wednesday, August 5   10:30–11:30 a.m.   Room 18D

★ Developing an Industrial or Machine Control Application Using CompactRIO and the LabVIEW Touch Panel Module

View a reference design and discuss programming best practices for developing industrial and machine control applications using the NI programmable automation controller (PAC) platform, specifically CompactRIO and LabVIEW Touch Panel Module targets.

David Harding, Systems Engineer, *National Instruments*

Wednesday, August 5   1:00–2:00 p.m.   Room 11A/B

Energy Storage with LabVIEW

Learn how Boston Engineering used LabVIEW software to monitor a balance of plant (BOP), which consists of interlocks, safety measures, and an emergency power dissipation system, to support an energy storage unit. This technology uses a series of custom flywheel systems to store and provide energy to the grid.

Jeff Frost, Controls Engineer, *Boston Engineering*

Tuesday, August 4   1:00–2:00 p.m.   Room 13A/B

Graphical System Design Opportunities for Wind and Solar Energy

With the increasing demand for clean, renewable energy, the wind and solar energy industries are experiencing fast growth despite the global recession. Explore how engineers and scientists use graphical system design technology to attack the key technical challenges of these industries.

Chris Fronda, Product Manager, and
Brian MacCleery, Senior Product Manager,
National Instruments

Wednesday, August 5   2:15–3:15 p.m.   Room 11A/B

Hands-On: Introduction to CompactRIO and LabVIEW Real-Time

Gain hands-on experience with CompactRIO and the LabVIEW Real-Time Module and learn how to quickly build and deploy embedded measurement and control applications using graphical programming. Discover new LabVIEW Real-Time features that increase flexibility and integration with LabVIEW FPGA when programming in CompactRIO Scan Mode.

Kurt Williams, Product Manager, *National Instruments*

Tuesday, August 4	1:00–2:00 p.m.	Room 18B
Tuesday, August 4	4:45–5:45 p.m.	Room 18B
Wednesday, August 5	10:30–11:30 a.m.	Room 18B
Thursday, August 6	10:30–11:30 a.m.	Room 18B

Hands-On: Introduction to LabVIEW for Wireless Sensor Networks

Learn how LabVIEW graphical programming can extend wireless sensor network capabilities to conserve power and interface with custom sensors.

Nicholas Butler, Product Manager, *National Instruments*

Tuesday, August 4	10:30–11:30 a.m.	Room 18D
Wednesday, August 5	2:15–3:15 p.m.	Room 18D
Thursday, August 6	10:30–11:30 a.m.	Room 18D

Move It Beyond the Standard – Experience Advanced Motion Features

NI SoftMotion simplifies multiaxis motion application development, but what if you want to go beyond the standard use case? Learn how to implement advanced control algorithms using NI SoftMotion and experience how to connect CompactRIO to third-party drives by creating a custom axis interfaces.

Christian Fritz, Product Manager, *National Instruments*

Wednesday, August 5   3:30–4:30 p.m.   Room 11A/B

Move It – Develop Powerful Motion Applications Using NI SoftMotion and CompactRIO

Experience industrial motion applications and learn how to create custom applications using the high-level motion functions provided by NI SoftMotion. Explore the C Series drive interface modules for CompactRIO to connect to servo and stepper drives and learn how to perform motion simulation using SolidWorks 3D-CAD models.

Christian Fritz, Product Manager, *National Instruments*

Wednesday, August 5   4:45–5:45 p.m.   Room 13A/B

Porting a Legacy Control System to PXI with LabWindows™/CVI Real-Time

Learn about a factory control system that was ported from a multibus architecture to the PXI platform. Discover the economic benefit of the conversion, why engineers chose PXI and LabWindows/CVI Real-Time, how they ported the ANSI C software, key lessons learned, and the performance characteristics of the final system.

Nate Mackley, Lead Hardware Engineer, and David Wheeler, Director of Software Engineering, *Mantaro Product Development Services*

Tuesday, August 4   4:45–5:45 p.m.   Room 13A/B

Power Measurements 101

Examine power quality and power monitoring fundamentals as well as recommended NI hardware for making power measurements. Discover how to build a power analyzer, complete with rms, power factor, and real-power analysis, using C Series modules and LabVIEW.

Dr. Daniel Kaminsky, Director of the Virtual Instrumentation Division, *ELCOM*
Brett Burger, Product Manager, *National Instruments*

Tuesday, August 4   4:45–5:45 p.m.   Room 11A/B

INDUSTRIAL MEASUREMENTS AND CONTROL TRACK

★ Advanced

★ Real-Time Prototyping and Deployment Controls for Automotive and Manufacturing Applications

Review several teaching and research problems that the Clemson International Center for Automotive Research solved using the NI deployment curve from PXI to CompactRIO to the LabVIEW Embedded Module for ARM Microcontrollers. Applications include an airflow controller for an engine, manufacturing-precision positioning, and electronic stability control for heavy trucks.

Tom Kurfess, Professor and
BMW Chair in Manufacturing, and
Laine Mears, Assistant Professor, *Clemson University*

Tuesday, August 4   2:15–3:15 p.m.   Room 11A/B

Researching and Deploying Wireless Sensor Networks

Discover how leading researchers at UCLA and the Center for Embedded Networked Sensing use PACs and wireless sensor networks to address challenges in structural, environmental science, and water quality research.

William Kaiser, Professor of Electrical Engineering, *UCLA*
Thomas Harmon, Professor of Engineering, *UC Merced*

Wednesday, August 5   10:30–11:30 a.m.   Room 13A/B

Upgrading Nuclear Power Plant Systems with CompactRIO

Many instrumentation signals from nuclear power plant systems are not used to the fullest potential due to hardware limitations in the systems that were designed and built in the 1960s. Learn how to acquire these signals to provide information for more efficient and reliable plant operation by applying CompactRIO technology.

Greg Morton, Software Development Manager, *AMS Corporation*

Thursday, August 6   10:30–11:30 a.m.   Room 11A

Using Advanced Motor Control Algorithms for Increased Efficiency

Estimates suggest that 40 percent of electricity consumed in the United States powers electric motors, most of which are controlled using on/off techniques or very basic algorithms. Discuss field-oriented control, an advanced control algorithm being used by embedded designers to significantly increase efficiency of synchronous motors.

Dr. Ben Black, Systems Engineer, *National Instruments*

Tuesday, August 4   10:30–11:30 a.m.   Room 13A/B

Using Graphical Programming to Apply Large-Scale Online Computations to Optimal Geosystems Management

Optimal geosystems management relies on predictive computational models and real-time field data acquisition/assimilation, and massive parallel computations are unfeasible for real-time implementations. Learn about a new proposed framework based on LabVIEW and COTS technology, such as multicore, FPGA, and graphics processing unit (GPU), to apply large-scale, real-time optimal control to oil reservoirs.

Dr. Eduardo Gildin, Postdoctoral Fellow,
Jack L. Poulson, Graduate Student,
Sunil G. Thomas, Graduate Student, and
Dr. Mary F. Wheeler, Director for the Center for Subsurface Modeling, *The University of Texas at Austin*

Tuesday, August 4   3:30–4:30 p.m.   Room 13A/B

What's New with CompactRIO

Discover the latest technological advances for CompactRIO – the rugged PAC that combines an open, embedded architecture with small size, extreme ruggedness, and hot-swappable industrial I/O modules.

Irene Bearly, Product Manager, and
Arves Stolpe, Product Manager, *National Instruments*

Tuesday, August 4   10:30–11:30 a.m.   Room 11A/B

SOFTWARE DEVELOPMENT TECHNIQUES TRACK

Adding Internet-Like Search to LabVIEW with NI DataFinder

Engineers and scientists spend more time searching through post-test data for useful information than performing the actual test. Learn how NI DataFinder technology and the new API for LabVIEW offers Internet-like search to index, search, find, and report post-test data across channels, files, and network locations.

Caroline Tipton, Product Manager, *National Instruments*

Wednesday, August 5   10:30–11:30 a.m. Room 16A

★ Advanced Error Handling Techniques in LabVIEW

Errors are bound to occur during software execution, and it is important for your software to help you manage them. Learn ways to handle, manage, and present those errors in a safe and controlled manner.

Brian Gapske, Systems Engineer, *V I Engineering*

Tuesday, August 4   4:45–5:45 p.m.   Room 16B

Application Debugging Tools in LabWindows/CVI

The most effective debugging is the kind you do not have to do. Learn how LabWindows/CVI can help you trace the behavior of your application, even when you cannot debug your program, including how to track down memory leaks. Also examine some helpful third-party debugging tools.

Mert Akinc, Staff Software Engineer, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 13A

Best Practices for Developing with Shared Variables

Discover the advanced uses of the NI shared variable and discuss design trade-offs and system architecture. Review benchmarks for various use cases and tips and tricks for developing high-channel-count applications with the shared variable.

Darin Gillis, LabVIEW Group Manager, *National Instruments*

Thursday, August 6   10:30–11:30 a.m.   Room 16A

★ Best Practices for Memory Management and LabVIEW Code Optimization

Explore the internal workings of the LabVIEW execution engine, and learn how to use those principles to improve your performance and memory usage.

Dan Hedges, Senior Software Engineer, *National Instruments*

Wednesday, August 5   3:30–4:30 p.m.   Room 16B

★ Best Practices for NI TestStand Architecture Development

Efficiently create advanced NI TestStand architectures with a greater understanding of the NI TestStand object model – a collection of objects with specific functionality that contribute to the power and flexibility of NI TestStand.

Albert DeWeese, Systems Engineer, *VI Technology*

Thursday, August 6   2:15–3:15 p.m.   Room 19B

Beyond the Basics: LabVIEW Debugging Techniques

Most users are familiar with basic LabVIEW debugging features such as highlight execution, break points, stepping, and error handling; however, more advanced technologies and techniques are helpful for larger, more complex applications. Learn about custom probes, remotely debuggable executables, probe to disk, conditional debugging code, and the new LabVIEW Desktop Execution Trace Toolkit.

Darren Nattinger, Senior Software Engineer, *National Instruments*

Tuesday, August 4   2:15–3:15 p.m.   Room 16A

Build Eye-Catching LabVIEW User Interfaces

Learn how to make your LabVIEW applications look and feel like other common applications by exploring creative ways to handle user interaction, graphical representation, and custom controls, and present your clients with a professional and easy-to-use application.

Jonathan Cohn, Project Engineer, *Bloomy Controls*

Wednesday, August 5   2:15–3:15 p.m.   Room 16B

SOFTWARE DEVELOPMENT TECHNIQUES TRACK

Comparing Graphical Programming Languages to Traditional Text-Based Languages

Programming has traditionally been taught using text-based languages. Fundamental concepts common to all programming languages include math operations, loops, conditional statements, arrays, file manipulations, and functions. Learn how project members attempt to determine the effectiveness of LabVIEW in teaching these concepts.

Stuart Brand, Engineering Lab Supervisor, *The Ohio State University*

Wednesday, August 5   3:30–4:30 p.m.   Room 16A

Data Acquisition Remote Monitoring and Control in .NET with NI Measurement Studio

Learn how to create thin-client remote system monitoring and control applications with LabVIEW, ASP.NET, and Measurement Studio software. Explore several options for developing distributed Web-enabled applications.

Adri Kruger, Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 13A

Hands-On: Data Mining Techniques for LabVIEW Users

Learn how to effectively harness LabVIEW data storage technologies to document test data using the TDM data model. Discover how to use Technical Data Management Streaming VIs to save structured data for loading into Microsoft Excel or for mining, analyzing, and reporting within the DIAdem environment.

Caroline Tipton, Product Manager, *National Instruments*

Tuesday, August 4   3:30–4:30 p.m.   Room 18C
Wednesday, August 5   1:00–2:00 p.m.   Room 18C

Deploying Text-Based Math Scripts to Real-Time Hardware

LabVIEW MathScript introduces text-based math to the graphical world of LabVIEW developers. Learn how LabVIEW MathScript is revolutionizing the task of deploying text-based algorithms to real-time hardware.

Jeffrey Phillips, Product Manager, *National Instruments*

Tuesday, August 4   3:30–4:30 p.m.   Room 16A

★ Enhanced Data Visualization in LabVIEW

Learn about the different LabVIEW data visualization tools and methods for developing applications that integrate measurements with data analysis and visualization in structural dynamics. View demonstrations on how visualization is important in testing and validating the numerical methods and analysis code for structural health monitoring and analysis applications based on LabVIEW.

Igor Alvarado, Business Development Manager, *National Instruments*

Thursday, August 6   10:30–11:30 a.m.   Room 16B

From Spaghetti Code to State Machines: One Man's Journey through the NI Certification Process

Hear an ex-spaghetti coder share his thoughts about the NI certification process. Find out how certification assisted him in the development of more functional, readable, scalable, and maintainable LabVIEW programs at the University of Michigan mechanical engineering department.

Thomas Bress, Undergraduate Laboratory Coordinator, *University of Michigan*

Tuesday, August 4   1:00–2:00 p.m.   Room 16B

Improving Prototype Validation with LabVIEW – Automating Multisim Simulation

Extend the analysis capabilities of LabVIEW to circuit design through the acquisition of SPICE simulation measurements. With Multisim circuit design and LabVIEW, you can improve prototype validation with the correlation of simulated and real measurements, as well as the creation of advanced LabVIEW analyses. Learn how to apply these tools to your design flow.

Bhavesh Mistry, Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 13B

Improving the LabVIEW Upgrade Experience

Examine best practices for upgrading to the latest version of LabVIEW. Learn about the changes, what they mean for customers with LabVIEW applications, and how NI is working to simplify this process.

Simon Hogg, Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 16A

SOFTWARE DEVELOPMENT TECHNIQUES TRACK

Introduction to LabVIEW Object-Oriented Programming

Learn the basics of creating object-oriented applications using LabVIEW and gain an overview of LabVIEW classes, access scope, and inheritance. An introduction for LabVIEW programmers, this session requires no prior knowledge of object-oriented programming.

Trevor Christman, Software Engineer, and Stephen Mercer, Senior Software Engineer, *National Instruments*

Tuesday, August 4   4:45–5:45 p.m.   Room 16A

Introduction to the TDMS File Format

Collecting measurement data, saving it for reuse, and sharing it with others can be challenging. Explore the benefits of TDMS as a file standard versus other storage techniques, and learn best data-saving practices to get the most out of your test data.

Caroline Tipton, Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 11B

LabVIEW Code Reuse for Teams and Large Projects

LabVIEW code reuse is a key component of team-based development, large project work, and knowledge sharing within an organization. Learn how to create a shared repository of reusable VIs and use analytics tools to report your organization's software reuse metrics.

James Kring, President, *JKI*

Wednesday, August 5   10:30–11:30 a.m.   Room 16B

★ LabVIEW Graphical Scripting

Learn how to programmatically script a LabVIEW VI and examine how the LabVIEW R&D team and lead users successfully automated their code generation with this powerful tool.

Trevor Christman, Software Engineer, *National Instruments*

Tuesday, August 4   2:15–3:15 p.m.   Room 16B

Managing Large Applications with the Project Explorer and Source Code Control

Learn how to integrate souce code control into LabVIEW to track changes and coordinate work among teams of developers.

Elijah Kerry, Product Manager, *National Instruments*

Tuesday, August 4   10:30–11:30 a.m.   Room 16A

★ Multicore Design Patterns in LabVIEW

Learn programming patterns that take advantage of today's multicore systems, particularly those well-adapted to LabVIEW and LabVIEW Real-Time.

Rob Dye, Principal Architect, *National Instruments*

Tuesday, August 4   10:30–11:30 a.m.   Room 16B

.NET and LabVIEW: The Old New Thing

LabVIEW and .NET are two great platforms that work even better together. From using GAC to unpacking clusters, discover tips and pitfalls about the interoperability between LabVIEW and .NET to help you provide access to complex databases from LabVIEW or call existing LabVIEW VIs from .NET instead of rewriting code.

Bryan Bates, Programmer/Analyst, *Jacobs Engineering Group*

Tuesday, August 4   10:30–11:30 a.m.   Room 12A

★ New Features in LabVIEW Object-Oriented Programming

Join LabVIEW developers who know the LabVIEW basics and are interested in learning more. Discuss new development techniques and new LabVIEW features that extend the LabVIEW object-oriented programming model.

Stephen Mercer, Senior Software Engineer, *National Instruments*

Wednesday, August 5   4:45–5:45 p.m.   Room 16B

SOFTWARE DEVELOPMENT TECHNIQUES TRACK

New Software Engineering Tools for Large LabVIEW Applications

Learn about new tools for large LabVIEW applications and how to use them in a structured development environment to develop high-quality, reliable applications.

Elijah Kerry, Product Manager, *National Instruments*

Tuesday, August 4   3:30–4:30 p.m.   Room 16B

NI TestStand from the Trenches: Plan for Success with Automated Test

Discuss the NI TestStand modular architecture and how it helps engineers transition from using a simple scripting tool to a fully customized test solution. Learn about style and strategies, participate in a short test design discussion, gain an overview of out-of-box features, and discover three simple customizations to tailor a test platform.

Elaine Ramundo, Training and Support Engineer, *Bloomy Controls Inc.*

Thursday, August 6   10:30–11:30 a.m.   Room 17A

Optimizing Automated Test Systems with Parallel Technologies

Learn how to use parallel technologies such as multicore processors, pipelining, and autoscheduling to optimize the execution of your automated test system. Take advantage of multicore processors to improve processor-intensive tasks while using autoscheduling to increase the performance of instrument-intensive tasks.

Santiago Delgado, Product Manager, and Antonio Lie, Software Engineer, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 19B

Practical Data Logging: Best Practices, Tips, and Tricks

Logging data to disk is one of the most basic tasks a test engineer performs. Learn practical techniques that can help you eliminate common headaches, achieve higher performance, and save development time in both LabVIEW and LabVIEW SignalExpress.

Jared Aho, Test Software Group Manager, *National Instruments*

Thursday, August 6   10:30–11:30 a.m.   Room 11B

Raw Data to Results: Proper Data Management Techniques

See how you can move quickly from raw data collection to usable engineering results with NI software for managing measurement data, mining, analysis, and reporting. Explore different data management strategies and ways to use the latest NI software features to expand your approach to multiple groups or departments within your organization.

Caroline Tipton, Product Manager, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 11B

Role-Based Development with LabVIEW and NI TestStand

Learn how to implement a software development process centered on roles that allow organizations to maximize the experience of test automation engineers and the knowledge of test engineers. Discover how LabVIEW and NI TestStand help test automation engineers assume the integration of measurement instruments into NI TestStand, simplifying the software task for test sequence developers.

Joe Helms, Test Engineer, *Harris Corporation*

Thursday, August 6   2:15–3:15 p.m.   Room 12B

SOFTWARE DEVELOPMENT TECHNIQUES TRACK

Run Windows and LabVIEW Real-Time in Parallel on the Same Controller

Learn how to incorporate real-time processing and a GUI on the same controller and take advantage of Windows services in conjunction with LabVIEW Real-Time test and control applications. Also discover ways to partition devices between operating systems and communicate via virtual Ethernet.

Casey Weltzin, Product Manager, *National Instruments*

Tuesday, August 4   10:30–11:30 a.m.   Room 12B
Wednesday, August 5   1:00–2:00 p.m.   Room 16A

Saving Lives and Money by Predicting Mechanical Failures with LabVIEW

As innovation drives complexity in mechanical design, it is becoming increasingly important to understand how signal processing can help vibration analysts see into the future and predict catastrophic failures. Learn how researchers in civil structure design and the wind energy industry use LabVIEW to predict bridge collapses and help increase the use of renewable energy.

Mike Albright, General Manager, *Signal.X Technologies*
Chris Fronda, Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 16B

★ Software Engineering with LabVIEW from Requirements to Deployment

Learn about the V-model and how NI development products are a great fit for it from requirements development to traceability through the product development cycle – design, development, and testing. Explore industry case studies that demonstrate practical applications of the process.

Jeff Plotzke, Systems Engineer, and
Christopher Relf, Chief Architect, *V I Engineering*

Wednesday, August 5   1:00–2:00 p.m.   Room 16B

Tips and Tricks to Increase LabVIEW Performance Speed

Participate in an interactive presentation that covers a variety of simple ways to help you write faster LabVIEW code. Review simple and advanced techniques to easily improve VI performance.

Darren Nattinger, Senior Software Engineer,
National Instruments

Wednesday, August 5   4:45–5:45 p.m.   Room 16A

Hands-On: Tools and APIs to Build on to the LabVIEW Platform

The LabVIEW platform offers partners and developers the chance to customize LabVIEW in many different ways. Learn how to use APIs and features such as graphical scripting and the LabVIEW project as a way to add to LabVIEW.

Jeff Meisel, Product Manager, *National Instruments*

Tuesday, August 4   4:45–5:45 p.m.   Room 18C
Wednesday, August 5   2:15–3:15 p.m.   Room 18C

Using Your VI as a Web Service in LabVIEW

Learn how to use LabVIEW Web services to publish your VIs for standard, Web-based communication and for use with thin-client HMIs.

Elijah Kerry, Product Manager, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 16B

What's New in LabVIEW

Examine the latest LabVIEW features and ways you can use them to improve your productivity and the performance of your test, control, and design applications.

Jeffrey Phillips, Product Manager, *National Instruments*

Tuesday, August 4   1:00–2:00 p.m.   Room 16A
Wednesday, August 5   2:15–3:15 p.m.   Room 16A

SOFTWARE DEVELOPMENT TECHNIQUES TRACK

Hands-On: What's New in LabVIEW

Explore the features of LabVIEW in this interactive session.

Jeffrey Phillips, Product Manager, *National Instruments*

Tuesday, August 4   *10:30–11:30 a.m.*   *Room 18C*
Wednesday, August 5   *10:30–11:30 a.m.*   *Room 18C*
Thursday, August 6   *10:30–11:30 a.m.*   *Room 18C*

What's New in LabWindows/CVI: Version 9.0 and Beyond

Explore the new features of LabWindows/CVI 9.0 and LabWindows/CVI Real-Time. Learn how you can detect memory leaks earlier, reduce compile times, and integrate the latest PXI, PXI Express, and PC hardware in your real-time applications. Also share your feature suggestions directly with the LabWindows/CVI developers.

Luis Gomes, Software Group Manager, and
Adri Kruger, Product Manager, *National Instruments*

Thursday, August 6   *10:30–11:30 a.m.*   *Room 13A*

★ **Advanced**

Achieve Hardware Independence with an Object-Oriented Hardware Abstraction Layer

Test system engineers often have to develop software that is independent of the hardware on which it relies. Learn how a hardware abstraction layer (HAL) adds simulation and hardware interchangeability to your applications and examine the implementation method NI recommends that is based on an object-oriented design.

Nathan Tacha, Product Support Engineer, *National Instruments*

Thursday, August 6   *10:30–11:30 a.m.*   *Room 15*

★ Advanced Data Acquisition Techniques with R Series DAQ

Have you ever needed more flexible triggering options, multirate sampling, or other tasks outside the functionality of a typical data acquisition device? NI R Series devices feature a user-defined FPGA for custom timing, triggering, and onboard processing. Explore ways to customize your data acquisition device with R Series products and LabVIEW FPGA.

Chris Delvizis, Product Manager, *National Instruments*

Thursday, August 6   *10:30–11:30 a.m.*   *Room 17B*

Architecting High-Speed Data Streaming Systems

Learn how to architect and build high-speed data streaming systems for applications such as RF record and playback, IF/baseband streaming, and digital video and audio test based on new high-throughput PXI Express instruments, chassis, and controllers. Discuss system-level considerations and module-specific characteristics.

Chetan Kapoor, Product Manager, *National Instruments*

Thursday, August 6   *10:30–11:30 a.m.*   *Room 13B*

Hands-On: Build an Automated Test System from Scratch

Explore ways to develop an automated test system from start to finish and how to use NI TestStand test management software to quickly sequence your measurements. Discover ways to use LabVIEW software to easily communicate with measurement instruments.

Chris Ghanbarzadeh, Applications Engineer, and Matt Gist, Applications Engineer, *National Instruments*

Tuesday, August 4   *1:00–3:15 p.m.*   *Room 18C*
Wednesday, August 5   *3:30–5:45 p.m.*   *Room 18C*

Comprehensively Testing Complex Electronics Systems: Nintendo Wii Teardown

Nintendo Wii is a next-generation gaming console that competes with the Microsoft Xbox 360 and Sony PLAYSTATION 3. Tear down a Nintendo Wii to explore its inner operations and understand how engineers use PXI-based systems to comprehensively test critical components.

Chetan Kapoor, Product Manager, *National Instruments*

Tuesday, August 4   *10:30–11:30 a.m.*   *Room 14*
Wednesday, August 5   *4:45–5:45 p.m.*   *Room 14*

Data Acquisition for Netbooks and Handheld and Mobile Devices

Conducting mobile and handheld measurements can be challenging due to size and power constraints, providing limited functionality in data display, analysis, and storage. Explore new processors, computing platforms, and software technologies that can give you unprecedented measurement mobility without sacrificing functionality.

Nathan Yang, Product Manager, *National Instruments*

Thursday, August 6   *1:00–2:00 p.m.*   *Room 14*

★ DAQ Advanced: Counters and Timing

Multifunction DAQ has expanded the functionality of counters and timing on a single data acquisition device. Learn about the enhancements in timing engines, triggering, and counter capabilities, and examine the best practices for using them with NI-DAQmx.

Daniel Domene, Software Group Manager, *National Instruments*

Wednesday, August 5   *3:30–4:30 p.m.*   *Room 13A/B*

★ DAQ Advanced: Streaming and Performance

Gain in-depth knowledge about hardware and software technologies for high-performance, single-point, and buffered I/O. Learn tips and tricks on how to maximize throughput and obtain the best performance.

Neil Stoddard, Product Support Engineer, *National Instruments*

Thursday, August 6   *2:15–3:15 p.m.*   *Room 17A*

TEST AND DATA ACQUISITION TRACK

★ Advanced

Demystifying and Working with FlexRay

Found in cars such as the new BMW X5, FlexRay is the automotive networking technology behind active suspension, brake-by-wire, driver assistance, and other advanced vehicle technologies. Explore how FlexRay works and learn how to take advantage of this network using NI technology.

Paul Mandeltort, Product Manager, *National Instruments*

Wednesday, August 5   1:00–2:00 p.m.   Room 14

Demystifying Wireless for Real-World Measurement Applications

Gain an understanding of wireless networking basics and learn how to deploy reliable wireless measurement and control applications in a variety of harsh outdoor or industrial environments.

Jesse Frankel, Systems Engineering Director,
AirMagnet Inc.
Charlie Stiernberg, Product Manager,
National Instruments

Wednesday, August 5   4:45–5:45 p.m.   Room 15

Determining the Accuracy of Your Data Acquisition Application

Noise, temperature drift, total harmonic distortion (THD), differential nonlinearity (DNL), and gain/offset errors may introduce uncertainty in your measurements. Learn about the trade-offs and techniques for improving the accuracy of your data acquisition application.

Vineet Aggarwal, Product Manager, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 17A

★ Developing an Efficient, Low-Cost MEMS Microphone Test System with PXI and LabVIEW

As a pioneer and leader in micromachine technology, Analog Devices offers cutting-edge microelectromechanical systems (MEMS) used in cell phones, digital cameras, and other electronics to sense changes in the surrounding environment. Learn how the company developed a test system for its latest MEMS microphone using PXI and LabVIEW to drastically reduce the cost of test.

Dan Weinberg, Senior Staff Engineer, and
Rob Whitehouse, Senior Staff Engineer, *Analog Devices*

Wednesday, August 5   2:15–3:15 p.m.   Room 13A/B

Digital Video Testing for Design and Production Test

Testing multimedia devices like set-top boxes, Blu-ray players, and LCD displays that contain modern digital video such as HDMI 1080p 60 Hz requires features for acquiring and analyzing video performance as well as handling audio data for 5.1 or 7.1 channels. Gain background knowledge for digital video testing and take a look at the NI VideoMASTER tool suite for digital video testing.

Birger Schneider, Managing Director,
National Instruments

Wednesday, August 5   4:45–5:45 p.m.   Room 17B

Digital Instruments for Semiconductor, Multimedia, and Signal Processing

Learn about the latest digital technologies from NI and how they apply to your ADC/DAC test, video/audio test, or custom real-time digital data processing with an onboard FPGA. Discover how NI optimizes instrument designs for speed, signal quality, data streaming, clocking, and more.

Raajit Lall, Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 17B

Extend Your DC Measurement Performance

Learn how to source, measure, and switch nanovolts, picoamps, and microhms. Also explore ways to use PXI hardware including high-precision multimeters and source measure units (SMUs) in various configurations to attain the best measurement performance for your automated test system.

Travis White, Product Manager, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 15

Extending Real-Time Testing Applications with LabVIEW, LabVIEW FPGA, and NI TestStand

Explore several examples that demonstrate the use of LabVIEW, LabVIEW FPGA, NI TestStand and other tools to create customized, flexible real-time testing applications more efficiently.

Travis White, Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 15

Hack Your Car with NI CAN Interfaces

Learn the details of automotive diagnostics (OBD-II) and controller area networking used in every production car since 2008. Discover how to use LabVIEW and NI USB CAN interfaces to gain hidden data from your car, read diagnostic trouble codes, and build custom automotive diagnostic applications.

Paul Mandeltort, Product Manager, *National Instruments*

Tuesday, August 4   *1:00–2:00 p.m.*   *Room 15*

Hardware-in-the-Loop and Real-Time Testing Techniques

Real-time testing applications require greater reliability and determinism than a typical stimulus-response test system. Examine many of these applications and review the architectures and technologies used to develop them including some recently released implementation tools.

Chris Washington, Product Manager, *National Instruments*

Thursday, August 6   *10:30–11:30 a.m.*   *Room 19B*

Head-to-Head High-Speed Bus Comparison and Techniques to Maximize Productivity at Zero Cost

Compare the merits and strengths of PCI, PCI Express, GPIB, USB, and Ethernet/LAN in instrumentation, and explore ways to maximize your investment and the productivity of your GPIB instruments at no additional cost. Learn about reducing communication overhead and increasing driver efficiency as well as productivity tools such as NI Spy, 64-bit support, and other performance-increasing measures.

Murali Manohar Ravindran, Product Manager, *National Instruments*

Wednesday, August 5   *10:30–11:30 a.m.*   *Room 11A/B*

High-Performance Protocol-Based Testing Using FPGA Technology

An analysis of today's semiconductor manufacturer needs indicates a lack of protocol-based test solutions. Learn about a new architecture that combines new software and hardware and delivers a powerful tool to reduce time to market.

Michael Konrad, President, and
Armin Lechner, Manager for Semiconductor Test, *Konrad Technologies*

Tuesday, August 4   *4:45–5:45 p.m.*   *Room 14*

Hands-On: Introduction to Data Acquisition

Perform exercises to learn the fundamentals of data acquisition with analog I/O, digital I/O, and LabVIEW.

Seth Berry, Product Support Engineer, *National Instruments*

Wednesday, August 5   *4:45–5:45 p.m.*   *Room 18D*

Introduction to PXI and PXI Express

Learn the basics of the PXI platform and explore the technical features of PXI including timing, synchronization, and streaming. Gain a business update on industry adoption, future growth, and the PXI Systems Alliance, and get a sneak peek at new products and user solutions.

Matthew Friedman, Product Manager, and
Sarah Schlonsky, Applications Engineer, *National Instruments*

Tuesday, August 4   *10:30–11:30 a.m.*   *Room 15*

LabVIEW FPGA for Test Applications

From cell phone base station emulation to protocol-aware semiconductor test, user-programmable FPGAs are becoming increasingly common in test systems. Explore how LabVIEW FPGA and NI FlexRIO enable increased versatility and speed in your test application. Also learn about test-specific LabVIEW FPGA programming and how to design custom NI FlexRIO adapter modules.

Ryan Verret, Product Manager, *National Instruments*

Thursday, August 6   *1:00–2:00 p.m.*   *Room 19A*

TEST AND DATA ACQUISITION TRACK

Load, Pressure, and Torque: Sensor Selection, Technology, and Applications

Learn about the main applications and technologies for load, pressure, and torque sensors as well as the different sensor designs; how to select and install the correct product for various applications; and ways to simplify setup with instrumentation.

Brian Duffy, Global Applications Engineering Manager, *Honeywell Test & Measurement*

Thursday, August 6   10:30–11:30 a.m.   Room 14

New Technologies for High-Throughput Data Acquisition

Data acquisition applications frequently involve multiple types of analog, digital, and counter measurements and can consume hundreds of megabytes per second. Learn about advancements in data acquisition technology and see how PCI Express enables more complex applications.

Samuel Freed, Product Manager, *National Instruments*

Wednesday, August 5   1:00–2:00 p.m.   Room 15

NI-DAQmx Development in .NET and Text-Based Languages

Learn how to program in .NET with the NI-DAQmx data acquisition driver. Explore features, tips, and tricks and gain an overview about how to quickly display and save your data. Also discover advanced signal analysis and other text-based software tools.

Jervin Justin, Applications Engineer, and Seth Berry, Product Support Engineer, *National Instruments*

Thursday, August 6   1:00–2:00 p.m.   Room 17B

Hands-On: Real-Time Testing Technologies

Test-drive the latest NI technologies for building real-time testing applications including new multicore, real-time, and FPGA capabilities that will reduce your real-time test system development and maintenance costs.

Chris Washington, Product Manager, *National Instruments*

Tuesday, August 4   10:30–11:30 a.m.   Room 18A
Tuesday, August 4   4:45–5:45 p.m.   Room 18A
Wednesday, August 5   2:15–3:15 p.m.   Room 18A
Wednesday, August 5   4:45–5:45 p.m.   Room 18A

Noise, Vibration, and Harshness (NVH) and Machine Condition Monitoring with USB

Discover how to simplify test system setup in industrial environments using NI bus-powered USB dynamic signal analyzers combined with the configuration-based NI Sound and Vibration Assistant for rapid customized measurement setup.

Mike Denton, Product Manager, *National Instruments*

Wednesday, August 5   3:30–4:30 p.m.   Room 14

Overcome Top High-Speed Measurement Challenges with Tektronix and NI

Evaluate how gigahertz signal speeds impact measurements and discuss the considerations ranging from optimizing measurement systems for production test to ensuring acquisition signal integrity. Learn tips and technologies for effectively using oscilloscopes and PXI digitizers from the design through the automated testing of your product.

Rebecca Suemnicht, Senior Product Manager, *National Instruments*

Wednesday, August 5   10:30–11:30 a.m.   Room 14

PXI Best Practices: Building High-Quality PXI Systems

The PXI specification ensures reliability with requirements such as a rugged Eurocard design and forced air cooling. NI engineers design PXI products to deliver the highest quality for the most demanding applications. Learn best practices for maximizing the uptime of your PXI system.

Matt Anderson, Hardware Services Manager, and Patrick Webb, PXI Product Manager, *National Instruments*

Thursday, August 6   2:15–3:15 p.m.   Room 14

★ Advanced

★ Hands-On: Real-Time Test with NI FlexRIO

Discover how to implement a real-time digital test system on NI FlexRIO, which is difficult if not impossible to build using traditional test methodologies. Learn ways to use an NI FlexRIO adapter module to interface with specific real-world electrical levels while programming an NI FlexRIO FPGA module to implement a digital protocol using that electrical interface.

Ryan Verret, Product Manager, *National Instruments*

Tuesday, August 4	*1:00–2:00 p.m.*	*Room 18D*
Tuesday, August 4	*3:30–4:30 p.m.*	*Room 18D*
Wednesday, August 5	*1:00–2:00 p.m.*	*Room 18D*

Real-Time Testing Software Development

Real-time testing software provides increased reliability and more deterministic execution to test applications. Examine real-time testing software architectures and as well as some of the latest technologies available for building real-time testing applications.

Chris Washington, Product Manager, *National Instruments*

Tuesday, August 4	*3:30–4:30 p.m.*	*Room 15*

Sensing Strain and Temperature Using Optical Fiber Technology

Electromagnetic interference (EMI), lighting, fatigue, corrosion, or cable management can make electronic gauges cumbersome or even impossible to use. Fiber-optic (FO) gauges can overcome these challenges. Discover how FO sensors work, learn about current applications, and explore how to integrate these with conventional sensors using LabVIEW.

Tom Graver, Vice President of Optical Sensing, *Micron Optics*

Wednesday, August 5	*2:15–3:15 p.m.*	*Room 15*

★ Shorten Audio Test Times and Ease Development

Using the latest NI AudioMASTER technology, you can simplify audio test development for several standard measurements. Learn about this technology and how the latest testing algorithms from the NI Sound and Vibration Measurement Suite can deliver reduced test throughput times.

Mike Denton, Product Manager, *National Instruments*

Wednesday, August 5	*2:15–3:15 p.m.*	*Room 14*

★ Software-Defined Radio with LabVIEW FPGA

Software-defined radios use general-purpose hardware and high-performance signal processing to implement radios that would otherwise use custom hardware. Today's high-performance FPGAs are ideal for this type of signal processing performance. Discover how you can use LabVIEW FPGA to build software-defined radios that incorporate the NI PXIe-5641R RIO IF transceiver or new NI FlexRIO adapter modules.

Ryan Verret, Product Manager, *National Instruments*

Tuesday, August 4	*2:15–3:15 p.m.*	*Room 15*

Hands-On: Sound and Vibration

Explore sound and vibration software for acoustics, NVH, and machine vibration applications.

Brooks Campbell, Product Support Engineer, *National Instruments*

Tuesday, August 4	*2:15–3:15 p.m.*	*Room 18D*
Wednesday, August 5	*3:30–4:30 p.m.*	*Room 18D*

Synchronizing Dynamic Signal Acquisition with GPS

Learn how Alion and Gulfstream used wireless communication to facilitate the setup of NI data acquisition hardware with integrated signal conditioning hardware to conduct community-scale surveys that measure the public response to events that sound as benign as distant thunder.

Mike Dignan, Principal Engineer, *Alion Science and Technology*
Doug Wilson, President, *PVI Systems*

Tuesday, August 4	*3:30–4:30 p.m.*	*Room 14*

Testing Next-Generation Wireless Standards

With the emergence of new wireless standards, RF engineers face the challenge of updating their test equipment to meet new measurement requirements. Learn ways to work with LabVIEW toolkits to create software-defined RF test systems and test devices that use wireless standards such as WiMAX, WLAN, and GPS.

David Hall, Product Manager, *National Instruments*

Thursday, August 6	*10:30–11:30 a.m.*	*Room 19A*

TEST AND DATA ACQUISITION TRACK

The Dresden Measurement Streetcar

Learn about a Bombardier streetcar equipped with measurement instruments including approximately 50 sensors that acquire accelerations, deflections, strain, and other mechanical values to deliver short-term measurements for simulation validation as well as long-term results. These measurements and electrical states are collected and processed via an NI data acquisition system.

Michael Beitelschmidt, Full Professor, *TU-Dresden*

Tuesday, August 4   2:15–3:15 p.m.   Room 14

Top Considerations for Large-Scale Testing and Monitoring

Whether you are testing and monitoring large civil structures such as dams, bridges, and stadiums or aircraft wings and large turbine blades, you face unique challenges. Learn about the top considerations for testing larges structures including programming for efficient data handling, distributed architectures, and measurement synchronization.

David Potter, Market Development Manager, *National Instruments*

Wednesday, August 5   10:30–11:30 a.m.   Room 15

Ultrahigh-Bandwidth Sampling Scope via an NI 5154 and a Photonic Time Stretch Preprocessor

Ultrawideband analog-to-digital conversion is a critical problem found in instrumentation systems. Learn about an ultrawideband sampling scope that combines the new photonic time-stretched ADC technique, which uses optical time-wavelength transformations to reduce the signal bandwidth and carrier frequency prior to digitization, with an NI 5154 digitizer.

Bahram Jalali, Professor, *UCLA*

Tuesday, August 4   1:00–2:00 p.m.   Room 14

Extending Real-Time Testing Applications with LabVIEW, LabVIEW FPGA, and NI TestStand

Explore several examples that demonstrate the use of LabVIEW, LabVIEW FPGA, NI TestStand and other tools to create customized, flexible real-time testing applications more efficiently.

Carl Ljungholm, Group Manager, *National Instruments*

Tuesday, August 4   4:45–5:45 p.m.   Room 15

Wireless DAQ: Streaming High-Bandwidth Remote Measurements

Wireless technology extends the concept of PC-based data acquisition beyond the limits of cables and wired infrastructure for new remote or distributed measurement applications. Learn how to use NI Wi-Fi DAQ and NI-DAQmx technology to stream high-bandwidth sensor measurements over IEEE 802.11 networks for reliable and secure wireless data acquisition systems.

Charlie Stiernberg, Product Manager, *National Instruments*

Wednesday, August 5   3:30–4:30 p.m.   Room 15

ACADEMIC FORUM

Overview

The NIWeek 2009 Academic Forum provides an exclusive platform for academic professionals to share their research and teaching methodologies and learn about innovative National Instruments technologies and products used in academia. Join your colleagues for technical sessions, new NI product previews, and networking. Also attend a poster session to see how NI products are used in both research and the classroom.

Keynote

Innovative Graphical System Design Technologies for Hands-On Project-Based Learning

Explore recent advances in graphical system design technologies that make it possible for educators to incorporate hands-on project-based learning techniques into the classroom. Learn about trends in engineering education and ways in which graphical system design helps educators become leaders in implementing these trends in their classrooms.

Ray Almgren, Vice President of Academic and University Relations, *National Instruments*

Monday, August 3   *Noon–1:00 p.m.*   *Ballroom A*

Academic Forum Schedule – Monday, August 3

8:15–11:45 p.m.	Education Track: UT Lab Tours	The University of Texas at Austin
9:30 a.m.–Noon	Research Track: Technical Sessions	Ballroom A
Noon–1:00 p.m.	Keynote and Lunch	Ballroom A
1:00–5:00 p.m.	Education Track: Technical Sessions	Ballrooms B–C
	Research Track: Technical Sessions	Ballroom A
5:30–6:30 p.m.	Poster Session	Exhibition Hall
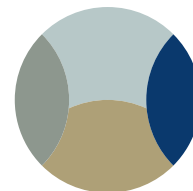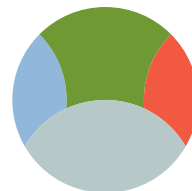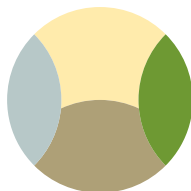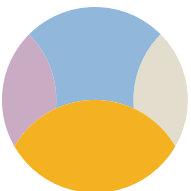
UT Lab Tours

Take a tour of the engineering labs at The University of Texas at Austin to see how NI products are used to provide hands-on experience with engineering concepts. Tour participants can visit all four labs or focus their visit on a single lab.

Aerospace Engineering – Sensors and Actuators Lab
The Sensors and Actuators Laboratory is a hands-on design course for graduate students who experiment with aerospace devices such as control-moment gyroscopes, inertial navigation systems, optical navigation systems, magnetometers, and robots. These instruments are applied to experiments involving visualization, remote actuation, and attitude determination. Students use LabVIEW, CompactRIO, and PCI R Series data acquisition hardware to study different types of sensors and actuators.

Biomedical Engineering – Instrumentation and Senior Design Labs
Visit the new Biomedical Engineering Building, Undergraduate Teaching Lab, and Senior Design Lab. Students use LabVIEW, the NI Educational Laboratory Virtual Instrument Suite (NI ELVIS), and PXI modular instruments to learn the basics of instrumentation for recording and displaying electrophysiological signals including pressure, flow, temperature, ultrasonics, and bioelectric signals. Also, students use the equipment during the development of a semester-long senior design project of a biomedical system.

Electrical and Computer Engineering –
Wireless Networking and Communications Group (WNCG)
The WNCG is an interdisciplinary center for research and education in wireless networking, communications, and related industry applications. The Wireless Communications lab course takes an experimental approach to wireless digital communication. Theory in the classroom is translated directly into practice with the help of the NI PXI RF platform and the LabVIEW Modulation Toolkit. Emphasis is on physical layer concepts rather than implementation considerations. Specific course topics include bandwidth, sampling, complex baseband equivalent representation, upconversion, downconversion, narrowband signals, channel estimation, and principles of software-defined radio.

Mechanical Engineering – Dynamic Systems and Controls Lab
This junior-/senior-level undergraduate laboratory core course aims to provide practical hands-on experience in modeling, analysis, simulation, and control of engineering systems. Emphasis is given to developing and using experimental techniques in LabVIEW for simulation, data analysis, and data acquisition. View a demo of a novel vision-based control experiment using a webcam and USB data acquisition.

Tour participants should meet in the registration area for transportation.

Monday, August 3   8:15–11:45 a.m.   The University of Texas at Austin

ACADEMIC FORUM
EDUCATION TRACK

Integrating LabVIEW and Environmental Sustainability into Engineering Instruction

Explore how students integrate LabVIEW programming concepts in a freshman engineering course at Virginia Tech, and learn about the development and status of a LabVIEW Enabled Watershed Assessment System (LEWAS).

Dr. Vinod Lohani, Associate Professor of Engineering Education, *Virginia Tech*

Monday, August 3   1:00–1:30 p.m.   Ballroom A

Product In-Depth: New NI ELVIS II+ and Plug-In Boards

The latest addition to the NI ELVIS family of products, NI ELVIS II+, features a 100 MS/s oscilloscope. Discover how to implement this integrated platform in the classroom to extend your lab beyond instrumentation and circuits with new plug-in boards and courseware from NI partners.

Sandra Tso, Academic Product Manager, *National Instruments*

Monday, August 3   1:00–1:30 p.m.   Ballroom B

Portable, Low-Cost Experiments for Lecture-Based Courses

Learn how to increase student knowledge of fundamental, theoretical signal processing concepts by developing portable experiments that can enhance learning for courses that do not use LEGO® MINDSTORMS® NXT and a low-cost NI data acquisition board.

Bonnie Heck Ferri, Professor of Electrical and Computer Engineering, *Georgia Tech*

Monday, August 3   1:30–2:00 p.m.   Ballroom A

Reinforcing Circuits Principles and Problem-Solving Techniques Using Simulation and Measurement

Learn how the coauthor of a new circuits textbook examines the use of Multisim simulation software for mastering circuits and their applications by discussing the NI toolchain that fosters comparison between theory, simulation, lab data, and analysis.

Michel Maharbiz, Assistant Professor, *UC Berkeley*

Monday, August 3   1:30–2:00 p.m.   Ballroom B

Targeting Instruction at the Typical LabVIEW Developer

Because the typical beginning LabVIEW developer does not have a formal programming background, and the current training model is not designed to foster one, learn how to adjust the model to address fundamental programming concepts and add the data acquisition component late in the programming process.

Stuart Brand, Engineering Lab Supervisor, *The Ohio State University*

Monday, August 3   2:00–2:30 p.m.   Ballroom A

Teaching a Motion Control Undergraduate Lab Course Using LabVIEW

Explore how the LabVIEW Control Design and Simulation Module is used to teach positioning with linear motors, hydraulic cylinders, and pneumatics at the motion control lab at Georgia Tech. Students learn modeling, identification, and control design techniques.

Dr. Wayne Book, Professor of Mechanical Engineering, *Georgia Tech*

Monday, August 3   2:00–2:30 p.m.   Ballroom B

Using LabVIEW in an Introduction to Computer Tools Course

First-year engineering students at Purdue University take an introduction to problem solving using computers course, which has traditionally been taught using MATLAB software. Learn about the results from a study that explored the use of LabVIEW to aid in developing an understanding of programming concepts.

Greg Bucks, Graduate Research Assistant, and Dr. William Oakes, Associate Professor of Engineering Education and Director of EPICS Program, *Purdue University*

Monday, August 3   *3:30–4:00 p.m.*   *Ballroom A*

Learning and Developing Intelligent Control Systems with LabVIEW

Explore how virtual instrumentation offers new possibilities for learning intelligent control systems. The Intelligent Control Toolkit for LabVIEW (ITCL), developed by the Technological Institute of Monterrey (ITESM), introduces step-by-step methods for learning and applying control theory to real-world practice for undergraduate teaching and graduate research.

Dr. Pedro Ponce-Cruz, Professor, *ITESM-CCM*

Monday, August 3   *3:30–4:00 p.m.*   *Ballroom B*

A Data Acquisition Device in Every Hand: Integrating NI Hardware into Undergraduate Engineering Curriculum

What happens when every student is given a USB data acquisition device? Discuss the implications of this teaching paradigm on engineering curriculum with the recent integration of acquisition hardware into a new mechanical engineering mechanics of materials laboratory course at the University of Florida.

Dr. Gregory Sawyer, Assistant Professor of Mechanical Engineering, *University of Florida*

Monday, August 3   *4:00–4:30 p.m.*   *Ballroom A*

The VISIR Open Lab Platform

Explore how the VISIR Open Lab Platform enables universities to open laboratories for remote access and how students use a virtual breadboard and virtual instrument panels displayed on their PCs to remotely perform physical electrical experiments.

Thomas Lagö, Professor, *Blekinge Institute of Technology*

Monday, August 3   *4:00–4:30 p.m.*   *Ballroom B*

Student-Designed Robots that Fly, Hover, and Play Music

Learn about the airplane, hovercraft, piano-playing robot, and other innovative projects designed by students in the mechanical engineering real-time systems course at UC Berkeley. Students built their entire robots in a single semester using CompactRIO and the LabVIEW Embedded Module for ARM Microcontrollers.

George Anwar, Instructor, *UC Berkeley*

Monday, August 3   *4:30–5:00 p.m.*   *Ballroom A*

MP3 Encoding and Other Signal Processing Algorithms Based on LabVIEW

With digital signal processing as the basis for MP3 players, cell phones, and other technologies that play significant roles in students' lives, examine how LabVIEW is used to interactively explore audio processing, MP3 coding, and other "student relevant" signal processing algorithms.

Dr. Mark Yoder, Professor of Electrical and Computer Engineering, *Rose-Hulman Institute of Technology*

Monday, August 3   *4:30–5:00 p.m.*   *Ballroom B*

ACADEMIC FORUM RESEARCH TRACK

Graphical System Design in Scientific Computing and Experimental Research

Scientific computing combines hardware acceleration technologies such as multicore CPUs, FPGAs, GPUs, and DSPs; algorithms and applied mathematics; and advanced visualization into one integrated environment. Learn how graphical system design and LabVIEW can help you combine measurements with online data analysis and visualization to increase productivity and effectiveness when conducting experimental research.

Igor Alvarado, Academic Business Development Manager, *National Instruments*

Monday, August 3   9:30–10:30 a.m.   Ballroom C

Nuclear Magnetic Resonance Based on Off-the-Shelf Digital Data Acquisition Equipment

Examine a nuclear magnetic resonance (NMR) spectrometer that operates in the earth's magnetic field, is implemented based on a standard data acquisition card, and is controlled by a program written in LabVIEW. Also discuss the potential of off-the-shelf technology for NMR applications at a higher field.

Dr. Christian Hilty, Associate Professor, and Sean Bowen, Graduate Student, *Texas A&M University*

Monday, August 3   10:30–11:00 a.m.   Ballroom C

Virtual Instrumentation in Nanotechnology: From Tool to Architecture to Enabler

Nanotechnology is a potent field for research by enabling the development of disruptive technologies, materials, processes, and products. Explore how virtual instrumentation, evolved from PC-connected-and-coordinated instrumentation to custom logic harnessing arrays of transducers, plays a central role in developing tools of unprecedented performance.

Scott Jordan, Director of NanoAutomation Technologies, *PI (Physik Instrumente) GmbH and Co. KG.*

Monday, August 3   11:00–11:30 a.m.   Ballroom C

FPGA-Based Feedback to Create an Ultrastable Atomic Force Microscope

Discover how the University of Colorado used six independent FPGA-based control loops to separately stabilize an atomic force microscope tip and sample to within 10 pm in each axis, and integrated this feedback into a data acquisition software suite, which allows the user to perform high-precision, single-molecule biophysics.

Allison Churnside, Graduate Research Assistant, *University of Colorado*

Monday, August 3   11:30 a.m.–Noon   Ballroom C

Evolutionary Multirobot System as an Implementation of eXtreme Cyber-Physical Systems

Learn how students developed a control scheme using artificial immune systems and deployed a task-achieving multirobot system (MRS) with coordination among the robots within the MRS and between robots and agents in the task environment, delivering strong performance for the intertwined entities involved in any task-achieving MRS.

Benito Fernandez, Professor/Researcher, *The University of Texas at Austin*

Monday, August 3   1:00–1:30 p.m.   Ballroom C

Using Graphical Programming to Apply Large-Scale Online Computations to Optimal Geosystems Management

Optimal geosystems management relies on predictive computational models and real-time field data acquisition/assimilation requirements, and massive parallel computations are unfeasible for real-time implementations. Learn about a framework based on LabVIEW and COTS technology, such as multicore, FPGA, and GPU, to apply large-scale, real-time optimal control to oil reservoir management.

Dr. Eduardo Gildin, Postdoctoral Fellow, Jack L. Poulson, Graduate Student, Sunil G. Thomas, Graduate Student, and Dr. Mary F. Wheeler, Director for the Center for Subsurface Modeling, *The University of Texas at Austin*

Monday, August 3   1:30–2:00 p.m.   Ballroom C

Advanced 3D Visualization with Avizo Using LabVIEW Data

Multidimensional, multivariate data sets from various LabVIEW applications are moderated, visualized, and quantitatively analyzed with Avizo. Discover how advanced visualization technology such as out-of-core data management, vector field topology coupled with innovative computing algorithms can greatly facilitate scientific discovery and accelerate engineering design by interfacing directly with LabVIEW.

Dr. Shuang Zhang, Product Leader,
Mercury Visualization Sciences Group

Monday, August 3   2:00–3:00 p.m.   Ballroom C

Enhancing Education and Research Using NI ELVIS

Learn how The University of Texas at San Antonio used NI products to enhance education and research by developing a remote hands-on educational module with NI ELVIS, creating a test bed for impact detection with NI data acquisition tools, and conducting advanced research using the recently introduced NI GPS Simulator.

David Akopian, Associate Professor,
The University of Texas at San Antonio

Monday, August 3   3:30–4:00 p.m.   Ballroom C

The Texas Petawatt Laser

The Texas Petawatt Laser is currently the highest-power operating laser and produces ultrashort laser pulses above one petawatt peak power. Learn about the tools to access states of matter at extreme, unprecedented physical conditions that are crucial to understanding phenomena from controlled fusion to stellar interiors.

Dr. Erhard Gaul, Scientist,
The University of Texas at Austin

Monday, August 3   4:00–4:30 p.m.   Ballroom C

Advanced Numerical Methods with LabVIEW and Parallel Programming

NI customers work with demanding applications that move HPC-like algorithms to real-world situations such as complicated digital signal processor (DSP)/mathematics/control backgrounds combined with restrictive real-time constraints. The complexities require standard hardware components with multicore processors including CPUs, blade servers, GPUs, and FPGAs. Watch a demonstration of numerical algorithms, data acquisition, real time, simulation, design, and visualization based on LabVIEW.

Darren Schmidt, Senior Software Engineer,
National Instruments

Monday, August 3   4:30–5:00 p.m.   Ballroom C

15,000,000,000 intelligent, connected devices.*
Imagine the possibilities.

A new generation of digital devices is transforming the planet. Are you in?
Join the embedded internet era at intel.com/embedded/15billion

NIWeek 2009 offers the ideal opportunity for you to build and validate your development skills through training courses and certification exams.

Certification and Recertification Exams

Certification exams are available for LabVIEW, LabWindows/CVI, and NI TestStand. During NIWeek, you can take the one-hour Certified LabVIEW Associate Developer (CLAD) exam for only $99 USD and all other certification exams for $199 USD. Also, you can take the Certified LabVIEW Developer (CLD) recertification exam for a special price of $99 USD, nearly half off the regular price of $199 USD.

Visit the NI Services and Training booth in the exhibition hall to register for a certification exam. Seating is limited, so register today.

Exam Schedule

Room 5C
Certified LabVIEW Associate Developer Exam
Certified LabVIEW Recertification Exam
Certified TestStand Developer Exam
Certified TestStand Architect Exam

Monday, August 3
1:30–2:30 p.m.
3:00–4:00 p.m.

Tuesday, August 4–Thursday, August 6
10:30–11:30 a.m.
1:30–2:30 p.m.
3:00–4:00 p.m.

Room 5B
Certified LabVIEW Developer Exam
Certified LabVIEW Architect Exam
Certified LabWindows/CVI Developer Exam

Tuesday, August 4–Thursday, August 6
1:00–5:00 p.m.

Free Certification Exam Preparation Courses

Prepare for the Certified LabVIEW Developer or Certified LabVIEW Architect Exam by attending a free, two-hour preparation course. Learn about the exam format, programming practices, technical topics, and grading criteria as well as how to avoid common pitfalls.

Room 2
Mastering the National Instruments LabVIEW
Certified LabVIEW Developer Exam

Monday, August 3
8:00–10:00 a.m.

Mastering the National Instruments LabVIEW
Certified LabVIEW Architect Exam

Monday, August 3
10:00 a.m.–Noon

Build on NIWeek Technical Sessions with Advanced Training

Expand your knowledge of NI products and successful application development by attending advanced training courses taught by NI engineers or certified instructors. Offered at the NI corporate campus in Austin, Texas, regional training centers, or on-site at your facility, NI advanced software courses teach structured programming practices to optimize application development while hardware courses focus on designing, setting up, and programming optimized systems using NI products. To learn more about NI training or to register for a course, stop by the NI Services and Training booth in the exhibition hall, visit ni.com/training, or call 866.337.5918.

• GRAPHICAL SYSTEM DESIGN •
ACHIEVEMENT AWARDS

The Graphical System Design Achievement Awards recognize the most innovative user applications based on National Instruments software and hardware. Visit the contest poster display, located outside Ballroom D, to view the finalist applications for each of the 10 categories: Academic/Research, Aerospace/Defense, Automotive, Biotechnology/Life Sciences, Communications/Wireless, Embedded Design, Industrial Measurements/Control, Mechatronics/Robotics/Control, Production/ATE, and Prototype/Validation Test.

Winners of each category as well as the recipients of five featured awards – Multicore, Green Engineering, Humanitarian, Editor's Choice, and the 2009 Customer Application of the Year – will be announced at the invitation-only awards dinner on Tuesday, August 4.

ACADEMIC/RESEARCH

Developing an Ultrastable Atomic Force Microscope Based on FPGA Control

Allison Churnside, *University of Colorado*

Levitating Objects in a Controlled 2D B-Field with LabVIEW and CompactRIO

Wolfgang Werth, *Carinthia University of Applied Sciences*

AEROSPACE/DEFENSE

Developing an Infrared Detector Control System with LabVIEW and CompactRIO

Eric Lyness, *Mink Hollow Systems*

Twenty-First Century Flight Test Engineering Education Using LabVIEW Software and PXI Hardware

John F. Muratore, *University of Tennessee Space Institute*

AUTOMOTIVE

Designing a Turbocharger Test System with LabVIEW Software and PXI Hardware

Jeff Plotkze, Mike Rakolta, Christopher Relf, and David Smith, *V I Engineering*

NI Tools Keep Ford at the Forefront of Innovation

Kurt D. Osborne, *Ford*

BIOTECHNOLOGY/LIFE SCIENCES

Developing a Novel Portable Intelligent Greenhouse Using Graphical System Design

Pedro Ponce-Cruz and Hiram E. Ponce-Espinosa, *Technological Institute of Monterrey (ITESM)*

Developing and Managing a Stimulation Environment for a Functional MRI Using LabVIEW, PXI, SCXI, and NI CompactDAQ Systems

Bruno Nazarian, *Centre IRMf*

COMMUNICATIONS/WIRELESS

Developing an Explosive Detection System Using Nuclear Quadrupole Resonance, LabVIEW, and PXI Hardware

Akiko Konnai, *National Maritime Research Institute*

NI PXI Brings Record and Playback Capability to Car Radio and GPS System Testing

Etienne Frenette, *Averna, Canada*
Hans-Joachim Tepper, *IAV, Germany*
Jeremy Goddard, *IAV, USA*

EMBEDDED DESIGN

Creating an Innovative Medical Instrument Using NI Products

Fabio D'Aniello, *Azienda RobotroniX S.r.l.*

Using Graphical System Design to Help Premature Infants Learn to Oral Feed

Daryl Farr and Barry Price, *KC BioMediX Inc.*

INDUSTRIAL MEASUREMENTS/CONTROL

Developing a Supercritical Steam Test Facility with NI Software and Hardware

Parthiban S. and Anu Kalidas M., *Captronic Systems Pvt. Ltd*

Precision Servo-Hydraulic Control Using LabVIEW FPGA and PXI Hardware

Martin Saxton, *Product Technology Partners Ltd.*

MECHATRONICS/ROBOTICS/CONTROL

Controlling a Dual-Robot System to Provide Upper-Limb Therapeutic Exercise to Stroke Patients

Bipinchandra Bhakta, *University of Leeds*

Developing a Real-Time MAV Flight Control System Test Bed Using LabVIEW and PXI

Christopher McMurrough, *Automation and Robotics Research Institute*

PRODUCTION/ATE

Building a Reconfigurable Motor Life Test System for Medical Device Test Powered by FPGA

Derek Fluegge, *Cal-Bay Systems Inc.*

Functional Testing of Battery Management Systems for Hybrid Electric Vehicles Using the NI PXI Platform

Grant Gothing, *Bloomy Controls*

PROTOTYPE/VALIDATION TEST

Creating and Validating a Long-Term Test System for Artificial Hearts with LabVIEW

Timothy Nolan, *Data Science Automation Inc.*

Development of an Electronic Stability Program Hardware-in-the-Loop Simulation Based on NI PXI and CompactRIO

Hong-zhi Li, *Tsinghua University*

EXHIBITION HALL QUICK REFERENCE GUIDE

EXHIBITION HALL FLOOR MAP

MAIN ENTRANCE

ENTRANCE

STUDENT DESIGN SHOWCASE

NIWeek PRIZE DISPLAY

NI STORE

| 201 | 300 | | 301 | 400 | | | | | 801 | 900 | | 901 | 1000 |
| 203 | 302 | | 303 | 402 | | **401** | | | 803 | 902 | | 903 | 1002 |

701

| 307 | 406 | | 407 | 506 | | 707 | 806 | | 807 | 906 |

RF PAVILION

NI SERVICES AND TRAINING

CAFÉ ENTRANCE

217					917	1016
219	316					1018
221					921	1020
223	320					1022

DESIGN

LabVIEW ZONE

INDUSTRIAL MEASUREMENT AND CONTROL

225	326				925	1024
227	328				927	1026
229	330

329	428		429			828		829	928
331	430		431	528		830	729	831	930
333	432		433			832		833	932
335	434		435	532		834	733	835	934

AUTOMATED TEST AND DATA ACQUISITION

ROBOTICS PAVILION

VISION NEIGHBORHOOD

339	438		439	538		539				738		739	838
341	440		441	540		541	638		639	740		741	840
343	442		443	542		543	642		643	742		743	842

NI MOBILE EXPO

CONNECT @NIWeek LOUNGE

EXHIBITOR LOUNGE

NIWeek SHOW OFFICE

TECHNOLOGY THEATER

Exhibition Hall Hours

Monday, August 3	5:30–7:30 p.m.	*Wednesday, August 5*	10:00 a.m.–5:00 p.m.
Tuesday, August 4	10:00 a.m.–7:30 p.m.	*Thursday, August 6*	10:00 a.m.–1:00 p.m.

NATIONAL INSTRUMENTS PRODUCT SHOWCASE

Visit the National Instruments Product Showcase to see demonstrations of the latest NI hardware and software products, talk to NI developers, and discover ways to incorporate NI products into your design, test, and control applications.

LabVIEW Zone

LV1   Design and Production Testing of Audio and Video for Multimedia Devices

LV2   CompactRIO Dual-Axis Sun Tracking Reference Design

LV3   Wind Turbine Condition Monitoring

LV4   NI Wi-Fi DAQ Slam Dunkometer

LV5   Test-Drive LabVIEW

LV6   NIWeek Keynote Demos

LV7   NIWeek TestDome – Measurements Made Awesome

LV8   Autonomous Quadcopter

LV9   Wireless Monitoring with LabVIEW

LV10   Samsung Solorean – The University of Texas Solar Vehicles Team

LV11   Virtual RockBot
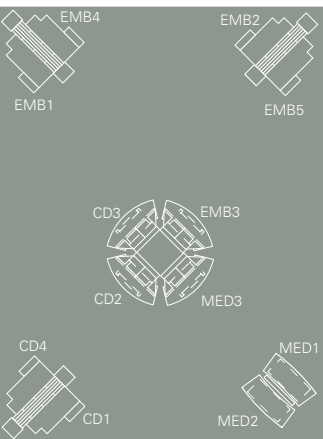
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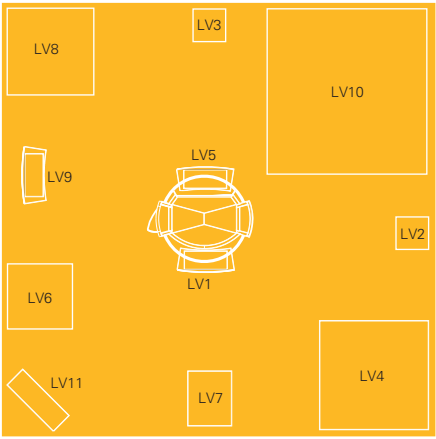
LabVIEW ZONE
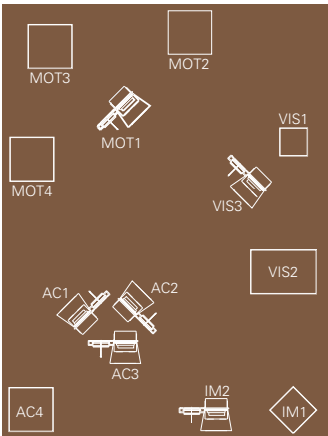
INDUSTRIAL MEASUREMENTS AND CONTROL

AUTOMATED TEST AND DATA ACQUISITION

Automated Test and Data Acquisition

Automated Test

AT1	Automated Test System for CompactRIO Modules
AT2	Head-to-Head Bus Comparison – GPIB, PXI, TekLink, USB, Ethernet, and LXI
AT3	Data Management, Visualization, and Synchronization with LabVIEW and DIAdem
AT4	HALT/HASS Automated Test with the LabWindows/CVI Real-Time Module
AT5	Characterize a Variety of Semiconductor Chips Using the PXI Platform
AT6	Instruments for Testing Multiple RF Standards – One Test Platform
AT7	pA-Level DC Characterization in PXI

Physical Measurements

PM1	Testing Digital Audio Using NI Multifunction DAQ
PM2	Mixed Sensor Test with NI CompactDAQ
PM3	Dynamic Structural Test with PXI and LabVIEW
PM4	High-Speed Speaker Validation Test with Fault Characterization
PM5	Real-Time Processing of Gigahertz Signals Using NI FlexRIO

Real Time

RT1	Open Hardware-in-the-Loop Test Platform
RT2	Software-Defined Radio in PXI

Design

Custom Design

CD1	Building a Custom NI Single-Board RIO Daughter Card with Multisim
CD2	Circuit Simulation and Prototyping with Multisim
CD3	LabVIEW FPGA IP from Any Source
CD4	Machine Design: Digital Prototyping with NI SoftMotion for SolidWorks

Embedded Design

EM1	Program ARM Microcontrollers with LabVIEW Graphical Programming
EM2	RIO Deployment Curve
EM3	Virtex-5 Vocoder with the LabVIEW FPGA Module
EM4	Advanced Control with the LabVIEW Control Design and Simulation Module
EM5	Automotive Network Interfaces for PCI and PXI

Medical

MED1	Quad-Core Medical Imaging with LabVIEW
MED2	LabVIEW for Medical Device Design
MED3	NI Embedded Platforms

Industrial Measurements and Control

Advanced Control

AC1	Take Advantage of Time-Based Synchronization with the NI Platform
AC2	Linear Stage Control
AC3	Distributed Intelligence with Inverted Pendulums
AC4	RIO Laser Harp

Industrial Measurements

IM1	C Series – I/O for Benchtop, Lab, Portable, and Embedded Systems
IM2	Machine Condition Monitoring with NI Wi-Fi DAQ

Motion

MOT1	Advanced Motion Profile Design
MOT2	Gears of Death
MOT3	Delta Robot Powered by NI SoftMotion
MOT4	LabVIEW for Industrial Robotics

Vision

VIS1	Roller Skate Inspection Station
VIS2	Beer Bottle Inspection Station
VIS3	Many Cameras – Many Programming Methods

Demonstrations subject to change.

LabVIEW @NIWeek

Community Activities

Byte-Sized Information in Real Time

Learn how social media technologies, like online communities, blogs, and even Twitter, can improve product development, increase customer loyalty, drive revenue, and reduce support costs.

Tuesday, August 4   *10:30–11:00 a.m.*   *Technology Theater*

LabVIEW Experts Panel

You have read their discussion forum posts, downloaded their example code, and commented on their blogs. Now, gain insight and advice directly from NI engineers working on the latest version of LabVIEW.

Tuesday, August 4   *Noon–1:00 p.m.*   *Technology Theater*

NI Community *Block Diagram* Party

Check out the NI Community *Block Diagram* Party on Tuesday night to enjoy food and drinks and meet fellow developers. Exchange best practices with LabVIEW programmers from a range of industries and companies as well as tour exhibitors' booths to see the latest products and services. Also, participate in the NIWeek Twitter Scavenger Hunt during the party for a chance to win awesome prizes.

Tuesday, August 4   *5:00–7:30 p.m.*   *Exhibition Hall*

Challenge the Champions

If you are a fan of game shows or just a fan of LabVIEW, check out this interactive trivia competition that pits a team of NIWeek contestants against the famed LabVIEW Champions. Visit the Connect@NIWeek Lounge before 2:00 p.m. on Tuesday to sign up for your chance to show off your programming knowledge and compete for some buzzworthy prizes.

Tuesday, August 4   *5:00–6:00 p.m.*   *Technology Theater*

LabVIEW Coding Challenge

Take in the LabVIEW Coding Challenge located in the Connect@NIWeek Lounge to test your coding skills. The highest scorer will compete against a member of the LabVIEW R&D team in a live coding competition. The winner receives fame and fortune or, at the very least, some LabVIEW promotional items.

Thursday, August 6   *Noon–1:00 p.m.*   *Technology Theater*

Other Ways to Interact @NIWeek

Stop by the Connect@NIWeek Lounge in the exhibition hall to participate in the following activities:

LabVIEW Graffiti Wall

Virtually spray paint the city of Austin using a graffiti wall powered by LabVIEW and created by V I Engineering.

"Flip for NIWeek" Video Contest

Take advantage of the Connect@NIWeek Lounge computer stations and USB video cameras to share your own NIWeek experiences with your colleagues back home. The contestant with the best "word on the street" video will win a great prize.

@NIWeek and @LabVIEW Twitter

See the latest buzz on Twitter from the comfort of our sofas and a big plasma screen TV in the Connect@NIWeek Lounge. Follow @NIWeek and @LabVIEW for official conference information.

Global Developer Community Photo Zone

Add your image and make your mark on the electronic NIWeek Community Map in the Connect@NIWeek Lounge. This interactive networking display will show you other developers and events in your area.

Staying "in the Loop"

Visit ni.com/niweekcommunity to stay connected after NIWeek. The NI Developer Community contains the latest example code, technical wikis, developer blogs, and groups.

Can't Miss LabVIEW Sessions

Build Eye-Catching LabVIEW User Interfaces, *page 39*

Hands-On: Introduction to CompactRIO and LabVIEW Real-Time, *page 37*

LabVIEW Graphical Scripting, *page 41*

Multicore Design Patterns in LabVIEW, *page 41*

New Software Engineering Tools for Large LabVIEW Applications, *page 42*

Hands-On: NI CompactRIO, *page 32*

Tips and Tricks to Increase LabVIEW Performance Speed, *page 43*

What's New in LabVIEW, *page 43*

What's New in LabVIEW FPGA, *page 34*

RF AND WIRELESS PAVILION

Overview

Visit the RF and Wireless Pavilion and see the PXI instruments that industry leaders are using to meet the fast-evolving demands of the wireless industry from design to validation to production. Using NI software-defined instrumentation, you can keep pace with the increasing number of wireless standards by using flexible tools for signal generation, analysis, visualization, and processing of standard and custom digital and analog modulation. View demonstrations of the latest RF software toolkits, ranging from WLAN and GPS to WiMAX, that can help you create flexible and cost-reducing wireless test systems at a fraction of the cost of traditional instruments.

Use the PXI Platform for RF Test

The PXI platform delivers a high-speed PXI Express data bus for streaming applications and high-performance multicore processors for increased RF measurement speed. View a demonstration of RF record and playback, a new test method enabled by the high-speed data bus of the PXI platform that you can use to stream terabyte-sized waveforms to and from disk using NI RF vector signal analyzers and generators. Also watch demonstrations of multiple test systems that use modern, high-performance multicore processors to reduce test times by up to 10 times, significantly lowering test costs.

Software-Defined Instrumentation

Using the new RF toolkits for LabVIEW, you can define the same set of RF hardware as a GPS simulator, an RF record and playback system, or a wireless measurement device for protocols ranging from RFID and ZigBee to WLAN and WiMAX. At the RF and Wireless Pavilion, see how other companies are using the software-defined PXI platform to meet the fast-evolving needs of the wireless industry. View several demonstrations implementing this software-defined approach:

- Wireless Meter Reader for Utilities Smart Grid
- Power Amplifier Characterization
- GPS Simulator
- RF Record and Playback of 50 MHz Bandwidth up to 6.6 GHz
- Multistandard PXI Test of GPS, DVB, WLAN, ZigBee, and WiMAX
- Real-Time Signal Processing Using the NI PXIe-5641R RIO IF Transceiver
- MIMO Test System (used for 802.11n, WiMAX, and 3GPP LTE)

ROBOTICS PAVILION

Overview

The Robotics Pavilion is an interactive exhibit demonstrating how NI software and hardware are used across the breadth of the robotics landscape in academia and industry. Visit the pavilion to learn how the NI robotics platform spans from 8-year-olds working with LEGO MINDSTORMS NXT to sophisticated autonomous vehicle and industrial packaging robot design.

Robotics in Action

- Check out a live robot "playground" complete with rescue robot platforms.
- See SLAM-capable autonomous systems and dancing robots.
- Drive a teleoperational robot and autonomous wheelchair powered by CompactRIO.
- Enjoy action-packed videos of systems from battlefield-extraction robots to autonomous boats.
- See how robotics, powered by LabVIEW, inspire tens of thousands of kids through programs such as the *FIRST* LEGO League (FLL) and *FIRST* Robotics Challenge (FRC). Also learn how CompactRIO, the official robot controller for FRC, helps students expand their engineering skills.

Sense, Think, and Act

All robotics and autonomous systems can be simplified into basic steps of "sense, think, and act." The Robotics Pavilion showcases a variety of implementations for each area including new sensing capabilities and recently developed LabVIEW drivers, cutting-edge "think" algorithms, and innovative act or mobility platforms from omnidirectional wheels to hexapod movements.

VISION NEIGHBORHOOD

Overview

The Vision Neighborhood features product demonstrations from many of the world's leading vision companies. Experts from each company are available to help answer questions about lighting, cameras, optics, and systems integration. Learn how you can use NI vision tools to cumulate the components of a complete machine vision system.

Vision Exhibitors

Complete Vision Component Providers

Graftek Imaging Inc. – components for industrial, medical, and scientific imaging markets

Custom Vision Solution Providers

Adsys Controls Inc. – provides engineering services for military and commercial applications within the aerospace industry

Cyth Systems – custom NI Vision Builder for Automated Inspection (AI) steps for advanced applications as well as integration of solutions for medical and scientific imaging

Design & Assembly Concepts Inc. – complete mechanical design, automation, and machining

moviMED – products based on LabVIEW and services for industrial, medical, and military imaging

PVI Systems – custom and off-the-shelf machine vision, motion control, data acquisition, and automated test solutions

Lighting and Optics Providers

Advanced illumination – LED lighting and controllers for imaging applications

Edmund Optics – imaging components for scientific and machine vision

Smart Vision Lights – advanced lighting for machine vision

Machine Vision Camera Providers

Allied Vision Technologies – IEEE 1394a and 1394b cameras

Basler Vision Technologies – color and monochrome line-scan and area-scan cameras

Hitachi Kokusai Electric America Ltd. – cameras for the broadcast, industrial, medical, and scientific markets

Imperx – high-resolution, high-speed cameras for GigE Vision and Camera Link standards

JAI Inc. – industrial-grade cameras for machine vision

NET USA – video camera systems for the professional world market in the industrial, medical, and scientific fields

Specialty Camera Providers

FLIR Systems – infrared imaging

Hardware and Software Demonstrations

Stop by the Vision Neighborhood to see various demonstrations of NI vision hardware and software. Visit with partners and integrators about how their products and services can make your vision application come to life when combined with NI vision products.

NI MOBILE EXPO

The NI Mobile Expo is touring the country and loaded with the latest technologies for automated test. Visit the expo at NIWeek to learn how you can lower the cost of test while gaining efficiencies in test system development, optimization, and maintenance.

Semiconductor Test
Explore how Freescale Semiconductor performs linearity tests on its microcontroller analog-to-digital converters using mixed-signal stimulus and response, precision DC, and switch modules.

RF, Audio, and Video Test
Discover how you can test multiple RF standards including terrestrial broadcast high-definition television (HDTV), HD Radio, custom wireless transducers, RFID, and GPS using a single platform.

Parallel Test with Hybrid Instrumentation
Learn about emerging technologies that can help you implement concurrent execution of multiple tests and how these tools increase test throughput. View a demonstration testing a device with PXI and LXI/USB/GPIB instruments using hardware-agnostic test code.

Sensor Measurements
Discover how engineers can "plan and predict" scheduled maintenance, and learn about different technologies to avoid failures and unplanned downtime. Also explore the breadth of transducers with which NI products can interface, focusing on wireless data acquisition, signal conditioning, and dynamic signal acquisition products.

Hardware-in-the-Loop (HIL) Simulation and Test
Real-time hardware and software enable deterministic signal stimulus and acquisition. See how NI products can implement HIL systems through the interactive testing of a flight controller, provide stimuli to a flight controller, and receive updated information through a digital display. Also learn how to create highly realistic simulations for controlling test with a cost-effective hardware and software platform.

NI SERVICES AND TRAINING

Visit the National Instruments Services and Training booth and talk to our knowledgeable and professional staff about a host of global service solutions designed to keep your business operating smoothly and efficiently – including training and certification programs, software maintenance, calibration and system configuration, and warranty and repair services. Whether you are an individual engineer or integrator, or you work for a large organization or OEM, NI provides the services necessary to ensure your success.

TECHNOLOGY THEATER

Visit the Technology Theater for interactive Q&A sessions, product teardowns, demonstrations, and videos featuring the latest products and technological innovations from NI and industry experts.

Tuesday, August 4

Byte-Sized Information in Real Time
Learn how social media technologies, like online communities, blogs, and even Twitter, can improve product development, increase customer loyalty, drive revenue, and reduce support costs.

Tuesday, August 4   10:30–11:00 a.m.   National Instruments

LabVIEW Experts Panel
You have read their discussion forum posts, downloaded their example code, and commented on their blogs. Now, gain insight and advice directly from NI engineers working on the latest version of LabVIEW.

Tuesday, August 4   Noon–1:00 p.m.   National Instruments

Deadliest Warrior
Who would win in a head-to-head battle – a ninja or a Spartan? Hear how Geoff Desmoulin, host of the hit TV show *Deadliest Warrior,* uses NI tools on the show to test and analyze data to determine which warrior would win in an epic battle.

Tuesday, August 4   1:30–2:00 p.m.   Spike TV

Next-Generation Engineering Systems Modeling and Simulation Tools
for Control Development
The latest release of MapleSim offers advantages for systems modeling with the symbolic computation capability to produce concise, numerically efficient system models for rapid implementation in real-time systems through automatic code generation to LabVIEW.

Tuesday, August 4   2:30–3:00 p.m.   Maplesoft

How Can NI Help You?
NI offers a variety of services to support your business. Learn about NI offerings and the unprecedented relevance of service in tough economic times.

Tuesday, August 4   3:30–4:00 p.m.   National Instruments

TECHNOLOGY THEATER

Challenge the Champions
Check out this interactive trivia competition that pits NIWeek contestants against the famed LabVIEW Champions. Visit the Connect@NIWeek Lounge before 2:00 p.m. on Tuesday to sign up for your chance to show off your programming knowledge and compete for some buzzworthy prizes.

Tuesday, August 4   *5:00–6:00 p.m.*   *National Instruments*

Wednesday, August 5

Powerful and Effective I²C and SPI Interfaces for LabVIEW
Watch a demo of Total Phase tools driving and monitoring an I2C accelerometer using free LabVIEW VIs with an Aardvark host adapter and Beagle protocol analyzer.

Wednesday, August 5   *11:00–11:30 a.m.*   *Total Phase*

Deadliest Warrior – Extended Version
Who would win in a head-to-head battle – a ninja or a Spartan? Hear how Geoff Desmoulin, host of the hit TV show *Deadliest Warrior,* uses NI tools on the show to test and analyze data to determine which warrior would win in an epic battle.

Wednesday, August 5   *Noon–1:00 p.m.*   *Spike TV*

High Density of High-Speed Serial Protocols on 3U CompactPCI Systems
Learn about the 3M Ultra Hard Metric (UHM) Socket, which offers a direct way to improve the performance of legacy and new CompactPCI systems built in accordance with PICMG CompactPCI standards.

Wednesday, August 5   *1:30–2:00 p.m.*   *3M*

Training and Certification: Proficiency Equals Productivity Equals Profitability
There are big benefits to developing proficiency in NI product offerings. Learn about the benefits of advancing your skills through training or confirming your achievements through certification.

Wednesday, August 5   *2:30–3:00 p.m.*   *National Instruments*

Programming the LEGO MINDSTORMS NXT with LabVIEW
While a kid's version of LabVIEW is in the NXT kit, the full LabVIEW for LEGO MINDSTORMS NXT helps you to program complex behaviors and unlock the full potential of the NXT.

Wednesday, August 5   *3:30–4:00 p.m.*   *National Instruments*

TECHNOLOGY THEATER

Thursday, August 6

Deadliest Warrior

Who would win in a head-to-head battle – a ninja or a Spartan? Hear how Geoff Desmoulin, host of the hit TV show *Deadliest Warrior,* uses NI tools on the show to test and analyze data to determine which warrior would win in an epic battle.

Thursday, August 6   *11:00–11:30 a.m.*   *Spike TV*

LabVIEW Coding Challenge

See the NIWeek attendee with the highest score from the LabVIEW Coding Challenge compete against a member of the LabVIEW R&D team in a live coding challenge.

Thursday, August 6   *Noon–1:00 p.m.*   *National Instruments*

ALSO IN THE EXHIBITION HALL

Network at the Connect@NIWeek Lounge

Take a break from the NIWeek action and relax in the Connect@NIWeek Lounge. Located in the exhibition hall, the Connect@NIWeek Lounge provides wireless Internet service so you can catch up on e-mail, access the NIWeek community group for daily online reports of conference highlights, and view live Twitter feeds to see what other attendees are saying about NIWeek. Also take advantage of the lounge to share best practices and example code with fellow developers and network with leading engineers and scientists.

Open during exhibition hall hours.
Sponsored by Putman Media.

Visit the NI Store

Take the NIWeek experience home with you. Visit the NI Store, located near the dining area in the exhibition hall, to purchase National Instruments merchandise including stylish men's polos and shirts. The store accepts American Express, MasterCard, and VISA.

Monday, August 3	*5:30–7:30 p.m.*
Tuesday, August 4	*10:00 a.m.–7:30 p.m.*
Wednesday, August 5	*10:00 a.m.–5:00 p.m.*
Thursday, August 6	*10:00 a.m.–1:00 p.m.*

Win the NIWeek Prize Giveaway

Complete the conference survey online at ni.com/niweek or in the Connect@NIWeek Lounge, and be entered into a drawing for one of three gift card bundles from global retail stores including Best Buy, Home Depot, and Starbucks. The grand prize winner will be announced during the keynote address on Thursday, August 6. Stop by the exhibition hall display to see the prize bundles and visit ni.com/niweek for additional rules and regulations.

The conference giveaway is sponsored by Advantage Business Media.
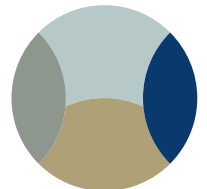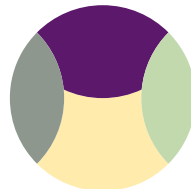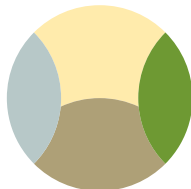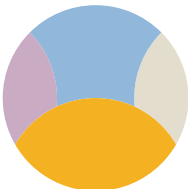
EXHIBITORS

3M Electronic Solutions Division

Booth 900   *3m.com/electronics*

3M Electronic Solutions Division provides interconnect solutions to electronic equipment manufacturers/ assemblers. Solutions include the the Ultra Hard Metric Socket Connector for PICMG 2.30 CompactPCI PlusIO standard.

ACO Pacific

Booth 303   *acopacific.com*

ACO Pacific Inc. has been manufacturing SS Precision Measurement Microphones and systems for more than 30 years and offers innovative products to worldwide markets.

Adsys Controls Inc.

Booth 541   *adsyscontrols.com*

Adsys Controls, an NI Alliance Partner, LabVIEW system integrator, and custom design house, specializes in advanced control systems, imaging systems, and automated test equipment.

Advanced illumination

Booth 638   *advancedillumination.com*

Advanced illumination designs and manufactures LED lighting and electronics for machine vision, including an extensive line of standard products as well as expandable lights and smart electronics.

AIM-USA

Booth 831   *aimusa-online.com*

AIM-USA is a leading supplier of MIL-STD-1553, ARINC 429, and AFDX Databus Interface Test & Simulation modules.

Alfautomazione S.p.A.

Booth 906   *alfautomazione.com*

Alfautomazione S.p.A. delivers a range of functional test solutions to the electronic industry and has expert knowledge in automotive, consumer electronics, and telecom applications.

Allied Vision Technologies

Booth 738   *alliedvisiontec.com*

Allied Vision Technologies, with its subsidiary Prosilica, is the leading supplier of digital IEEE 1394 and GigE Vision cameras to the industrial automation and scientific imaging markets.

AmFax

Booth 206   *amfax.xo.uk*

AmFax designs, manufactures, and supports functional and special-to-type solutions, from fixtures and cable assemblies to large-scale ATE systems, for the aerospace, defense, RF, and automotive markets.

AMREL

Booth 917   *amrel.com*

AMREL manufactures rugged mobile computer solutions as well as a range of programmable air/water-cooled electronic loads (60 W to 100 kW+) and programmable linear/switching power supplies (20 W to 900 kW+).

Averna

Booths 401 and 701   *averna.com*

Averna is a global test engineering solutions company and a strategic partner for innovative OEMs.

Basler Vision Technologies

Booth 538   *baslerweb.com*

Basler manufactures area and line-scan cameras using CCD and CMOS sensors. Interfaces include IEEE 1394, Camera Link, and gigabit Ethernet.

Bloomy Controls Inc.

Booth 729   *bloomy.com*

Bloomy Controls specializes in high-performance automated test, data acquisition, and control systems for research, validation, and manufacturing within the energy, medical, mil/aero, and semiconductor industries.

Boston Engineering

Booth 432   *boston-engineering.com*

As an outsourced engineering services firm, Boston Engineering offers turnkey project development services to meet clients' immediate and long-term needs for electrical, mechanical, software, and controls engineering.

Cal-Bay Systems Inc.

Booth 434   *calbay.com*

Cal-Bay is a recognized leader for test and measurement solutions when product quality is critical, serving leading companies in biomedical, mil/aero, and power generation.

Captronic Systems

Booth 430   *captronicsystems.com*

Captronic Systems is an ISO 9001- and CSIA-certified company specializing in the design and development of custom automated test, control, and acquisition systems.

Circuit Check

Booth 428   *circuitcheck.com*

Circuit Check manufactures high-performance functional test systems, in-circuit and custom test fixtures, and related products for automatic test equipment in the United States.

Conduant Corporation

Booth 532   *conduant.com*

Conduant Corporation develops the StreamStor family of PCI, PCI Express, PXI, PXI Express, and CompactPCI disk controllers for high-speed recording and playback of digital data.

Cyth Systems

Booth 506   *cythsystems.com*

Cyth Systems is the premier engineering firm in Southern California for designing automated test systems, machine vision systems, and embedded control systems.

Davis Calibration

Booth 925   *daviscalibration.com*

Davis Calibration operates North America's largest network of calibration labs. With 29 locations, we provide custom-tailored services to help you keep your total equipment costs low.

Design & Assembly Concepts Inc.

Booth 921   *dac-us.com*

Design & Assembly Concepts Inc. is an international provider of custom and standard automation solutions that include the latest technology for complete motion, robotic, and vision applications.

DISTek Integration

Booth 324   *distek.com*

DISTek Integration, an NI Certified Alliance Partner, works with clients to provide comprehensive applied technology solutions including embedded control system software; data bus communications (CAN); integration and testing; and design, development, support, and maintenance of real-time operating systems.

Dow-Key Microwave Corporation

Booth 217   *dowkey.com*

Dow-Key manufactures and custom designs RF coaxial relays, waveguides, RF and fiber optic switching systems, and PXI modules for the commercial, military, and space industries.

Dynamic Technology Inc.

Booth 829   *dtical.com*

Dynamic Technology Inc., an NI Alliance Partner and A2LA-accredited (ISO/IEC 17025, Z540-1) metrology lab for electronic, physical, and dimensional instrumentation, offers calibration, instrument repair, and on-site services.

Dytran Instruments Inc.

Booth 902   *dytran.com*

Dytran Instruments Inc. is a world-class designer and manufacturer of piezoelectric and DC sensors for the measurement of acceleration, vibration, force, and pressure.

Edmund Optics

Booth 639   *edmundoptics.com*

Edmund Optics is a leading supplier of optics and optical components, designing and manufacturing an array of multielement lenses, lens coatings, imaging systems, and optomechanical equipment.

Emona Instruments

Booth 901   *qpsk.com*

Emona Instruments manufactures add-on boards for the NI ELVIS platform: DATEx for wireless telecoms, FOTEx for fiber optics, and now HELEx for sustainable energy with solar and fuel cell technology teaching.

EXHIBITORS

Endevco

Booth 400   *endevco.com*

Endevco is the world's leading designer and manufacturer of dynamic instrumentation for vibration, shock, and pressure measurements.

ESTECO

Booth 227   *esteco.com*

Endevco is the world's leading designer and manufacturer of dynamic instrumentation for vibration, shock, and pressure measurements.

Fastek

Booth 1002   *fastekintl.com*

Fastek is an engineering and solutions company that offers hardware and software services from hardware-in-the-loop (HIL) systems to production test and measurement automation.

FLIR Systems

Booth 539   *flirthermography.com*

FLIR Systems designs, manufactures, and markets infrared imaging systems worldwide. Commercial product applications include nondestructive testing, research and development, manufacturing process control, and predictive maintenance.

Freescale Semiconductor

Booth 307   *freescale.com*

Freescale Semiconductor is a global leader in the design and manufacturing of embedded semiconductors for the automotive, consumer, industrial, and networking markets.

FunctionSIM

Booth 832   *functionsim.com*

FunctionSIM LLC provides functional simulation solutions for a range of mechanical, mechatronic, and controls systems applications. Test-drive our productivity package featuring the GDUI Toolkit from ExpertControl GmbH.

G Systems

Booth 402   *gsystems.com*

G Systems improves test performance and saves customers money through the design and integration of custom test and measurement, data acquisition, and control system solutions.

G.R.A.S. Sound & Vibration

Booth 903   *gras.us*

G.R.A.S. offers a broad range of acoustical devices including standard measurement microphones and preamplifiers, sound intensity microphones, ear and mouth simulators, telephone-testing equipment, HATS, pistonphones, and calibrators.

Graftek Imaging Inc.

Booth 643   *graftek.com*

Graftek Imaging provides machine vision components and turnkey solutions as well as helps customers choose the right lighting, lens, and camera for their projects.

Hitachi Kokusai Electric America Ltd.

Booth 438   *hitachikokusai.com*

Hitachi Kokusai America Ltd. offers GenICam-compliant GigE Vision cameras as well as analog, IEEE 1394, and Camera Link formats.

Honeywell Sensing and Control

Booth 830   *honeywell.com/sensotec*

Honeywell Sensing and Control is a global manufacturer of high-quality sensors and switches. Products include pressure, load, torque, displacement, and wireless telemetry sensors. Key industries served include test labs, industrial, aerospace, medical, and oil/gas.

IBM Rational Software

Booth 739   ibm.com/software/rational/solutions/systems

IBM Rational Software provides software solutions, which enable organizations to align product, system, and software development life cycles with business objectives to improve quality while reducing costs.

Imperx

Booth 642   *imperx.com*

Imperx makes feature-rich cameras in resolutions from VGA to 16 MP, with Camera Link or GigE Vision output. The highest-quality cameras are offered at competitive prices.

IntraStage

Booth 834   *intrastage.com*

IntraStage provides enterprise software, which automates the retrieval, storage, mining, and visualization of R&D, supplier, repair, and manufacturing test data.JAI Inc.

JAI Inc.

Booth 801   *jai.com*

JAI Inc. offers compact, high-speed, high-resolution cameras for machine vision, medical, and defense applications. The cameras are available in monochrome or color, with CL, mini-CL, or GigE Vision interfaces.

JKI Software

Booth 335   *jkisoft.com*

JKI Software is a tight-knit team of LabVIEW experts who are passionate about LabVIEW and its vibrant community, providing professional LabVIEW development tools and add-ons such as VI Package Manager, EasyXML, the JKI State Machine, and various other toolkits for LabVIEW.

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EXHIBITORS

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VI Technology Inc.

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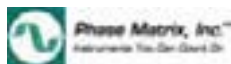
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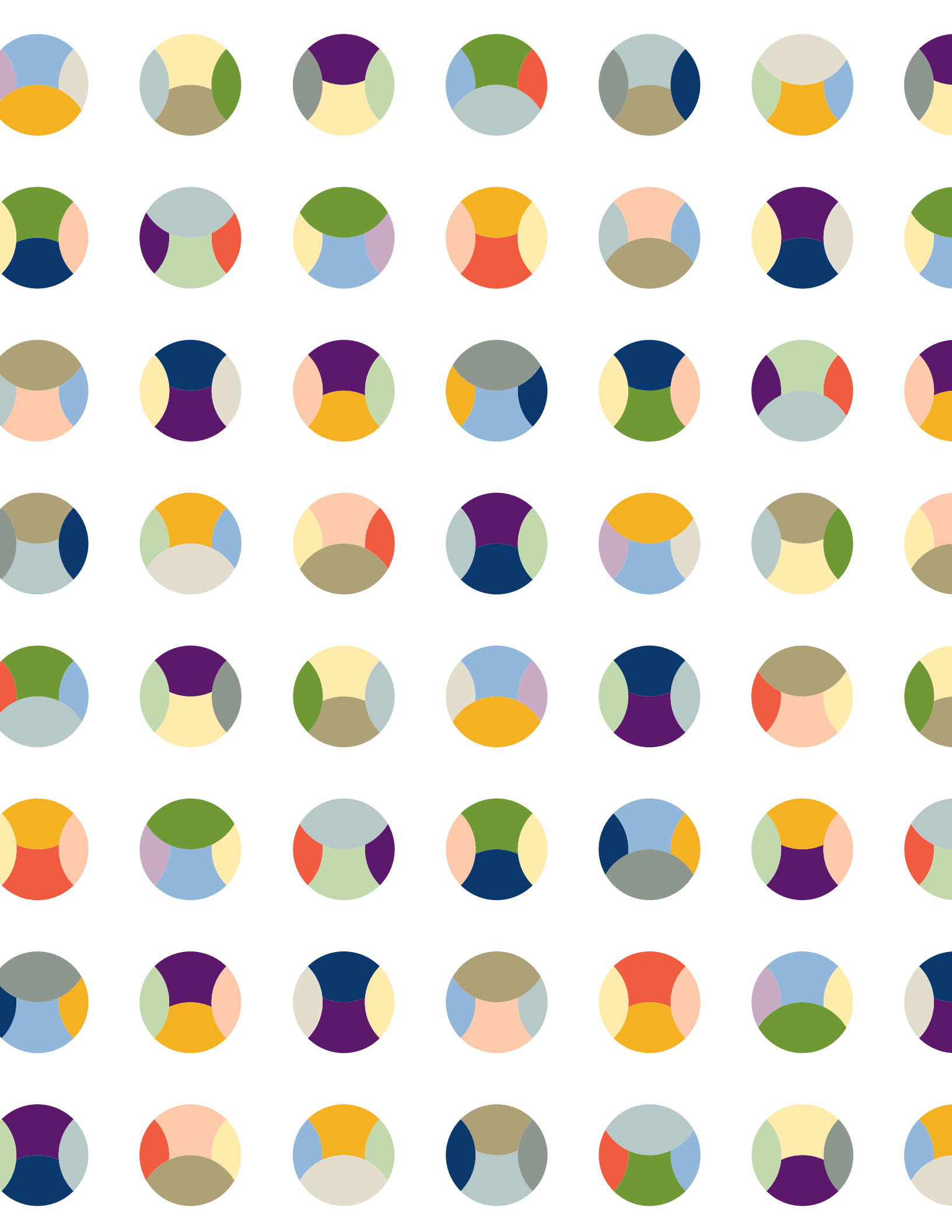
See you at the next NIWeek, August 3–5, 2010.

NIWeek 2009 SCHEDULE

TUESDAY

Time	11A/B	12A	12B	13A/B	14	15	16A	16B	17A	17B	18A	18B	18C	18D	19A	19B
8:00–8:30 a.m.	Breakfast (Ballroom Foyer)															
8:30–10:00 a.m.	NIWeek Keynote (Ballroom G) *(p02)*															
10:00–10:30 a.m.	Break															
10:30–11:30 a.m.	What's New with CompactRIO *(p40)*	.NET and LabVIEW: The Old New Thing *(p44)*	Run Windows and LabVIEW Real-Time in Parallel on the Same Controller *(p43)*	Using Advanced Motor Control Algorithms for Increased Efficiency *(p40)*	Comprehensively Testing Complex Electronics Systems: Nintendo Wii Teardown *(p47)*	Introduction to PXI and PXI Express *(p49)*	Managing Large Applications with the Project Explorer and Source Code Control *(p43)*	Multicore Design Patterns in LabVIEW *(p43)*	The Past, Present, and Future of Aerospace Flight Test *(p16)*	Robot Analysis and Control *(p25)* (10:30–11:00); Intelligent Mechatronics Systems *(p25)* (11:00–11:30)	Hands-On: Real-Time Testing Technologies *(p50)*	Hands-On: Introduction to the LabVIEW Embedded Module for ARM Microcontrollers *(p34)*	Hands-On: What's New in LabVIEW *(p46)*	Hands-On: Introduction to LabVIEW for Wireless Sensor Networks *(p39)*	Where Wi-Fi Came From and the Lessons It Has Taught Us *(p20)*	Advances in Image Processing *(p29)*
11:30 a.m.–1:00 p.m.	Lunch (Exhibition Hall)															
1:00–2:00 p.m.	Deploying and Replicating LabVIEW Real-Time and LabVIEW Touch Panel Applications *(p38)*	Introduction to the LabVIEW Embedded Module for ARM Microcontrollers *(p34)*	The "Right" Development Process for LabVIEW FPGA *(p35)*	Energy Storage with LabVIEW *(p38)*	Ultrahigh-Bandwidth Sampling Scope via an NI 5154 and a Photonic Time Stretch Preprocessor *(p52)*	Hack Your Car with NI CAN interfaces *(p48)*	What's New in LabVIEW *(p46)*	From Spaghetti Code to State Machines: One Man's Journey through the NI Certification Process *(p42)*	3D Sound Mapping with PXI for Aircraft Noise Test *(p17)*	Real-Time Quadrotor Flight Control *(p25)* (1:00–1:30); Blind Driver Challenge and Other Innovative Robotics Research at Virginia Tech *(p25)* (1:30–2:00)	Hands-On: Run Windows and LabVIEW Real-Time in Parallel *(p35)*	Hands-On: Introduction to CompactRIO and LabVIEW Real-Time *(p39)*	Hands-On: Build an Automated Test System from Scratch *(p47)*	Hands-On: Real-Time Test with NI FlexRIO *(p51)*	Trends in the RF and Wireless World *(p21)*	Understanding Human Visual Perception and How It Relates to Computerized Image Analysis *(p28)*
2:00–2:15 p.m.	Break															
2:15–3:15 p.m.	Real-Time Prototyping and Deployment Controls for Automotive and Manufacturing Applications *(p40)*	LabVIEW Statechart Module Programming *(p34)*	LabVIEW FPGA under the Hood *(p34)*	A Regenerative Fuel Cell Backup Power Station Monitor and Control System *(p37)*	The Dresden Measurement Streetcar *(p52)*	Software-Defined Radio with LabVIEW FPGA *(p51)*	Beyond the Basics: LabVIEW Debugging Techniques *(p41)*	LabVIEW Graphical Scripting *(p43)*	Model-Based Diagnostic Test Systems *(p17)*	iHop, iLean, iFling, iSee, and More – Multimodel Dynamic Robotic Systems *(p25)* (2:15–2:45); Spatial Robotic Isotropy *(p25)* (2:45–3:15)	Hands-On: NI Vision *(p30)*	Hands-On: CompactRIO *(p34)*	Hands-On: Build an Automated Test System from Scratch *(continued)* *(p47)*	Hands-On: Sound and Vibration *(p51)*	Physical Layer Modeling of 3GPP LTE MIMO Spatial Multiplexing *(p21)*	Design a Vision System You Can Trust *(p29)*
3:15–3:30 p.m.	Break															
3:30–4:30 p.m.	CompactRIO Scan Mode Tips and Tricks *(p37)*	What's New in LabVIEW FPGA *(p36)*	Tips and Tricks for LabVIEW Microprocessor SDK Programming *(p35)*	Using Graphical Programming to Apply Large-Scale Online Computations to Optimal Geosystems Management *(p40)*	Synchronizing Dynamic Signal Acquisition with GPS *(p51)*	Hands-On: Real-Time Testing Technologies *(p49)*	Deploying Text-Based Math Scripts to Real-Time Hardware *(p42)*	New Software Engineering Tools for Large LabVIEW Applications *(p44)*	F-35 Vehicle Systems Integration Facility Data Acquisition System *(p17)*	Modular Machines: Reconfigurable Mobile Robots for Research and Education *(p26)* (3:30–4:00); Building Cool, Complex Robots with LabVIEW and CompactRIO for FIRST *(p26)* (4:00–4:30)	Hands-On: Run Windows and LabVIEW Real-Time in Parallel *(p35)*	Hands-On: Adding HMI to CompactRIO with LabVIEW *(p37)*	Hands-On: Data Mining Techniques for LabVIEW Users *(p42)*	Hands-On: Real-Time Test with NI FlexRIO *(p51)*	Using PXI and NI TestStand for Automated Test *(p21)*	Lessons for Understanding Color: Building a Better Multispectral Imaging System *(p29)*
4:30–4:45 p.m.	Break															
4:45–5:45 p.m.	Power Measurements 101 *(p39)*	LabVIEW for Embedded Device Design and Prototyping *(p34)*	Using CompactRIO in the *FIRST* Robotics Competition *(p35)*	Porting a Legacy Control System to PXI with LabWindows™/CVI Real-Time *(p39)*	Extending Real-Time Testing Applications with LabVIEW, LabVIEW FPGA, and NI TestStand *(p49)*	Extending Real-Time Testing Applications with LabVIEW, LabVIEW FPGA, and NI TestStand *(p52)*	Introduction to LabVIEW Object-Oriented Programming *(p43)*	Advanced Error Handling Techniques in LabVIEW *(p41)*	INERTIA Application for Turbine Engine Test Systems and Iron Birds *(p17)*	Building Robots to Inspire the Engineering World *(p24)*	Hands-On: Real-Time Testing Technologies *(p50)*	Hands-On: Introduction to CompactRIO and LabVIEW Real-Time *(p39)*	Hands-On: Tools and APIs to Build on to the LabVIEW Platform *(p45)*	Hands-On: Develop Powerful Motion Appliction with NI CompactRIO and SolidWorks *(p38)*	Reducing the Cost of PXI Field Testing *(p21)*	Six Steps to Vision-Guided Industrial Robotics *(p29)*
5:00–7:30 p.m.	NI Community Block *Diagram* Party (Exhibition Hall) *(p08)*															

Legend:
Military and Aerospace Summit | RF and Wireless Summit | Robotics Summit | Vision Summit | Embedded Design Track | Industrial Measurements and Control Track | Software Development Track | Test and Data Acquisition Track

NIWeek 2009 SCHEDULE

WEDNESDAY

Columns: 11A/B, 12A, 12B, 13A/B, 14, 15, 16A, 16B, 17A, 17B, 18A, 18B, 18C, 18D, 19A, 19B

8:00–8:30 a.m. — Breakfast (Ballroom Foyer)

8:30–10:00 a.m. — NIWeek Keynote (Ballroom G) *(p02)*

10:00–10:30 a.m. — Break

10:30–11:30 a.m.

11A/B	12A	12B	13A/B	14	15	16A	16B	17A	17B	18A	18B	18C	18D	19A	19B
Head-to-Head High-Speed Bus Comparison and Techniques to Maximize Productivity at Zero Cost *(p49)*	Introduction to LabVIEW FPGA *(p34)*	Transitioning from a PCI-Based System to CompactRIO *(p35)*	Researching and Deploying Wireless Sensor Networks *(p40)*	Overcome Top High-Speed Measurement Challenges with Tektronix and NI *(p50)*	Top Considerations for Large-Scale Testing and Monitoring *(p52)*	Adding Internet-Like Search to LabVIEW with NI DataFinder *(p41)*	LabVIEW Code Reuse for Teams and Large Projects *(p43)*	Developing the Next Generation of Navy Automated Test and Calibration Systems Using LabVIEW, NI TestStand, and PXI *(p18)*	Making Ground Robotics a Reality *(p24)*	Hands-On: Run Windows and LabVIEW Real-Time in Parallel *(p35)*	Hands-On: Introduction to CompactRIO and LabVIEW Real-Time *(p39)*	Hands-On: What's New in LabVIEW *(p46)*	Hands-On: Develop Powerful Motion Applications with NI CompactRIO and SolidWorks *(p38)*	Simulating Real-World Channel Conditions with LabVIEW FPGA and the NI PXIe-5641R *(p22)*	Futureproof Your Vision System *(p29)*

11:30 a.m.–1:00 p.m. — Lunch (Exhibition Hall)

1:00–2:00 p.m.

11A/B	12A	12B	13A/B	14	15	16A	16B	17A	17B	18A	18B	18C	18D	19A	19B
Developing an Industrial or Machine Control Application Using CompactRIO and the LabVIEW Touch Panel Module *(p38)*	How CompactRIO Can Teach Babies to Suck *(p33)*	Developing a PDA Platform Based on LabVIEW for Cochlear Implant Studies *(p33)*	Deploying Applications to Windows XP Embedded Targets *(p38)*	Demystifying and Working with FlexRay *(p48)*	New Technologies for High-Throughput Data Acquisition *(p49)*	Run Windows and LabVIEW Real-Time in Parallel on the Same Controller *(p43)*	Software Engineering with LabVIEW from Requirements to Deployment *(p45)*	Twenty-First Century Flight Test Engineering Education Using LabVIEW *(p18)*	The Past, Present, and Future of Robotics for the Rest of Us *(p26)*	Hands-On: NI Vision *(p30)*	Hands-On: NI CompactRIO *(p34)*	Hands-On: Data Mining Techniques for LabVIEW Users *(p42)*	Hands-On: Real-Time Test with NI FlexRIO *(p51)*	Under the Hood of a Software-Defined RF Instrument *(p22)*	Improving Cell Phone Quality of Experience with LabVIEW *(p29)*

2:00–2:15 p.m. — Break

2:15–3:15 p.m.

11A/B	12A	12B	13A/B	14	15	16A	16B	17A	17B	18A	18B	18C	18D	19A	19B
Graphical System Design Opportunities for Wind and Solar Energy *(p38)*	Seven Tips for Developing FDA-Friendly LabVIEW Code *(p35)*	Converting The MathWorks, Inc. MATLAB® Software to LabVIEW Graphical System Design *(p33)*	Developing an Efficient, Low-Cost MEMS Microphone Test System with PXI and LabVIEW *(p48)*	Shorten Audio Test Times and Ease Development *(p51)*	Sensing Strain and Temperature Using Optical Fiber Technology *(p51)*	What's New in LabVIEW *(p46)*	Build Eye-Catching LabVIEW User Interfaces *(p41)*	PXI-Based Test Systems for Military Maintenance Support *(p18)*	Autonomous Fish: Swarms, Surveillance, and Swimming *(p26) (2:15-2:45)*; Drive 102 mph by Wire with CompactRIO, LabVIEW, and JAUS *(p26) (2:45-3:15)*	Hands-On: Real-Time Testing Technologies *(p50)*	Hands-On: Introduction to the LabVIEW Embedded Module for ARM Microcontrollers *(p34)*	Hands-On: Tools and APIs to Build on to the LabVIEW Platform *(p45)*	Hands-On: Introduction to LabVIEW for Wireless Sensor Networks *(p39)*	Improving RF System Accuracy with Methodical Calibration Techniques *(p22)*	Processing Images with LabVIEW FPGA *(p30)*

3:15–3:30 p.m. — Break

3:30–4:30 p.m.

11A/B	12A	12B	13A/B	14	15	16A	16B	17A	17B	18A	18B	18C	18D	19A	19B
Move It – Develop Powerful Motion Applications Using the LabVIEW NI SoftMotion Module and NI CompactRIO *(p39)*	Custom Design 101 with CompactRIO C Series Modules and NI Single-Board RIO *(p33)*	Fixed-Point Math Primer *(p33)*	DAQ Advanced: Counters and Timing *(p47)*	Noise, Vibration, and Harshness (NVH) and Machine Condition Monitoring with USB *(p50)*	Wireless DAQ: Streaming High-Bandwidth Remote Measurements *(p52)*	Comparing Graphical Programming Languages to Traditional Text-Based Languages *(p42)*	Best Practices for Memory Management and LabVIEW Code Optimization *(p41)*	Maintaining Systems for More Than 20 Years and Replacing Legacy VXI Instruments with PXI *(p18)*	U.S. Deployment of Defense Priorities and Reform Under the Obama Administration *(p26) (3:30-4:00)*; Robotics Innovations with Reconfigurable I/O (RIO) and LabVIEW *(p27) (4:00-4:30)*	Hands-On: Run Windows and LabVIEW Real-Time in Parallel *(p35)*	Hands-On: NI CompactRIO *(p34)*	Hands-On: Build an Automated Test System from Scratch *(p47)*	Hands-On: Sound and Vibration *(p51)*	From Baseband to Bits: Under the Hood of the QPSK Demodulator *(p22)*	Explore the Depths of 3D Vision *(p30)*

4:30–4:45 p.m. — Break

4:30–5:45 p.m. — Industry Experts Panel: What Inspires Innovation? (Ballroom G) *(p11)*

4:45–5:45 p.m.

11A/B	12A	12B	13A/B	14	15	16A	16B	17A	17B	18A	18B	18C	18D	19A	19B
Connecting LabVIEW to PLCs *(p37)*	Build, Integrate, and Reuse FPGA IP *(p33)*	LabVIEW and Neuroscience *(p34)*	Move It Beyond the Standard – Experience Advanced Motion Features *(p39)*	Comprehensively Testing Complex Electronics Systems: Nintendo Wii Teardown *(p47)*	Demystifying Wireless for Real-World Measurement Applications *(p48)*	Tips and Tricks to Increase LabVIEW Performance Speed *(p45)*	New Features in LabVIEW Object-Oriented Programming *(p44)*	GPS Synchronized RF Test System and Techniques for Synchronizing PXI Systems *(p18)*	Digital HDTV Testing: Streaming and Static Image Verification *(p48)*	Hands-On: Real-Time Testing Technologies *(p50)*	Hands-On: Adding HMI to CompactRIO with LabVIEW *(p37)*	Hands-On: Build an Automated Test System from Scratch *(continued) (p47)*	Hands-On: Introduction to Data Acquisition *(p49)*	Four-Channel Synchronous RF Record and Playback System *(p22)*	Essential Techniques for Vision Timing and Synchronization *(p30)*

7:00–10:30 p.m. — Annual NIWeek Conference Party (The City Terrace at the Long Center) *(p08)*

Legend: Military and Aerospace Summit · RF and Wireless Summit · Robotics Summit · Vision Summit · Embedded Design Track · Industrial Measurements and Control Track · Software Development Track · Test and Data Acquisition Track

NIWeek 2009 SCHEDULE

THURSDAY

	11A	11B	12A	12B	13A	13B	14	15	16A	16B	17A	17B	18A	18B	18C	18D	19A	19B
8:00–8:30 a.m.	Breakfast (Ballroom Foyer)																	
8:30–10:00 a.m.	NIWeek Keynote (Ballroom G) *(p02)*																	
10:00–10:30 a.m.	Break																	
10:30–11:30 a.m.	Upgrading Nuclear Power Plant Systems with CompactRIO *(p40)*	Practical Data Logging: Best Practices, Tips, and Tricks *(p44)*	Prototyping and Verifying HDL Code with LabVIEW FPGA *(p35)*	Adding a User Interface to Embedded Systems *(p33)*	What's New in LabWindows/CVI: Version 9.0 and Beyond *(p46)*	Architecting High-Speed Data Streaming Systems *(p47)*	Load, Pressure, and Torque: Sensor Selection, Technology, and Applications *(p50)*	Achieve Hardware Independence with an Object-Oriented Hardware Abstraction Layer *(p47)*	Best Practices for Developing with Shared Variables *(p41)*	Enhanced Data Visualization in LabVIEW *(p42)*	NI TestStand from the Trenches: Plan for Success with Automated Test *(p44)*	Advanced Data Acquisition Techniques with R Series DAQ *(p47)*		**Hands-On:** Introduction to CompactRIO and LabVIEW Real-Time *(p39)*	**Hands-On:** What's New in LabVIEW *(p46)*	**Hands-On:** Introduction to LabVIEW for Wireless Sensor Networks *(p39)*	Testing Next-Generation Wireless Standards *(p51)*	Hardware-in-the-Loop and Real-Time Testing Techniques *(p49)*
11:30 a.m.–1:00 p.m.	Lunch (Exhibition Hall)																	
1:00–2:00 p.m.	Architecting a Low-Power Wireless Sensor Network *(p37)*	Raw Data to Results: Proper Data Management Techniques *(p45)*	Using the New C Interface for LabVIEW FPGA *(p35)*	Virtualization Demystified *(p36)*	Application Debugging Tools in LabWindows/CVI *(p41)*	What's New In LabVIEW Real-Time *(p36)*	Data Acquisition for Netbooks and Handheld and Mobile Devices *(p47)*	Extend Your DC Measurement Performance *(p48)*		Using Your VI as a Web Service in LabVIEW *(p46)*	Determining the Accuracy of Your Data Acquisition Application *(p48)*	NI-DAQmx Development in .NET and Text-Based Languages *(p50)*					LabVIEW FPGA for Test Applications *(p49)*	Optimizing Automated Test Systems with Parallel Technologies *(p44)*
2:00–2:15 p.m.	Break																	
2:15–3:15 p.m.	Deploying and Replicating Embedded Systems *(p33)*	Introduction to the TDMS File Format *(p43)*		Role-Based Development with LabVIEW and NI TestStand *(p45)*	Data Acquisition Remote Monitoring and Control in .NET with NI Measurement Studio	Improving Prototype Validation with LabVIEW – Automating Multisim Simulation *(p42)*	PXI Best Practices: Building High-Quality PXI Systems *(p50)*	Using Hardware Fault Insertion for Electronic Testing *(p52)*	Improving the LabVIEW Upgrade Experience *(p42)*	Saving Lives and Money by Predicting Mechanical Failures *(p45)*	DAQ Advanced: Streaming and Performance *(p47)*	Digital Instruments for Semiconductor, Multimedia, and Signal Processing *(p48)*					Choosing the Best Technology for Your Wireless Application *(p37)*	Best Practices for NI TestStand Architecture Development *(p41)*
3:15 p.m.	End of NIWeek 2009																	

Embedded Design Track   Industrial Measurements and Control Track   Software Development Track   Test and Data Acquisition Track