NIWeek09

WORLDWIDE GRAPHICAL SYSTEM DESIGN
CONFERENCE

PRELIMINARY CONFERENCE PROGRAM

August 4–6 ▪ Alliance Day, August 3

Austin Convention Center ▪ Austin, Texas USA ▪ **ni.com/niweek**

NATIONAL INSTRUMENTS™

CONFERENCE OVERVIEW

8:00 a.m.	10:00 a.m.	Noon	2:00 p.m.	4:00 p.m.	6:00 p.m.	8:00 p.m.	10:00 p.m.

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Register for NIWeek at **ni.com/niweek** or call our customer service representatives at 888 564 9335.

PROGRAM CONTENTS

Dear Colleague,

Please join me, National Instruments developers, and more than 3,000 of the brightest engineers, educators, and scientists at NIWeek 2009, the world's leading graphical system design conference and exhibition, opening August 4 at the Austin Convention Center in Austin, Texas.

Because of the challenging economic climate, it is more important than ever for engineers and scientists to learn new skills and technologies to increase their productivity and lower costs. NIWeek helps you boost your competitive advantage by delivering training on cutting-edge NI products and the latest technologies impacting design, control, automation, manufacturing, and test. Here is what you will find at NIWeek 2009:

- *More than 200 technical sessions – Attend interactive technical sessions, case study presentations, and panel discussions on topics ranging from test and data acquisition to industrial measurements and control.*

- *Interaction with NI products – Explore the latest product offerings from NI through hands-on workshops and view hundreds of product demonstrations on the main stage and in the exhibition hall.*

- *CEUs and certification exams – Participate in advanced training sessions to earn continuing education units (CEUs) and take certification exams for NI LabVIEW, NI LabWindows™/CVI, and NI TestStand.*

NIWeek is the ultimate learning environment that gives you the tools and knowledge to develop your applications faster, smarter, and more cost-efficiently. Register today at **ni.com/niweek**.

Sincerely,

Jeff Kodosky
Cofounder and Business and Technology Fellow
National Instruments
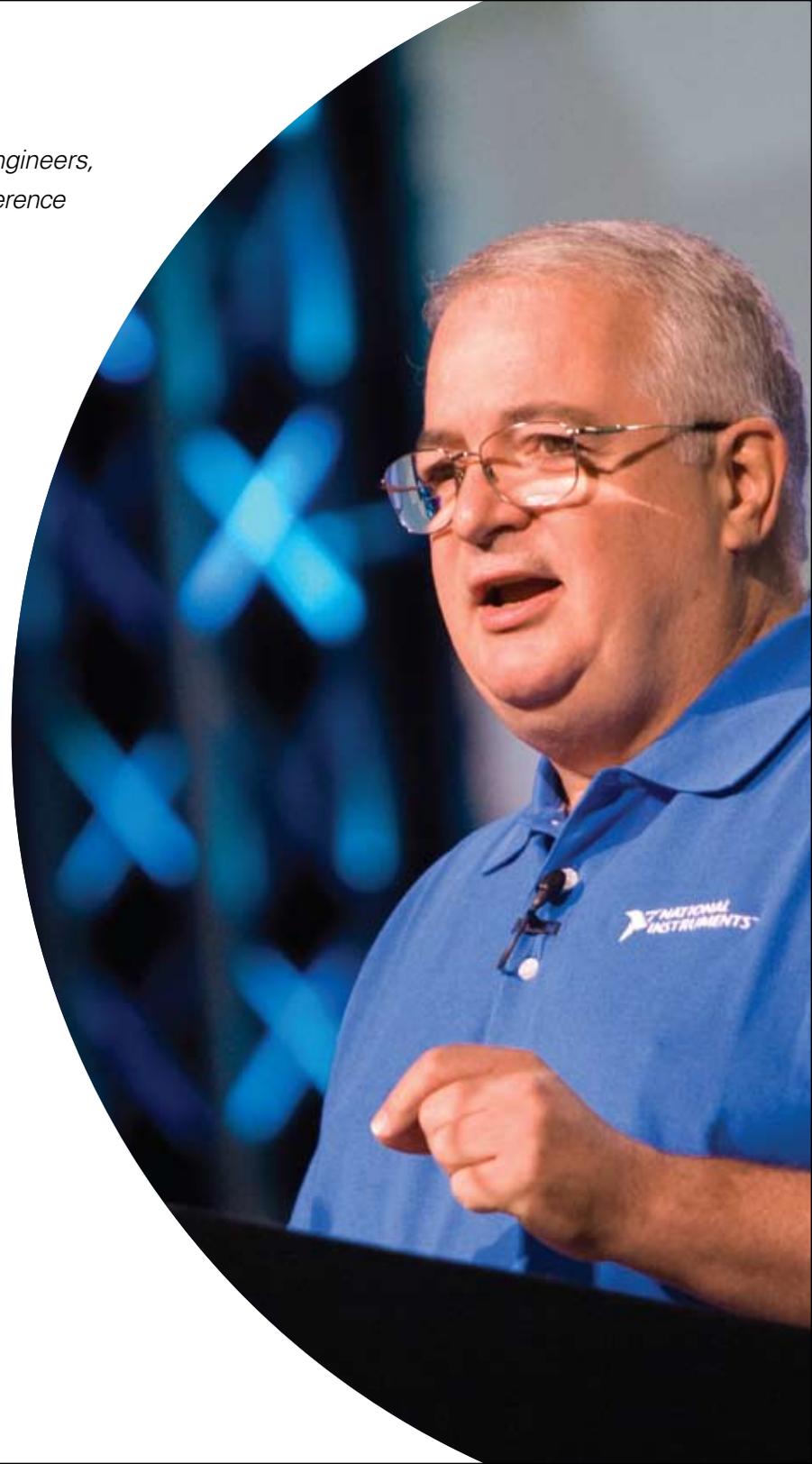
KEYNOTE PRESENTATIONS

Tuesday, August 4

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

Dr. James Truchard, who has served as CEO of National Instruments for 33 years, coinvented the award-winning LabVIEW graphical programming software. Join Dr. Truchard as he discusses the benefits of graphical system design and how this approach is helping engineers and scientists change the world.

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 and sales professionals who educate and support thousands of customers worldwide. Join him and NI R&D engineers as they unveil the products and technologies that help engineers and scientists optimize system performance and efficiency.

Wednesday, August 5

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 and the possibilities it presents for engineers and scientists.

Mike Santori
Business and Technology Fellow
National Instruments

Mike Santori has helped drive the development of key NI software and hardware platforms for 23 years. Watch as he and NI R&D engineers demonstrate emerging technologies and offer a sneak peek at some "still in the lab" developments for advanced control, design, test, and data acquisition applications.

Thursday, August 6

Ray Almgren
Vice President of Academic Marketing
National Instruments

Ray Almgren, a 22-year NI veteran, leads the company's efforts to create dynamic, hands-on engineering and science education that empower the innovators of tomorrow. Join him and students of all ages as they demonstrate how they use technology and hands-on learning to change the world around us.

Dr. David Barrett, PhD
Director of SCOPE
Olin College

Dr. David Barrett, who has more than 25 years of robotics experience, has served as vice president of engineering at iRobot and director of Imagineering at Walt Disney. Join Dr. Barrett as he discusses how robotics in industry and engineering education is poised to revolutionize the way we interact with technology in our daily lives.

NI Alliance Day – *August 3*

NI Alliance Day is reserved for developers, consultants, and systems integrators in the National Instruments Alliance Partner program. This event is held in conjunction with the NI worldwide sales conference, giving NI Alliance Partners the opportunity to network with the NI sales team and learn how to work together to increase customer success.

Benefits of Attending NI Alliance Day 2009:
- **Keynote on pivotal strategies** – Hear from top NI executives about NI business, markets, and strategies that can create opportunities for your company and customers.
- **NI product training** – Attend in-depth training sessions to learn how to market, sell, and use NI products. Also discover and provide feedback on future product initiatives during strategy sessions.
- **Technical training** – Learn from NI systems engineers how to use the latest reference designs to speed application development and implement architectures to meet new application challenges.
- **Business empowerment** – Participate in professional workshops to improve your business practices, and learn how to tap into NI marketing and sales activities to augment your own plans.

Register for NIWeek and NI Alliance Day at **ni.com/niweek**.

Academic Forum – *August 3*

The NIWeek 2009 Academic Forum provides a platform for academic professionals to share best practices on research and teaching methodologies and network with their colleagues from around the world.

Benefits of Attending the NIWeek 2009 Academic Forum:
- **Technical seminars** – See presentations from leading experts on teaching methodologies and research applications using NI products.
- **Keynote on technical advancements** – Join NI Vice President Ray Almgren as he discusses advances in graphical system design for education and research.
- **New products** – Learn about and preview the latest innovations in LabVIEW, the National Instruments Educational Laboratory Virtual Instrumentation Suite (NI ELVIS), and other NI products used for teaching and research.
- **Networking** – Interact with other academic professionals and meet experts in your field at an exclusive evening reception.
- **Poster session** – Present a poster to share how you use NI products to introduce technological innovation within research or in the classroom.

Register for NIWeek and the Academic Forum and submit a poster for the poster session at **ni.com/niweek.**

EPICS Annual Conference – *August 3–4*

Held in conjunction with NIWeek, the EPICS Annual Conference on Service-Learning in Engineering and Computing unites the university community involved in integrating the educational needs for realistic design experiences with the technological needs of communities through service-learning. Join other academic professionals and share best practices, assessment strategies, and institutionalization successes that can be employed across campuses.

Visit **engineering.purdue.edu/EPICSU** to learn more.

NETWORKING ACTIVITIES

NIWeek 2009 offers a variety of opportunities for networking and relaxing with other NIWeek attendees. Meet product experts, share best practices with engineers working on similar applications, and exchange programming tips with LabVIEW Champions at the following events.

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.

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

Peer2Peer Roundtable

Now, more than ever, it is critical to grow your network and expand your expertise. Meet with your peers and NI developers over lunch and discuss best practices and challenges within your application, job position, or industry. Topics include machine condition monitoring, medical device development, LabWindows/CVI applications, and building, marketing, and selling LabVIEW add-ons.

Tuesday, August 4   *Noon–1:00 p.m.*   *Exhibition Hall*
Wednesday, August 5   *Noon–1:00 p.m.*   *Exhibition Hall*
Thursday, August 6   *Noon–1:00 p.m.*   *Exhibition Hall*

NI Community *Block Diagram* Party

Enjoy food, drinks, music, and good company at the hottest party in the neighborhood! Exchange best practices with fellow engineers and scientists from a wide range of industries and companies, and meet with leaders in design, control, and test to discuss the latest technical innovations.

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

Annual NIWeek Conference Party

Take a break from learning about the latest technological advancements and unwind Austin-style at this popular conference event. Enjoy Texas cuisine, cold drinks, and a memorable evening with thousands of new friends. Dance the night away to the musical stylings of one of Austin's coolest cover bands or simply kick back and listen to the hits you know and love. *Transportation provided.*

Wednesday, August 5   *7:00–10:30 p.m.*
The City Terrace at The Long Center
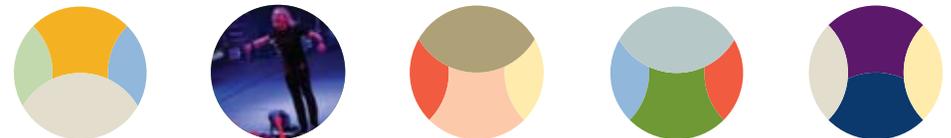
Military and Aerospace (NEW)

The Military and Aerospace Summit unites industry and research experts across the fields of advanced research, flight research, defense and commercial aerospace test, ground vehicles, RADAR, and unmanned vehicles. Hear from industry experts about the latest technological advances and discover which tools engineers are using to design, develop, and implement systems in an evolving market.

Who Should Attend
Test system developers, systems engineers, researchers, and professors

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 Space Shuttle 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.

Presented by The University of Tennessee Space Institute

Military and Aerospace Summit Sessions Include:
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 center and how PXI technology helped improve synchronization.

Presented by White Sands Missile Range

Model-Based Diagnostic Test Systems
Learn about 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.

Presented by the U.S. Marine Corps

RF and Wireless Communications

The RF and Wireless Communications Summit engages industry and research experts in the RF and wireless communication 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.

Who Should Attend
RF, communications systems, and wireless systems engineers; researchers; and professors

RF and Wireless Communications Summit Sessions Include:
Creating a Multipath Simulator with LabVIEW FPGA
Engineers who design wireless receivers may use a multipath simulator to emulate how their receiver performs in a real-world environment. Learn how LabVIEW FPGA can be used to simulate real-world channel conditions in real time.

Presented by DAQTron Inc.

Fundamentals of Phase-Coherent RF Measurements
Explore how phase-coherent RF transceivers enable applications such as multiple input, multiple output (MIMO) measurements, diversity radio, beamforming, and phase-array radio detection and ranging (RADAR). Also learn how RF instrumentation can be synchronized in a phase-coherent manner.

Presented by National Instruments

Modeling the Physical Layer of 3GPP LTE
Fourth-generation cellular standards have emerged to meet the growing demands of today's cellular users. Discover how engineers at The University of Texas at San Antonio prototyped the physical layer of the 3GPP Long Term Evolution (LTE) standard using PXI vector signal generators and analyzers.

Presented by The University of Texas at San Antonio

Robotics and Autonomous Systems

Engineers and researchers from industry and academia worldwide have embraced LabVIEW graphical system design for a variety of robotic and autonomous vehicle applications. Hear from leaders in robotics who use LabVIEW and other NI technologies for cutting-edge robotic designs through interfacing with sensors and actuators, engineering sophisticated algorithms, and targeting embedded hardware.

Who Should Attend
Robotics, mechatronics, control, and embedded design engineers; entrepreneurs; and robotics 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. Hear from Dean Kamen, the founder of *FIRST* and president of DEKA Research & Development Corp., as he discusses the role of engineers in meeting the toughest global challenges.
Presented by FIRST

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. Join Ellen Purdy, enterprise director of Joint Ground Robotics for the U.S. Department of Defense, as she outlines the technology investments needed to make the future of robotics a reality.
Presented by the U.S. Department of Defense

Robotics and Autonomous Systems Summit Sessions Include:
Robotics and Autonomous System Challenges Panel Discussion
Explore the challenges of autonomous systems with leaders from industry and academia including Jeanne Dietsch of MobileRobots, Dean Kamen of *FIRST*, Ellen Purdy of the U.S. Department of Defense, and Dr. David Barrett of Olin College. The panel will be moderated by Rob Malone from *IEEE Spectrum*.
Presented by Academic and Industry Experts

Vision

Visit one of the most comprehensive vision session lineups in North America at the NIWeek Vision Summit. Attend hands-on workshops and technical sessions presented by NI developers, industry experts, and academic professionals on topics ranging from modeling potential points of failure in an inspection to measuring the quality of experience (QoE) of portable electronic devices.

Who Should Attend
Engineers and scientists interested in image processing, machine vision, and automated inspection

Keynote
Understanding Human Visual Perception and How It Relates to Computerized Image Analysis
Many of the properties of visual perception can be revealed through optical illusions that emphasize how perception is similar to, but also fundamentally different from, image analysis. Learn how these perceptions can help suggest algorithmic approaches to computerized image analysis.
Presented by Purdue University

Vision Summit Sessions Include:
Advances in Image Processing
Learn valuable background theory and useful programming techniques to get the most out of several new image-processing algorithms available in the latest version of the NI Vision Development Module.
Presented by National Instruments

Processing Images with LabVIEW FPGA
Field-programmable gate arrays (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.
Presented by National Instruments

EMBEDDED DESIGN

Adding a User Interface to Embedded Systems

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

Presented by National Instruments

Build, Integrate, and Reuse FPGA IP

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

Presented by National Instruments

Hands-On: CompactRIO

Get hands-on experience with CompactRIO measurement and control systems.

Presented by National Instruments

Custom Design 101 with NI Single-Board RIO and CompactRIO

Discover how to use design resources to customize CompactRIO, NI Single-Board RIO, or NI FlexRIO for embedded design; explore how to build custom C Series modules, accessories, breakout boards, or connectors; and view application-oriented examples based on proofs of concept that you can use for your custom integration.

Presented by National Instruments

Deploying and Replicating Embedded Systems

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

Presented by National Instruments

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.

Presented by The University of Texas at Dallas

Fixed-Point Math Primer

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

Presented by National Instruments

Introduction to LabVIEW FPGA

Learn how LabVIEW FPGA can be useful for your applications and how you can efficiently evaluate and develop an application using the software.

Presented by National Instruments

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.

Presented by National Instruments

LabVIEW for Embedded Device Design and Prototyping

Explore 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 robotics greenhouse, and a novel scanning laser range finder.

Presented by National Instruments

★ LabVIEW FPGA Under the Hood

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

Presented by National Instruments

Programming the LabVIEW Statechart Module

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.

Presented by National Instruments

★ 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.

Presented by National Instruments

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.

Presented by National Instruments

★ **The "Right" Development Process for LabVIEW FPGA**

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

Presented by National Instruments

Tips and Tricks for LabVIEW Microprocessor Programming

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

Presented by Boston Engineering

★ **Transitioning from a PCI-Based System to CompactRIO**

Purdue University's 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.

Presented by Purdue University

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.

Presented by National Instruments

Using the New C Interface for LabVIEW FPGA

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

Presented by National Instruments

Using Your .m and .MDL Files in LabVIEW

Learn how to integrate existing text-based math algorithms within LabVIEW and NI hardware.

Presented by National Instruments

What's New in LabVIEW FPGA

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

Presented by National Instruments

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. Additional features include the ability to synchronize operations on distributed real-time systems as well as manage system replication and application deployment.

Presented by National Instruments

NIWeek Advanced Technical Sessions

TECHNICAL TRACKS

INDUSTRIAL MEASUREMENTS AND CONTROL

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 programmable logic controller (PLC) and conduct data logging and alarming.

Presented by National Instruments

Architecting a Low-Power Wireless Sensor Network

Gain a detailed overview of the NI wireless sensor network architecture 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.

Presented by National Instruments

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.

Presented by National Instruments

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.

Presented by National Instruments

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 using these protocols.

Presented by National Instruments

Customizing Motion Control Systems with Advanced Control Algorithms and Custom Axes

The NI software tools for motion can help you implement custom motion control applications based on an easy-to-use API. Learn how to go beyond the standard use case and add advanced control to your application. Also explore tools for creating custom axes.

Presented by National Instruments

★ 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.

Presented by National Instruments

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.

Presented by National Instruments

★ 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 targets.

Presented by National Instruments

Hands-On: Digital Prototyping with LabVIEW and SolidWorks

Gain firsthand experience with the new integrated solution for digital prototyping that combines LabVIEW graphical programming and SolidWorks 3D modeling.

Presented by National Instruments

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.

Presented by Boston Engineering

Graphical System Design Opportunities in 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 address the key technical challenges of these industries.

Presented by National Instruments

Hands On: Introduction to CompactRIO and LabVIEW Real-Time

Gain hands-on experience with CompactRIO and LabVIEW Real-Time 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.

Presented by National Instruments

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.

Presented by National Instruments

Porting a Legacy Industrial Control System to 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 software, and the performance characteristics of the final system.

Presented by Mantaro Product Development Services

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 using C Series modules and LabVIEW complete with RMS, power factor, and real-power analysis.

Presented by National Instruments

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.

Presented by Clemson University

Researching and Deploying Wireless Sensor Networks

Learn 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.

Presented by UCLA and National Instruments

The Motion Control Revolution

Learn how to use NI software tools for motion to create custom motion control applications as well as to achieve motion applications including path planning, position, and velocity control in the LabVIEW environment. Explore how to deploy the code to CompactRIO or use it to drive the motion simulation of your SolidWorks 3D CAD models.

Presented by National Instruments

The PAC Network Advantage

Learn how Nucor Steel implemented a measurement and control application based on CompactRIO to optimize plant efficiency. Also explore ways that NI PACs provide a technological advancement over traditional PLCs through flexible communications and advanced processing.

Presented by Nucor Steel

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. Massive parallel computations are unfeasible for real-time implementations. Learn about a framework based on LabVIEW and commercial off-the-shelf (COTS) technology, such as multicore, FPGA, and graphical processing units (GPU), to apply large-scale, real-time optimal control to oil reservoir management.

Presented by The University of Texas at Austin

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.

Presented by National Instruments

TECHNICAL TRACKS

SOFTWARE DEVELOPMENT TECHNIQUES

Adding Internet-Like Search to LabVIEW with the 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 apply Internet-like search to help you index, search, find, and report post-test data across channels, files, and network locations.

Presented by National Instruments

★ Advanced Error Handling Techniques in LabVIEW

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

Presented by V I Engineering Inc.

Best Practices for Developing 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.

Presented by National Instruments

★ Best Practices for Memory Management and LabVIEW Code Optimization

Examine new features in LabVIEW and the best ways to identify areas for code improvement. Also learn how to write graphical code to reach peak performance.

Presented by National Instruments

Beyond the Basics: LabVIEW Debugging Techniques

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

Presented by National Instruments

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.

Presented by The Ohio State University

★ 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.

Presented by National Instruments

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 in the development of more functional, readable, scalable, and maintainable LabVIEW programs at the University of Michigan mechanical engineering department.

Presented by the University of Michigan

Improving the LabVIEW Upgrade Experience

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

Presented by National Instruments

Introduction to Real-Time Virtualization: Run Windows and LabVIEW Real-Time in Parallel on the Same Controller

Learn about virtualization technology and how you can incorporate real-time processing and a GUI on the same controller. Discover the advantages of running LabVIEW Real-Time side by side with Windows and how to implement Windows services in conjunction with real-time test and control applications.

Presented by National Instruments

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.

Presented by James Kring Inc.

Managing Large Applications with the Project Explorer and Source Code Control

Learn how to effectively manage a large application and coordinate work among teams of developers.

Presented by National Instruments

★ 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.

Presented by National Instruments

★ New Features in LabVIEW Object-Oriented Programming

Join LabVIEW developers to discuss new development techniques and advanced features that extend the LabVIEW object-oriented programming model.

Presented by National Instruments

★ New Software Engineering Tools for Large LabVIEW Applications

Examine the LabVIEW Unit Test Framework, LabVIEW Desktop Execution Trace, and LabVIEW VI Analyzer toolkits, and learn how to use them in a structured development environment to develop high-quality, reliable applications with LabVIEW.

Presented by National Instruments

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.

Presented by Bloomy Controls

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.

Presented by National Instruments

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.

Presented by National Instruments

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.

Presented by National Instruments

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.

Presented by Harris Corporation

★ Software Engineering with LabVIEW from Requirements to Deployment

Examine 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.

Presented by V I Engineering Inc.

The Good, the Bad, and the Ugly: Styling Your LabVIEW User Interface

Join a senior LabVIEW developer and a LabVIEW Champion as they walk through the techniques involved in creating high-quality user interfaces that make your applications easier to use and you look more professional.

Presented by National Instruments

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.

Presented by National Instruments

Using Your VI as a Web Service in LabVIEW

Learn to use the LabVIEW Web services feature to publish your VIs as a standard Web service for machine-to-machine communication and remote thin-client HMIs.

Presented by National Instruments

What's New in LabVIEW

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

Presented by National Instruments

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.

Presented by National Instruments

TECHNICAL TRACKS

TEST AND DATA ACQUISITION

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.

Presented by National Instruments

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 how to work with this network using NI embedded network interfaces.

Presented by National Instruments

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.

Presented by National Instruments

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.

Presented by National Instruments

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.

Presented by National Instruments

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.

Presented by National Instruments

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 how 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.

Presented by National Instruments

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.

Presented by Konrad Technologies

Mobile and Handheld Data Acquisition

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.

Presented by National Instruments

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.

Presented by National Instruments

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.

Presented by National Instruments

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 software for rapid customized measurement setup without an AC voltage source.

Presented by National Instruments

Overcome Top High-Speed Measurement Challenges with Tektronix and NI Hardware

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.

Presented by National Instruments

Programming Simplified with NI CompactDAQ

Learn programming techniques with NI CompactDAQ that can help you incorporate low-speed thermocouple measurements and high-speed accelerometers in the same chassis, build systems with multiple counter/timers, and design systems that handle sudden module removal. Examine modules for electrical power and strain measurements.

Presented by National Instruments

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.

Presented by National Instruments

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.

Presented by Micron Optics and National Instruments

Shorten Your Audio Test Development, Deployment, and Test Times

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 faster test throughput times.

Presented by National Instruments

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, and today's high-performance FPGAs are ideal for this type of signal processing performance. Explore how you can use LabVIEW FPGA to build software-defined radios using the NI PXIe-5641R IF transceiver or new NI FlexRIO Adapter Modules.

Presented by Red Rapids and National Instruments

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. Discover how to use LabVIEW tookits to create software-defined RF test systems to test devices that use wireless standards such as WiMAX, WLAN, and GPS.

Presented by National Instruments

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.

Presented by TU Dresden

Top Five Considerations for Large-Scale DUT Testing

Whether you are testing and monitoring large civil structures such as dams, bridges, and stadiums or aircraft wings and large turbine blades, you will face unique challenges. Learn about the top considerations for testing devices under test (DUT) including distributed architectures, measurement synchronization, and remote operation.

Presented by National Instruments

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

Ultrawideband analog-to-digital conversion is a critical problem instrumentation systems face. 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.

Presented by UCLA

Using Hardware Fault Insertion for Electronic Testing

How will your DUT react to a short circuit between pins, a short to ground, or a short to a power rail? Learn how to improve the test coverage of your electronic devices using hardware fault insertion techniques.

Presented by National Instruments

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.

Presented by National Instruments

TECHNICAL TRACKS

CONFERENCE REGISTRATION

Description	By May 31, 2009[1]	June 1, 2009, and After[1]
Full Conference (August 4–6, 2009) Admission includes three-day conference and exhibition, meals, exhibition hall receptions, and evening events.	$895	$995
NI Alliance Day[2] (August 3, 2009) Special day for developers, consultants, and systems integrators in the NI Alliance Partner program.	$100	$200
NI Alliance Day[2] and Full Conference (August 3–6, 2009) Includes full conference and NI Alliance Day.	$895	$995
Volume Discount – Full Conference Covers four full-conference registrants for the price of three.	$2,685	$2,985
Academic Discount – Full Conference (August 3–6, 2009) Includes full conference and Academic Forum.	$350	$400
Academic Discount – Sessions Only Includes access to keynotes, sessions, and exhibition hall booths only.	$100	$150
Academic Discount – One-Day Pass Includes access to keynotes, sessions, exhibition hall, and evening event for a single day.	$175	$200
Sessions Only Includes access to keynotes, sessions, and exhibition hall booths only.	$695	$795
One-Day Pass Includes access to keynotes, sessions, exhibition hall, and evening event for a single day.	$500	$500
Expo Plus Pass Includes access to keynotes and exhibition hall plus all meals, receptions, and evening events.	$200	$200
Exhibition Hall Pass Includes access to keynotes and exhibition hall only.	Free	Free

[1] Prices shown are in USD .   [2] NI Alliance Day is limited to members of the National Instruments Alliance Partner program. Visit **ni.com/alliance** to learn more about the program.

Cancellation – If you cancel your NIWeek registration by July 1, 2009, you are subject to a $95 USD cancellation fee.
No cancellation refunds are available after July 1, 2009, or for no-shows.

Hotel Registration – Visit **ni.com/niweek/attend_info** to find special NIWeek rates in the downtown Austin area.

Register for NIWeek and NI Alliance Day at **ni.com/niweek** or call NI customer service representatives at **888 564 9335**.

TRAINING AND CERTIFICATION

Maximize your NIWeek 2009 experience by supplementing conference sessions with training and certification exams. Offered on-site at the Austin Convention Center, the training and certification exams help advance and validate your development skills.

Certification Exams

Validate your skills by taking certification exams 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 exams for $199 USD. Certification exam prep courses are offered at no cost.

Certification Exam Prep Courses

Certified LabVIEW Developer
Monday, August 3
8:30 a.m.–12:30 p.m.

Certified LabVIEW Architect
Monday, August 3
1:00–5:00 p.m.

Exam Schedule

Certified LabVIEW Associate Developer

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.

Certified LabVIEW Developer
Certified LabVIEW Architect
Certified TestStand Developer
Certified LabWindows/CVI Developer
These are four-hour exams.

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

Training and Continuing Education

Gain in-depth product knowledge and learn best practices for developing applications by attending a two-day training course that begins two days prior to NIWeek 2009. By taking each course, you can earn 1.4 continuing education units (CEUs) to maintain a professional status such as Professional Engineer.

The following courses are offered as two-day modules from
Sunday, August 2–Monday, August 3:

- LabVIEW Basics
- LabVIEW Intermediate
- LabVIEW Object-Oriented Programming System Design
- LabVIEW FPGA
- RF Application Development

Visit **ni.com/niweek/training** or call **800 890 2062** for additional training and certification and enrollment information.
Register today because seating is limited.
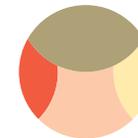
NIWeek Pavilions

LabVIEW Zone

Discover what's new in LabVIEW and get a close-up look at featured demos from the conference. Interact with LabVIEW R&D developers and system integrators and walk away with starter code that you can use. Connect with LabVIEW users worldwide, learn about new programming resources, and participate in LabVIEW Community activities.

National Instruments Product Showcase

Stop by the National Instruments Product Showcase to view demonstrations of the latest NI hardware and software products and talk to NI developers. Learn how cutting-edge technologies such as multicore processing and FPGAs are pushing the boundaries of innovation. Discover how to incorporate NI products into your design, test, and control applications.
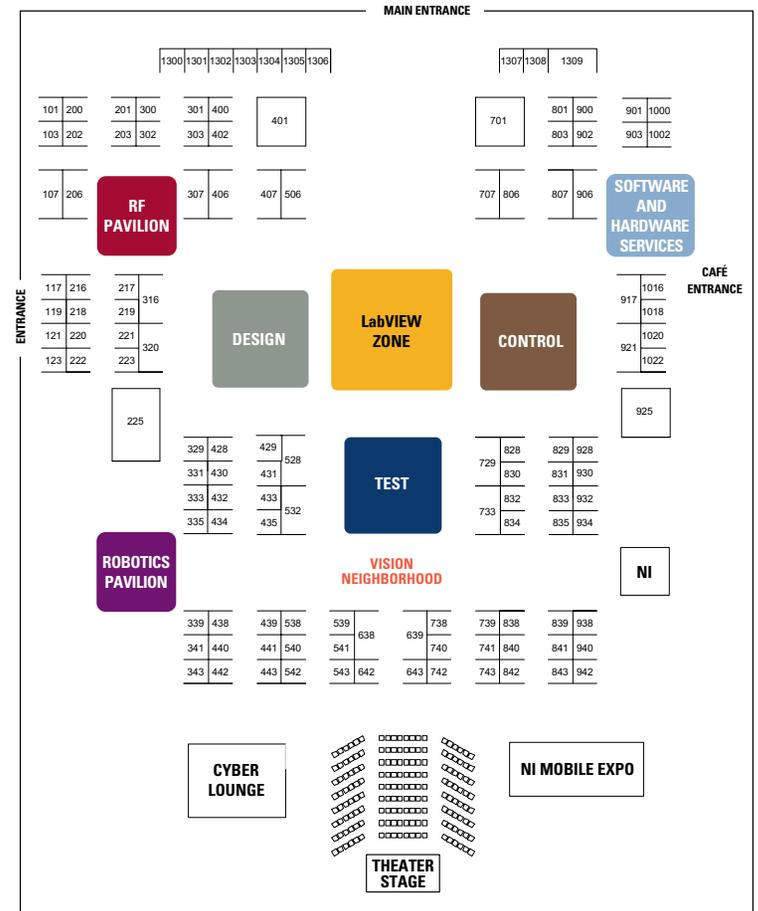
RF and Wireless Pavilion

Visit the RF and Wireless Pavilion to learn how software-defined test systems based on the NI PXI platform can perform fast, flexible, and accurate measurements. View demonstrations that include WLAN device characterization, GPS simulation, WiMAX testing, spectral monitoring, and MIMO measurements. Also watch practical demonstrations of the measurements and technologies discussed at the RF and Wireless Communications Summit.

Robotics and Autonomous Systems Pavilion

Interact with unmanned robots that can drive, swim, and fly autonomously. Check out the next generation of robots built using LabVIEW and NI technology including a robotic tuna from the Olin College of Engineering and Boston Engineering; a music-conducting humanoid robot from Virginia Tech; and innovative LEGO® MINDSTORMS® NXT and iRobot Create robots. Also view demonstrations of the technologies featured in the Robotics Summit.

Vision Neighborhood

Explore the Vision Neighborhood, one of the largest vision solution displays in North America. Learn about new products from leading companies in the industry, visit with experts to answer your machine vision questions, and gain insight into vision system design and state-of-the-art technology. Sign up for the Vision Summit to attend related technical sessions.

Exhibition Hall Hours

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.

Exhibitor Contact Information

As an exhibitor at NIWeek 2009, gain critical business development opportunities with a targeted audience of more than 3,000 engineers, educators, and scientists. There are three ways to register to exhibit:

- Visit **ni.com/niweek**
- Call NI customer service representatives at **888 564 9335**
- E-mail **niweekexhibition@ni.com**
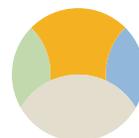
Current Exhibitor List

3M Electronic Solutions Division	Design & Assembly Concepts Inc.	Intercon 1	Quanser
Advanced illumination	DISTek Integration	IntraStage	Roper Mobile Technology (RMT)
Alfautomazione S.p.A.	Dow-Key Microwave Corporation	JAI Inc.	S.E.A. Datentechnik GmbH
Allied Vision Technologies	Dynamic Technology Inc.	James Kring Inc.	Smart Vision Lights
AMREL	Dytran Instruments Inc.	KSE–Texas Inc.	TDK-Lambda
AmFax	Edmund Optics	Lion Precision	Teclution
ARC Technology Solutions	Endevco	MAC Panel Co.	Tektronix
Averna	Everight Position Technologies	Maplesoft	Texas Instruments
Basler Vision Technologies	Fastek	National Technical Systems	Thermotron Industries
Bloomy Controls Inc.	FLIR Systems	NETUSA	VI Service Network Co. Ltd.
Cal-Bay Systems Inc.	Freescale Semiconductor	Optimation Technology	VI Technology Inc.
Captronic Systems	G Systems	PCB Piezotronics Inc.	Virginia Panel Corporation
Conduant Corporation	G.R.A.S. Sound & Vibration	Phase Matrix Inc.	Xcitex
Cyth Systems	Graftek Imaging Inc.	Prevas AB	Xilinx Inc.
DAQTron	Hitachi Kokusai Electric America Ltd.	PVI Systems	Yaskawa Electric America
Davis Calibration	Imperx	PWG Systems	

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For more information about sponsorship opportunities, contact NI at **niweeksponsorship@ni.com** or call **888 564 9335**.

"Good training.
Good knowledge.
Good networking."

– Bruce Stedwell
Ford Motor Company

NATIONAL INSTRUMENTS

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