

NI in Academia

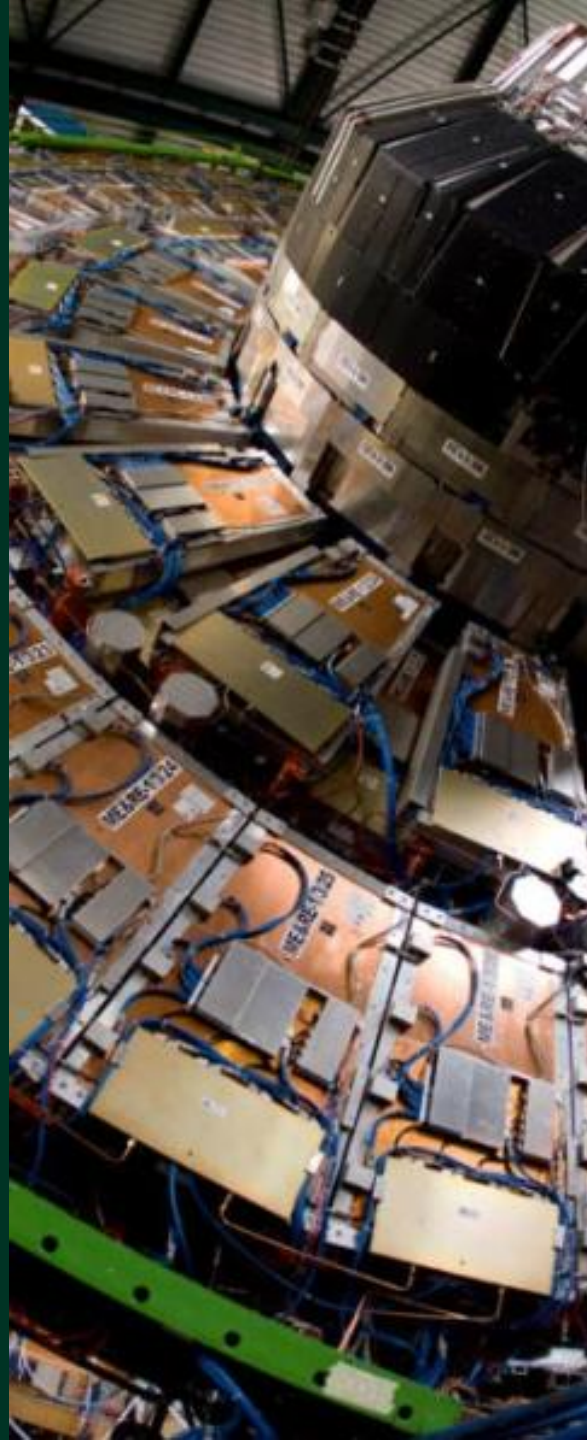
Teaching and Research

Damjan Drozg

ADD ProS

ADD ProS TechDay Slovenia 2026 | Ljubljana 23.9.2026

**The Art of
What's
Possible
(not easy
but
possible!)**



Solving the great engineering challenges with NI

Whether we're controlling the largest particle accelerator in the world, harnessing the power of antimatter, building the largest channel and network emulator, or outfitting mile-long wind tunnels, NI is here to help engineers and scientists tackle the impossible.

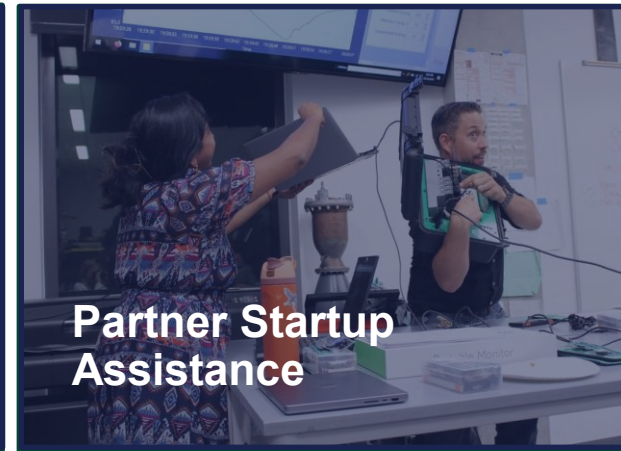
With the power of modular hardware, world-class synchronization, infinitely scalable distribution, and the tools to capture, analyze and make decisions on data, NI's platform unlocks the frontier of innovation.

Choose NI to enable the art of what's possible.

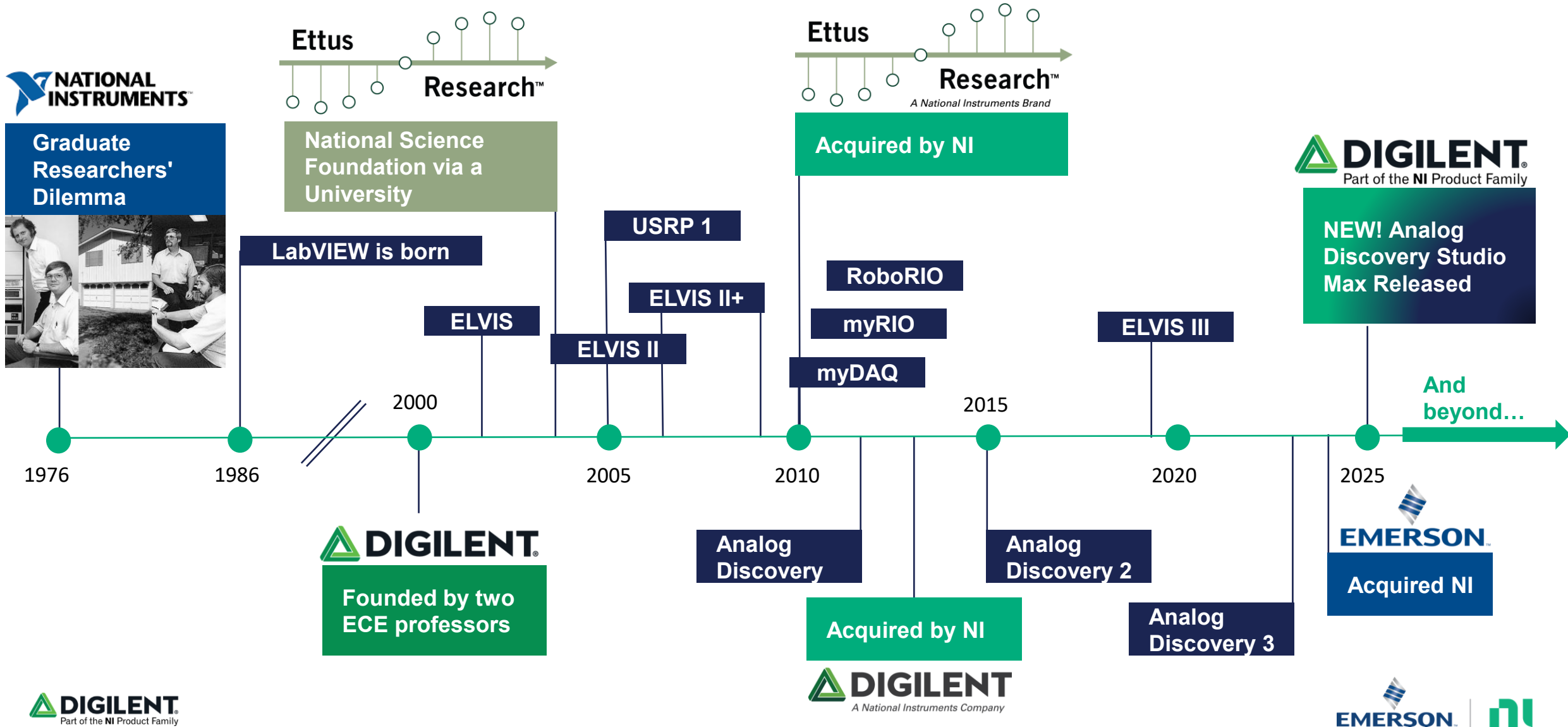
NI's Mission Statement for Academia

Empowering scientific and engineering exploration with adaptable tools that accelerate discovery, foster innovation, and meet the demands of the modern laboratory

Re-Investing in our Academic Community



NI's Academic History



The Pace of Change Is Faster than Ever

Educators Must Rethink Teaching Approaches or Risk Falling Behind



Traditional Challenges of Teaching

- Engaging students with hands-on learning in labs and projects.
- Managing a variety of instruments and software for teaching applications.
- Developing practical examples to demonstrate complex engineering concepts.



Challenges of Modern Academic Programs

- Integrating rapidly advancing technologies and tools into curricula.
- Preparing students for evolving industry standards and expectations.
- Utilizing data and feedback to continuously improve student learning experiences.

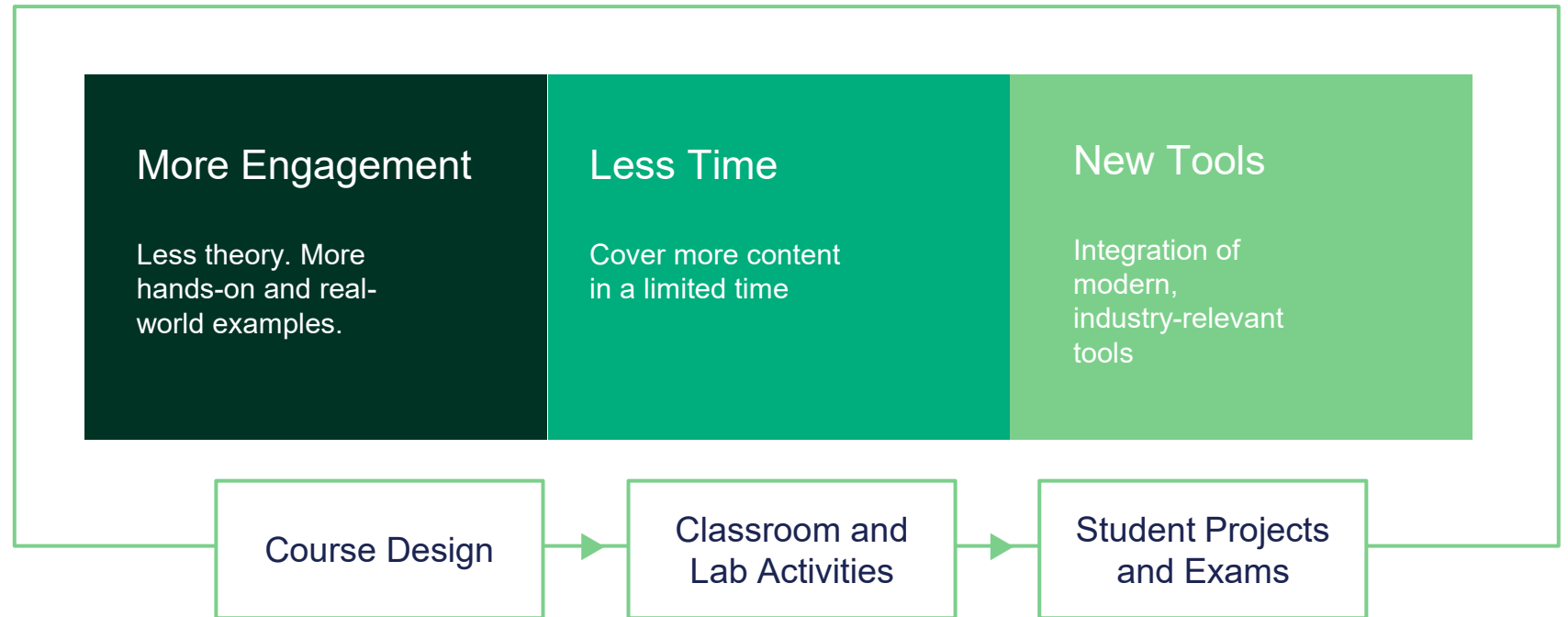
Teaching Methods Must Evolve

Empowering Future Engineers with Modern Learning Approaches

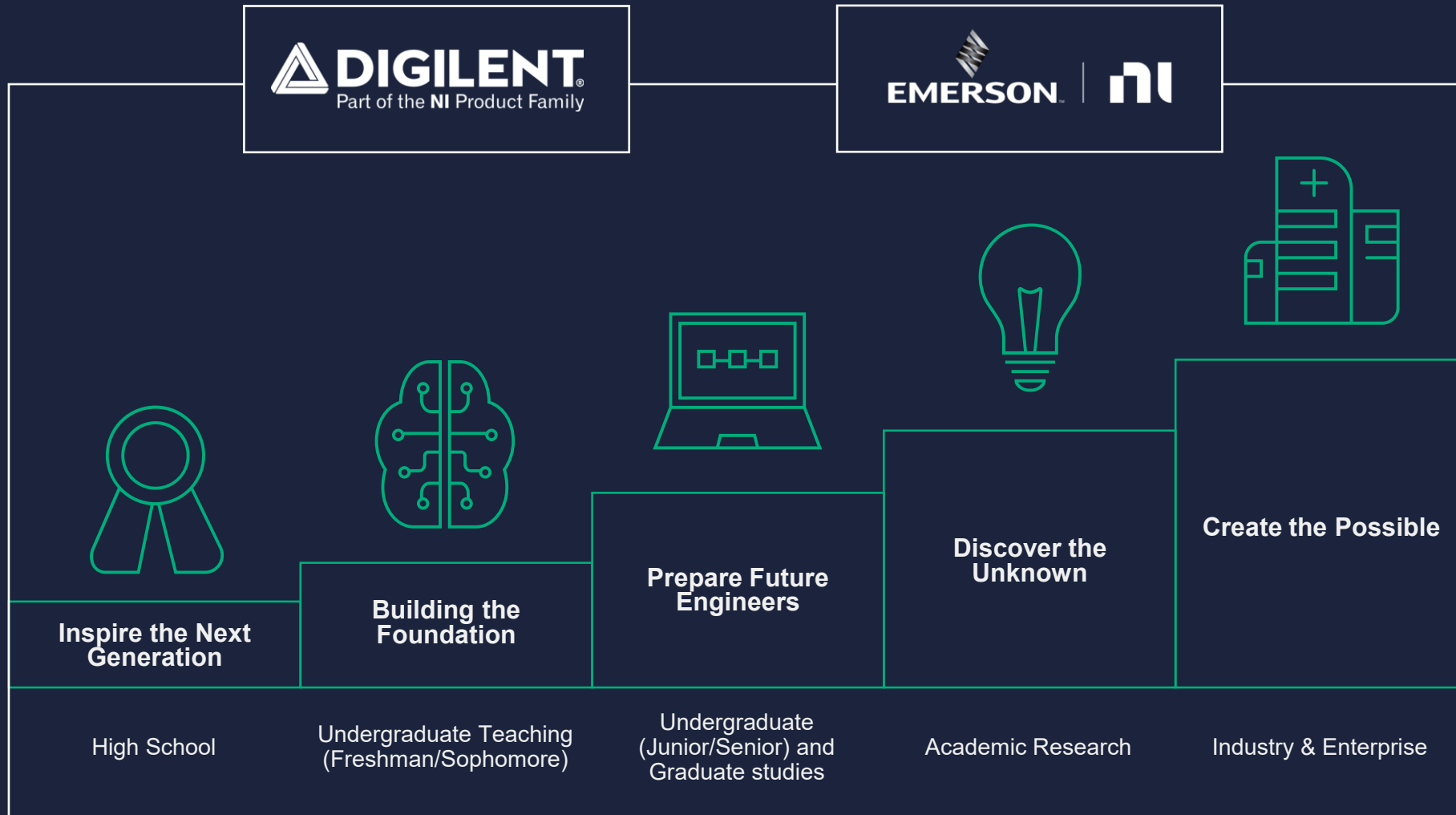
NI's approach
aids you in:

- Creating a Unique Student Experience
- Empowering tomorrow's engineer with professional-grade tools

Course Lifecycle



How NI and Digilent Build Test Engineers



Interconnectedness of Innovation

Shared Goals

Capable engineering graduates



Right Tools



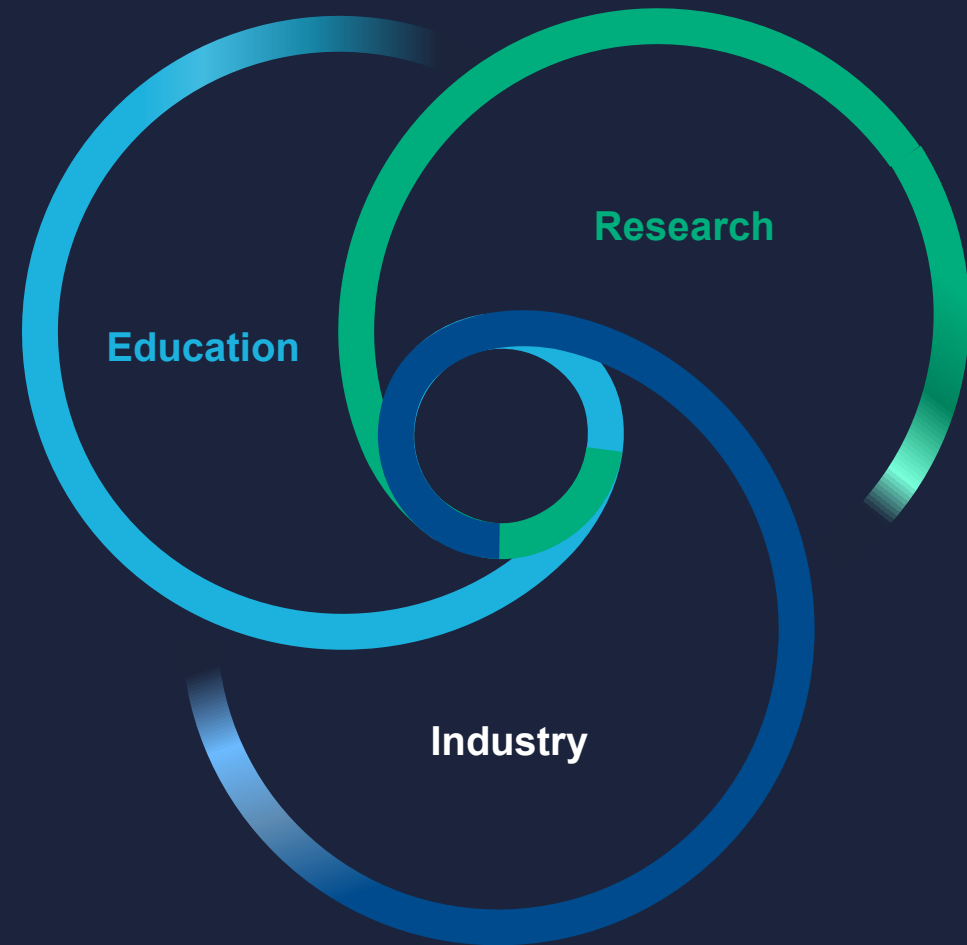
Effective & Engaging



Cost-Effective



Prepared for the Future



Academic Portfolio

Education and Research

From student-owned to in the labs

Digilent



USRP



DAQ/RIO



PXI

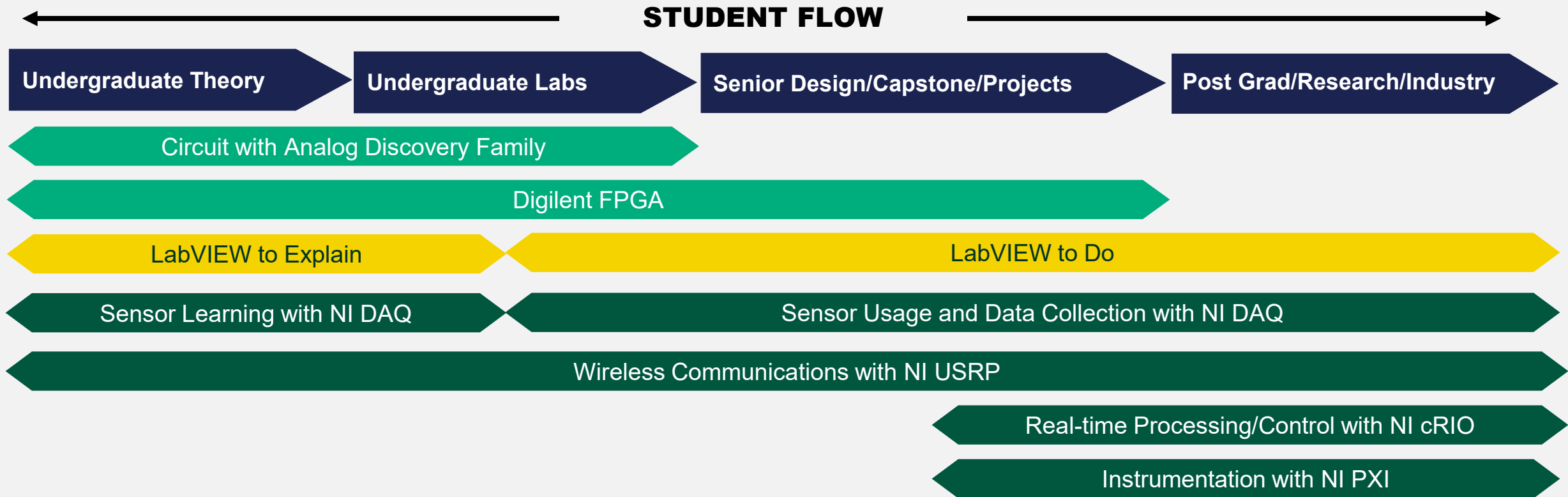


Software



The Student's Journey with NI

Enabling them to discover and learn faster



How to Get Access to LabVIEW and other NI Software

Students to Faculty

LabVIEW Community Edition	Single Seat Software	Academic Volume License
✓ Free for students ✓ Includes only LabVIEW and G Dev SW ✓ Students can install on their personal computers for academic and personal projects	✓ Discounted licenses for academic use (teaching and research) ✓ To be used by teachers and researchers, or in lab computers ✓ Subscription-only	✓ Discounted licenses for academic use (teaching and research) ✓ To be used by teachers and researchers, or in lab computers ✓ Subscription or perpetual with a service program ✓ Includes the student install option (SIO) to access all the NI academic software suite in students' personal computers ✓ Include on-demand training access, LabVIEW for Academic teaching material, education services credits for certification and training, and more!

Benefits of the LabVIEW Academic Volume License (AVL)

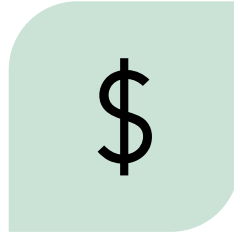
LabVIEW for Academic Use AVL - Bundled software licensing and services.



Bulk Software
License for select
NI software



Education
Services Credits



Discounts for
more seats vs.
single-seat
licenses



On-Demand
Training



LabVIEW for
Academic
Use Course
Content

Example Benefits for 100 seats

Includes LabVIEW (with most modules and toolkits), DIAdem, FlexLogger, VeriStand, among others

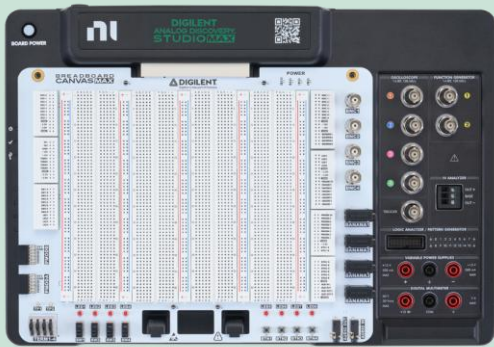
90 credits to be used for certification and training, for example: 50 CLAD exams + 2 virtual class seats

Regular academic price:
\$30,000 USD
Volume academic price:
\$6,000 USD (80% off)

All students in the campus get access to the courses available at learn.ni.com

Professors get access to LabVIEW content that can be included in the class curriculum

Analog Discovery Product Line

Analog Discovery 3	Analog Discovery Studio Max	Analog Discovery Pro 5470
		
✓ Portable for student homework ✓ 125 MS/s USB Oscilloscope, Waveform Generator, Logic Analyzer, and Variable Power Supply	✓ Lab-ready, rugged and with higher power/channel count ✓ 13 instruments, including an Oscilloscope, Logic Analyzer, Spectrum Analyzer, Waveform, and DMM	✓ Lab-ready instrumentation ✓ All-In-One 1GS/s 100MHz Mixed Signal Oscilloscope, Function Generator, Power Supply, and DMM



DIGILENT ANALOG DISCOVERY STUDIOMAX™

Multi-Instrument Lab for Engineering Experimentation



Available **June 2025**

Measurements & Instrumentation



Analog Circuits



Digital Electronics



Power Electronics



Energy Systems



Communications



Digilent – Your Ideal Engineering Classmate

Flexible suite of software options

Out-of-box usage with **Waveforms** on Windows, Mac, and Linux

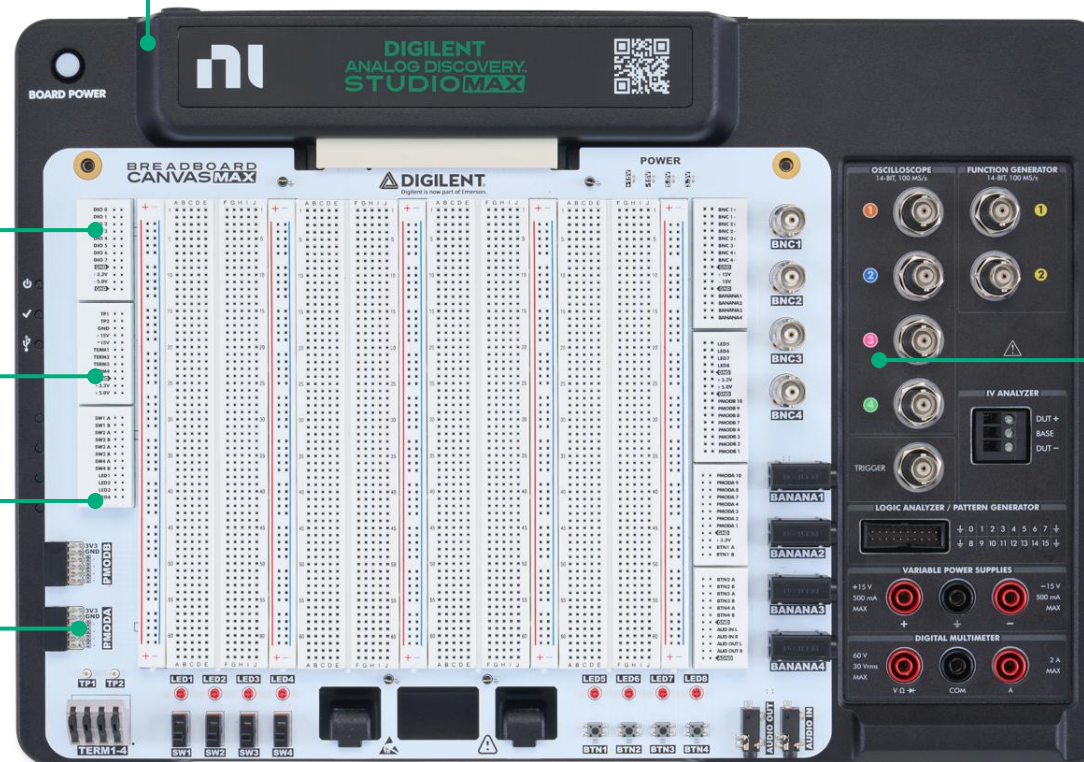
Use with **LabVIEW**, graphical programming and powerful automation

Build on fundamentals and leverage simulations with **MATLAB**

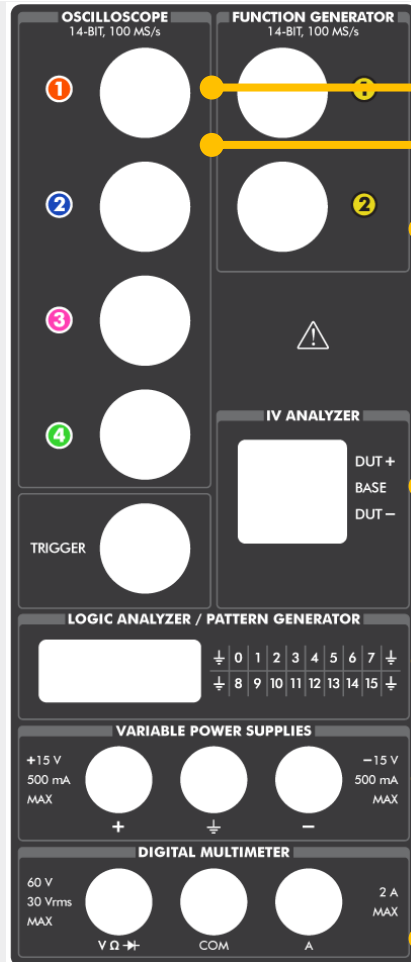
LLM ready with **Python**

Making engineering technologies both understandable and accessible

A toolbox of instrumentation (10+ instruments)



Specifications



Fully Accessible Instrumentation Panel

Bode Plotter

Oscilloscope 4-CH 14-bit 100 MS/s 50MHz BW

Function Generator 2-CH 14-bit 100 MS/s

IV Analyzer

Logic Analyzer / Pattern Generator 16 Independent I/O at 100MS/s

Variable Power Supply $\pm 15V$ 500mA

Digital Multimeter 4.5 Digit 50V 2A with LC Measurement Capabilities

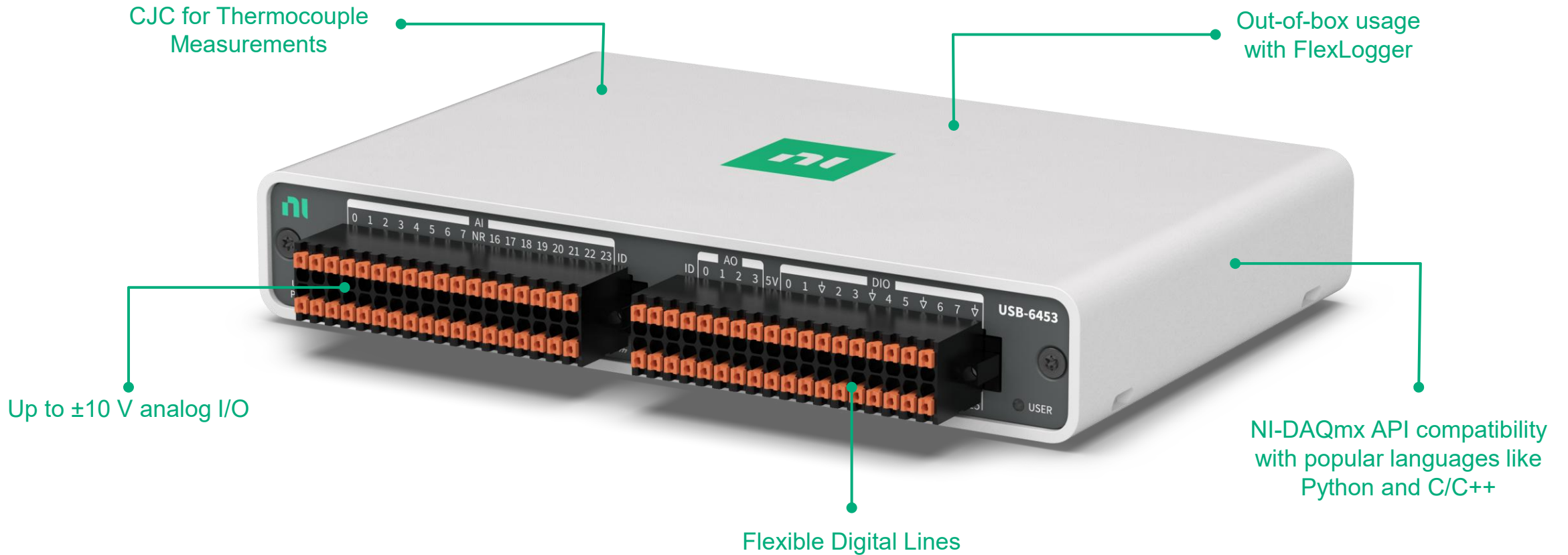


Enabling Ambitious Engineers – NI mioDAQ

*Professional-grade DAQ – Compact,
affordable, ready for any lab.*

Meet NI mioDAQ

High-performance. Bus-powered. USB DAQ device.



What can you measure with mioDAQ?

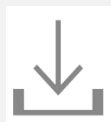
Measure

- ± 10 volt signals at 16- and 20-bit resolution
- Sensors that output ± 10 volts
- High-speed voltage signals up to 1,000,000 samples/second/channel.
- Thermocouples
- Voltage drops across a shunt resistor for current measurement
- Battery cell voltages (± 10 volt peak cell measurement)
- Power rails on USB/battery-powered electronic boards (PCBs)
- Pulse and event counting
- Digital (2.5 V, 3.3 V, and 5 V thresholds)
- Quadrature encoder
- Resolvers
- String pots, line pots
- Low voltage current sensors
- Low voltage potential transformers
- And many more...

Generate and Control

- Voltage output (± 10 V)
- Digital output (TTL)
- Relay module (250 V_{RMS} @ 2 A, 60 VDC @ 1A)
- External relay (control with digital lines)
- Generate pulse-width modulated signals
- Simulate sensors/signals
- Connect to LEDs

NI's Industry-leading DAQ Software



Programming
Language Support

Stay with Preferences

NI DAQmx-Driver (Free)

API for Python, C, .NET

- Documented programming interface for DAQ hardware
- Example programs
- Support while on hardware service program (1st year included)



FlexLogger

Start up Fast

Lite Edition (Free),
Full Edition via Single-Seat
License or AVL

FlexLogger Lite Data Logging Software

- Configure your DAQ device
- Drag-and-drop graphs for a display
- Log to Excel or .TDMS files

FlexLogger Data Logging Software

- ???



LabVIEW

For the Innovator

Professional Edition via Single-Seat
License or AVL

LabVIEW

- Example programs
- Control valves, motors, relays, chambers, and other equipment for cyclical tests
- Automate instruments like power supplies and SMUs
- Create professional user interfaces
- Program like you think with graphical data flow
- Use your Python, C, and MATLAB code



Be Flexible and Expand

LabVIEW AVL includes LabVIEW,
TestStand, DIAdem, VersiStand,
FlexLogger, and more

LabVIEW Academic Volume License

- Reduce development and maintenance time with software designed for innovating and learning
- Improve data analysis and utilization with automated report generation and interactive analysis
- Future proof your system with open software compatible with non-NI instruments and code from Python, C, or MATLAB.

Options beyond mioDAQ

Install inside a computer



PCIe DAQ Devices

Select over USB mioDAQ for:

- Faster control loop rates over PCIe bus
- Higher-channel count systems

Modular System Connected to a Computer



NI CompactDAQ

Select over mioDAQ for:

- Modularity
- More Measurement Options
- Rugged Operating Specs
- Ethernet expansion with synchronization

PXI

(Computer for Advanced Instrumentation)



PXI Chassis

Select over mioDAQ for:

- Highest measurement performance
- Combining DAQ with DMMs, scopes and other instruments
- Advanced test systems



Empowering Tomorrow's Rocket Scientists

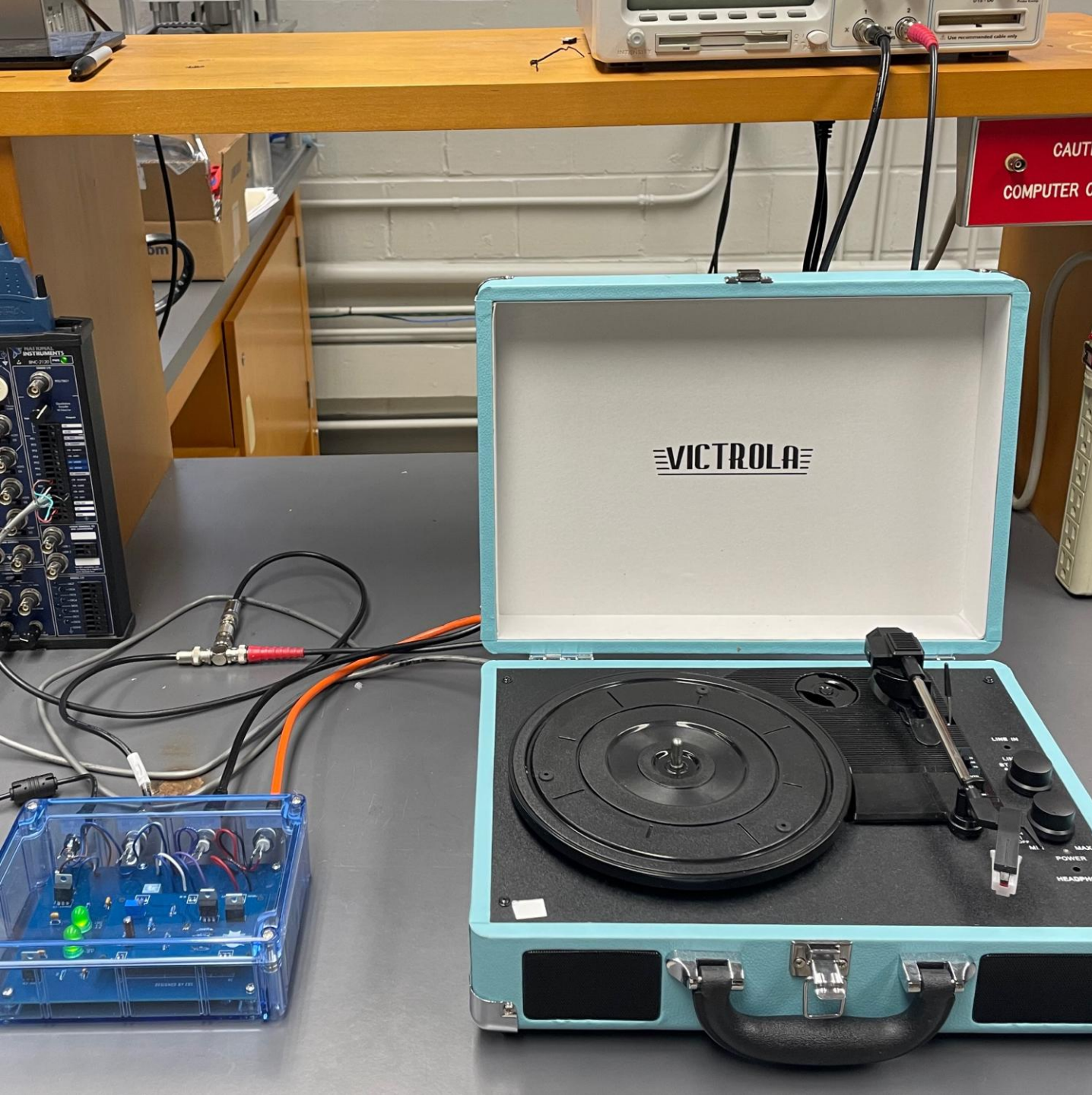
Shifting Perspectives: Leveraging LabVIEW for Control

As the Skunkworks considered alternatives for software, students decided LabVIEW was well suited for the job.

Another tool in the toolbelt

"I'm quite excited about being able to explore LabVIEW, especially as it relates to our project...we need a system like LabVIEW to autonomously point our radar at a rocket."

- Trent, TREL's Ground Station Team



Creating a Unique Student Experience

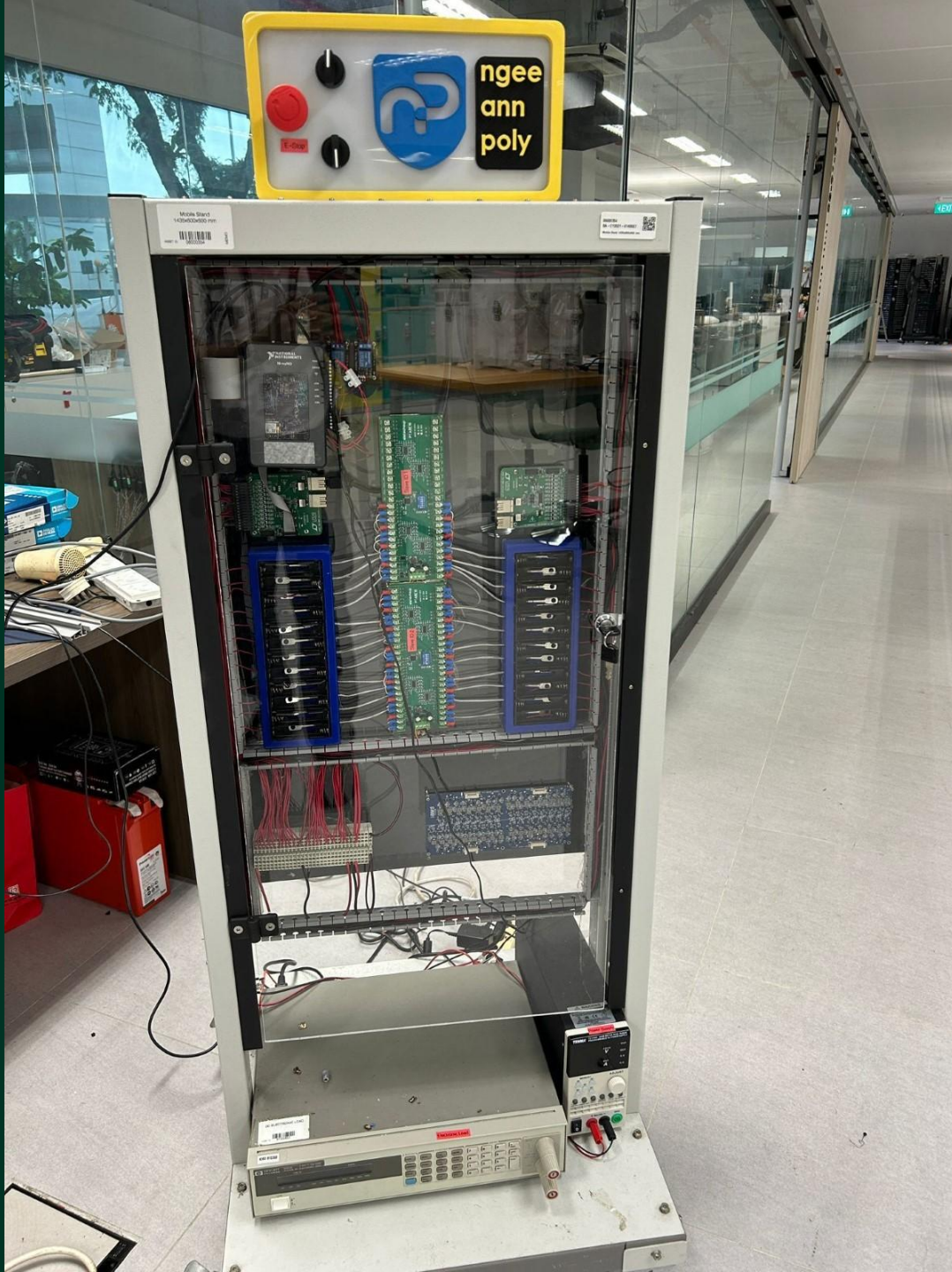
Having the “Wow” factor

Labs that go beyond the traditional “lab manuals” create interactive and critical thinking elements with the best teaching factor. Duke’s Mechanical Engineering labs create fun and interactive labs to teach engineering concepts, like PID, using LabVIEW.

Why LabVIEW

“LabVIEW makes it so much easier and more fun—students don’t have to worry about low-level details, so they can focus on problem-solving and experimentation...It’s a sigh of relief for mechanical engineers who just want to solve a task—like taking data—without really having to program.”

– Eric, Previous MEMS Lab Manager



Advancing Battery Sustainability with LabVIEW

Addressing the Challenge

The rise in electric vehicle adoption has led to a significant increase in lithium-ion battery disposal, raising environmental concerns. Ngee Ann Polytechnic is addressing this issue by developing a Battery Monitoring and Management System to repurpose second-hand lithium-ion batteries for research and secondary applications. This initiative minimizes waste while supporting renewable energy projects like solar farming and rainwater harvesting systems. Additionally, the project plays a crucial role in advancing battery research, improving energy storage solutions, and fostering more efficient and safer battery technologies.

Why LabVIEW?

“The unified system design platform, the seamless integration with a wide range of hardware facilitates hands-on experience, empowering undergraduates to connect theory with practice effortlessly. By mastering LabVIEW, students not only enhance their problem-solving skills but also significantly boost their employability in a competitive job market, as industries increasingly seek professionals proficient in advanced measurement and control systems.”

-- Dr. Alex See, Deputy Course Chair |Electrical Engineering, School of Engineering, Ngee Ann Polytechnic.
SMIEEE, Certified LabVIEW Professional Instructor, Certified LabVIEW Developer, LabVIEW Champion



Prevention of HIV Transmission During Breastfeeding

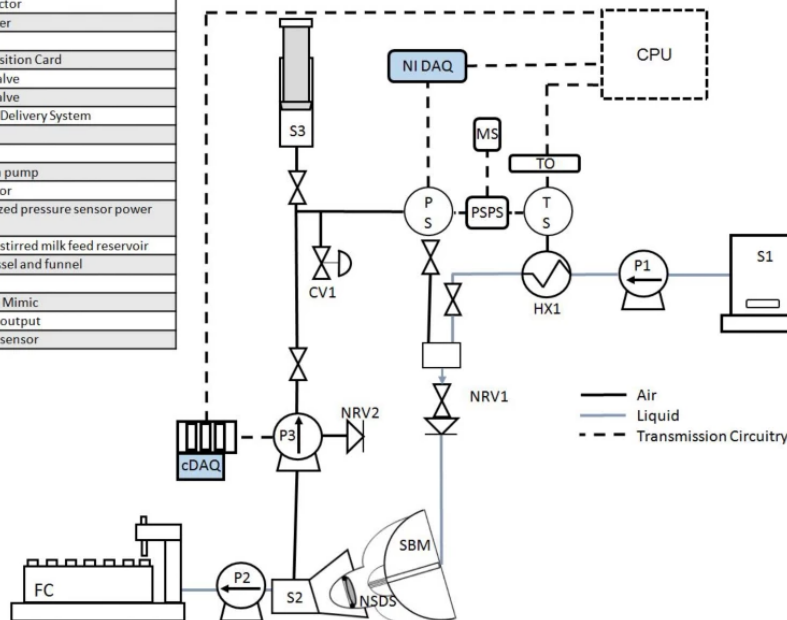
Verification of the Technology was Crucial

"We have used NI technologies for vital research and development of our medical device, which stands to improve the health of millions of breastfeeding infants around the world."

-- Rebekah Scheuerle, Department of Chemical Engineering and Biotechnology, University of Cambridge."

Researchers at the University of Cambridge needed to verify a low-cost nipple shield delivery system (NSDS) capable of providing life-saving nutrients and drugs during breastfeeding to prevent HIV transmission. By combining **NI CompactDAQ** hardware for precise, modular data acquisition with **LabVIEW** for test automation and real-time monitoring, the team could recreate infant feeding conditions in a controlled lab environment. NI's flexible, software-defined platform proved vital in accelerating the research cycle, simplifying measurement workflows, and providing the accuracy and configurability necessary for developing a robust medical device.

Object Acronym	Object Function
cDAQ	NI Compact DAQ
CPU	Computer system
CV1	Air control valve
FC	Fraction collector
HX1	Heat exchanger
MS	Main switch
NI DAQ	NI Data Acquisition Card
NRV1	Non-return valve
NRV2	Non-return valve
NSDS	Nipple Shield Delivery System
P1	Feed pump
P2	Exit pump
P3	Cyclic vacuum pump
PS	Pressure sensor
PSPS	Current digitized pressure sensor power supply
S1	Continuously stirred milk feed reservoir
S2	Collection vessel and funnel
S3	Air syringe
SBM	Silicon Nipple Mimic
TO	Temperature output
TS	Temperature sensor





Developing a Functional Smart Grid Prototype with LabVIEW, CompactRIO, and DAQ

"We used LabVIEW, CompactRIO FPGA, and DAQ modules to easily integrate the BESS, PV system, BEMS, and HEMS into the microgrid prototype"

-- Peng Huat Cheah, Nanyang Technological University

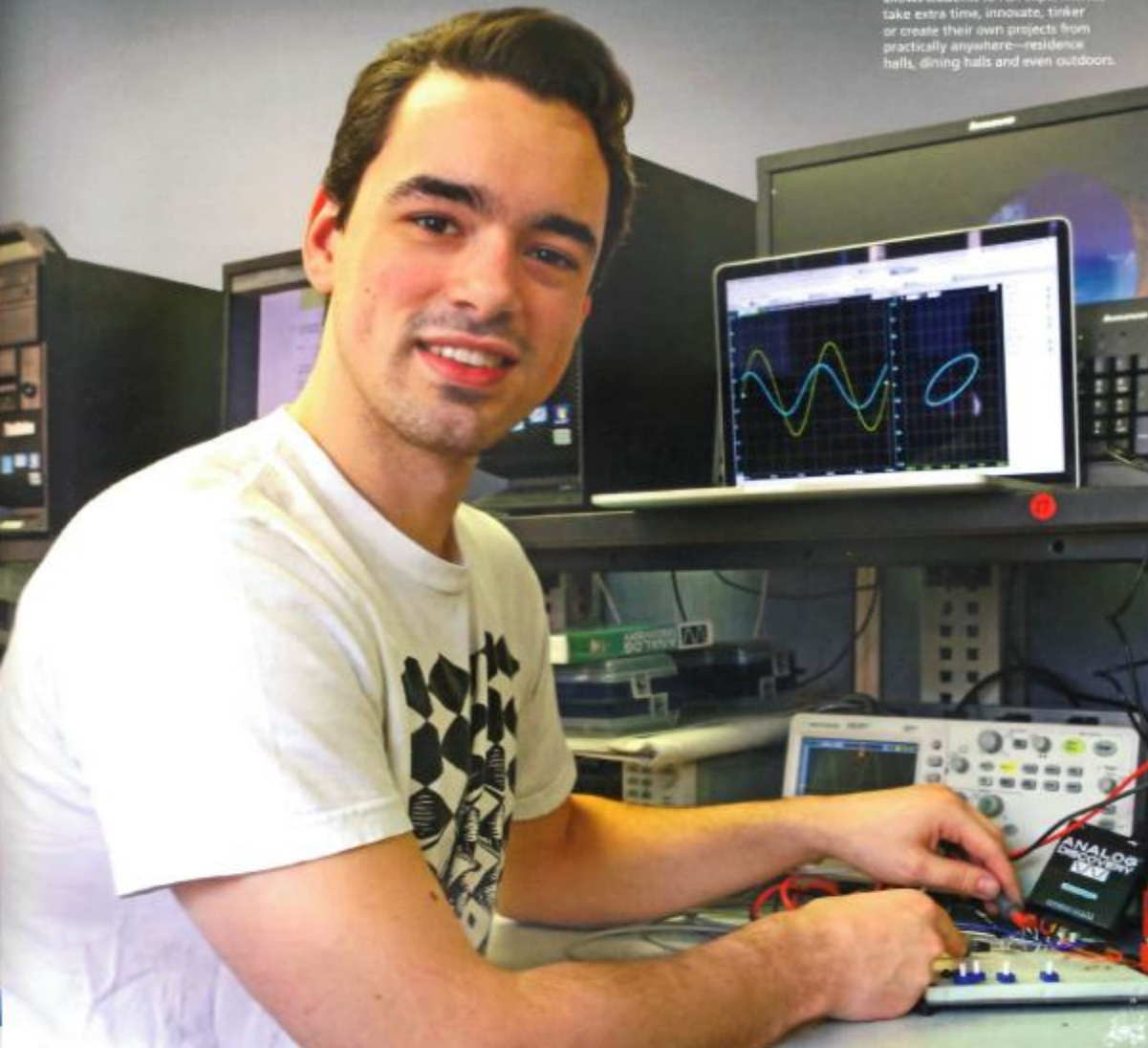
Highlights:

- **DER integration:** The smart grid incorporates distributed energy resources like solar photovoltaic (PV) systems and battery energy storage systems (BESSs), enhancing the reliability and efficiency of energy management
- **Energy management:** Home Energy Management Systems (HEMS) and Building Energy Management Systems (BEMS) are integrated into the microgrid, allowing for better control and optimization of energy usage
- **Control and monitoring:** FPGA technology enables advanced control and real-time monitoring, improving the lifespan and reliability of the battery packs
- **Smart grid applications:** The prototype supports various smart grid applications such as demand-response management (DRM), time-of-use (TOU) electricity pricing, power quality monitoring, and load forecasting

Students Explore Electronics with 'Laboratory Anywhere'

Electrical, Computer Engineering Majors Put Theory into Practice

Electrical engineering sophomore Michael Nuzzo works on his lab project using an earlier version of the Analog Discovery learning kit. The kit is at the heart of the "Laboratory Anywhere" teaching model, which allows students to run experiments, take extra time, innovate, tinker or create their own projects from practically anywhere—residence halls, dining halls and even outdoors.



The Best Solution for a Hybrid Learning Environment

Hands-On Flexibility Led to Adoption

When COVID peaked, universities were scrambling to find answers for how to get their hands-on labs and classrooms recommissioned. UMass – Lowell was one of the first to declare a school-wide adoption of Digilent's Analog Discovery, which gave students the ability to continue learning electrical engineering fundamentals from their homes and graduate on time.

Impact and Commitment

- A new lab was built upon the return from lockdown, exclusively featuring Analog Discovery 3 and other Digilent products.
- Intro to Circuits and other undergrad courses
- Lab managers found that even in "normalcy", a hybrid approach putting the power of learning in students' hands achieved the best results.

Circuits and Electronics Laboratory

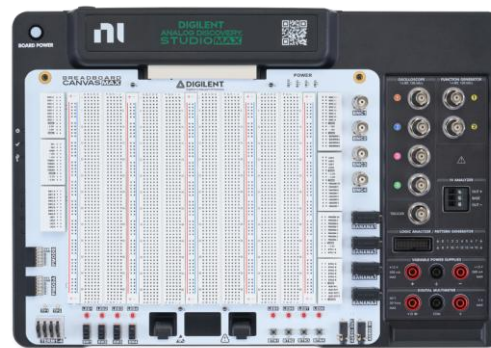
Recommended Solutions

HW: Digilent Analog Discovery



AD3

All-in-one Student
Owned Device



ADS Max

All-in-one lab with add
on boards

Software Options



Multisim + Multisim Live

Circuit simulation and design
software, desktop and online
versions



Waveforms

Included software for Digilent
Analog Discovery products that
transforms a laptop or desktop
into a portable electronics lab.

Measurement Laboratory

Recommended Solutions

HW: NI Data Acquisition Devices



Stand-Alone DAQ

Multifunction data acquisition devices for entry-level experiments and basic sensor applications.



CompactDAQ + C Series Modules

A highly flexible platform supporting a wide range of C Series modules for measurements such as voltage, IEPE, thermocouples, and digital signals.

Software Options



FlexLogger Lite

Free, out-of-box configuration software for simple data acquisition



LabVIEW

Empowers students to graphically program experiments and analyze results intuitively



Python, C++, .NET, and more

Program the way you want with the free NI-DAQmx hardware driver

Wireless Laboratory

Recommended Solutions

HW: USRP Product Family



Software-defined radios (SDRs) provide full-duplex MIMO capabilities, a wide frequency range (70 MHz to 6 GHz),

Software Options



GNU Radio, Python, and more

Program the way you want with the free UHD hardware driver

RFNoC™ (RF Network on Chip)

Decrease development time for experienced FPGA engineers seeking to integrate IP into the USRP signal processing chain

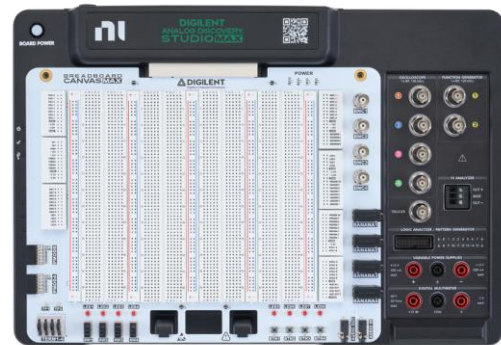
LabVIEW

Intuitive programming platform for signal processing, system design, and data analysis

Signals and Systems Laboratory

Recommended Solutions

HW: Digilent Analog Discovery + Ecosystem



ADS Max

All-in-one lab with add on boards



Emona Signals and Systems Board

Covers concepts including impulse response, convolution, correlation, sampling, Fourier, Laplace and Z-domains.

SW: LabVIEW



Prototype, analyze, and experiment with a variety of signal processing functions effectively.

Control and Mechatronics Laboratory

Recommended Solutions

HW: NI Reconfigurable I/Os



Single-Board RIO

CompactRIO + C Series Modules

Provide students with hands-on experience implementing closed-loop control systems.

SW: NI LabVIEW Environment

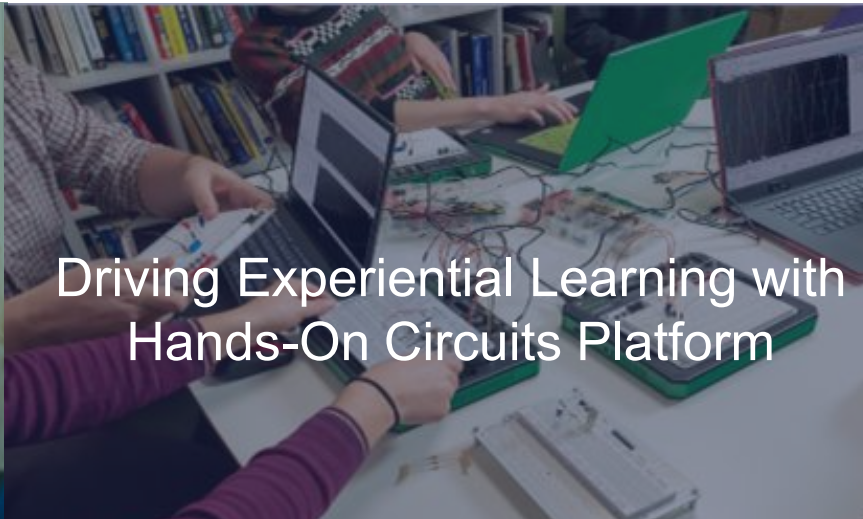


NI LabVIEW, NI LabVIEW FPGA Module, and NI LabVIEW Real-Time Module provide an intuitive graphical programming environment that simplifies real-time system design, control, and data acquisition

Re-Investing in our Academic Community



Delivering Enhanced
Software Value



Driving Experiential Learning with
Hands-On Circuits Platform



Advancing Research in
6G Wireless Research



Introducing New Advanced
Data Acquisition Hardware



Expanding University
Partnerships



Supporting Educators Through
with an Academic Team

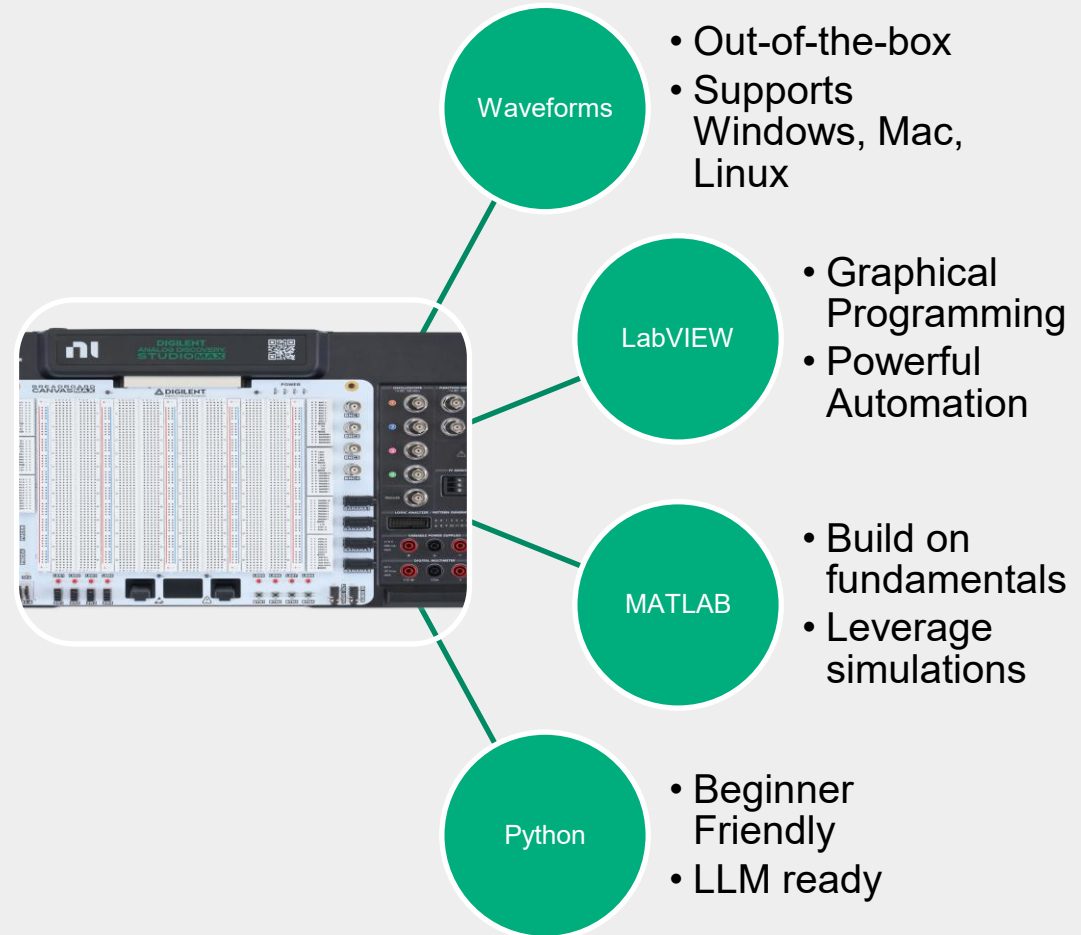
Accelerating Discovery from High-School to College and Beyond



Digilent – Your Ideal Engineering Classmate

Making engineering technologies both understandable and accessible with Digilent hardware and software to meet your learning needs

With the power of the Analog Discovery, jump into your engineering courses with the best measurement partner at your side. By leveraging a toolbox of instrumentation and a flexible suite of software options, learn faster with Digilent.



Academic Product Portfolio - Hardware

From student-owned to in the labs (and research/industry)



Hand-held/Portable to Complex Industry Solutions

Signal and Data Acquisition



FPGA



Wireless Communications



Hand-held/Portable to Complex Industry Solutions

Instrumentation

Thanks



NI is now part of Emerson.