



Sparking Innovation in the Engineer of Tomorrow

Richard Roberts

Academic Marketing Engineer
NATIONAL INSTRUMENTS

NIDays Academic Presentations

15.10 - 15.55 Sparking Innovation in the Engineer of Tomorrow
15.55 - 16.40 Take Full Advantage of the NI Academic Program



Big Physics



Clean Energy



5G



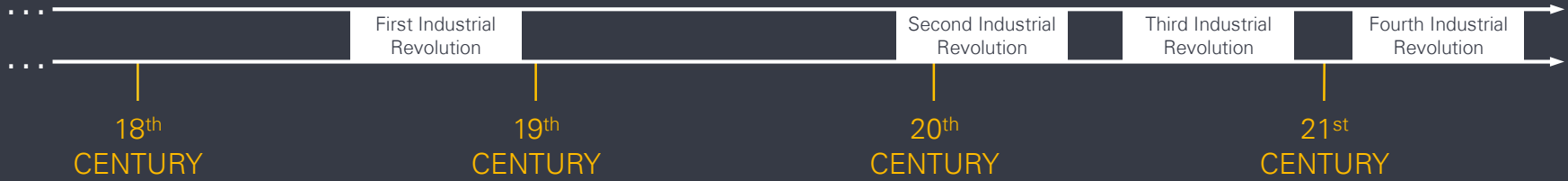
IOT



Driverless Cars

WORLD ECONOMIC FORUM

65% of Children Entering Primary School Today Will
Ultimately End Up Working in Job Types that Don't Yet Exist





MIT TECHNOLOGY REVIEW

2021 May Be the Year of the Fully Autonomous Car



IEEE SPECTRUM

2020 Will Be the Year When 5G Goes From Theory to Reality



CISCO

50 Billion Devices Globally Will Be Connected to the Internet by 2020

CONVERGENCE

of Mechanical, Electrical, Computer,
and Control Components



Prepare Our Students for the Challenges of 2020 and Beyond



ENGINEERING
PRACTICE



PROJECT BASED
LEARNING



ENGINEERING
SCIENCE



ACTIVE LEARNING OF
ENGINEERING
SYSTEM DESIGN

1950

1960

1970

1980

1990

2000

2010

2020



NATIONAL ACADEMY
OF ENGINEERING



A NEW METHODOLOGY

Every Student Learns Through Design Work



Prepare and Motivate
Our Students



Learn Complex
Engineering Systems



Develop Well-
Rounded Engineers

ENGINEERING SYSTEMS DESIGN AND RESEARCH

5G

IoT

Smart Grid

Massive MIMO

Autonomous Vehicle

Cyber-Physical Systems

Smart Connected Factories

CORE CONCEPTS

Circuits

Intro to Controls

Signal Processing

Intro to Engineering

Sensors and Actuators

SUBSYSTEMS

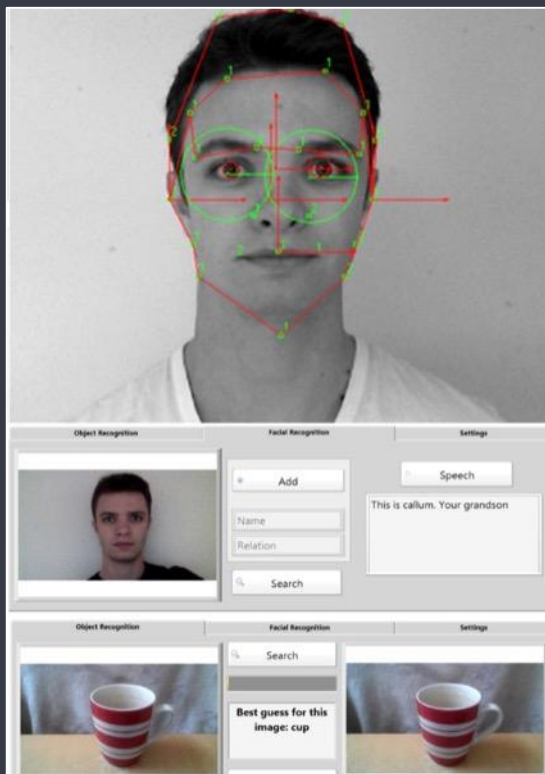
Mechatronics

Embedded Systems Design

Wireless Communications

HOW DO WE PREPARE

Students for Engineering System Design?



RESPONSE

Supporting Dementia Patients
THE UNIVERSITY OF READING



PERFECT PINT

Never Spill a Drop
THE UNIVERSITY OF LEEDS



CARDIFF RACING

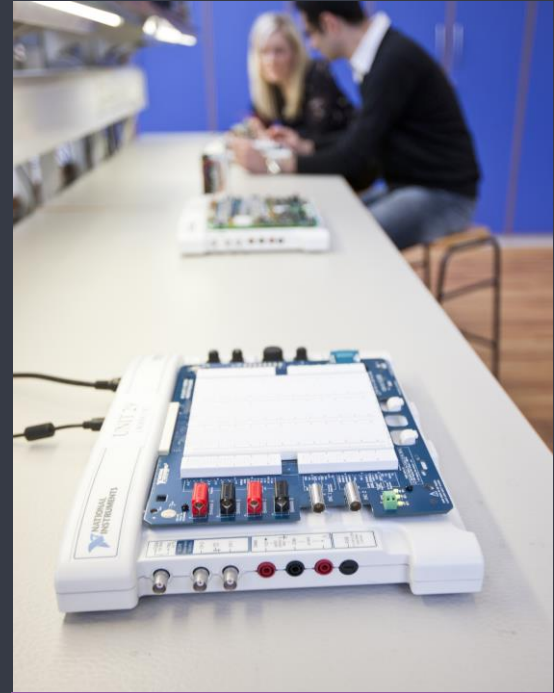
Historic Formula Student Champions
CARDIFF UNIVERSITY



STUDIO LEARNING



REMOTE CLASSROOMS

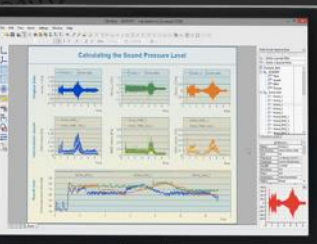


HANDS-ON DESIGN

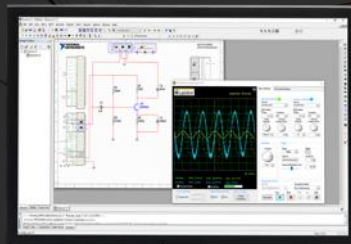


ACADEMIC SITE LICENSE

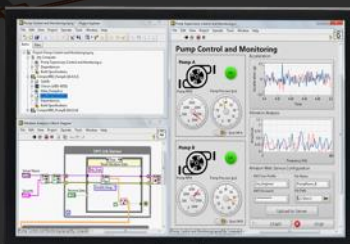
Comprehensive Suite of Over \$100,000 of NI Software



DIAdem



Multisim



LabVIEW



LabVIEW Communications



LabWindows™/CVI



Intuitive Engineering Workflows

Take Your First Measurement Faster



Iterative Data Exploration

Instantly Explore Your Engineering Data



Productive System Customization

Accelerate Your Development with an Enhanced Editor

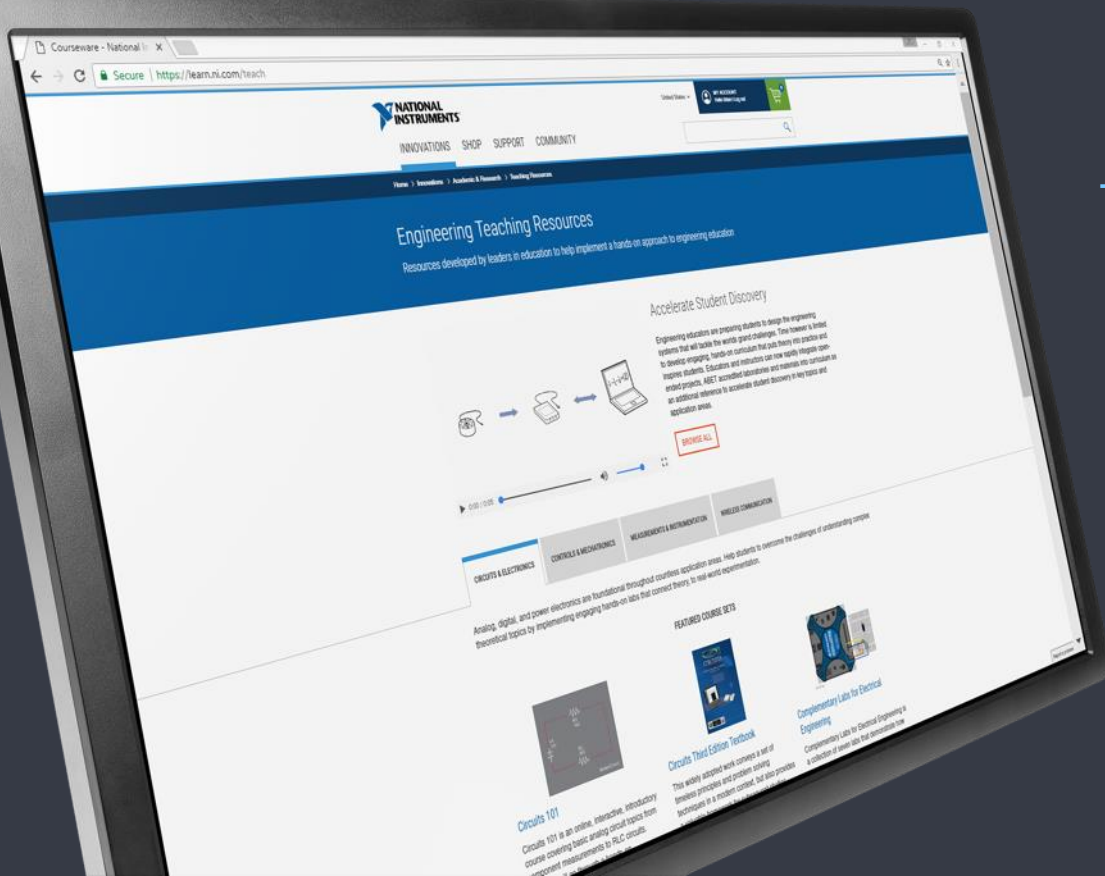


Interactive Learning and Help Content

Learn What's Needed to Build the Project at Hand

ni.com/labviewnxg

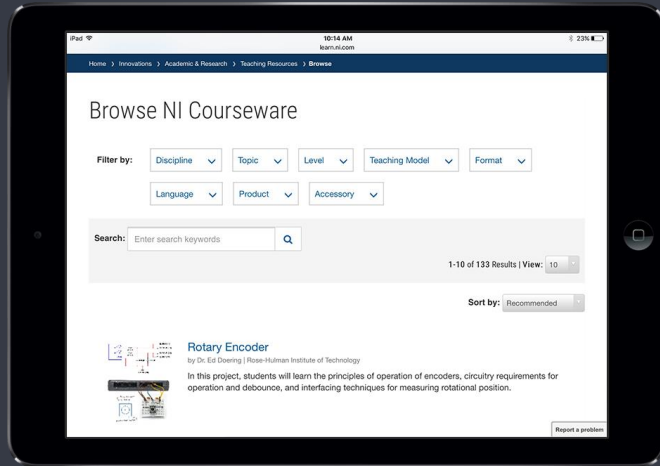
[ni.com/asl](https://www.ni.com/asl)



Teaching Resources Portal

Materials to Engage Today's
Engineering Student

[ni.com/teach](#)



TEACHING RESOURCES PORTAL

Integrate open-ended projects rapidly

Easily find LabVIEW reference materials

Improve student outcomes with engaging labs

ni.com/teach



Morten Baltzer Kristensen

Sales Development Engineer

NI

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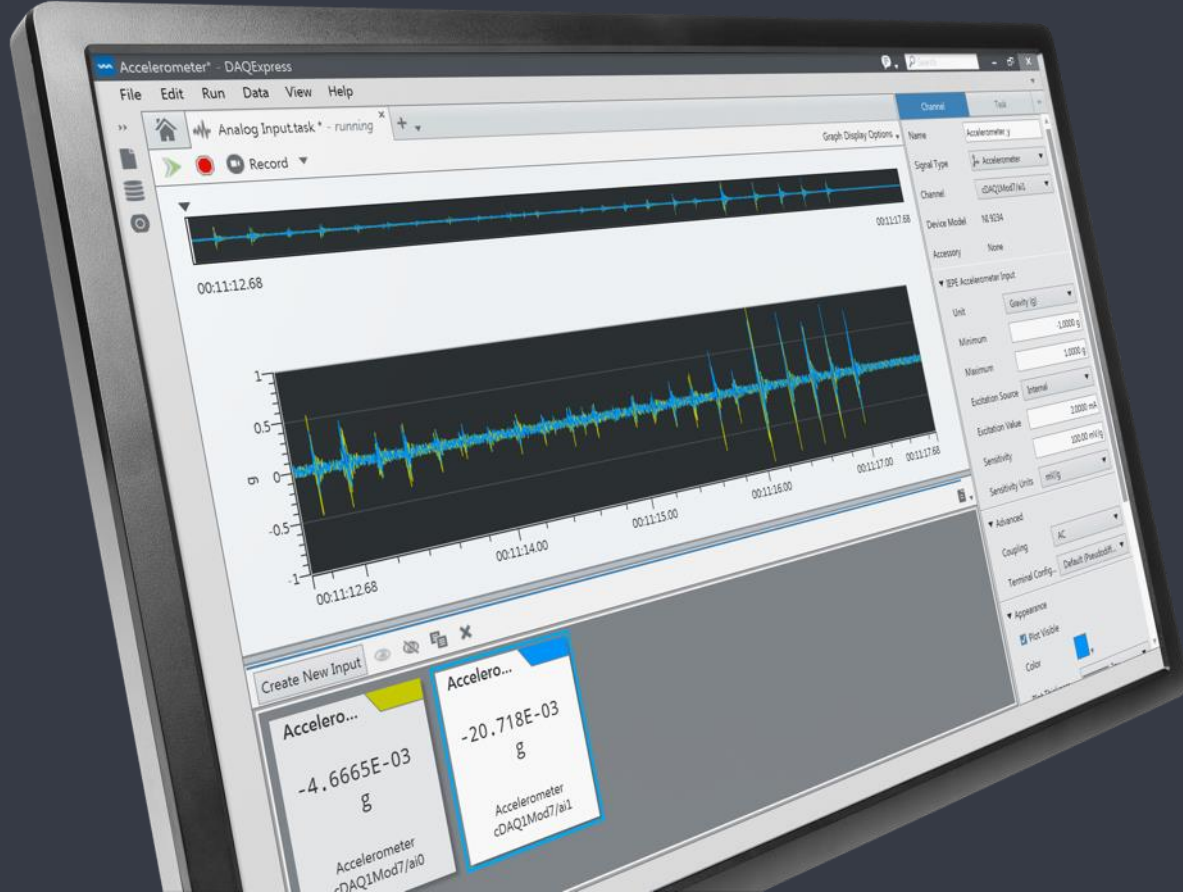
Mechatronics

Embedded Systems Design

Wireless Communications



CORE CONCEPTS
Intro to Engineering



DAQExpress™

Learn Faster With Accurate
and Interactive Measurements



DAQExpress AND myDAQ SOLUTION

Use built-in projects for intro to engineering

Measure instantly, no programming necessary

Interactively teach engineering concepts



ni.com/teach

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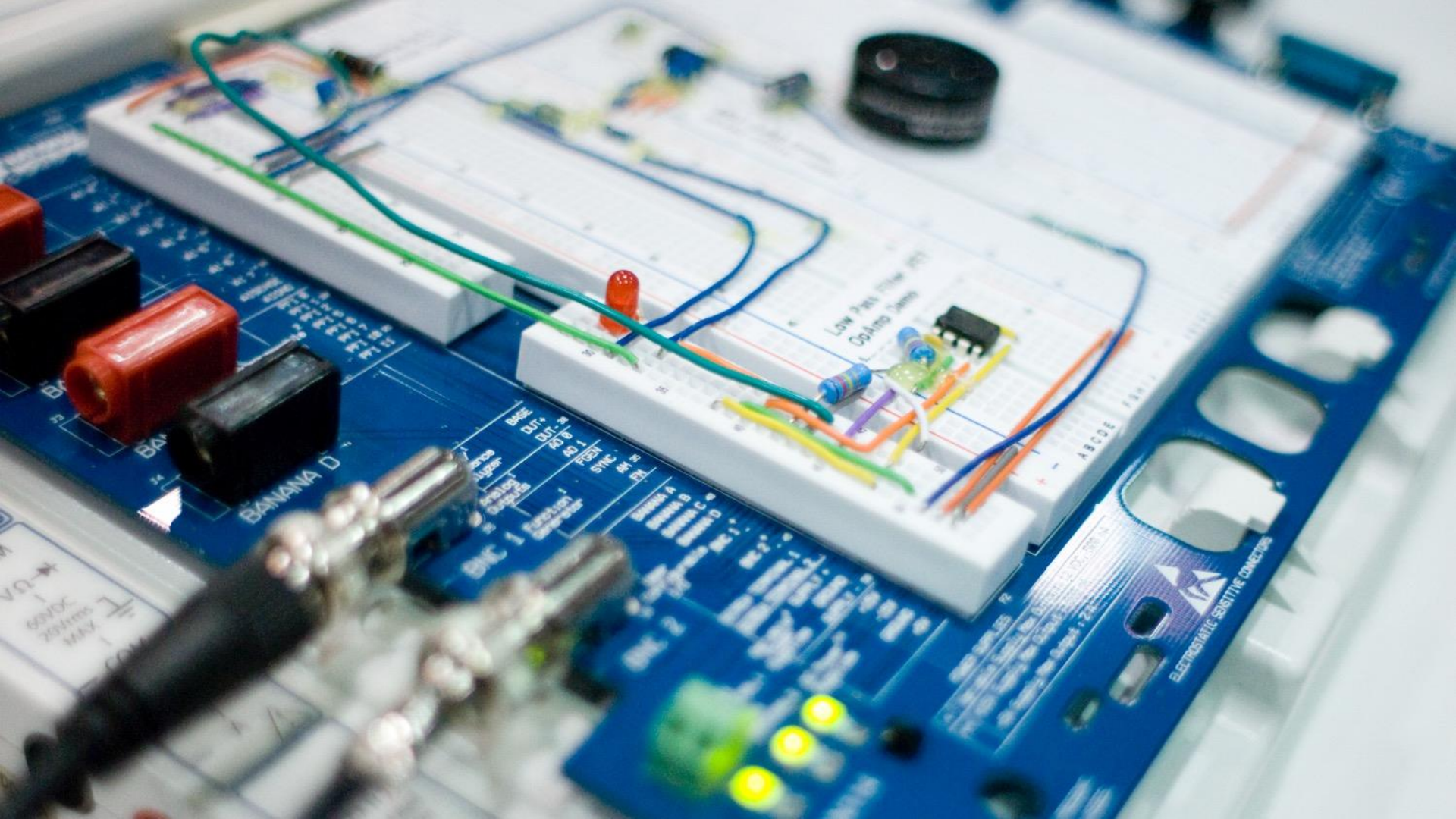
CORE CONCEPTS

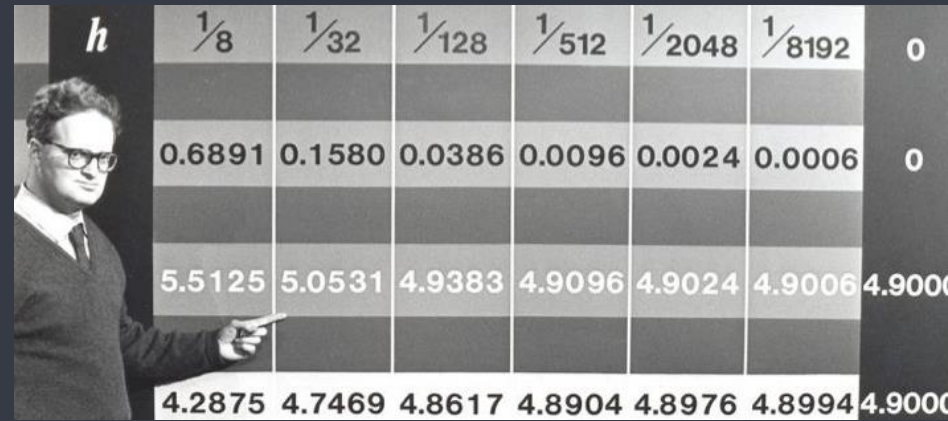
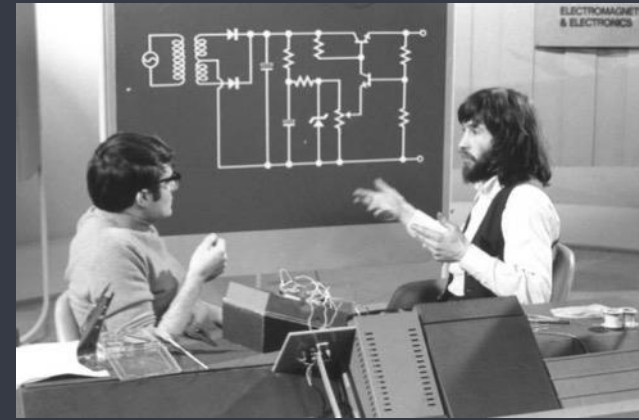
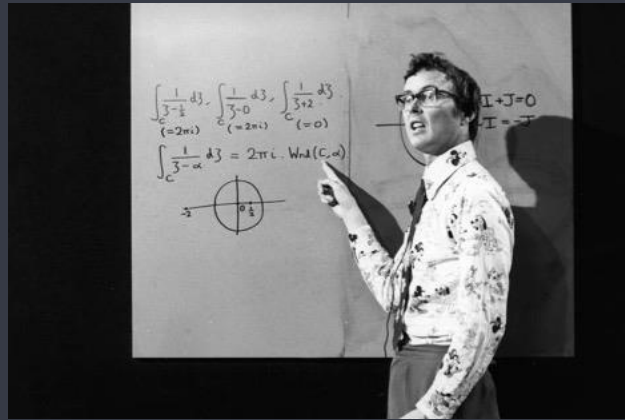
Circuits



NATIONAL RENEWABLE ENERGY LABORATORY

80% of US Energy from Renewable Sources by 2050



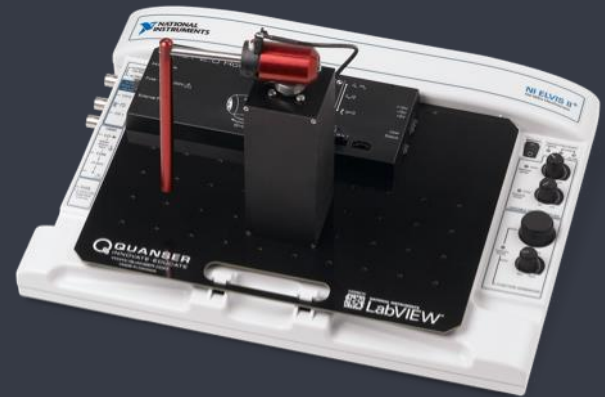


NI ELVIS AND QNET INVERTED PENDULUM

Real experiments with real systems

Intuition built from simulation to implementation

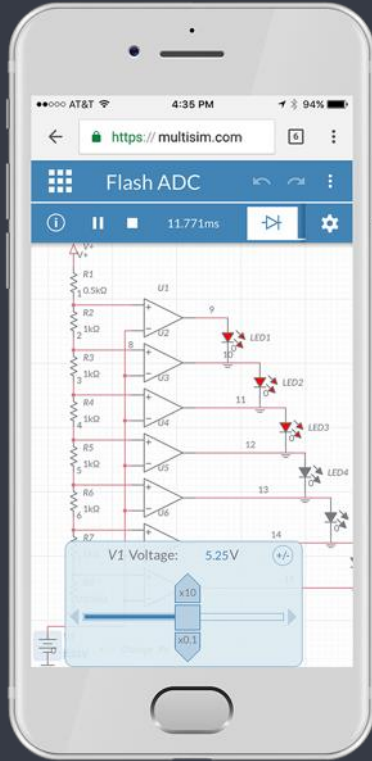
Deeper understand of engineering principles



Multisim Live

Accurate Circuit Simulation
Anywhere, Anytime





MULTISIM LIVE

Online SPICE simulation environment

Interactive schematics and circuit analysis

Fully integrated community and courseware

Works on mobile devices, apple, and windows

multisim.com

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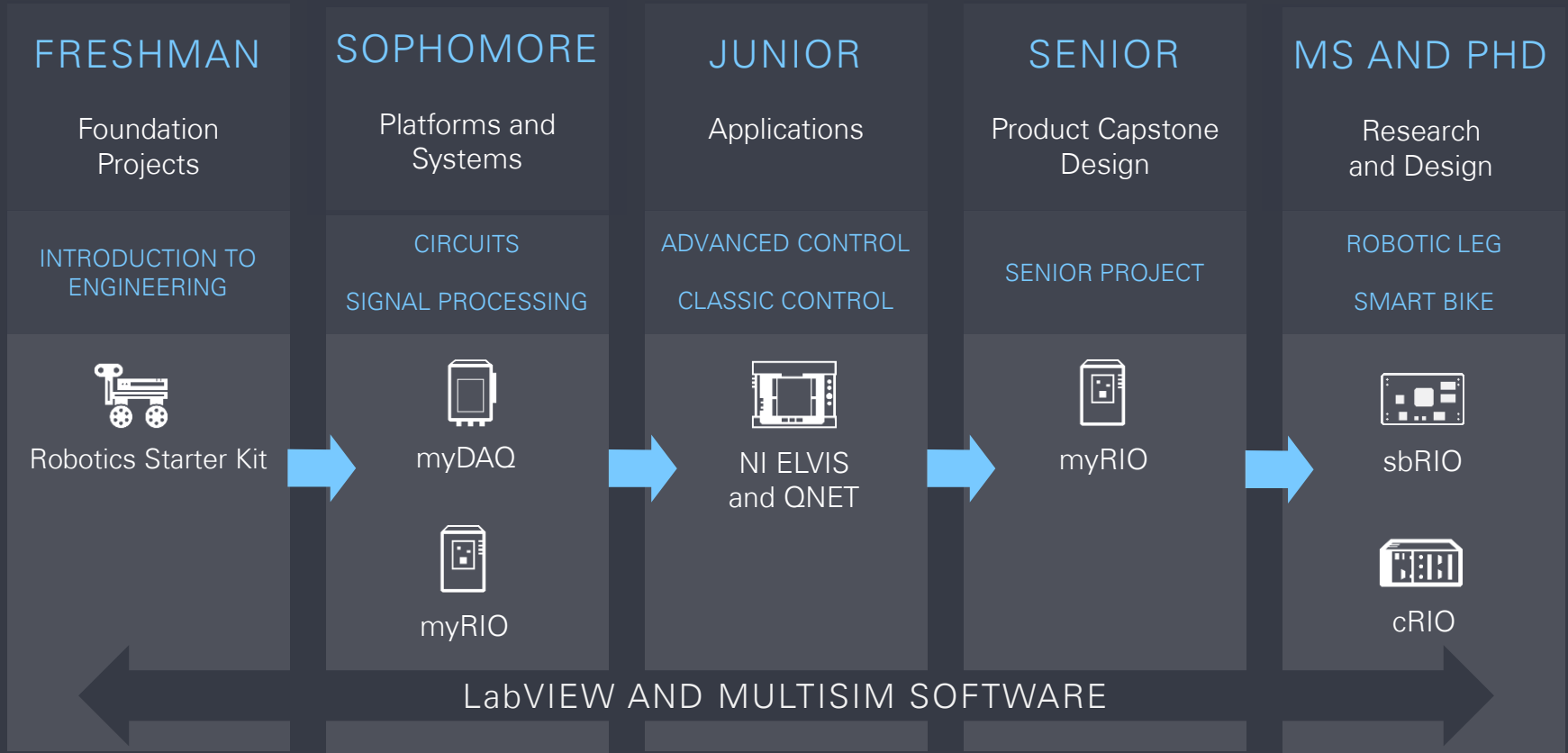


SUBSYSTEMS

Mechatronics



Founded in 1911 in Beijing China
41,000 students enrolled
Globally ranked #1 engineering university
#1 in engineering publications



MECHATRONICS COURSE SEQUENCE

INTRODUCTORY



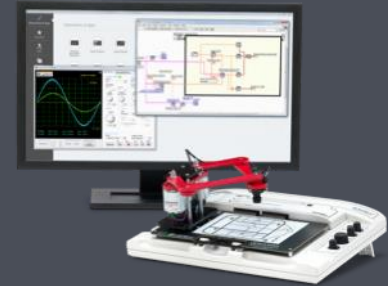
Measurements and Analysis
Introduction to Controls
Thermodynamics and
Fluid Dynamics

FUNDAMENTALS



Classical Controls
Sensors and Instrumentation
Actuators and Power Electronics
Interfacing and Microcontrollers

SYSTEMS



Mechatronics Systems
Advanced Control Systems
Mechatronics Systems



QUANSER QUBE 2.0

Compact and integrated rotary servo system

Built-in voltage amplifier with integrated current

User-controllable tri-color LED



QUANSER AERO

High-efficiency cordless DC motors

Pitch and yaw axes and DC motors/rotors
speed measurements through digital tachometer

Easy-connect cables and connectors

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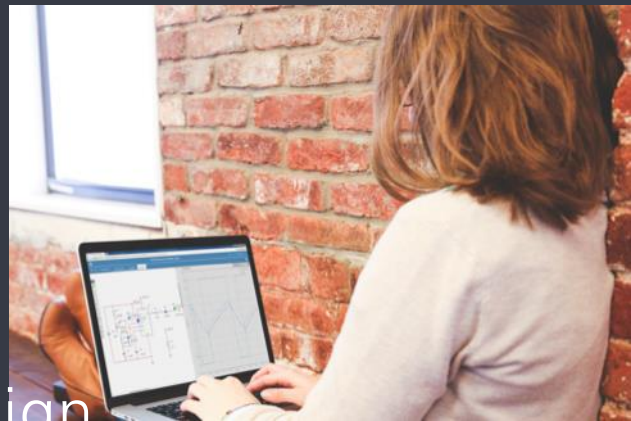


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Driverless Cars





Engineering System Design

