

Keysight Education Solutions

Doug Baney

**SEPTEMBER
2021**

Corporate Director of Education



Agenda

- **How Technology is Transforming Education**
- **How Covid-19 is Reshaping Engineering Labs in Academia**
- **Remote Learning**
 - Remote Access Labs
 - Keysight University
- **Preparing Industry-Ready Students**
- **Educating Customers and the Industry**
- **Q&A**

Speakers



Ron Nersesian
Keysight
President, and
Chief Executive
Officer



Ee Huei Sin
Senior Vice President
of Keysight's
Electronic Industrial
Solutions Group,
President of Keysight
Education



Chris Cain
Vice President &
General Manager of
Keysight's Electronic
Industrial Products



Dr. Doug Baney
Corporate Director
of Education,
Fellow of the IEEE

How Technology is Transforming Education

Engineering education has undergone important changes to keep pace with innovative new technologies and the tools available to provide hands-on experience to students.

Huei–Sin, Senior Vice President, and President Electronic Industrial Solutions Group, President of Keysight Education, at Keysight Technologies.

Keysight and Education: A Special Relationship

Keysight interacts with universities in many ways:

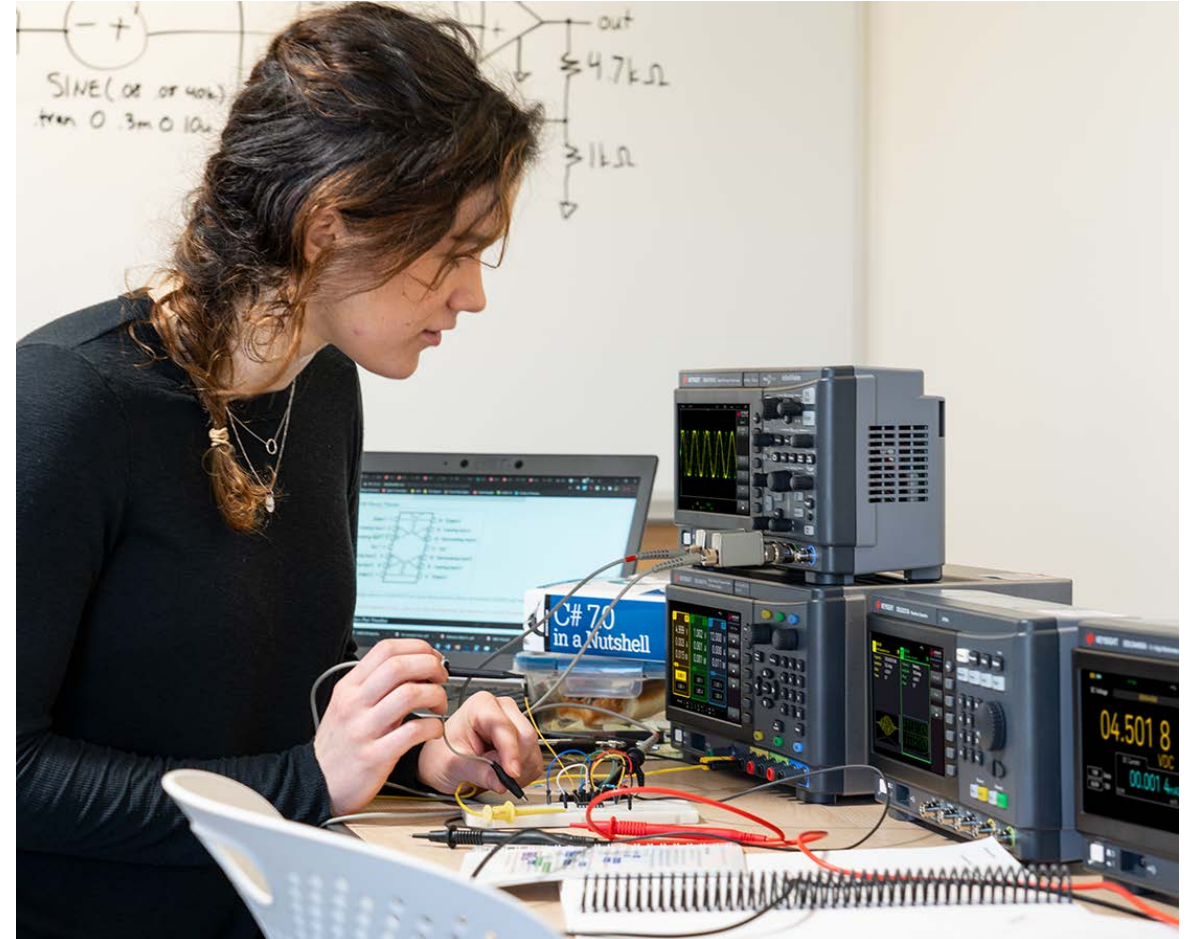
- We recruit new employees and interns from campuses
- Our R&D teams collaborate with universities on research
- We sponsor research and education programs
- Our executives serve as advisors
- We support activities aligned to our corporate social responsibility mission



How Keysight Partners with Educators

TRANSFORMING ENGINEERING EDUCATION

- Modernizing teaching labs around the world
- Supporting educators with academic teaching solutions, course materials, and resources
- Helping educators create industry-ready students





The Teaching Lab

How Covid-19 is Reshaping Engineering Labs in Academia



The Covid-19 pandemic has ushered in a new era of remote learning, which is here to stay. According to an Ipsos survey for the World Economic Forum, 72% of respondents believe higher education will remain in the hybrid model for the next five years.

Chris Cain, Vice President and General Manager of the Electronic Industrial Solutions Group at Keysight Technologies.

Educational Environments are Changing

Face-to-Face Learning



- Interactive & collaborative
- Hands-on experience

Remote Learning



- Software & cloud-based
- Learner's pace

Hybrid Learning



- Increased access to learning
- Learning beyond classroom
- Flexible, equal learning

Keysight Solutions are Empowering the Change

Introducing Keysight's new Smart Bench Essentials Series



A Closer Look at Smart Bench Essentials

WHAT'S INCLUDED



PathWave BenchVue Software

Integrated, smart software to test, analyze, and share results remotely



EDU34450A 5 1/2 Digital Multimeter

Measures 11 different input signals at up to 110 readings/s for speed-critical tests



EDU36311A DC Power Supply

90 W, triple output, & programmable for clean, reliable power



EDU33211A/EDU33212A Function Generator

17 arbitrary waveforms & 6 modulations built-in to get you set up and testing quickly



EDUX1052G Oscilloscope

50 MHz, 2 analog channels, & 1 GSa/s sample rate for accurate capture & analysis

KeysightCare 24-7 Technical Support

What Educators Are Saying



Dr. Mark Bauer
Professor at University of
Nebraska - Lincoln

“They all match so nicely. It makes a really impressive looking setup here.”



Dylan Spruill
ECE Senior Design TA
North Carolina State University

“This is the coolest stuff I’ve ever seen. The user interface is insanely easy to use. It can generate Sine, Square, Ramp, Pulse, Arb, Triangle, Noise, PRBS, and DC waves.”



Dr. Scott Koziol
Professor at Baylor College

“I put myself in the student case where they walk up and use their intuition and twist the knobs, and by and large, I was able to find what I needed to do. There is a lot of capability in these devices for this price point. I can easily pay that for just one oscilloscope.”

Remote Learning Matters

MARKET OVERVIEW

- Worldwide e-Learning market set to surge 21 percent through 2027 (CAGR); to hit \$1 trillion
- e-Learning environments are booming in academia AND on the rise in corporate settings and with governments worldwide



Enabling Remote Lab Access

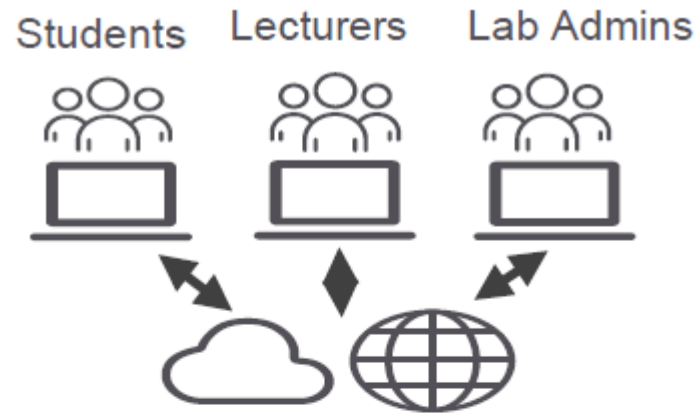
ENGINEERING LABS FROM A NEW PERSPECTIVE



- Cloud-based PathWave Remote Access Lab software an IMS Global certified LTI learning tool, that is Learning Management System (LMS) integration ready, provides students a single-point, secure and simultaneous cloud-based remote lab access and instruments control, anytime and anywhere, while enabling educators to manage student lab access, maintain lab benches systematically and monitor multiple remote lab sessions.
- PathWave Lab Manager software provides simplified centralized lab configuration and asset management, in addition to enabling mass firmware updates for instruments.
- U3900DAQ Switching System covers a broad spectrum of switching and routing requirements for teaching labs, offering students full remote access to industry-standard instruments for hands on test and measurement experience.

Innovative Software Delivers 360° View of Teaching Labs

PATHWAVE LAB OPERATIONS FOR REMOTE LEARNING



Easily and seamlessly migrate engineering labs online faster

Hassle free and centralized user access and teaching content management system

Interaction with the students and facilitate group collaboration in real-time to accomplish smart teaching and learning

Streamline and simplify lab management, saving lab administrators and educators time and freeing them to focus on teaching

Equip students for success in the industry



The background features a series of red circles of varying sizes and opacities, arranged in a curved path from the top left towards the right. Some circles are connected by thin grey lines. The overall aesthetic is clean and modern, with a focus on geometric shapes and color contrast.

Additional Solutions for Education

Keysight Education For Researchers & Educators

In the research lab, Keysight enables breakthroughs in science & technology:

- Advanced software simulation and modeling tools
- Advance work with leading-edge instrumentation
- Keep labs state-of-the art through favorable pricing
- Access to Keysight's extensive application notes and eLearning



University research resources include:

- Grant funding and resources
- Grant proposal writing guides
- Faculty spotlight articles
- Global support presence



Enhance Education Classroom

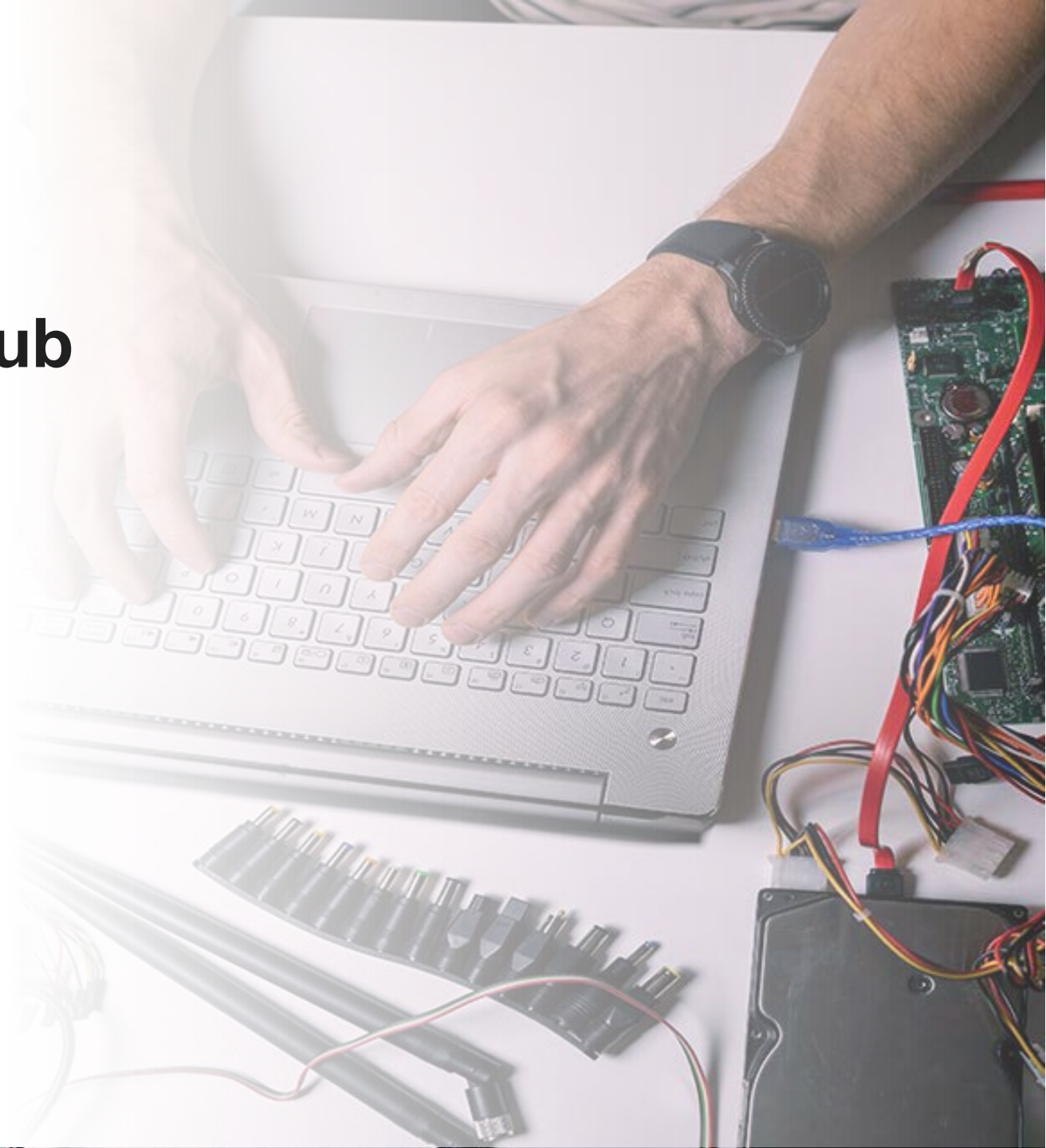
INDUSTRY-READY TEACHING SOLUTIONS

- Easy-to-teach package for full semester
 - Advanced IoT Teaching Solution
 - RF Microwave Teaching Solution
- Teaching Slides
- Up to 50 hours of lab sessions
- Training kit: controller board, lab sheets, and assignments
- Works with instruments and software



Keysight University Vision

Build a world-class **learning hub** that delivers an engaging, personalized educational experience for engineers.



Keysight University

AN ONLINE EDUCATION PORTAL



Key topic areas:

5G

Aerospace and Defense

Automotive and Energy

Design and Simulation

Digital Testing

Internet of Things (IoT)

Network Security and Test

Quantum

Radio Frequency (RF) Testing

Semiconductor Testing

Software Test Automation



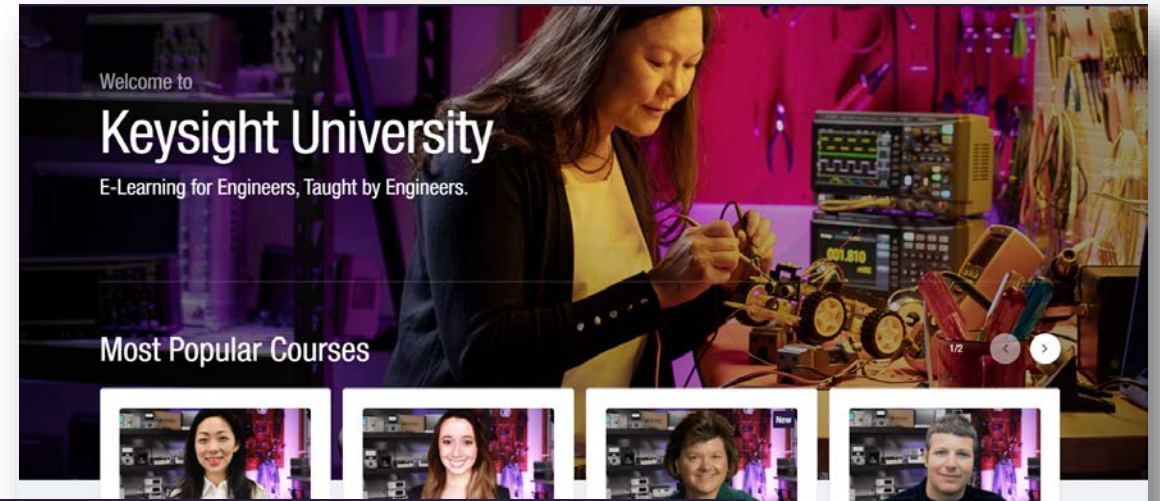
Keysight University

TOP COURSES AND LEARNING PLANS

139
COURSES

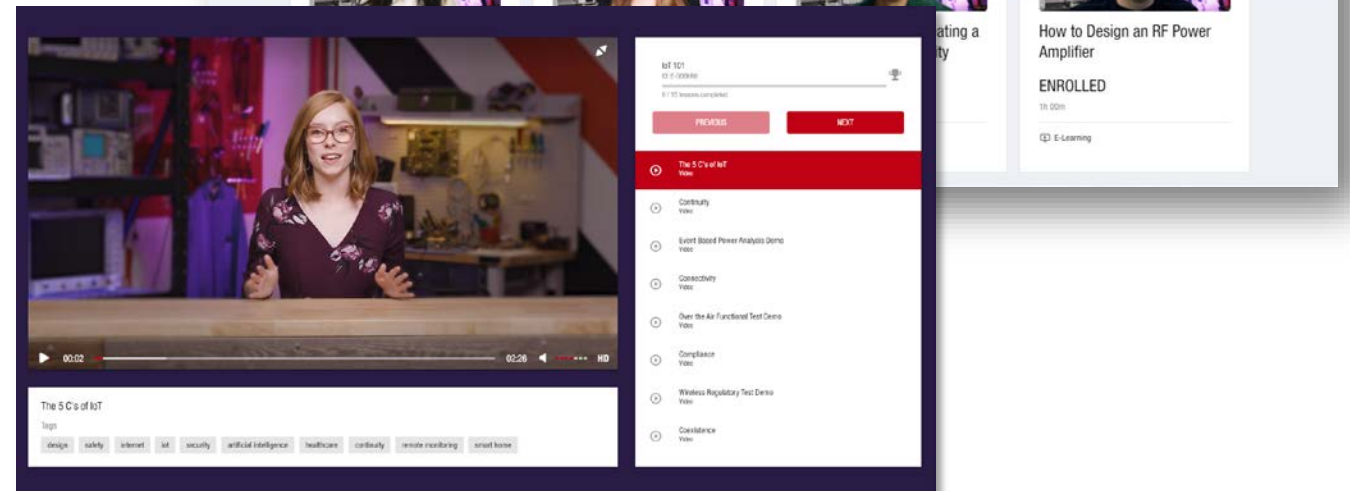
7
LEARNING
PLANS

13
TOPIC
AREAS



TOP COURSES

- Oscilloscope Probes 101 & 201
- RF Field Testing Basics
- RF Power Measurements
- Spectrum Analyzer Basics
- 5G New Radio Standards





Preparing Industry-Ready Students

Industry-Ready Certification Programs

STUDENT ENRICHMENT AND ADVANCEMENT



More than 45 participating universities



Enriches students who demonstrate RF/uW design & measurement expertise



Over 800 students certified and recognized internationally to date

Student-Focused Competitions

WORLDWIDE DESIGN CHALLENGES FOR STUDENTS



IoT
INNOVATION
CHALLENGE



Stanford

Immersible IoT Sensors for Cloud-Based Water Quality Monitoring

www.iotchallengekeysight.com

Hackathons and Student Clubs

KEYSIGHT SPONSORED





Educating Customers and the Industry

Upcoming Customer Events - Keysight Worlds

OCTOBER 2021



Keysight Worlds showcase experts and solutions that address end-user expectations for **“everyone and everything, connected”**

Opening keynote remarks will be delivered by Ron Nersesian, Keysight’s chairman, president and CEO, and Satish Dhanasekaran, Keysight’s chief operating officer.



Keysight World Themes

Connectivity

Illuminating the Path Forward: The Future of Connectivity

- Keynote: Kailash Narayanan, president of Communications Solutions Group
- The value of connectivity is clear, and the focus is on network modernization and the path to 6G. This program illuminates the way forward for customers.

Digital Transformation

Riding the Tidal Wave of Digital Transformation

- Keynote: Jay Alexander, senior vice president and chief technology officer
- Endless demand for bandwidth has implications for data centers, edge devices, and even quantum computing. This program enables customers to discover new ways to meet the challenges.

Security

Reinforcing Cybersecurity in a Connected World

- Keynote: Mark Pierpoint, senior president and president of Network Applications and Security
- Connectivity has real benefits, but also creates a wider attack surface. This program helps customers improve their security posture with fresh ideas in preparation and resiliency.

- Europe, Middle East, Africa and India
October 5 – 7
- Americas
October 12 – 14
- South Asia Pacific
October 12 – 14
- Japan
October 12 – 14
- Korea
October 12 – 14
- Taipei
October 12 – 14
- Shanghai
October 19

Featured Industry Presenters



Bernard Marr

Renowned futurist, influencer, and
thought leader

Bernard Marr & Co.



Dr. Sadayuki Abeta

VP and GM of Radio Access
Network Development Department

NTT DOCOMO



Sassan Ahmadi

Director of 5G Wireless Systems
and Standards

Xilinx Inc.



John Oates

Systems Hardware Development
Manager

Analog Devices



Dr. I-Kang Fu

Director of Technology Division

MediaTek



Vahid Joroughi

Business Development Manager

RHEA Group



Pradeep Gowda

Director Engineering

Qualcomm



Andreas Mueller

Chair
5G ACIA

Global Head of Communication
Robert Bosch



Dr. Matthew Reagor

VP of Research and Development

Rigetti Computing



Alan Ho

Head of Product - Google Quantum
AI

Google

Summary

KEYSIGHT EDUCATION SOLUTIONS

Technology is Transforming Education

- Keysight is committed to driving advancements in engineering education supporting teaching methods, adoption of technology and state-of-the-art labs to help engineering students advance their work with leading-edge instrumentation and software.

Keysight is Reshaping Engineering Labs in Academia

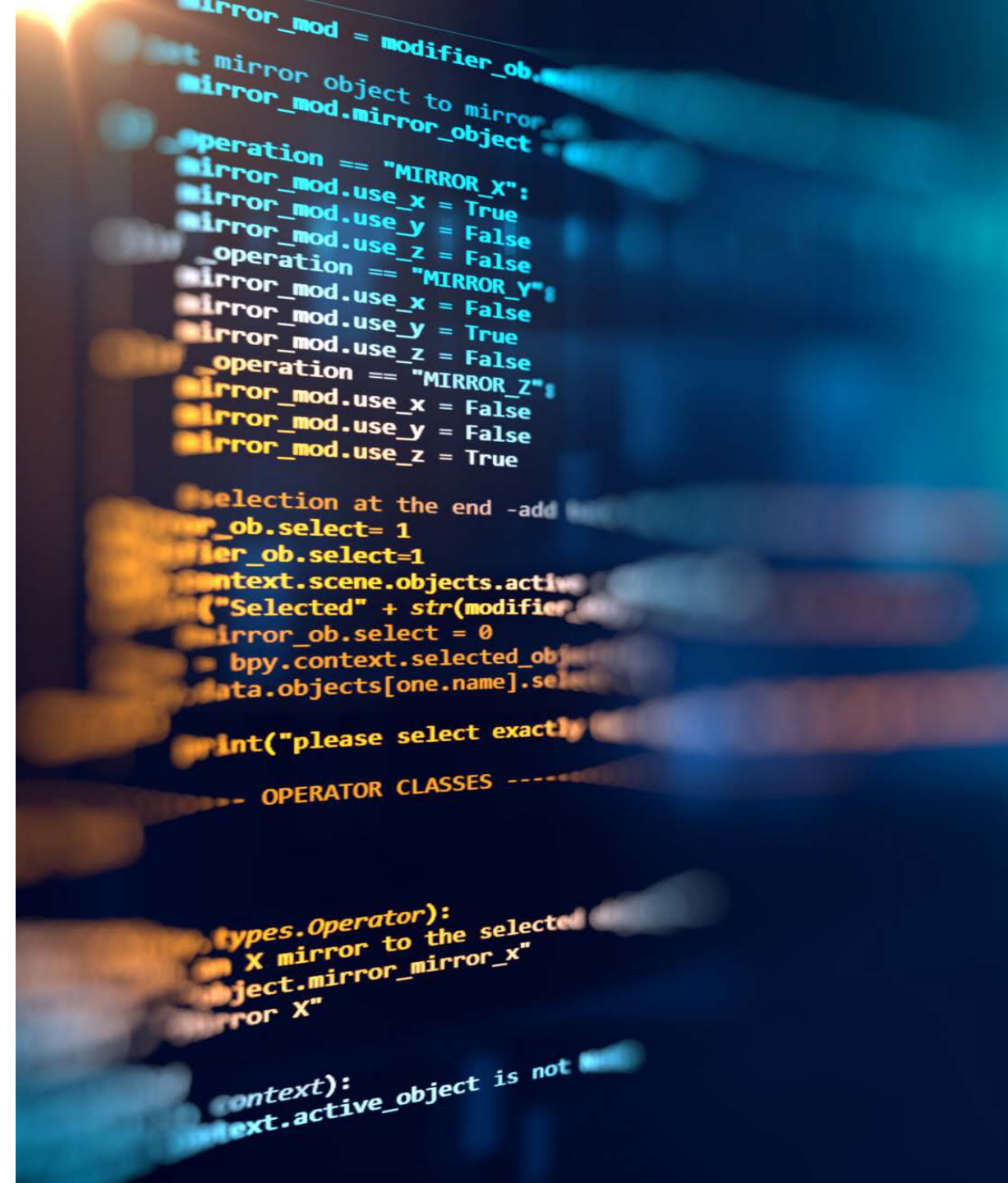
- Keysight understands that educational environments are changing and delivers the solutions that are empowering that change.

Remote Learning and Keysight University

- Keysight is committed to supporting engineers in advancing their knowledge of precision digital and radio frequency measurement approaches, the latest industry standards, compliance and power, delivering basic to advanced techniques, tips and tricks that lead to more accurate measurements and insightful signal interpretation.

Keysight Worlds – educating our customers and the industry

- Keysight fully understands that our customers' success hinges on new ideas. Opportunities start with use cases built on 5G, Open RAN, quantum computing, connected cars and beyond. Keysight Worlds explores these areas, and more, with a focus on accelerating our customers' next innovation.



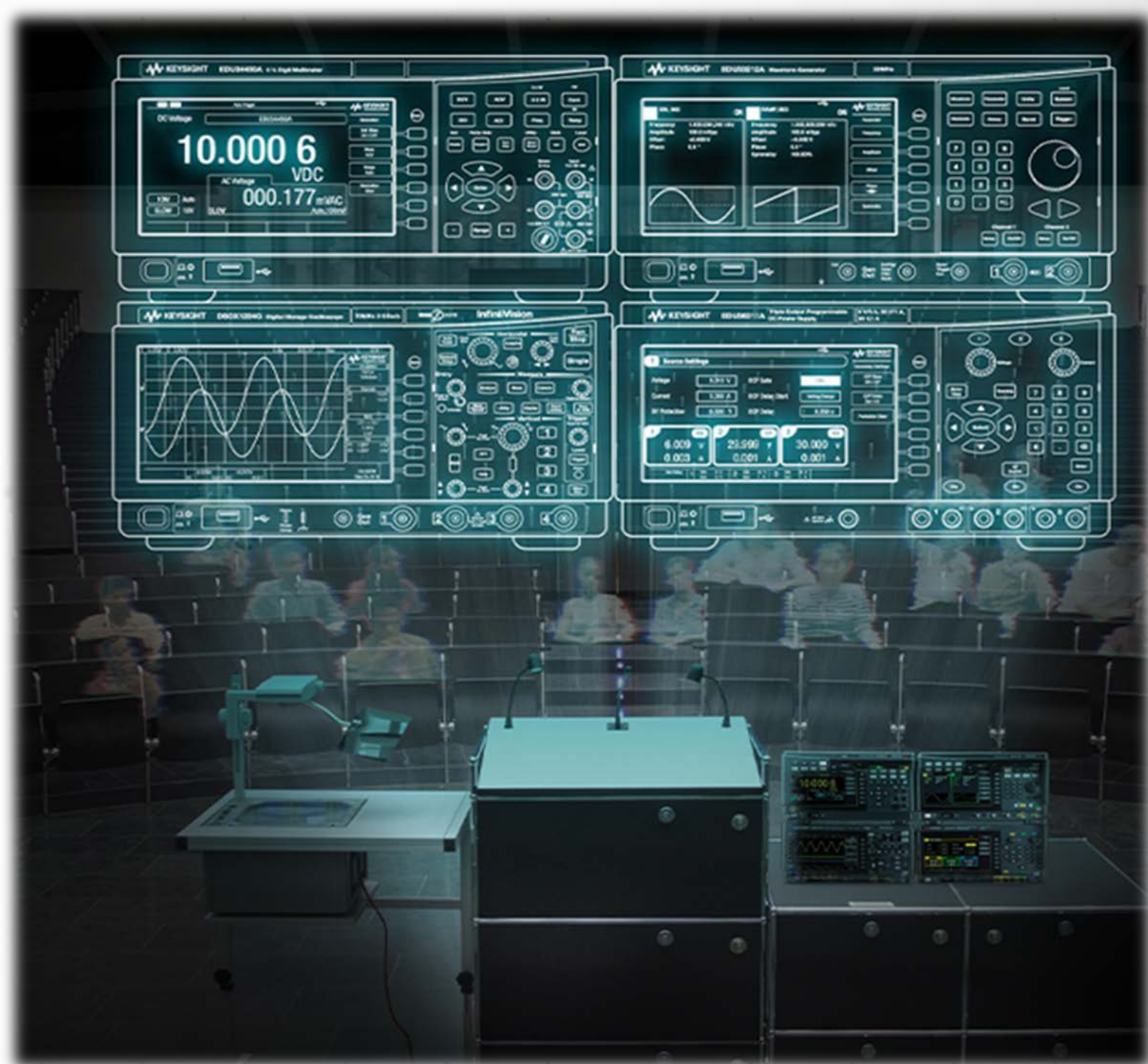
Available Resources & Media Kit

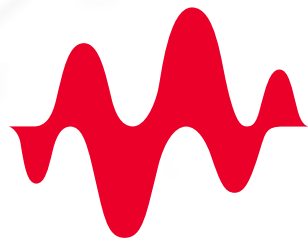
www.keysight.com/find/education

Media Kit: (downloadable)

<http://www.keysight.com/find/educationpress>

- Press Releases
- Image Library
- Videos
- Media Backgrounder
- Media Presentation
- Biographies
- Slides





KEYSIGHT
TECHNOLOGIES

Q & A