CAV Connected and Automated Vehicles

COLLEGE OF ENGINEERING
INTEGRATIVE SYSTEMS + DESIGN
UNIVERSITY OF MICHIGAN

PROFESSIONAL PROGRAM

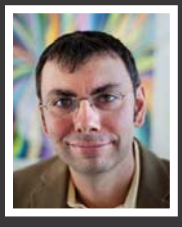
The Course at the Epicenter of Connected Vehicle Research and Development

Join leading US researchers at the University of Michigan for a four-day immersion in connected and automated vehicles. You'll learn about key topics, technologies, and challenges for this emerging industry, as well as the solutions and standards being developed right here in Ann Arbor and around the world.

Learn more and register:
isd.engin.umich.edu/cav

2015 Course October 19–22 Ann Arbor, Michigan

World-Class U-M Faculty + Researchers



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Professor of Mechanical Engineering, Associate Director of Michigan Mobility Transformation Center

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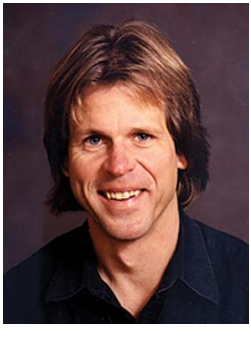
Research Scientist, University of Michigan Transportation Research Institute

André Weimerskirch
Associate Research Scientist, University of Michigan Transportation Research Institute

Learn more

Our CAV program faculty are at the forefront of connected vehicle research and testing. Learn more about their work at

isd.engin.umich.edu/cav



CAV Program Director

James Freudenberg

Program Director, Automotive Engineering
Professor, Electrical Engineering & Computer Science

Exclusive MCity Tour: One of Many Course Highlights

Course participants will have the opportunity to tour the cityscape for testing driverless vehicles at U-M. Mcity is a 32-acre “mini-city” designed expressly for testing connected and automated vehicle systems and other emerging 21st-century smart city technologies, located on the University of Michigan’s North Campus.

Learning Objectives

- Hear from leading US researchers on the current V2X standards and technologies with the focus on safety and traffic control applications using dedicated short-range communication (DSRC)
- Learn about the scope and major findings from recent connected and automated vehicle research and development projects in the EU and US
- Understand the key cybersecurity and privacy issues and solutions under development
- Gain insight into both full-automated and partial-automated vehicle technologies and challenges, including their human factor issues and testing/evaluations
- Learn about several simulations tools used in connected and automated vehicle development

Program Overview

MONDAY

Big Picture—Trends, Opportunities and Challenges
- Societal trends
- Safety, mobility and energy/ environment
- Early success stories
- Known challenges

Past and Present Research, Demonstration and Deployment Activities in EU, Japan, and US
- EU programs and key lessons learned
- Japan/Asia programs and key lessons learned
- US programs and key lessons learned

Connected Vehicle Technology
- Overview, objectives and how they complement vehicle-based sensors (radar, lidar, etc.)
- Technologies
- Vehicle-based CV devices
- Infrastructure-based CV devices
- Vehicle-to-Vehicle applications (V2V)
- Vehicle-to-Infrastructure applications (V2I)
- Infrastructure-to-Infrastructure applications (I2I)
- Vehicle-to-Everything Else (V2X)
- Deployments of connected vehicle technology

TUESDAY

Connected Vehicle Data Standards
- SAE J2735
- IEEE 1609
- ASTM E2213-03
- CVRIA

Connected Vehicle Data Capture and Analytics
- Safety Pilot data capture
- Dynamic Interrogative Data Capture (DIDC)
- Trajectory Conversion Algorithms (TCA)
- Traffic performance estimation using BSM and PDM
- Safety Pilot data analysis and visualization

Traffic control with connected vehicles
- Adaptive traffic signal control
- Traffic signal priority
- Ramp metering control
- Mobile accessible pedestrian signal system

WEDNESDAY

Cybersecurity and Privacy of CAV
- Introduction to cryptography, data security, and privacy
- Cybersecurity standards: secure communication protocols, secure development, secure platforms
- Related activities in US and EU
- Secure vehicle-to-vehicle safety application communication
- Secure vehicle-to-infrastructure applications communication
- Security credential management system
- Automotive security applications
- Secure automotive electronics architectures

MCity Tour

THURSDAY

Automated vehicle technology
- NHTSA and SAE definitions
- Key technologies and functions
- Human factors, user interface and acceptance
- Standards, testing and evaluation
- Laws and regulations—current status and future trends

Simulation tools
- Carsim (MSC speaker), Prescan (TASS speaker)
- POLARIS and Vissim

Summary and Conclusion

Program Details

Who Should Attend

This course is ideal for engineers, managers, and thought leaders interested in understanding the technologies, challenges, and current development effort in connected and automated vehicles.

Register Today!

Visit our Connected and Automated Vehicles program web page at **isd.engin.umich.edu/cav**, send an email to **MEonline@umich.edu**, or call **(734) 647-7200**.

Only one course will be offered this year.

Join us October 19–22 in Ann Arbor.

Space is limited. Register today!

About Michigan Engineering and Integrative Systems + Design

The University of Michigan's College of Engineering was founded in 1853. Today, Michigan Engineering and its academic departments rank in the top ten in their respective areas (U.S. News and World Report). The faculty's ongoing research and industry consultation in engineering contribute to Michigan's strength and impact on professional development. Michigan Engineering's research expenditures for fiscal 2014 totaled $217.9 million, placing it in the forefront of collegiate engineering research in the U.S.

Integrative Systems + Design (ISD), a division of Michigan Engineering, offers credit courses to students on campus and at locations around the world. Recognized as a global leader in online education in addition to offering on-campus programs, ISD provides lifelong learning to technical professionals, and has served more than 100,000 students with intensive short courses, conferences, professional certifications, and online advanced degree and certification programs.

ISD responds to the needs of industry, healthcare, government, the military, and non-profit organizations with specialized education programs.

For more information about ISD, visit isd.engin.umich.edu
Questions? Email meonline@umich.edu