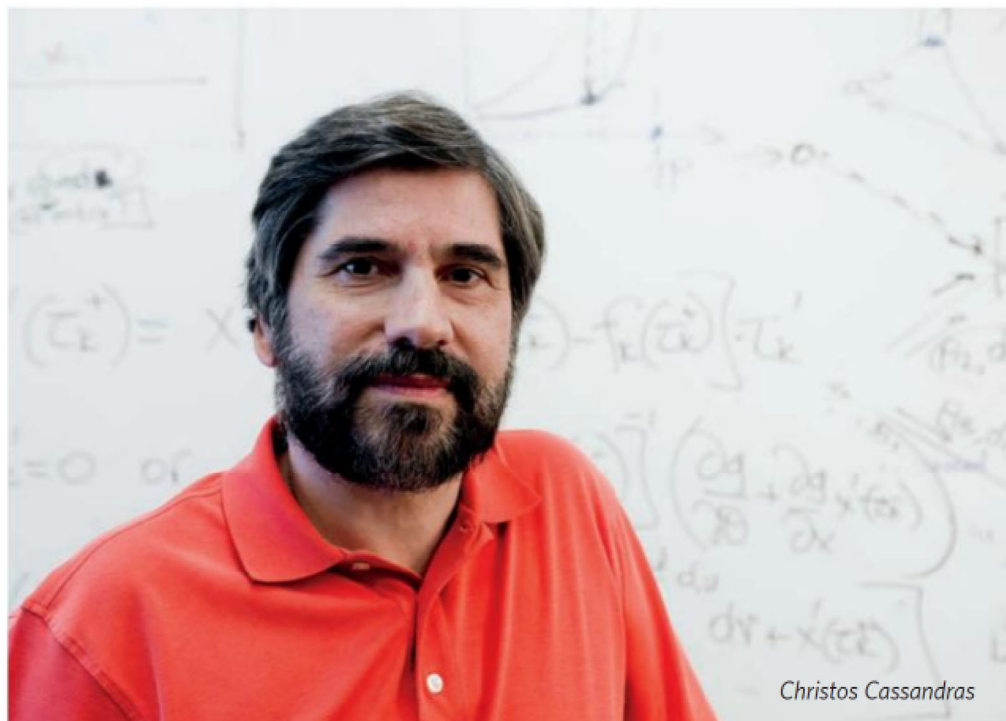




An Internet of Cars

CASSANDRAS RECEIVES GRANT TO DEVELOP SMART CAR TECHNOLOGY



Christos Cassandras

Most drivers who commute to and from Boston—considered one of the worst US cities for traffic—have experienced the misery of rush hour. Professor **Christos Cassandras** (SE, ECE) is part of a research group aiming to ease the commuting process (and the resulting air pollution) by developing efficient, smart vehicle technology through a \$4.4 million grant from the Department of Energy's Advanced Research Projects Agency-Energy NEXTCAR program.

"Right now, the car's awareness of its surrounding relies completely on the eyes and ears of the driver operating it," Cassandras explains. "But when you look at the data, humans are terrible drivers. Humans get distracted, they get tired, they can't react as quickly to sudden or multiple simultaneous changes. But computers thrive in an environment like that, so what we want to do is create a technology that allows the car to access information about its environment on its own, process it and act accordingly, and communicate it to other vehicles and infrastructure. Essentially, we want to create an internet of cars."

The project—Ultimately Transformed and Optimized Powertrain Integrated with Automated and Novel Vehicular and Highway Connectivity Leveraged for Efficiency, or UTOPIAN VEHICLE—is multifaceted. Cassandras will helm several phases, including one that focuses

on the eco-routing algorithms to help establish the connection between vehicles, infrastructure and the environment.

Other partners will work on the cars themselves. On the spectrum of automobile autonomy, this project—which includes researchers at the University of Michigan and the Oak Ridge National Laboratory and features Bosch as a corporate partner—will produce a car that performs some functions automatically but will still require human input, which may help ease the public with the transition toward smart cars.

The goal is to design a control technology that enables a plug-in hybrid car to communicate with other cars and city infrastructure and then act on that information. Cars with situational self-awareness will be able to efficiently calculate the best possible route, accelerate and decelerate as needed and manage their powertrain. According to Cassandras, the idea is to improve the efficiency of vehicles to the point where you can drive from point A to point B without stopping, which would have transformative positive effects.

"You can reduce fuel and energy consumption, which benefits the environment and lessens our dependence on expensive energy sources, and you make the traffic system work more efficiently by reducing congestion," he says. "The government would be satisfied if we could increase these efficiencies by 20 percent." —SARA CODY

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Two Faculty Members Elected to BME Society Leadership

Two BME faculty members have been elected to leadership positions in the Biomedical Engineering Society (BMES), the field's principal professional association.

Professor **Catherine Klapperich** (BME, ME, MSE), associate dean for Research and Technology Development, joined the board of directors for the 2016–2019 term. The main governing body of BMES, the board's responsibilities include electing an executive director, managing the society's resources and public image and maintaining accountability.

"It's a great honor to participate in the leadership of BMES," said Klapperich. "It gives us a great avenue to promote the field and engage in efforts to diversify and strengthen the pool of students and advanced trainees in biomedical engineering."

Professor **John A. White**, BME chair, was elected secretary for the 2016–2018 term. As the chief communications officer of the society, the secretary serves on both the Board of Directors and the Executive Committee.



Catherine Klapperich
(BME, ME, MSE)



John A. White, BME chair

"Out of six total leadership positions, the election of two members of our faculty reflects the esteem with which the department is held within the entire BME community," White said. —SARA CODY

ENG Faculty Elevated to Prestigious Fellowships

Professor **Xin Zhang** (ME, MSE) has been named a fellow of the American Association for the Advancement of Science (AAAS), the largest general scientific society in the world and publisher of the journal *Science*.

Zhang was recognized for her "distinguished contributions to the field of micro/nanoelectromechanical systems (MEMS/NEMS), addressing a wide range of important problems in advanced materials, biophotonics and energy." An AAAS tradition dating back to 1875, the fellowship is awarded to members by a panel of their peers. Zhang was also elevated as a fellow of the Institute of Electrical and Electronics Engineers (IEEE) for her "contributions to microelectromechanical systems." Zhang has applied MEMS techniques to develop metamaterials, arrays



Zhang



Belta



Sclaroff



Porter

of engineered structures that act like artificial atoms and exhibit unusual properties such as negative refractive indices and cloaking. In biomedicine, Zhang has developed a MEMS-based toolset that uses a unique sensing approach to analyze cellular behavior, which could improve our understanding of cardiovascular, liver and other diseases and potentially lead to novel therapies.

Professor **Calin Belta** (ME, SE, ECE) was named a 2017 IEEE fellow for his "contributions to automated control synthesis and robot motion planning and control." Director of the new Robotics

Laboratory and the Hybrid and Networked Systems Group, Belta does wide-ranging research including dynamics and control, robotics and systems biology.

Professor **Stan Sclaroff** (CS, ECE), associate dean of the faculty, mathematical and computer sciences, was elevated to a fellowship position by IEEE "for contributions to computer vision, image retrieval and gesture analysis." His research interests include computer vision, machine learning and human-computer interaction.

Associate Professor **Tyrone Porter** (ME, MSE) has been

elected a fellow to the Acoustical Society of America, the highest honor a member can achieve, "for contributions to therapeutic ultrasound." Porter's research focuses on using physical methods (such as ultrasound) and biochemistry to circumvent natural barriers within the human body in order to deliver targeted therapies to affected areas. Not only does this technology have potential treatment applications for a variety of neurological diseases, but it could also be used in the military to treat traumatic brain injuries and combat nerve agents.

—SARA CODY