SELECT
SYSTEMS ENGINEERING LABORATORIES

GENDER BIAS

Data Science & Machine Learning Lab

This lab discovered that machine learning applications were amplifying gender biases present in daily Google News reports. The team publicly identified the bias and implemented a fix.

Areas: machine learning, vision & learning, structured signal processing, decision and control. Directed by VENKATESH SALIGRAMA.

CELL CONTROL

Center for Autonomous and Robotic Systems

Researchers are working to unite artificial intelligence and biology. The lab is establishing control of cells that have been genetically modified. The success of this research will benefit international healthcare efforts to engineer tissues and organs.

Areas: autonomy, vehicles and microbiological robots. Directed by CALIN BELTA.

SEARCH-AND-RESCUE

Collaborative and Integrative Robotics Lab

The team is working on teleoperation projects that could help first responders use robots to rescue survivors in the wake of a disaster without being exposed to hazards.

Areas: Assistive technologies, collaborative robotics, teleoperation. Directed by REBECCA KHURSHID.

TOP ROBOTICS
AS RECOGNIZED BY ANALYTICS INSIGHT

The robotics program was singled out by *Analytics Insights* for a comprehensive approach to education. Many of the largest, resource-rich companies in the country—including Google, Amazon and Uber—are now investing in creating autonomous robotic systems. BU researchers take a unique approach to the field by focusing on robotic teams as cooperative dynamic systems.

VISIT US.

BU DIVISION OF SYSTEMS ENGINEERING
15 Saint Mary's Street, Room 117
Brookline, MA 02446

ENSURING THE SEAMLESS INTEGRATION OF TECHNOLOGY INTO EVERYDAY LIFE
BU.EDU/SE

BUSYSTEMS**ENGINEERING**

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SMART CITIES & TRANSPORTATION

$4.4M CHRISTOS CASSANDRAS (ECE, SE) advances the *internet-of-cars*, ANOL prototypes and self-driving cars.

$.5M C. CASSANDRAS (ECE, SE) AND IOANNIS PASCHALIDIS (ECE, BME, SE) optimize vehicle routing to ease traffic congestion.

HEALTHCARE

$25M AVRUM SPIRA (MED, SE) develops tools for early lung cancer diagnosis and establishes Johnson and Johnson partnership.

$1.6M IOANNIS PASCHALIDIS (ECE, BME, SE) develops a system to predict the risk of heart disease and diabetes.

$1.5M SANDOR VAJDA (BME, CHEM, SE) launches ClusPro a widely-used tool for protein-protein docking.

$1M ERIC KOLACZYK (MATH & STATS, SE) develops seizure intervention therapy.

ROBOTICS

$2.4M CALIN BELTA (ME, ECE, SE) directs teams of robots to survey areas with collapsed buildings and debris.

$1M ROBERTO TRON (ME, SE) is developing disaster relief technology for aerial vehicle search-and-rescue.

ENERGY

$1M JANUSZ KONRAD (ECE), PRAKASH ISHWAR (ECE, SE), THOMAS LITTLE (ECE, SE) and MICHAEL GEVELBER (ME, MSE, SE) are developing next generation sensors for HVAC systems.

$.3M MICHAEL CARAMANIS (ME, SE) is working to reform the power market for retail customer participation and distribution network marginal pricing.

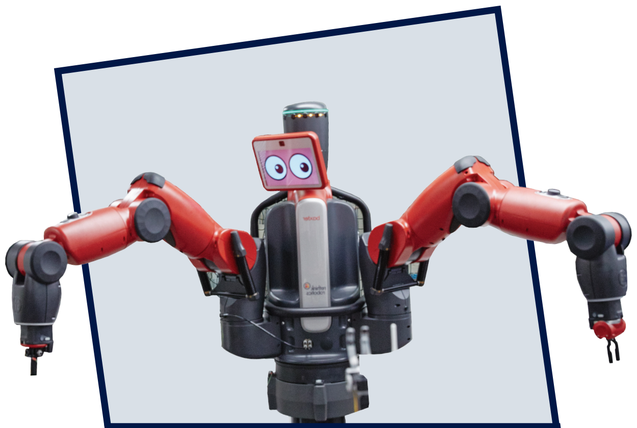
COLLEGE OF ENGINEERING DIVISION OF
SYSTEMS ENGINEERING

WHAT'S INSIDE?
INTERNATIONAL
DUAL DEGREE,
SMART CITIES

PLUS:
GREEN BUILDINGS,
STRIDES TOWARD
CURING CANCER

New Professor:
REBECCA KHURSHID

BOSTON UNIVERSITY



SYSTEMS ENGINEERING

$11M
Expenditures in 2017-2018

$60M
Active SE grants in 2017-2018 with anticipated funds

INTERDISCIPLINARY RESEARCH

- Automation, Robotics & Control
- Communications & Networking
- Computational Biology
- Informational Sciences
- Production, Services & Energy Systems

GLOBAL PRESENCE

Last year, a dual degree program between Boston University and Tsinghua University in Beijing was launched. The engineering program at Tsinghua University is one of the top worldwide.
SE Head CHRISTOS CASSANDRAS (ECE, SE) is working with universities around the world to establish similar programs.

RESEARCH IN ACTION

THE CENTER FOR INFORMATION & SYSTEMS ENGINEERING (CISE) is the Division of Systems Engineering's research component. The center is focused on deepening and broadening interdisciplinary research in the study and design of intelligent systems. With 43 faculty affiliates across 10 departments, CISE researchers solve complex problems in fields such as healthcare, communications, transportation, energy, and national security.

SE FACULTY SNAPSHOT
17 Appointed Faculty & 16 Affiliated Faculty
6K Average # Career Citations, 14 Early Career Awards,
17 Total Fellows in Professional Societies
SE faculty hail from 4 different colleges within the University

HEALTHCARE

AVRUM SPIRA (MED, SE) was named director of a team that is developing early lung cancer diagnostic tools such as nasal swabs, blood tests and radiological imaging. Also this year, A. Spira forged a five-year translational research alliance between BU and Johnson & Johnson Innovation LLC. In addition to developing biomarker-based early-screening tests, the initiative aims to develop therapeutics to arrest or eradicate the disease in its earliest stages.

A. Spira received $25M in funding this year, including: $15M from Johnson & Johnson, $5M from American Association of Cancer Research and $2M from NIH.

MORE: BU.EDU/ENG/JJI & BU.EDU/ENG/LUNGCANCER

ENERGY

JANUSZ KONRAD (ECE), PRAKASH ISHWAR (ECE, SE), THOMAS LITTLE (ECE, SE) and MICHAEL GEVELBER (ME, MSE, SE) received $1M from the Department of Energy to develop a system of sensors that can estimate the number of people in a room and adjust air flow in heating, ventilation and air conditioning (HVAC) appropriately, with the goal of saving energy.

The project aims at building a sensor system that will reduce energy costs in commercial buildings.

MORE: BU.EDU/ENG/ENERGY

TRANSPORTATION

CHRISTOS CASSANDRAS (ECE, SE) is part of a research group aiming to ease commuting traffic and the resulting air pollution by developing efficient, smart vehicle technology under a $4.4 million grant from the Energy Department's Advanced Research Projects Agency-Energy (ARPA-E) NEXTCAR program.

"Humans are terrible drivers," says C. Cassandras. "Humans get distracted, they get tired and they can't react quickly to multiple simultaneous changes. Computers thrive in that environment. We want to create technology that enables a car to access information about its environment on its own. The car will be able to process information, act accordingly and communicate to other vehicles and the infrastructure."

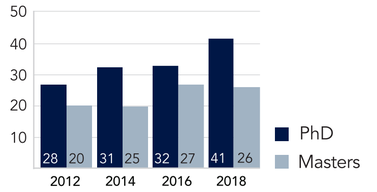
MORE: BU.EDU/ENG/NEXTCAR

ACADEMICS

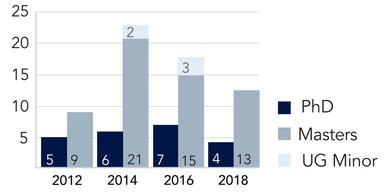
PHD STUDENTS ARE GUARANTEED FUNDING for up to five years subject to satisfactory academic performance.

40% FEMALE STUDENTS: While the national average of female engineering students is 24%, at BU, 40% of systems engineering students are female. Source: Council of Graduate Schools, 2016.

STUDENT POPULATION



DEGREES AWARDED




ALUMNUS MA STATE REP THOMAS VITOLO

I'VE ALWAYS BEEN INTERESTED IN HELPING MY COMMUNITY

SYSTEMS ENGINEERING ALUMNUS

Dr. Thomas Vitolo is a newly elected Massachusetts State Representative, advancing policies to benefit the community. Before politics, Vitolo worked with corporations to modernize their operating systems for results that benefited the company's bottom line and the livelihood of the community in which it functioned.

Vitolo values diversity in government affairs and prides himself on offering a distinct perspective to the House. Vitolo said that there are very few politicians with STEM backgrounds, especially considering the technical element within so many policies.

MORE: BU.EDU/ENG/REP*SOCIETAL*CHALLENGES