

SCHOOL OF ENGINEERING UPDATE

FAIRFIELD UNIVERSITY | SPRING 2019

Fairfield
UNIVERSITY

School of Engineering

Celebrating 25 Years

Message from the Dean



“We believe that engineering is a ‘service to humanity’ profession, which means that virtually everything engineers do is designed to help others.”

As this is my first message as Dean of Fairfield’s School of Engineering, I thought it would be helpful to provide a brief overview of my academic background. I joined Fairfield in July 2018, as (interim) dean and professor of engineering. Prior to that, I spent nine years at Embry-Riddle Aeronautical University as an engineering professor and senior vice president for Academics and Research, and seven years as a professor and dean of Engineering at Manhattan College. Before that, I spent 26 years at the University of Rochester on the Chemical Engineering faculty and as associate dean for Graduate Studies.

I am both pleased and proud to join the well-respected engineering faculty at Fairfield. Our School of Engineering (SOE) is relatively young; in fact, this year we are celebrating our 25th anniversary. The program came into being when Fairfield University acquired the Bridgeport Engineering Institute in 1994, and we have come a long way in a short time.

We believe that engineering is a “service to humanity” profession, which means that virtually everything engineers do is designed to help others. Couple this fundamental philosophy with the University’s Jesuit focus on service to others and social justice, and what we provide, in addition to a first-class engineering education, is an individual, character-building experience that encourages leadership development in our students. This, in part, is why we have a 100% job placement rate for our engineering graduates.

Just as important for our future, we have a growing cadre of applied research-involved faculty with interests in cutting-edge areas such as Artificial Intelligence, machine learning, cybersecurity, data science and analytics, nano/micro materials manufacturing, advanced simulation and analysis, and bioinformatics, to list a few.

Our growing emphasis on applied research will strengthen our academic reputation and will help bring about a “sea-change” in the SOE over the next decade. My belief is that the number of engineering faculty and students will increase substantially, and that there will be a stand-alone engineering building on the Fairfield campus.

The expansion of SOE as we move into our second quarter century will strengthen STEM awareness on our campus and help develop a “continuum of understanding” that broadens and strengthens the relationship with engineering and all the other academic disciplines.

It is an exciting time to be part of the engineering team here at Fairfield University, and I look forward to our working together to continue to define our path to the future for the School of Engineering.

Sincerely,

RICHARD H. HEIST, PhD
Dean

ON THE COVER:

An instructor and a student use a magnifying lens to create a Printed Circuit Board (PCB) in the Electrical Engineering Lab.

Photo by Joe Adams

SCHOOL OF ENGINEERING UPDATE

Richard Heist, PhD
Dean

Harvey Hoffman, PhD
Associate Dean

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Assistant Dean

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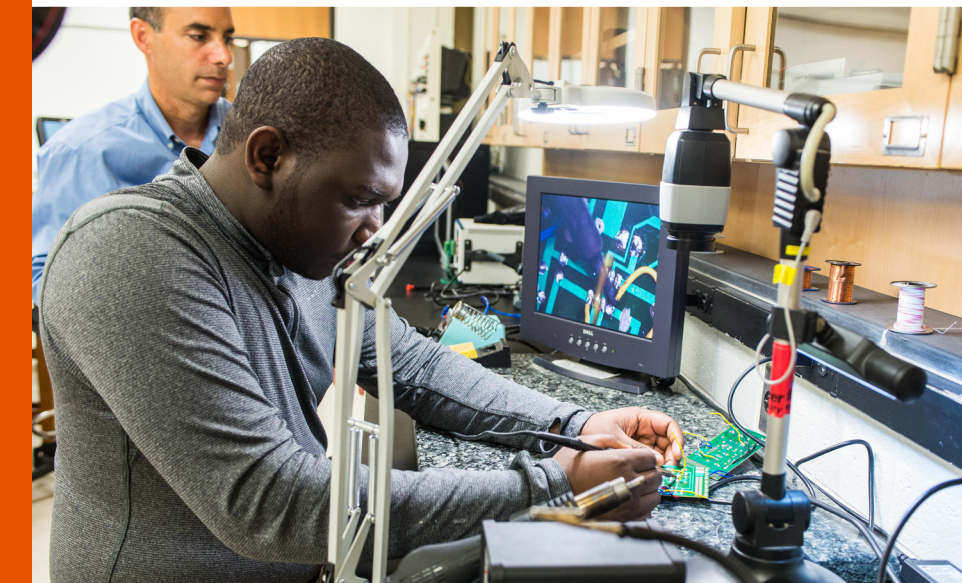
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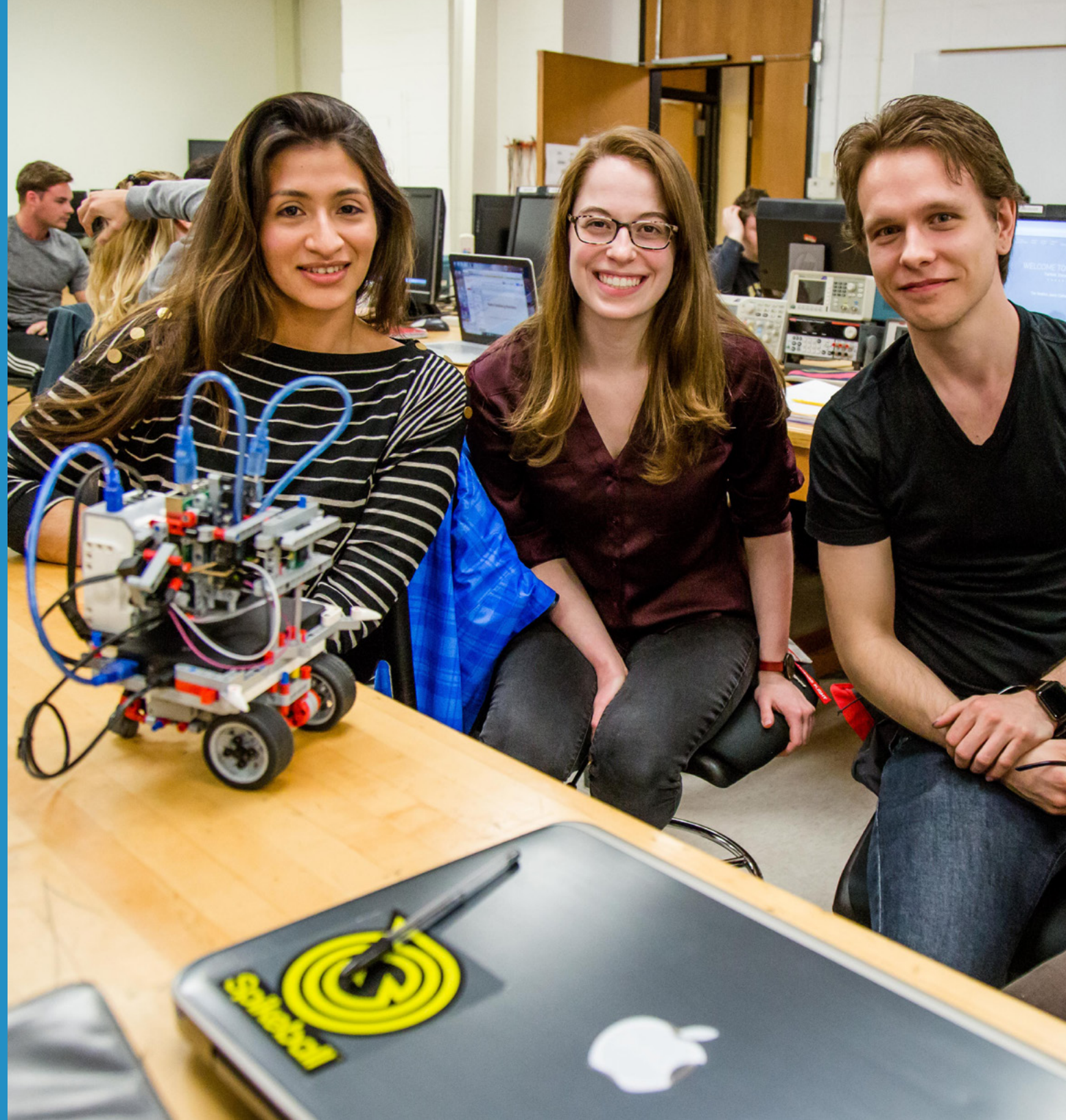
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UNDERGRADUATE PROGRAMS

B.S. in Bioengineering
B.S. in Computer Science
B.S. in Electrical Engineering
B.S. in Mechanical Engineering

STUDENT ORGANIZATIONS AND SOCIETIES

3D Printing Club
American Society of Mechanical Engineers (ASME)
Biomedical Engineering Society (BMES)
Engineers Without Borders (EWB)
Engineering Student Society (ESS)
Institute of Electrical and Electronics Engineers (IEEE)
National Society of Black Engineers (NSBE)
Society of Automotive Engineers (SAE)
Society of Women Engineers (SWE)
Tau Beta Phi (Engineering Honor Society)



STUDENT ACCOMPLISHMENTS

2018-19 Inductees to Tau Beta Phi, Fairfield's Engineering Honor Society

CLASS OF 2019
Peter Coffman (CE)
Joshua Dougherty (ME)
Uyen Thy Ho (MOT)
Jeffrey Kramer (SE)
Kacper Laska (ME)
Brandon Thomas (MOT)
Katherine Unfried (BE)
Daryl Vinluan (EE)

CLASS OF 2020
Thomas Botelho (ME)
Colin Bradley (ME)
Amy Caplan (BE)
Emmett Godfrey (ME)
Brian Gozzo (ME)
Keith McHugh (ME)
Mitchell Owen (ME)
John Weichenried (ME)
Peter Wihbey (ME)

NASA CT Space Grant Awardees, Fall 2018

Russell Moore
Katherine Unfried
Jovelt Dorsainvil

2018-19 BEI Scholarship

Harold Corey Loke
Johnathan Menz
Mayara Miranda
Carlos Murcia
Jacob Musto
Mohanapriya Nithiyanthantha Sukumar
Son Pham
Pawan Pillai
Galo Pombar Chico
Esai Varuni Rajapandi
Ashwini Sajjan
Mahitha Thikkavarapu
Brandon Thomas

Society of American Military Engineers (SAME) Scholarship

Davis Doherty

2018-19 Bernadette and John Porter Scholarship

Rathin Kumar Agarwal
Nicholas Caratelli
Nimesh Das
Nicholas DeBiase
John Delaney
Michael Donofrio
Naga Vydehi Gurram
Wei Hu
John Knight
Kacper Laska
Thuy Le
Yifei Li
Serena Lo

Martha Rogers BEI Scholarship

Calvin Thomas
Carlos Urena
Vandana Venkat Raman

Fairfield County ISI Engineering Scholarship

Bindu Madhavi Pesaladinne

GRADUATE PROGRAMS

Applied Data Science
Electrical and Computer Engineering
Management of Technology
Mechanical Engineering
Software Engineering

CERTIFICATE PROGRAMS

Cybersecurity
Data Science and Big Data Technology
Network Technology
Web and Mobile Application Development

STUDY ABROAD FOR ENGINEERS

University Comillas Pontifica in Madrid, Spain

University of Ireland, Galway*

* The University of Ireland, Galway also offers a 4 + 1 BS/MS biomedical engineering program in conjunction with its study abroad program. Students can earn a BS from Fairfield and MS from University of Ireland, in five years.

LEFT: (l-r), Milgjan Moreno-Villatoro '18, Christina Ficaro '18, and Kacper Laska '18, MS'19.

Photo by Joe Adams



“The event was very high energy. I did meet a lot of new people. It was not all game developers, as people might think. There were musicians, artists, writers, and designers among many others.”

Samuel Nguyen

FAIRFIELD SOFTWARE ENGINEERS WIN “BEST IN SHOW” AT GLOBAL GAME JAM

World records were broken as six Fairfield graduate student engineers spent an entire weekend collaborating on the design and development of a new video game at the largest Game Jam ever.

With a goal of bringing people from all over the world together for one exciting weekend of creating innovative video games, Global Game Jam is described by its volunteer organizers as “a hackathon focused on game development.” The 2019 non-profit event took place from January 25 to 27 and broke all previous participation records with 47,000 “jammers” making 9,000 new games at 860 sites in 113 countries.

Now in its 11th year, ten new countries took part for the first time in Global Game Jam 2019, including Azerbaijan, Namibia, and Sri Lanka. The team of grad students from Fairfield’s software engineering program participated at a location closer to home – Stamford, Connecticut.

At the start of the weekend, Game Jam organizers strategically announced this year’s secret theme across virtually every time zone in the world: “What Home Means to You.” And then the fun began; inspired by a shared love for survival-style games, the software engineers from Fairfield feverishly took to their keyboards and created a game with a story based on a map design. Grad student Jack Crowley said, “This was my first competition like this, and my favorite part was working with friends to build a fun game that everyone could play.”

“The event was very high energy,” added teammate and fellow grad student Samuel Nguyen, a self-taught video game developer with experience in 3D graphics. “I did meet a lot of new people. It was not all game developers, as people might

think. There were musicians, artists, writers, and designers among many others.”

Both Crowley and Nguyen agreed that the hardest part of building the game was the time constraint. Describing the hectic pace of the sleep deprived weekend, Crowley noted, “It was early morning starts all the way through until 9 p.m. Lots of asset designing and even more logic programming.”

At the end of the competition, a half dozen judges with expertise in game development and design individually tested out each game created at the Stamford location, and awarded the Fairfield University team “Best in Show.” This honor did not come as a complete surprise to Nguyen, thanks to his team’s use of complex 3D graphics for their characters, assets, and animation, which he shared, “the judges said was very rare since it is difficult to develop.”

“On top of that, even before the judging, many observers came by and asked us how long we have been doing this and what courses we took,” continued Nguyen. “They were very surprised to find out that we had never taken any specific game design courses.”

In addition to Crowley and Nguyen, the Fairfield University team included classmates Jingfei Zhang, Rajashekar Reddy Nandyala, Mohanapriya Nithiyanthanatha Sukumar, and Michael Donofrio. Adrian Rusu, PhD, professor and chair of Computer Science and Engineering said that all students in the software engineering graduate program participate in some type of competition during their studies “as part of the unique out-of-classroom preparation and experience we provide to our students.”



ABOVE: Fairfield grad students look on as a judge tries out their video game.

Photo by Dr. Adrian Rusu

LEFT: Graphic from the Fairfield team’s 3-D game, “Home Sweet Home.”

Photo by Jack Crowley

SKY'S THE LIMIT FOR NASA CONNECTICUT SPACE GRANT CONSORTIUM AWARDEES

A Fairfield professor and three students heeded the fall 2018 Call for Proposals and were awarded a total of \$17,000 in grant funding.

“**T**he Connecticut Space Grant funding will truly assist our school in preparing the next generation of STEM professionals, by exposing students to scientific research on projects that will include the implementation of cutting-edge learning algorithms on real-world problems,” said **Djedjiga Belfadel, PhD**, assistant professor of electrical and computer engineering.

The research agenda of Dr. Belfadel’s awarded project, “Robust Approach for Space-Based Imaging Sensors Alignment,” is to develop algorithmic and computational models to enhance the tracking quality of a Space Tracking and Surveillance System (STSS).

Support from the NASA Connecticut Space Grant Consortium will assist Dr. Belfadel in the development of a new laboratory built upon her extensive research experience in space-based tracking systems, and her \$10,000 grant will go toward providing stipends for multiple students to work on research projects related to space technology and target tracking.

Russell Moore ’19 was awarded a \$5,000 undergraduate research fellowship for his research project, “Pixel-Level Image Fusion Algorithms to EO/IR Multi-Sensor System,” which strives to develop an improved algorithm for target tracking, using the fusion of multiple images from electro-optical sensors. “Since the Cold War, the United States has relied on reconnaissance satellites for the safety of its citizens,” Moore wrote in his abstract. “Our research will add to this effort.”

Because satellite imaging can capture environmental data inaccessible through other methods, Moore believes that improving this technology will also benefit global efforts to study and monitor our planet.

Katherine Unfried ’19, a bioengineering major with a minor in biochemistry, was awarded a \$1,000 grant for a senior design project titled “Lend a Hand (Lightweight Low Noise Prosthetic Hand),” which will be developed by a team of engineering classmates. Unfried said that the team’s prototype aims to be myoelectric-controlled, meaning that it will be externally powered by the same neural signals that would control an actual human hand.

“The goal of designing something completely silent,” explained Unfried, “sets us apart from what is typically on the market because it requires us to use non-mechanical components: no gears, no fans, and none of the typical actuators that control movement in most prosthetic hands.”

Chemistry major **Jovelt Dorsainvil ’19**, who was granted a \$1,000 Student Travel Award, has been conducting research with Jillian Smith-Carpenter, PhD, assistant professor of chemistry and biochemistry, to develop peptides that can self-assemble into larger structures. “Essentially my goal is to add different groups to these peptides in order to create a supramolecular structure that can catalyze certain reactions,” Dorsainvil said.

“I developed the project in the summer; I started the peptide synthesis this fall. I will work on characterization of the catalysis during the spring semester and will present the results at the National Meeting of the American Chemical Society in Orlando, Florida in April 2019.”



Djedjiga Belfadel, PhD

“The Connecticut Space Grant funding will truly assist our school in preparing the next generation of STEM professionals, by exposing students to scientific research on projects that will include the implementation of cutting-edge learning algorithms on real-world problems.”

School of Engineering Celebrates 25 Years in Stag Country

The year 2019 marks the silver anniversary of the 1994 merger between the Bridgeport Engineering Institute (BEI) and Fairfield University, and plans are underway for a yearlong celebration of reinvention and innovation.

The Bridgeport Engineering Institute (BEI) was founded in 1924 to offer evening courses taught by local industry leaders to part-time engineering students – most of whom worked full-time in local factories and businesses. In the '80s, as enrollment peaked at 1,000, BEI President William Krummel, PhD, described these hard-working students as “the future of our industries, with open minds ready to find new solutions in an ever-changing environment.”

As a tuition-driven school, the Institute owned no property and operated out of rented classroom space and

borrowed labs until a 1994 merger, when BEI found a permanent home on Fairfield's campus and the University gained a School of Engineering with a vocation of service to humanity that perfectly complements its Jesuit mission to form men and woman for others.

“During times of peace and war, feast and famine, and incredible technological progress, BEI kept pace and its mission has survived,” said Evangelos Hadjimichael, PhD, who served for 15 years as dean of Fairfield's School of Engineering and oversaw its evolution from a part-time, evening school with deep local roots, into an internationally recognized full-time bachelor's and master's

degree granting program with students who hail from all corners of the globe.

Now celebrating its 25th anniversary, the Fairfield University School of Engineering continues to adapt to an ever-changing world and reinvent itself to best serve its students. In response to the stronger than ever demand for data scientists, the SOE launched an interdisciplinary MS in Applied Data Science program last year. A new state-of-the-art cybersecurity lab opened on campus in fall 2018, and the school's newest software engineering certificates include specializations in: Cybersecurity, Data Science and Big Data Technologies, Network Technology,

and Web and Mobile Application Development.

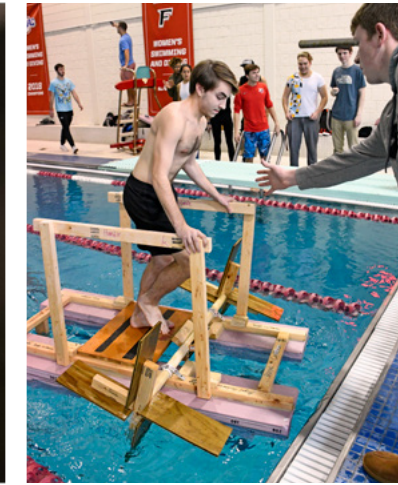
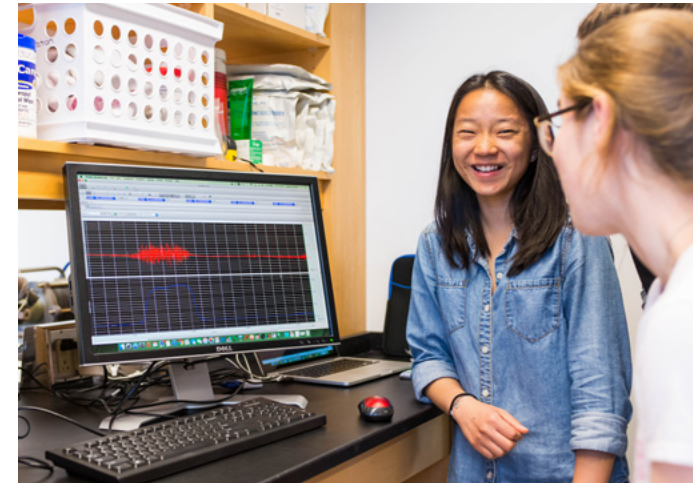
Under the new leadership of Dean Richard Heist, PhD, a growing cadre of SOE faculty is pursuing applied research in the cutting-edge areas of artificial intelligence, cybersecurity, data science, nano/micro materials, advanced simulation and analysis, and bioinformatics, to name a few.

When asked to envision Fairfield's School of Engineering 25 years from now, Dr. Heist looked into his crystal ball and saw a bright future, “The next quarter century will bring a ‘sea-change,’” he predicted.

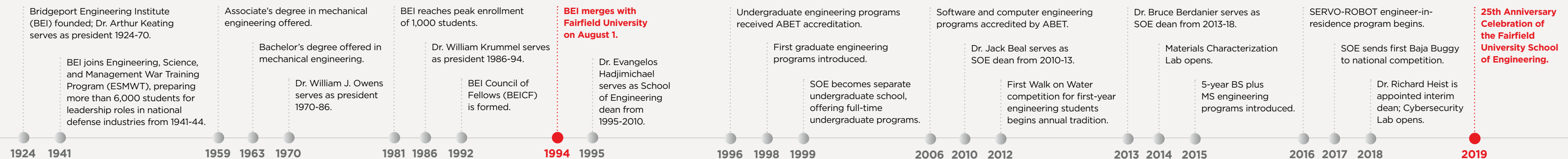
“The further maturing of the School of Engineering in its second quarter century, along with the growth of

applied research, will foster a strengthening of STEM awareness on our campus and help to develop a ‘continuum of understanding’ that broadens and strengthens the relationship with engineering and all the other academic entities on campus.”

ABOVE FROM LEFT: Bioengineering major, Liliana Delmonico '20; Electrical engineers create a printed circuit board; Joseph Resca '21 competes in Walk on Water; Engineers service a water filtration system in Bolivia; Engineering student at work in a robotics class.
Photos by (1, 2, 5) Joe Adams, (3) Giles Ruck '21, (4) Liliana Delmonico '20



Fairfield UNIVERSITY
School of Engineering
Celebrating 25 Years



FAIRFIELD INSTRUCTOR DOMINIC FIGUEIREDO CREATES ONE- OF-A-KIND AXE FOR CHARITY AUCTION

First offered by the School of Engineering in 2016, the “STEM Guitar” class combines art, music, design, and engineering — and is one of the most popular classes on campus.



Dominic Figueiredo is a man of many talents. “He’s so talented, it’s almost annoying; the guy’s a comedian, he can play guitar, he can make guitars, he can sing, and he’s a nice guy,” said Connecticut on-air radio personality Chaz, during a broadcast of 99.1 PLR’s *Chaz and AJ in the Morning* program.

This past fall, “Dom Fig,” as DJ Chaz refers to Figueiredo, spent more than 100 hours designing and building a one-of-a-kind, handmade electric guitar to be auctioned off at the WPLR radio station’s holiday toy drive.

Figueiredo described how he crafted the instrument — which went for a winning bid of \$1,000 — out of cherry, maple, and rosewood. He laser-engraved the radio show’s logo on the front of the guitar, and created a detailed picture of the on-air WPLR personalities on the back. “It’s actually a three-dimensional image, so it’s burned into the back of the guitar,” said Figueiredo. “That alone took many hours.”

Fitted with dual humbucker pickups, a three-way switch, and volume and tone controls, “This guitar looks bad-ass and sounds tremendous!” noted the WPLR website. “Pictures cannot do this axe justice.”


“I put a lot of love into it,” Figueiredo told *Chaz and AJ in the Morning* listeners. “Season of giving, man! It’s all about the kids!” The annual toy drive event raised a total of \$192,000 for Connecticut non-profits, including the McGivney Center, the Boys & Girls Village, and the Family & Children’s Agency.

Off the air and back on Fairfield’s campus, the “STEM Guitar” instructor described his inspiration for this project, “I have worked with Chaz and AJ for many years on the toy drive and this year instead of offering my services, I thought it would be great to donate something of value that they could exchange for money to help underprivileged children.”

“I grew up in Bridgeport,” he continued. “My parents were immigrants from the Azores Islands off the coast of Portugal and we never had much money ... I saw a guitar in a pawn shop in Bridgeport when I was 8 years old — it was love at first sight. My dad bought it for me for Christmas, and my passion for guitars has remained to this day.”

Figueiredo studied guitar with some great teachers, most notably Connecticut’s legendary Linc Chamberland. He also sang in a band called Essence in Hollywood for a while. These days, he doesn’t play guitar that much — he prefers to build them.

Each semester that he teaches “STEM Guitar,” Figueiredo said that he encourages his students “to think outside the box and create something that hasn’t yet been done.”

Clearly, these are words he lives by. 



LEFT: A student adds strings to his newly designed electric guitar in the “STEM Guitar” workshop.
Photo by Joe Adams

RIGHT: Dominic Figueiredo displays the three-dimensional laser engraved image on the back of his guitar.
Photo by Jeannine Graf

Engineering School Initiatives Strengthen International Student Recruitment

Although it remains the top global destination for international study, the *Connecticut Post* reports that the United States is seeing a decline in the number of students coming from abroad. Recognizing that the international student environment in the U.S. is changing, Fairfield's School of Engineering has embarked on a multifaceted approach to increase international enrollment.


The first phase of this approach focuses on China, the top origin country for international students in the U.S. In the summer of 2017, Adjunct Professor Xiaojiang (Henry) Wu, PhD, traveled to China with Associate Dean Harvey Hoffman, PhD, to promote Fairfield's new and existing engineering graduate programs, and to begin development of collaborative relationships with a half dozen Chinese universities.

In August 2018, a delegation from Ganzhou City's Jiangxi University of Science and Technology visited the School of Engineering at Fairfield University. Jiangxi President Luo Sihai and Fairfield President Mark R. Nemec, PhD, signed a Memorandum of Understanding (MOU), a general agreement of academic cooperation.

Drs. Wu and Hoffman returned to China in October 2018, to promote Fairfield's new Applied Data Science and Information Security graduate programs at Guangzhou Maritime University in Guangzhou and Donghua University in Shanghai.

On this trip, the professors also introduced two new program concepts. The first is a 10-course version of Fairfield's Management of Technology program, to be co-taught by Fairfield and Chinese university faculty, in China. Targeted at working students and professionals, this program will be taught through a combination of weekend, summer, and online courses. Students and faculty will collaborate using Skype and email, and the students will present their capstone projects at the China location.

The second program concept will enable Chinese students to complete a one-year engineering master's degree at Fairfield University, as part of their Chinese university graduate studies. The year at Fairfield will replace the internship and research year typically required in a three-year Chinese master's program. At the end, a student will have earned two master's degrees – one from the Chinese university and one from Fairfield.

In March 2019, Dr. Wu represented the School of Engineering and Fairfield University at recruiting fairs sponsored by Linden Educational Services in Beijing and Shanghai. Dr. Wu distributed bilingual Management of Technology and Applied Data Science master's degree brochures, and debuted a new engineering school video with Chinese subtitles. 

Fairfield's School of Engineering has embarked on a multifaceted approach to increase international enrollment.



At this time, Fairfield University has signed articulation agreements with the following universities:

- Donghua University – Shanghai
- Guangzhou Maritime University (Guangzhou Province)
- Jiangxi University of Science and Technology (Jiangxi Province)
- Nanchang University (Jiangxi Province)

Additional discussions focusing on the Applied Data Science master's program are currently in progress with the Finance and Trade Vocational College in Gansu Province and Shenzhen Polytech Institute in Shenzhen Province.

To accommodate Chinese students who demonstrate a need for improved English writing and reading skills, Fairfield has enlisted the services of The Washington Institute, LLC, a provider of online English as a Second Language (ESL) instruction directly available to students while still in China. Upon successfully completing this ESL instruction, students will have achieved sufficient English fluency to pursue studies in the School of Engineering and other Fairfield University programs.

Fairfield University and the School of Engineering use a variety of websites to communicate with Chinese students and their families. They include: web.wechat.com, www.renren-inc.com/en/, weibo.com, and www.youku.com.

In addition, Fairfield's Admission Department has collaborated with Sunrise, a Chinese web development company, to establish a Fairfield University Chinese website, www.fairfield-edu.cn, which is currently being updated to provide information about our graduate and undergraduate academic programs.

SENIOR DESIGN PROJECTS SPRING 2019

TEAM 1

Distributed JavaCat

Advisors: Dr. Amalia Rusu and J. Ritchie (Federal Aviation Administration)
Benicat Benoit (E); Peter Coffman (C); Davis Doherty (S); John Wiley (S).*

Working with the FAA, Team 1's goal is to improve an existing distributed system that generates test data for air traffic control safety equipment. The new system will be efficient, portable, and reliable while using a master/slave topology to communicate between distributed components.

TEAM 2

Reticle Handler Simulation Package

Advisor: Dr. Adrian Rusu and S. Lindeberg (ASML)
Brendan Dunne (S); Evan Gorman (S); Benjamin Nelligan (C); Matthew Williges (S).*

Team 2 will create a simulator framework with automated testing capabilities, using Python to design a flexible and easily extendable system, to be integrated into ASML's systems.

TEAM 3

Multipurpose Solar Charging Station

Advisor: Dr. Balaji
Ryan Avery (E); Patrick Evans (E); Maxwell Malcy (E); Maverick Ruiz (E).*
 Team 3 will design a multipurpose solar station with the goal of charging a variety of devices using energy that will be efficiently harvested from the sun, using solar tracking.

TEAM 4

Computational and Experimental Development of Inlet/Exhaust Manifolds for a Cylindrical Chemical Reactor

Advisor: Dr. Etemad, Dr. Loebick, and Dr. Weissman (Precision Combustion, Inc.)
Conor Goetz (M); Daniel Hagis (M); Alyssa Martinez (M); Taylor Poosikian (M).*

For this project, Team 4 will develop an inlet/outlet manifold structure system, achieving a low-pressure drop and uniform flow through a cylindrical chemical reactor.

TEAM 5

Automated Inventory Robot for Small Companies

Advisors: Dr. Denenberg and J. Butala (O'Keefe Controls)
Michael Lynders (E); Matthew Pauwels (M); Bryan Sepkowski (E); Daryl Vinluan (E).*

Team 5 will create a rail-based robotic platform to retrieve small boxes from inventory at a manufacturing business. Emphasis of the robotics platform design will be to achieve safe, reliable, precise movements using readily available and cost-effective automation components.

TEAM 6

Lightweight Low Noise Prosthetic Hand

Advisor: Dr. Gunawardana
Nicholas Herringshaw (S), Robert O'Donovan (B), Moses Olimpio (E), Justin Touve (M), Katherine Unfried (B).*
 Using a hand frame, silent actuators, and an electrical circuit, Team 6 will design and build a lightweight, low-noise,

myoelectric-controlled prosthetic hand. They will program a microprocessor to intake myoelectric signals from the body and output electrical signals to the prosthetic.

TEAM 7

Rate-Dependent Material Testing

Advisors: Prof. McFadden
Claire Ismirlan (M), Liam Jago (M), Raphael Longobardi (M), Jeremy Morton (M).*

Team 7 will develop an auxiliary piece of equipment to allow an Instron to operate above 10 times its maximum speed. The piece of equipment will fit within the Instron housing and meet safety requirements.

TEAM 8

Optical Speed Gun

Advisor: Dr. Denenberg
Michael Amoroso (E), Nicholas Delfico (E), Ryan Dunkin (M), Muhammad Mubasit (S), Christopher Quinn (E).*

Studying current police radar guns, Team 8 will explore stereoscopic vision to solve the existing health problems they bring. Using a camera to take two images from different perspectives, they will calculate the velocity of a moving object using the difference in the depth between each image.

TEAM 9

Stent Device for Less Invasive Circulatory Assist

Advisor: Dr. S. Freudzon
Andrew Altamirano (M), Mahammad Camaro (B), Christopher Costabile (M), Christine Cunniff (B).*

Team 9 will create a stent-like device for

weakened hearts, to hold a circulatory assist pump in place. The heart-assist device will be an alternative to invasive and more expensive circulatory assist devices.

TEAM 10

LogOX 3-in-1 Forestry Multi-Tool Optimization

Advisors: Dr. Sundarram and Prof. Bauer
Gabriella Borea (M), Gunnar Brewen (B), Jonathan Canniff (M), Gabriella D'Angelo (M).*
 Team 10 will refine the design of a novel wood log handling device to benefit the end user. Focus areas will be ergonomics, weight reduction, and production cost.

TEAM 11

Manual Reticle Handler Redesign

Advisors: Dr. Judge, T. Weinlandt, and J. Lombardo (ASML)
Mckenzie Armington (M), Joshua Dougherty (M), Tyler Moragas (M), Kaitlyn Nelson (M).*

Working with ASML, Team 11 will design and construct a device to aid in the manual movement and rotation of a reticle, an extremely sensitive and crucial piece of equipment in the lithography process.

TEAM 12

Precision Surface Metrology System Applicator

Advisors: Dr. Judge, T. Weinlandt, and P. Gupta (ASML)
Muhammad Bangi (M), Christopher Connors (M), Sarah Dignam (M), John Norton (M).*

Team 12 will develop a device that will apply a Particle Measurement Card to measure surface cleanliness on any surface that collects particles. The device will use a puck to collect and measure the particles.

TEAM 13

Pill Identification and Dose Verification

Advisor: Dr. Munden (ASML)
Daniel Hage (M), Samuel Harris (M), Joan Ruiz (E), Leighton Waters (C).*
 Team 13 will create a safer pill dispenser: one that releases medication one-by-one and is photo verified.

TEAM 14

Pixel-Level Image Fusion Algorithms for IR/EO Multi-Sensor System

Advisor: Dr. Belfadel
Clarensky Benoit (E), Michael Foster (M), Russell Moore (E), Robert Munoz (M).*
 Researching state-of-the-art tracking methods from satellites used to track a ballistic missile, Team 14 will focus research on the tracking algorithm and the associated hardware used to capture images.

TEAM 15

Redesign of a Charm Extractor for an Automated Jewelry Unpacking System

Advisors: Dr. Zabinski and K. Kharbouch (NLE)
Bradley Kimball (M), Madison Roberts (M), Raymond Sanchez (M), Lillian Vincens (M).*
 Team 15 will create a machine that unpacks jewelry from individual packaging and frees the charms from the tags and plastic attached without harming the charm.

SCHOOL OF ENGINEERING FAST FACTS

<p>12:1</p> <p>Undergraduate student-to-professor ratio</p>	<p>100%</p> <p>Engineering students with at least one internship*</p>	<p>37%</p> <p>Engineering students with two or more internships*</p>
<p>100%</p> <p>Placement Rate</p> <p><i>six months after graduation</i></p>	<p>62% employed</p> <p>+</p> <p>38% full-time graduate program enrollment</p>	<p>\$66,874</p> <p>Median starting salary for Fairfield University SOE graduates</p>

*Based on respondents to Class of 2018 survey

A SAMPLING OF COMPANIES THAT HIRE FAIRFIELD SOE GRADUATES



(B)=Bioengineering, (C)=Computer Eng., (E)=Electrical Eng., (M)=Mechanical Eng., (S)=Software Eng.

* Student in charge of team Purchase Orders and Finances

FACULTY DEDICATED TO RESEARCH AND INNOVATION

Uma Balaji

Associate Professor and Chair of Electrical Engineering and Bioengineering

PhD, University of Victoria, B.C. Canada

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- RF Power Amplifier
- Microstrip Antennas
- RF and Wireless Systems
- Design for Electromagnetic Compatibility
- Numerical Methods in Electromagnetics
- Microwave Component Design for Satellite Applications

Djedjiga Belfadel

Assistant Professor, Electrical and Computer Engineering

PhD, University of Connecticut

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- Design and Development of Multi-Sensor, Multi-Target Trackers
- Sensor Fusion Algorithms
- Hardware and Firmware Development of Embedded Systems
- Assembly and C-Programming Languages
- Signal and Image Processing
- Machine Learning and Classification Algorithms

Shahrokh Etemad

Professor and Chair of Mechanical Engineering

PhD, University of Washington

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- Energy Conversion, Heat and Mass Transfer
- Renewable Energy
- Innovative Concept Development
- Gas Turbines and IC Engines
- Scroll Compressor
- Catalytic Combustion
- Turbomachinery and Thermo-Fluids

- Novel Thermodynamic Cycles
- Computational Fluid Dynamics

Susan Freudzon

Professor, Bioengineering

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- Clinical and Translational Research
- Biomedical Data Analysis
- Medical Image Analysis and Quantification
- Medical Devices
- Biomechanics

Richard H. Heist

Professor and Dean, School of Engineering

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- Nucleation
- Nucleation-Related Phenomena
- Aerosols and Air Pollution
- Applications of Computers to Education

Harvey Hoffman

Professor and Associate Dean, School of Engineering

Director of Management of Technology

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- Engineering Education

Douglas Lyon

Professor, Director of Electrical and Computer Engineering Graduate Program

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- Signal and Image Processing
- Computer-Based Hardware and Software Systems
- Biomedical Sensors and Processing
- Financial Engineering
- Data Mining

- Internet of Things
- Engineering Entrepreneurship

Adrian Rusu

Professor, Chair of Computer Science and Engineering

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- Data Visualization
- Software Engineering
- Edutainment
- Human-Computer Interaction
- Design and Analysis of Algorithms
- Computer Science and Software Engineering Education

Amalia Rusu

Associate Professor, Software Engineering

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- Human Interactive Proofs and CAPTCHA
- Document Image Analysis and Pattern Recognition, Image Processing
- Artificial Intelligence
- Human-Computer Interaction
- Web Security and Biometrics
- Computer Game Modeling
- Software Engineering
- Computer Science and Software Engineering Education

Mehdi Safari

Assistant Professor, Mechanical Engineering

PhD, Northeastern University

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- Thermal-Fluid Sciences
- Computational Fluid Dynamics (CFD)
- Turbulent Combustion
- High Performance Computing
- Energy Conversion and Propulsion

Sriharsha S. Sundarram

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PhD, University of Texas at Austin

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- Micro/Nano Manufacturing
- Applications in Energy and Biomedicine
- Materials Chemistry and Numerical Modeling

Haishuai Wang

Assistant Professor, Computer Science and Engineering

PhD, University of Technology, Sydney

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- Artificial Intelligence
- Machine Learning and Deep Learning
- Time Series and Graph Mining
- Biomedical Informatics
- Social Network Analysis
- Big Data

Michael Zabinski

Professor, Mechanical Engineering

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- Mechanics of Solids
- Simulations and Numeric Solutions
- Computers in Education

RIGHT: Top (l-r), Ashley Halmans '20, Liliana Delmonico '20, and Katherine Unfried '19 with Dr. Susan Freudzon; Bottom, Dr. Shahrokh Etemad.

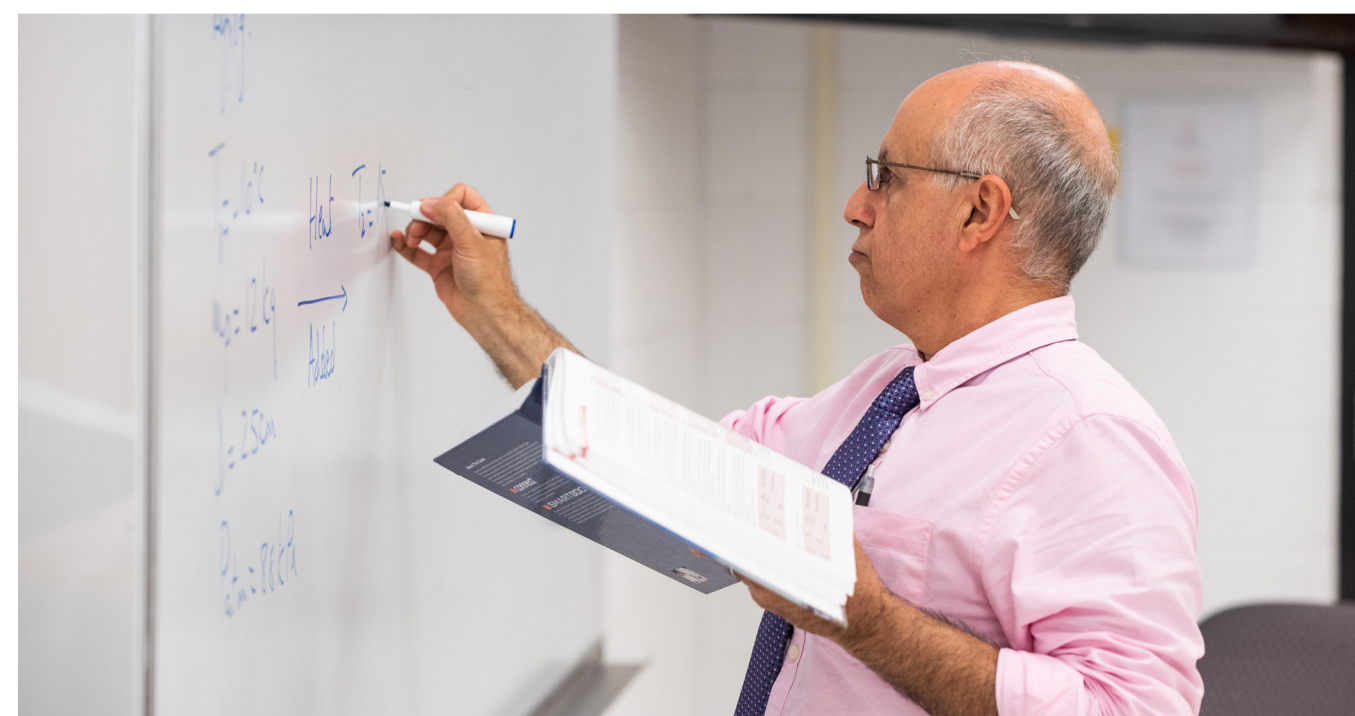
Photos by Joe Adams

BACK COVER: Emmett Godfrey '20, Peter Wihbey '20, and Jack Callanan '20 at work in the Mechanical Engineering Lab.

Photo by Mike Budny

Class in the Electrical Engineering Lab.

Photo by Joe Adams



VISION

As an integral component of a comprehensive Jesuit university, the Fairfield University School of Engineering is committed to providing a student-oriented classroom and laboratory environment enhanced by research that enables graduates to become leaders in the quest to solve society's greatest challenges in service to others.

MISSION

The Fairfield University School of Engineering is dedicated to providing quality educational opportunities in engineering and computer science to a diverse student population. The School emphasizes whole-person development (*cura personalis*) through its commitment to a unique integration of expertise in innovative technical areas with a strong liberal arts core preparing graduates well for professional practice and graduate education.



School of Engineering

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