



ELECTRICAL & COMPUTER
ENGINEERING
UNIVERSITY of WASHINGTON

THE INTEGRATOR

2019

Ganesh Moorthy

ECE alumnus and visionary leader of microchip industry speaks at ECE graduation ceremony.



01 ELECTRICAL & COMPUTER ENGINEERING

ACKNOWLEDGMENTS

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MESSAGE FROM THE CHAIR

DEAR MEMBERS OF UW ECE COMMUNITY,

This has been an incredible year of growth in many dimensions for the UW ECE department. Our faculty and students continue to be recognized nationally and internationally for their societally impactful discoveries, inventions, and translational work. Professor Shwetak Patel won the prestigious ACM prize in Computing for his groundbreaking contributions in low-power sensing and mobile health, the first at the University of Washington; Professors Mari Ostendorf and Li Deng were elected to the Washington Academy of Sciences; Professor Deng was also elected as a Fellow of the Canadian Academy of Sciences; Professor Lih Lin was elected as a Fellow of the Optical Society of America; Professor Linda Bushnell was elected as a Fellow of the International Federation of Automatic Controls, the first at the University of Washington. Professors Arka Majumdar, Lillian Ratliff and Visvesh Sathe received the highly prestigious and competitive NSF CAREER awards, and Arka Majumdar also received a Washington Research Foundation Distinguished Investigator Professorship. Additionally, Professor Akira Ishimaru has been honored with the Life Fellow award from URSI.

Our students were raking up national recognition as well. ECE Professional Master's Program Alum Elaine Reeves received the Society of Women Engineers Distinguished New Engineer Award at the national level; four ECE female students were selected to present at the 2019 Grace Hopper Conference; ECE postdoctoral scholar Shana Moothedath was selected to participate at the EECS Rising Star Award in 2019; a team of students led by Professor Jeng-Neng Hwang won in multiple categories of the 2019 CVPR AI city challenges; and the UW's Advanced Robotics Club, mentored by Professor Blake Hannaford, once again traveled to Shenzhen, China to compete in the international RoboMaster tournament.

Many of the startups of our recent graduates are also doing exceptionally well. Drs. Ben Waters, Vamsi Tala and Fredrik Ryden are leading and growing their startups Wiobtics, Jeva Wireless and Olis Corporation, respectively. The ENGINE program of ECE, which is supported and based on the vision of Milton and Delia Zeuschel, has scaled up the entrepreneurial education at UW ECE tremendously.

Our newly formed Industry Advisory Board (IAB) is led by Ted Kummert, whose family is deeply connected to the UW. The son of a world-renowned legal scholar and legendary pro-

fessor of the UW law school, Richard O. Kummert, Ted was part of the previous IAB that was instrumental in the name change of the department. The IAB is now in the great hands of Ted and his team, and the future is incredibly bright for ECE. We also welcome our incoming COE Dean, Nancy Allbritton.

I am also very excited to share the establishment of the Moorthy Family Inspirational Professorship endowment in ECE by alum Ganesh Moorthy and his wife, Hema Moorthy. As the inaugural graduation speaker of the newly formed UW ECE department, Ganesh delivered one of the most inspiring speeches.

It has been my great privilege and honor to get to know all of you and serve as the department chair for the past five years, from Jan. 1, 2015 to Dec. 31, 2019. Your support and helpful inputs shaped the department to be in this excellent position. When the new ECE chair arrives, please continue to engage with us, provide your inputs for increased societal impact, and join us in the alumni mixers and quarterly lab tours with the future Huskies in your families.

Wishing you and your families the most wonderful Holiday Season!



RADHA POOVENDRAN

PROFESSOR AND CHAIR,
ELECTRICAL & COMPUTER ENGINEERING, UW



photo by Mark Stone

THE UW ECE COMMUNITY WELCOMES NEW DEAN, NANCY ALLBRITTON

Dr. Nancy Allbritton joins us as the Frank & Julie Jungers Dean of Engineering. A faculty member, researcher and chair of the Joint Department of Biomedical Engineering at the University of North Carolina at Chapel Hill (UNC) and North Carolina (NC) State University, Allbritton brings an impressive record of leadership, teaching, research and innovation to the UW.

On November 1, 2019, Dr. Nancy L. Allbritton joined the University of Washington as the Frank & Julie Jungers Dean of Engineering. In that capacity, she serves as the chief academic officer of the college and provides leadership to over 279 faculty and more than 8,000 students. The College of Engineering is a top-15 nationally ranked public university program with annual research expenditures exceeding \$159 million.

Allbritton holds an appointment in the UW's Department of Bioengineering, and is an international expert on multiplexed single-cell assays, microfabricated platforms for high-content cytometry combined with cell sorting, and microengineered stem-cell-based systems for recapitulating human organ-level function. She has been nationally recognized for her research, which has been funded by more than \$60 million in grants, and is a Fellow of the American Association for the Advancement of Science, the American Institute for Medical & Biological Engineering and the National Academy of Inventors. Allbritton holds 43 patents that have led to 15 commercial products, and four companies have been formed based on her research discoveries.

Prior to joining the UW, Allbritton led the Joint Department of Biomedical Engineering at the University of North

Carolina at Chapel Hill and North Carolina State University, which spans two universities and three colleges. She joined UNC in 2007, after 13 years on the faculty at the University of California, Irvine. In 2009, Allbritton became chair and expanded the Joint Department of Biomedical Engineering, a single unit across UNC and NC State that also includes faculty from UNC's School of Medicine and College of Arts & Sciences and NC State's College of Engineering. She has received excellence in teaching awards and has advised 42 graduate students and trained 33 postdoctoral fellows.

After earning her doctorate in medical physics/medical engineering from MIT, Allbritton completed a postdoctoral fellowship at Stanford University. She holds a medical degree from Johns Hopkins University and her bachelor's degree in physics from Louisiana State University.

Regarding the ECE department, Allbritton noted, "The field of electrical and computer engineering is at the forefront of solving emerging societal challenges. One of our largest engineering departments, ECE is a leader in education, research and innovation. I'm looking forward to working with and among ECE's creative faculty and bright students as well as meeting and engaging with ECE's distinguished alumni."

BAY AREA ALUMNI NETWORKING HAPPY HOUR 2019!

THIS SEPTEMBER, NEARLY 50 OF OUR BAY AREA ALUMS RECONNECTED AT THE COMPUTER HISTORY MUSEUM IN SAN JOSE, CALIFORNIA.

SAN JOSE, CA | 09.12.19

On September 12, 2019, the Bay Area Alumni Networking Happy Hour was held in San Jose, California. Alumni from across the department's history, spanning more than five decades, came out to network, catch up and hear from ECE's outstanding faculty. This event was hosted by Radha Poovendran, with ECE faculty guests Payman Arabshahi, Sreeram Kannan and Eli Shlizerman in attendance. It is the department's honor and priority to remain connected to our alumni. Thanks to everyone who was able to join us at this annual event and we look forward to seeing you again next year, where we also hope to host an industry panel and even more opportunities for networking and engagement! If you would like to get in touch with us about this event, please email: events@ece.uw.edu.



Stewart Wu with Radha Poovendran



Eli Shlizerman, Sreeram Kannan, Sal Dhanini and Radha Poovendran



Bror Saxberg, Radha Poovendran and Denise Brudevold



Mahnaz Sherzoi, Kyle Hurlbut and Payman Arabshahi



Uday Kapoor and Zoe Bartholomew



James Goin, Pierre Laury and Wenjie Zheng



Alumni guests at the 2019 Bay Area Alumni Networking Happy Hour.

2019 ENGINE SHOWCASE

Nearly 50 teams showed off projects with a societal impact as a part of the annual Engineering Innovation and Entrepreneurship showcase.

On June 3, 2019, the Department of Electrical & Computer Engineering hosted its annual ENGINEERING INNOVATION and Entrepreneurship (ENGINE) program showcase. The program gives students the opportunity to work in teams on industry sponsored projects.

This year, nearly 50 teams of students worked to develop projects with a particular societal impact. Students' projects covered an array of electrical and computer engineering areas including healthcare, power and energy, transportation, the environment, and artificial intelligence.

Rolled out in 2016, the Engineering Entrepreneurial Capstone Program enables students to work in teams on industry sponsored projects, under faculty and industry mentorship.

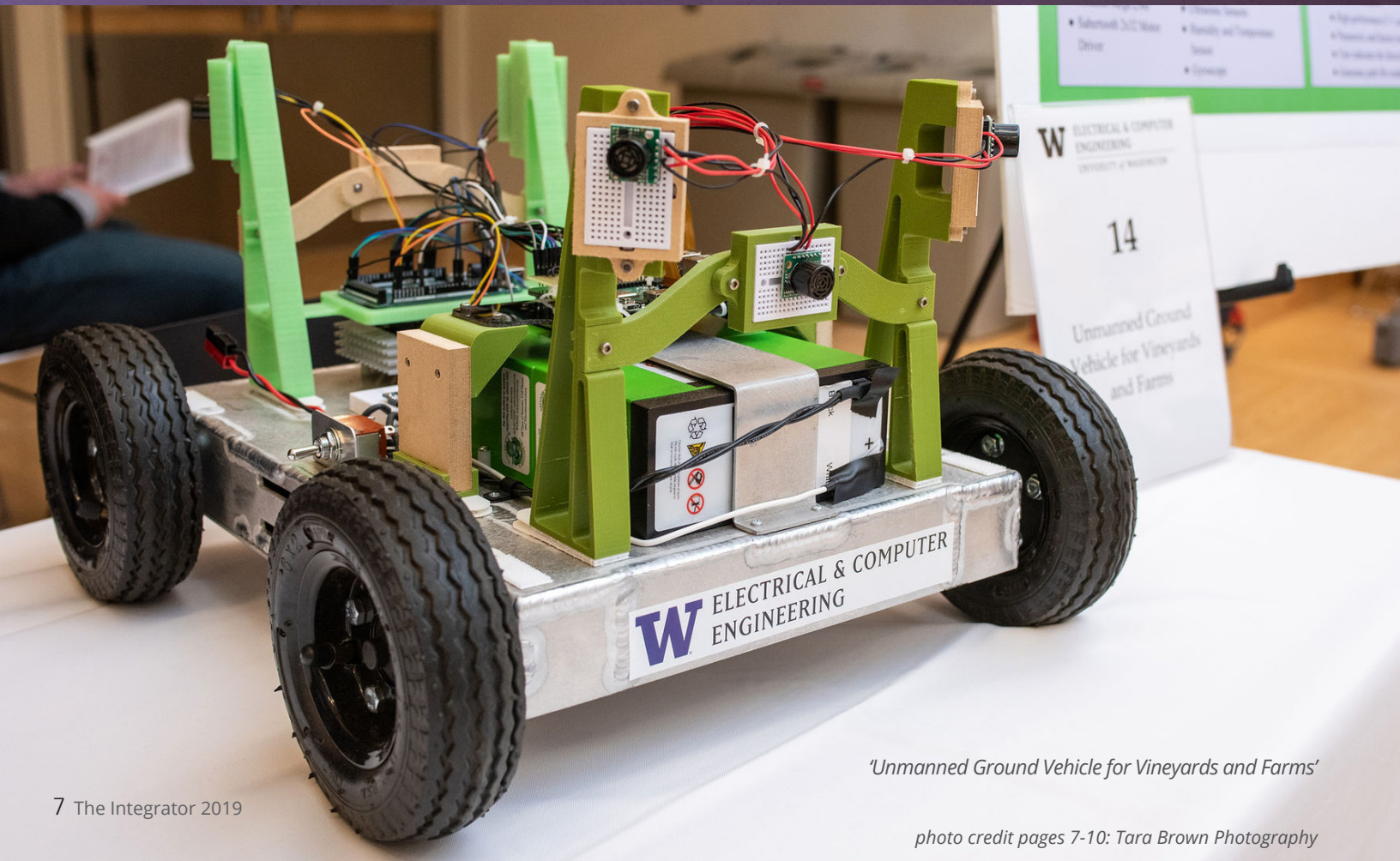
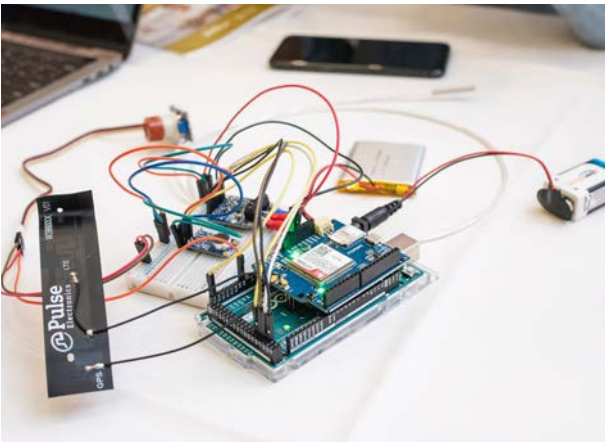
The first year-long entrepreneurial system design course sequence of its kind in the department, the ENGINE program develops students' skills in innovation and entrepreneurship, systems engineering, project management, and product development. This new initiative offers select companies an opportunity to benefit from the vibrant innovation culture at the University of Washington's Department of Electrical & Computer Engineering.

Teams of 3-5 students work on hardware and software system design challenges that emphasize depth of analysis and synthesis in all areas of electrical and computer engineering. During the course of a full academic year, students spend over 1,200 hours per team on their project. Students present their final projects in the spring to faculty, industry leaders, peers, and researchers at the annual ENGINE showcase.



CONGRATULATIONS TO Shen Yuan Yao, Tianning Li & Hong Zhang, who took first place!

One particular group, sponsored by Zetron, whose business is creating mission-critical communications, was chosen by industry sponsors as the winning team. Shen Yuan Yao, Tianning Li and Hong Zhang (pictured above) won for their project called the, 'Internet of Life Saving Thing for Firefighters (IoLST)'. Advised by ECE professor James Peckol and Zetron Senior Software Engineering Manager, Len Cayetano, the group developed an Internet of Things environmental sensing and communication system for fire rescue operations (shown here).



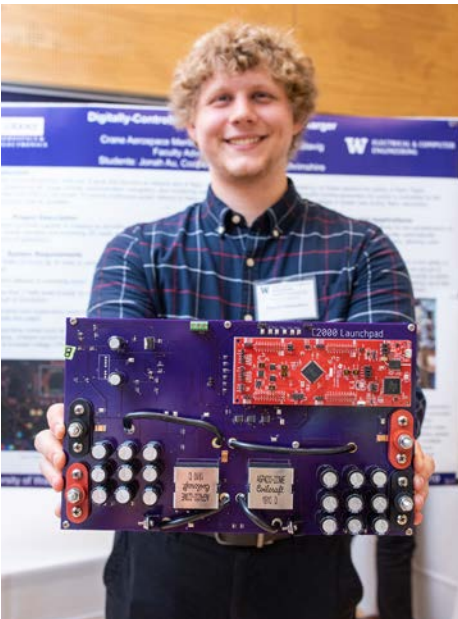
'Unmanned Ground Vehicle for Vineyards and Farms'



Kaiden Field - 'Autonomous Wheelchair with Monocular Visual Odometry'



Selma Kapetanović - 'Aircraft Non-Intrusive Continuous Level Sensor'



Thaniel Schrimshire - 'Digitally-Controlled Synchronous Battery Charger'



Milt & Delia Zeutschel and John Reece's Continued Support for the ENGINE Program

The ECE department is enormously grateful for the vision and generosity of **Milt (BSEE '60) and Delia Zeutschel**, which has enabled us to develop the ENGINE program to its current scale. Through the magnitude of their endowment of the ENGINE program, the Zeutschels are helping to secure the futures of UW ECE engineers and promote continued local and statewide innovation.

We would also like to thank Milt's business partner, **John Reece**, for his unwavering support, having spent significant amounts of time giving feedback to shape the program. Additionally, John has given several lectures to our students over multiple years on career development, team work, entrepreneurship, and leadership.

The ENGINE program is designed to develop students' skills in innovation, systems engineering, and project management. Initiated only three years ago, ENGINE has grown exponentially - from just four projects in 2016 to 43 in 2019.

ECE is also deeply appreciative of our many industry sponsors for their support in mentoring students as part of the ENGINE program.

For additional information on the ENGINE program, please visit: www.ece.uw.edu/entrepreneurship/entrepreneurial-capstone/



Milton "Milt" Zeutschel at this year's ENGINE fair.



Delia and Milt Zeutschel



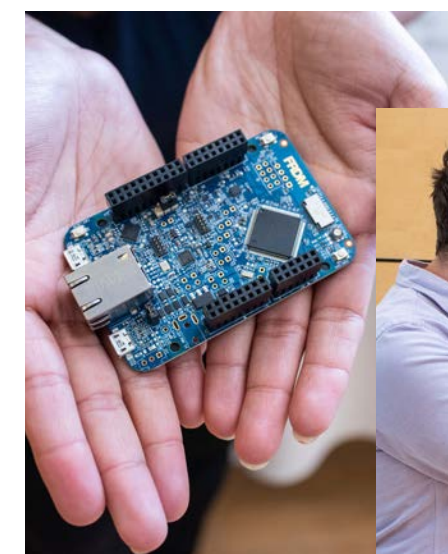
John Reece at this fall's ENGINE Pitch Day event.



(above) Bernardo Olivas III and Nathan Williams explain their 'Modular Battery Management System for EV' project.



Tyler Ho



'Over-the-Air Update System for Microcontrollers'



(above) Devon Endsley and Rahul Ramanarayanan
(below) Hady Ouyang and Mingyi Yang



“Engineering students need to be able to think of the big picture. Having a program that gives them an opportunity to connect early on with industry professionals gives them important lessons in not only entrepreneurship, but in working in the real world.”

- MILT ZEUTSCHEL

CLASS OF 2019



Ph.D. graduate Abeer Almainouni waves to her family during the graduation ceremony.



photo credit pages 11-16: Tara Brown Photography

On **Wednesday, June 12**, the Department of Electrical & Computer Engineering celebrated the Class of 2019 in the Alaska Airlines Arena at Hec Edmundson Pavilion. Roughly **335** graduates—**31** doctorate degrees, **89** master's degrees and **215** bachelor's degrees—walked across the stage, becoming ECE alumni.



ECE Professor Matt Reynolds hoods doctoral student Xingyi Shi.

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2019 GRADUATION CEREMONY

The keynote speaker of the ceremony was ECE alum Ganesh Moorthy. Moorthy, who earned his BSEE degree in 1981, has established himself as a leader in the microchip industry. He is the President and Chief Operating Officer of Microchip Technology, Inc., the leading provider of microcontroller, mixed signal, analog, security and Flash-IP solutions.

UW College of Engineering Associate Dean of Diversity and Access Eve Riskin and Professor of Electrical & Computer Engineering Bruce Darling announced the names of the graduates. Professor and Lead Graduate Program Faculty Coordinator Scott Dunham spoke before the conferral of the doctoral degrees, Associate Professor Rich Christie spoke before the conferral of the master’s degrees, and Associate Professor and Undergraduate Education Faculty Coordinator Chris Rudell spoke before the conferral of the bachelor’s degrees.

In addition to recognizing the graduates, ECE Professor and Chair Radha Pooovendran welcomed back to campus members of the class of 1969, who were celebrating their 50th reunion. Lauren Countryman, Dave Deits, Neil Faulkner, Bill Harrison, Alex Hoad, Bill Kotsogean, Dennis Lambert, Greg Mathers, Chuck Orrestad, Gordon Radovich, Louis Sims, Keith Wilbur and David Winningham were all in attendance.



ECE graduation speaker and alum Ganesh Moorthy



GANESH MOORTHY

Industry Pioneer & Compassionate Leader

President and COO,
Microchip Technology

BSEE '81

In its over one hundred year history, the Department of Electrical and Computer Engineering alumni have made great contributions to our society, and the department has invited its members to deliver the graduation address for over a decade. ECE was proud to continue the tradition this year by recognizing the impact of one such distinguished alum, Ganesh Moorthy, who made the journey from Arizona to offer his insights and advice to graduates and audience members at this year's ceremony. Ganesh was joined by his wife, Hema Moorthy, for the special occasion.

Moorthy is the President and COO of Microchip Technology, a leading provider of microcontroller, mixed-signal, analog, security and Flash-IP solutions. He joined the company in 2001 after serving as CEO of Cybercilim, a small Arizona-based software start-up company. Prior to that, he held various engineering and management positions at Intel, where he worked for 19 years.

Originally from India, Ganesh came to the U.S. as a student in 1979. He holds a BS degree in physics from the University of Bombay in India, a BS degree in electrical



Ganesh Moorthy with his wife, Hema



engineering from the University of Washington, which he completed in 1981, and an MBA in marketing from the National University in Sacramento, California. Ganesh is a strong proponent of K-12 outreach, encouraging students to enter STEM fields. His company provides project-based mentorship to high school students to help them gain early exposure to the field of engineering. Ganesh also served on the ECE advisory board in addition to appearing as a lecturer in our leadership seminar series, contributing to our students' understanding of potential career paths. Over the years, Ganesh has consistently made time to volunteer and help his alma mater, giving back his time and expertise to the Department of Electrical and Computer Engineering.

In Moorthy's insightful and inspirational speech, he spoke passionately about the amazing path he has taken in order to arrive where he is today. He made a point to acknowledge his parents and other noteworthy individuals who have offered their time, help and encouragement to him along the way, including his friends, professors, mentors and colleagues. Most notably, Ganesh shared five important lessons that he has learned throughout his storied career and life journey. First, he emphasized the importance of working hard and persevering in one's endeavors, yet not hesitating to reach out for support when necessary, and remembering to keep everything in perspective. He stressed how being receptive to new and challenging possibilities that may arise throughout life can often help to set oneself up for

"lucky" opportunities to occur. He challenged everyone to become lifelong learners in any possible capacity or area, and encouraged us to continually look for ways to give back to our communities. Finally, Ganesh reminded us to always remember to express our sincere gratitude and appreciation to those individuals who have helped get us to where we are today, and to those who are assisting us in following the path which we are currently on.

"I am sometimes asked for career advice by our younger employees and the adult children of our friends and family," says Moorthy. "While I am no expert in providing career advice, what I tell everyone is what has worked for me, which is to:

be passionate about what you want to do, be persistent in achieving it, and be pragmatic in how you get there."

"Workplaces expect us to deliver results," he continued, "and while effort does matter, it's results that count."

Ganesh concluded his speech by sharing a quote from Winston Churchill, which he hoped audience members would find equally as inspiring for their own life journeys as it has been for his: *"Success is not final, failure is not fatal - it is the courage to continue that counts."* ■



Radha Poovendran presents Ganesh Moorthy with the graduation speaker gift.

/// 50 years ago

concluded a pivotal decade in U.S. and world history that saw remarkable changes, phenomenal creations, and incredible feats of human ingenuity and engineering. The Beatles recorded Abbey Road, their final album together; Richard M. Nixon was inaugurated as the 37th president of the United States as 250,000 protesters marched against the Vietnam War in Washington D.C.; and the US military's ARPANET, the precursor to the modern Internet, sent the first electronic communication between two connected computers located at UCLA and Stanford.

Closer to home, the 1969 Seattle Pilots team played their one and only season of Major League Baseball at Sick's Stadium; headliners Chuck Berry, Carlos Santana and The Doors entertained a crowd of thousands at the Seattle Pop Festival - just one month prior to Woodstock's more notorious festival in upstate New York (it was newcomers Led Zeppelin who stole the show in Woodinville, WA, however); and, with 191 passengers on board, mostly reporters and photographers, the now-legendary Boeing 747 jumbo jet took off from a Boeing field in Everett, WA on February 9, 1969 on its first ever flight en route to New York City.

Undoubtedly the most memorable event to occur in the year 1969, and quite possibly in all of recorded history, was largely facilitated by yet another major Boeing milestone. The Apollo 11 module carrying Neil Armstrong and Buzz Aldrin, and powered by the mighty Boeing-built Saturn V rocket during its liftoff from Earth, landed safely onto the surface of the Moon on July 20, 1969. To this day, the Saturn V remains the largest rocket, and most powerful machine, ever constructed by humankind.

On June 12 of this year, the Electrical & Computer Engineering Department honored and celebrated the extraordinary lifetime achievements of a number of its alumni who graduated from the University of Washington 50 years ago.

The University of Washington Quad in the late 1960s. credit: UW Photo

GRADUATES

Guy Adriaenssens
Dawood Albassam
John Allen
Douglas Allen
Christopher Allen
John Allyn
Willy Andersen
Bert Anderson
John Anderson
Moreland Anderson
Stuart Arns
Roberts Ascall
Astrid Autier
Najib Azar
Bruce Bagley
Stephen Baughn
Igor Bazovsky
Donald Bedlington
Martin Bender
Paul Bennett
Douglas Benzel
Donald Bird
Reid Brockway
Ronald Brooks
Robert Burrill
David Cain
Roy Calvert
Alden Carlson
Joseph Chacko
Zandell Charles
Ming Chen
George Chow
Richard Coe
George Cole
Lester Coles
Lauren Countryman
Clayton Dahlberg
Terry Dayton
David Deits
Richard Duncan
Gary Durrant
Thomas Dyer
Ronald Eguchi
Garry Elliott
Jack Ensign
Neil Faulkner
Robert Fletcher
Steven Foote

Thomas Fortner
Edgar Frease
Terrence Gadbaw
Gregory Gardner
Astrid Gautier
Howard Gnauden
Nasser Golshan
Darshan Goswami
John Graef
Bruce Granston
James Green
Richard Gross
Gary Gustafson
Dougla Haines
Michael Hammond
Michael Hanrahan
Robert Harmsen
William Harrison
Gary Heimbinger
Richard Hendrickson
Richard Henry
Lee Heusman
Victor Hiatt
Alexander Hoad
George Hofmann
Cheng Hou
Howard Huisel
Jerry Hutcheson
David James
Robert Johnson
David Johnson
George Johnson
William Johnston
Randall Jones
Kenneth Kessler
Stanley King
Paul Kipper
Dean Klaudt
Donald Kolve
William Kotsogean
Louis Kuhlman
Claude Lacombe
Dennis Lambert
Richard Lawhern
Mihail Lermontov
Kenneth Long
W. Macomber
Gregory Mathers

Kenneth Maulden
Robert Mayer
Joe McArthur
Thomas McCain
Curtis McGath
Robert McLaren
James McTaggart
Bahman Moayedi
Peter Moerbeek
Gregers Moller
David Moros
Raymond Mosher
Frederick Motter
David Murakami
Ja Naini
Richard Nassi
Garold Nelson
Thomas Norman
Mark Oestreich
Frederick Ojima
Charles Orrestad
David Osgood
Gary Parker
Lawrence Parks
Thomas Paulson
Bruce Pettyjohn
Vincent Poh
John Polky
Curtis Porterfield
Orville Potter
Patrick Powell
Gordon Radovich
George Reich
John Richardson
Marion Ringo
Dennis Robb
Steven Robertson
Ronald Ruosch
Thomas Ruttan
Charles Sanderson
Louis Scharf
Rodney Schroeder
Richard Schwerdtfeger
William Severson
Terry Sheets
Victor Shinoda
Roy Shoemaker
George Shortle

Dale Shoup
Diego Silva
Edward Simpson
Louis Sims
Howard Smith
Brian Smith
Thomas Stanford
Wesley Stevens
Ronald Stofer
Kenneth Storkel
Larry Sullivan
Robert Sundin
Leo Tandecki
Ronald Terada
Dennis Terpstra
Richard Thomas
Louis Thompson
Joseph Thykkuttathili
George Tomey
Kenneth Towsley
Donald Trimberger
Rob Trostad
Jan Ungern
Nicholas van Brunt
Richard van Metre
James Vasbinder
Thomas Vogel
Douglas Walcher
Robert Walton
Curtis Webb
Michael Webb
Royle Wells
Arthur Whipple
Robert Whitman
Keith Wilbur
Robert Wilson
James Wing
Robert Winn
David Winningham
Alan Winslow
William Wolf
Tai Wong
Myles Wright
Yuki Yamamoto
Charles Zandell



/// CELEBRATING 50 YEARS

In addition to recognizing its newest graduates, ECE also welcomed back to campus members of the class of 1969. Alumni heard from department chair, Radha Poovendran, received commemorative stoles, and were featured in the graduation ceremony so that graduates could hear about their productive careers. Biographies of the attendees are included below.

LAUREN COUNTRYMAN graduated with his master's and worked for Boeing for 52 years, predominantly in avionics for commercial aircrafts including major versions of the 747. Lauren's experience in electronics ranges from tube circuits to integrated circuits and began when he taught himself to repair radios and televisions in high school.

DAVE DEITS completed his bachelor's degree and after graduation worked at Boeing before completing his JD at Willamette University. Dave spent 36 years as a patent attorney specializing in intellectual property and retired in 2012. He consistently made the list of Best Lawyers in America.

NEIL FAULKNER graduated with his bachelor's degree and spent 46 years with Fluke Electronics working on the design of automated test systems. Neil ended his career as the Director of Electrical Metrology at Fluke and since his retirement has been active with his hobby of amateur radio.

BILL HARRISON graduated with a master's degree and was responsible for developing control systems to ground test Boeing commercial airplanes. Later in his career, Bill worked for Lockheed Martin to modernize military transport airplanes. Bill earned his MBA at the University of Chicago and has spent his 30-year academic career teaching at DeVry University and Georgia Piedmont Technical College, where he is still teaching.

ALEX HOAD completed his bachelor's degree and spent 30 years with Boeing, primarily detailing customers' airplane configuration to support engineering design through delivery. Alex obtained an MA in practical theology & taught in various private and religious organizations.

BILL KOTSOGEAN graduated with his bachelor's degree and joined Puget Sound Energy where he spent 38 years. Bill returned to UW to complete a master's degree in EE while working at Puget Sound Energy in distribution engineering. Later in his career, Bill worked in transmission and distribution engineering and then in corporate IT.

DENNIS LAMBERT received his bachelor's and joined Bell Labs to design digital signal processing computers. Dennis returned to Washington to join Fluke Electronics, where he worked for 31 years. Dennis also holds an EE master's degree from the University of Michigan, an MBA from Seattle U, and conducted postgraduate research at Columbia University.

GREG MATHERS completed his bachelor's degree and served in the U.S. Air Force for four years before returning to UW for a dual bachelor's in Industrial Engineering and Mechanical Engineering. Greg has had a successful career employed by the US Navy, Crown Zellerbach, Lockheed Martin and Boeing.

CHUCK ORRESTAD graduated with his bachelor's degree and began his career at Bell Labs before spending most of his career in the medical device industry. In later years, he served as COO for a series of emerging tech companies and as President of an international non-profit. He currently serves as CEO and Managing Partner of DNA Partners LLC, a management consultancy. Chuck also holds an EE master's degree from Stanford.



ECE Alum Bill Kotsogean stands as the Class of 1969 receives recognition during the 2019 spring commencement ceremony.

DAVID WINNINGHAM completed his bachelor's and became the chief of several engineering and quality assurance contract management organizations. He focused on developing processes to make software more reliable and testable, and to provide better cost and schedule management. David is a retired commander from the U.S. Navy and the Defense Contract Management Agency.

KEITH WILBUR graduated with his bachelor's degree and served in the U.S. Air Force during the Vietnam War. Keith went on to work as an engineer at Boeing for 42 years. Keith is active in the Overlake Christian Church Choir and enjoys spending winters in Sun City, Arizona.



ECE alumni at the 50th Reunion dinner.

GORDON RADOVICH received his bachelor's degree and went on to work as a sales engineer for Warehouse Electric. At age 25, Gordon started his own business developing residential subdivisions & credits his engineering degree for equipping him with business acumen.

LOUIS SIMS received his master's degree and became an engineer on the Boeing Minuteman Missile. He then joined Keytronic and became VP of engineering at ISC Engineering. Louis was the President of Output Technology, manufacturing high-speed printers.



Radha Poovendran recognizes the success of ECE alum Keith Wilbur at the 50th Reunion.



Graduates of the Class of 1969 wearing their stoles with ECE faculty at their 50th class reunion.

ALUMNI NETWORKING HAPPY HOUR

ECE held its fifth annual Puget Sound Alumni Mixer on Thursday, March 14, also affectionately known within the mathematics community as “Pi Day” (3.14). UW ECE was very excited to have the opportunity to continue the tradition of bringing several members of its esteemed alumni community together for such rewarding occasions. Hosted each spring, the mixer is a great way to network with fellow alums, catch up with favorite professors and learn about the latest research and innovations from UW ECE faculty.

This year’s mixer was held at the Husky Union Building (HUB), with ECE faculty members Radha Poovendran, Payman Arabshahi, Karl Böhringer and Blake Hannaford in attendance. ECE would also like to thank its past sponsorship from T-Mobile, Amazon and Microsoft for generously hosting such successful and well-attended events as this.

The mixer event took place just prior to ECE’s Research Review Day, also held at the HUB (continued on next page). Attendees were invited to visit both events, where they could see student poster projects firsthand and speak with them about their research. Department Chair Radha Poovendran recognized special guest Boon Chaya, Chapter President of the Thailand Alumni Association, thanking him for his excellent service and continued representation of the ECE department.



Jessica Tran (BS '08, MS '10, Ph.D. '14) speaking with Radha Poovendran



Gary Anderson and Mahnaz Sherzoi



Manford & Jayne Williamson with Boon Chaya and Chieko Chay



Radha Poovendran with Boon Chaya, Chapter President of the Thailand Alumni Association



Martin Huang and guest enjoy a laugh with Radha Poovendran



PUGET
SOUND

MIXER



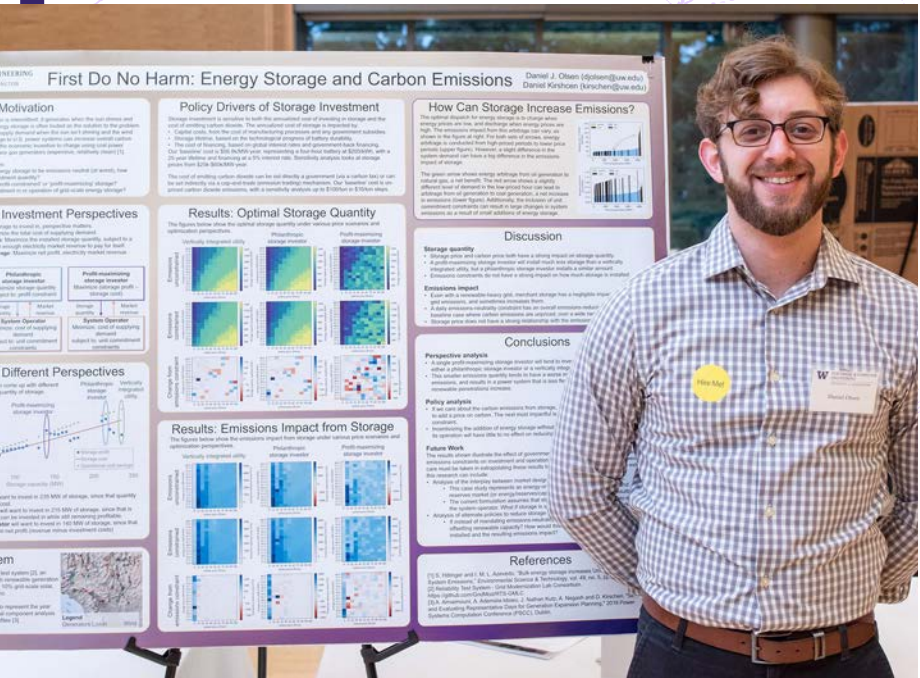
ECE



Zheyi Han and Manford Williamson

RESEARCH REVIEW DAY

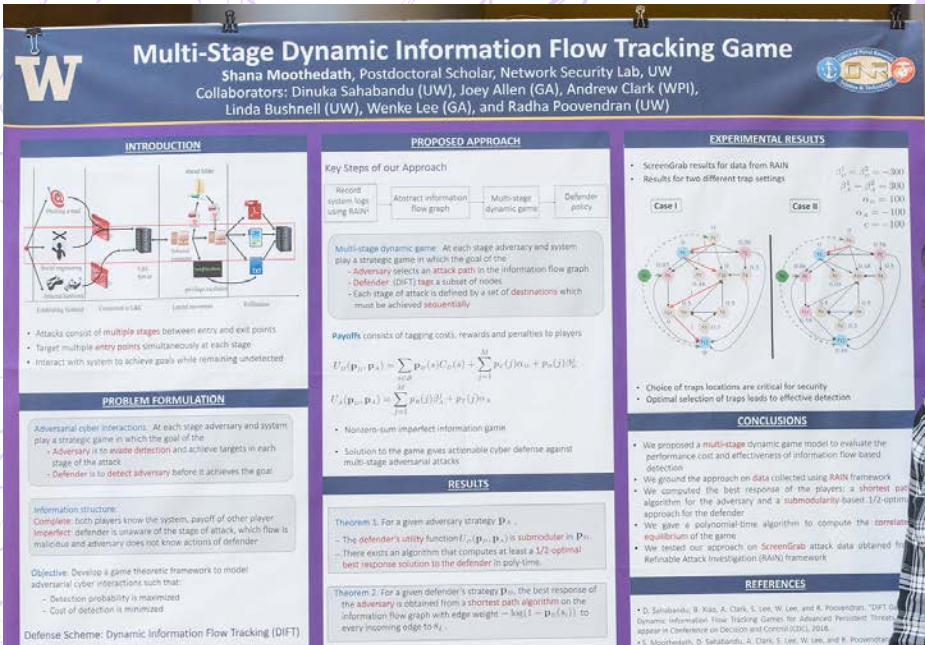
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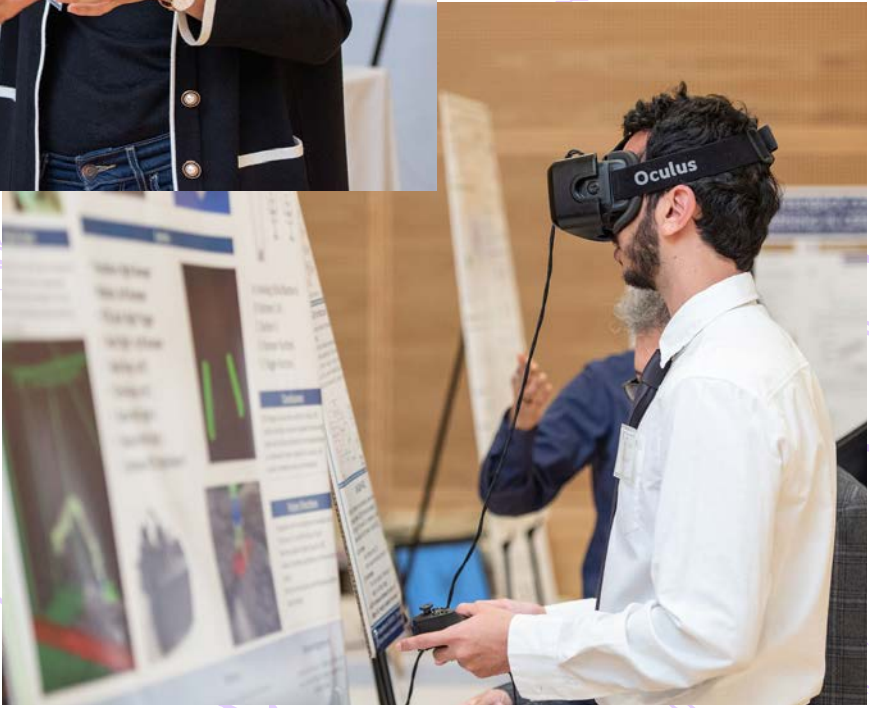
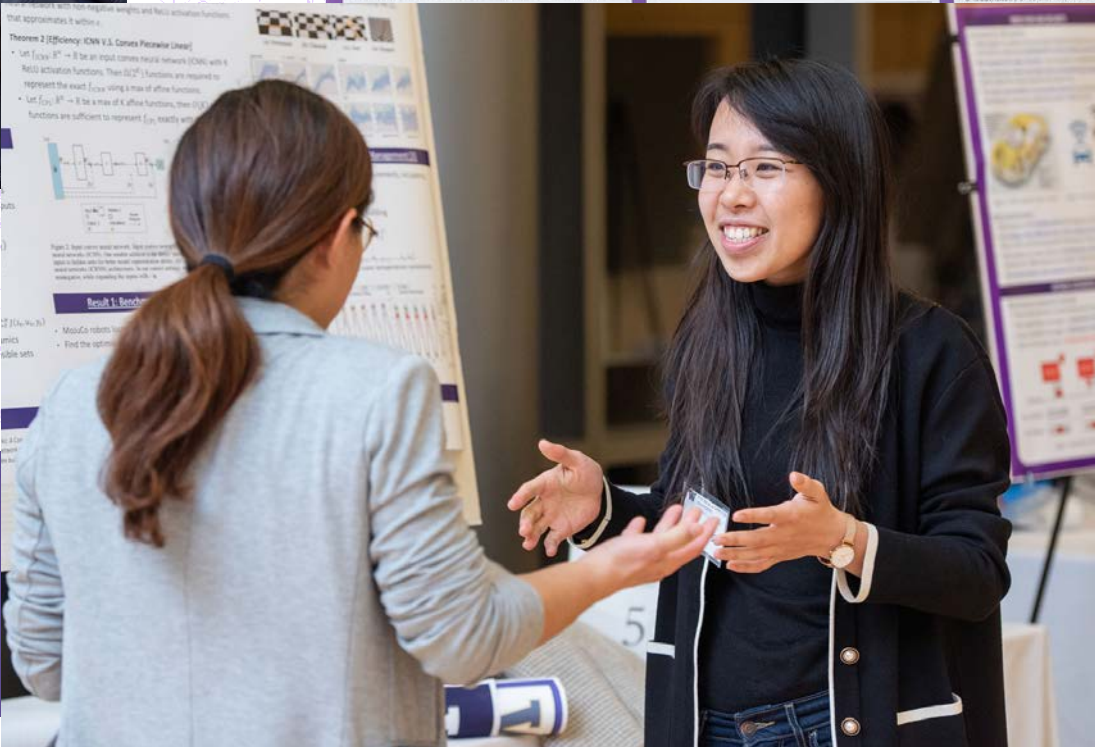
Daniel Olsen

ECE held its second annual Research Review Day at the Husky Union Building (HUB) on March 14, 2019.

This year's Review Day featured work from more than 40 groups exhibiting their research in far-reaching topics including artificial intelligence, robotics, medical device technologies, the smart grid and wireless networks, to name a few.



Shana Moothedath



AN ALL-IN ALUM

Alum Chun Ng discusses his role as an ECE advisory board member and why he feels compelled to give his time and resources to the ECE community.

Chun Ng joined the advisory board this past year with a clear dedication to supporting the growth and development of the ECE department. A local UW alum and successful intellectual property attorney, Chun now works at Perkins Coie, a leading international law firm comprised of more than 1,100 lawyers in offices across the United States and Asia that provides strategic IP counseling, patent diligence and enforcement, and litigation support to some of the most innovative companies across the globe. Based in both Asia and downtown Seattle (its largest branch in the nation), Chun has had the opportunity to be involved with a number of high-profile legal projects during his 20 years at Perkins Coie, such as resolving recent smartphone technology patent litigations between major tech companies. Chun praises his educational background in electrical engineering from the University of Washington as instrumental in preparing him to better serve the needs of his clients and partners.

A first-generation American student and the youngest of six siblings, Chun says his parents made their way to Seattle from China in the late 1960s, when he was still just a toddler. They encouraged their children to pursue law, medicine, engineering, business or accounting.

“Growing up in Seattle, the UW campus was so close to home that it was easy to overlook and take for granted just what an incredible resource existed right here in my own backyard.”

Chun chose to study electrical engineering at UW because of the rigor and challenge of the electrical engineering curriculum. Always a strong student in math and science, Chun knew that an EE degree would enable him to forge a strong career path in many different sectors with his strong technical background. “I’ve been incredibly fortunate,” he admits. “There’s no doubt about it.”

After earning his bachelor’s degree in electrical engineering from UW in 1988, however, Chun decided to further his studies by returning to the university a few years later in pursuit of a law degree. Chun chose the legal profession because he especially enjoys the personal interaction element of patent law, while also having opportunities to utilize the vast technical training and knowledge he acquired as an electrical engineering student at the University of Washington. He fondly recalls his time as a student at UW, reminiscing about the beautiful campus setting and its “crisp fall air”, his former professors, some of whom are currently still teaching in the ECE department, and the overall experience of being able to fully absorb himself in his demanding engineering and law studies.

Chun says he became inspired to become a member of the advisory board after attending last year’s Dean W. Lytle Lecture, the ECE department’s premier annual event. After attending the lecture, Chun reconnected with department leadership and faculty, and was subsequently asked to speak to students about his career and to serve on the advisory board. Chun was honored to receive such an invitation, and is looking forward to advising ECE as the department continues to grow and launch cutting-edge educational experiences.



Chun Ng at UW Taipei Converge 2019 in Taipei, Taiwan; November, 2019. Photo: Henry Weng, Sherbet Photography

Most recently, Chun attended UW Taipei Converge 2019 in early November, the foremost annual gathering of the UW’s international network of alumni and friends. Converge Taipei focused on the future of AI, a field of particular interest to several faculty and alumni of the ECE department. The conference gave Chun the unique opportunity to learn from UW experts, connect with Huskies from around the world and discover the University’s global impact.

Throughout Chun’s engagement, he saw the impact of philanthropic support on departmental programs. Chun considered giving support of his own after reflecting upon the many things that he had gained from his own educational experience, and his drive to aid the strategic goals of the department. By giving to the Excellence in Electrical & Engineering fund, Chun is proud to provide flexible, sustainable assistance for the department to use where it is needed most. Chun adds that he derives a great deal of satisfaction in being able to witness, firsthand, the impact of his personal generosity.

Compared to his own experience as a student at UW,

“I’m going to focus where I can see really changing somebody’s life.”

Chun says one of the biggest overall changes to the department that he has noticed is the highly interdisciplinary nature of today’s programs. In fact, he is a strong advocate for encouraging students with multiple academic interests in the fields of engineering and law to pursue the exciting new joint MS ECE/JD degree currently being offered at UW. In a partnership between ECE and the School of Law, the program provides a streamlined pathway for students to obtain dual degrees, like

Chun himself did. Next up in his engagement, Chun intends to visit with current students interested in the MS ECE/JD degree program and share his extensive industry experiences.

Chun also offered several pieces of advice to current and future engineering students. “There are a lot of opportunities now that students should take advantage of.” He says, “They should relish this unique time in life, enjoying every moment of being a student.” He added, “They need to trust themselves and trust their instincts, and ultimately try their hardest to pursue those areas that they feel the most passionate about, that fit them the best, and then follow those passions wherever they may lead.” ■

Working in Associate Professor Mo Li's new ECE lab, graduate student Seokhyeong Lee explains how a neutral density filter can be used to diminish the intensity of a laser or any other light source evenly across all wavelengths.
photo: Ryan Hoover

ECE SPOTLIGHTS

It has been a truly phenomenal year in the Department of Electrical and Computer Engineering at UW. In 2019, a number of our faculty have received national and international recognition for their exciting research pursuits, successful new startups and engaging student projects.



Top

THREE ECE FACULTY RECEIVE NSF CAREER AWARDS

ECE Assistant Professors Arka Majumdar, Lillian Ratliff and Visvesh Sathe each won a National Science Foundation (NSF) CAREER award in 2019, one of the nation's most coveted honors for early-career faculty. The NSF selects the award recipients based on faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization.



ARKA MAJUMDAR -
PHOTONICS AND NANO DEVICES

Majumdar's award is for his research in Van der Waals material integrated ultra-low power silicon nitride nano-photonics. His research interests focus on emerging nano-photonic devices with computational algorithms to build compact optical sensors to support the growing infrastructure of the Internet of Things.



LILLIAN RATLIFF -
DATA SCIENCES, ROBOTICS & CONTROLS

Ratliff's award is for her work in the co-design of information incentives in societal-scale cyber-physical systems. Her research interests lie at the intersection of game theory, optimization and statistical learning. She applies tools from these domains to address inefficiencies and vulnerabilities in next-generation urban infrastructure systems.



VISVESH SATHE -
BIOSYSTEMS, COMPUTING & NETWORKING

Sathe's award is for his work in transforming implantable neural interfaces through computing from circuits to systems. His research focuses on covering circuits and architectures for low power computing and biomedical systems.

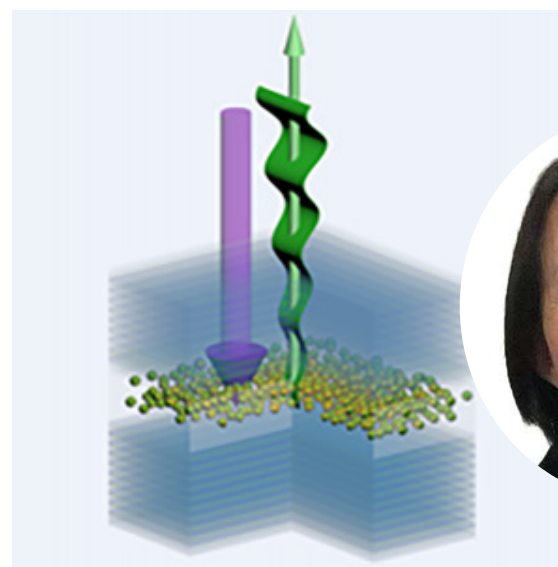
ALUM ELAINE REEVES RECEIVES DISTINGUISHED NEW ENGINEER AWARD

ECE's Professional Master's Program's own, 2017 alum Elaine Reeves, received The Society of Women Engineers (SWE) Distinguished New Engineer Award on Nov. 9, 2019. An EMC Test Engineer at Microsoft, Reeves was recognized at WE19, the world's largest conference and career fair for women engineers, in Anaheim, California.



LINDA BUSHNELL ELECTED INTERNATIONAL FEDERATION OF AUTOMATIC CONTROL FELLOW

Linda Bushnell, an ECE Research Professor since 2000, has been elected an International Federation of Automatic Control (IFAC) Fellow for "contributions to the analysis and design of networked control systems." The IFAC Fellow Award is given to persons who have made outstanding and extraordinary contributions in the field of interest of IFAC, in the role of Engineer/Scientist, Technical Leader or Educator.

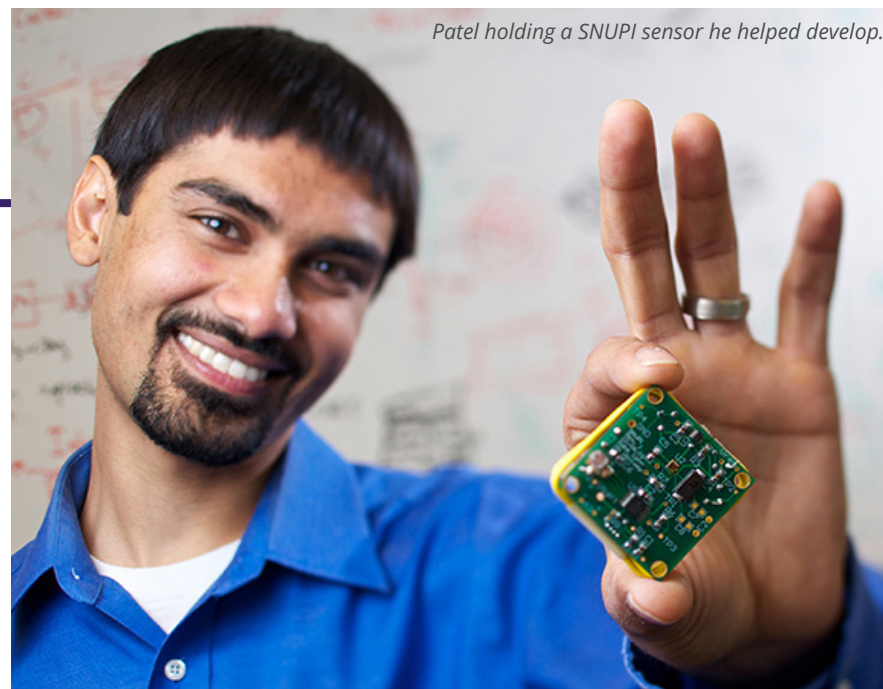


A perovskite quantum dot vertical cavity laser under optical pumping.



LIH LIN AWARDED OPTICAL SOCIETY OF AMERICA FELLOWSHIP

An ECE Professor at UW since 2003, Lih Lin has been awarded an Optical Society (OSA) Fellowship for 2020 due to the significant technical achievements and contributions she has made in the field of photonics. Prof. Lin has demonstrated pioneering efforts in several new research frontiers, including the research and development of MEMS (Micro-Electro-Mechanical Systems) optical switching technologies and innovation in solution-processed photonic components and devices.



Patel holding a SNUPI sensor he helped develop.

SHWETAK PATEL RECEIVES PRESTIGIOUS ACM PRIZE IN COMPUTING

ECE Professor Shwetak Patel was honored by the ACM for "contributions to creative and practical sensing systems for sustainability and health." The ACM Prize in Computing recognizes early or mid-career computer scientists whose research has had fundamental impact and broad implications, and is among the highest honors bestowed in computer science - second only to the A. M. Turing Award, which is widely regarded as the "Nobel Prize of computing."



LI DENG & MARI OSTENDORF NAMED MEMBERS OF WASHINGTON STATE ACADEMY OF SCIENCES

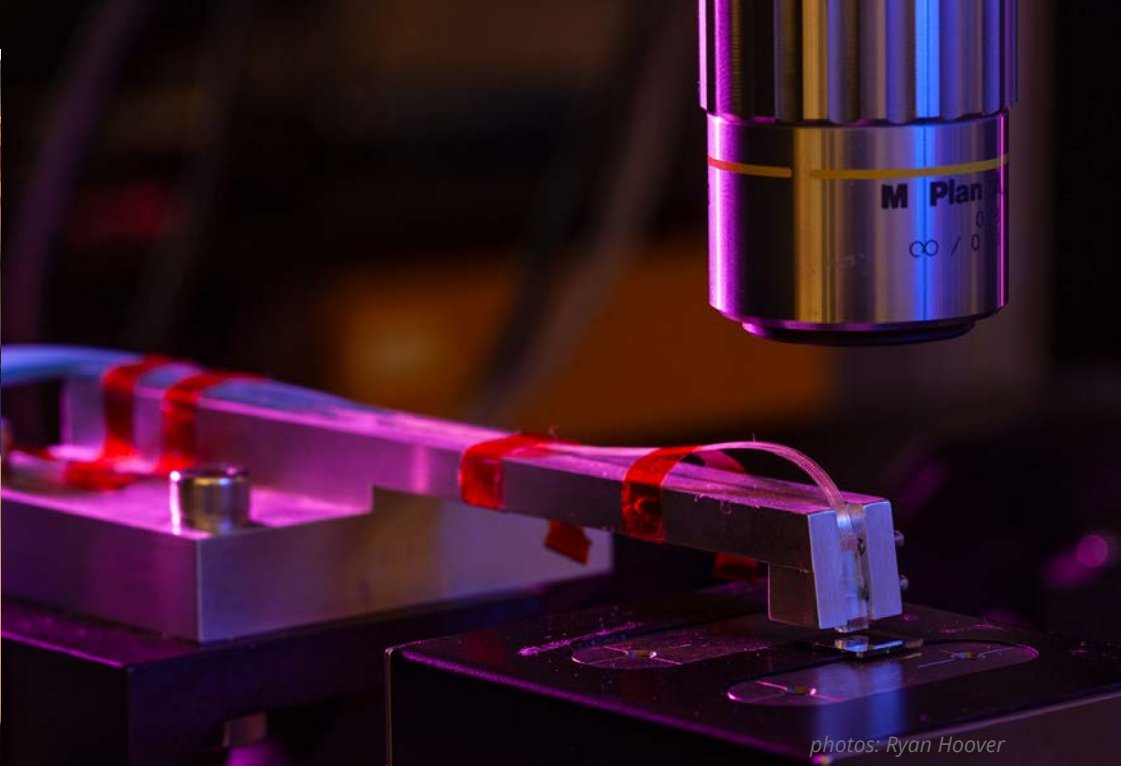
The Washington State Academy of Sciences (WSAS) announced 24 new members in 2019, including ECE Professor Mari Ostendorf and Affiliate Professor Li Deng. Members of WSAS are recognized for their “outstanding record of scientific and technical achievement and their willingness to work on behalf of the Academy to bring the best available science to bear on issues within the state of Washington,” according to WSAS.



“It’s an honor to join this group of nationally recognized experts in science and technology, but it is also an opportunity to serve the state of Washington, providing input on engineering issues that impact our citizens.”
-Mari Ostendorf



Graduate students Seokhyeong Lee and Ruoming Peng prepare a microscope sample.



photos: Ryan Hoover

BAOSEN ZHANG SERVES AS PANELIST AT DOE ARTIFICIAL INTELLIGENCE SUMMIT

Baosen Zhang, the Keith and Nancy Rattie Endowed Career Development Professor at ECE, recently attended the 4th InnovationXLab Artificial Intelligence Summit in Chicago, Illinois from Oct. 2-3. Hosted by U.S. Secretary of Energy Rick Perry and the Department of Energy’s Argonne National Laboratory, the event discussed the DOE’s latest AI research and the establishment of its Artificial Intelligence and Technology Office and Artificial Intelligence Program. Zhang, who researches power systems and cyberphysical systems in the ECE Department, served on a panel to discuss AI for Energy Grid Optimization, and was the sole representative from the fields of academia and engineering at the event.

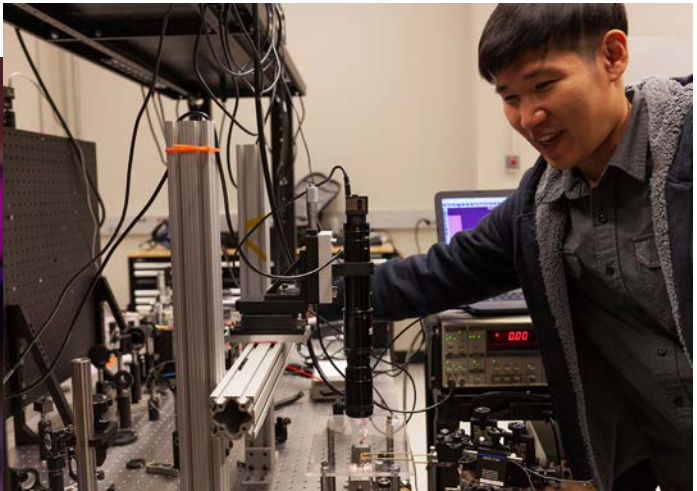
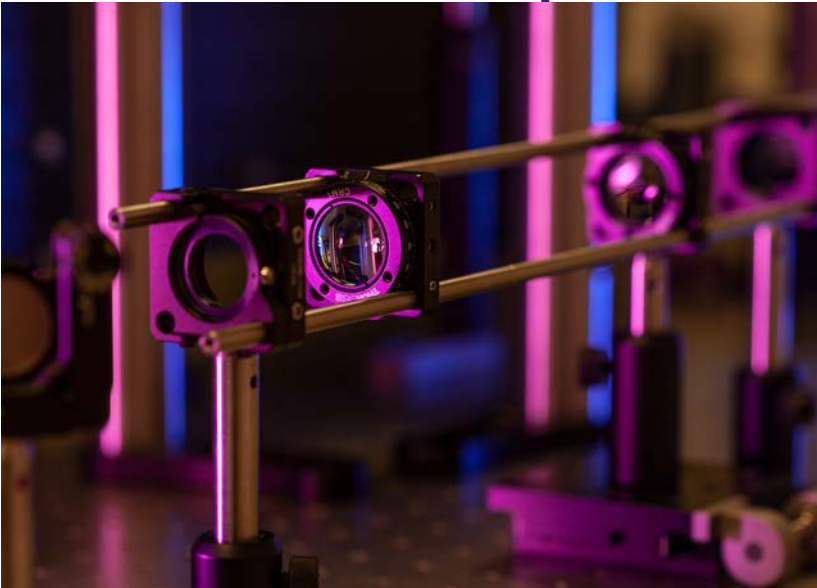


MO LI OPENS NEW RESEARCH LAB AT ECE

Associate Professor Mo Li recently finished transitioning into a new lab facility within the ECE building, the Laboratory of Photonic Devices, which focuses on integrated photonics and nano device research. The extensive move required Li to coordinate the careful transportation of several key pieces of specialized equipment to Seattle from his former research lab at the University of Minnesota, where he had been teaching for 8 years prior to joining the faculty at UW ECE.



Zhang speaking on the AI for Energy Grid Optimization panel.



3rd year Ph.D. student Seokhyeong Lee demonstrating his research lab setup.



AMY ORSBORN AWARDED 2019 L'OREAL USA "CHANGING THE FACE OF STEM" MENTORING GRANT

ECE Assistant Professor Amy Orsborn was recently announced as one of 11 female scientists to receive a 2019 "Changing the Face of STEM" (CTFS) mentoring grant, which are issued through the beauty leader's For Women in Science program. Orsborn will be using her first CTFS grant to support her mentorship organization that promotes Women In Neural Engineering (WINE). The CTFS grant will help WINE provide mentorship and outreach across the training pipeline.

SREERAM KANNAN RECEIVES 2019 UW ECE OUTSTANDING TEACHING AWARD

The Outstanding Teaching Award was presented to Sreeram Kannan, ECE Assistant Professor, for his exemplary mentorship to students and his creative approaches to teaching.



HOWARD CHIZECK'S COMPANY OLIS ROBOTICS CHOSEN TO RUN SOFTWARE FOR LUNAR MISSIONS

Seattle-based Olis Robotics, which aims to commercialize haptic rendering, haptic navigation and other UW telerobotic technologies, has been selected by U.S tech firm Maxar Technologies to provide software that will prepare operators on Earth to control a robotic arm on the moon. The software will be used in connection with a robotic-arm experiment known as SAMPLR (Sample Acquisition, Morphology Filtering and Probing of Lunar Regolith). SAMPLR is one of a dozen payloads chosen by NASA to fly on commercial lunar landers in support of the space agency's Artemis program to send astronauts back to the moon by 2024. Professor Chizeck, a co-founder and chair of the board of directors for Olis Robotics, established the company in 2013 under the name BluHaptics along with co-founder and CTO Fredrik Rydén. Rydén (MS '12, Ph.D. '13) is also an Affiliate Assistant Professor of ECE.

(top) An artist's rendition shows the SAMPLR robotic arm working on the moon. (Maxar Technologies Illustration) (bottom) Olis Robotics' plug-and-play controller with its AI-driven robotic control platform. (Olis Robotics Graphic)



MARYAM FAZEL LEADS SUMMER WORKSHOP ON DATA SCIENCE

ECE Professor Maryam Fazel was the lead organizer for The Algorithmic Foundations of Data Science Institute (ADSI) Summer Workshop on Algorithmic Foundations of Learning and Control, co-organized by UW and U Wisconsin and hosted at the UW campus from Aug. 19-21. The workshop provided a forum to discuss timely topics bridging the different research communities: the statistical and reinforcement learning community, the optimization and control theory community, as well as robotics practitioners. The event brought together researchers with diverse backgrounds in computer science, control theory, statistics and math to discuss theoretical and foundational questions arising from dynamical systems that aim to learn from, and take action in, their environments (such as robotic systems that perform manipulation and navigation). ADSI was founded through a major grant from the NSF TRIPODS (Transdisciplinary Research in Principles of Data Science) program. TRIPODS implements the NSF's vision of Harnessing the Data Revolution, one of its "10 Big Ideas" for future investment.



ADSI Summer Workshop participants on the roof patio of the new Bill & Melinda Gates Center at UW; photo: Amber Cochran

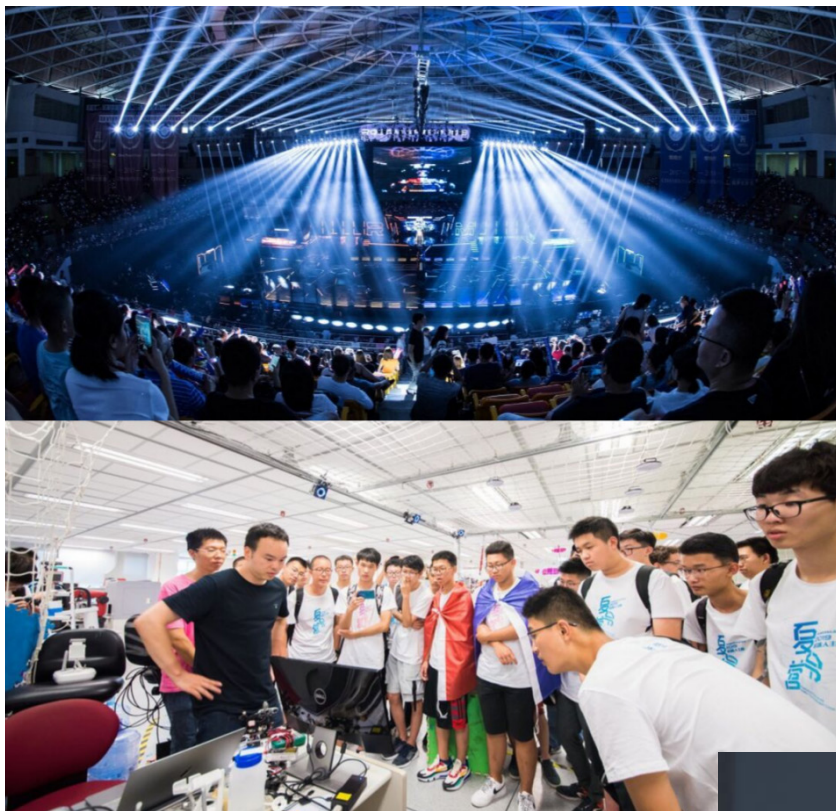


UW alum and Google Brain researcher Vikash Kumar speaking at the ADSI Summer Workshop.

ALUM ARTHUR CHIAO HONORED AS INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE LAUREATE

On October 15th, ECE alum and Winbond Electronics Chairman Arthur Yu-Cheng Chiao was inducted as one of five new Industrial Technology Research Institute (ITRI) laureates. ROC President Tsai Ing-wen attended the 2019 ITRI Laureate Ceremony in Taiwan to extend her congratulations and to bestow badges and certificates to the five laureates. They were selected for their outstanding leadership abilities, each having successfully led various enterprises to become globally competent, bringing great impact to their respective industry's growth.

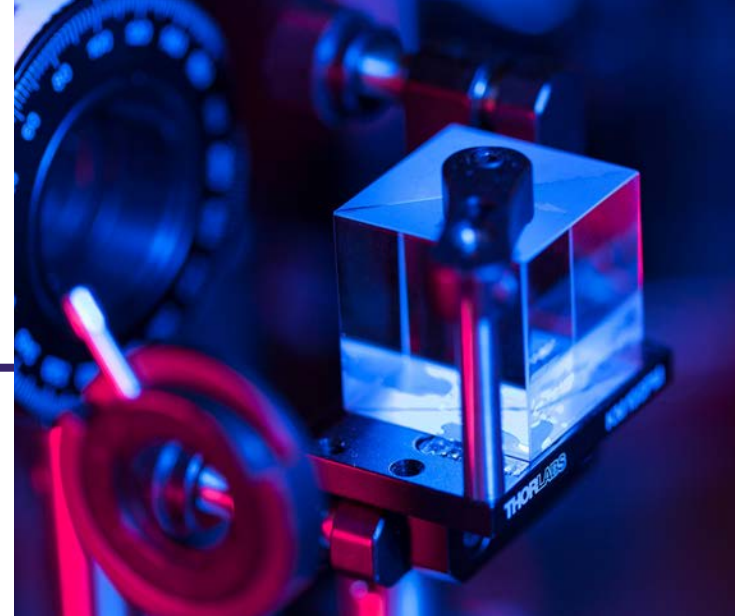
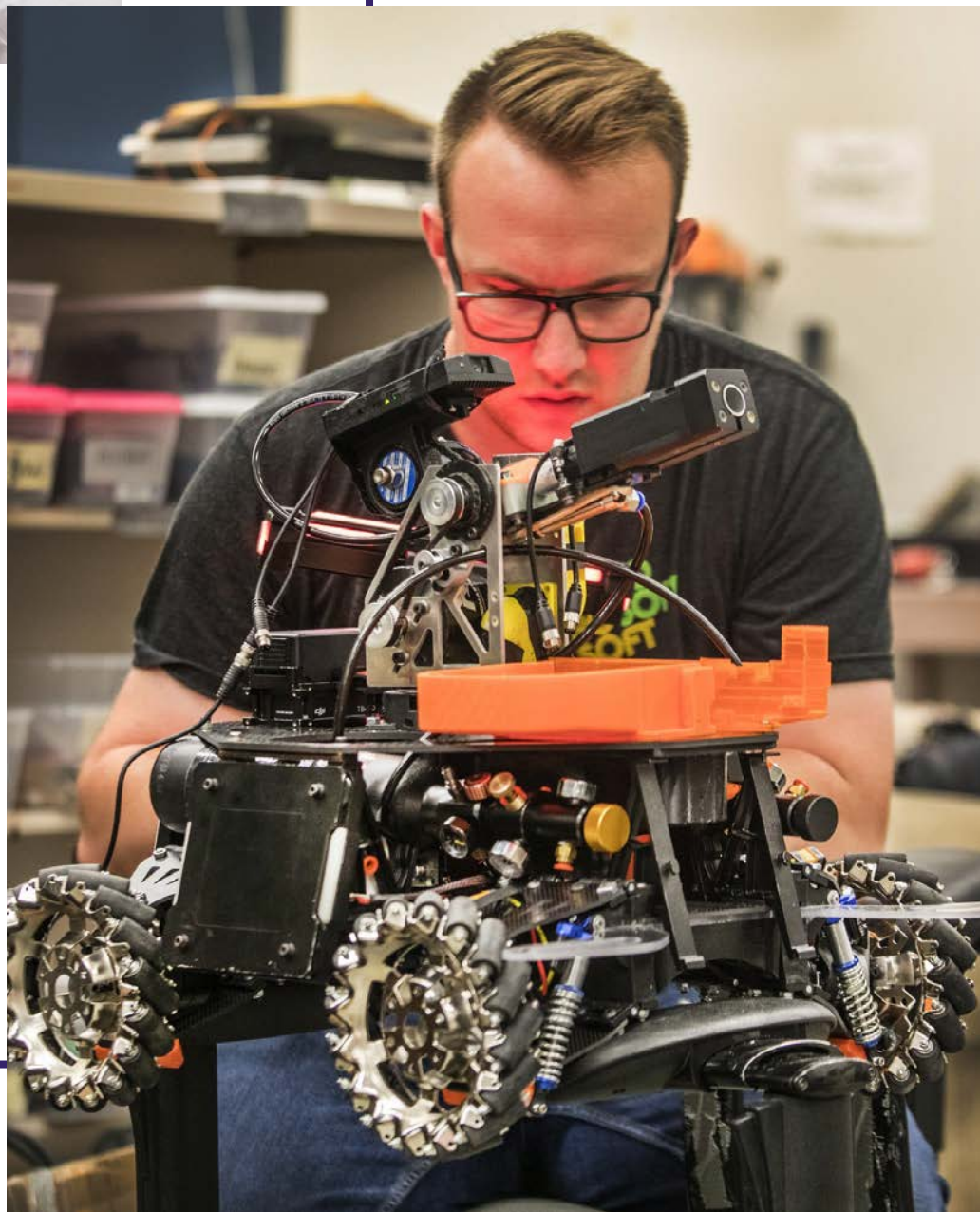




BLAKE HANNAFORD AND UW ROBOTICS TEAM COMPETE AT ROBOMASTER 2019

Professor Blake Hannaford once again advised the UW's student-led and student-organized Advanced Robotics Club (ARUW) as they battled it out at RoboMaster 2019, an annual robotics competition for aspiring young engineers and university students. Held in Bao'an Stadium in Shenzhen, China this past July over the course of 13 days, the Final Tournament's winning team from Northeastern University, TDT, took home the gold trophy along with RMB 500,000 (USD \$70,841) as the Grand Prize. Close to 200 teams consisting of 10,000 young engineers from around the world signed up for the 2019 RoboMaster competition season, with 32 teams battling it out in the final tournament. Participating teams included students from mainland China, the United States, Canada, Japan and Hong Kong. As one of just 10 teams representing universities from North America, the UW Advanced Robotics Club won 2nd prize in the International Regional Competition, and was also recognized for their outstanding aesthetic design and outstanding open source submission.

UW student and member of the UW Advanced Robotics team Jeremy Moon works on his team's 8-wheeled robot.



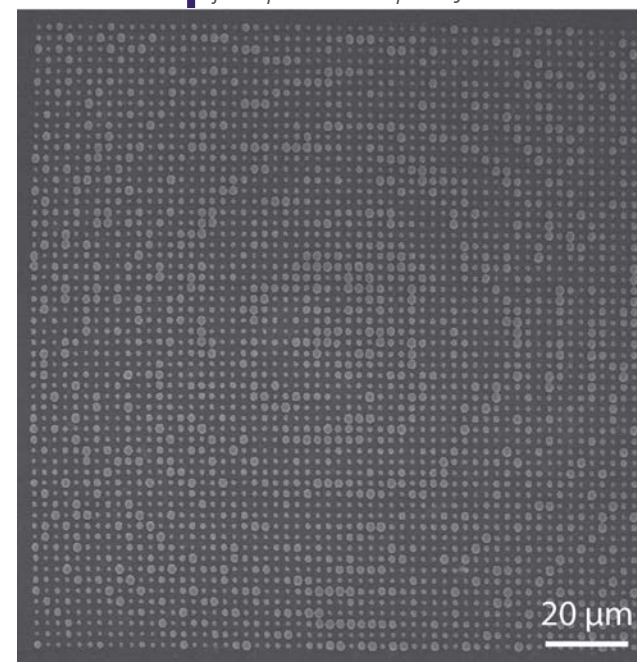
Beam splitter (pictured above), used for separating light into two different paths with varying intensity levels.



(below) Close-up array of metasurface lenses (metalenses) used for full color imaging, depth sensing, microscopy imaging and generating holograms.

photos: Ryan Hoover

A scanning electron micrograph image of the surface of the optical element. photo: James Whitehead/UW



ARKA MAJUMDAR'S LAB CREATES NEW METASURFACE DESIGN THAT CAN CONTROL OPTICAL FIELDS IN THREE DIMENSIONS

A team led by scientists at the University of Washington has designed and tested a 3D-printed metamaterial that can manipulate light with nanoscale precision. Based out of ECE Assistant Professor Arka Majumdar's lab, the team's design principles and experimental findings demonstrate that it is possible to model and construct metamaterial devices that can precisely manipulate optical fields with high spatial resolution in three dimensions. Though the team chose a helical pattern — a spiral helix — for their optical element to focus light, their approach could be used to design optical elements that control and focus light in other patterns.



SUMIT ROY JOINS INNOVATION PARTNERSHIP ZONE FOCUSED ON 5G MOBILE TECHNOLOGY

The Washington State Department of Commerce recently designated a new Innovation Partnership Zone (IPZ) focused on 5G mobile technology and designed to spur regional economic growth in key industry sectors, including manufacturing, global health and technology. The 5G Open Innovation Lab, sponsored by the city of Bellevue, envisions a global hub for development of next generation 5G mobile networks and technology. Partners in the new IPZ are the University of Washington, 5G Open Innovation Lab and Pacific Northwest National Laboratories. The Innovation Partnership Zones program was created in 2007 to stimulate development of industry clusters and build regional economies. IPZs empower regions to create formal alliances among researchers, private business, local economic development leaders and workforce organizations to collaborate and develop commercially viable technologies. "5G networks have the ability to capture information from the environment through sensors and process and transform it into actionable information. The ability to communicate across devices and platforms seamlessly and at very low latency will enable us to connect people and things anywhere, share experiences and intelligence and synthesize new knowledge. We are working to seed the future workforce that will be needed by enterprises, startups and the public sector as 5G enabled products and services become pervasive," said ECE Professor Sumit Roy.

"The 5G Innovation Partner Zone in Washington exists as a focal point for global 5G ecosystem development, and engages the breadth of Seattle's community stakeholders from technology, business, academia and the public sector." –Sumit Roy



BRIAN JOHNSON LEADS \$4.9M DOE GRANT TO IMPROVE SOLAR TECHNOLOGIES ON THE NATIONAL GRID

On November 6, 2019, the U.S. Department of Energy announced it would provide \$128 million in funding for 75 projects to advance solar technologies. \$50 million was provided for 15 research projects that improve the ability of grid operators to integrate increasing amounts of solar generation onto the grid in a cost-effective, secure, resilient, and reliable manner. Brian Johnson, Washington Research Foundation Innovation Assistant Professor of Clean Energy and Electrical & Computer Engineering, will be leading the University of Washington's team and using the grant to support their project "A Scalable Control Architecture for 100% PV Penetration with Grid Forming Inverters".

TWO ECE STUDENTS SELECTED FOR THE HUSKY 100

Takunda Masike, an ECE undergraduate, and Farah Nadeem, an ECE Ph.D. student, were both picked for the 2019 Husky 100. Students selected for this honor are chosen for showing that they are making a visible difference on campus, in their communities and for their future.



AKIRA ISHIMARU BECOMES LIFETIME FELLOW OF URSI

The International Union of Radio Science/Union Radio-Scientifique Internationale (URSI), which acknowledges scientific research in the field of Radio Science, will induct ECE Professor Emeritus Akira Ishimaru as a Lifetime Fellow. URSI awardees are selected through a system of nominations and evaluations, with individual awards being presented at the Opening Ceremony of the URSI General Assembly and Scientific Symposium held in Rome, Italy on August 29, 2020. Dr. Ishimaru is renowned for his research in the field of electro-magnetics. To read more about Dr. Ishimaru's life and illustrious career, see our "ECE Trailblazers" feature on page 45 of this issue.



FOUR ECE WOMEN CHOSEN TO PRESENT AT GRACE HOPPER CELEBRATION FOR WOMEN IN COMPUTING CONFERENCE

Since 2013, ECE has provided partial support for eight undergraduate and graduate students to attend the national Grace Hopper Celebration for Women in Computing Conference. This year four ECE women, a record number, were selected to present at GHC19. Three of them (pictured)- Ph.D. student Niveditha Kalavakonda, advised by Blake Hannaford; Ph.D. student Zerina Kapetanovic, advised by Josh Smith; and Ph.D. student Shuowei Li, advised by Eric Klavins; were able to attend and present at the event. The following students were also awarded ECE departmental support to attend the conference: Trang Tran (Ph.D.), Atinuke Abolaji Ademolaidowu (Ph.D.), Forum Vinod (MSEE), Yue Wang (MSEE), Morgan McCandless (BSEE).

ECE TEAM LED BY JENQ-NENG HWANG
WINS COMPETITION IN AI CHALLENGES



A team of UW students and researchers was recognized for its significant research in improving transportation systems. The group, led by ECE Professor Jenq-Neng Hwang, won one of the three track challenges and were named runners-up for the other two from the AI City Challenge at the 2019 IEEE Computer Vision and Pattern Recognition Conference held in Long Beach, Ca. Postdoc Hung-Min Hsu, graduate students Tsung-Wei Huang, Gaoang Wang, Jiarui Cai, Hao Yang (civil engineering), Xinyu Yuan and undergraduates Aotian Zhang and Zhichao (computer science) made up Hwang’s team.

FOUR ECE STUDENTS RECEIVE
POWER & ENERGY SCHOLARSHIP

Four UW students received the 2019-20 Power & Energy Scholarship (PES) presented by IEEE - Ishaan Bhimani (2021), Neil Flodin (2021), Michael Kenny (2020) (not pictured), and Nathan Shih (2021). Recipients are high-achieving undergraduate students in electrical engineering programs who are committed to exploring the power and energy engineering field through both coursework and career experiences.



ARKA MAJUMDAR APPOINTED
WRF DISTINGUISHED INVESTIGATOR

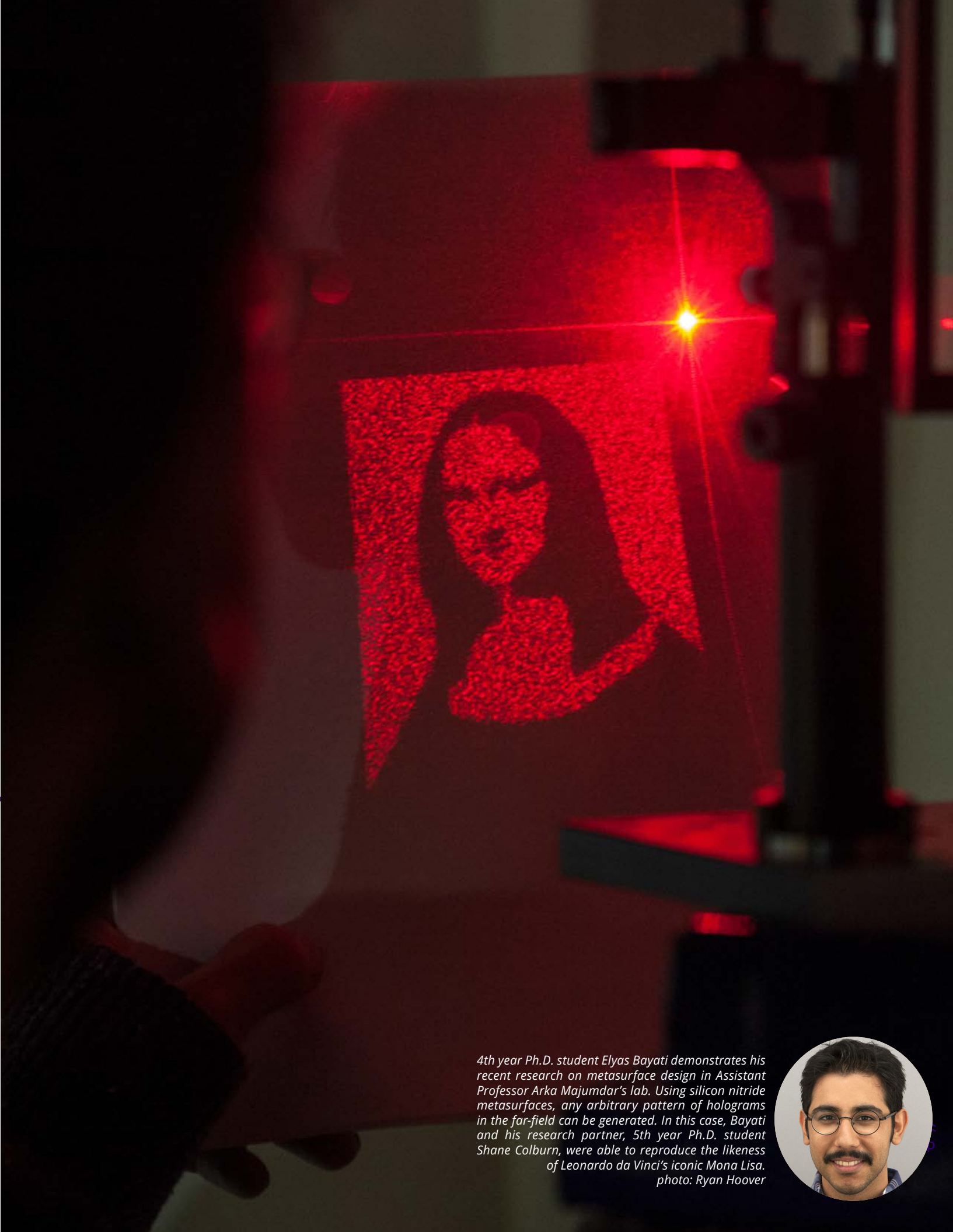
Professor Arka Majumdar was appointed as a Distinguished Investigator by the Washington Research Foundation (WRF). The appointment is a 5-year Professorship with WRF. Majumdar is planning to use his nanophotonic technologies to create miniature, implantable sensors for health science applications.

“This is a wonderful recognition of what Arka has been doing at the UW. We are deeply grateful to WRF for their continued support and friendship to UW.”

-Radha Poovendran
ECE Professor and Chair

LI DENG NAMED CANADIAN
ACADEMY OF ENGINEERING FELLOW

Li Deng, an Affiliate Professor in ECE, has been named a Fellow of the Canadian Academy of Engineering (CAE) in recognition for his research in deep learning and speech recognition. CAE is the national institution through which Canada’s most distinguished and experienced engineers provide strategic advice on matters of critical importance to Canada. Deng was inducted with 48 other Fellows on June 21.



4th year Ph.D. student Elyas Bayati demonstrates his recent research on metasurface design in Assistant Professor Arka Majumdar’s lab. Using silicon nitride metasurfaces, any arbitrary pattern of holograms in the far-field can be generated. In this case, Bayati and his research partner, 5th year Ph.D. student Shane Colburn, were able to reproduce the likeness of Leonardo da Vinci’s iconic Mona Lisa. photo: Ryan Hoover





Ganesh Moorthy and his mother on the steps of the UW campus, 1980.

AN AMAZING JOURNEY

Ganesh and Hema Moorthy establish ECE's newest endowment, The Moorthy Family Inspiration Career Development Professorship, and share their incredible life journey.

The Electrical and Computer Engineering department is incredibly lucky to announce the successful formation of a new faculty endowment, the Moorthy Family Inspiration Career Development Professorship. This generous endowment was established by Ganesh and Hema Moorthy in the fall of 2019 for the purposes of recruiting, rewarding and retaining highly promising faculty members within the UW ECE department who have demonstrated a significant amount of promise early on in their careers. Carefully considered candidates who are selected to receive the endowed professorship are offered funding for an initial 3-5 years, after which time they are eligible to be reviewed for renewal.

the age of just 19. Upon arriving in Seattle, he attended the University of Washington, earning his BSEE degree in the summer of 1981. He also holds a BS in physics from the University of Bombay in India and an MBA in marketing from the National University in Sacramento, California. Ganesh currently serves as the President and COO of Microchip Technology, one of the world's leading providers of microcontroller, mixed-signal, analog, security, Flash-IP, connectivity and power management semiconductor solutions that enable smart, connected and secure devices, and enjoys over \$6 billion in revenue. He joined the company in 2001, having previously served as the CEO of a small Arizona-based software start-up company, Cybercilim, and holding various engineering and management positions at Intel, which was the first job he landed in the U.S. after completing his studies at the University of Washington. He continued working there for the next 19 years of his career.

Ganesh Moorthy, who was also invited to speak at this year's department graduation ceremony (see page 15), came to the United States from Mumbai, India in 1979 at

Encouraged by his parents to study in the United States, Ganesh says he was unaware of the field of semiconductors until they brought it to his attention, after which his eyes were opened to a whole new world of possibilities. He feels that his degree in Electrical Engineering from UW is what led him on the path to receiving such a wonderful employment opportunity at Intel; his fulfilling and successful career in the semiconductor industry in the subsequent years; becoming a US citizen in 1994 and, ultimately, to realizing the American dream for himself and his family. "The United States is truly the most generous country in the world and offers boundless opportunities to everyone," says Ganesh.



Ganesh Moorthy

"As a family, we feel that we have a responsibility to pay things forward and extend a helping hand to others through the establishment of this endowment at the University of Washington, where for me it all began."

This sentiment is very much in keeping with Ganesh's ethos, who also served on the ECE advisory board and has frequently dedicated both his time and expertise to the department over the years. A strong proponent of K-12 outreach, Ganesh's company also provides project-based mentorship to high school students to help them gain early exposure to the field of engineering and

understanding of various potential career paths. In Ganesh's words, "My incredibly lucky personal journey in the United States began as a foreign student in 1979, right here at the University of Washington in Seattle, to which I owe a debt of gratitude. From the early days of learning to live in a new country, to the kindness of many people who extended their hospitality and goodwill to me, to the wisdom of my professors and mentors..."



Ganesh in his first Seattle apartment; autumn, 1979.

"...it has been a most amazing journey for a young immigrant student from India. The sacrifices my parents made to enable me to come to America and join the University of Washington are immeasurable."

(continued on next page)



Ganesh with his children visiting Mt. Rainier, 2000.



Hema Moorthy at this year's ECE graduation ceremony.

“There were many people who helped me accomplish my life journey— family and friends of course, but also professors, mentors, managers, volunteers, communities and institutions.”

He continued, “Some people offered advice and wisdom, while others inspired me through their conduct and the example they set. Still others taught me specific skills and various life lessons. Each did their part, whether they realized it or not, to extend their hand in support of my journey and I cannot thank them enough for their role in helping me to become what I am today,” added Ganesh. “They are also role-models for what I have in turn endeavored to do, to look for ways to give back to society. I believe each of us has an obligation to reciprocate the same sort of help we have received from others.”

Celebrating 34 years of marriage with Ganesh is his wife, Hema Moorthy. Also an electrical engineer by training, Hema holds an MBA from the California State University in Sacramento, and considers herself a “business techie” much like her husband. She worked at Hewlett Packard for a number of years before the job of raising their three children, including twin boys, caused the work-home life balance to become too difficult to manage. After taking 18 years off to be a full-time mother, Hema started a Kumon math and reading center in 2010, once all of their kids were out of the house and off to college. She has always had a passion for teaching, and this opportunity gave her an outlet not only to teach children, but also to become a small business owner.

Ganesh and Hema's children have also gone on to become highly educated, successful adults themselves. Their daughter Anjali works as an intellectual property lawyer at Twitter, while both of their twin sons, Ashwin and Mohan, are business analysts and software test engineers for General Motors.



Ganesh and his father in Ganesh's apartment near the UW campus, 1980.

images courtesy of the Moorthy family



Ganesh and Hema on vacation in Greece, 2005.

The Moorthy Family Inspiration endowment recognizes the encouragement and support that Ganesh and Hema found in their parents, their family members and many others, as well as the same inspiration that they continually strive to offer their own children. This multi-generational professorship in perpetuity reflects the spirit of their generous endowment. Ganesh and Hema feel that education, and STEM (Science, Technology, Engineering & Math) education especially, is the key to building wealth for nations and creating a better life for individuals on the whole. Ganesh noted that while many countries have increasingly been creating diverse entrepreneurial opportunities, the United States remains the best place in the world for fostering innovation and entrepreneurship for anyone with a dream. He feels that his education at the University of Washington in particular provided him with an excellent foundation on which to build a vibrant future for himself and his own family.

Ganesh and Hema sincerely hope that their endowment will inspire future holders of this professorship to make a significant impact on the UW's efforts to develop the next generation of engineers, who will continue to advance engineering and science in order to change the world and make it a better place in every sense and for everyone for years to come. The Moorthy Family Inspirational Career Development

Professorship has equipped the ECE department with a very powerful recruiting and retention tool of exceptional faculty in the field of electrical and computer engineering. The impact and the lasting legacy of this generous gift to the UW and UW ECE are immeasurable. Our community is deeply grateful to Ganesh and Hema for their love and support of UW ECE. ■

“I believe each of us has an obligation to reciprocate the same sort of help we have received from others.”
- Ganesh Moorthy



Ganesh and Hema in India with their twin sons Mohan and Ashwin, daughter Anjali and son-in-law Jonathan; December, 2018.

ECE TRAILBLAZERS

ECE trailblazers are honored for the work they do to effect positive change in the world. Our academic pioneers' far-reaching research has created important paths for other electrical and computer engineering scholars to build upon, while our industry leaders' ground-breaking enterprises have provided important solutions that improve lives. This year we have the pleasure of highlighting two of our long serving emerita faculty members, Professors Akira Ishimaru and Irene Peden. In addition to the great number of prestigious awards and recognitions they have both received during their long and illustrious careers, Ishimaru and Peden are also past recipients of the Diamond Award, recognized as the UW College of Engineering's highest alumni award. Ishimaru was honored with the 2011 Diamond Award for Distinguished Achievement in Academia, while Peden was honored with the 2018 Diamond Award for Distinguished Service.



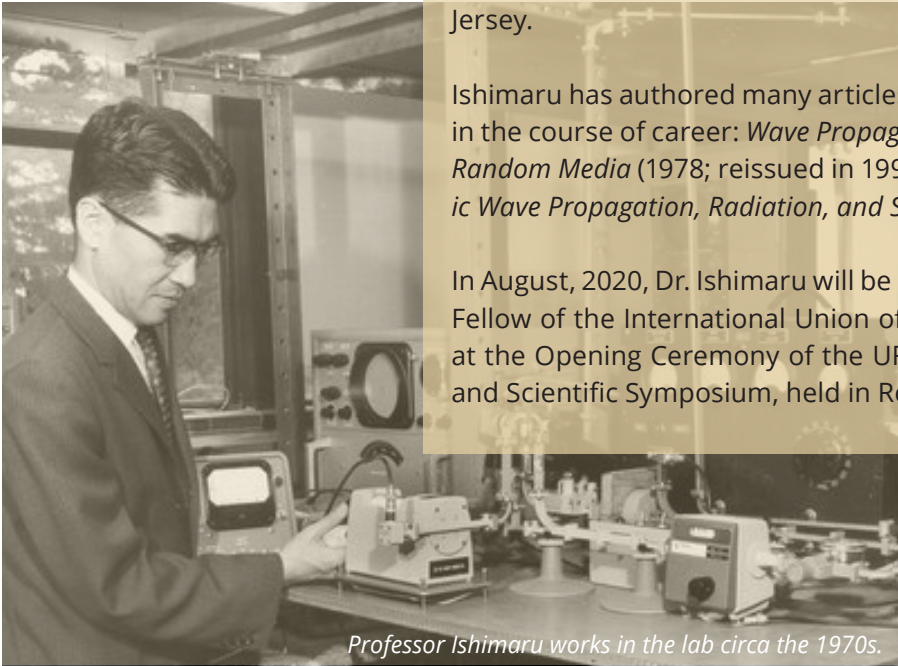
Akira Ishimaru
(Professor Emeritus)

Landing a plane in fog is possible thanks to the work of Akira Ishimaru, a National Academy of Engineering member and one of the world's top experts in wave propagation and scattering in random and turbulent media. His work on this topic has influenced advancements in ultrasound imaging, microwave remote sensing, satellite and cellular communications, optical communications, laser surgery, radar tracking and astronomy.

Born in Fukuoka, Japan, Ishimaru received his bachelor's degree from the University of Tokyo in 1951 before coming to the United States the following year. He completed the first Ph.D. in the University of Washington Electrical Engineering department in 1958, where he was immediately hired as an instructor. Prior to joining the faculty of UW, he worked with the Electrotechnical Laboratory in Tanashi, Tokyo, and Bell Laboratories in Holmdel, New Jersey.

Ishimaru has authored many articles as well as two books in the course of career: *Wave Propagation and Scattering in Random Media* (1978; reissued in 1997) and *Electromagnetic Wave Propagation, Radiation, and Scattering* (1991).

In August, 2020, Dr. Ishimaru will be inducted as a Lifetime Fellow of the International Union of Radio Science (URSI) at the Opening Ceremony of the URSI General Assembly and Scientific Symposium, held in Rome Italy.



Professor Ishimaru works in the lab circa the 1970s.



Akira Ishimaru in 1954.



Irene Peden
(Professor Emeritus)

A trailblazer for women in engineering, Irene Peden was the first woman to receive a Ph.D. in engineering from Stanford and was the first woman hired by the UW College of Engineering in 1962. Peden is one of only two UW ECE faculty admitted into the National Academy of Engineering in the past 100 years. She is known for her pioneering work and leadership in engineering education in antennas, radio wave propagation and contributions to radio science in the polar regions. Peden is also the first woman engineer/scientist to conduct field work in the interior of the Antarctic continent as a principal investigator, which she accomplished in 1970.

Irene has also opened doors for female engineers to succeed on the UW campus. The **Irene C. Peden Endowed Fellowship** was created in her name in 2015, providing a stipend, tuition and fee coverage to female Ph.D. students in ECE, who remain underrepresented to this day. Dr. Katherine Pratt is the 2018-19 recipient of the fellowship.



“What is important about Irene and other trailblazers is how life is easier for the women who follow them.”

- Eve Riskin, ECE Professor and Associate Dean for Diversity & Access



Professor Peden in Antarctica in 1970.

Education • Innovation • Impact

MORE WAYS TO GET INVOLVED WITH UW ECE:

- ECE Lab Tours
- Lytle Lecture Series & Reception
- Puget Sound Mixer & Research Review Day 3.12.20
- ENGINE Project Mentorship
- Other Department Events



UNIVERSITY of WASHINGTON

photos: Ryan Hoover



On October 10, several of our local alumni and their family members enjoyed a tour of the ECE laboratories, followed by faculty presentations and lunch with ECE Professor and Chair Radha Poovendran.

IN MEMORIAM

Remembering Our Friends | Honoring Their Legacies

STEPHEN GRAHAM



In July, ECE sadly announced the passing of our friend and colleague, Stephen Graham. Graham had been in the department for 27 years and at the UW since 1989. Graham wore a variety of hats in the department, transferring to the advising office as a Program Assistant in 1997. He was an integral member of the advising team and impacted the student experience through time scheduling and working with them directly.

Born in Toledo, Ohio, Graham

double majored in history and physics as an undergrad at Carlton College and earned his M.A. from the University of Hawaii, focusing on Modern Southeast Asian and Comparative Colonial History.

When he wasn't at work, sharing his UW expertise with his colleagues, Graham liked to attend gaming conferences and was an avid reader. He will be missed both personally and professionally.

VIKRAM JANDHYALA



ECE lost our friend, esteemed faculty member and former Department Chair, Vikram Jandhyala, this past February at the age of 47. Jandhyala joined the ECE department as a professor in 2000. Although his career was prematurely cut short, he was hugely prolific in his numerous endeavors.

Jandhyala also served as the Executive Director and Vice Provost for Innovation for five years at UW's startup office, CoMotion, and was the co-CEO for the UW

Global Innovation Exchange (GIX), among many others.

Described as a renaissance man and "absolutely brilliant" thinker, Jandhyala was an educator, entrepreneurial leader and innovative pioneer who dedicated himself to bridging Seattle's tech world with the university and broader community as a whole.

Donations to support Vikram's children can be made at the following website:

www.gofundme.com/f/support-vikram-jandhyalas-children

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photo: Ryan Hoover

Radha Poovendran
Professor and Chair

Payman Arabshahi
Associate Chair for Advancement

Mahnaz Sherzoi
Director of Advancement,
College of Engineering

Maryam Fazel
Associate Chair for Research
and Entrepreneurship

Daniel Kirschen
Associate Chair for Education
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Ryan Hoover
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