

THE ECE CURRENT

FALL 2021

Research Initiatives

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ECE Alumni Spotlight

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UC SANTA BARBARA

Electrical and Computer Engineering

College of Engineering

Letter From The Chair



Greetings!

We just completed a very unusual yet highly productive 2020-21 academic year. We added three new outstanding faculty members: Kerem Camsari and Bongjin Kim in Computer Engineering and Nina Miolane in Communications and Signal Processing. Our faculty's excellence in teaching and research is recognized by major awards, including the senate distinguished teaching award and early career awards. A new AI/Machine learning instructional lab is set up with gift funds to address the growing need for computing resources in this emerging area. We had several initiatives towards enhancing diversity at all levels: students, faculty and staff, including forming a new Diversity, Equity, and Inclusion (DEI) committee and planning recruitment activities targeting underrepresented groups. The Department received close to \$27 million in extramural support during the 2020-21 academic year, continuing its tradition of exceptional research. We all are excited to be back on campus as we welcome our new undergraduate and graduate students return to a "normal" environment, noting that about half of these students are on campus for their very first in-person quarter! We look forward to another productive year.

A handwritten signature in black ink, appearing to read "B.S. Manjunath".

B.S. Manjunath, ECE Chair



In Memoriam

George L Matthaei
1923 - 2020

George Matthaei was a member of our faculty from 1964 to 1991. He was born in Tacoma, Washington, on August 28, 1923, and developed an interest in aeronautical engineering at an early age. He attended the University of Washington (UW) until he was called from ROTC to active duty in the army in 1943. During WWII, Matthaei served with an anti-aircraft unit in New Guinea and the Philippines where he transitioned his engineering interest to microwave component design. At the end of the war, he returned to UW to complete a BS in electrical engineering. He went on to attain a MS in 1949, a professional engineer degree in 1951, and a PhD degree from Stanford University in 1952.

Prior to joining UCSB, he was a faculty member at UC Berkeley from 1951 to 1955, and engaged in system analysis and microwave component research with the Ramo-Wooldridge Corporation. From 1958 to 1964, he was with the Stanford Research Institute, where he became manager of the Electromagnetic Techniques Laboratory. He also participated in writing a book on microwave filters for the Army Signal Corps, entitled "Microwave Filters, Impedance-Matching Networks, and Coupling Structures," that is still in publication today.

In 1964, he became a professor for the ECE department at UCSB, and over the next 27 years he saw the small engineering school grow into a large college of engineering by the time of his retirement in 1991. He authored or co-authored over 85 papers and was a contributor to several books. Matthaei was Fellow of the IEEE, a recipient of the 1961 Microwave Prize of the IEEE Microwave Theory and Techniques Society (IEEE MTT-S), and the 1986 IEEE MTT-S Microwave Career Award.

Following his retirement, Matthaei joined STI (superconductors) where he worked part-time until age 85. He also joined his wife, Jean, in volunteering as a docent at the Santa Barbara Museum of Natural History, sharing their passion for nature and science. He was a thoughtful and intelligent man who will be missed by everyone dearly. Matthaei is survived by two daughters, Jane Bell (Douglas) and Susan Larsen (James), four grandchildren and three great grandchildren.

Welcome, New Faculty!



Kerem Camsari

Assistant Professor in Electrical and Computer Engineering

Kerem received his PhD degree in electrical and computer engineering from Purdue University in 2015, where he continued as a post-doctoral researcher between 2015 and 2020, before joining the ECE department at UCSB in 2020.

His PhD work established a modular approach to connect a growing set of emerging materials and phenomena to circuits and systems. In his postdoctoral work, he used this approach to establish the concept of p-bits and p-circuits as a bridge between classical and quantum circuits to design efficient, domain-specific hardware accelerators in the new, beyond-More era of electronics.

Kerem's work has been published in many

journals and conferences including Nature, Nature Electronics, Science Advances, and Physical Review X. He has delivered more than a dozen invited talks in international conferences and workshops, including American Physical Society (APS) March Meeting, IEEE Device Research Conference (DRC), Magnetism and Magnetic Materials (MMM) Conference, the IEEE International Electron Devices Meeting (IEDM) and the International Conference on VLSI Design (VLSID).

Kerem served on the technical program committee for Design, Automation and Test in Europe Conference (DATE) in 2020 and in 2021. He has also served on the technical program committee of the IEEE Conference on Rebooting



Bongjin Kim

Assistant Professor in Electrical and Computer Engineering

Bongjin received his PhD degree from the University of Minnesota in 2014. After receiving his PhD, he worked on design techniques and methodologies for communication circuits and microarchitectures at Rambus and Stanford University as a senior staff and a postdoctoral research fellow. In 2017, he went on to work as an assistant professor at Nanyang Technological University in Singapore, until he joined the ECE department at UCSB in 2020.

His research team develops innovative integrated circuits and system solutions using traditional CMOS logic and emerging technologies to solve challenging problems in fundamental science and accelerate computations and communications. Target applications include, but not limited to,

artificial intelligence, machine learning, robotics, and alternative computing.

He received the Doctoral Dissertation Fellowship Award at the University of Minnesota and the International Symposium on Low Power Electronics and Design Contest Award (ISLPED). His research works have been published in peer-reviewed conferences and journals, including the International Solid-State Circuits Conference (ISSCC), VLSI Symposium, Custom Integrated Circuits Conference (CICC), and Journal of Solid-State Circuits (JSSC). He has served on the technical program committee for Design Automation Conference (DAC) and the IEEE Solid-State Circuits Letter (SSC-L) editorial review board.



Nina Miolane

Assistant Professor in Electrical and Computer Engineering

Nina Miolane received her MS in Mathematics from Ecole Polytechnique, France, and Imperial College, UK, her PhD degree in computer science from INRIA, France, in collaboration with Stanford, and spent two additional years at Stanford in Statistics during her postdoc. She also worked as a deep learning software engineer in Silicon Valley for several years. At UCSB, Nina directs the BioShape Lab, whose goal is to explore the "geometries of life." Her research investigates how the shapes of proteins, cells, and organs relate to their biological functions, how abnormal shape changes correlate with pathologies, and how

these findings can help design new automatic diagnosis tools. Her team is also co-developing the open-source Geomstats library, a package that provides methods at the intersection of geometry and machine learning, to compute with geometric data such as biological shape data. Nina has extensively published in the field, is a co-author on the reference book Riemannian Geometric Statistics for Medical Imaging, a co-inventor on several patents, serves on the scientific committees of several international conferences, and was the recipient of the L'Oréal-UNESCO for Women in Science Award.

Student Awards and Fellowships 2020-2021

Outstanding Seniors

Navid Mir (EE)

Andrew Lu (CE)

Outstanding Teaching Assistants

Rohit Karnaty (EE)

Boning Dong (CE)

Hynes-Wood Award and the University Award of Distinction

Abel Semma (CE)

Ed Hass Outstanding Junior Award

Emily O'Mahony (CE)

Kroemer Dissertation Fellowship

Mitra Saeidi (EE)

Roger Wood Scholarship Award

Vincent Benenati (CE)

Calvin Jenkins (CE)

Daniel Hernandez-Vitela (EE)

Angel Patino (EE)

Faculty Awards and Honors 2020-2021



John Bowers

2021 Compound Semiconductor Week IPRM Award



Kerem Camsari

2021 IEEE Magnetics Society Early Career Award



Steve DenBaars

2021 Compound Semiconductor Week IPRM Award; 2021 AAFM-Nakamura Award



Yogananda Isukapalli

2020-2021 Academic Senate Distinguished Teaching Award; 2020-2021 Northrop Grumman Excellence in Teaching Award; 2020-2021 Outstanding Faculty Member award in Computer Engineering



Nikil Jayant

2020 Fellow of the National Academy of Inventors



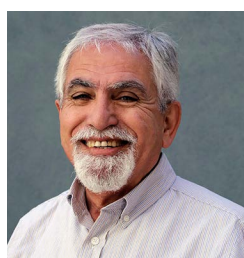
Jonathan Klamkin

2021 Director's Fellowship from the U.S. Defense Advanced Research Projects Agency



Galan Moody

2021 Defense University Research Instrumentation Program Award; 2020 NSF Career Award



Behrooz Parhami

2021-2023 IEEE Computer Society Distinguished Visitor



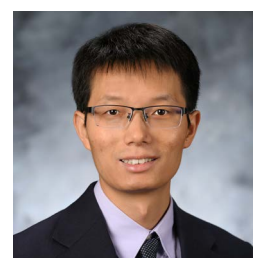
Ramtin Pedarsani

2020 Joint Communications Society/Information Theory Society Paper Award



Mark Rodwell

2020-2021 Outstanding Faculty Member award in Electrical Engineering



Zheng Zhang

2020-21 ACM Special Interest Group on Design Automation; Outstanding New Faculty Award

Faculty Mentorship: **GALAN MOODY**



Quantum Photonics Lab members, (from right to left) Galan Moody, Shaimaa Azzam, Trevor Steiner, and Quynh Dang, discussing research outside of Henley Hall.

What does mentoring mean to you and why is it important in your profession?

The most important aspect of my profession is to serve as a role model and mentor for students. Academia is driven by the students, and my role is to help guide them through this phase of their life and career. I definitely benefited from the advice of several great mentors, and I still speak with them regularly for guidance. I strive to do the same for my students!

As a student did you have faculty that you looked up to?

I took two courses from Eric Cornell and Carl Wieman—Physics Nobel Laureates who created the first Bose-Einstein condensate in 1995. They had an uncanny ability to break down difficult topics into easy-to-understand concepts and they helped students develop similar critical thinking and reasoning skills. I really try to emulate this type of teaching style in my courses too. My PhD advisor, Steve Cundiff, had a similar advising style—explaining difficult research topics in ways that were easier to understand. He was also very supportive of undergraduate and graduate research, both in the lab and through professional development.

Do you think it is helpful for undergraduates to find a mentor?

Absolutely, and I would encourage undergraduates to look for a mentor as early as possible! Mentors help students learn about their career options, interests and goals, undergraduate research and internship opportunities, and ways to prepare for the next phase of their career. Different methods for finding a mentor include emailing faculty or stopping by their office, taking a course by faculty whose research interests you, speaking with the students in their research group, or attending seminars to learn more about the different research groups in the department and on campus.



How do you measure your success as teacher?

For me, success is being able to engage with every student in my class on some level, so everyone feels welcome and that they can contribute, even if the course topic isn't in their research field or wasn't something they were originally interested in. My hope is that each student leaves my class learning or refining critical thinking skills, having developed a new conceptual

understanding of a challenging topic, or they feel inspired to pursue a new research direction or career path.

Do most students come to you with a clearly defined path and goal? If not, how do you help them get there?

Some do and some don't! When I was an undergraduate student, I had no idea what I wanted to work on and what career path I was interested in. My undergraduate mentor (and eventual PhD advisor) allowed me to work on several projects over the course of a few years, and more importantly, I attended and presented at several research conferences. These are two great ways for students to get exposed to leading academic research and industry developments.

What aspects of an academic career do you find most rewarding?

In the research lab, it's amazing to see all the hard work that my students put in and how it pays off. It could be a new device that they designed and fabricated, or experiments and measurements that led to exciting or unanticipated results. Seeing them take ownership of their research and their future, and me being able to support them through mentorship and professional development, is by far the most rewarding aspect. The same goes for teaching—I do my best to create an engaging academic environment, and seeing students respond to that through their interest and hard work is really inspiring.

What do you hope your students take away from their time in your lab?

If nothing else, I hope my students become the best scientific citizens that they can be. This means learning how to carry out impactful research projects, hold themselves to high ethical and professional standards, and engaging with their community to inspire the next generation of learners.

What is the greatest thing a student ever taught you?

Many students continually teach me that I can always improve as a researcher, educator, and mentor. Students ask insightful and thought-provoking questions that always keep me on my toes and remind me that I can always improve professionally and personally. Keep asking great and challenging questions!

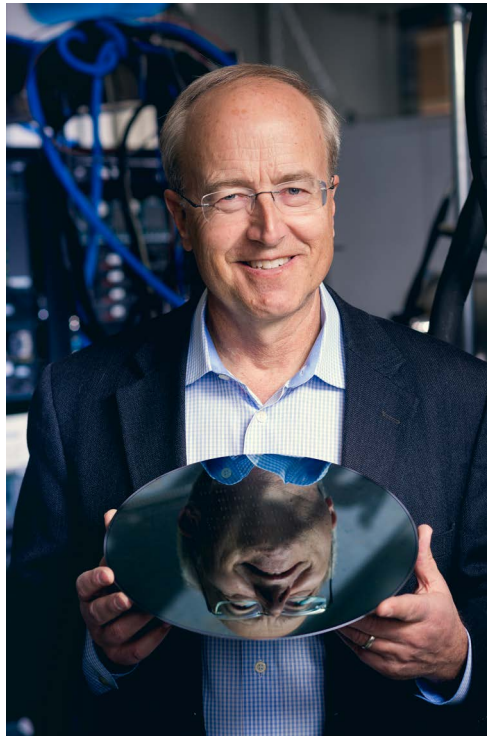
Do you have any advice for ECE students?

Engage with faculty as soon as you can to help maximize your opportunities going forward. Also, developing habits to maintain a healthy school-life balance is really important, and meeting with a faculty mentor often for guidance is key for this.

John Bowers

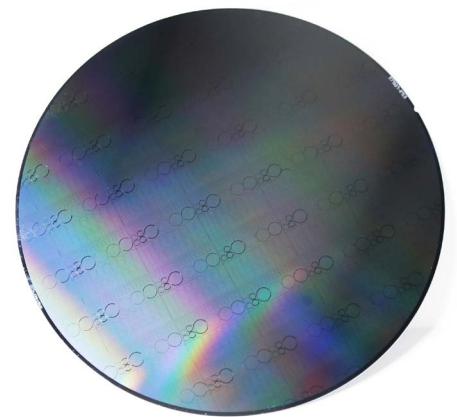
Convergence of Silicon Photonics and Electronics

Silicon photonics research and commercialization has intensified as both photonic component performance and photonic integration complexity have been dramatically improved and expanded in the past decade. Silicon photonics enables a wide range of applications from datacom and telecom to sensors including light detection and ranging (LIDAR), gyroscopes, biosensors, and spectrometers. The key drivers for using silicon for photonics include the advantages of low-loss silicon waveguides with compact size and excellent uniformity, resulting from the high quality and mature processing of CMOS processing. Modern CMOS packaging techniques, including those originally developed for the cell phone and IT industries, are being applied to silicon photonic integrated circuits (PICs), resulting in much lower costs and far improved scalability. The biggest application has been for datacom transceivers, which have moved through five generations of technology from pluggables to on-board optics to copackaged optics to integrated 3D silicon chips where photonic wafers are bonded to electronic wafers. Datacom transceivers using silicon photonics have rapidly moved from product introductions to multi-million units per year. As data rates increase from 100 Gbps to 100 Tbps, integrated electronics is essential to reduce both the system-level power consumption and the device-level capacitance of connecting the transmitter modulators as well as the receiver photodetectors. Target power requirements have dropped from thousands of pJ/bit to sub-pJ/bit over the past decade.



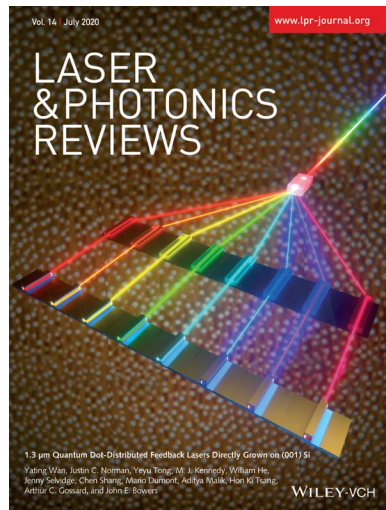
Just as integrated electronics is essential to high performance photonics, electronics has encountered a communication and power bottleneck that can now be solved with integrated photonics. Because the loss of optical fibers is so low and the capacity is so high (319 Tbps on a single fiber was recently demonstrated), most data communication today is via fiber optics (except for the wireless connection to cell phones and laptops). This is for transcontinental distances down to connections between electronic chips. With the recent demonstrations of 3D bonding of electronic and photonic chips, chip to chip communication can be done optically at very high capacity and very low power. Switching chips at 51 Tbps from Broadcom, Intel, and others are using copackaged optics.

Modern CMOS packaging techniques, including those originally developed for the cell phone and IT industries, are being applied to silicon photonic integrated circuits (PICs), resulting in much lower costs and far improved scalability.



Top Left: John Bowers holds a reflective silicon wafer instrumental to the cutting edge science of quantum photonics.

Above: A close up of a silicon photonic circuit wafer used in Bowers' lab.



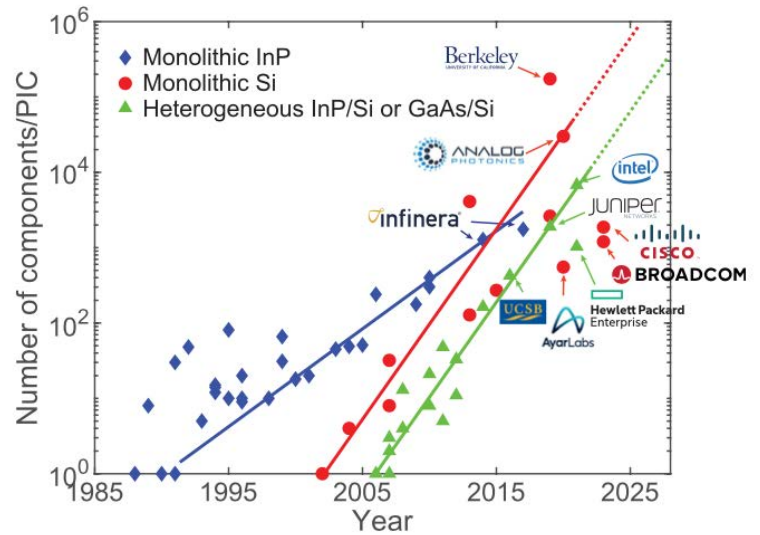
Far Left: A recent result from Bowers' showing tunable quantum dot lasers on silicon.

Left: Another recent result showing quantum dot distributed feedback (DFB) single frequency lasers grown on silicon for datacom applications.

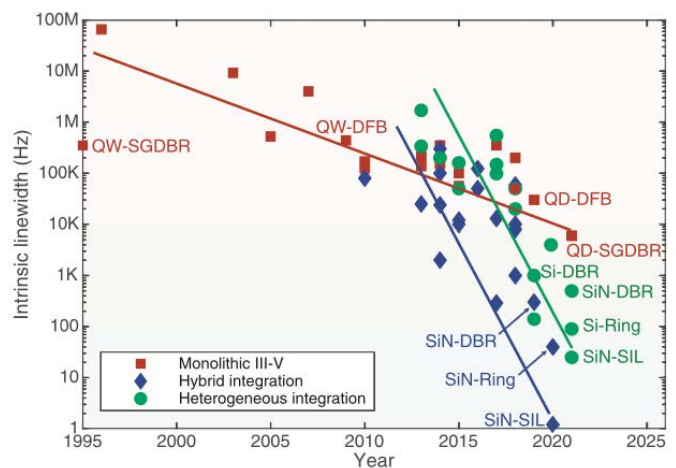
Putting the optics in the package greatly reduces the power and increases the switch capacity. This will rapidly increase the capacity of switching chips to 500 Tbps capacity by the end of this decade.

These high capacity transmitters use a lot of integration to achieve tens of Tbps data rates using transistors operating at tens of Gbit/s. Combs of optical frequencies are generated and each wavelength is encoded with data at rates of 25 Gbps today and 100 Gbit/s at the end of the decade. Fig. 1 shows the level of integration that has been achieved with three dominant technologies: InP photonics, silicon photonics with separate "disaggregated" lasers and silicon photonics with integrated lasers. Silicon is a very inefficient light emitter, so lasers are integrated using direct bandgap III-V materials. This is accomplished by either bonding III-V material to silicon or epitaxially growing the III-V material on silicon. The former was invented at UCSB and is now in commercial production at Intel and two UCSB spinoffs (Aurrion, acquired by Juniper and Nexus Photonics), and the latter is an active area of research at UCSB. It turns out that a new technology, quantum dot lasers, developed in collaboration with Professors Gossard, Mukherjee and Klamkin, is ideal for highly reliable lasers on silicon and lifetimes have improved over the past decade from hundreds of hours to hundreds of millions of hours. This was accomplished through a detailed study of dislocations and their movement during lasing. The solution is a UCSB invention licensed by a UCSB silicon photonics spinoff, Quintessent.

15 years ago, at UCSB, we started focusing on laser integration hoping to make lasers on silicon as good as lasers on InP or GaAs. Fortunately, ultralow loss silicon nitride waveguides on silicon, developed in collaboration with Professor Blumenthal, allow us to make much better lasers on silicon. By self injection locking DFB lasers to silicon nitride waveguides, the noise of the DFB laser can be reduced by over 40 dB, and the Lorentzian linewidth can be reduced from 1 MHz to 1 Hz, as shown in the figure to the right. We used to think of semiconductor lasers as noisy, but now they can be lower noise than gas or fiber lasers, and that may open up a lot of new applications for these compact, CMOS compatible, low cost lasers and photonic integrated circuits that use them. Most recently, in collaboration with Professor Moody and the UCSB Quantum Foundry, we are using them for quantum computing applications.



The number of photonic components integrated on a single waveguide over time for three photonic integration platforms: InP substrate with integrated lasers, Si substrate without integrated lasers and Si substrate with integrated lasers.



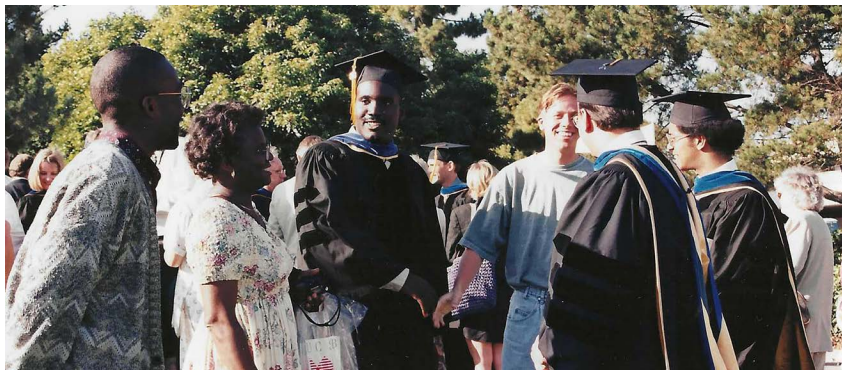
Semiconductor laser linewidth progression for three different integration approaches.

ALUMNI Q&A:

ARCHIE HOLMES

*Executive Vice Chancellor for Academic Affairs,
University of Texas System*

Since earning his PhD degree in 1997, Archie Holmes has established himself as a lauded educator, researcher, and administrative leader. The ECE department had the pleasure of catching up with him this July, and discussing how his experience at UCSB helped shape his career.



Archie Holmes at UCSB commencement, 1977.



Holmes doing research in ECE lab.

What were your ambitions when you first came to UCSB?

When I was a student at UCSB, I really loved the research activities I engaged in as a graduate student. It made me want to do that as part of my academic career, so I was very fortunate to be hired on at my alma mater as a faculty member and then continue as both a faculty member and an administrator.

Why did you choose UCSB's Electrical Engineering program for your graduate studies?

The selection of graduate school and why I ultimately ended up being at UCSB was really because of two main aspects. Number one, they were the best in the world in terms of compound semiconductor research and that's certainly what I wanted to be involved in. More importantly, I wanted to be involved in a collaborative environment. I wasn't interested in just having my own project and doing it on my own. I wanted to be involved in a community of people working on similar projects engaging in ideas and UCSB really exceeded my expectations.

Who were your faculty advisors at UCSB?

My PhD advisor was Steven DenBaars and I was co-advised by John Bowers. I worked on a project where I was looking at semiconductor growth for lasers and then using a wafer-bonding technique that was pioneered in John Bowers' lab to try to improve the performance of those lasers.

Your career path changed in 2016 when you became the vice provost at the University of Virginia (UVA). What motivated you to make that change?

In 2016, I joined the Provost Office at the University of Virginia. I think what prompted me to do that was my overall experience in academia. I felt throughout my time in academia, I was very well supported and was transformed by higher education, but I recognized not all students were having the same experience. So, I was continually looking for how I could impact the most students and for me that meant going into academic administration where I get to work across the university. At the University of Texas System, I work with eight very different academic institutions, and we impact around 24,000 students. Being in a position where I can help figure out how we are going to make education affordable, accessible, and transformational for all of our students is a passion I gained through this experience.

How did your education and training as an engineer prepare you to succeed in your new roles?

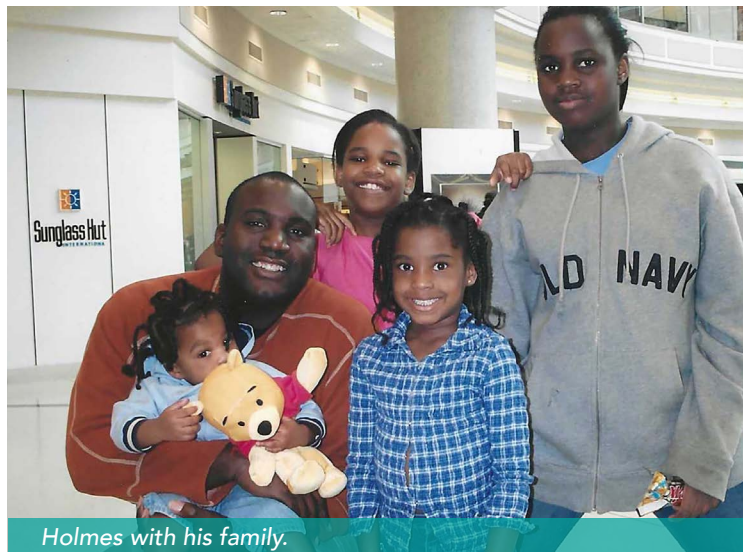
I think that my training as an engineer benefits me in a number of ways. At the end of the day, what we're doing is really trying to solve a problem at its core. I think that what I've had to learn over time is that in administration the problems weren't technical, they were interpersonal and lots of other things. I've had to build skills, however, my engineering education and experience taught me how to teach myself what I needed to learn.

How have you worked toward increasing diversity and inclusion in your current position and why is it important?

Engineering is going to be at its strongest when we have a diverse set of folks around the table who bring both professional and personal experiences to bear in terms of the problems that we solve. To me, the research on this is clear that diversity and inclusion lead to better solutions. In my role both at the University of Virginia and at the University of Texas System, my goal is to try to help advocate for that all the time, just making sure that people really understand the power that diversity has.

How do you think UCSB's ECE Department impacted your career and where you are today?

As I reflect on my career, I think that I really benefited from a number of things that happened in the ECE Department at UCSB. One is the collaboration that happens across the faculty and research groups. It made me a stronger researcher because I got to see problems from different angles and perspectives. I think another thing that is part of the culture of UCSB, that you cannot understate, is the importance of talking about your research or talking about technical terms.



Holmes with his family.

When you go out into the world, whether it's like a faculty member like me or in industry, you have to sell your ideas, sometimes it's to a technical audience and sometimes it's not to a technical audience, and so getting practice is important. That was really embedded into my educational experience at UCSB and it has paid huge dividends.

What advice do you have for current ECE students and those who are considering whether UCSB is the right place for them?

I really hope that you take advantage of all the opportunities that are there. When I went to college I never was interested in taking any classes outside of science or math, but a philosophy class changed my life. There are great faculty and great students across campus. I think you will find UCSB is a warm and inviting atmosphere that will challenge you both personally and intellectually.



Archie Holmes receives his award in teaching excellence.

For an extended video interview, please visit:

<https://www.ece.ucsb.edu/spotlights/archie-holmes>

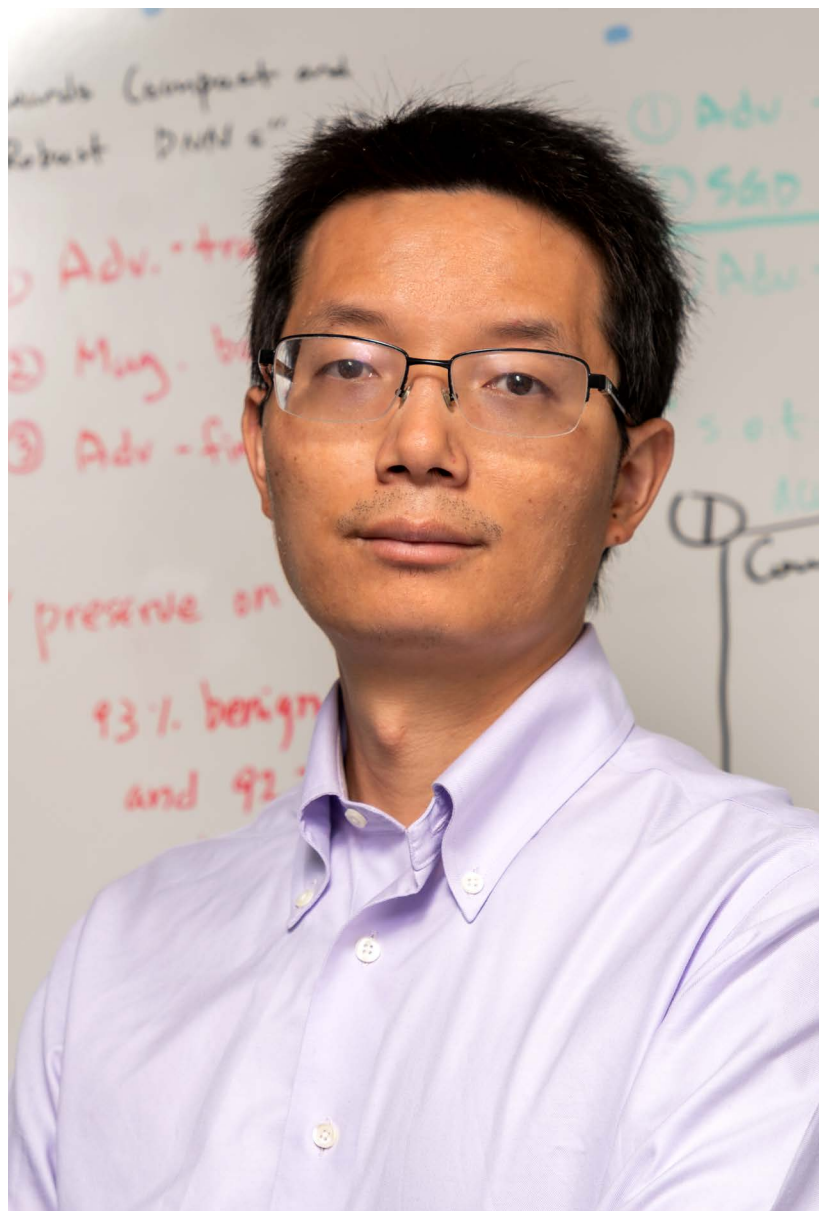
COMPUTATIONAL DATA SCIENCE

for Designing Emerging Hardware and AI Systems

Zheng Zhang

Professor Zheng Zhang's group investigates computational data science to solve modeling, verification, and optimization problems in electronic and photonic design automation under process variations, large-scale AI systems under various perturbations and attacks, and autonomous systems with environmental uncertainties and sensor noise. In these applications, ensuring robustness and safety is of high importance in practical design or operations. To address this issue, his group investigates the fundamental theory and algorithms of uncertainty quantification.

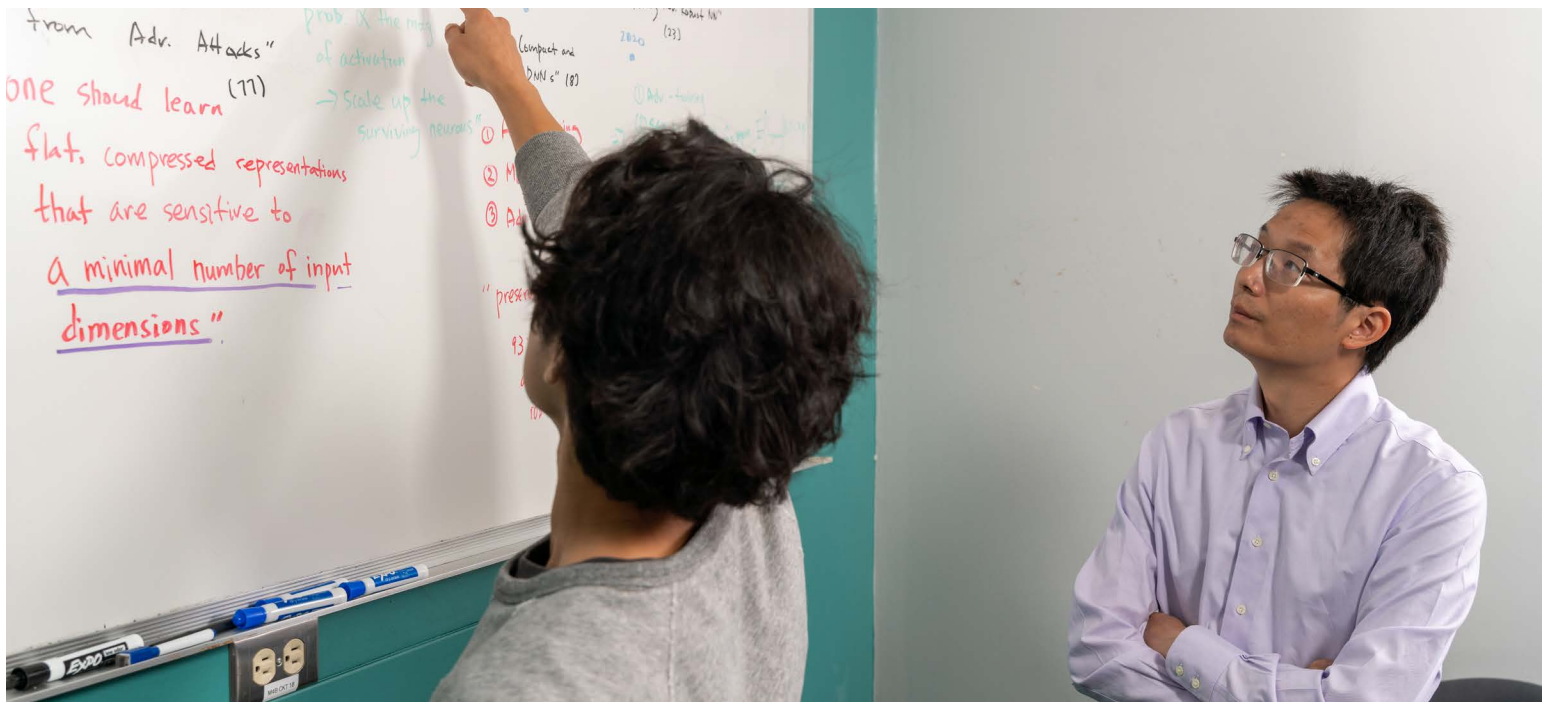
Meanwhile, many of these system designs involve high dimensionality and high-volume of data. This motivates his group to investigate the second theoretical topic: tensor computation.



Data-efficient Design Modeling and Optimization Under Uncertainties

Nano-scale electronic and photonic IC chip fabrication suffers from increasing process variations such as random doping effect and surface roughness. Quantifying the impact of such uncertainties and optimizing the yield of chip design has been a long-standing challenge in the electronic design automation (EDA) field. While there has been a trend of solving EDA problems with AI, directly applying AI to EDA problems may lead to bad performance. This is because modernized AI algorithms (e.g., deep learning) are designed based on a high volume of available training data, while obtaining data samples in electronic and photonic design automation is often expensive. In analog/mixed-signal design, each piece of data is obtained from a numerical simulation of a device- or circuit-level computational models, which are computationally expensive large-scale differential equations.

With the support of two NSF grants and one DOE award, Zhang's group are investigating small-data techniques to develop variation-aware design automation algorithms. In this direction, their research efforts include: (1) stochastic spectral methods for forward uncertainty quantification under non-Gaussian correlated uncertainties; (2) overcoming the curse of dimensionality by tensor computation; (3) ensuring performance-yield co-optimization by developing rigorous chance-constraint optimization algorithms; (4) accurate Bayesian inference algorithms inspired by the models from statistical physics and quantum physics. His former postdoc Chunfeng Cui and PhD student Zichang He achieved best journal paper award once and best conference paper awards twice in this area.



Professor Zhang in the lab with a student from his research group.

Using tensor compression in the training process, they significantly reduce the training variables and offer a promising solution for training AI models on energy-efficient edge devices.

Hardware-friendly, Energy-efficient and Trustworthy AI systems

While deep neural networks have achieved great performance in many engineering applications, their deployment has been limited by some fundamental challenges. Firstly, the huge AI models consume lots of computing resources and energy in the training and inference stage. Secondly, deep neural networks often have a significant accuracy drop when the input data is perturbed only a little bit due to the black-box nature. To overcome these two challenges, Zhang's group is developing computational methods and algorithm/hardware co-design to improve the training efficiency and robustness/safety of deep learning models.

With the support of an NSF grant and in collaboration with Facebook, his PhD student Cole Hawkins has developed a highly efficient tensor optimization framework for training deep neural networks with orders-of-magnitude reduction of memory and energy cost. The key idea is fundamentally different from the mainstream techniques of pruning or quantization that only offer reduction around one order of magnitude. Using tensor compression in the training process, they significantly reduce the training variables and

offer a promising solution for training AI models on energy-efficient edge devices. Several leading AI and semiconductor companies have shown great interests in this research direction.

In order to improve the robustness and safety of deep learning models, his group is investigating the theoretical and algorithm issues from the perspectives of uncertainty quantification and dynamic systems. Specifically, his former postdoc Chunfeng Cui has shown that the theoretical tools from uncertainty quantification can be used to detect the strongest possible universal attack to a neural network. In collaboration with National University of Singapore, his student Zhuotong Chen developed a closed-loop control method to detect and fix the possible errors caused by various uncertainties and attacks in the input data. Their proposed method connects trajectory optimization of dynamic systems with neural network robustness, providing a powerful defense tool that can handle many kinds of attacks unseen in the training process.

Beyond the Disciplinary Boundaries

Professor Zhang's group highly appreciates the value of interdisciplinary research. The technical background of his group members are very diverse: their undergraduate and PhD degrees are from ECE, CS and applied math. Such a diverse background is a key enabler to the success of interdisciplinary projects.

Beyond the above-mentioned fields, Zhang's group is also investigating the following emerging topics beyond conventional computing: (1) quantum computing and probabilistic computing to ensure safe machine learning (in collaboration with Professor Kerem Camsari); (2) tensor computation for quantum AI and quantum design automation (in collaboration with Professor Galan Moody and with industries).

Student Spotlight: **Hoontaek Oh**

ECE PhD student
Advisor: Jerry Gibson



Why did you choose UCSB's ECE department?

UCSB is one of the universities that has the greatest faculty in signal processing. Their amazing ongoing research inspired me in Korea. Moreover, when I realized the campus is located right on the beach, I became totally mesmerized by UCSB.

How did you learn about the program?

When I decided to start my graduate study in the United States, UCSB was one of the schools my undergraduate advisor recommended to me. Since I had never been to the U.S. before, I had no information, so I listened to their recommendation and I learned more about the program through the ECE website.

What is campus life like for ECE students?

I believe that ECE students are very passionate about hobbies as well as their study. A balanced campus life keeps us happier and more satisfied with what we are doing. Since Harold Frank Hall and the other engineering buildings are quite close to the beach, students often get out and take a walk with friends while enjoying the wonderful ocean view.

Looking back, what do you think you would have wanted your parents to know about UCSB?

Honestly, the thing my parents were most worried about was my safety since I was going abroad. I would explain to them how safe Santa Barbara is compared with other cities.

What were some challenges you faced as a student/researcher?

In my case, the biggest challenge was the moment when my long-term research didn't perform as well as I expected. I think this is common among graduate students, but honestly, it is frustrating at first. However, when I look back, overcoming that moment was an important experience for my growth.

Can you tell us of anyone who you looked up to?

The answer to this question is always my parents. Their generation has been commonly raised in hungry and poor situations. Most people, when they were growing up, gave up studying at school and began farming. However, my parents never gave up studying and pursuing their dreams, even when in a poorer situation than others.

What have you learned that has surprised you the most so far?

It is simple. If I never give up, eventually I will get a reward for that. This looks like a kind of rule or algorithm of life.

Is there anything else you'd like to share regarding the department, your program, or UCSB?

Because of COVID-19, we lost about two years of precious time at UCSB. But, nonetheless, I often read about the great works of UCSB faculty and students, and these great works were possible with the endless support from all UCSB employees. I sincerely respect and appreciate all of them for their ongoing efforts during this time.



ECE ALUMNA, TANYA DAS, NAMED THE CHIEF OF STAFF OF THE OFFICE OF SCIENCE

Tanya Das, who received her PhD degree in electrical and computer engineering from UCSB in 2017, has been appointed to a senior position in the Department of Energy (DOE) by President Joe Biden's

administration. She is the new chief of staff to the Office of Science.

"This position is a dream job," said Das, who was a member of Professor Jon Schuller's research group at UCSB. "It is an incredible honor to be appointed to advance climate change and racial equity policies for an administration led by one of the politicians I most respect, President Joe Biden, and the first female, Black, and South Asian Vice President, Kamala Harris."

With a \$7 billion budget, the Office of Science supports research in the physical sciences, stewards ten of DOE's seventeen national laboratories, and supports workforce development and training programs for teachers and students in the science, technology, engineering, and mathematics (STEM) fields.

Das has been applying her training as a scientist to evaluate and improve policy in Washington, D.C. ever since she completed her doctorate from UCSB. She was named a

2017-18 Arthur H. Guenther Congressional Fellow by the Society of Photographic Instrumentation Engineers and the Optical Society of America (SPIE/OSA), serving a one-year term as a special assistant on the staff of U.S. Senator Chris Coons of Delaware. The fellowship provided insight into the inner workings of government as she worked to support the senator's economic as well as professional training opportunities by the American Association of the Advancement of Science (AAAS). After the fellowship, she joined the U.S. House of Representatives Committee on Science, Space, and Technology as a professional staff member, where she worked on a range of issues in clean energy and manufacturing policy until her appointment to the Office of Science.

Das says that she developed the essential skills she needed to succeed in Washington D.C. both inside and outside of the research lab at UCSB. "My work in the Schuller Lab helped me gain a solid understanding of the research process and federal funding mechanisms for our nation's scientific research enterprise," said Das.

Schuller is thrilled to witness Das's success. "Tanya was very hard-working and affable; it's no surprise she found such success in public service," said Schuller. "She is a testament to why graduate students should think about their long-term career goals during their PhD and work to develop the skills and experiences that will best propel them toward success."

To read the full article please visit: <https://bit.ly/3hSMpd3>



NETFLIX FILM ABOUT UCSB ALUMNUS AND FORMER NASA ASTRONAUT JOSÉ HERNÁNDEZ

The inspirational story of former NASA astronaut José Hernández, a graduate of the UCSB ECE department, will be the subject of a Netflix original movie that began production this summer 2021. The working title of the film is *A Million Miles Away*.

Hernández spent fourteen days in space in 2009 as

a flight engineer on board STS-128, a NASA Space Shuttle mission to the International Space Station. While in orbit, he became the first person to send a tweet in Spanish from space. But his flight path to space was not easy.

"The film shows my life as a migrant farmer who went from working in the fields with his parents to becoming an astronaut," said Hernández. "I think this film is going to inspire a lot of people, not just kids, to believe that anything is possible if you put your mind to it."

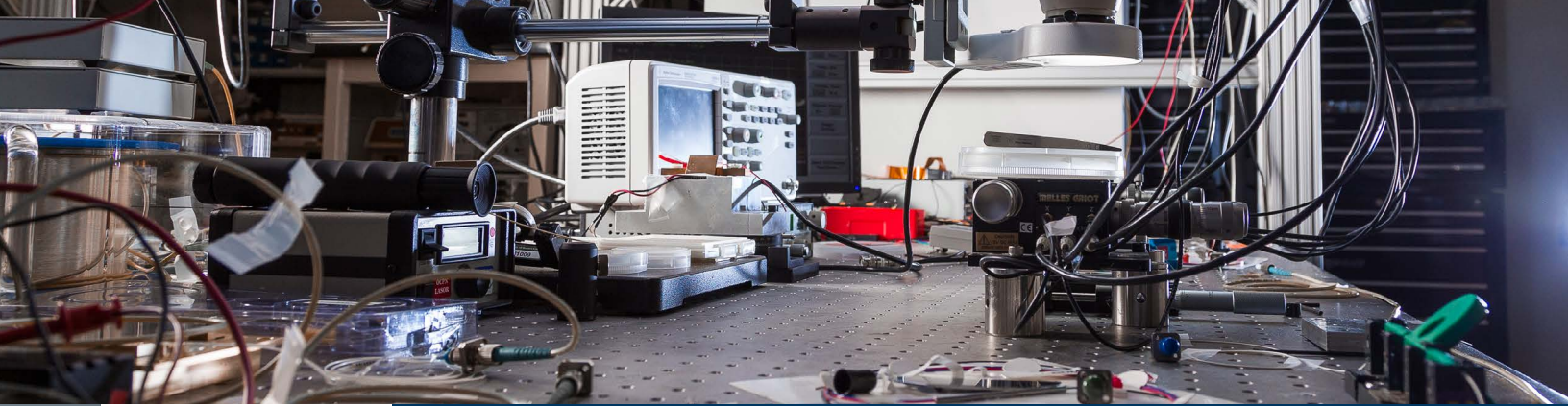
"A movie always has to have a villain. The villain in this case is not a person: it's the self-doubt and inner struggle of believing in myself," said Hernández. "A lot of minority children suffer from imposter syndrome, feeling they don't belong and aren't as competent as they should be while they start to succeed. The film addresses this head on, so hopefully people will see it and be better able to better deal with their own struggles and rejection."

Hernández knows all about rejection. He was turned down eleven times by NASA's astronaut program, finally getting accepted on his twelfth attempt in May 2004.

Hernández hopes the film features a few scenes filmed on the UCSB campus. He describes his time at UCSB as his most-enjoyable college experience. "UCSB prepared me very well for my job...I am certain that without that training from UCSB, there is no way I would have become an astronaut."

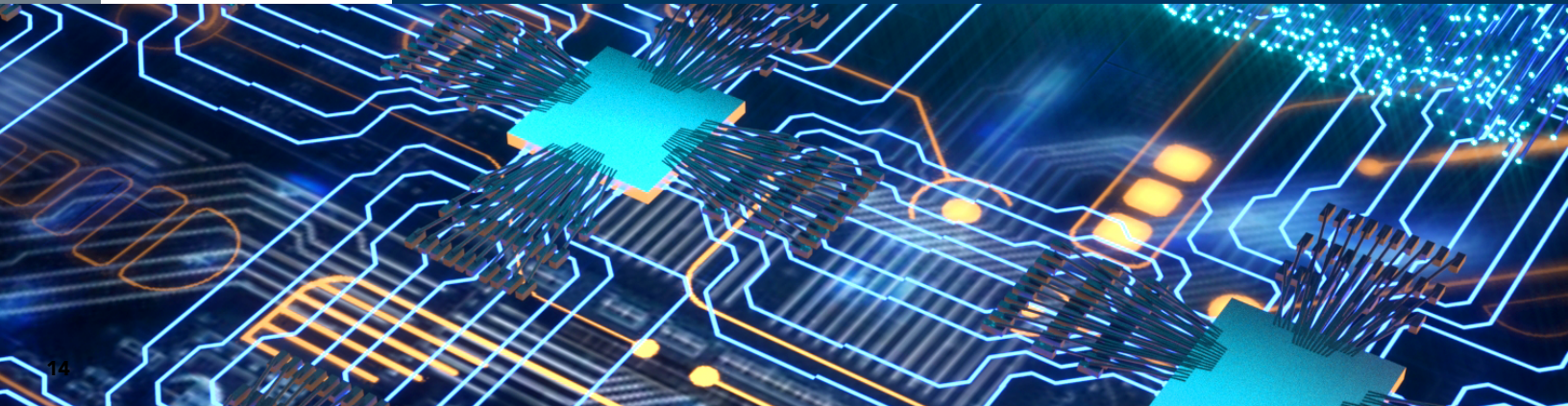
Netflix plans to release the movie in 2022. Hernández hopes to return to UCSB to host a screening and a question-and-answer session.

To read the full article please visit: <https://bit.ly/2UUMFzc>



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