calSWIFT'25

California **S**emiconductor **W**orkforce **D**evelopment &
Innovation for **F**uture **T**echnologies

California State University,
San Bernardino

Office of Academic
Research

April 11, 2025

CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

CSU The California State University

UC RIVERSIDE

NanoFAB
SDSU

UCLA Samueli
School of Engineering

MNT-EC
Micro Nano Technology
Education Center

USC
INFORMATION
SCIENCES
INSTITUTE

TAP Training All People

NATIONAL
Quantum Literacy
NETWORK

Ina
Solutions Inc

UNITED SEMICONDUCTORS
EXPLORE. EXPERIMENT. ENGINEER.

IEEE
Advancing Technology
for Humanity

At CSUSB we are pioneering a national framework designed to enhance technological literacy to ensure our students and our workforce are prepared to meet dynamic industry changes coinciding with emerging and futures technologies.

This groundbreaking initiative, California's first symposium focusing on Semiconductor Workforce Development and Innovations for Future Technologies (calSWIFT'25), boldly envisions the needs of an accelerated workforce to ensure a strong Emerging Technology, Innovation, and Partnerships (eTIPs) Workforce Supply Chain.

Our strategy emphasizes collaboration among students, researchers, and industry experts to propel the advancement of emerging technologies. calSWIFT'25 aspires to elevate awareness both statewide and nationally regarding the vital role these technologies play in ensuring America's future security and prosperity.

At CSUSB, We Define the Future

At calSWIFT'25 We Make that Future Real

CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

April 11, 2025

Dear Attendees of the calSWIFT'25 Symposium

It is our distinct pleasure to welcome you to California State University, San Bernardino for the calSWIFT'25 Symposium—a gathering that represents both the dynamism of innovation and the enduring commitment of higher education to empower the workforce of tomorrow.

This symposium stands at the intersection of knowledge, opportunity and impact. It is more than a convening of thought leaders and experts—it is a catalyst for workforce development and a powerful expression of our university's mission to provide students with access to transformative learning experiences. Events like calSWIFT'25 equip our students with the insights, tools and networks they need to enter the workforce not only prepared but also positioned to make a substantive impact on their communities and across industries.

We are especially honored to welcome our external speakers to campus. Your presence here—your willingness to share your expertise and engage with our students and faculty—speaks volumes about your dedication to shaping the future. We are grateful for your partnership in our shared mission to educate and inspire the next generation of leaders, problem-solvers and innovators.

We also extend our deepest appreciation to Dr. Timothy Akers and his exceptional team for their vision, leadership and tireless work in bringing calSWIFT'25 to life. Your efforts have created a space for meaningful dialogue, connection and progress.

Thank you for being here. We look forward to the ideas sparked, partnerships formed and lives changed as a result of this extraordinary event.

Tomás D. Morales, Ph.D.
President
California State University, San Bernardino

A. Rafik Mohamed, Ph.D.
Provost and Vice President for Academic Affairs,
California State University, San Bernardino

calSWIFT'25

California Semiconductor Workforce Development and Innovation for Future Technologies

Santos Manuel Student Union South

April 11, 2025

AGENDA Morning Sessions

8:30 AM – 9:00 AM | Registration & Networking Breakfast

- Check-in and badge distribution
- Light breakfast and coffee

9:00 AM – 9:30 AM | Opening Remarks

Speakers:

- Dr. A. Rafik Mohamed, Provost
- Dr. Tim Akers (CSUSB Office of Academic Research)

The CSU and the Importance of Workforce Development

- Dr. Frank Gomez (CSU Chancellor's Office)

A Message from the Chancellor's Office

9:30 AM – 10:00 AM | Keynote Address: The Future of the Semiconductor Industry

- **Keynote Introduction**: Dr. Youngmin Kim
- **Speaker**:
  - Dr. Ajey Jacob (Univ. of Southern California)

Topic: Building the Semiconductor Workforce for the Next Era of Innovation

10:00 AM – 10:15 AM | Break

AGENDA

10:15 AM – 10:45 AM | Workforce Development in Action

- **Speaker**:
  - Dr. Partha Dutta (United Semiconductors, LLC)

Topic: Workforce Development using Semiconductor Manufacturing in Space Platform: *a case study*.

10:45 AM – 11:30 AM | Panel Discussion: Bridging the Gap – Academia and Industry Research

- **Moderator**: Dr. Ryan Keating
- **Panelists**:
  - Dr. Youngmin Kim (CSUSB)
  - Dr. Andrew Joe (UCR)
  - Henrik Wang (UCLA)
  - Feiyang Ou (UCLA)

Topics: Current workforce challenges || Skills required for next-gen semiconductor jobs || Role of industry-academia partnerships

11:30 AM – 12:15 PM | Fireside Chat: Workforce Growth and the Place of the University

- **Speakers**:
  - Brian Hagerty (P3 Innovation Center, IEEE CA.)
  - Timothy Lee, President (IEEE USA)
  - Dr. Timothy Akers (CSUSB)

Topics: CHIPS Act & government initiatives || Funding for education & training programs || Public-private partnerships

12:15 PM – 12:45 PM | Lunch & Presentation from TAP3D

Afternoon Sessions

12:50 PM – 1:15 PM | High-Performance Computing for Semiconductor Research

- **Speaker**:
  - Dr. Nabeel Alzahrani (CSUSB)

Topic: Artificial Intelligence and Semiconductor Research

1:20 PM – 1:45 PM | 2D Materials and Semiconductor Development

- **Speaker**:
  - Dr. Youngmin Kim (CSUSB)

Topic: *2D Quantum Materials and Semiconductors*

1:50 PM – 2:15 PM | Micro Nano Technology Education Center – A Case Study

- **Speaker**:
  - Dr. Jared Ashcroft (Pasadena City College)

Topic: Micro Nano Technology/AR

2:15 PM – 2:30 PM | Break

2:30 PM – 3:00 PM | Leveraging AI & Quantum for Next-Gen Workforce Training

- **Speaker**:
  - Suresh Nair (INA Solutions)

Topic: *Talent for quantum computing and AI-integrated hardware, ensuring future-ready engineers.*

3:05 PM – 3:35 PM | Student Experiences in Semiconductor Research

- **Moderator**: Dr. Ryan Keating
- **Panelists**:
  - Diego Lundquist (SDSU)
  - Vanessa Kwong (UCR)
  - Alfred Arellano Galvan (CSUSB)

Topic: *Understanding the impact of student research on workforce development.*

3:40 PM – 4:10 PM | Research and Workforce Convergence

- **Speaker**:
  - Sam Kassegne (SDSU Nano.FAB)

Topic: *Technology, Innovation, and Partnerships in the Semiconductor Workforce*

4:15 PM – 4:30 PM | Closing Remarks

- **Speaker**:
  - Dr. Timothy Akers (CSUSB)

Topic: *Exciting announcements of the next steps*

Dr. Ajey Jacob is a Director at the Information Sciences Institute (ISI), University of Southern California. He leads transformative initiatives in semiconductor research, with diverse projects spanning quantum systems to edge sensors. His work focuses on advancing microelectronics and nanoelectronics through innovative materials, alternative state variables, and application-specific devices. He is also the Director of Projects at the DOD-funded ME Commons CA DREAMS Hub. Ajey joined ISI in 2019, bringing 16 years of experience from GlobalFoundries and Intel.

At GlobalFoundries, Ajey led research on differentiating technologies such as silicon photonics, non-volatile memories, and advanced technology nodes below 14 nm. Before this, at Intel, he managed key consortia on beyond CMOS and next-generation semiconductor technologies.

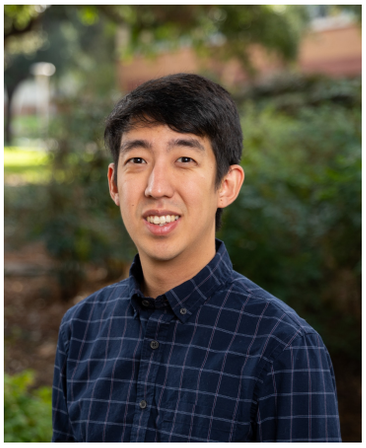
Ajey holds a Ph.D. in Physics with a specialization in nanoelectronics from Chalmers University of Technology, Sweden in 2002. He has authored over 100 peer-reviewed papers, delivered numerous invited talks, and holds more than 300 patents in areas such as microelectronics, nanoelectronics, and photonics. Ajey is committed to driving innovation that bridges fundamental research and real-world semiconductor applications, shaping the future of advanced computing technologies.

Dr. Sam Kassegne holds a Ph.D. degree in engineering mechanics from Virginia Polytechnic Institute and State University. His research interests are in the areas of MEMS, bio-nanoelectronics, and integrated micro- and nano-fabrication technologies. His experimental research work is focused primarily in Organic-MEMS, novel applications of microfluidics/nanofluidics and microarray technology, new bio-nanoelectronics platforms, as well as polymer photovoltaic technology. His lab has a strong focus on developing the next generation of integrated micro- and nano-lithography technology for a variety of application areas. Other focus areas include MEMS-based IMUs.

Dr. Kassegne has an extensive industrial experience in MEMS, biotech and computational sciences acquired through his employment at Nanogen, Microfabrica and Bentley Systems in Southern California. He also has consulted for the following companies: Corning/Intellisense, SAIC, Nevada Nanotech, OxyHeal, ERC, OmniTech, KeyMark Engineering, Game Changers, Cooley LLP, and Nokia. Further, as evidenced by the breadth and depth of his publication records and the companies he has consulted for, Dr. Kassegne has a unique engineering background that spans a number of engineering disciplines.

Timothy Lee is currently the 2025 IEEE USA President. He is the past IEEE Region 6 (Western US) Director and member of IEEE Board of Directors (2021-2022). He is a Boeing Technical Fellow in advanced microelectronics and packaging. Tim's interests in IEEE activities that promotes the use of technology that benefit humanity. Currently, Tim is Vice-Chair of the IEEE Future Networks Technical Community. He is the Co-Chair of the IEEE Heterogenous Integration Roadmap TWGs for mm-waves and Aerospace & Defense. He was the IMS2020 General Chair. Previously he was the Chair of the IEEE Internet Inclusion track for the IEEE Internet Initiative, the Chair for IEEE SIGHT and and the Chair of the IEEE Humanitarian Activities Committee Projects.

In 2024, Tim's priorities for the IEEE include leveraging the US CHIPS and Science Act of 2022 programs to promote semiconductor workforce development, revitalization of IEEE membership in the US, industrial engagement, and the support of Diversity, Equity and Inclusion. He is leading the expansion of the IEEE MOVE program for emergency communications for disaster relief to Western US regions



Dr. Andrew Joe is an Assistant Professor in the Department of Physics and Astronomy at the University of California, Riverside. He received his B.A. in Physics from Cornell University and earned his Ph.D. in Physics from Harvard University. Before joining UCR, he was a postdoctoral researcher at UC Berkeley and Lawrence Berkeley National Lab. Andrew's work focused on unique optical and optoelectronic techniques to study novel electronic and excitonic states in 2D materials.

At UCR, he is using these techniques to study the underlying physics behind new types of 2D material heterostructures to develop the next generation of optoelectronic quantum devices.

Dr. Frank Gomez is the Executive Director of STEM-NET, a multicampus consortium, based at the California State University Chancellor's Office where he leads STEM initiatives for the 23-campus system. Prior to this position he was Professor of Chemistry at Cal State LA since 1994. He received his BS and PhD in Chemistry from Cal State LA and UCLA, respectively and was a postdoctoral fellow at Harvard University.

As Executive Director, he has been a part of collaborative grants securing over $55MM in funding for STEM and education-related projects. As a faculty member he has received over $21 million in research funding for his work in microfluidics, point-of-care diagnostics, and fuel cells. He has mentored over 140 students and postdocs, the majority from underrepresented groups, and has over 130 publications and two books.

For years, Gomez has given back to the community by serving on several non-profit boards, and in elected office as a member of the Montebello Unified School District Board of Education, the Montebello City Council and as Mayor.

Dr. Jared Ashcroft is Professor of Chemistry at Pasadena City College (PCC) and the Principal Investigator (PI) of the Micro Nano Technology Education Center (MNT-EC). He leads efforts to advance education and workforce development in micro and nanotechnology, helping to create pathways for students into high-tech industries. Dr. Ashcroft was recently named the Community College Lead for the National Network for Microelectronics Education, where he is helping to shape national strategies for microelectronics education and workforce development.

He is passionate about expanding access to STEM education, particularly for underrepresented groups, and works closely with industry and academic partners to develop cutting-edge training programs. His leadership at MNT-EC has made PCC a key player in preparing the next generation of technicians and scientists in the semiconductor and nanotechnology fields.

Dr. Dr. Partha S. Dutta is the Chief Technologist at United Semiconductors in Los Alamitos, California and a Professor Emeritus in the Electrical, Computer and Systems Engineering Department at Rensselaer Polytechnic Institute in Troy, New York. Prior to his current position, he served as a professor in the ECSE Department at RPI from 2000 to 2022 and as the Deputy Director of NSF funded Smart Lighting Engineering Research Center from 2010 to 2015.

He has over 3 decades of experience in crystal growth and semiconductor technologies. Currently he is leading a NASA funded microgravity crystal growth and In-Space manufacturing project. He received his Ph.D. in Condensed Matter Physics from the Indian Institute of Science, Bangalore and an Honorary D.Sc. (Honoris Causa) from the RKDF University, Bhopal, India for his innovative contribution in the field of engineering, science and technology with societal impacts. In 2023, he received the American Association for Crystal Growth Award for Outstanding Contributions to Crystal Growth. His research interests are in the areas of crystal growth, semiconductors and nanotechnology. He has co-authored over 150 research papers, 5 book chapters and inventor of 21 issued US Patents.

Dr. Dutta is a serial entrepreneur with over 2 decades' experience in laboratory to market ventures. He has engaged in a wide gamut of TRL-1 through TRL-9 technology and product development activities with applications in the oil and gas, aerospace, defense, lighting and display, and healthcare industries. He received the 40 under forty entrepreneurship award in 2004. He is an IEEE Senior Member.

Suresh Nair – President & CEO, Ina Solutions Inc. Suresh Nair is an accomplished technology leader and entrepreneur with over two decades of experience in IT solutions, program management, and emerging technology strategy. As the President & CEO of Ina Solutions Inc., he has been at the forefront of driving innovation in digital transformation, quantum computing, and AI-driven solutions.

With a Master's in Information Technology Management and a Bachelor's in Mechanical Engineering, Suresh brings a unique blend of technical expertise and business acumen. His leadership extends beyond Ina Solutions, as he serves on the External Advisory Board for the Monark Quantum Foundry (NSF funded) and as a Board Member of the National Quantum Literacy Network (NSF Funded), contributing to workforce development in quantum technologies.

Suresh led his team to win a prestigious National Science Foundation (NSF) award in Quantum Machine Learning, further solidifying his role as a pioneer in advancing quantum applications. His recent research, Quantum Readiness in Healthcare and Public Health: Building a Quantum Literate Workforce, underscores his commitment to preparing industries for the quantum era.

Brian Hagerty has over 40 years of experience in high-tech industries. -- He began his career working in the semiconductor industry when he graduated from UC Irvine in 1983 with a degree in Physics & Mathematics. He started as a physicist modeling 5-nanometer semiconductors at a firm in Irvine and later became Engineering Design Center Manager.

He has worked as a systems engineer in the telecommunications industry, smart-grid power industry, and aerospace industry. He worked for companies like Beckman Instruments in their scientific instruments division; Inference Corporation, an artificial intelligence and knowledge engineering firm; and as a contract engineer for companies like Southern California Edison and Jet Propulsion Labs. -

Brian created his own firm in the 1990s to design telecommunications hardware and software and now runs his own Research & Development firm at the University Research Park in Irvine. He is also the founding Chair of IEEE Southern California Council.

Dr. Nabeel Alzahrani is an adjunct professor in the Computer Science and Engineering Department, specializing in artificial intelligence (AI), high-performance computing (HPC), and cybersecurity. He earned his Ph.D. in computer science from the University of California, Riverside.

Dr. Alzahrani is also a consultant in the Identity, Security, and Enterprise Technology Department at CSUSB. He is a published author of books and research papers and has delivered multiple presentations in his field.

Feiyang Ou is currently a third year Ph.D. Candidate at UCLA working under Dr. Panagiotis D. Christofides. Ou also completed his undergrad degree in Chemical Engineering at UCLA Chemical Engineering with a concentration in semiconductors.

Ou's research is focused on machine-learning based soft sensor building for semiconductor manufacturing industry, as well as building multiscale simulation models and data-driven model predictive controllers for atomic layer etching/deposition processes.

Alfred Arellano is a senior at California State University, San Bernardino majoring in Physics. He has gained extensive experience working in 2D materials growth, magnetic materials, and optics labs in Wellington, New Zealand, at UC Merced, and at CSU San Bernardino. His past and current projects include epitaxy layering, various spectroscopy techniques, and non-linear optical fibers.

This fall, Alfred will begin a graduate program in Physics, though he has yet to declare where.

As a San Bernardino native, Alfred hopes to demonstrate to others from his community that pursuing academic excellence and succeeding in research is within reach through dedication and grit.

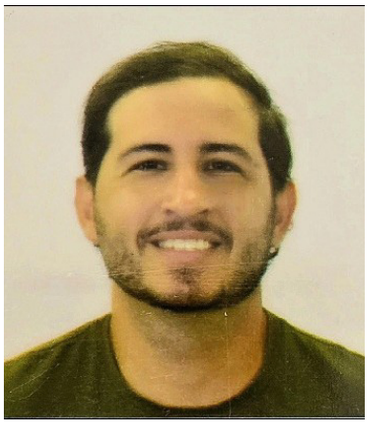
Henrik Wang is a Ph.D. candidate at UCLA under the guidance of Dr. Panagiotis D. Christofides. His research focuses on developing advanced semiconductor manufacturing methods, namely by integrating machine learning models into process controllers.

He has collaborated with industry leaders like Seagate Technology, creating automated fault detectors that enhance process reliability, and published novel control methods such as an Endpoint Feedback Controller for an atomic layer etching process.

Vanessa Kwong is a recent graduate from University of California Riverside with a B.S. in Physics, and am currently a researcher in an experimental condensed matter lab under Dr. Andrew Joe. My research experience involves optics and transport in two-dimensional semiconducting materials within heterostructure devices, applicable to optoelectronics development.

Specifically, her project focuses on developing and testing Ohmic contacts for various transition metal dichalcogenides, opening doors to measuring Quantum Hall states.

Having this invaluable experience after pivoting from a biological research background, She looks forward to additional research involvement and higher education in this subfield.



Diego Lundquist is a senior pursuing a Bachelor of Science in Chemical Physics with a minor in Cell & Molecular Biology at San Diego State University. He is passionate about advancing clean energy technologies through innovation and groundbreaking advancements in semiconductor research.

Currently, as a Research Specialist in the Behura Research Group, he has played a pivotal role in establishing the 2D Quantum Materials Design and Growth Lab. My work focuses on the design and growth of 2D quantum materials and optical thin films using advanced deposition techniques such as Physical and Chemical Vapor Deposition. I specialize in material growth and characterization through methods like SEM, TEM, Raman spectroscopy, and EDS, which enable the development of solid-state quantum light sources and innovative applications in quantum materials.

Dr. Timothy Akers Dr. Timothy A. Akers, M.S., Ph.D., is a distinguished leader in public health, criminology, and quantum literacy, currently serving as Chief Research Officer and Associate Provost for Academic Research at California State University, San Bernardino. With a remarkable career spanning academia, government, and military service, he has pioneered Epidemiological Criminology, authored seminal works, and developed the National Quantum Literacy Network (NQLN) as its CEO, following a groundbreaking NSF grant in 2020. A former U.S. Air Force Security Police specialist in counterterrorism and nuclear weapons security, Dr. Akers also served as a fire team leader with the elite USAF Emergency Services Team. His extensive contributions include senior roles at the U.S. Centers for Disease Control and Prevention (CDC), mentorship in securing interdisciplinary grants from NSF, NIH, and DHS, among others, and holding advisory positions the White House and the U.S. Department of Energy's National Quantum Initiative Advisory Committee (NQIAC), including the National Academies of Science, Engineering, and Medicine. Recognized globally, he has published over 268 works, earned prestigious awards like the U.S. Air Force Meritorious Achievement Medal for Research, and remains a trailblazer in quantum literacy education and interdisciplinary research, creating the first e-learning micro-credential certification in quantum literacy education_

Dr. Youngmin Kim Dr. Youngmin Kim is an experimental physicist specializing in quantum optical effects within low-dimensional solid-state structures and semiconductor materials, bringing over a decade of expertise to his field. He earned his Ph.D. in Physics from Universität Paderborn, Germany, in 2013, followed by postdoctoral research at the Korea Advanced Institute of Science and Technology (KAIST) and the University of Maryland, College Park.

Dr. Kim excels at connecting technical research communities with non-technical stakeholders, effectively fostering collaborations that advance education, research, and innovation. He is passionate about mentoring students, identifying and nurturing talent to achieve substantial professional growth.

Dr. Kim is particularly driven by initiatives aimed at accelerating the development of the American workforce in critical emerging technologies, with a current emphasis on AI semiconductors and quantum technologies. His work directly addresses vital national security and technological competitiveness challenges.

Dr. Ryan Keating is Professor and Director of the Office of Student Research at California State University, San Bernardino. For nearly twenty years he has been a passionate advocate for students with a particular focus on encouraging engagement in co-curricular research as a means of ensuring access and equity for all students. He has worked in support of grants from the NSF, NIH, NEH, and the American Heart Association many of which focus on developing pipeline programs for students to expand their understanding of, and access to, post-baccalaureate opportunities in all fields.

WE DEFINE THE future

WE DEFINE THE future

WE DEFINE THE future

CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

Office of Student Research