STEM RESEARCH SHOWCASE

2025

SEATTLE UNIVERSITY

COLLEGE OF SCIENCE AND ENGINEERING

SEATTLE UNIVERSITY

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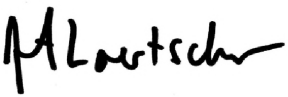
DEAR COLLEAGUES AND FRIENDS,

We invite you to explore the outstanding research of our undergraduate students, carried out in close collaboration with our own nationally/globally recognized faculty scholars. This year's Showcase features 35 projects involving over 70 students across a wide range of disciplines, including biology, chemistry, physics, and engineering. You'll encounter projects ranging from research on sevengill sharks in the South Salish Sea, to studies on proteins involved in gut-brain axis signaling, to the development of a soft robotic hand rehabilitation device. Numerous projects highlight interdisciplinary collaborations between SU faculty and their research students. In addition to their research projects, 16 students participated in a new mini-accelerator program designed to help them explore the local biotech landscape. All student projects demonstrate how STEM education at SU builds on a strong foundation of knowledge to inspire creativity and address real-world challenges. The Showcase highlights the unique opportunities available to our students, where discovery and problem-solving lie at the heart of their learning. These experiences prepare our students to make meaningful contributions as future leaders in science and engineering. Thank you for joining us today and for your continued support. Our summer research program is only possible due to the philanthropic and grant support from the following generous funders:

The Arline F. and Thomas J. Bannan Foundation, Simmons Endowment for Undergraduate Research and Application, the Lillian Doyle Undergraduate Research Endowment, the Donald W. Hoba Endowment, Peter L. and Patricia A. Lee Fellowship for Excellence in Student Research, Admiral Michael G. Mathis [Ret.] and Jannine C. Mathis, the M.J. Murdock Charitable Trust, the National Institutes of Health, the National Science Foundation, the PACCAR Professorship in Mechanical Engineering, Rose M. Southall, Research Corporation for Science Advancement, and Patrick E. and Mary V. Welch.

Together, we celebrate the creativity and dedication of our students, as they shape the future of science and engineering.

Sincerely,



Jennifer Loertscher, PhD
Interim Dean, College of Science and Engineering

2025 RESEARCH PROJECTS

BIOLOGY

FACULTY **Dr. Kaiser** / RESEARCHER **Sam Nouwens** / PROJECT ***Identification of DNA target sequence of a phage-encoded anti-CRISPR transcriptional repressor***

FACULTY **Dr. Kaiser** / RESEARCHER **Duc Vu** / PROJECT ***Structure and Characterization of the ATP Bound B/Z+C Core Complex of the BREX Defense System***

FACULTY **Dr. Stenbak** / RESEARCHERS **Natane Yaecob, Gracie Atkinson** / PROJECT ***Collection and Isolation of Chloroviruses across Cascadian lakes***

FACULTY **Dr. Chang** / RESEARCHERS **Lauren Ghrist** / PROJECT ***Making a Buzz: Wool Carder Bee Interactions on Gonzaga University Campus***

FACULTY **Dr. Hultgren** / RESEARCHERS **Kai Hua, Lilka Clocksin, Mickey Crunk** / PROJECT ***Invertebrate biodiversity in kelp forests revealed by autonomous reef monitoring structures***

FACULTY **Dr. Luckey** / RESEARCHERS **Medini Madhusudan** / PROJECT ***Impact of Different Exercise Paradigms on Hypertension in Spontaneously Hypertensive Rats: A Literature-Based Meta-analysis***

FACULTY **Dr. Zanis** / RESEARCHERS **Hope Takazawa, Kailee Massenburg** / PROJECT ***Exploring the diversity of urban terrestrial algae using DNA barcoding***

FACULTY **Dr. Zanis** / RESEARCHERS **Lydia LaCount, Andy Woolfolk** / PROJECT ***Ecological Limits of Temperature Tolerance in Freshwater Algae***

FACULTY **Dr. Kremer-Herman and Dr. Rutherford** / RESEARCHER **Margaret Fitzgibbon** / PROJECT ***Teaching Evolutionary Concepts with EVO: A Simulation of Snowshoe Hare Adaptation***

FACULTY **Dr. Luckey** / RESEARCHER **Rachael Bush** / PROJECT ***Sex Differences in the Impact of Exercise on Hypertension***

FACULTY **Dr. Pool** / RESEARCHERS **Oliver Burkholder, Lincoln Jagger, Jeansid Leonor** / PROJECT ***Field Ecology Research on the Broadnose Sevengill Shark (Notorynchus cepedianus) in the South Salish Sea***

CHEMISTRY

FACULTY **Dr. Whidbey** / RESEARCHER **Oscar Gonzalez** / PROJECT ***Determine barriers to genetic transformation of host-specific Lactobacillus species***

FACULTY **Dr. Whidbey** / RESEARCHER **Aspen Scott-Lewis** / PROJECT ***Exploration of the nutrient requirements of Lactobacillus iners***

FACULTY **Dr. Whidbey** / RESEARCHER **Kiera Tanaputra** / PROJECT ***Identification of Microglial Receptor Proteins Involved in Gut-Brain Axis Signaling***

FACULTY **Dr. Whidbey** / RESEARCHER **Zoe Jackson** / PROJECT ***Activity-Based Protein Profiling of Microbial Proteomes for Functional Annotation***

FACULTY **Dr. Latch** / RESEARCHER **Sarah Conde** / PROJECT ***Development of quantitative structure-activity relationships for triplet-sensitized photochemical reactions***

FACULTY **Dr. Latch** / RESEARCHER **M Kuramura** / PROJECT ***Development of Mass Channel Based Principal Component Analysis for GC-QuadMS***

FACULTY **Dr. Latch** / RESEARCHERS **Maggie Gaur, Shane Nelson, Logan Warner** / PROJECT ***Chlorine actinometer performance under variations in temperature, pH, and irradiance***

FACULTY **Dr. Watson** / RESEARCHERS **Stephanie Saw, Sage Glandorf, Khoa Nguyen** / PROJECT ***Syntheses and Reactivity of Trimetallic Complexes of Iron and Manganese***

FACULTY **Dr. Frato** / RESEARCHERS **Kyle Nguyen, Gregory Handoyo, Ash Morris** / PROJECT ***GCMS analysis of metabolite profiles of Chlamydomonas reinhardtii under varying growth conditions***

FACULTY **Dr. Alaimo** / RESEARCHER **Joseph Dakin** / PROJECT ***Ground Control to Major Tom: Synthesis of microbial metabolite analogs containing a diazirine and an alkyne to study the gut brain axis***

COMPUTER SCIENCE

FACULTY **Dr. Li** / RESEARCHERS **Daniel Kirov-Tomilov, Alyssa Abogado, Jakob Balkovec** / PROJECT ***Detecting Diabetic Retinopathy (DR) Using Machine Learning***

FACULTY **Dr. Milkowski** / RESEARCHERS **Ezekiel Mitchell** / PROJECT ***C.A.S.E. | Data Collection***

FACULTY **Dr. Bae** / RESEARCHERS **Angela Han, Alivia Zhao, Tony Nguyen, Alice Han, Victoria Zhang, Desmond Wan** / PROJECT ***GeoAI Walkability Assessment***

COMPUTER SCIENCE CONTINUED

FACULTY **Dr. Bae** / RESEARCHERS **Kenny Nguyen, Tony Nguyen, Nathan Tran** / PROJECT ***Hybrid Regression–Clustering for Drone 3D Apple Counting & Yield***

FACULTY **Dr. Zhao** / RESEARCHER **Brian Vu** / PROJECT ***Is Artificial Intelligence an Elixir to the Software Engineering Community? An Empirical Study Among Product Managers***

ELECTRICAL & COMPUTER ENGINEERING

FACULTY **Dr. Louie** / RESEARCHER **Dean Aquino** / PROJECT ***Data Analysis for Residential Off-Grid Solar Power on the Navajo Nation***

FACULTY **Dr. Louie** / RESEARCHER **Melvin Dang** / PROJECT ***Effects of Load Estimation Detail on Off-Grid System Design and Reliability***

FACULTY **Dr. Abraham** / RESEARCHERS **Loritha Keza, Laurel Maronick, Austin Lo** / PROJECT ***LoRa-based Environmental Monitoring for Resource-Constrained Environments***

MATHEMATICS

FACULTY **Dr. Helliwell** / RESEARCHERS **Luka Lawrence, Kevin Lin, Alina Potapyev** / PROJECT ***Geodesics and hyperbolicity for the half-plane models of taxicab hyperbolic space***

MECHANICAL ENGINEERING

FACULTY **Dr. Ren** / RESEARCHERS **Steven Hong, Karin Stoddart, Michi Tawara, Samuel Mesfin, Parsa Dadfarnia, Adi Roitburg, Chris Robinson, Quinn Dickenson** / PROJECT ***Engineering a Better Cryoprotectant: Balancing Low Toxicity and High Vitrifiability for a Novel Electromagnetic Rewarming System***

FACULTY **Dr. Han** / RESEARCHERS **Jhet Cooperrider Young, Devin Raleigh, Kai Boydon, Eric Olson, Ethan Holden, Indie Heinemann-Rueda** / PROJECT ***Design and Testing of a Soft Robotic Hand Rehabilitation Device***

FACULTY **Dr. Han** / RESEARCHERS **Aaron Chhor, Indie Heinemann-Rueda, Evan Nguyen, Micah Meenan** / PROJECT ***Soft Robotic Assistive Device for Carpal Tunnel Syndrome***

PHYSICS

FACULTY **Dr. McEwen and Dr. Hughes Clark** / RESEARCHERS **Ira Evetts, Thea Campbell, Sebastian Foss, Leander Villarta** / PROJECT ***Numerical Simulations of the Globular Cluster NGC 6569***

FACULTY **Dr. Fontana** / RESEARCHERS **Rowen Jorgensen, Maximillian Burger** / PROJECT ***Plasma I-V Characteristics in a Fusor***