



STEM RESEARCH SHOWCASE 2024

SEATTLE UNIVERSITY | COLLEGE OF
SCIENCE AND ENGINEERING

2024 RESEARCH PROJECTS

BIOLOGY

FACULTY MENTOR **Dr. Kaiser** / RESEARCH STUDENT **Duc Vu**

PROJECT **Examining the Role of the AAA+ ATPase Domain of the Bacterial Defense Factor BrxC**

FACULTY MENTOR **Dr. Yasuda** / RESEARCH STUDENTS **Erin Tanaka, Kevin Huang, Kevin Nguyen** / PROJECT **Paternal Effect Genes and Animal Development**

FACULTY MENTOR **Dr. Whitlow** / RESEARCH STUDENTS **Emma Weaver, Laurel Shepherd, Miranda Gormley** / PROJECT **Hopping Around the Salish Sea: Investigating How Shoreline Modification and Kelp Affect Wrack, Invertebrate, and Bird Communities**

FACULTY MENTOR **Dr. Zanis** / RESEARCH STUDENT **Lilka Clocksin**
PROJECT **Deciphering *Micrasterias rotata* (Desmidiaceae) Habitat Preference Using Experimental Microcosms**

FACULTY MENTOR **Dr. Zanis** / RESEARCH STUDENT **Nicole Teola** / PROJECT **DNA Barcoding and Population Genetics of *Micrasterias* Species**

FACULTY MENTOR **Dr. Luckey** / RESEARCH STUDENT **Rohan Sethi**
PROJECT **Hypertension in Motion: A Support to a Meta-Analysis of the Effects of Exercise Intensity on Cardiovascular Outcomes in the Hypertensive Rat Model**

COMPUTER SCIENCE

FACULTY MENTOR **Dr. Kremer-Herman** / RESEARCH STUDENTS **Anna Muller, Colin Hanrahan, Hadiya Chishti** / PROJECT **Sugarscape: Creating a Nexus for Interdisciplinary Research**

FACULTY MENTOR **Dr. Kremer-Herman and Dr. Rutherford**
RESEARCH STUDENTS **Amanda Nouwens, Gina Philipose, Rena Ahn, Zach Mullen** / PROJECT **Super Simple Biology Simulations**

FACULTY MENTOR **Dr. Juneja** / RESEARCH STUDENT **Ashleen Sandhu**
PROJECT **Beyond Words: How Text-to-Image Models Interpret Adjectives Across Various Dimensions**

FACULTY MENTOR **Dr. Juneja** / RESEARCH STUDENT **Bryan Kim**
PROJECT **Bias in the Spotlight: Analyzing Text-to-Image Models for Music Awards and Genre Representation**

FACULTY MENTOR **Dr. Samavi** / RESEARCH STUDENTS **Aaron Shrestha, Benjamin Philipose, Yonnas Alemu** / PROJECT **Using Machine Learning for Early Detection of Autism Spectrum Disorder (ASD)**

FACULTY MENTOR **Dr. Bae** / RESEARCH STUDENTS **Alivia Zhao, Garland Lau**
PROJECT **GeoAI for Walkable Path Planning**

FACULTY MENTOR **Dr. Zhao** / RESEARCH STUDENT **Riley Young**
PROJECT **A Tale of Two Cities: Insights from Software Developers in Big Tech and Non-Tech Workplaces**

FACULTY MENTOR **Dr. Milkowski** / RESEARCH STUDENT **Max Tran**
PROJECT **CASE: Context Aware Screen-based Estimation of Gaze**

CHEMISTRY

FACULTY MENTOR **Dr. Whidbey** / RESEARCH STUDENTS **Eugene Kiera Tanaputra, Jillian Hesse** / PROJECT **Labeling of Live Microglia Cells and Protein Activity Assays**

FACULTY MENTOR **Dr. Whidbey** / RESEARCH STUDENT **Tusani Nhleko**
PROJECT **Activity-Based Protein Profiling for Functional Annotation**

FACULTY MENTOR **Dr. Latch** / RESEARCH STUDENTS **Megan Morris, Roan Weinkauff** / PROJECT **Development of a Spectrophotometric Chlorine Actinometer for Field and Laboratory Use**

FACULTY MENTOR **Dr. Latch** / RESEARCH STUDENT **Emily Chaffe** / PROJECT **Development of Quantitative-Structure Activity Relationships for Photochemical Reactions Involving Triplet Natural Organic Matter**

FACULTY MENTOR **Dr. Frato** / RESEARCH STUDENTS **Ainsley Yukawa, Norah Zampardo, Willow Rotton** / PROJECT **Optimizing GC-MS Protocols for Monolignol Detection in Chlamydomonas Reinhardtii**

FACULTY MENTOR **Dr. Skogerboe** / RESEARCH STUDENT **Lior Fisher**
PROJECT **Preserving the Essence of a Crime: Development and Evaluation of a Solid Phase Carbon Extraction/GC-MS Method to Capture the Smellprint of Forensic Evidence**

FACULTY MENTORS **Dr. Alaimo and Dr. Whidbey** / RESEARCH STUDENTS **Megan Bigalk, Zoe Quach** / PROJECT **Synthesis of Metabolic Mimicking Probes**

FACULTY MENTOR **Dr. Alaimo** / RESEARCH STUDENT **Mireya Haran**
PROJECT **A Copper-Catalyzed Approach to Selective Ortho-Nitration of Arenes: Exploring C-H and C-F Functionalization Supported by Bidente Directing Groups**

ELECTRICAL AND COMPUTER ENGINEERING

FACULTY MENTOR **Dr. Louie** / RESEARCH STUDENT **Melvin Dang**
PROJECT **Determining importance of Precise Load Profile Estimation for Residential Off-Grid Solar Power on the Navajo Nation**

FACULTY MENTOR **Dr. Louie** / RESEARCH STUDENT **Dean Aquino**
PROJECT **Automated Data Collection for Residential Off-Grid Solar Power on the Navajo Nation**

FACULTY MENTOR **Dr. Louie** / RESEARCH STUDENT **Daniel Kasakula**
PROJECT **Battery Discharge Tests Using Variable Load Profiles for Off-Grid Power Systems**

FACULTY MENTORS **Dr. Abraham** / RESEARCH STUDENT **Loritha Keza**
PROJECT **Edge Computing for Remote Environmental Monitoring**

CIVIL AND ENVIRONMENTAL ENGINEERING

FACULTY MENTORS **Dr. Riazi** / RESEARCH STUDENTS **Azul Davila Carrasco, Sam Kinerk** / PROJECT **Optimizing Pipe Network Design Using Genetic Algorithm Integration in EPANET**

FACULTY MENTOR **Dr. Lee** / RESEARCH STUDENT **Samhita Tovinkere**
PROJECT **Effect of Vegetation Change on Streamflow in the Tolt River**

MATHEMATICS

FACULTY MENTOR **Dr. Zhang** / RESEARCH STUDENT **Lukas Nitsche**
PROJECT **Machine Learning, Precision Medicine and Health Disparities**

FACULTY MENTOR **Dr. Bahuaud** / RESEARCH STUDENT **Craig Horton**
PROJECT **A Mathematical Exploration of Kepler's Laws**

FACULTY MENTOR **Dr. Egan** / RESEARCH STUDENTS **Amanda Blunt, Jonathan Shiner** / PROJECT **Ocean Rainfall Detection Using Spotter Buoy Audio Data**

FACULTY MENTOR **Dr. Carter** / RESEARCH STUDENT **Joanna Van Liew**
PROJECT **Modeling Broad-Frequency-Band Water-Wave Experiments**

FACULTY MENTOR **Dr. Carter** / RESEARCH STUDENT **Makayla Allen**
PROJECT **The Derivation of the Korteweg-De Vries Equation**

MECHANICAL ENGINEERING

FACULTY MENTOR **Dr. Dadfarnia** / RESEARCH STUDENTS **Rowen Jorgensen, Samuel Hannah** / PROJECT **Failure of 3D Printed Objects Under Combined Load Conditions**

FACULTY MENTOR **Dr. Hoang** / RESEARCH STUDENTS **EJ Edora, Ian Agopsowicz, Marco-Antonio Sahagun, Sameer Gill, Samuel Mesfin** / PROJECT **Tuning and Validating a Multi-Rotor Drone Model Using a Stationary Frame**

FACULTY MENTOR **Dr. Ren** / RESEARCH STUDENTS **Jacob Shinsato, Justin Lewis, Karin Stoddart, Michi Tawara, Ty Smith, Vincent Reitinger**
PROJECT **Molecular Dynamics-Informed Optimization of Cryoprotectant Solutions for Enhanced Single-Mode Electromagnetic Rewarming**

FACULTY MENTOR **Dr. Han** / RESEARCH STUDENTS **Ava Wiese, Devin Raleigh, Ethan Holden** / PROJECT **Phase Changing Materials (PCMs) in Soft Robotics**

FACULTY MENTOR **Dr. Han** / RESEARCH STUDENTS **Kai Boydon, Eric Olson**
PROJECT **Development of Air Tight Soft Robotic Actuators**

PHYSICS

FACULTY MENTOR **Dr. Hughes** / RESEARCH STUDENTS **Fiona Kovisto, Leander Villarta, Vy Vuong** / PROJECT **Tidal Disruption of the Globular Cluster NGC 6544**

FACULTY MENTOR **Dr. McEwen** / RESEARCH STUDENT **Sarah Albrecht**
PROJECT **SpaceTimePy: Scientific Computing and General Relativity**

FACULTY MENTORS **Dr. Alberg** / RESEARCH STUDENT **Alejandro Enguidanos**
PROJECT **Vector Meson Contributions to the Light Polarized Sea Asymmetry of the Proton**

DEAR COLLEAGUES AND FRIENDS,

Welcome to the 2024 STEM Research Showcase! Today, we invite you to engage with the exceptional research projects led by our talented students. These posters represent not only the culmination of their hard work, but also their curiosity and drive to solve real-world problems.

I am so impressed by the breadth of knowledge and innovation fostered in our undergraduate research community, and this year we have 40 total research projects with 63 undergraduate researchers! Today you will discover student-led projects across disciplines investigating everything from novel applications of AI to recommend pedestrian-safe routes, to exciting analysis of fruit fly genetics, and mapping the microbiome's complex world. Each and every project is fascinating and showcases how STEM education at SU builds on a strong foundation of knowledge to inspire creativity and tackle real-world challenges.

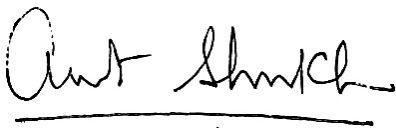
Our STEM Showcase highlights the unique opportunities available to our students, where discovery and problem solving are at the core of their learning. The experiences gained here equip them to make a meaningful impact as future leaders in their fields.

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,

A handwritten signature in black ink, appearing to read "Amit Shukla". The signature is written in a cursive, flowing style. Below the signature is a solid black horizontal line.

Amit Shukla, PhD

Dean, College of
Science and Engineering