

The 17th Annual SJSU College of Science Student Research Day

Friday, May 6, 2022,

10:00am to 1:00pm

Duncan Hall Ground Floor Breezeway



The College of Science Student Research Day (SRD) is our annual showcase of post-ers highlighting original research projects presented by students working with COS

faculty. You are invited to view their posters and discuss the projects with the student researchers and their faculty mentors. SRD 17 will be the penultimate SRD before the opening of our new Interdisciplinary Science Building (ISB) in Spring 2023

Although the event is outside, we ask that participants presenters and guests) wear masks to limit the spread of COVID-19.

The event is wheelchair accessible

College of Science SRD 17 PROGRAM

May 6, 2022

DEPARTMENT OF BIOLOGICAL SCIENCES

1. The cGMP-dependent Protein Kinase egl-4 is Necessary for Sensory Synapse Formation in *Caenorhabditis elegans*
Fabiola Briseno, Sukhdeep Kaur, Veronica Bi, Tanya Ly, Christina Nguyen, Aruna Varshney, Jaimei Lu
Faculty: Miri VanHoven, Martina Bremer, Philip Heller
2. Olfactory Synapses are Modulated by Odor Training and Sleep in *Caenorhabditis elegans*
Anirudh Bokka, Cibelle Nassif, Fatima Farah, Vanessa Jimenez, Anjana Baradwaj, Sara Alladin, Vanessa Garcia, Emily SooHoo, Emma Odisho, Kateryna Tokalenko, Kelli Benedetti
Faculty: Miri VanHoven, Martina Bremer
Collaborator: Noelle L'Etoile
3. Bromoperoxidase expression is activated in response to hydrogen peroxide and sodium bicarbonate in *Bacillus cereus*
Matthew Perry, Francesca Torres
Faculty: Sabine Rech
4. Soil specialist or generalist? Are Bay Area wallflowers adapting to different soils?
Jessica Trow
Faculty: Ben Carter
Collaborator: Tracy Misiewicz
5. Citizen Science Data Reveal Geographic Patterns in Flower Color in Western Wallflowers
Grace Duyanen, Malia Miley
Faculty: Ben Carter
Collaborators: Tracy Misiewicz and Yvonne Luong
6. Drought Impacts Evolution and Plasticity of a Native California Plant Species
Natalie Woodmansee, Allen Levan, Jessica Smith, Harrison De Voy
Faculty: Susan Lambrecht
7. Novel Bacterial Beta-Galactosidase Enzyme and its Potential Role in Human Tooth Decay
Michelle Wallerius, Yissel Reyna, Farsheed Ghadiri
Faculty: Cleber Ouverney
8. Utilization of an Integrase Deficient Lentiviral Vector for Delivery of a DNA Repair Template
Juan F. Sanchez, Parnit Jhutti, Asrita Bhamidipati
Faculty: Jennifer M. Johnston
9. Platelet Factor IV as a FVIII Safe Harbor Location for Hemophilia A Patients With Inhibitors
Kenney Tuyen, Clara J. Lemus, Casey N. Rojas, Vaibhavi Garish, Naomi Freitas,
Faculty: Jennifer M. Johnston
10. Identification and Evaluation of CRISPR Cas9 sgRNAs for the Purpose of Editing Several Loci in the *Methylobacterium Extorquens* Genome
Raquel M. Hall, Asrita S. Bhamidipati, Julian J. Hermida
Faculty: Elizabeth Skovran, Jennifer M. Johnston

11. Enrichment for Rare and Novel Bacteria in the Oral Microbiome using CRISPR-Cas9 Editing
Leif Greene, William Huang
Faculty: Cleber Ouverney
12. Sympathetic Neurotransmitters Decrease Sensitivity to Stretch in Muscle Spindle Afferents
Teodomiro Gomez, Serena Ortiz, Timothy Andrade, Arthur Harnich, Alexandra Salazar, Steven R. Valdespino, Erika Snyder, Maya Vallinayagam, Phylcia Sanchez
Faculty: Katherine A. Wilkinson
13. Development of an Optogenetic Approach to Stimulate Gamma Motor Neurons in vitro Remie Mandawe, Apoorva Karakel, Sai Kiran Byri, Danitza Cheline, Serena Ortiz, Alyssa Occiano, Mrudula Nukula, Priti Patel, Shivali Kanwari, Alexis Jackson, Denise Virgen
Faculty: Katherine A. Wilkinson
Collaborator: Shawn Hochman
14. Deciduous Plants are More Hazardous than Previously Found in California Home Ignition Zone
Kanako Kato
Faculty: Kate Wilkin
Collaborators: Skyla Dennis, Jordan Reding, Sky Biblin, Spenser Klinefelter, Atharv Keskar, David Benterou, Elyes Essanaa , Rachel Wong , Charlotte Ward, David Wang, Jessica Lee
15. Combinations of Mechanical Pre-treatment & Prescribed Fire Cause Shrub Mortality in *Baccharis pilularis* (coyote brush) Encroached Coastal Prairie Restoration
Jordan Reding, Jessica Lee
Faculty: Kate Wilkin
Collaborators: Jared Childress, Devii Rao
16. Identifying Proteins that Mediate Increased Proliferation at Higher Intracellular pH
Laura Martins, Jenna Hunter, Daniel Orozco,
Faculty: Bree Grillo-Hill
17. Regulation of Proliferation and Cell Death by Increased Intracellular pH
Carly Montan, Emilio Morales,
Faculty: Bree Grillo-Hill
18. Engineering Proteins to Measure Acid Levels in Living Cells
Andela Crnjac, Hanna Severiotti, Trisha Marie Fabillaran, Barbara Sandoval,
Faculty: Bree Grillo-Hill
19. pH Stability of Thermostable and Non-thermostable RNA Virus
Edgar Barajas, Niki Panahi zadeh
Faculty: Sonia Singhal
20. Investigation and Engineering of Phosphate Metabolism in *Methylobacterium extorquens* for Enhanced REE Biorecycling
Harpreet Kaur, Colan Tizon, Thasel Numan, Meagan Enrile, Sajede Rasouli, and Eric Shao
Faculty: Elizabeth Skovran
21. Genetic Variation Among Phi-6 Cystoviruses Undergoing Different Heat Shock Treatments
Sanika Samel, Pranav Babu, Yangchen Li
Faculty: Sonia Singhal
22. Determining Characteristics of Newly Discovered Halophage
Akiko Kaitlin Balitactac, Karen Cao
Faculty: Sonia Singhal

23. Implementation of CRISPR Cas9 Gene Editing in *Methylobacterium extorquens* AM1
Nadiya Vysotska, Asrita Bhamidipati, Anjali Chauhan, Raquel Hall, Ahdil Hameed, Julian Hermida, Richard Ngo
Faculty: Jennifer M. Johnston, Elizabeth Skovran
24. Effect of Angiotensin II and Captopril Upon Inflammatory Responses to Acute Sleep Fragmentation in Mice
Reem Al Makki
Faculty: David C. Ensminger
Collaborators: Nicholas D. Wheeler, Kristen N. Eads, Noah T. Ashley
25. Developmental Ethanol Exposure Causes Changes in the Expression of Histone Modifying Enzymes and Results in Long-Term Changes in Gene Expression
Joshua Marsh, Jodi Nguyen
Faculty: Rachael French
26. The Effects of Developmental Ethanol Exposure on Markers of Aging in *Drosophila melanogaster*
Navneet Sanghera
Faculty: Rachael French
27. Female Mice With a Sirtuin 4 Knockout Experience Accelerated Age-Induced Glucose Intolerance and Insulin Resistance
Magan C. Penney
Faculty: Frank K. Huynh
28. Examining the Role of Sirtuin 4 on the Structure and Function of Testes in Mice
Arshia Hamzehpour S., Albert A. Nguyen, Aeowynn J. Coakley, Thi-Tina N. Nguyen
Faculty: Frank K. Huynh
29. Investigating the Role of Estrogen and Progesterone in Mediating the Impaired Mammary Development Observed in Sirtuin 4 Knockout Mice
Joanne P. Khau
Faculty: Frank K. Huynh
30. Molecular Identification and Reference Genetic Database of American Pika-associated Plants
Neha Guru, Muhammad Rashid, Stephanie Thang
Faculty: Jessica Castillo Vardaro
31. DNA Metabarcoding Reveals Differences in American Pika Diets
Yvonne Luong, Salvador Martinez, Cecilia Rios Del Rio, Giovanni Quezada, Monica Villasenor
Jessica Castillo Vardaro
32. Assessing the Loss of p38 MAP Kinase as a Therapeutic Target for Chemotherapy Induced Peripheral Neuropathy
Hoang-Vi Vu, Serena Ortiz
Faculty: Katherine A. Wilkinson
Collaborators: Aleksandra Chudinova, Miriam B. Goodman
33. Visualizing hormonal effects on cardiac muscle cell hypertrophy using digital holographic microscopy: Does size matter?
Jacquelyn Simmons and Herman Huang
Faculty: Alexander Payumo

34. A Chemically-Defined Assay to Investigate the Effects of Hormones on Heart Muscle Cell Proliferation
Nanak Pabla, Shanthi Dave, Hafsanoor Vanya, Berenice Barragan-Rocha, and Andrew Caampued
Faculty: Alexander Payumo
35. Pneumolysin-induced PMN Transmigration and Disruption of Airway Epithelium Adherens Junctions
Devons Mo, Elaine Nguyen, Tarek Jakoush, Christian Aspiras, Vivian Nguyen, Jasmin Do, Francisco Nunez, Katherine Coll, Janessa Carozza, Nicole Homez
Faculty: Walter Adams
Collaborators: Shuying Xu, Rod K Tweten, John M Leong, Juan P Rosa-Cortes
36. Dynamic Python-based Method Provides Quantitative Analysis of Intercellular Junction Organization During *S. pneumoniae* Infection of the Respiratory Epithelium
Devons Mo, Elaine Nguyen, Francisco Nunez, Nicole Homez
Faculty: Walter Adams
Collaborators: Shuying Xu, Juan P Rosa-Cortes
37. Development of Erythrocyte Precursors from mESC and BMSC Cell Lines
Phi Phan, Lorene Lee, Raana.Mogharrab
Faculty: Tzvia Abramson, Leila Khatib
38. Promoting mESC Derived Cardiomyocyte Maturation With Thyroid Hormone Treatment
Nicolas Butelet, Angela DeGuzman, Raana.Mogharrab
Faculty: Tzvia Abramson Alexander Payumo, Leila Khatib
39. Effect of Amyloid Beta on Vesicular Glutamate Transporter 1 in Cortical Pyramidal Neurons Differentiated from Mouse Embryonic Stem Cells
Kamilla Sedov, Kaleana Plares, Urmi Kandpal,Raana Mogharrab,Leila Khatib
Faculty: Tzvia Abramson
40. Effect of the TLR-2 Stimulation by the Bacterial Ligand on the Growth, Survival, and Epithelial Barrier Protection of Mice Intestinal Organoids
Manali Kunte, Rishita Golla, Raana.Mogharrab
Faculty: Leila Khatib, Tzvia Abramson

DEPARTMENT OF CHEMISTRY

41. Cloning of *Aedes aegypti* Serine Protease I (AaSPI) and Optimizing Soluble Expression I in *E. Coli*
Giselle Martinez, Kevin Derisier, Muhammad Khan
Faculty: Alberto A. Rascón, Jr.
42. Recombinant Expression and Activity of *Aedes aegypti* Midgut Protease, AaSPII with EK-psuedo propeptide region
Joyce Wu, Elizabeth Moreno-Galvez
Faculty: Alberto A. Rascón, Jr.
43. Optimizing Soluble Recombinant Expression of the *Aedes aegypti* Early Trypsin Protease
Neomi Millan
Faculty: Alberto A. Rascón, Jr.
44. Thermodynamic Analysis of DNA:DNA Binding by Isothermal Titration Calorimetry
Anoop Kaur
Faculty: Daryl Eggers

45. Binding Analysis of Cucurbit[7]uril with Phenylalanine and Triethylammonium using Isothermal Titration Calorimetry
Nina Chuang
 Faculty: Daryl Eggers
46. Prediction from Protein Sequence of a Switch-Like Region in hSIRT1
 Richard Pearson, Benjamin Strauss, Jonathan Oribello, Tiffany Thai, Selina Lima Guan, Brooke Bellinghausen
 Faculty: Brooke Lustig
 Collaborator: Ningkun Wang
47. Kinetics of the C-terminal Domain of *Pseudomonas aeruginosa* ArnA in the Polymyxin Resistance Pathway
Lucero Sandoval
 Faculty: Laura C. Miller Conrad
48. Acyl Homoserine Lactone Analogs as Potential Inhibitors of Quorum Sensing
Adrian Blancas
 Faculty: Laura C. Miller Conrad
49. Characterization of Colistin Adjuvants in *Pseudomonas aeruginosa*
Mayura Panjalingam, Chad Reed
 Faculty: Laura C. Miller Conrad
50. A Review of Select Literature Focused on the Undergraduate Chemistry Research Experience
 Snigdha Rayala
 Faculty: Resa M. Kelly
51. Anomalous Carbon-Boron Bond Formation on Nanoscale Diamond Surfaces Using Trigonal Boron Compounds
 Krishna Govindaraju, Ezhioghode O. Uwadiale, Daniel N. Labunsky, Tyanna Supreme, Juan Miguel Del Rosario, Solomon Adjei II, Cynthia Melendrez,
 Faculty: Abraham Wolcott
 Collaborators: Sang-Jun Lee, Virginia Altoe, Kent Irwin, Dennis Nordlund
52. Direct Branched and Cyclic Amine Diamond Lattice Bond Formation Using a Bromine Surface Intermediate
 Tsz Ching Cheung, Grace Olivia Drew, Camron X. Stokes^Ψ, Jorge A. Lopez-Rosas, Cynthia Melendrez, Halim Muhammad
 Faculty: Abraham Wolcott
 Collaborators: Sang-Jun Lee, Virginia Altoe, Sami Sainio, Dennis Nordlund, Kent Irwin
53. Plasmonic Fluorescence Enhancement of Gold-Diamond Nanoarchitectures for Biolabeling Applications
 Rina Kawamura, Nawal Sugala, Steven Teddy, D'Enjoli Cox
 Faculty: Abraham Wolcott
 Collaborators: Dennis Nordlund, Sang-Jun Lee, Virginia Altoe
54. Elucidating the Effect of Phosphorylation on Motif A Dependent Activation of SIRT1
Addison Chen, Patricia Dosayla, Adorina Shahbazi, Ryan Nhan
 Faculty: Ningkun Wang
55. Dissecting the Mechanism of Allosteric Regulation of SIRT1
 Emily Leong, Reena Dosanjh, Yujin Hur, My Vu
 Faculty: Ningkun Wang

56. Effects of Polymer Confinement on Catalyst Activity in Cross Metathesis of Alkenes
Tyeshia Sapp, Stephanie Velasquez, Mejgon Omar
 Faculty: Madalyn R. Radlauer
57. Studies of Structured N-Isopropyl Acrylamide (NIPAM) Polymers as Supports for Transition Metal Catalysts
Melissa S. Griffin
 Faculty: Madalyn R. Radlauer
58. Synthesizing Polymer-Bound Copper Catalysts for Enzyme-Like Catalysis
Brenda Lu, Sayori Trejo, Abigail Ramirez, Lily Truong
 Faculty: Madalyn R. Radlauer
59. Exploring Chemically Reactive Regions of Phase Space with Support Vector Machines
 Heekun Cho, Calvin Nguyen, Nicholas Chan, Justin Prado, Karla Armenta
 Faculty: Gianmarc Grazioli
60. Simulated Mechanical Testing of Amyloid Fibril Structures Predicted by X-ray Crystallography Experiments
 Adam Ingwerson, David Santiago Jr., Patrick Regan, Andy Tao, Inika Bhatia
 Faculty: Gianmarc Grazioli
61. Investigating Incorporated Graphene-Bismuth Targets for Nuclear Reactions
 Melanie Guerrero, Luca Le, Cynthia Mach, Kacy Mendoza
 Faculty: Nicholas E. Esker
 Collaborators: John Greene, Matthew Gott, Richard Fink
62. CH₂ targets & single nucleon reactions
 Alex Chuyanov, Justin Diaz, Melanie Guerrero, Daniel Andre Hernandez Garcia, Luca Le, Cynthia Mach, Kacy Mendoza
 Faculty: Nicholas E. Esker
63. Synthesis and Post-Polymerization Functionalization of Poly(Iodostyrene)
 Tien Nguyen, Khanh Ha Vo, Richard Liu, Jenny Hoang
 Faculty: Philip T. Dirlam
64. Zinc-Ion Batteries with Organic Cathodes and Aqueous Electrolyte
 Alexander Vazquez and Kevin Shao
 Faculty: Philip T. Dirlam
65. Natural Products from California Native Plants: Chemical Analysis of *Emmenanthe penduliflora* and Other Native Plants
Christian Pham, Jaimie Chau, Sukhmani Batra, Phuong Anh Mai, Tricia Nguyen
 Faculty: Roy K. Okuda

DEPARTMENT OF COMPUTER SCIENCES

66. Concept Drift and Malware Evolution Detection
Xiaoli Tong
 Faculty: Mark Stamp
67. Generative Adversarial Networks for Image-Based Malware Classification
Huy Nguyen
 Faculty: Mark Stamp

68. Malware Classification Using Graph Neural Networks
Vrinda Malhotra
Faculty: Mark Stamp
69. Understanding the Role of Segmental Duplications in Higher-order Genome Organization
Sara E. Bell
Faculty: Wendy Lee, William Andreopoulos
Collaborator: Carlos Rojas
70. Interactive miRNA-mRNA Analysis App
Alexis Torres, Crystal Han, Diksha Kool
Faculty: Wendy Lee
71. Modeling Sequencing Artifacts in Next Generation Sequencing
Yvonna Leung, Felix Mbuga
Faculty: Wendy Lee
72. Twitter Bot Detection using Social Network Analysis
Thi Bui
Faculty: Katerina Potika
73. Predicting Externally Visible Traits from DNA Samples
Niraj Pandkar
Faculty: Teng Moh
Collaborator: Mark Barash, Department of Justice Studies
74. Using Machine Learning to Maximize First-Generation Student Success
Mustafa Yesilyurt
Faculty: Teng Moh, Elaine Collins
75. Real Time Panoramic Image Processing
Matthew Gerlits
Faculty: Teng Moh
76. Targeted Adversarial Attacks on Speech Separation Systems
Kendrick Trinh
Faculty: Melody Moh, Teng Moh
77. Beyond 5G Wireless
Pooja Shyamsundar, Peter Knight, Srajan Gupta
Faculty: Navrati Saxena
Collaborator: Dr. Abhishek Roy
78. Autonomous Connected Cars
Pooja Shyamsundar
Faculty: Navrati Saxena
Collaborator: Dr. Abhishek Roy
79. Reaching the Unreachable (Satellite Networks)
Peter Knight
Faculty: Navrati Saxena
Collaborator: Dr. Abhishek Roy

80. Accurate Identification of Species in Metagenomes Through Ribosomal 16S Assembly
Stephanie Chau, Sophia Yuan, Meet Patel, Vincent Stowbunenko, Rajvi Shah, Dishant Shah, Anirudh Mallya, Stephen Nguyen, Sudha Vijayakumar, Carlos Rojas, Jorjeta Jetcheva
Faculty: William B Andreopoulos, Carlos Rojas, Jorjeta Jetcheva

DEPARTMENT OF GEOLOGY

81. Investigation of Fragmentation Processes Producing Volcaniclastic Deposits in Shallow and Deep Marine Environments
Ricky Ede
Faculty: Ryan Portner
82. Effects of Caldera-Forming Eruption on Foraminiferal Communities at Axial Seamount, Juan de Fuca Ridge.
Gabriela Diaz Santana, Nikka Pauline Pacifico
Faculty: Carlie Pietsch, Ryan Portner
83. Ecological Change of Shallow Marine Invertebrates Across the Cretaceous-Paleogene Mass Extinction Event
Ronan Beltracchi, Page Thibodeaux, Kendall Grajeda-Klingler, Aminiah Manning
Faculty: Carlie Pietsch
84. HYDRUS Modeling of Sahelian Agroforestry Ecosystem: An Investigation of Local Water Balance
Nicole Butler
Faculty: Nathaniel Bogie
Collaborators: Roger Bayala, Teamrat Ghezzehei, Ibrahima Diehiou, Richard Dick
85. Construction, Emplacement, and Structure of Two Major Intrusive Suites in the Northern Sierra Nevada Batholith
Hollianne McClure
Faculty: Bob Miller
86. Construction and Structure of the Northern Margin of the Late Cretaceous Sonora Pas Intrusive Suite, North-Central Sierra Nevada Batholith, California
Victoria Arnold
Faculty: Bob Miller

DEPARTMENT OF MATHEMATICS & STATISTICS

87. How Many Clusters Are Best? Investigating Model Selection in Robust Clustering
Louis Tran
Faculty: Cristina Tortora

DEPARTMENT OF METEOROLOGY & ATMOSPHERIC SCIENCES

88. Analyzing Tornado Warning Performance Across Storm Lifetime
Josué Chamberlain (SJSU, NWC, NCAS-M),
Faculty: Sen Chiao
Collaborators: Dr. Matt Flournoy (CIWRO/OU), Dr. Kenzie Krocak (IPPRA/CIWRO/SPC),

Department of Physics and Astronomy

89. Simulating Magnetic Permeability Measurements of a Resonant Ferromagnetic Thin Film in the GHz Range With a Short Circuited Microstrip Using COMSOL Multiphysics
Alexander Cabot
Faculty: Ranko Heindl
90. Machine Learning Phase Detection in Snapshots of Ultracold Atoms in Optical Lattices
Stephanie Striegel
Faculty: Ehsan Khatami
91. Topology of a Driven 2D Spin Torque Oscillator Array
Shivam Kamboj
Faculty: Hilary M. Hurst
92. Quantum State Engineering with Ultracold Atoms
Faculty: Hilary M. Hurst
93. Explaining Photons with a Classical Field Action Principle
James Saslow, Brendan Stork
Faculty: Ken Wharton
94. Discovering Low Surface Brightness Galaxies with Rich Star Cluster Systems
Enrique Cabrera, Autumn Galinski, Alexander Hawksley
Faculty: Aaron Romanowsky
95. Classification of Compact Stellar Systems Around Nearby Galaxies
Satinderpreet Singh, Jynessa Valladon
Faculty: Aaron Romanowsky

Acknowledgements

Thanks to all of the student researchers and their faculty mentors and collaborators for displaying the results of their hard work! This is truly an impressive showcase of the broad range of research activity that takes place within our College.

Preparation for the SRD involved many colleagues from the College. Justin Croly printed most of the posters that were displayed today. Setup, teardown, and related aspects involved Lee Veliz, Mike Stephens, Marco Parent and Matt Geary. Cher Jones prepared the name tags.

Finally, thanks to Dr. Melody Esfandiari and students of the SJSU Chapter of the Student Affiliates of the American Chemical Society (SAACS) / Chemistry Club for providing refreshments for the student authors and faculty!

Thanks to everyone who participated and assisted with SRD17!