

The background of the cover is a photograph of the UCSB Campanile tower, a tall, slender, light-colored stone structure with arched windows near the top. The tower is positioned on the right side of the image. To the left, there are several trees, including a large pine tree in the foreground and a palm tree further back. The sky is a clear, pale blue. The text is overlaid on the left side of the image.

UC **SANTA BARBARA**
Summer Sessions

2025 SUMMER RESEARCH ACADEMIES
CAPSTONE SEMINAR
PROCEEDINGS

2025 Capstone Seminar

List of talks

Thursday, July 24

Decentralized Game-Theoretic Model Predictive Control for Multi-Agent Trajectory Optimization in Highway Scenarios

Luke Bula, Anrui Hong, and Luke Liu

Efficient Pig-Inspired Particulate Endonasal Filter for COPD

Christon Rex, Aayushi Shah, and Trisha Shivakumar

Alleviating the Toxicity of Metformin through Regulation of the UPRmt Pathway

Bonmin Gu, Brian Lee, and Sohum Parvate

21st-Century Black U.S. Literature: Climate Injustice Concerns and Public Policy Implications

Lemeng Kong, Godha Venugopalan, and Congran (Emily) Yang

Feeding Growth: Examining Generative AI's Social Media Marketing Capabilities for Independent, Small Restaurants

Amir Ali, Verner Guzman, and Joshua Yu

Pollute, Pledge, Profit: The Corporate Logic of Perception Debt

Rebecca Chau, Aditya (Adi) Siddabathuni, and Krishang Singhvi

Evaluating the Effects of Network-Induced Errors in a PID-Controlled 3-DOF Robotic Arm

Ritika Shah, Yitong Tang, and Branden Zhou

Need for Speed: Aerodynamic Optimization of a Peregrine Falcon Inspired Vehicle

Melina Bazar, Aarav Jamdar, and Shengqi Pang

Axon Regeneration in *C. Elegans*: Insights from the JNK MAPK Pathway

Katheryn (Katie) Chan, William Wang, and Guanting (Mitt) Wu

Beyond the Flames: How California Wildfires are Redefining the Lives of People and Wildlife

Chace Nusantoro Liu, Xinting (Cindy) Ren, and Ayush Swarnakar

Independent Venture Capital vs. Corporate Venture Capital: How Investor Type Shapes CEO Retention and Financial Trajectory

Kate Ma, Samuel Ma, and Karen Xiao

Resistance & Resale: A Critical Look at Consumerism and Thrifting Under a Capitalist Market

Robin Huang, Olivia Tan, and Diana Zhang

2025 Capstone Seminar

List of talks

Thursday, July 24

Trajectory Generation using Dynamic Terrain Abstraction for Autonomous Mobile Robots in Variable Environments

Juwan Chun, Pranav Murthy, and Dav Rahnpaur

Hydrodynamic Streamlining: A CFD Evaluation of the Impact of the Dorsal Fin on Lift and Drag in Garden Eels

Jessica Lee, Melvin Qiu, and Yuxuan Zhang

Resetting the Clocks: Mitochondrial Quality Control Through Genetic Adaptation

Mansi Mandal, Mohammed Yasar Meeran, and Aaryan Samanta

Abusive Relationships in Online & Offline Settings: An Empirical Study on the Linkages between FBI Reports and Reddit Forums

Abigale Dong, Sophia Madrid, and Jiayue Wang

On Forecasting Start-up Sentiment Trends: A Hybrid Epidemiological Approach with Stochastic Jumps

Michelle Chen, Danny Jiang, and Thomas X. Li

Are Negative Cultural Views Associated With Social Media Use?

Umaiyaa Hariharan, Keerthi Kalluri, and Paajkub Ana Moua

Accelerating Grover's Algorithm Against Mini-AES Using Convolutional Neural Network Key Bit Predictions

Emily Liu, Umair Paranjpye, and Aidan Reese

Effects of N92T Mutation in *rac1* on *Drosophila melanogaster* Ovariole Border Cell Migration

Chris Li, Zoey Sarrazine, and Jiatong (Anna) Zhang

Assessing the Impact of the 21st Century Assistive Technology Act on Technology Access for Disabled Americans

Henry Hussey, Evelyn Oh, and Chelsea Xie

Platforms of Hate? How Legal and Platform Moderation Differences Shape Racial Discourse in China and the U.S.

Stephan An, Noah Blackhart, and Zijun (Ava) Tian

Forecasting Mosquito-Borne Dengue Transmission in Brazil with Optimized SIR-Based Models and Sensitivity Analysis

Yagnik Chilamakuri, Jiyeon (Sarah) Hong, and Ziqin Yu

Digital Media's Role: White Matter In Developing Brains with Psychosis

Amanda Chen, Juliet Fox, and Kurn Sundaram

Investigating Quantum Random Number Generators and Deep Reinforcement Learning in One-Dimension Radiation Dose Deposition

Levi Gould, Priya Kukkamalla, and Audrey Wang

2025 Capstone Seminar

List of talks

Thursday, July 24

Functional Implications of G15D Mutation on Rac1 in Investigating Cell Death in *Drosophila melanogaster* Border Cells

Sanah Bhasin, Jeter Hoang, and Xiaotang Liu

The Effects of Proposition 227 on Fluency of English Language Learners Across Different Socioeconomic Classes

Gianna Kim, Frida Hernandez Pulido, and Ava Yi

Cultural Mirrors: A Cross-Cultural Analysis of Digital Appearance Hate

Isabella Cho and Kendall Wei

ODEM-S: A Comprehensive Orbital Debris Evolution Model for Predicting Kessler Syndrome Onset in Low-Earth Orbit

Brandon Chang, Erika Chiu, and Sophie Nadkarni

The Influence of Parental Regulations on Self-Regulation in Early Adolescence

Isabel Bitonio and Kamalika Devabhaktuni

AI Ethical Beliefs and Organizational Context as Predictors of Software Developer Job Satisfaction: A LightGBM Study

Shriyanka Hiremagalur, Swarchis Kulkarni, and Anthony Wang

The Mystery of the Box: Understanding Popmart's Formula for Obsession

Nate Hurst, Samuel Wang, and Daniel Zhu

Exploring How Sea Level Rise Is Affecting the Connotation of Water in Tuvaluan Literature

John-Noah Chang, Anna Lazovski, and Joseph Mensah

C. Elegans* Differential Gene Expression Highlights Potential Neurodegeneration Prevention through *Fkh-9*, *sir-2.1*, and *Sqst-1

Corey Le, Karen Song, and Valeria Ventura

Analyzing Bidding Strategies in Ascending Auctions Using An Agent-Based Modeling Approach

Sophia Cheng, Camryn Nguyen, and Kshitij Singhal

Fog Basking Namib Desert Beetle: Effects on Water Collection Rates from Shell Geometry

Daniel Huang and Aaron Li

Signaling AI: Keyword Frequency in Annual Reports and Its Correlation with Stock Performance

Matthew Bae, Jeffrey Bao, and Jeffrey Su

Summer Research Academies

Summer Sessions

2025 Capstone Seminar

List of talks

Thursday, July 24

Fit for Profit: Lululemon's Use of Social Media to Construct a Consumable Feminine Lifestyle of Health

Qianxi Chelsea Hu, Eden Lee, and Andrew Zhao

When Trees Sue Back: Environmental Personhood's Effect on Societal Values and the Implications on Ecuador's Legal System

Lena Fackler, Richard Lee, and Hannah Yang

Activation of ALT Pathways in Wild-Type *Caenorhabditis elegans* via Natural Polymorphisms in Telomere Maintenance Genes

Sophia Hou, Amy Park, and Kopal Tare

Neural Network-Augmented PID Controlled Path Following of Shifting Center of Mass Autonomous Underwater Vehicles

Shreya Baronia, Aadi Dahake, and Kevin He

Effects of Bio-inspired Covert Bird Feather Arrangements on Aerodynamic Efficiency: A Computational Approach

Bryan Chen and Gabi Tinoco

Effects of Home Environment and Contentment on Job Satisfaction Across Work Models

Alice Chen, Shivani Parikh, and Isha Tangri

Palantir, Privatization, and the Panopticon

Ben Danilov, Mahika Goswami, and Bruce Zhang

Where Land Meets Water: Cultural Perceptions of Water and Storytelling on Sea-Level Rise from China, Japan, and the Marshall Islands

Selina Lai, Jiayan Liu, and Greta Young

The Impact of U.S. Dollar Strength on Argentina's Trade During The Convertibility Plan

Ishan Khosla, Supra Malepati, and Katy Yan

A Comparative Analysis of Quantum and Classical Support Vector Machines on Complex Data for Churn Prediction

Aarush Arya, Isabella Li, and Daniella Litman

Recurrent *rac1* P29S Mutation in Melanoma Patients Alters Border Cell Migration in *Drosophila melanogaster*

Karis Chan, Greta Rechten, and Isabelle Tran

Modeling Bacterial Growth and Fitness in *E. coli* Nissle Under Variable Environmental Stressors and Horizontal Gene Transfer

Jaiveer Gill, Varsha Jonnalagadda, and Nitya Pisolkar

2025 Capstone Seminar

List of talks

Thursday, July 24

Effects of Varying BPM of Music on Cognitive Ability Based on Attention Deficit Hyperactivity Disorder (ADHD) Symptomology

Chloe Kim, Michelle Li, and Tayson Nguyen

Marginalized Faces, Polarized Spaces: Identity Visibility, Hate Speech, and Polarization on YouTube

Lakshmi Chakka, Niki (Leyan) Liang, and Amalie Skakkebaek

An Analysis of California Bill SB 54: Impact on ICE Deportation Rates In California's Jurisdictions

Aiden Kim, Momina Niazi, and Simran Suri

Effects of Spin-Orbit Coupling on Quantum Emission in Defect States of Hexagonal Boron Nitride

Praadhyumn Indaana and Levin Ma

Rac2E62K Mutation Causes Tissue Death in Migrating *Drosophila melanogaster* Border Cells

Astren Chang, Atreya Kulkarni, and Cecilia Vargas

Integrating Lotka-Volterra and SIR Models to Analyze Social Media's Impact on Duopolistic Market Dynamics

Flora Guo, Jingyu Lei, and Peter Zhao

An Experimental Study on Grayscale Screen Intervention and Its Influence on Sleep, Mental Health, and Sustained Attention in Daily Smartphone Use

Ryan Shintani, Sean Yu, and Joanne Zhang

Rhetoric and Political Violence Across the Federal Spectrum: Analyzing the Association between Presidential and Congressional Speech and Hate Crime Outcomes

Annika Hambali, Kaylan Hu, and Richa Prasanna

"A Model Policing Agency": Analyzing the Impact of the Collaborative Reform Initiative on Use of Force in San Francisco

Ian Gao, Amber Wang, and Emily Xie

Novel Approach to Quantum Error Mitigation: Resolving Coherent Errors with Variational Quantum Algorithms and Machine Learning

Sachit Gonur, Henry Lu, and Adhit Natla

The Rac P34H Mutation's Impact on Border Cell Migration in *Drosophila melanogaster*

Bhargavi Mallajosyula, Junrui Qu, and Jinchen Zhang

2025 Capstone Seminar

List of talks

Friday, July 25

Utilizing Natural Structures in *A. Clypeata* to Inspire Water Filtration Design

Jingyan (Sabrina) Liu, Brandon Pang, and Ayush Varma

A Generalized Multi-Component Model of Toxin Accumulation and Disease Transmission in Predator-Prey Systems: A Case Study of Southern Resident Killer Whales

Kylah Hu, Advi Wehzan, and Zixiao (Cherie) Zeng

Better to Love Your Friend Than Hate Your Enemy: A Computational Analysis of Political Discourse on Truth Social During the 2024 U.S. Presidential Election

Vihaan Mittal, Christopher Stubbs, and Tony Wu

Effects of Rac1 N92T Mutation on Ovarian Tissue Death in *Drosophila melanogaster*

Avani Seema Kumar, Lydia Meyer, and Wuyou (Julie) Zhu

UAV Search and Rescue via Stochastic Lost Person Behavior Modeling and Cell Signal Localization for Fleet-Limited Swarms

Siddharth Arutla, Poorv Patil, and Chenhao (Charley) Zhang

Between the Earth and Us: Native American Authors' Reflection on Knowledge Systems and Perception of Climate Justice and Action

Manhuen (Michelle) Wu, Mikayla Yamada, and Sophie Yu

From Shell to Shield: Harnessing the Scaly-Foot Gastropod Shell for Underwater Robot Armor

Meghana Konduri and Qinghan Wang

Decoding ADHD from EEG: A Hybrid Deep Learning Model for Diagnosis Using Wilson-Cowan Neural Clock Simulations

Brooke Li, Ishan Mysore, and Jaahnavi Tirumala

MorALL: A Machine-Generated Corpus Examining the Moral Reasoning and Lexical Footprint of Large Language Models

Sara Chhabra and Kalyaa Pradeep

G15D Mutation in *rac1* Disrupts Border Cell Migration in *Drosophila melanogaster*

Saswatha Chandrasekaran, Jianing Li, and Mia Niu

Development of Event-Triggered Torque Control Systems for Energy Optimization in Transtibial Prosthetics within Aquatic Environments

Maria Calderon, Boxuan Gao, and Chintan Gharpure

2025 Capstone Seminar

List of talks

Friday, July 25

Strength in Stories: Animacy and Agency in Anishinaabe Climate Narratives

Andrew Li, Yu-Shan (Sharon) Liu, and Colette Wang

Leveraging Biological Defense Architecture to Optimize Fluid Flow in Microneedle Arrays

Sahithi Cherukuri, Aarav Narang, and Alexander Zhang

A Novel Dynamic Model for Driver Risk Assessment in Response to Auditory Environments

Joosang (Joe) Lee, Anuj Subramanian, and Sarah Wu

Assessing Hate Speech Prevalence and Platform Governance on Social Media: Introducing the Hate Priority Index

Elise Lee, Warren Yuan-Ling Li, and Dominic Lim

Investigating the Relationship Between WAH-1 Expression and Parkinson's-Associated Orthologs in *C. elegans*: Implications for Oxidative Stress and Neurodegeneration on Aging

John Jou

How Consumer Involvement and Orienting Responses Impact Purchase Intent in Advertisements

Riyana Jain, Chloe Wang, and Dinah Yadidi

Quantum Circuit Optimization for Energy Efficiency Using Deep Reinforcement Learning

Prahlad Vangeepuram Canchi, Sumedha Joshi, and Nathaniel Na

Medicaid's Effectiveness: A Comparative Outcomes Study Between California and Texas

Audrey Huang, Megan Kho, and Catherine Rivers

Essential but Unwanted: Exploitation of Immigrant Food Delivery Drivers Under Platform Capitalism

Everett Leigh, Liqi (Afra) Miao, and Gabriel Morales

Perceived Precision: How Algorithmic Personalization Messaging Affects Consumer Engagement on Short-Form Video Platforms

Rio Kawamoto, Sophie Qi, and Claire Zhong

UPRmt Pathway Dynamics as an Alternative Mechanism for Lifespan Extension in *C. elegans* Starvation Response

Maya Kumar, Ranting(Grace) Wang, and Kevin Yu

How Your Feed Forms Friction: Political Media Echo Chambers Amplify Cognitive Dissonance

Aditi Chawla, Ashley Han, and Joyce (Yixuan) Li

An In-Depth Comparison Between Quantum and Classical CNNs for Brain Tumor Classification

Rui Rebich Hespanha, Ayaan Syed, and Siddharth Vedam

2025 Capstone Seminar

List of talks

Friday, July 25

The Hurdles of Stopping Nurdles: Evaluating California's Policy To Curb Marine Microplastic Pollution

Joshua Huang, Shriya Tripathi, and Ethan Van

From "Got Milk?" to Poppi: How Gen Z Drinks Capitalism

Devin Huang, Taylor Koo, and Emily Xue

Team Dynamics Under Pressure: A Study of NBA Team Success through Language and Statistics

Siqi Li, Shayla Pheng, and Annabel Yen

Natural Intronic Variation in the SKN-1 Pathway: Insights into Nrf2-Like Stress Adaptation and Its Parallels in Cancer Cell Tumorigenesis

Allison Lei and Daniel Li

Digital Media: Which Modality is Most Effective for Learning?

Emma Huang and Rumi Jahangir-Arshad

The Effects of Qubit Reduction on Accuracy and Efficiency of Quantum Convolutional Neural Networks

Sanvi Krishnan, Mooncy Li, and Kai Yi

Analyzing the Effect of Game-Theoretic Negotiations on the Housing Market in California

Ethan Ding, Maira Gracias, and Claire Su

Quantitative Easing: Impact on Mortgage Rates and Housing Affordability

Solomon Auerbach, Richard Chen, and Ryan Lok

Investigating the effects of RAC1P29S Mutation on Cell Viability in *Drosophila Melanogaster* Egg Chambers

Marina Girgis, Amy Miao, and Zoya Sajid

Hate in the Margins: Identity-Specific Hate Speech Intensity and Virality Dynamics on Fringe Social Media Platforms

Anika Ghosh Basu, Humberto Carlon Espinoza, and Junyi Liu

Effects of Wing Corrugation Geometry on the Aerodynamic Properties of Flapping Wing Micro Aerial Vehicles

Lucho Caballero, Sameeksha Pradhan, and Jasper Yip

Tuning Longevity: How the age-1 Gene Modulates Aging via the Insulin/IGF-Signaling Pathway in *C. elegans*

Haely Park, Shruti Patel, and Helen Wu

Joint A* and Social Force Model for Autonomous Navigation in Dynamic Crowd Environments

Jatin Sarabu, Sahil Vijay, and Dhruv Yadati

2025 Capstone Seminar

List of talks

Friday, July 25

The Impact of State Vaccination Exemption Policies on MMR Vaccination Coverage

Angela Fang, Amelia Finnell, and Anoushka Rajeshkumar

Modeling Human Immunodeficiency Diseases: Effects of *rac1*^{G12V} Mutation on Border Cell Migration in *Drosophila melanogaster*

Ricardo Avila, Mihika Moghe, and Joyce Tan

Scripts, Stereotypes, and Satire: A Computational Analysis of Racial and Ethnic Humor in American Animated Adult Comedy Series

Aavya Mishra, Amelie Rhew, and Jessica Wang

Perfecting the Pod: The Hydrodynamic Optimization of Dolphin Pod Formations

Brooke Davis, Gavin Koo, and He Wenyu (Thomas)

Reduced tRNA Fragmentation via *nsun-4* Overexpression Points to a Potential Mechanism Influencing mtDNA Heteroplasmy

Aarnav S. Padigala, Claire Shu, and Gemma Wang

Optimizing UAV Swarm Performance in Wildfire Detection and Monitoring: A Study of GWO and PSO

Siddharth Mahesh, Lilian Wu, and Sophie Yang

Equity at the Edge: Effect of the Emergency Rental Assistance Policy (ERA1) on Perceived Likelihood of Eviction by Demographics

Alex Kim, Li (Jayden) Li, and Matthew Zhang

E62K Mutation in *Rac1* Does Not Show a Significant Decrease in Border Cell Migration in *Drosophila melanogaster*

Anata Bezman, Darsh Maheshwari, and Sophie Qiao

Modern Advertising of Sports Bras Impact on the Women's Body Ideal: A Comparative Content Analysis of "Alo Yoga" and "Athleta"

Emily Choi, Angelina Sun Dang, and Sophie Weiss

Collective Agency in Waorani, Uru-eu-wau-wau, and Tsleil-Waututh Indigenous Literature: How Elders' Communal Contributions Forge Pathways of Indigenous Activism

Nayeon Koh, Kinsey Nam, and Chloe Woo

2025 Capstone Seminar

List of talks

Friday, July 25

Financial Flattening: How Restructuring Impacts Risk-Adjusted Performance in Public Banks

Dhruv Bhatnagar, Kayleen Corona, and Vivek Gowda

Centipede's Leap into the Quantum Realm

Kaytki Chakankar, Xinhui (Claire) Tang, and Yiguo Zhang

Modeling the Effect of Social Media Engagement in the Stock Market Using Dynamic Systems and Machine Learning

Aravindkrishna Arivudainambi, Cinty Lin, and Hanyuan (Michael) Qu

Evaluating Radicalization Through Autism Diagnosis Criteria and Media Addiction

Christopher Huang, Elise Mowbray, and Evelyn Wu

From Colony to Nation: Tracing the Enduring Impact of British Colonial Policies in Nigeria

Ho Ka Bobby Fu, Kelsey Li, and Ethan Wu

What Shapes Amazonian Indigenous Activism: Exploring the Power of Memories

Kevin Chapman, Avery Liu, and Nini (Han) Tan

Mapping Influence: Centrality Metrics and Return on Assets in Board Networks

Jialin (Nigel) Cao, Nicole Dean, and Ehman Sandhu

Comparing Error Mitigation in Quantum and Artificial Neural Networks Using Noisy Data

Yash Balaji, Zinta Jacob, and Patrick Zhou

Modeling the Effect of Microplastic Concentration on Biofilm Dynamics in Aquatic Environments

Anay Tiwari and Amanda Wang

Mind Over Media: A Dissonance-Based Intervention and Neural Correlates of Problematic Social Media Use

Yunqi Peng, Shanaya Puri, and Vivian Shu

Rhetoric vs. Reality: Insight into Donald Trump's Campaign Strategy

Sanskriti Arun, Jixuan Chen, and Prisha Malhotra

The Flooded Future: Underlying Power Dynamics and Environmental Injustice Behind the Belo Monte Dam

Grace Wong and Jason (Tsz Sen) Zhu

Counting Sentiment in the Innovation Ledger: The Impact of Employee Sentiment on R&D Intensity in Fortune 500 Technology Firms

Simon Chen, Jiayi Jiang, and Yikai (Eric) Zhao