

# 2025 CAPSTONE SHOWCASE

**BLOCK 1 (11AM-12:30PM)**

A01-1	A01-2	A02-1	A02-2	A03-1	A03-2
A04-1	A04-2	A05-1	A05-2	A06-1	A06-2
A06-3	A07-1	A07-2	A07-3	A08-1	A09-1
A09-2	A09-3	A10-1	A10-2	A10-3	A11-1
A12-1	A13-1	A13-2	A14-1	A14-2	A14-3
A14-4	A15-1	A15-2	A16-1		
A16-2	A16-3	A16-4	A17-1		

Poster session for the undergraduate data science major's senior capstone program

Friday, March 14, 2025 | 11AM-2:30PM

Price Center East Ballroom, UC San Diego Campus

## 🍎 Medicine & Bioinformatics

- A01-1** Effectiveness of PRS models Across Populations
- A01-2** Modify PRS to Incorporate Deep Learning Model to Better Predict Individual Gene Expression
- A02-1** Radiographic Enhanced Clinical Decision Support System for Early Sepsis Detection & Risk Assessment
- A02-2** Data Science Pipeline for end-to-end Advanced Clinical Decision Support System
- A03-1** Predicting Drug Resistance in Malaria Using Language Models
- A03-2** Assessing LLMs to Improve the Prediction of COVID-19 Status
- A04-1** Hierarchical Latent Variables Models for Neural Data Analysis
- A04-2** Using Gaussian-Process Factor Analysis to Understand the Interplay Between Brain Regions in Decision Making
- A05-1** Exploring Working Memory Task Predictability using fMRI Data
- A05-2** Predicting of Handedness with Resting-State fMRI Data
- A06-1** Integrating Multi-Omics Data to Enhance Protein-Protein Interaction Predictions Using Graph Autoencoders
- A06-2** LLM-Driven Descriptive Analysis of Metaphase Cell Images Containing ecDNA
- A06-3** Identifying ecDNA Genomic Regions using Graph Neural Networks

## 👉 Fairness & Causal Inference

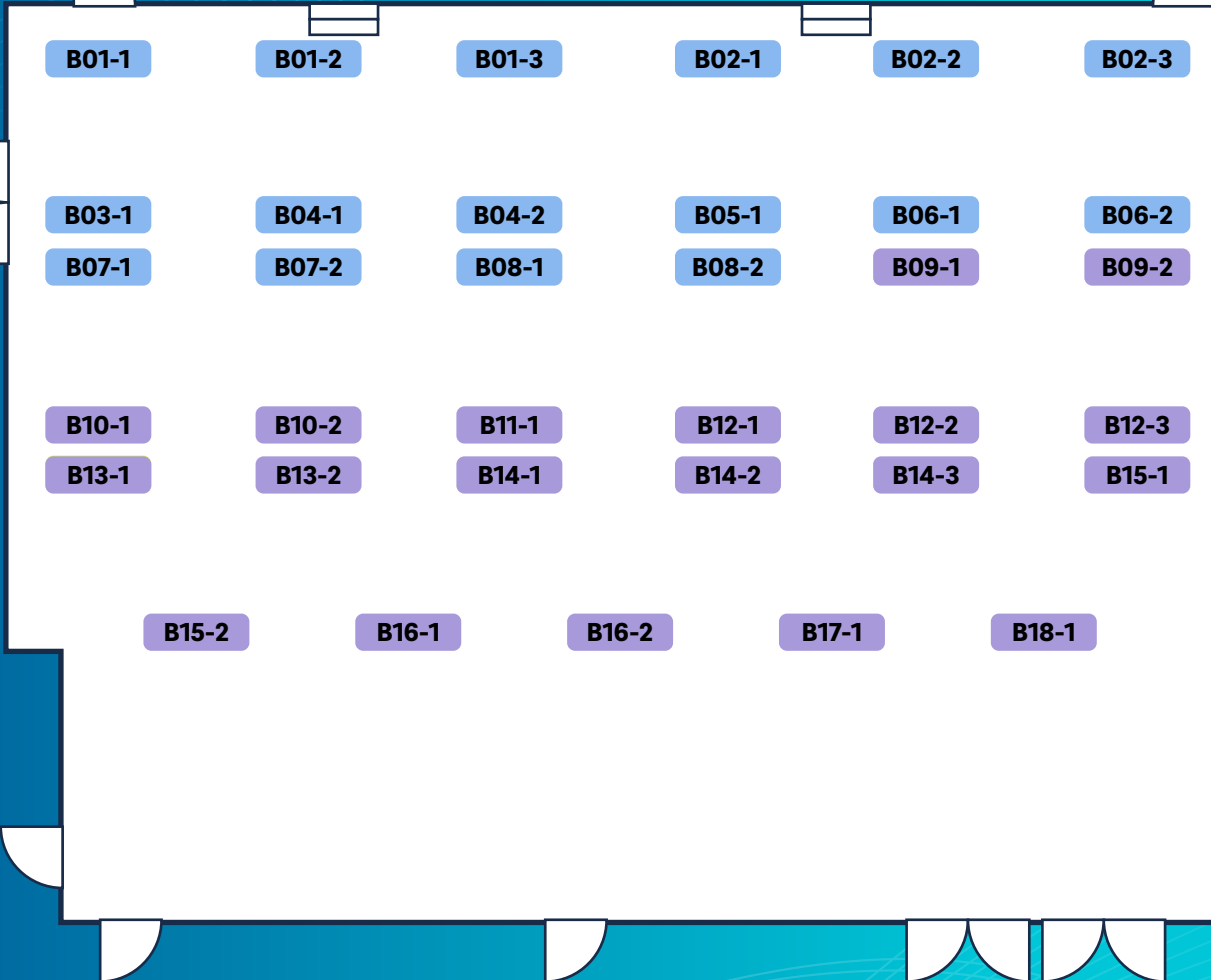
- A07-1** Error Injection Robustness Classifier
- A07-2** Addressing Voter Turnout Disparities through Data-Driven Resource Allocation
- A07-3** Exploration & Applications of Fairness Algorithms
- A08-1** Investigating LLM Bias in Housing Contexts
- A09-1** Causal Discovery on Gut Microbial Data for Disease Risk Prediction
- A09-2** A Causal Approach to Understanding Student Depression
- A09-3** Causal discovery of Stock Returns
- A10-1** An Adversarial Framework for Mitigating Gender Bias in Coronary Heart Disease Prediction
- A10-2** Bias Detection & Mitigation in Ride Hailing
- A10-3** Ethics of Artificial Intelligence in Crime

## 🧠 Theoretical Foundations

- A11-1** Probabilistic Deep Sequence Models for Bayesian Optimization
- A12-1** Improving Continual Test-Time Adaptation for Increased Efficiency & Accuracy
- A13-1** Novel Techniques in Private Data Analysis
- A13-2** Adversarial Attacks on Invisible Watermarks
- A14-1** CLEAR: Contextual Latent Exploration for Adaptive Representation
- A14-2** Improving Accessibility of Concept Bottleneck Layers for Scalable, Accurate, Interpretable Models
- A14-3** Faithful Concept Bottleneck Model
- A14-4** Comprehensive Evaluation & Extension of Lag-Llama for Time Series Forecasting
- A15-1** Balancing Accuracy & Efficiency: A Comparative Study of Knowledge Distillation & Post-Training Quantization Sequences
- A15-2** Label-Aware CNN Quantization using ImageNet
- A16-1** Knowledge Graph Compression Using Graph Transformers
- A16-2** Interpreting Graph Transformers for Long-Range Interactions
- A16-3** Neural Collapse on Graph Transformers
- A16-4** Evaluating Graph Transformers for Scalable Social Media Recommendations
- A17-1** Enhancing Efficiency & Robustness in Semantic Smoothing: An Algorithmic Approach to LLM Defense

# 2025 CAPSTONE SHOWCASE

## BLOCK 2 (1PM-2:30PM)



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### 🗣️ Language Models

- B01-1** GenAI for Good
- B01-2** Mitigating/Grading Misinformation and Disinformation with Hybrid Model AI
- B01-3** Disinformation Detection RAG Chatbot
- B02-1** Rethinking Creditworthiness
- B02-2** Predicting Loan Default Probability Using Transaction Data
- B02-3** Building Better Credit Scores: Machine Learning and NLP for Optimized Risk Assessment
- B03-1** Advanced Detection for Jailbreak Attacks on LLMs
- B04-1** VoiceNavigator: AI-Driven Speech-to-Speech Computer Control and Visual Content Narration System
- B04-2** Developing a LLM-Driven Multi-Agent Framework for Multimodal Translation
- B05-1** LLMaps
- B06-1** Leveraging Multi-Modal LLM-Agents for Web Task Automation
- B06-2** Test-Time Scaling of Multi-Modal Reasoning
- B07-1** Digital Bouncers – Secure Smart Home Solution with Large Language Models
- B07-2** UCSD Mental HealthBot
- B08-1** Comparing Chronos-Bolt and ARIMA Models for Portfolio Optimization in the S&P 500 Information Technology
- B08-2** Utilizing News in the Stock Market

### ⚙️ Applied Data Science

- B09-1** Demystifying Privacy: Building Tools for Clear and Accessible Data Security Practices
- B09-2** Web-Based Privacy Data Flow Design Space
- B10-1** Finding Ghost Particles - Regression Model
- B10-2** Majorana Neutrino Hunt - Classification Model
- B11-1** Data Driven Passivator Optimization for Perovskite Solar Cells
- B12-1** Congestion Prediction in Chip Design with Walks and Partitioning
- B12-2** Chip Design and Graph Representation
- B12-3** De-HNN Optimization: Reducing Runtime for Scalable Graph Processing
- B13-1** SeeRise: Visualizing the Impact of Emulated Sea Level Rise on Coastal Regions
- B13-2** Projecting Climate Livability Based on ESM Emulation
- B14-1** Computer Vision-Based Inspection for SDG&E Aviation Services
- B14-2** ILLNESS, An Alternative Way to Assess Wildfire Risk
- B14-3** Identifying Grid Areas With Wind Speed Discrepancies Through Time-Series Analysis and Optimizing VRI Polygon Boundaries
- B15-1** Fault Logging and Assessment for Responsive EV Station Repairs (FLARES)
- B15-2** Electric Vehicle Charging Station - Optimizing Placement Tool via Intersection Modeling (EVCS-OPTIM)
- B16-1** DataMatch
- B16-2** Decentralized Data and Data Analysis Marketplace
- B17-1** PropChain: A Blockchain Based Framework for Automated Real Estate Transactions
- B18-1** Designing an Energy-Efficient Hardware Accelerator for Deep Learning