JING PENG

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RESEARCH INTERESTS

My research interests lie at the intersection of artificial intelligence and neuroscience, aiming to uncover the brain's learning mechanisms and translate those insights into biologically inspired AI systems

EDUCATION

University of California, Santa Barbara **Expected June 2025**
Master of Science in Computer Science - GPA: 3.91 / 4.00 *Santa Barbara, CA*

Northeastern University **June 2022**
Bachelor of Engineering in Software Engineering - GPA: 86.4 / 100.0 *Shenyang, China*

RESEARCH EXPERIENCE

Graduate Student Researcher, Bionic Vision Lab **Jul 2024 - Present**
Uncovering Behavioral Strategies: Training Mice and AI on a Shared Foraging Task *UC Santa Barbara*

- Investigated visual-driven mouse navigation by modeling a shared foraging task using **Deep Reinforcement Learning (DRL)** in an agent-based Unity environment
- Developed RL agents with **ML-Agents**, leveraging **Convolutional Neural Network (CNN)** and **Proximal Policy Optimization (PPO)** to simulate foraging behavior and enhance decision-making accuracy
- Evaluated agent robustness to visual perturbations (e.g., fog, clutter) and compared their behavioral performance and neural alignment with that of mice

2021 Summer GEARS Program, WISN Lab **Jul 2021 - Aug 2021**
Data Mining for Dockless E-scooter Sharing Systems *North Carolina State University*

- Processed raw data of available e-scooters before and after COVID-19 in **12** companies from **11** cities worldwide
- Visualized **55k+** geographic data points, classified **928k** trips by coordinates, and identified the most popular areas
- Analyzed usage patterns across diverse demographics within micro-mobility platforms

CONFERENCE ABSTRACTS

- Marius Schneider, **Jing Peng**, Yuchen Hou, Joe Canzano, Spencer Smith, Michael Beyeler. "Uncovering Behavioral Strategies: Training Mice and AI on a Shared Foraging Task," *COSYNE 2025: Computational and Systems Neuroscience*
- Yuchen Hou, Marius Schneider, Joe Canzano, **Jing Peng**, Spencer Smith, Michael Beyeler. "A deep learning framework for center-periphery visual processing in mouse visual cortex," *COSYNE 2025: Computational and Systems Neuroscience*

PROFESSIONAL EXPERIENCE

Teaching Assistant, University of California, Santa Barbara **Apr 2023 - Sep 2024**
CS 156: Advanced Applications Programming

- Tutored in issue tracking and testing, using **JaCoCo** for test coverage, **PITest, Stryker** for mutation testing
- Contributed to Full-stack sample using **Spring Boot**, **React**, **PostgreSQL**, **MongoDB**, **Google/Github OAuth**
- Configured **CI/CD** pipelines for continuous integration and deployment, enhancing project efficiency and reliability

CS 5A: Introduction to Data Science

- Facilitated learning in the lab section, providing students with a solid foundation in **Python** programming and data analysis, covering areas such as **Numpy**, table manipulation, data structures, functions, and loops
- Delivered guidance on broader data science concepts, including plot drawing, causation analysis, and A/B Testing

Software Development Engineer Intern, Neusoft **May 2021 - Aug 2021**
Neusoft Profit Management System

- Implemented efficient backend modules using **Spring Boot**, **MyBatis-Plus**, optimizing data processing to effectively support real-time tracking of **5,000+** sales opportunities
- Boosted system response by **27%** using **Redis** to cache user information, enhancing data retrieval and reducing load

- Built a scalable microservices architecture on **Alibaba Cloud** servers using **Spring Cloud**, with dynamic configuration management via **Nacos**, improving system calling efficiency by **63.2%**
- Deployed **RabbitMQ** on **Docker** for a secure, real-time communication platform supporting over **300** users
- Enhanced system security with **OAuth2**, **Spring Security**, and **JWT**, safeguarding user credentials

Undergraduate Software Engineer, Network Science and Big Data Technology Lab **Mar 2021 - Jun 2022**
Resource Recycling Center Information Management System
- Created an **Android** app featuring **70** pages across **3** sections, facilitating data management for users at **7** stations
- Redesigned the **MySQL** schema, achieving an **18%** performance acceleration
- Enabled real-time web access on Android through a new navigation feature, boosting engagement by **12.6%**
- Integrated **Apache Echarts** for dynamic temperature and humidity visualizations
- Streamlined communications using **REST APIs** with **Swagger**, improving **50%** optimized development efficiency

SELECTED PROJECTS

5 categories related to Mental Health from Checkouts Over Time **Dec 2023 – Mar 2024**
MAT 259: Data Visualization
- Analyzed 98M+ Seattle Library records (2006–2023), tracking five mental health categories by monthly checkout percentage to reveal long-term trends
- Visualized trends by designing and implementing a custom 3D spherical coordinate system in Processing, encoding the evolution of five mental health categories over time
- Implemented log scaling, radial mapping, and curve rendering for clear, expressive data shapes

Lights Camera Action: Real World Videos to Non-Photorealistic Animation **Dec 2022 – Mar 2023**
CS 281B: Advanced Topics in Computer Vision
- Developed a novel segmentation-based pipeline to transform live-action videos into stylized, non-photorealistic animations, significantly reducing production time and cost compared to traditional animation methods
- Experimented with advanced deep learning frameworks (U-Net, Super Resolution Style Transfer, Mixed Neural Style Transfer (MNST), DABNet, Animation Transformer (AnT)) to optimize visual quality and artistic expressiveness

Performance Evaluation of Different JVMs **Sep 2022 – Dec 2022**
CS 263: Runtime Systems
- Benchmarked and analyzed four major Java Virtual Machines (HotSpot, GraalVM, OpenJ9, Azul Zulu) supporting Java 11, leveraging Docker to ensure reproducible testing environments
- Executed 10 computationally intensive benchmark programs to systematically assess JVM performance across key metrics, including execution speed, memory consumption, garbage collection behavior, and throughput
- Visualized JVM performance metrics using Python (Matplotlib) to highlight key strengths and trade-offs

Analysis of Musical Influence via Network and Clustering | *Interdisciplinary Contest in Modeling* **Apr 2021**
- Established a directed graph model network about music genres and quantified the influence of artists with Topsis
- Administered the K-means algorithm to classify approximately 200,000 songs
- Explored the environmental impact on music using a Feature Fusion algorithm based on Bayesian theory
- Identified distinctive and influential musical traits through Systematic Cluster Analysis and Cosine Distance
- Used the Pearson Correlation Coefficient and Data Fitting method to determine whether the musical revolution exists

Vehicle Detection based on YOLOv3 | *Intelligent Driving Technology* **Apr 2021**
- Trained an YOLOv3 model to detect vehicle in 20 pictures of different scenes and a 10s video

Power Load Forecasting of Buildings | *Introduction to Machine Learning* **Apr 2021**
- Constructed Long Short-Term Memory (LSTM) Network and used time series to predict electricity of buildings

TECHNICAL SKILLS

Languages: Java, Python, SQL, C, C++, JavaScript, Ruby, Processing, MATLAB, LaTeX
Frameworks: Spring Boot, MyBatis, Redis, Numpy, Pandas, PyTorch, Node.js, React, Vue, Vuetify, Spring Cloud
Tools: Git, Maven, AWS, Dokku, Nacos, Docker, Nginx, Apache Tomcat, Elastic Beanstalk, Postman, Wireshark