Kaiwen Bian

✎ Contact: 619-246-3876
✉ kbian@ucsd.edu
⌨ http://www.kbian.org

Education

2022 – 2026 **University of California, San Diego**, La Jolla, CA

B.S. in Data Science, Major-GPA 3.891/4.0

B.S. in Cognitive Behavioral Neuroscience, Major-GPA 3.875/4.0

Research Interests: Embodied Agent, Computational Neuroscience, Robotics, Manifold Learning.

Research Experience

2024 – 2026 **Salk Institute for Biological Studies**, *Research Intern*, La Jolla, CA.

Crick-Jacobs Center for Theoretical and Computational Biology

Advisor: Talmo D Pereira

- Developed computationally efficient deep reinforcement imitation systems (Mimic-MJX) to control a bio-mechanically realistic agent and mimic realistic animal behaviors.
- Discovered governing topological insights into the representational space of embodied agents' behaviors (TopoMimic) and achieved higher performance on behavior transition clustering compared to SOTA segmentation methods.

2025 – 2026 **Stanford University**, *Visiting Research Scholar*, Palo Alto, CA.

Statistics Department & Wu Tsai Neurosciences Institute

Advisor: Scott W Linderman

- Created latent dynamical models for planning and generating bio-mechanically realistic behaviors for embodied agents using deep state-space modeling methods.

2025 – 2026 **University of California, San Diego**, *Student Researcher*, La Jolla, CA.

Halıcıoğlu Data Science Institute

Advisor: Yusu Wang

- Created graph compositional abstraction scheme for tokenization (MOSAIC), allowing sequence transformers to generate complex molecules more realistically with more structural properties compared to SOTA flat tokenization methods.
- Co-advised on the TopoMimic project from Salk.

2023 – 2024 **University of California, San Diego**, *FMP Scholar*, La Jolla, CA.

Cognitive Science Department & Undergraduate Research Hub

Advisor: Sean Trott

- Developed tools using linguistic techniques (i.e. affordance) for probing the embodied simulation in large multi-modal models to improve the interpretability of these models.

Conference & Journal Publications

Nature 2026 Zhang, C.Y., Yang, Y., Sirbu, A., Leonardis, E.J., Abe, E., Warnberg, E., Aldarondo, D.E., Lee, A., Prasad, A., Foat, J., **Bian, K.**, Park, J., Bhatt, R., Saunders, H., Nagamori, A., Thanawalla, A.R., Huang, K.W., Plum, F., Beck, H., Flavell, S.W., Labonte, D., Richards, B.A., Brunton, B.W., Azim, E., Ölveczky, B.P., & Pereira, T.D. (2026). MIMIC-MJX: Neuromechanical Emulation of Animal Behavior. Manuscript submitted to *Nature Methods*.

NeurIPS 2026 **Bian, K.**, Leonardis, E. J., Yang, Y., Zhang, C., Azim, E., Ölveczky, B. P., Wang, Y., & Pereira, T. D. (2026). Shaped by What's Missing: Topological Discovery of Behavioral Transitions. *Manuscript in preparation to submit to main conference.*

NeurIPS 2026 **Bian, K.**, Yang, A. H., Parviz, Ali., Mishne, G., & Wang, Y. (2026). Beyond Flat Walks: Compositional Abstraction for Autoregressive Molecular Generation. *Manuscript in preparation to submit to workshop.*

Conference Presentations

UCSD 2026 **Bian, K.**, Yang, A. H., Parviz, Ali., Mishne, G., & Wang, Y. (2026). Beyond Flat Walks: Compositional Abstraction for Autoregressive Molecular Generation. *Poster will be presenting at Halıcıoğlu Data Science Institute, UC San Diego Senior Capstone Showcase, La Jolla, CA.*

COSYNE 2026 Zhang, C., Sirbu, A., Yang, Y., Leonardis, E. J., Park, J., Prasad, A., **Bian, K.**, Abe, E., Wärnberg, E., Brunton, B. W., Richards, B., Ölveczky, B. P., & Pereira, T. D. (2026). MIMIC-MJX: Neuromechanical Emulation of Animal Behavior. *Poster will be presented at Computational and Systems Neuroscience (Cosyne) Conference, Lisbon, Portugal.*

COSYNE 2026 Leonardis, E. J., Nagamori, A., Thanawalla, A., Yang, Y., Saunders, H., Gilmer, J., Zhang, C., **Bian, K.**, Ölveczky, B. P., Al Borno, M., Azim, E., & Pereira, T. D. (2026). Musculoskeletal Imitation Learning: Physics-Aware Constraints Promote Naturalistic Muscle Activity. *Poster will be presented at Computational and Systems Neuroscience (Cosyne) Conference, Lisbon, Portugal.*

Stanford 2025 **Bian, K.**, Jha, A., Buchanan, K., & Linderman, S. W. (2025). Deep State Space Controls For Biomechanically Realistic Artificial Agents. *Poster presented at Stanford Undergraduate Research Program (SURP-Stats) Symposium, Palo Alto, CA.*

SfN 2025 **Bian, K.**, Leonardis, E. J., Yang, Y., Zhang, C., Azim, E., Ölveczky, B. P., Wang, Y., & Pereira, T. D. (2025). Topology-driven Insights into Naturalistic Behavior from Neuromechanical Agent Modeling. *Poster presented at the Society for Neuroscience (SfN) Annual Meeting, San Diego, CA.*

SfN 2025   Yang, Y., Zhang, C., Leonardis, E. J., Sirbu, A., **Bian, K.**, Azim, E., Ölveczky, B. P., & Pereira, T. D. (2025). VNL-playground: Fast and Biologically Realistic Virtual Environment for Simulating Animal Behavior. *Poster presented at the Society for Neuroscience (SfN) Annual Meeting, San Diego, CA.*

SfN 2025   Leonardis, E. J., Nagamori, A., Thanawalla, A., Yang, Y., Saunders, H., Gilmer, J., Zhang, C., **Bian, K**, Ölveczky, B. P., Al Borno, M., Azim, E., & Pereira, T. D. (2026). Musculoskeletal Imitation Learning: Physics-Aware Constraints Promote Naturalistic Muscle Activity. *Poster presented at the Society for Neuroscience (SfN) Annual Meeting, San Diego, CA.*

COSYNE 2025   Zhang, C., Yang, S., **Bian, K.**, Abe, E., Wärnberg, E., Foat, J., Aldarondo, D., Brunton, B. W., Ölveczky, B. P., & Pereira, T. D. (2025). Track-MJX: A GPU-Accelerated Pipeline for Imitating Animal Motor Control. *Poster presented at the Computational and Systems Neuroscience (COSYNE) Conference, Montreal, Canada.*

UCSD 2023   **Bian, K.**, Li, A., Jones, C., & Trott, S. (2023). Embodied Simulation in Multimodal Models Using Affordance Stimulus: A Probing Study. *Poster presented at the UC San Diego Undergraduate Research Faculty Mentorship Program (FMP) Symposium, La Jolla, CA.*

Skills

Programing   Python, SQL, Java, Java Script, Web Dev.

Python Packages   Jax, Flax, Ray, MuJoCo/MJX, Gym, Dm-Control, Brax, PyTorch (Torch, TorchRL, and PyG), TensorFlow, Ripser, SkLearn, Panda, Dask, and Spark.

Mathematic   Probability & Statistics (State Space Models, Probabilistic Inference, Stochastic Processes, and Computational Stochastic), Reinforcement Learning, Convex Optimization, Dynamical System, Signal Processing, Linear Algebra, Linear Control Theory, Graph Theory, Manifold Learning, and Computational Topology.

Neuroscience & Biology   System & Cognitive Neuroscience, Neuro-anatomy, Motivational & Developmental Neurobiology, Behavioral Endocrinology, Neural Signal Processing, Exercise Physiology, Kinesiology, and Human Nutrition.

Language   Mandarin Chinese and English