

Chengrui Li 李宸睿

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Research Interests

Computational neuroscience, neural latent variable models, statistical machine learning.
Eye tracking experiments and data analysis.
Fractional calculus signal processing.

Education

- 2021.08 – present **Ph.D. in Computational Science & Engineering.**
M.Sc. in Mathematics on 2023.12.
Georgia Institute of Technology (Georgia Tech), Atlanta, USA.
GPA: **4.00/4.00**
Advisor: Prof. Anqi Wu
- 2018.08 – 2019.05 **Undergraduate Non-Degree Exchange Student.**
University of Tennessee, Knoxville (UTK), USA.
GPA: **4.00/4.00**
- 2016.09 – 2020.06 **B.Eng. in Software Engineering (Computational Biology);**
B.Sc. in Biological Sciences.
Wu Yuzhang Honors College, Sichuan University (SCU), Chengdu, China.
GPA: **3.94/4.00**; Rank: **1/28**
Advisor: Prof. Yifei Pu & Prof. Wei Deng
Thesis title: *The application of fractional order image enhancement in computational neuroscience.*

Employment

- 2024.05 – 2024.08 **Research Internship**, Neuromotor Interfaces: Computational Modeling, CTRL-Labs, Meta Reality Labs, New York City, USA.
Advised by Dr. Sean Bittner in the EMG Foundations team.

Honors and Awards

- 2023 **Runner-up Poster Award in the Neuro Next Initiative Launch Event**, Georgia Tech.
- 2020 **Outstanding Undergraduate Thesis**, SCU.
 Outstanding Graduates, SCU.
- 2019 **Finalist (<0.3%) + Frank Giordano Award** (the only 1 out of 14,000), Mathematical Contest in Modeling (MCM/ICM), Consortium for Mathematics and Its Applications.
- 2018 **“Tang Lixin” Lifetime Scholarship**, Tang Lixin Education Development Foundation.
 First Grade Scholarship, SCU.
- 2017 **National Scholarship**, Ministry of Education of the People’s Republic of China.
 First Grade College Mathematical Contest, SCU.

Research Publications

Peer Reviewed Conference Proceedings

- C7** “Markovian Gaussian Process: A Universal State-Space Representation for Stationary Temporal Gaussian Process”
Weihan Li, Yule Wang, **Chengrui Li**, and Anqi Wu
Advances in Neural Information Processing Systems 36 (NeurIPS), 2024 [under review]
- C6** “Exploring Behavior-Relevant and Disentangled Neural Dynamics with Generative Diffusion Models”
Yule Wang, **Chengrui Li**, Weihan Li, and Anqi Wu
Advances in Neural Information Processing Systems 36 (NeurIPS), 2024 [under review]
- C5** “A Differentiable Partially Observable Generalized Linear Model with Forward-Backward Message Passing”
Chengrui Li, Weihan Li, Yule Wang, and Anqi Wu
The Forty-first International Conference on Machine Learning (ICML), 2024
- C4** “Multi-Region Markovian Gaussian Process: An Efficient Method to Discover Directional Interactions Across Multiple Brain Regions”
Weihan Li, **Chengrui Li**, Yule Wang, and Anqi Wu
The Forty-first International Conference on Machine Learning (ICML), 2024
- C3** “Forward χ^2 Divergence Based Variational Importance Sampling”
Chengrui Li, Yule Wang, Weihan Li, and Anqi Wu
The Twelfth International Conference on Learning Representations (ICLR), 2024 [spotlight 5%]
- C2** “One-hot Generalized Linear Model for Switching Brain State Discovery”
Chengrui Li, Soon Ho Kim, Chris Rodgers, Hannah Choi, and Anqi Wu
The Twelfth International Conference on Learning Representations (ICLR), 2024
- C1** “Extraction and Recovery of Spatio-Temporal Structure in Latent Dynamics Alignment with Diffusion Model”
Yule Wang, Zijing Wu, **Chengrui Li**, and Anqi Wu
Advances in Neural Information Processing Systems 35 (NeurIPS), 2023 [Spotlight: 3%]

Journal Articles

- J2** “Cross Semantic Heterogeneous Modeling Network for Hyperspectral Image Classification”
Zhi Li, Ke Zheng, Jiaxin Li, **Chengrui Li**, and Lianru Gao
IEEE Transactions on Geoscience and Remote Sensing, 2024
- J1** “Inverse Kernel Decomposition”
Chengrui Li and Anqi Wu
Transactions on Machine Learning Research (TMLR), 2024

Abstracts

- A1** “Similarity of Memory Representations Modulate Saccade Curvatures”
Golnaz Forouzandehfar, **Chengrui Li**, Aaron T. Buss, and A. Caglar Tas
Journal of Vision, 2024

Preprints

- P1** “Continuous-time systems for solving 0-1 integer linear programming feasibility problems”

Theses

- T1 “The application of fractional order image enhancement in computational neuroscience”
Chengrui Li, Wei Deng, and Yifei Pu
Sichuan University Undergraduate Thesis, 2020 [**Outstanding Undergraduate Thesis**]

Invited Talks and Other Presentations

- 2024.02 📖 “One-hot Generalized Linear Model for Switching Brain State Discovery”
Chengrui Li, Soon Ho Kim, Chris Rodgers, Hannah Choi, and Anqi Wu
Poster presentation @ *The 20th anniversary of Computational and Systems Neuroscience (COSYNE 2024)*, Lisbon, Portugal
- 📖 “Extraction and recovery of spatio-temporal structure in neural alignment via diffusion models”
Yule Wang, Zijing Wu, **Chengrui Li**, and Anqi Wu
Poster presentation @ *The 20th anniversary of Computational and Systems Neuroscience (COSYNE 2024)* Lisbon, Portugal
- 2023.10 📖 “One-hot Generalized Linear Model for Switching Brain State Discovery”
Chengrui Li, Soon Ho Kim, Chris Rodgers, Hannah Choi, and Anqi Wu
Poster presentation @ *Neuro Next Initiative Launch Event*, Georgia Tech
- 2023.08 📖 “Latent Variable Models for Neural Spike Train Data”
Chengrui Li
Invited talk @ *Affiliated Mental Health Center, Zhejiang University School of Medicine (Hangzhou Seventh People’s Hospital)*, Hangzhou, China
- 2018.12 📖 “The Power and Beauty of Mathematics: A Prospect of Nature Inspiration & Computational Model from the Interdisciplinary View”
Chengrui Li and Wei Deng
Oral presentation @ *The 11th International Conference on Brain Informatics (BI 2018)*, Arlington, TX, USA

Miscellaneous Experience




Teaching Experiences

- Fall 2023 📖 **Teaching assistant.** CSE 6740 Computational Data Analysis @ Georgia Tech.
- Spring 2023 📖 **Teaching assistant.** CSE 6740 Computational Data Analysis @ Georgia Tech.
- Summer 2022 📖 **Graduate student research mentor.** SURE @ Georgia Tech.

Summer Schools

- 2020.08 📖 **CNeuro 2020: Theoretical and Computational Neuroscience Summer School**, Tsinghua University.
- 2018.08 📖 **The Chinese University of Hong Kong Summer Workshop**, Hong Kong SAR, China.
- 2018.07 📖 **Cognitive Neuroscience Summer School**, Peking University.

Other Research Experiences

- 2018.09 – 2019.10  **Eye tracking experiment: Response Selection.** Designed the eye-tracking program by Experiment Builder. Completed an eye-tracking data analysis program in MATLAB. Used the eye-tracking technique to investigate the influence of different stimulus-response conditions on the eye movement trajectories.
- 2019.07  **Web project development.** Developed a web project for an e-commerce platform under the SSM framework. Java + MySQL + JSP was used for full-stack agile development.
- 2018.02  **Clinical internship at the State Key Laboratory of Biotherapy, West China Hospital, SCU.** Conducted tests including the Mini-Mental State Examination (MMSE), the Montreal Cognitive Assessment (MoCA), the Hamilton Anxiety Rating Scale (HAM-A), and the Hamilton Depression Rating Scale (HAM-D).

Academic Services

Reviewer

Neural Information Processing Systems (NeurIPS) 2023, 2024
International Conference on Machine Learning (ICML) 2023, 2024
International Conference on Learning Representations (ICLR) 2023

Skills and Hobbies

Machine Learning/Math Programming: Python, MATLAB, Mathematica, R, Julia.

Development Programming: C/C++, Java, SQL.

Multi-Media: Cinema 4D, Adobe Premiere Pro, Adobe Illustrator, Adobe Audition, etc.

Others: Experiment Builder (eye-tracking), \LaTeX , Linux, etc.

Hobbies: Violin, Piano, Magic tricks, YOYO ball, Aerial photograph & film/audio post-processing, etc.