Huimiao Chen

RESEARCH INTERESTS

My research interests lie in computational neuroscience and artificial general intelligence. I am excited to build models for both individual neurons and neural populations, to explore complex neural mechanisms underlying cognitive processes, and to develop intelligent systems capable of mimicking, or even surpassing, the human brain.

Previously, my research was centered on the optimization of cyber-physical systems (e.g., energy systems). That experience equipped me with a strong foundation in understanding various algorithms, which in turn, enriched my insights into statistics and intelligence, and fueled my interest in neuroscience.

EDUCATION

Tsinghua University

- M.E. in Biomedical Engineering* (Advisor: Sen Song) Aug. 2023 – Jul. 2024

Johns Hopkins University

- M.S. in Biomedical Engineering* GPA: 4.0 (Advisor: Alan Yuille) Aug. 2022 – May 2023

  Courses 2022 Fall: Probabilistic Models of the Visual Cortex (A+), Theoretical and Computational Neuroscience (A), Principles of Complex Networked Systems (A+), Research Seminar in Computational Cognitive Neuroscience (A), Introduction to Data Science (A+), Research in Biomedical Engineering (P).

  Courses 2023 Spring: Models of the Neuron (A), Vision as Bayesian Inference (A), Data Science for Public Health I/II (A/A), Research Seminar in Computational Cognitive Neuroscience (A), Research Seminar in Computer Vision (A), Imaging Science Seminar (P), Research in Biomedical Engineering (P).

* *Dual degree BME program in JHU and Tsinghua.*

Additional Training:

Yale University

- Postgraduate Associate (Neuroscience, Advisor: Liang Liang) Jun. 2023 – Now

Shanghai Jiao Tong University

- Computational Neuroscience Winter School Jan. 2023

Tsinghua University

- Computational and Theoretical Neuroscience Summer School Aug. 2022

---------- Academic and Research Focus Shift (2018-2022) ----------

Tsinghua University

- M.E. in Electrical Engineering (Advisors: Zechun Hu and Yonghua Song) Aug. 2015 – Jul. 2018
- B.E. in Electrical Engineering (Advisor: Zechun Hu) Aug. 2011 – Jul. 2015

Additional Training:

University of Washington

- Visiting Student Researcher (Advisor: Yinhai Wang) Jul. 2017 – Sep. 2017

University of California, Berkeley

- Visiting Student Researcher (Advisor: Zuo-Jun Max Shen) Jan. 2017 – Mar. 2017

Stanford University

- Visiting Student Researcher (Advisors: Ram Rajagopal and Chin-Woo Tan) Jul. 2016 – Sep. 2016

APPOINTMENTS

RunFuture Tech. | Co-Founder and Head of Technology Mar. 2021 – Jul. 2022

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- Developed mobile charging technology for electric vehicles.

Sparkzone Tech. | Co-Founder and Research Mentor Dec. 2016 – Mar. 2021

- Provided research opportunities to high school students from around the world.

NoBarriers Tech. | Partner and Head of Algorithm Team Aug. 2018 – Mar. 2020

- Designed software for electromyography (EMG) data collection, labeling, and quality inspection.
- Developed algorithms for EMG signal recognition and deployed them on smartphones.
- Achieved real-time EMG-based human-machine interaction using custom-designed armbands, software and algorithms (slides, video 1, video 2, video 3).

Momenta Tech. | Autonomous Driving Algorithm Engineer Apr. 2018 – Sep. 2018

- Developed faster and more accurate deep learning models for detection of vehicles in images and videos captured in various challenging scenarios.

AWARDS

- Comprehensive Scholarship, Tsinghua University 2023
- Best Business Application Award, Sino-French Youth Scientific Innovation Exchanges 2019
- Gold Award in the National University Student Entrepreneurship Competition, China 2018
- Outstanding Graduate Award, Tsinghua University 2018
- Excellent Thesis Award, Tsinghua University 2018
- Comprehensive Scholarship for Academic Excellence, Tsinghua University 2013
- 1st Prize in the National Undergraduate Physics Contest, China 2012
- 1st Prize in the 27th Chinese Physics Olympiad 2010

RECENT PROJECTS

- "Evolving Connectivity for Spiking Neural Networks," with Y. Sun, G. Wang and S. Song from the Tsinghua Laboratory of Brain and Intelligence, in progress (slides, proposal).
- "Subcellular Modeling of Individual Neurons in the Visual Thalamus – from Dendritic Inputs to Somatic Response," with C. Liu and L. Liang from the Neuroscience Department at Yale University, in progress (pending release).
- "Optogenetics-Fiberphotometry Hardware and Software System," with C. Li, L. Cao, and L. Liang from the Neuroscience Department at Yale University (slides, github).
- "Boosting the Speed and Precision of Spiking Neural Network Parameter Estimation," with S. Wang from the Laboratory of Computational Neuroscience at EPFL, to be submitted (slides, draft).
- "Continual Learning for Abdominal Multi-Organ and Tumor Segmentation," with Y. Zhang, X. Li, A. Yuille, Z. Zhou, and Y. Liu from the Cognitive Science and Computer Science Departments at JHU, published by *MICCAI* 2023 (paper, arXiv, github).
- "ProGroTrack: Deep Learning-Assisted Tracking of Intracellular Protein Growth Dynamics," with K. S. Chan, C. Jin, Y. Tian, and D. Lin from the BME and MSE Departments at JHU, accepted by *CISP-BMEI* 2023 (arXiv).

PUBLICATIONS

Note: My publications below primarily focus on my previous research topics in the optimization of cyber-physical systems (e.g., energy systems and electric vehicle charging facilities). **I have shifted my research interest to computational neuroscience and artificial general intelligence.**

Google Scholar

Refereed Journal Papers

✉ huimiaochen@foxmail.com Last updated on Dec. 1, 2023

J1. **H. Chen**, Z. Hu, H. Luo, J. Qin, R. Rajagopal, and H. Zhang, "Design and Planning of a Multiple-Charger Multiple-Port Charging System for PEV Charging Station," *IEEE Transactions on Smart Grid*, vol. 10, no. 1, pp. 173-183, 2019.

J2. **H. Chen**, Z. Hu, H. Luo, and H. Zhang, "Coordinated Charging and Discharging Strategies for Plug-in Electric Bus Fast Charging Station with Energy Storage System," *IET Generation, Transmission & Distribution*, vol. 12, no. 9, pp. 2019-2028, 2018.

J3. H. Luo, Z. Hu, H. Zhang, and **H. Chen**, "Coordinated Active Power Control Strategy for Deloaded Wind Turbines to Improve Regulation Performance in AGC," *IEEE Transactions on Power Systems*, vol. 34, no. 1, pp. 98-108, 2019.

J4. W. Wu, Z. Hu, Y. Song, G. Sansavini, **H. Chen**, and X. Chen, "Transmission Network Expansion Planning Based on Chronological Evaluation Considering Wind Power Uncertainties," *IEEE Transactions on Power Systems*, vol. 33, no. 5, pp. 4787-4796, 2018.

J5. Y. Liang, Z. Cui, Y. Tian, **H. Chen**, and Y. Wang, "A Deep Generative Adversarial Architecture for Network-Wide Spatial-Temporal Traffic State Estimation," *Transportation Research Record*, vol. 2672, no. 45, pp. 87-105, 2018.

J6. Y. Liang, Z. Wu, Y. Tian, and **H. Chen**, "Road Side Units Deployment for Information Propagation Promotion on Two Parallel Roadways with a General Headway Distribution," *IET Intelligent Transport Systems*, vol. 12, no. 10, pp. 1442-1454, 2018.

J7. S. Wang, **H. Chen**, and D. Wu, "Regulating Platform Competition in Two-Sided Markets under the O2O Era," *International Journal of Production Economics*, vol. 215, pp. 131-143, 2019.

J8. X. Duan, **H. Chen**, Y. Song, Z. Hu, and Y. Song, "Planning of Plug-in Electric Vehicle Fast-Charging Stations Considering Charging Queuing Impacts," *IET Smart Grid*, vol. 3, no. 6, pp. 786-793, 2020.

J9. B. Li, C. Liu, **H. Chen**, Y. Hu, Z. Xu, L. Xia, and Z. Hu, "Coordinated Charging of Plug-in Electric Buses in Fast Charging Stations Based on Mixed-integer Linear Programming," *Power System Technology*, vol. 40, no. 9, pp. 2623-2629, 2016. (In Chinese)

J10. J. Li, H. Zhang, X. Xia, K. Ning, M. Peng, **H. Chen**, and Z. Hu, "Optimal Planning of Electric Vehicle Fast Charging Facilities in Urban Areas," *Electric Power Construction*, vol. 38, no. 1, pp. 17-22, Jan. 2017. (In Chinese)

J11. X. Duan, Z. Hu, Y. Song, and **H. Chen**, "Two-Stage Optimization of Distributed Network Operation Strategy with Electric Vehicle and Distributed Energy," *Journal of Global Energy Interconnection*, vol. 1, no. 1, pp. 87-95, 2018. (In Chinese)

Refereed Conference Papers

C1. **H. Chen**, Y. Yu, Z. Hu, H. Luo, C.-W. Tan, and R. Rajagopal, "Energy Storage Sharing Strategy in Distribution Networks Using Bi-Level Optimization Approach," *IEEE Power and Energy Society General Meeting*, 2017.

C2. **H. Chen**, Z. Guo, Y. Xin, Y. Zhao, and Y. Jia, "Coordination of PEV Charging across Multiple Stations in Distribution Networks Using Aggregate PEV Charging Load Model," *IEEE International Smart Cities Conference (ISC2)*, 2017.

C3. **H. Chen**, Y. Xin, Z. Guo, Y. Zhao, and Y. Jia, "Vehicle Travel Data Based Evaluation of Achievable PEV Penetration Rate from Distribution Network Capacity Perspective," *IEEE International Smart Cities Conference (ISC2)*, 2017.

C4. **H. Chen**, Z. Hu, Y. Jia, and Z.-J. M. Shen, "Risk-Averse Joint Capacity Evaluation of PV Generation and Electric Vehicle Charging Stations in Distribution Networks," *IEEE Power and Energy Society International Conference on Innovative Smart Grid Technologies (ISGT), Europe*, 2017. (Invited

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panel paper)

C5. **H. Chen**, Y. Jia, Z. Hu, G. Wu, and Z.-J. M. Shen, "Data-Driven Planning of Plug-in Hybrid Electric Taxi Charging Stations in Urban Environments: A Case in the Central Area of Beijing," *IEEE Power and Energy Society International Conference on Innovative Smart Grid Technologies (ISGT), Europe*, 2017.

C6. **H. Chen**, Z. Hu, Z. Xu, J. Li, H. Zhang, X. Xia, K. Ning, and M. Peng, "Coordinated Charging Strategies for Electric Bus Fast Charging Stations," *IEEE Power and Energy Society Asia-Pacific Power and Energy Engineering Conference (APPEEC)*, 2016.

C7. Y. Jia, **H. Chen**, J. Li, F. He, M. Li, Z. Hu, and Z.-J. M. Shen, "Planning for Electric Taxi Charging System from the Perspective of Transport Energy Supply Chain: A Data-Driven Approach in Beijing," *IEEE International Transportation Electrification Conference and Expo (ITEC), Asia-Pacific*, 2017.

C8. Y. Jia, Y. Zhao, Z. Guo, Y. Xin, and **H. Chen**, "Optimizing Electric Taxi Charging System: A Data-Driven Approach from Transport Energy Supply Chain Perspective," *IEEE Electrical Power and Energy Conference (EPEC)*, 2017.

C9. Z. Zhong, X. Zhang, D. Zhang, **H. Chen**, and C. Gao, "Simulation Based Evaluation and Optimization for PEV Charging Stations Deployment in Transportation Networks," *IEEE International Conference on Power and Energy Systems (ICPES),* 2018.

C10. Y. Song, N. Sun, and **H. Chen**, "Demand Adaptive Multi-Objective Electric Taxi Fleet Dispatching with Carbon Emission Analysis," *IEEE Power and Energy Society Asia-Pacific Power and Energy Engineering Conference (APPEEC)*, 2019.

C11. X. Luo, X. Qing, and **H. Chen**, "Spatiotemporal Traffic Flow Forecasting for PHETs Based on Data Mining and Deep Learning," *IEEE International Symposium on Signal Processing and Information Technology (ISSPIT)*, 2019.

C12. X. Qing, X. Luo, and **H. Chen**, "A PHET Dispatching Method Considering Customer Demand and Charging Resources," *International Conference on Green Energy and Applications (ICGEA)*, 2020.

C13. Z. Zeng, and **H. Chen**, "Optimization of Fund Periodic Investment Strategy Considering Frequency, Time Scale and Dynamic Payments," *IEEE Symposium Series on Computational Intelligence (SSCI)*, 2020.

C14. T. Ouyang, J. Cai, Y. Gao, X. He, **H. Chen**, and K. Hang, "A Method of EV Detour-to-Recharge Behavior Modeling and Charging Station Deployment," *IEEE Symposium Series on Computational Intelligence (SSCI)*, 2020.

PATENTS & SOFTWARE

P1. Y. Jia, **H. Chen**, Z. Shen, F. He, and M. Li, "A Management Method and Electronic Devices for Electric Vehicle Mobile Charging," *Chinese Invention Patent*. Patent Number: 202110658450X. Publication Number: CN113103904B. Date: Sep. 2021.

S1. Z. Hu, **H. Chen**, and G. Wu, Tsinghua University, "Electric Vehicle Charging Infrastructure Planning Software V1.0," *Computer Software Copyright*. Registration Number: 2017R11L105784. Date: Mar. 2017.

ACADEMIC SERVICES

- **Referee for Journals**:
  IEEE Transactions on Sustainable Energy, *IEEE Transactions on Power Systems*, *IEEE Transactions on Smart Grid*, *IEEE Transactions on Transportation Electrification*, *IEEE Transactions on Industrial Informatics*, *IEEE Transactions on Energy Conversion, IET Generation, Transmission &*

Distribution, *IET Electrical Systems in Transportation*, *IEEE Access*.

- **Referee for Conferences**:
  IEEE Power and Energy Society General Meeting, *IEEE Power and Energy Society Transmission and Distribution Conference & Exposition*, *IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)*, *IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC)*.
- **Conference Session Chair**:
  Smart Energy Systems Session, *IEEE International Smart Cities Conference (ISC2)*, 2017.

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