Joe Choo-Choy

SWE, ML, science

I'm an aspiring software engineer and researcher, attentive to detail and strategically-minded. I'm broadly-interested and open-minded in the short-term. I have previous experience in developing data analysis software in a research environment, as well as ever-expanding full-stack skills gained since my undergraduate degree. **I'm excited for an opportunity to prove myself, to develop my skills, and to learn about an organisation deeply.**

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Skills

Familiar (days, weeks)
MySQL, C++, ...
Express, Jest, React Testing Library, Tensorflow, Axios, ...

Comfortable (months)
Typescript, C, R, Java, ...
React, React Router, NextJS, Node, Pytorch, SKLearn, Pandas, ...

Fluent (years)
Python, Javascript, MATLAB, Bash, HTML, CSS, ...
Git, Sass, Numpy, Matplotlib, ...

Experience

- Research Assistant, Naumann Lab, Duke Neurobiology (Sep 2021 – Sep 2022)
  - Lab focuses on: whole-brain zebrafish calcium imaging, online data analysis, development and individual differences, circuits neuroscience, ...
  - I worked on a project modelling neurons in the zebrafish pretectum (visual cortex-analogue) using (calcium imaging) data-constrained recurrent neural networks (RNNs). I wrote MATLAB and Python code to train ensembles of RNNs with various custom regularisation techniques, as well as to visualise and analyse weight, activity, and error dynamics.
- Teaching Assistant, Deep Learning, Neuromatch Academy (Aug 2021, Aug 2022)
  - 3+ week intensive deep learning summer school, with peer programming in PyTorch and varied topics, e.g. optimisation, regularisation, convolutional neural networks, recurrent neural networks, attention/transformers, unsupervised learning, generative models, reinforcement learning, ...
  - I led tutorial groups of ~10 undergraduate and graduate students through programming tutorials for ~6 hours per day, 5 days a week, explaining complex topics clearly.
- Research Assistant, Heaton Lab, Duke Molecular Genetics & Microbiology (Jun 2019 - Jun 2020)
  - Lab focuses on: virology, immunology, vaccinology.
  - I worked on a project attempting to discover immunological phenotypes (in mice) associated with unannotated-ORF products (of putative (li)ncRNAs) in the human translatome. My work was mostly cleaning, preprocessing, analysis and visualisation of Ribo/RNA-Seq data from ribosome footprinting experiments, using many tools including Cufflinks, DE-Seq, SAMTools, and Bowtie.
  - I also learnt basic molecular biology and mammalian cell culture techniques.

Education

- Machine Learning Safety Scholar, Center for AI Safety (Jun - Aug 2023)
  - An 8-week course on machine learning safety, with readings and programming assignments across various topics, including adversarial robustness, monitoring and interpretability, alignment, systemic safety engineering, and existential risk.
- Software Engineering Bootcamp, BrainStation (Mar - Jun 2023)
- Computational Biology B.S., Duke University (2021)
  - Primary areas of study: computer science, neuroscience, bioengineering.
  - Relevant coursework (*graduate-level*): Data Structures & Algorithms, Probability & Statistical Inference, Mathematical Probability, Intro Data Science, Discrete Math, Neurobiological Data Analysis, Machine Learning, Statistical Learning & Inference, *Computational Sequence Biology*, *Computational Structural Biology*, *Theoretical Neuroscience*, *Computational Neuroengineering*, *Formal Epistemology*.
- Computational Neuroscience Course, Neuromatch Academy (Jul 2020)
  - 3+ week intensive computational neuroscience summer school, with peer programming in Python and varied topics, e.g. neuronal dynamics / Hodgkin-Huxley models, drift-diffusion models, generalised linear models, optimal control / reinforcement learning, elementary deep learning, causal inference, ...
  - Project on decoding and encoding models of behaviour in mouse sensory areas using open dataset from Stringer et al. (*Nature*, 2019).

Publications

- Jacobs, **Choo-Choy**, Loring, Dunn, & Naumann (2022) Predicting connectivity of motion-processing neurons with recurrent neural networks. *Computational and Systems Neuroscience (COSYNE)*.

Miscellaneous Formative Learning

- **Computational Psychiatry Course, ETH Zurich (Sep 2020)**
  - 7-day full-time course on various topics in computational psychiatry. I attended workshops on variational Bayes and active inference.
- **MOOCs**
  - Machine Learning, Stanford, Coursera
  - Deep Learning Specialization, deeplearning.ai, Coursera
  - Practical Deep Learning for Coders, fast.ai
  - AGI Safety Fundamentals (Alignment track), BlueDot Impact
  - Computational Neuroscience, U Washington, Coursera
  - Cellular Mechanisms of Brain Function, EPFL, EdX
  - The Multi-Scale Brain, EPFL, EdX
  - Simulation Neuroscience, EPFL, EdX
  - Bioinformatics Specialization, UC San Diego, Coursera
  - The Missing Semester of Your CS Education, MIT

Volunteering

- **Effective Altruism Duke**
  - Board Member (2017-2018)
  - Co-President (2018-2021)
- **Duke Philosophy Society**
  - Co-President (2017-2018, 2020)
  - President (2019)
- **One for the World Duke**
  - Researcher (Jul - Aug 2020)