Katherine Baker

Scientific Data and Software Engineer

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SKILLS & TOOLS

Languages: Python, JavaScript, HTML, CSS, GraphQL, SQL
VCS, Code Review, CI/CD: Git; GitHub w/ Actions; AWS CodeBuild and CloudFormation
Tools: AWS infrastructure, including ECS, EC2, VPC, RDS, and S3; Docker; SLURM; Jira
Operating Systems: Linux, MacOS, Windows

EXPERIENCE

Allen Institute for Brain Science, Seattle WA

Data Engineer / Analyst — Data Integration 2021 - Present

- Practice test-driven development in a team-oriented software engineering environment
- Build and maintain ETL pipelines to deliver scientific data that conforms to GraphQL API schemas
- Manage and publish petabyte-scale datasets using parallel computing on cloud infrastructure
- Orchestrate containers on HPC clusters using SLURM to achieve 10x speedup in data delivery
- Develop full stack web application using Python, Javascript, and PostgreSQL on AWS
- Set up greenfield CI/CD pipelines for production software using Docker on GitHub Actions
- Mentor interns and new-hires on software development best practices in an Agile framework

Research Associate — In Vitro Single Cell Electrophysiology 2018 - 2021

- Execute triple modality patch-seq experiments on mouse and human neurons, obtaining high quality electrophysiological, transcriptomic, and morphological data
- Write data visualization and analysis software in Python to generate figures for publications
- Identify data quality issues and propose engineering solutions to increase experiment fidelity
- Write and edit standard operating procedures for experimental protocols

University of Washington, Seattle WA

Laboratory Technician / Research Assistant — Nanopore Lab 2015 - 2018

- Perform nanopore DNA sequencing and single molecule enzyme kinetics experiments
- Prototype and manufacture custom nanopore experiment devices using machine shop
- Develop and execute cleaning protocols to decontaminate experiments

EDUCATION

University of Washington, Seattle WA

Double Major: BS Biophysics, BS Biochemistry; Minor: Applied Mathematics 2017

Bellevue College, Bellevue WA

Major: AS Chemical and Biological Engineering; Certificate: Medical Imaging Aide 2014

PUBLICATIONS

Lee, B. R., Dalley, R., Miller, J. A., Chartrand, T., Close, J., Mann, R., Mukora, A., Ng, L., Alfiler, L., **Baker, K.**, … Ting, J. T. (2023). **Signature morphoelectric properties of diverse GABAergic interneurons in the human neocortex**. *Science*, 382(6667). https://doi.org/10.1126/science.adf6484

Berg, J., Sorensen, S. A., Ting, J. T., Miller, J. A., Chartrand, T., Buchin, A., Bakken, T. E., Budzillo, A., Dee, N., Ding, S.-L., Gouwens, N. W., Hodge, R. D., Kalmbach, B., Lee, C., Lee, B. R., Alfiler, L., **Baker, K.**, … Lein, E. S. (2021). **Human neocortical expansion involves glutamatergic neuron diversification**. *Nature*, 598(7879), 151–158. https://doi.org/10.1038/s41586-021-03813-8

Lee, B. R., Budzillo, A., Hadley, K., Miller, J. A., Jarsky, T., **Baker, K.**, … Berg, J. (2021). **Scaled, high fidelity electrophysiological, morphological, and transcriptomic cell characterization**. *ELife*, 10. https://doi.org/10.7554/elife.65482

Gouwens, N. W., Sorensen, S. A., Baftizadeh, F., Budzillo, A., Lee, B. R., Jarsky, T., Alfiler, L., **Baker, K.**, … Zeng, H. (2020). **Integrated Morphoelectric and transcriptomic classification of cortical GABAergic cells**. *Cell*, 183(4). https://doi.org/10.1016/j.cell.2020.09.057

Berg, J., Lee, B., Mann, R., Ng, L., Budzillo, A., Kalmbach, B., **Baker, K.**, Zeng, H., & Murphy, G. (2020). **Differences in potassium channel composition underlie distinct action potential kinetics in transcriptomically identified neocortical mouse cell types**. *Biophysical Journal*, 118(3). https://doi.org/10.1016/j.bpj.2019.11.2527

Noakes, M. T., Brinkerhoff, H., Laszlo, A. H., Derrington, I. M., Langford, K. W., Mount, J. W., Bowman, J. L., **Baker, K. S.**, Doering, K. M., Tickman, B. I., & Gundlach, J. H. (2019). **Increasing the accuracy of nanopore DNA sequencing using a time-varying cross membrane voltage**. *Nature Biotechnology*, 37(6), 651–656. https://doi.org/10.1038/s41587-019-0096-0

Craig, J. M., Laszlo, A. H., Nova, I. C., Brinkerhoff, H., Noakes, M. T., **Baker, K. S.**, Bowman, J. L., Higinbotham, H. R., Mount, J. W., & Gundlach, J. H. (2019). **Determining the effects of DNA sequence on HEL308 helicase translocation along single-stranded DNA using Nanopore tweezers**. *Nucleic Acids Research*, 47(5), 2506–2513. https://doi.org/10.1093/nar/gkz004

Laszlo, A. H., Craig, J. M., Brinkerhoff, H., Nova, I. C., Noakes, M. T., Mount, J. W., Bowman, J. O., Higinbotham, H., **Baker, K.**, Huang, J., Tippana, R., Gavrilov, M., Ha, T., & Gundlach, J. H. (2018). **Analysis of force dependence of translocation and unwinding of helicase PCRA using SPRNT**. *Biophysical Journal*, 114(3). https://doi.org/10.1016/j.bpj.2017.11.541