

# KYLE A. JOHNSEN

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## PROFESSIONAL SUMMARY

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Computational neuroscientist/-engineer specializing in the development of closed-loop systems for neural interface applications. Emphasis on optimal control and specialized dynamical system modeling of neural data. Committed to advancing the utility of high-dimensional neural recording and perturbation to fuel next-generation neurotechnologies.

## EDUCATION

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- 2019 - Present | **Georgia Institute of Technology & Emory University**, Atlanta, GA  
*PhD in Biomedical Engineering, Computational Neuroengineering minor*
- 2015 - 2019 | **Brigham Young University**, Provo, UT  
*BS in Bioinformatics, Computer Science minor*

## RESEARCH / RELEVANT WORK EXPERIENCE

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- 2019 - Present | **Georgia Tech**, Atlanta, GA  
*PhD Student*  
Developing and studying methods for closed-loop control of neural activity. Leveraging them to address previously unanswerable questions in collaboration with neuroscientists.
- 2019 | **FamilySearch, LLC**, Lehi, UT  
*Software Engineering Intern*  
Developed and maintained code for delivering personalized family history experiences to millions of patrons. Leveraged modern software and data science tools in an Agile team environment.
- 2016 - 2019 | **Brigham Young University**, Provo, UT  
*Undergraduate Research Assistant*  
Led a team developing a mutation-mapping R package for release on the open-source Bioconductor platform.
- 2018 | **Center for Genomic Interpretation**, Sandy, UT  
*Software Development Intern*  
Collaborated in full-stack development of a prototype clinical genetics data-mining web application with an interdisciplinary team. Spearheaded database design and implementation.
- 2018 | **Brigham Young University**, Provo, UT  
*Undergraduate Research Assistant*  
Performed computational analyses to assess the biological validity of experimental whole-genome phylogenetics software.
- 2017 | **Auburn University Computational Biology REU**, Auburn, AL  
*Undergraduate Research Assistant*  
Analyzed and compared pathogenic fungus genomes. Trained in a variety of tools and processes, including genome assembly and annotation, metagenomics, and physical computing.
- 2016 | **University of Nebraska-Lincoln Bioenergy REU**, Lincoln, NE  
*Undergraduate Research Assistant*  
Conducted high-throughput digital phenotyping and quantitative maize genetics analysis.

**PAPERS**

1. **Johnsen, K. A.**, Cruzado, N. A., Menard, Z. C., Willats, A. A., Charles, A. S., Markowitz, J. E., & Rozell, C. J. (2026). Bridging Model and Experiment in Systems Neuroscience with Cleo: The Closed-Loop, Electrophysiology, and Optophysiology Simulation Testbed. *Journal of Neuroscience*, 46(1). <https://doi.org/10.1523/JNEUROSCI.2239-24.2025>
2. Gazi, A. H., An, S., Sanchez-Perez, J. A., Chan, M., Nikbakht, M., Lin, D. J., Natarajan, S., **Johnsen, K. A.**, Bremner, J. D., & Hahn, J.-O. (2025). Modeling Latent Dynamics of the Autonomic Nervous System in Response to Trauma Recall and Non-Invasive Vagus Nerve Stimulation. *IEEE Transactions on Biomedical Engineering*. <https://ieeexplore.ieee.org/abstract/document/11037265/>
3. Chen, Y., Mudrik, N., **Johnsen, K. A.**, Alagapan, S., Charles, A. S., & Rozell, C. J. (2024). Probabilistic Decomposed Linear Dynamical Systems for Robust Discovery of Latent Neural Dynamics. *Advances in Neural Information Processing Systems*, 37, 104443–104470. <https://doi.org/10.52202/079017-3318>
4. Fallah, K., Helbling, A., **Johnsen, K. A.**, & Rozell, C. J. (2023). Manifold Contrastive Learning with Variational Lie Group Operators. *Transactions on Machine Learning Research*. <https://openreview.net/forum?id=IVE1VeGQwg>

**RESEARCH MENTORSHIP****MS Students (5)**

Sangeon Jeon

2025 – 2024

Yijun Lai

2024 – 2025

Stefano Poma

2023 – Present

Anushka Chaudhari

2023 – 2024

Tobias Niebur

2021

**BS Students (60)**

Joshua Rauf

2025 – Present

Zachary  
Beddingfield

2025 – Present

Lasya Malladi

2025 – Present

Shreyas Gadagi

2025

Aaryan Chatterjee

2025 – 2026

Austin Chen

2025

Sophia Pych

2025

Brady Hong

2025 – Present

Shaikha AlKuwari

2025

Jooyoung (John)  
Kim

2025

Bishop Glover

2024 – 2025

Carlton Cort

2024 – Present

Saketh Koon

2024 – Present

Haoyang Li

2024 – 2025

Rand Ismael

2024 – Present

Muhammad Yousuf

2024 – 2025

Pallavi Bathula

2024 – 2025

Kevin Wang

2024 – 2025

Sameer Khan

2024 – Present

Emily Kwan

2024 – 2025

Aditya Chickmath

2024 – 2025

Nitish Shirodkar

2024 – 2025

Jacob Hayes

2024 – 2025

Ishaan Madhivanan

2024 – 2025

Raaghav Agarwal

2024

Teja Pulagam

2024

Lavan

Vivekanandasarma

2024 – Present

Edan Eyal

2024 – 2025

Aiden Chiang 2024 – 2025	Mert Duezguen 2024	Glenn Zhang 2024 – 2025	Xianhe Qin 2024
Isaac Kim 2024	Veena Krishnan 2024	Chia-Chien (Aaron) Hung 2024 – Present	Felipe Oliveira 2024
Siddharth Navale 2024	Ankith Thalanki 2024	Aarav Gupta 2024	Hannah Kim 2024
Ryan Ouyang 2024 – 2025	Aidan Sawyer 2024	Arnav Tripathi 2023 – 2024	Jiwon Ahn 2023 – 2025
Aarav Shah 2023 – 2024	Sudipta Rath 2023 – 2024	Dev Patel 2023 – 2024	Miki Nguyen 2023 – 2024
Vipisha Pazhanivel 2023 – 2024	Raahi Jogani 2023 – Present	Maham Mehmood 2023	Mahta Tavafoghi 2023
Minkun Lei 2023 – 2024	Zachary Menard 2022 – 2023	Jonathan Maldonado 2022 – 2023	Jake Miller 2022 – 2024
Chuyu (Alissa) Wang 2022 – 2023	Olivia Klemmer 2022 – 2023	Brendon Hogge 2018 – 2019	Adam Bayer 2018

## POSTER & ORAL PRESENTATIONS

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1. **Johnsen, K. A.** (2026). *How Many Channels Do We Need to Control Latent Neural Dynamics in Real Time? Insights from a High-Throughput Survey of End-to-End, in Silico Experiments* [Oral]. <https://closed-loop-2026.github.io/>
2. **Johnsen, K. A.** (2025). *A Foundation for Causal Characterization of Latent Neural Dynamics with Limited Observational and Interventional Capacity* [Poster]. <https://interfaceneuro.org/>
3. **Johnsen, K. A.** (2024). *A Foundation for Causal Characterization of Latent Neural Dynamics with Limited Observational and Interventional Capacity* [Poster]. <https://meetings.cshl.edu/meetings.aspx?meet=NAISYS>
4. **Johnsen, K. A.** (2024). *Bridging Model and Experiment in Systems Neuroscience with Cleo: The Closed-Loop, Electrophysiology, and Optophysiology Simulation Testbed* [Poster].
5. **Johnsen, K.** (2023). *Enhancing the Cleo Experiment Simulation Testbed to Support All-Optical Control, Multi-Channel Optogenetics, and Easier Integration into Data Analysis Pipelines* [Poster]. <https://www.abstractsonline.com/pp8/#!/10892/presentation/39429>
6. **Johnsen, K.** (2023). *Enhancing the Cleo Experiment Simulation Testbed to Support All-Optical Control, Multi-Channel Optogenetics, and Easier Integration into Data Analysis Pipelines* [Poster]. <https://snufa.net/2023/abstracts/kyle-johnsen-enhancing.html>
7. **Johnsen, K. A.** (2022). *CLOCTools: A Library of Tools for Closed-Loop Neuroscience* [Poster]. <https://www.abstractsonline.com/pp8/#!/10619/presentation/66570>
8. **Johnsen, K. A.** (2022). *Cleo: A Simulation Testbed for Bridging Model and Experiment in Mesoscale Neuroscience* [Poster]. <http://snufa.net/2022/abstracts/kyle-johnsen-cleo.html>
9. **Johnsen, K. A.** (2022). *Cleo: A Simulation Testbed for Bridging Model and Experiment in Mesoscale Neuroscience* [Poster]. <https://crcns2022atl.gatech.edu/posters/>
10. **Johnsen, K. A.** (2022). *Cleo: A Simulation Testbed for Bridging Model and Experiment in Mesoscale Neuroscience* [Flash talk]. [https://conference.neuromatch.io/abstract?edition=2022-5&submission\\_id=rec30NkgvJCeHHhd1](https://conference.neuromatch.io/abstract?edition=2022-5&submission_id=rec30NkgvJCeHHhd1)

11. **Johnsen, K. A.**, & Borsa, A. (2022). *Closed-Loop Computational Neuroscience for Causally Dissecting Circuits III* [Poster]. [https://www.infinityconferences.com/wp-content/uploads/2022/06/8thAnnual\\_BRAIN\\_Initiative\\_Meeting\\_Abstract\\_Book.pdf](https://www.infinityconferences.com/wp-content/uploads/2022/06/8thAnnual_BRAIN_Initiative_Meeting_Abstract_Book.pdf)
12. **Johnsen, K. A.**, & Borsa, A. (2022). *Closed-Loop Computational Neuroscience for Causally Dissecting Circuits* [Poster].
13. **Johnsen, K. A.** (2021). *A Simulation Framework and Testbed for Studying and Prototyping Closed-Loop Neural Control Methods* [Flash talk]. [https://conference.neuromatch.io/abstract?edition=2021-4&submission\\_id=recayGg32klOADgpl](https://conference.neuromatch.io/abstract?edition=2021-4&submission_id=recayGg32klOADgpl)
14. Brown, B., **Johnsen, K. A.**, Olson, K., & Wadsworth, C. (2018). *Validation of a New Program That Performs Multiple Genome Comparisons (Kleuren)* [Oral]. <https://src.byu.edu/abstract/detail/4156>
15. **Johnsen, K. A.** (2017). *MMAPPR 2.0: Improved Genetic Mapping for Forward Genetic Screening* [Poster].
16. **Johnsen, K. A.** (2017). *Comparative Genomics Analysis of a Sequence Type 33 Clinical Isolate of *\mkbibemph{Fusarium}\mkbibemph{Oxysporum}** [Poster].
17. **Johnsen, K. A.**, & Schnable, J. C. (2016). *Maize Association Studies with High-throughput Image-based Phenotype Collection* [Poster].

## TEACHING EXPERIENCE

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2020 - 2021	<p><b>Teaching Assistant</b>  <i>Biomedical Engineering 3110: Quantitative Engineering Physiology Laboratory I, Georgia Tech</i>          Helping students develop research skills such as literature review, hypothesis generation, experimental design, and analysis by mentoring group projects, giving feedback during the process, and grading final submissions. Projects involve using self-constructed EKG and EMG circuits to answer original physiology research questions.</p>
2019	<p><b>Teaching Assistant</b>  <i>Computer Science 240: Software Design &amp; Testing, BYU</i>          Taught students software design principles at a conceptual level and helped them apply them in a full-stack Android app and web server game project.</p>
2018	<p><b>Teaching Assistant</b>  <i>Computer Science 418: Bioinformatics, BYU</i>          Assisted students in algorithmic coding projects as well as integrated scientific publication-style bioinformatics assignments. Graded coursework.</p>
2017	<p><b>Teaching Assistant</b>  <i>Computer Science 236: Discrete Structures, BYU</i>          Taught principles of discrete mathematics and assisted students in their implementation in coding projects. Graded assignments and exams.</p>

## ACADEMIC AND PROFESSIONAL SERVICE

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2025 - Present	<p><b>Advisory board member</b>  <i>Brian Simulator</i>          Chosen as a prominent user/contributor of Brian; help shape the future of the simulator through feedback and discussion of development, grants, etc.</p>
2023 - 2024	<p><b>Mentor pen pal</b>  <i>Letters to a Pre-Scientist</i></p>

- 2022 | **Web developer**  
*CRCNS PI Meeting*  
Web developer for the October 2022 CRCNS PI Meeting.
- 2022 | **Creative consultant**  
*"Step the Brain Along a Path" lobby installation, Ferst Center for the Arts at Georgia Tech*  
Part of a team creating audiovisual materials and interactive experiences from neuroscience data.
- 2020 - 2021 | **Annual events committee**  
*Computational Neuroengineering Training Program*  
Helped plan annual retreats, social events, and onboarding of new students.
- 2021 | **Organizing committee**  
*GT/Emory Neural Engineering Center Motion Analysis Tutorial*  
March 20, 2021.
- 2017 | **Organizer**  
*Multicultural Celebration, Auburn University*  
Independently planned event held on Auburn University campus with 20-30 attendees.
- 2016 - 2017 | **Executive Director**  
*Service Dates student service organization, Brigham Young University*  
Led a team in designing and implementing community service projects for student volunteers.

## HONORS & AWARDS

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- 2022 | **Trainee Highlight Award Honorable Mention, NIH BRAIN Initiative PI Meeting**  
Honorable mention for trainee highlight recognition.
- 2019 - Present | **GT/Emory Computational Neural Engineering Training Program Scholar, NIH T32 Institutional Training Grant**  
Scholar supported by the training program.
- 2015 - 2019 | **Heritage Scholarship, Brigham Young University**  
Four years full tuition.
- 2017 | **Auburn University Computational Biology REU Admission, Auburn University Computational Biology REU**
- 2017 | **Dean's List, College of Life Sciences, Brigham Young University**
- 2015 - 2017 | **Utah Regents' Scholarship, State-funded scholarship based on academic achievement**  
State-funded scholarship based on academic achievement.
- 2016 | **University of Nebraska-Lincoln Bioenergy REU Admission, University of Nebraska-Lincoln Bioenergy REU**
- 2015 | **National Merit Scholarship, National Merit Scholarship Program**

## COMPUTATIONAL SKILLS

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- Languages: Advanced Python; intermediate C++, Java, and R; basic Julia, MATLAB, and Scala.
- Technologies: Cluster computing, cloud computing, Spark, SQL, Git.

- Practices: Collaborative Git-based development, continuous integration, automated testing and documentation, Agile development.
- Frameworks: PyTorch, CMake, Bioconductor, Spring Boot, Android, Flask.

## **LANGUAGES**

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- English - Native speaker
- Spanish - Fluent
- German - Professional working proficiency
- Mandarin Chinese - Intermediate proficiency