Sonja Johnson-Yu

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EDUCATION

Harvard University
PhD Computer Science Candidate ('27)

Stanford University
M.S. Computer Science ('21)
GPA – 3.91

Stanford University
B.S. Computer Science, B.A. Music w/ Honors ('21)
GPA – 3.80

EXPERIENCE

Harvard University
Graduate Research Assistant (Rajan Lab) | November 2023 – present
Developing a framework for producing and analyzing emergent social behaviors in artificial teleost collectives via multi-agent reinforcement learning. Creating a toolkit for extracting and contextualizing common motifs in pulsatile social signals, using behavioral data collected from weakly electric fish.

Graduate Research Assistant (Tambe Lab) | September 2021 – October 2023
Conducted research in multi-agent systems, using multi-agent reinforcement learning, machine learning, game theory, and optimization. Scaled a predictive-patrolling application for use in hundreds of conservation areas worldwide.

Commons (formerly Joro Tech)
Data Scientist | June 2020 – January 2022
Redesigned core carbon estimation algorithm in Python, Node, & PostreSQL to integrate US EPA EEIO data and iteratively improved algorithm with a blend of bottom-up and top-down carbon estimates.

Stanford University
Stanford ML Group (Ng Lab) Research Assistant | September 2019 – August 2021
Developed a PyTorch deep learning model to classify direct drivers of deforestation in Indonesia using satellite imagery. Created a pipeline to deploy model over all forest loss events in Indonesia 2012-2018.

Stanford University
Section Leading (CS198) Coordinator | March 2018 – June 2019
Hired, trained, and managed over 100 CS106 section leaders. Restructured CS198 program to serve over 1000 students. Managed budget of over 500,000 dollars. Hosted community-building events.

Amazon Robotics
Software Development Engineering Intern | June 2018 – September 2018
Designed and implemented a closed-loop system for computer-vision-based inference in Python, Keras, and C++. Established data collection pipeline and leveraged data to train a convolutional neural network.

DataArts
Technology Intern | July – August 2017
Developed an interactive map of cultural organizations for use by grantmaking institutions using the Google Maps API, jQuery, and AngularJS, and integrated it into DataArts' web app.

PUBLICATIONS

S. H. Singh*, **S. Johnson-Yu***, Z. Lu, A. Walsman, F. Pedraja, D. Turcu, P. Sharma, N. Saphra, N. B. Sawtell, and K. Rajan. "Understanding Electro-communication and Electro-sensing in Weakly Electric Fish using Multi-Agent Deep Reinforcement Learning." In *NeurIPS 2025 AI for Non-Human Animal Communication Workshop.*

S. H. Singh, **S. Johnson-Yu**, Z. Lu, A. Walsman, F. Pedraja, D. Turcu, P. Sharma, N. Saphra, N. B. Sawtell, and K. Rajan. "Proposal: Deciphering Electrocommunication with MARL and Unsupervised Machine Translation." In *NeurIPS 2025 AI for Non-Human Animal Communication Workshop.*

K. Zheng, **S. Johnson-Yu**, S. H. Singh, D. Turcu, F. Pedraja, P. Sharma, N. Saphra, N. B. Sawtell, and K. Rajan. "Keypoint Annotation for Electrocommunication Source Separation with PIKAChU and RAIChU." In *NeurIPS 2025 AI for Non-Human Animal Communication Workshop.*

R. Malik*, S. H. Singh*, **S. Johnson-Yu***, R. Harpaz, and K. Rajan. "Dissecting Zebrafish Hunting Behavior using Deep Reinforcement Learning trained RNNs." In *NeurIPS 2025 AI for Science Workshop*. Selected for a Spotlight.

S. Johnson-Yu*, S. H. Singh*, H. Lu, A. Walsman, F. Pedraja, D. Turcu, P. Sharma, N. B. Sawtell, and K. Rajan. "Investigating active electrosensing and communication in deep-reinforcement learning trained artificial fish collectives." Extended Abstract. In *Reinforcement Learning and Decision Making 2025.* Selected for a Contributed Talk.

Z. H. Lu, S. H. Singh, **S. Johnson-Yu**, A. Walsman, K. Rajan. "Emergent small-group foraging under variable group size, food scarcity, and sensory capabilities." Extended Abstract. In *COSYNE 2025*.

S. Johnson-Yu, S. H. Singh, F. Pedraja, D. Turcu, P. Sharma, N. Saphra, N. Sawtell, and K. Rajan. "Understanding biological active sensing behaviors by interpreting learned artificial agent policies." In *InterpPol Workshop @ RLC-2024*.

S. Johnson-Yu, S. H. Singh, F. Pedraja, D. Turcu, P. Sharma, N. Saphra, N. B. Sawtell, and K. Rajan. "Emergent active sensing behaviors in artificial electric fish agents." Extended Abstract. In *Cognitive Computational Neuroscience 2024*.

N. Ramachandran, J. Irvin, H. Sheng, **S. Johnson-Yu**, K. Story, R. Rustowicz, A. Y. Ng, and K. Austin. "Automatic deforestation driver attribution using deep learning on satellite imagery." In *Global Environmental Change, Volume 86, May 2024.*

S. Johnson-Yu, J. Finocchiaro, A. Sinha, K. Wang, Y. Vorobeychik, A. Taneja, and M. Tambe. "Characterizing and Improving the Robustness of Predict-Then-Optimize Frameworks." In *Conference on Decision and Game Theory for Security (GameSec) 2023.*

S. Johnson-Yu, K. Wang, J. Finocchiaro, A. Taneja, and M. Tambe. "Modeling Robustness in Decision-Focused Learning as a Stackelberg Game." Extended Abstract. In *International Conference on Autonomous Agents and Multiagent Systems (AAMAS*) *2023*.

J. Killian*, L. Xu*, A. Biswas*, S. Verma*, V. Nair, A. Taneja, A. Hegde, N. Madhiwalla, P. Rodriguez Diaz, **S. Johnson-Yu**, M. Tambe. 2/9/2023. "Robust Planning over Restless Groups: Engagement Interventions for a Large-Scale Maternal Telehealth Program." In *AAAI Conference on Artificial Intelligence 2023*.

S. Johnson-Yu, N. Bowman, M. Sahami, C. Piech. "SimGrade: Using Code Similarity Measures for More Accurate Human Grading." *Educational Data Mining 2021.*

J. Irvin, H. Sheng, N. Ramachandran, **S. Johnson-Yu**, S. Zhou, K. Story, R. Rustowicz, C. Elsworth, K. Austin, and A. Y. Ng. "ForestNet: Classifying Drivers of Deforestation in Indonesia using Deep Learning on Satellite Imagery." *Tackling Climate Change with Machine Learning at NeurIPS 2020.*

TEACHING

Harvard University
CS290 (Seminar on Effective Research Practices & Academic Culture) Teaching Fellow | Aug 2023 – present
Leading a discussion-based seminar for first-year CS PhD students developing research skills (e.g. paper reading), meta-skills (e.g. managing advising relationships), and understanding of academic culture.

Harvard University
CS288 (AI for Social Impact) Teaching Fellow | August 2022 – December 2022
Created infrastructure for second offering of CS288, developing curriculum, mentoring graduate students pursuing final projects, and administering the course.

Stanford University

CS100A ACE Instructor | December 2019 – June 2021
Designed curriculum for CS106A support class targeting students from educationally disadvantaged backgrounds (ACE) and held weekly sections and office hours. Trained and led team of section leaders to assist in the classroom.

Stanford University
CS109 (Probability) Course Assistant | September 2019 – December 2019
Taught weekly sections on probability for computer scientists and graded assignments.

Stanford University
CS106AP (Programming Methodology) Lecturer | June 2019 – August 2019
Taught a class of over 150 students. Restructured the curriculum of CS106A in Python to replace the Java version of the introductory class. Developed assignments, practice exercises, and exams.

Stanford University
Section Leading (CS198) Coordinator | March 2018 – June 2019
Hired, trained, and managed over 100 CS106 section leaders. Restructured CS198 program to serve over 1000 students. Managed budget of over 500,000 dollars. Hosted community-building events.

Stanford University
CS198B Section Leader | March 2017 – June 2017
Led workshops for other section leaders on advancing teaching technique.

Stanford University
Music 19B (Intermediate Music Theory) Teaching Assistant | March 2017 – June 2017
Taught weekly ear training sections, held office hours, and graded assignments.

Stanford University
CS106 Section Leader | September 2016 – March 2018
Taught weekly sections on programming methodology in CS106 classes. Assisted students in design and debugging.

AWARDS & HONORS

Harvard SEAS PhD Hooding Ceremony Marshal
2025
Honor recognizing students who have done above-and-beyond service for their peers.

NSF Graduate Research Fellowship Program – Honorable Mention
2022
National graduate research funding program. Received 5 scores of "Excellent" and 1 "Very Good."

Centennial Teaching Assistant Award
Stanford University | 2021
University-wide award for excellence in teaching.

Louis Sudler Prize in the Performing & Creative Arts
Stanford University | 2021
Awarded to seniors who have demonstrated excellence in the highest standards of proficiency in performance or execution of the arts.

Carolyn Applebaum Prize
Stanford University | 2021
Awarded to graduating students whose entrepreneurial endeavors demonstrate an adopted responsibility for making the University music community especially robust and engaged.

National Latin Exam Maureen O'Donnell Oxford Classical Dictionary Award

2013, 2014
Awarded to students with four or more gold medals on the National Latin Exam.

SERVICE

CCN 2024 (Reviewer)
AAMAS 2023 AI4SG Workshop (Reviewer)
Try AI Micro-Internship 2023 (Mentor)
Friends of Music Stanford (Board of Directors) **2022 – 2025**
AAMAS 2022 AI4SG Workshop (Reviewer)
Code in Place 2020 (Curriculum Development, Section Leader, Small Group Leader)

ACTIVITIES

Ferris Choral Fellows	*2022 – present*
Harvard University Choir	*2022 – present*
Stanford Talisman A Cappella | Director	*2014 – 2018*
Stanford Ethics in Computer Science | Co-Founder	*2017 – 2018*
Stanford Chamber Chorale	*2016 – 2021*
Fossil Free Stanford	*2015 – 2016*

WRITING

S. Johnson-Yu, S. Shah. "You Don't Know Jack About AI." In ACM Queue, Volume 22, Issue 5. 12/2/2024.

PHOTOGRAPHY

Neuron. Dec 07, 2022. Volume 110, Issue 23. Cover photo.
Neuron. Feb 17, 2021. Volume 109, Issue 4. Cover photo.