STEPHEN PARKER SINGLETON

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Education

June 2020 - April 2023	Computational Biology, Ph.D.	Cornell University
August 2015 - June 2017	Chemistry, M.S.	Cornell University
August 2011-May 2015	Chemistry, B.S.	University of South Carolina

Professional Experience

August 2025 - Present
Senior Scientist
Advisor: Ted Satterthwaite
Penn Lifespan Informatics and Neuroimaging Center
University of Pennsylvania Perelman School of Medicine

- Research and development lead for sypres.io - an initiative to present high quality living evidence synthesis in clinical psychedelics.
- Member of the neuroinformatics team: neuroimaging dataset curation, analysis, and release; full-stack software engineering

May 2024 - July 2025
Postdoctoral Researcher
Advisor: Ted Satterthwaite
Penn Lifespan Informatics and Neuroimaging Center
University of Pennsylvania Perelman School of Medicine

- Assessing the clinical efficacy and risks of psychedelic-assisted therapies.
- Developing new tools and frameworks for measuring psychedelic-induced functional plasticity in the brain using fMRI.

April 2023 - April 2024
Postdoctoral Researcher
Advisor: Amy Kuceyeski
Computational Connectomics Lab
Weill Cornell Medicine

- Studied the effects of pharmacology, substance use, and trauma on human brain activity/connectivity using network control theory and multimodal neuroimaging.
- Mentored undergraduate and graduate students on their rotation/thesis projects.

June 2020 - April 2023
NSF Graduate Research Fellow
Advisor: Amy Kuceyeski
Department of Computational Biology
Cornell University

- Studyied the effects of psychedelics on human brain activity/connectivity in the Computational Connectomics Lab.
- Utilized advanced techniques in network control theory, statistics, and machine learning to quantify brain dynamics.
- Identified neural correlates of MDMA-assisted therapy for PTSD in humans using audio script-driven memory recollection during fMRI.
- Coding experience: MATLAB, R, python, bash, git.
- Experience with preprocessing and analysis of fMRI, dMRI, PET.
- Network (graph) neuroscience, feature extraction, biomarker discovery.

August 2017 - June 2020
Teacher
High School
Palmetto Scholars Academy
North Charleston, SC

- Designed and implemented a diverse 10th grade chemistry curriculum for intellectually gifted students.
- Instructor of dual-enrollment Chemistry 110/111 lecture and lab course along with an Introduction to Research class to prepare junior students for their senior capstone project.
- Utilized a project-based-learning curriculum for an experimental chemistry elective course.

June 2015 - August 2017
Graduate Research Assistant
Advisor: Brett P. Fors
Department of Chemistry & Chemical Biology
Cornell University

- Developed novel catalyst systems for controlling polymer topology *in situ*, utilizing visible light as an external stimulus.
- Structure-property relationships of these new materials studied via NMR, rheology, and SAXS.
- Random forest classifier implemented to map structure-property relationships.

August 2013 - May 2015
Undergraduate Researcher
Advisor: Chuanbing Tang
Department of Chemistry & Biochemistry
University of South Carolina

- Development and classification of cationic, rosin acid-derived, compounds and polymers as novel antimicrobial agents.
- Surface initiated ATRP modification of glass surfaces for medical device and implant applications.
- Novel monomer synthesis and natural product functionalization, purification, and characterization.

May 2013 - August 2014 | Applications/Development Chemist Intern I & II | MeadWestvaco (now Ingevity) North Charleston, SC

- Ladder study performed involving HM-PSA formulation and preparation, physical and rheological testing, followed by multivariate analysis (PCA, PLSA) to create an iterative screening process for new product development and adhesive formulation.
- Explored various synthetic pathways for the development of new products with targeted end-use properties in adhesive systems.

Teaching and Outreach

April 2023 - Present | Machine Learning in Medicine Virtual Seminar Series | Cornell University Ithaca, NY

- An inter-campus collaborative with the goal of bringing together researchers with common interests in machine learning applied to clinical questions/data
- Invite and host speakers from academia and industry for our regular virtual seminar series.

April 2019 - May 2022 | Advisor High School Senior Capstone Experience | Palmetto Scholars Academy North Charleston, SC

- Mentoring high school students interested in scientific research to develop, plan, and perform their thesis research for their Senior Capstone Project.
- Students carry out hands-on research, write a thesis, and defend it against a committee.

August 2017 - May 2018 | Head Coach VEX High School Robotics | Palmetto Scholars Academy North Charleston, SC

- Coached 4 high school VEX teams during the 2017-2018 In The Zone challenge.
- Teams earned 2 Excellence Awards, 2 Design Awards, and 1 Tournament Champions award.
- 2 Teams made it to SC State Tournament and 1 team advanced to the US CREATE Open event in Council Bluffs, Iowa.

January 2016 - June 2017 | Outreach Coordinator | Fors Research Group Cornell University

August 2015 - June 2017 | Families Learning Science Together Workshop Volunteer | Cornell Center for Materials Research Cornell University

August 2015 - May 2016 | Graduate Teaching Assistant Organic Chemistry Laboratory | Department of Chemistry & Chemical Biology Cornell University

October - November 2015 | Family Science Nights Module Instrutor | Sciencenter Museum Ithaca, NY

January 2013 - May 2013 | Teaching Assistant General Chemistry Laboratory | Department of Chemistry & Biochemistry University of South Carolina

Volunteer Experience

August 2017 - May 2023 | President Homeowner's Association | Jericho on the Ashley North Charleston, SC

October 2016 | Service Volunteer | Montgomery Park Playground Build Dryden, NY

September 2013 - June 2015 | President and Founder | Gates at Williams-Brice Recycling Committee Columbia, SC

Summers of 2013-2014 | Service Volunteer | The Hope Lodge, American Cancer Society Charleston, SC

Honors and Awards

Fulbright Research Grant Alternate — 2022 (*Neural and subjective effects of mescaline in naturalistic settings*)
National Science Foundation Graduate Research Fellow — 2016 - 2022
Graduation with Leadership Distinction in Research — May, 2015
University of South Carolina Outstanding Senior Award — April, 2015
Who's Who Among American Colleges and Universities Award — April, 2015
Hypercube Scholar Award — April, 2015
Hiram S. and Lawanda Allen Scholarship for Excellence in Chemistry — April, 2014
Magellan Scholarship for Undergraduate Research — April, 2014
Outstanding Poster Presentation, Presented at the South Carolina ACS Awards Day — April, 2014
South Carolina Palmetto Fellows Scholar — August, 2011 - May, 2015
USC Dean's Scholar — August, 2011 - May, 2015

Publications

***Original Research*:**

Nate Roy, **S. Parker Singleton**, Keith Jamison, Pratik Mukherjee, Sudhin A. Shah, Amy Kuceyeski *"Brain activity dynamics after traumatic brain energy indicate increased state transition energy and preference of lower order states,"* ***NeuroImage: Clinical,* 2025** doi: 10.1016/j.nicl.2025.103799.

S. Parker Singleton, Christopher Timmermann, Andrea I. Luppi, Emma Eckernäs, Leor Roseman, Robin L. Carhart-Harris, Amy Kuceyeski *"Network control energy reductions under DMT relate to serotonin receptors, signal diversity and subjective experience,"* ***Commun Biol,* 2025** doi: 10.1038/s42003-025-08078-9.

A. I. Luppi, **S. P. Singleton**, J. Y. Hansen, K. W. Jamison, D. Bzdok, A. Kuceyeski, R. F. Betzel, B. Misic *"Contributions of network structure, chemoarchitecture and diagnostic categories to transitions between cognitive topographies,"* ***Nature Biomedical Engineering,* 2024** doi: https://doi.org/10.1038/s41551-024-01242-2.

S. Parker Singleton, Puneet Velidi, Louisa Schilling, Andrea I. Luppi, Keith Jamison, Linden Parkes, Amy Kuceyeski *"Altered structural connectivity and functional brain dynamics in individuals with heavy alcohol use elucidated via network control theory,"* ***Biological Psychiatry: Cognitive Neuroscience and Neuroimaging,* 2024**; doi: https://doi.org/10.1016/j.bpsc.2024.05.006.

S. P. Singleton *"This Is Your Brain on Drugs: A Multimodal Neuroimaging and Computational Investigation into the Effects of Psychedelic Tryptamines and MDMA on Human Brain Dynamics,"* ***Doctoral Dissertation, Cornell University ProQuest Dissertations & Theses,* 2023**. 30420106.

S. P. Singleton, J. B. Wang, M. Mithoefer, C. Hanlon, M. S. George, A. Mithoefer, O. Mithoefer, A. R Coker, B. Yazar-Klosinski, A. Emerson, R. Doblin, A. Kuceyeski *"Altered brain activity and functional connectivity after MDMA-assisted therapy for post-traumatic stress disorder,"* ***Frontiers in Psychiatry,* 2023** 13:947622. doi: 10.3389/fpsyt.2022.947622

S. P. Singleton, A. I. Luppi, R. L. Carhart-Harris, J. Cruzat, L. Roseman, D.J. Nutt, G. Deco, M. L. Kringelbach, E. A. Stamatakis, A. Kuceyeski *"Receptor-informed network control theory links LSD and psilocybin to a flattening of the brain's control energy landscape,"* ***Nature Communications,* 2022** DOI: 10.1038/s41467-022-33578-1.

M. Nadgorny, D. T. Gentekos, Z. Xiao, **S. P. Singleton**, B. P. Fors, L. A. Connal *"Manipulation of Molecular Weight Distribution Shape as a New Strategy to Control Processing Parameters,"* ***Macromolecular Rapid Communications,* 2017** DOI: 10.1002/marc.201700352

M. S. Ganewatta, K. P. Miller, **S. P. Singleton**, P. Mehrpouya-Bahrami, Y. P. Chen, Y. Yan, M. Nagarkatti, P. Nagarkatti, A. W. Decho, C. Tang *"Antibacterial and Biofilm-Disrupting Coatings from Resin Acid-Derived Materials,"* ***Biomacromolecules,* 2015** DOI: 10.1021/acs.biomac.5b01005.

***Commentaries and Perspectives*:**

S. Parker Singleton, Brooke L. Sevchik, Simon N. Vandekar, Eric C. Strain, Sandeep M. Nayak, Robert H. Dworkin, J. Cobb Scott, Theodore D. Satterthwaite *"An initiative for living evidence synthesis in clinical psychedelic research,"* ***Nature Mental Health,* 2025**; doi: 10.1038/s44220-024-00373-4.

S. Parker Singleton, Amy Kuceyeski *"Bridging Psilocybin-Induced Changes in the Brain's Dynamic Functional Connectome With an Individual's Subjective Experience,"* ***Biological Psychiatry: Cognitive Neuroscience and Neuroimaging,* 2024**; doi: 10.1016/j.bpsc.2024.05.003.

Presentations

***Invited talks, panels, workshops*:**
- *"Novel treatments for PTSD: focus on fear conditioning as a translational model,"* The Winter Conference on Brain Research, Lake Tahoe, **2025.**
- *"Pharmacologically-informed network control theory,"* The Nora Volkow group at the National Institute on Alcohol Abuse and Alcoholism online, **2023.**
- *"Unlocking DMT Horizons: Exploring the clinical potential of DMT,"* OPEN Foundation, online, **2023.**
- "*Harnessing neural and cognitive plasticity with psychedelics,"* Cleveland Clinic Psychedelic Science Group, online, **2022.**
- *"Modeling brain dynamics using psychedelics,"* Maastricht University, Maastricht, Netherlands, **2022.**
- *"The flowing brain on psychedelics"*, Oxford Psychedelic Society, online, **2021. Recording:** https://youtu.be/wwovwxFuwUE
- "*Chemistry and Music Workshop,"* American Chemical Society National Meeting, Orlando, FL, **2019.**

***Oral presentations*:**
- "*This is your brain on drugs: A multimodal neuroimaging and computational investigation into the effects of psychedelics and MDMA on human brain dynamics,"* Dissertation Defense Seminar, Department of Computational Biology, Cornell University, **2023. Recording:** https://youtu.be/yE6NuOi3BAI
- *"Altered neural activity patterns following MDMA-assisted therapy for PTSD: an fMRI pilot study,"* Interdisciplinary Conference on Psychedelic Research, Haarlem, Netherlands, **2022. Recording:** https://youtu.be/iV0CcJzOk6E
- "*A flattened energy landscape under LSD and psilocybin: how psychedelics advance our ability to model brain dynamics*," Psychedemia: Neuroscience Panel, Columbus, OH, **2022. Recording:** https://youtu.be/khaVhAL9NFQ
- "*Evidence for a flattened energy landscape under LSD and Psilocybin*," Canadian Computational Neuroscience Spotlight, online, **2022.**
- "*Neurobiology of MDMA-assisted therapy for PTSD,"* Cornell Computational Biology Student Seminar Series, Ithaca, NY, **2022.**
- "*LSD flattens the brain's energy landscape: insights from receptor-informed network control theory,"* Cornell Computational Biology Student Seminar Series, Ithaca, NY, **2021.**

***Oral presentations (cont.)*:**
- *"Antibacterial and Biofilm-Disrupting Coating Sustainable Materials,"* University of South Carolina Discovery Day for Undergraduate Researchers, Columbia, SC, **2015**.
- *"Antibacterial and Biofilm-Disrupting Coating Sustainable Materials,"* Southeastern Undergraduate Research Conference, Montgomery, AL, **2015**.

***Poster presentations*:**
- "*A living systematic review, meta-analysis, and open data resource of trials of psilocybin treatment for symptoms of depression"* Gordon Research Conference: Neurobiology of Psychedelics, Smithfield, RI, **2025.**
- "*Altered structural connectivity and functional brain dynamics in individuals with heavy alcohol use elucidated via network control theory"* Organization for Human Brain Mapping, Seoul, South Korea, **2024.**
- "*Time-resolved network control analysis of human brain dynamics under DMT,"* Organization for Human Brain Mapping, Montreal, Canada, **2023.**
- "*Altered brain activity and functional connectivity after MDMA-assisted therapy for post-traumatic stress disorder,"* Psychedelic Science 2023, Denver, CO, **2023.**
- "*LSD and psilocybin flatten the brain's energy landscape: insights from receptor-informed network control theory,"* Organization for Human Brain Mapping, Glasgow, U.K., **2022.**
- "*Evidence for altered neural activity patterns after MDMA-assisted therapy in adults with chronic and severe post-traumatic stress disorder: a pilot study,"* Organization for Human Brain Mapping, Glasgow, U.K., **2022.**
- "*LSD and psilocybin flatten the brain's energy landscape: insights from receptor-informed network control theory,"* From Research to Reality: Global Summit on Psychedelic Therapies and Medicine, Toronto, CA, **2022.**
- "*Evidence for altered neural activity patterns after MDMA-assisted therapy in adults with chronic and severe post-traumatic stress disorder: a pilot study,"* From Research to Reality: Global Summit on Psychedelic Therapies and Medicine, Toronto, CA, **2022.**
- "*LSD flattens the brain's energy landscape: insights from receptor-informed network control theory,"* Organization for Human Brain Mapping, online, **2021.**
- *"Sustainable Antimicrobial Coatings from Resin Acids,"* American Chemical Society Awards Day, Orangeburg, SC, **2014**.