S. Parker Singleton

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Education

2020 – 2023 **Ph.D. Computational Biology**
Cornell University

2015 – 2017 **M.S. Chemistry**
Cornell University

2011 – 2015 **B.S. Chemistry**
University of South Carolina

Professional Experience

2025 – Present **Senior Scientist**
Penn Lifespan Informatics and Neuroimaging Center (PennLINC), University of Pennsylvania
Advisor: Theodore D. Satterthwaite
Research and development lead for SYPRES — 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.

2024 – 2025 **Postdoctoral Researcher**
Penn Lifespan Informatics and Neuroimaging Center (PennLINC), University of Pennsylvania
Advisor: Theodore D. Satterthwaite
Assessed the clinical efficacy and risks of psychedelic-assisted therapies.
Developed new tools and frameworks for measuring psychedelic-induced functional plasticity in the brain using fMRI.

2023 – 2024 **Postdoctoral Researcher**
Computational Connectomics Lab, Weill Cornell Medicine
Advisor: Amy Kuceyeski
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 rotation and thesis projects.

2020 – 2023 **NSF Graduate Research Fellow**
Department of Computational Biology, Cornell University
Advisor: Amy Kuceyeski
Studied 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 using audio script-driven memory recollection during fMRI.

2017 – 2020 **High School Teacher**
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.
Instructor of Introduction to Research course preparing juniors for their senior capstone project.
Utilized a project-based-learning curriculum for an experimental chemistry elective.

2015 – 2017 **Graduate Research Assistant**
Department of Chemistry & Chemical Biology, Cornell University
Advisor: Brett P. Fors
Developed novel catalyst systems for controlling polymer topology *in situ*, utilizing visible light as an external stimulus.
Structure–property relationships studied via NMR, rheology, and SAXS.
Random forest classifier implemented to map structure–property relationships.

2013 – 2015 **Undergraduate Researcher**
Department of Chemistry & Biochemistry, University of South Carolina
Advisor: Chuanbing Tang
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.

2013 – 2014 **Applications/Development Chemist Intern I & II**
MeadWestvaco (now Ingevity), North Charleston, SC
Performed ladder studies involving HM-PSA formulation and preparation, physical and rheological testing, followed by multivariate analysis (PCA, PLSA) for iterative product screening.
Explored synthetic pathways for the development of new products with targeted end-use properties in adhesive systems.

Publications

Original Research

13. P. Mallaroni, **S. P. Singleton**, N. L. Mason, T. D. Satterthwaite, J. G. Ramaekers. "Spatiotemporal mapping of brain organisation following the administration of 2C-B and psilocybin." *Molecular Psychiatry*, 2026. doi: 10.1038/s41380-026-03447-0.

12. A. I. Luppi, L. Uhrig, J. Tasserie, P. A. M. Mediano, F. E. Rosas, **S. P. Singleton**, D. Gutierrez-Barragan, S. Gini, P. Castro, C. M. Signorelli, D. Golkowski, A. Ranft, R. Ilg, D. Jordan, K. Muta, J. Hata, H. Okano, Z.-Q. Liu, Y. Yee, A. Destexhe, R. Cofre, D. K. Menon, A. Gozzi, B. Jarraya, E. A. Stamatakis. "Convergent transcriptomic and connectomic controllers of information integration and its anaesthetic breakdown across mammalian brains." *Nature Human Behaviour*, 2025. doi: 10.1038/s41562-025-02381-5.

11. L. Schilling, **S. P. Singleton**, C. Tozlu, M. Hédo, Q. Zhao, K. M. Pohl, K. Jamison, A. Kuceyeski. "Sex-specific differences in brain activity dynamics of youth with a family history of substance use disorder." *Nature Mental Health*, 2025. doi: 10.1038/s44220-025-00523-2.

10. D. P. Kelley, **S. P. Singleton**, K. Venable, G. Sturm, A. Skovgaard, J. Francis, T. C. Neylan, E. R. Bradley, J. Woolley, M. Picard, A. O'Donovan. "The allostatic triage model of psychopathology (ATP Model): How reallocation of brain energetic resources under stress elicits psychiatric symptoms." *Neuroscience & Biobehavioral Reviews*, 2025. doi: 10.1016/j.neubiorev.2025.106419.

9. N. Roy, **S. P. Singleton**, K. Jamison, P. Mukherjee, S. A. Shah, A. Kuceyeski. "Brain activity dynamics after traumatic brain injury indicate increased state transition energy and preference of lower order states." *NeuroImage: Clinical*, 2025. doi: 10.1016/j.nicl.2025.103799.

8. **S. P. Singleton**, C. Timmermann, A. I. Luppi, E. Eckernäs, L. Roseman, R. L. Carhart-Harris, A. Kuceyeski. "Network control energy reductions under DMT relate to serotonin receptors, signal diversity, and subjective experience." *Communications Biology*, 2025. doi: 10.1038/s42003-025-08078-9.

7. 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: 10.1038/s41551-024-01242-2.

6. **S. P. Singleton**, P. Velidi, L. Schilling, A. I. Luppi, K. Jamison, L. Parkes, A. 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: 10.1016/j.bpsc.2024.05.006.

5. **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.

4. **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.

3. **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.

2. 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.

1. 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 & Perspectives

- **S. P. Singleton**, B. L. Sevchik, S. N. Vandekar, E. C. Strain, S. M. Nayak, R. H. Dworkin, J. C. Scott, T. D. Satterthwaite. "An initiative for living evidence synthesis in clinical psychedelic research." *Nature Mental Health*, 2025. doi: 10.1038/s44220-024-00373-4.
- **S. P. Singleton**, A. 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, Netherlands, 2022.
- "The flowing brain on psychedelics." Oxford Psychedelic Society, online, 2021.
- "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.
- "Altered neural activity patterns following MDMA-assisted therapy for PTSD: an fMRI pilot study." Interdisciplinary Conference on Psychedelic Research, Haarlem, Netherlands, 2022.
- "A flattened energy landscape under LSD and psilocybin: how psychedelics advance our ability to model brain dynamics." Psychedemia: Neuroscience Panel, Columbus, OH, 2022.
- "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.
- "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." ACNP, Hollywood, FL, 2025.
- "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 PTSD: 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 PTSD: 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.

Teaching & Outreach

2023 – Present **Machine Learning in Medicine Virtual Seminar Series**
Cornell University

- Inter-campus collaborative bringing together researchers with common interests in machine learning applied to clinical questions and data.
- Invite and host speakers from academia and industry for regular virtual seminar series.

2019 – 2022 **Advisor, High School Senior Capstone Experience**
Palmetto Scholars Academy, North Charleston, SC

- Mentored high school students to develop, plan, and perform thesis research; students carry out hands-on research, write a thesis, and defend before a committee.

2017 – 2018 **Head Coach, VEX High School Robotics**
Palmetto Scholars Academy, North Charleston, SC

- Coached 4 teams during the 2017–2018 In The Zone challenge; teams earned 2 Excellence Awards, 2 Design Awards, and 1 Tournament Champions award; 2 teams advanced to SC State Tournament; 1 advanced to the US CREATE Open.

2016 – 2017 **Outreach Coordinator**
Fors Research Group, Cornell University

2015 – 2017 **Families Learning Science Together Workshop Volunteer**
Cornell Center for Materials Research

2015 – 2016 **Graduate Teaching Assistant, Organic Chemistry Lab**
Cornell University

Oct – Nov 2015 **Family Science Nights Module Instructor**
Sciencenter Museum, Ithaca, NY

Jan – May 2013 **Teaching Assistant, General Chemistry Lab**
University of South Carolina

Honors & Awards

2022	Fulbright Research Grant Alternate
2016 – 2022	National Science Foundation Graduate Research Fellowship
2015	Graduation with Leadership Distinction in Research
2015	University of South Carolina Outstanding Senior Award
2015	Who's Who Among American Colleges and Universities Award
2015	Hypercube Scholar Award
2014	Hiram S. and Lawanda Allen Scholarship for Excellence in Chemistry
2014	Magellan Scholarship for Undergraduate Research
2014	Outstanding Poster Presentation, SC ACS Awards Day
2011 – 2015	South Carolina Palmetto Fellows Scholar
2011 – 2015	USC Dean's Scholar

Volunteer Experience

2017 – 2023 **President, Homeowner's Association**
Jericho on the Ashley, North Charleston, SC

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

2013 – 2015 **President & Founder, Recycling Committee**
Gates at Williams-Brice, Columbia, SC

Summers 2013–14 **Service Volunteer**
The Hope Lodge, American Cancer Society, Charleston, SC