

Sophia C Ryan
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<https://scholar.google.com/citations?user=7Ixp0gAAAAJ&hl=en&oi=ao>

EDUCATION

University of North Carolina at Chapel Hill, Chapel Hill NC	2024-Present
Doctorate in Geography and Environment, PhD Candidate	
Focus Area: Human health impacts of multi-hazard events	
Appalachian State University, Boone NC	Graduation: May 2023
Masters in Geography	
Thesis: <i>Greenspace and adolescent mental health: understanding greenspace metrics and socio-demographic effect modifiers</i>	
University of Vermont, Burlington VT	Graduation: May 2018
Bachelors in Geography, Minor in Geology; Cum Laude	
Thesis: <i>Quantifying stream phosphorus dynamics and total suspended sediment export in forested watersheds in Vermont</i>	
The School for Field Studies, Costa Rica	Fall 2016
Study Abroad	
Community College of Vermont	Spring & Summer 2020
Continuing Education	

RESEARCH INTERESTS

Health & Medical Geography; Mental health; Spatiotemporal analysis; Spatial data analysis; Greenspace; Climate change and health; GIS; help-seeking

RELATED EXPERIENCE

Climate and Health Fellow, National Academy of Sciences Engineering and Medicine	Boone NC, 2025-Present
Funded on National Academy of Sciences Engineering and Medicine to investigate the mental health impacts of multi-hazard events among youth and young people in Louisiana; Dataset preparation; Collaborate with students, faculty and community partners; Prepare, submit and revise analyses for manuscripts and presentations	
Graduate Assistant, University of North Carolina at Chapel Hill	Chapel Hill, NC 2024
Funded on National Institute of Health K-award to conduct analyses regarding pharmacy closures and health outcomes; collaborate with fellow students and faculty members; Prepare, submit, and revise research analyses for grant submissions and publications	
Researcher, Appalachian State University	Boone, NC 2023-2025
Funded on National Institute of Environmental Health Sciences, National Institute of Health, National Science Foundation and American Foundation for Suicide Prevention grants; analyze and manage large health datasets; plan and prepare manuscripts; mentor undergraduate student researchers	
Lecturer, Appalachian State University	Boone, NC 2023-24
Teach introductory human and physical geography courses; plan and prepare syllabi and coursework; manage TAs; mentor undergraduate students	
Graduate Student Researcher, Appalachian State University	Boone, NC 2021-23
Conduct large scale analyses regarding the geography of mental health; collaborate with fellow students and faculty members; Prepare, submit, and revise research analyses for publication; mentor undergraduate students within the research group	
AmeriCorps Educator, Teton Science Schools	Jackson WY, 2019
Instruct 1 st -12 th graders in STEM literacy, leadership, and connection to place; develop curriculum for	

the Youth Conservation Leadership Institute; lesson plan and instruct with other educators

Undergraduate Researcher, University of Vermont Burlington VT, 2017-18
Conduct field and lab research on water chemistry; primary undergraduate researcher leading fellow undergraduates in field and lab work; present research at geoscience conferences

Teaching Assistant, University of Vermont Burlington VT, 2017
Plan and hold review sessions; meet with students during office hours; grade assignments

Undergraduate Researcher, National Science Foundation at The Pennsylvania State University State College PA, 2016
Conduct research regarding stream water chemistry; collaborate with other students and faculty mentors; develop field and lab research skills; present research at national conference

PUBLICATIONS

1. Gilbert, J. C., Thompson, M. P., **Ryan, S.**, & Roy, M. (2026). Learning Modalities During COVID-19 and Adolescent Mental Health in North Carolina. *Journal of School Health*, 96(1), e70093. <https://doi.org/10.1111/josh.70093>
2. **Ryan, S.C.**, Sugg, M.M., Schwandt, V., Crespo, S., Lindzey, S. and Runkle, J.D. (2026). Temperature Extremes Contribute to Suicide-Related Help-Seeking Through Multiple Pathways: Evidence from Crisis Hotline Data (2019-2023). *PLOS Mental Health*. (Accepted).
3. **Ryan, S.C.**, Thompson, M.T., Sugg, M.M. and Runkle, J.D. (2026). Disparities in suicide risk trajectories among youth during the COVID-19 pandemic. *Journal of Research on Adolescence*. (Accepted).
4. Thompson, M.T., Gilbert, C., Kennedy, S., Kingree, C., Langlais, A., Roy, M., and **Ryan, S.C.** (2026) COVID-19 pandemic and youth suicide risk: A scoping review. *Mental Health & Prevention*. (Accepted).
5. **Ryan, S.C.**, Runkle, J.D., Thompson, M., and Sugg, M.M. (2026). Quasi-experimental evaluation of mental health distress among transgender and gender nonconforming youth after Hurricane Ian (2022). *Journal of Gay and Lesbian Mental Health*. (In Press).
6. Sugg, M., **Ryan, S.**, Erb, M., Bigelow, J., Holbein, A., & Runkle, J.D. (2025). Help-Seeking Patterns During Weather Events: 2-1-1 Service Calls Among Service-Connected Unhoused Populations in Louisiana from 2014 to 2023. *Journal of Urban Health*. (In Press).
7. Sugg, M., Blackburn, C., **Ryan, S.**, Cardwell, J., Gohlke, J., & Runkle, J. (2025). Rural-Urban Disparities in Helene's Disaster Assistance in Western North Carolina. *Journal of the Appalachian Institute for Health and Wellness*. <https://jihhs.pubpub.org/pub/t94hm77m/release/1>
8. Sugg, M. M., Keefer, Q., **Ryan, S. C.**, Desjardins, M. R., & Runkle, J. D. (2025). Community firearm violence during extreme temperatures in the continental United States: A spatiotemporal epidemiological analysis (2014–2024). *Environmental Challenges*, 21, 101377. <https://doi.org/10.1016/j.envc.2025.101377>
9. Sugg, M. M., **Ryan, S. C.**, Rankins, H. A., Ulrich, S. E., & Runkle, J. D. (2025). Spatial inequities in greenspace: A spatial durbin model analyzing socio-demographic factors, heat risk, and neighborhood effects. *GeoJournal*, 90(2), 86. <https://doi.org/10.1007/s10708-025-11328-2>
10. **Ryan, S. C.**, Wertis, L., Sugg, M. M., & Runkle, J. D. (2025). A small area analysis of acute exposure to temperatures and mental health in North Carolina. *International Journal of Biometeorology*, 69(4), 805–819. <https://doi.org/10.1007/s00484-025-02858-y>
11. Runkle, J. D., Herbst, K., **Ryan, S.**, Sewell, K., Mallare, A., Berry, I., Getz, E., McKee, A., Thompson, M. P., & Sugg, M. M. (2025). Eco-anxiety, climate concern, and fatalistic outlooks: Insights from U.S. crisis text conversations on climate distress. *The Journal of Climate Change and Health*, 22, 100419. <https://doi.org/10.1016/j.joclim.2025.100419>
12. **Ryan, S. C.**, Sugg, M. M., Runkle, J. D., & Thapa, B. (2024). Advancing Understanding on Greenspace and Mental Health in Young People. *GeoHealth*. <https://doi.org/10.1029/2023GH000959>
13. Fehlman, C. A., **Ryan, S. C.**, Lysen, K. G., Rundgren, Q. M., Spurlock, T. J., Orbison, R. O., Runkle, J. D., & Sugg, M. M. (2025). Scoping review of the societal impacts of compound climate events. *Discover Environment*, 3(1), 2. <https://doi.org/10.1007/s44274-025-00185-y>
14. Sugg, M.M., **Ryan, S.C.**, Ulrich, S.E., Thompson, M.T., and Runkle, J.D. (2024). Psychiatric Emergency Department Visits Among Racial and Ethnic Minority Youth in North Carolina: A Neighborhood-Level Analysis. *Health and Place*. <https://doi.org/10.1016/j.healthplace.2024.103379>.

15. Lucero, C., Thompson, M.T., **Ryan, S.C.**, Runkle, J.D., and Sugg, M.M. (2024). Spatiotemporal Patterns of Youth Isolation and Loneliness in the US: A Geospatial Analysis of Crisis Text Line Data (2016-2022). *GeoJournal*. [10.1007/s10708-02411253-w](https://doi.org/10.1007/s10708-02411253-w)
16. **Ryan, S.C.**, Sugg, M.M, Runkle, J.D., Wertis, L., Singh, D., Green, S. and M. Meagher (2024). Short-term changes in mental health help-seeking behaviors following exposure to multiple social stressors and a natural disaster. *Social Science and Medicine*. <https://doi.org/10.1016/j.socscimed.2024.116843>
17. **Ryan S.C.**, Runkle, J.D., Wertis, M.L., and Sugg, M.M. (2024). Place-based differences in the association between greenspace and suicide-related outcomes among young people. *Journal of Adolescent Health*. <https://doi.org/10.1016/j.jadohealth.2024.03.014>
18. Runkle, J.D., Berry, A., Reed, C., Cowan, K., **Ryan, S.C.**, Wertis, L., and Sugg, M.M. (2024). Association of Psychiatric Emergency Visits and Warm Ambient Temperature during Pregnancy: A Time-Stratified Case-Crossover Study. *Environmental Health Perspectives*. <https://doi.org/10.1289/EHP1329>
19. Sugg, M.M., Runkle J.D., **Ryan, S.C.**, Singh, D., Green, S., and Thompson, M., (2023) A follow-up retrospective analysis of essential workers and their children throughout the COVID-19 pandemic: 2020 - 2021. *Public Health Reports*. <https://doi.org/10.1177/0033354922114817>
20. **Ryan, S.C.**, M. M. Sugg, J.D. Runkle and Matthews, J., (2023) Ecological analysis of greenspace and mental health in North Carolina: Consideration of rural and urban neighborhoods. *Family and Community Health*. <https://doi.org/10.1097/FCH.0000000000000363>
21. Sugg, M.M., Wertis, L. **Ryan, S.C.**, Green, S., Singh, D., and J.D Runkle, (2023). Cascading Disasters and Mental Health: The February 2021 Winter Storm and Power Crisis in Texas, USA. *Science of the Total Environment*. [10.1016/j.scitotenv.2023.163231](https://doi.org/10.1016/j.scitotenv.2023.163231)
22. **Ryan S.C.**, Sugg, M.M. and J.D. Runkle (2023). "Association between urban greenspace, tree canopy cover and intentional deaths: An exploratory geospatial analysis". *Urban Forestry and Urban Greening*. <https://doi.org/10.1016/j.ufug.2023.128015>
23. **Ryan, S.C.**, Desjardins, M., Runkle, J.D., Wertis, L., Sugg, M.M. (2023) "Evaluating Co-Occurring Space-Time Clusters of Depression and Suicide-Related Outcomes Before and During the COVID-19 Pandemic". *Spatial and Spatio-Temporal Epidemiology*. <https://doi.org/10.1016/j.sste.2023.100607>
24. Ulrich, S.E., Runkle, J.D., **Ryan, S.C.**, and Sugg, M.M. (2023). Mapping High-Risk Clusters and Identifying Place-Based Risk Factors of Mental Health Burden in Pregnancy. *Social Science and Medicine – Mental Health*. <https://doi.org/10.1016/j.ssmmh.2023.100270>
25. Sugg, M.M., Runkle J.D., **Ryan, S.C.**, and Wertis, L., (2023) "The Causal Effects of Maternal Health and Extreme Disasters: A Difference-In Difference Analysis of the South Carolina 2015 Floods". *International Journal of Disaster Risk Reduction*. <https://doi.org/10.1016/j.ijdr.2023.104037>
26. Sugg, M.M., **Ryan, S.C.**, Spurlock, T., Hege, A., Chidozie Ogwu, M., Schroeder Tyson, J., Shay, E., Renwick, K., Duncan, S., Hendren, C.O., Runkle, J.D., and R. Manan (2023). "Climate Change and Health in Rural Mountain Environments: Summary of a Workshop on Knowledge Gaps, Barriers, and Opportunities for Action". *GeoJournal*. <https://doi.org/10.1007/s10708023-10916-4>
27. **Ryan, S.C.**, J.D. Runkle, M. M. Sugg, D. Singh, S. Green, and L. Wertis., (2022) "Spatio-temporal clustering of adolescent bereavement in the United States during the extended response to COVID-19: A follow-up study". *Journal of Adolescent Health*. [10.1016/j.jadohealth.2022.08.021](https://doi.org/10.1016/j.jadohealth.2022.08.021)
28. **Ryan, S.C.**, Runkle, J.D., Andersen, L.M., Sugg, M.M. (2022) "Spatial analysis of mental health and suicide clustering among older adults in North Carolina: An exploratory analysis". *Social Science and Medicine -Mental Health*. <https://doi.org/10.1016/j.ssmmh.2022.100162>

PUBLICATIONS UNDER REVIEW

1. **Ryan, S.C.**, Bengchi-Sen, S., Karp, D., Thompson, M.T., Runkle, J.D., and Sugg, M.M. (2025). Risk of substance use emergency department visits among young people: Effect modification by neighborhood context and COVID-19. *Journal of Community Psychology* (Under Review).
2. **Ryan, S.C.**, Runkle, J.D., Hefner, M., and Sugg, M.M (2025). Nighttime air temperature exposure and heat-related illness risk: A small area distributed lag non-linear approach. *Population and Environment*. (Under Review).

3. Monrreal, A.; Sugg, M.M.; **Ryan, S.C.**; Runkle, J.D. (2026). What Finally Makes Farmers Call: Analyzing Help-Seeking Triggers in Agricultural Mental Health Crises. *Journal of Agromedicine*. (Submitted).

CONFERENCE PRESENTATIONS

1. **Ryan, S.C.**, Sugg, M.M., Tyson, J.S., Watkins, O, Blackburn, C. (October 2025). "Mental Health Among Community Volunteers after Hurricane Helene". Appalachian Translational Research Network – *Paper Presentation*.
2. Watkins, O; **Ryan, S**; Sugg, M.M.; Blackburn, C.; Tyson, J.S. (October 2025). "Income and Coping: Understanding the Relationship Between Income and Coping Following Hurricane Helene". Appalachian Translational Research Network – *Poster Presentation*.
3. **Ryan, S.C.**, Sugg, M.M., Ulrich, S.E., Delamater, P.D., Runkle, J.D. (March 2025). "Acute joint effects of warm temperatures and power outage events on maternal health emergency department visits". American Association of Geographers Annual Conference – *Paper Presentation*.
4. **Ryan S.C.**, Sugg, M.M., and Runkle, J.D. (May 2024). "Geospatial perspectives on mental health disparities". Rural Health Disparities Conference. Appalachian State University, Department of Public Health – *Paper Presentation*.
5. **Ryan S.C.**, Sugg, M.M., and Runkle, J.D. (April 2024). "Place-based differences in the association between temperature exposure and heat-related illnesses: A small area distributed lag non-linear approach". American Association of Geographers Annual Conference – *Paper Presentation*.
6. **Ryan S.C.**, Sugg, M.M., Runkle, J.D. and B. Thapa (April 2023). "Greenspace and Adolescent Mental Health: Investigation of Socio-Demographic Effects Modifiers and Recommendations for Community-Level Mental Health Interventions". Appalachian State Research Day -- *Best Poster Winner*
7. Lucero, C; Sugg, M.M and **S.C. Ryan** (April 2023). "Disparities in African American Mental Health during the COVID Pandemic: A spatial clustering analysis of North Carolina, 2016-2021." Appalachian State Research Day -- *Poster Presentation*
8. Ulrich, S.E., Sugg, M.M., **Ryan, S.C.**, and J. Runkle (April 2023). "Spatial Analysis of Maternal Mental Health Conditions in North Carolina: A Retrospective Birth Cohort Study." Appalachian State Research Day – *Poster Presentation*
9. **Ryan S.C.**, Sugg, M.M., Runkle, J.D. and B. Thapa (March 2023). "Investigation of the protective effects of greenspace on adolescent mental health". American Association of Geographers Annual Conference – *Paper Presentation*.
10. **Ryan S.C.**, Sugg, M.M. and J.D. Runkle (February 2022). "Greenspace and mental health: is there an association?". American Association of Geographers Annual Conference – *Poster Presentation*.
11. **Ryan S.C.**, Sugg, M.M. and J.D. Runkle (April 2022). "Greenspace and mental health in rural and urban neighborhoods in North Carolina". NC BREATHE Conference – *Invited Student Speaker*.
12. **Ryan, S.C.**, Wemple, B., Ross, D. (2018). Quantifying stream phosphorus dynamics and total suspended sediment export in forested watersheds in Vermont. Geol. Soc. Amer. Abs. Prog. 50. doi: 10.1130/abs/2018NE-311131. *Poster Presentation*.
13. **Ryan, S.C.**, Hoagland, B., Russo, T., Kim, H., Brantley, S. (2016). Temporal variability in the water chemistry of a first order stream. CUAHSI Biennial Symposium, National Conservation Training Center. *Poster Presentation*.

INVITED TALKS

Bard College: Seminar Series – <i>Invited Speaker</i>	2025
PEW Charitable Trust: Western North Carolina Flood Resilience Symposium – <i>Invited Speaker</i>	2023
University of Vermont: Intro to GIS – <i>Invited Guest Speaker</i>	2022
Appalachian State University: Global Health and Disease – <i>Student Panelist</i>	2022
Appalachian State University Cratis D. Williams School of Graduate Studies – <i>Student Panelist</i>	2022

AWARDS & FELLOWSHIPS

Population Science Trainee , Carolina Population Center	2025-Present
Best Graduate Thesis, Science and Technology , Cratis D. Williams Graduate School Appalachian State University	2023
Domer Research Award , Cratis D. Williams Graduate School Appalachian State University	2023
Chancellor Fellowship Recipient , Cratis D. Williams Graduate School Appalachian State University	2021-23
Diversity Fellowship Recipient , Cratis D. Williams Graduate School, Appalachian State University	2022

North Carolina Tuition Stipend Recipient , Appalachian State University	2022-23
Outstanding Geography Graduate Student , Appalachian State University	May 2023
Outstanding Senior Award – University of Vermont Geography Department Award for Academic Excellence	May 2018
Member of Gamma Theta Upsilon Geographical Honors Society	2017-Present

GRANTS

UNC Collaboratory , WNC Resilience Projects, Community Health Assessment, Co-Primary Investigator Funded, \$20,000	2026
National Hazard Center , Health and Extreme Weather Research Award Program, Primary Investigator <i>Mental Health of Community Volunteers in the Aftermath of Hurricane Helene.</i> Funded, \$50,000	2025
National Institute of Environmental Health Sciences R-21, Co-Investigator <i>Greenspaces and High Temperatures: Exploring Neighborhood Disparities, Usage Patterns, and Health Impacts.</i> Not Funded, \$275,000	2024-26
Appalachian State University RIEEE CONCERT Grant \$5,000	2023-24
National Science Foundation – Human-Environment and Geographical Sciences Grant \$6,000	2022-23
Appalachian State Student and Faculty Excellence Grant \$400, \$200	2022-23
Appalachian State Graduate Student Government Association Grant \$500	2021
Gamma Theta Upsilon Travel Grant \$250	2021
University of Vermont Travel Grant \$500	2016

COURSES TAUGHT

Introduction to Geosystems: An introductory physical geography course covering atmospheric systems, weather systems, climate systems and landscape formation *Fall 2023 & Spring 2024*

Human Geography and Social Justice: An introductory human geography course covering a wide suite of topics related to human geography, including medial geography, population geography, religious geographies, among others. I have taught this course asynchronous online and in-person *Fall 2023 & Spring 2024*

Global Change in the Biosphere: A lab-based course introducing students to research and fieldwork in Geography *Spring 2024*

PEER-REVIEW

Environmental Research, GeoHealth, Health & Place, Journal of Adolescent Health, Environment and Behavior, Landscape and Urban Planning, Public Health, Social Science and Medicine, Journal of Appalachian Health, International Journal of Biometeorology, Nature Mental Health

ADDITIONAL SKILLS

Microsoft, Google, and Adobe suites; QGIS, ArcGIS Desktop and ArcGIS Pro; R, SPSS, GeoDa and SaTScan; Experience coding in CSS, HTML and JavaScript; Bilingual: English and Spanish