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North Carolina State University
Teacher Education and Learning Sciences
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EDUCATION

University of Florida

Ph.D. Science Education 1999

Major concentration: Environmental Education

Dissertation: *The Influence of Outdoor School Yard Experiences on Elementary Students' Environmental Knowledge, Attitudes, Behaviors, and Comfort Levels*

University of Florida

M.Ed. Science Education 1992

University of Central Florida

B.S. Elementary Education 1988

PROFESSIONAL EXPERIENCE

Department Head, Professor

Teacher Education and Learning Sciences, North Carolina State University 2025-2028

Interim Department Head, Professor

Teacher Education and Learning Sciences, North Carolina State University 2024-2025

Professor, Science Education, with tenure

2021 - present

Department of Teacher Education and Learning Sciences, North Carolina State University

TELS Graduate Program Coordinator 2016 - 2023

Associate Professor, Science Education, with tenure

2013 - 2021

Department of Teacher Education and Learning Sciences, North Carolina State University

ELM Director of Graduate Programs 2014-2016

Assistant Professor, Science Education

2007 – 2013

Department of Elementary Education (ELM), North Carolina State University

Raleigh, NC

Assistant Professor, Science Education

2005 - 2007

Department of Curriculum and Teaching, Auburn University, Auburn, AL

Adjunct Assistant Professor, Science Education

2000 - 2005

School of Teaching and Learning, University of Florida, Gainesville, FL

Teacher, Elementary School

1988 - 2005

Alachua County Public School System, Gainesville, FL

PUBLICATIONS

*Journal Articles (Indicates work with: * graduate students, **teachers)*

- Carrier, S.J.**, Scharen, D., Hayes, M., Smith, P.S., Craven, L., McGowan, J., Goforth, C., Bruce, A., Safley, S., Sachs, L. (accepted). Incorporating citizen science in elementary schools: Teacher and student experiences with outdoor learning. *Electronic Journal of Research for Science and Mathematics Education*
- Smith, P. S., Goforth, C., **Carrier, S.**, Hayes, M. (2025). An emerging theory of school-based citizen science. *Citizen Science: Theory and Practice*, 10(1), 1-10. <https://doi.org/10.5334/cstp.755>
- Carrier, S.J.**, Scharen, D.R., Hayes, M., Sean, P.S., Bruce, A., Craven, L. (2024). Citizen science in elementary classrooms: A tale of two teachers. *Frontiers in Education*, 9. <https://doi.org/10.3389/educ.2024.1470070>
- *Fiocca, S., **Carrier, S.J.**, *McGowan, J. (2024). Turning science lessons inside out: Professional development for elementary school teachers' outdoor instruction. *Journal of Outdoor Recreation, Education, and Leadership*, 16(4), 15-31.
- Carrier, S.J.**, Minogue, J., *Fraulo, A.B. (2024). Examining novice teachers' developing teacher practices: planning for instruction and discourse. *Journal of Science Teacher Education*, 36(1), 118-137. <https://doi.org/10.1080/1046560X.2024.2378623>
- Grifenhagen, J.F., **Carrier, S.J.**, Scharen, D. (2024). Touch-talk-text: An approach to integrating science and literacy in every classroom. *Literacy Today*, 75(2), 147-156.
- Fraulo, A.B., **Carrier, S.J.** & Busch, K.C. (2024). The making of an outdoor educator: A phenomenological mixed methods study of identity through voice and discourse. *International Journal of Science Education Part B*, 1-19.
- Carrier, S.J.**, Sachs, L., *McGowan, J., Hayes, M., Smith, P.S., Goforth, C., Safley, S. (2024). Elementary teachers as collaborators: Developing educative support materials for citizen science projects. *International Journal of Science Education*, 47(1), 107-127. <https://doi.org/10.1080/09500693.2024.2311801>
- Carrier, S.J.**, *Fraulo, A., *Romeo, L., Stevenson, K.T., Peterson, M.N. (2023). Teachers as learners: Lessons about science, outdoors, and students. *Electronic Journal of Research in Science and Mathematics Education*, 27(2), 1-24.
- *Rende, K., Jones, M.G., *Refvem, E., **Carrier, S.J.**, Ennes, M. (2023). Accelerating high school students' STEM career trajectories through informal science volunteer programs. *International Journal of Science Education*, 13(1), 28-39. <https://doi.org/10.1080/21548455.2022.2100942>
- Jones, M.G., Nieuwsma, J., Rende, K., **Carrier, S.**, Refvem, E., Delgado, C., Grifenhagen, J., Huff, P. (2022). Leveraging the epistemic emotion of awe as a pedagogical tool to teach science. *International Journal of Science Education*, 44(16), 2485-2504.
- Thomson, M.M., Huggins, E, **Carrier, S.**, & Gray, D. (2022). Developmental trajectories for elementary novice teachers: Teaching efficacy, instructional beliefs, and domain knowledge. *International Journal of Science Education*, 44(8), 1277-1298. <https://doi.org/10.1080/09500693.2022.2075948>
- *Gibson, L, Busch, K.C., Stevenson, K., Cutts, B., DeMattia, E., Aguilar, A. Ardoin, N., **Carrier, S.J.**, Clark, C., Cooper, C., Feinstein, N.W., Goodwin, J., Peterson, N., & Wheaton, N. (2022). What is community-level

environmental literacy and how can we measure it? A report of a convening to conceptualize and operationalize CLEL. *Environmental Research*, 28(10), 1423-1451.
<https://doi.org/10.1080/13504622.2022.2067325>

- Kendall, C., **Carrier, S.J.**, Folta, E., Tinka, J., *Fraulo, A., Leeds, A., Lukas, K.E (2022). Can teacher-centered community-based conservation programs influence student household sustainable behaviors near a biodiversity hotspot. *Conservation Science and Practice*, 4(4) e12648. (2020 impact factor 3.233).
<https://conbio.onlinelibrary.wiley.com/doi/pdf/10.1111/csp2.12648>
- Carrier, S.J.**, Grifenhagen, J.F., & *Scharen, D.R. (2021). The language of science: Touch, talk, text. *Science and Children*, 59(2), 48-52.
- *Hartley, J.M., Stevenson, K.T., Peterson, M.N., Busch, K.C., **Carrier, S.J.**, DeMattia, E.A., Jambeck, J.R., Lawson, D.F., Strnad, R. L. (2021). Intergenerational learning: A recommendation for engaging youth to address marine debris challenges. *Marine Pollution Bulletin* 170, 112648. (2020 Impact factor 5.553)
- Grifenhagen, J.F., **Carrier, S.J.**, *Scharen, D. & **Fiocca, S. (2021). Touch-talk-text: Science practices and language for reading comprehension. *The Reading Teacher*, 75(2), 147-156.
 DOI: <https://doi.org/10.1002/trtr.2033>
- *Refvem, E., Jones, M.G., *Rende, K., **Carrier, S.**, Ennes, M. (2021). The next generation of science educators: Museum volunteers. *Journal of Science Teacher Education*, 1-18. DOI: 10.1080/1046560X.2021.1929713
<https://doi.org/10.1080/1046560X.2021.1929713>
- Stevenson, K.T., Szczytko, R., **Carrier, S.J.**, & Peterson, M.N. (2021). How outdoor science education can help girls stay engaged with science. *International Journal of Science Education*, 43(7), 1090-1111.
- Jones, M.G., Lee, T., **Carrier, S.**, Madden, L., Cayton, E., Chesnutt, K., Ennes, M., *Huff, P., & *Phillips, L. (2020). White lab coats and elementary students' science self-concept and science self-efficacy. *Science Educator*, 28(1), 1-9.
- Carrier, S.J.**, Jones, M.G., Ennes, M., Madden, L., Lee, T., Cayton, E., Chesnutt, K., *Huff, P., *Phillips, L., & *Bellino, M. (2020). Stereotypes of scientists: Seeds of progress and recommendations for elementary teachers. *Science Educator*, 27(2), 1-7.
- Carrier, S.J.** & Grifenhagen, J.F. (2020). Academic vocabulary support for elementary science pre-service teachers. *Journal of Science Teacher Education*, 31(2), 115-133.
 DOI: <https://doi.org/10.1080/1046560X.2019.1666631>
- Jones, M. G., Lee, T., Chesnutt, K., **Carrier, S.**, Ennes, M., Cayton, E., Madden, L., & *Huff, P. (2019). Encloded cognition: Putting lab coats to the test. *International Journal of Science Education*, 41(14), 1962-1976. DOI: 10.1080/09500693.2019.1649504.
- *Lawson, D., Stevenson, K.T., Peterson, M.N. **Carrier, S.J.**, Strnad, R. Seekamp, E. (2019). Children can foster climate change concern among their parents. *Nature Climate Change*, 9(6), 458-462. DOI: 10.1038/s41558-019-463-3. Impact factor 19.2 (2 year); 22.4 (5 year).
- Stevenson, K.T., Peterson, M.N., **Carrier, S.**, Strnad, R.L., Olson, R. E., Szczytko, R. E. (2019). Making the case for a null effects framework in environmental education and K-12 academic outcomes: When 'just as good' is a great thing. *Frontiers*. DOI: 10.3389/fcomm.2018.00059. Impact factor 6.4.

- *Lawson, D., Stevenson, K.T., Peterson, N., **Carrier, S.J.** (2018). Evaluating climate change behaviors and concern in the family context. *Environmental Education Research*, 25(5), 678-690.
DOI: 10.1080/13504622.2018.1564248. Impact factor 2.255
- Thomson, M.M., & *DiFrancesca, D., **Carrier, S.**, *Lee, C. & Walkowiak, T. (2018). Changes in teaching efficacy beliefs among elementary preservice teachers from a STEM-focused program: Case study analysis. *Journal of Interdisciplinary Teacher Leadership*, 2(1), 29-43.
- *Lawson, D., Stevenson, K.T., Peterson, M.N. **Carrier, S.J.**, Strnad, R. Seekamp, E. (2018). Intergenerational Learning: Are children key in spurring climate action? *Global Environmental Change*, 53, 204-208.
DOI: 10.1016/j.gloenvcha.2018.10.002. Impact factor 9.05.
- Carrier, S.J.** *Whitehead, A.N., Minogue, J., & *Kimble, R.S. (2018). Novice elementary teachers' developing visions of effective science teaching. *Research in Science Education*, 1-25.
DOI: 10.1007/s11165-018-9742-7. Impact Factor 1.78
- *Szczytko, R., **Carrier, S.**, & Stevenson, K.T. (2018). Impacts of outdoor environmental education on attention, behavior, and learning outcomes for students with emotional, cognitive, and behavioral disabilities. *Frontiers*, 3, 46. DOI: 10.3389/feduc.2018.00046. Impact factor 6.4.
- Carrier, S.J.**, *Hoyle, K.S., & *Luginbuhl, S.C. (2017). Bringing informal science education to elementary preservice teacher preparation: Expanding the vision. *Journal of Interdisciplinary Teacher Leadership*, 1(3), 32-37.
- Carrier, S.J.**, *Whitehead, A.N., Walkowiak, T.A., *Luginbuhl, S.C., & Thomson, M.M. (2017). The development of elementary teacher identities as teachers of science. *International Journal of Science Education*, 39(13), 1733-1754. DOI: [10.1080/09500693.2017.1351648](https://doi.org/10.1080/09500693.2017.1351648). Impact factor 1.85
- Sondel, B., Koch, J., Walkowiak, T., & **Carrier, S.** (2017). Toward a theory of teacher education for justice-oriented STEM. *Catalysts*, 7(1), 38-52. Impact factor 2.0
- *Adams, E. L., **Carrier, S. J.**, Minogue, J., Porter, S. R, McEachin, A., Walkowiak, T. A., & Zulli, R.A. (2017). The development and validation of the Instructional Practices Log in Science (IPL-S). *International Journal of Science Education*, 39(3), 335-357.
- Thomson, M.M., & *DiFrancesca, D., **Carrier, S.**, *Lee, C. & Walkowiak, T. (2016). Teaching efficacy: Exploring relationships between mathematics and science self-efficacy beliefs, PCK, and domain knowledge among pre-service teachers in the United States, *Teacher Development*, 21(1), 1-20. DOI: 10.1080/13664530.2016.1204355.
- Carrier, S.J.**, Faulkner, V.N., & Bottomley, L. (2016). Walking the walk: An integrated STEM project for elementary teachers. *Journal of Interdisciplinary Teacher Leadership*, 1(1), 25-29.
- *Tugurian, L.P., & **Carrier, S.J.** (2016). Children's environmental identity and the elementary science classroom. *Journal of Environmental Education*, 48(3), 143-153. DOI: 10.1080/00958964.2016.1191415.
- *Stevenson, K.T., **Carrier, S.J.**, Peterson, M.N. (2014). Evaluating strategies for inclusion of environmental literacy in the elementary school classroom. *Electronic Journal of Science Education*. 18(8), 1-17.
- *Stevenson, K. T., Peterson, M. N., Bondell, H. D., Moore, S. E., & **Carrier, S. J.** (2014). Overcoming skepticism with education: Interacting influences of worldview and climate change knowledge on perceived climate change risk among adolescents. *Climatic Change*. DOI: 10.1007/s10584-014-1228-7.

- *Stevenson, K.T., Peterson, M.N., **Carrier, S.**, Strnad, R., Bondell, H.D., Kirby-Hathaway, T., & Moore, S.E. (2014). Role of significant life experiences in building environmental knowledge and behavior among middle school students. *Journal of Environmental Education*, 43(3), 163-177.
- Carrier, S.J.**, Thomson, M.M., & *Tugurian, L.P., Stevenson, K.T. (2014). Elementary science education in classrooms and outdoors: Stakeholder views, gender, ethnicity, and testing. *International Journal of Science Education*, 36(13), 2195-2220.
- *Albert, J. L., Blanchard, M. R., *Kier, M. W., **Carrier, S. J.**, & Gardner, G. E. (2014). Supporting teachers' technology integration: A descriptive analysis of social and teaching presence in technical support sessions. *Journal of Technology and Teacher Education*, 22(2), 137-165.
- McIntyre, E., Walkowiak, T., Thomson, M., **Carrier, S.**, *Lee, C., *Grieve, E., Lowe, R., Maher, M., Difrancesca, D. (2013). A STEM-focused elementary teacher preparation program: Student and alumni perceptions. *Teacher Education and Practice*, 26(4), 670-687.
- Carrier, S.J.** & *Rex, E. (2013). Learning the ropes about electricity. *Science and Children*, 50(7), 36-39.
- ***Carrier, S.J.**, *Tugurian, L.P. & Thomson, M.M. (2013). Elementary science indoors and out: Teachers, time, and testing. *Research in Science Education*, 43(5), 2059-2083.
- Carrier, S.** (2013). Elementary preservice teachers' science vocabulary: Knowledge and application. *Journal of Science Teacher Education*, 24(2), 405-425.
- Carrier, S.** (2012). Climate change education in elementary school. *Journal for Activist Science & Technology Education*, 4(1), 40-44.
- Carrier, S.**, **Scott, C., & **Hall, D. (2012). Soundsational science. *Science Activities*, 49(1), 1-6.
- Carrier, S.**, Wiebe, E. N., Gray, P., & Teachout, D. (2011). BioMusic in the classroom: Interdisciplinary elementary science and music curriculum development. *School Science and Mathematics*, 111(8), 425-434. DOI: <https://doi.org/10.1111/j.1949-8594.2011.00116.x>
- Carrier, S.** (2011). Effective strategies for teaching science vocabulary. LEARN North Carolina: UNC-Chapel Hill, NC. <http://www.learnnc.org/lp/pages/7079>.
- Carrier, S.** (2011). Implementing and integrating effective teaching strategies including features of lesson study in an elementary science methods course. *The Teacher Educator*, 46(2), 145-160.
- ***Class of 2012 - Identified by Routledge Education for a collection of the most downloaded articles from all Routledge Education journals.***
<http://www.educationarena.com/pdf/classof2012/ScienceMathematicsEnvironmentalEducation.pdf>.
- Carrier, S.** & **Thomas, A. (2010). Potato problem solving. *Science & Children*, 47(7), 33-37.
- Carrier, S.** (Fall, 2009). Survey of elementary teachers' views on science teaching and its implications for self-efficacy and teacher attrition, *Florida Association of Science Teachers (FAST) journal*, 26(1), 22-23.
- Carrier, S.** (2009). The effects of outdoor science lessons with elementary school students on preservice teachers' self-efficacy. *Journal of Elementary Science Education*, 21(2), 35-48.
- Carrier, S.** (2009). Environmental education in the schoolyard: Learning styles and gender. *Journal of Environmental Education*, 40(3), 2-12.

Carrier, S. & **Thomas, A.** (2008). Button basics. *Science and Children*, 45(5), 21-23.

Carrier, S. (2007). Gender differences in attitudes towards environmental science. *School Science and Mathematics*, 107(7), 271-278.

Carrier, S. J. (2006). The road to stress-free science fairs: A long-term approach to learning inquiry takes the stress out of science fairs. *Science and Children*, 44(1), 36-39.

Pringle, R.M & **Carrier Martin, S.** (2005). The potential of upcoming high-stakes testing on the teaching of science in elementary classrooms. *Research in Science Education*, 35, 347-361.

Martin, S.C. & Pringle, R.M. (Spring, 2005). Testing in science: Teachers' views and the influence on their practices in elementary classrooms. *Florida Educational Leadership*, 5(2), 59-64.

Martin, S.C. (2003). The influence of outdoor schoolyard experiences on students' environmental knowledge, attitudes, behaviors, and comfort levels. *Journal of Elementary Science Education*, 15(2), p. 51-56.

Pringle, R.M., **Martin, S.C.**, & Jones, G. (Fall, 2001) College of Education and P.K. Yonge Developmental Research School: Collaborators in science education. *National Association of Laboratory Schools Journal*. 1-3.

MANUSCRIPTS IN REVIEW

Smith, P.S., Peterson, E.S., Carrier, S.J., Goforth, C.L., Hayes, M.L., Sachs, L.H., Scharen, D.R., Bruce, A.D., Craven, L.M., McGowan, J.M., Safley, S.E. (submitted 6.24.25). Elementary teachers' use of educative support materials for participatory science projects: Affordances, obstacles, and impacts. *Journal of Research in Science Teaching*

*Refvem, E., *Rende Mendoza, K., Jones, M.G., Carrier, S., *Nieuwsma, J., Lee, T., & Taylor, A. (In Review). Pathways to teaching: How early STEM experiences inspire careers in science education. *International Journal of Science Education, Part B*.

MANUSCRIPTS IN PREPARATION

Scharen, D.R., & **Carrier, S.J.** Identifying the realities of science and literacy integration in primary classrooms: Sharing expert voices of teachers and teacher educators. *Journal of Science Teacher Education*

Smith, P.S., Scharen, Goforth, C., D.R, Hayes, M., **Carrier, S.J.** Educative support materials: Citizen science support for elementary school teachers. *International Journal of Science Education*

Carrier, S.J., Scharen, D.R., Hayes, M., Safley, S. Supporting elementary science instruction: Interdisciplinary connections in citizen science

BOOKS

Edited Books

Luft, J., & Jones, M. G. (Eds.). (2022). *Handbook of research on science teacher education*. Routledge, Taylor & Francis Group. (**Carrier, S.J.**, Editor Section 2: Initial Science Teacher Education - Core Areas)

Smith, A.C., & **Carrier, S.J.** (Eds.). (2020). *Thirty great North Carolina science adventures: From underground wonderlands to islands in the sky and everything in between*. A Southern Gateways Guide. Chapel Hill, NC: University of North Carolina Press.

Book Chapters

Carrier, S. J. & Jones, M.G. (2024). Getting down and dirty. In S. (S. K.) Jeong, L. A. Bryan, D. J. Tippins, and C. M. Sexton (Eds.) *Navigating elementary science teaching and learning: Cases of classroom practices and dilemmas* (pp. 409-413). Cham: Springer International Publishing.

*Szczytko, R., **Carrier, S.**, & Stevenson, K.T. (2019). Positive impacts of outdoor environmental education on attention, behavior, and learning outcomes for students with emotional, cognitive, and behavioral disabilities. In Ming Kuo & Cathy Jordan (Eds.), *The natural world as a resource for learning and development: From schoolyards to wilderness*. Frontiers Media.

Carrier, S.J., & Stevenson, K.T. (2017). Children experiencing the outdoors: A natural setting for learning. In Eija Kimonen and Raimo Nevalainen (Eds.), *Reframing school education: A comparative view*. Rotterdam, the Netherlands: Sense Publishers.

Carrier, S.J., & **Thomas, A. (2012). Potato problem solving: A 5E model addresses misconceptions about thermal insulation. In Eric Brunzell (Ed.), *Integrating engineering and science in your classroom*. Arlington, VA: NSTA Press.

Eick, C., **Carrier, S.**, Keasel, D., & Perez, K. (2010). Summer methods in summer camps: Teaching projects WILD, WET, and Learning Tree at an outdoor environmental education center. In A.M. Bodzin, B.S. Klein, & S. Weaver (Eds.), *The inclusion of environmental education in science teacher education* (pp. 173-189). New York: Springer.

INTERNATIONAL AND NATIONAL CONFERENCE PRESENTATIONS (* indicates work with students)

Goforth, C.L, **Carrier, S.**, Smith, P.S. (2025). *Developing high-quality teacher support material for school-based participatory science - full day workshop*. Conference for Advancing Participatory Science (CAPS). Association for Advancing Participatory Science (AAPS). May 30. Portland, OR

Smith, P.S., Goforth, C.L, **Carrier, S.**, Hayes, M.L., Safley, S.E., Scharen, D.R. (2025). An emerging theory of school-based participatory science. Conference for Advancing Participatory Science (CAPS). Association for Advancing Participatory Science (AAPS). May 27-30. Portland, OR

Carrier, S.J., Scharen, D.R., Smith, P.S., Goforth, C., Hayes, M. (2025). *Citizen Science supports for elementary school teachers: Connecting science across disciplines*. National Association for Research in Science Teaching (NARST). March 23-26. National Harbor, MD.

Smith, P.S., Goforth, C.L., **Carrier, S.J.**, Hayes, M.L., Safley, S.E., Scharen, D.R. (2025). *An emerging theory of school-based citizen science*. National Association for Research in Science Teaching (NARST). March 23-26. National Harbor, MD.

Bordewieck, K., Jones, M. Gail, Ward, R., **Carrier, S.**, Manfra, M., Stallard, M. Ferdous, T., Meeks, M., Fiocca, S., Shaver, B. (2025). *How do high school students see climate change? Examining climate change visualizations in lesson plans*. National Association for Research in Science Teaching (NARST). March 23-26. National Harbor, MD.

- Goforth, C.L., Smith, P.S., & **Carrier, S.J.** (2024). *An emerging theory of school-based citizen science*. Citizen Science Association (CSA). June 6.
- Carrier, S.J.**, Scharen, D.R. (2024). *Elementary school teachers' use of educative support curricula: Citizen science projects in science instruction*. NARST - A global organization for improving science education through research. March 17-20. Denver, CO.
- Smith, P.S. & **Carrier, S.J.** (2024). *Citizen science in elementary classrooms: A tale of two teachers*. NARST - A global organization for improving science education through research. March 17-20. Denver, CO.
- Carrier, S.J.**, *McGowan, J., Sachs, L., Goforth, C.L., Smith, P.S., Hayes, M., Safley, S. (2024) *Elementary teachers' implementation of citizen science in their classroom using educative support materials*. Association of Science Teacher Education (ASTE). January 10-13. New Orleans, LA.
- Scharen, D.R., **Carrier, S.J.** (2024) *Preparing to teach science in a literacy-focused school day: Elementary pre-service teachers' reflections of the Touch-Talk-Text science instructional model*. Association of Science Teacher Education (ASTE). January 10-13. New Orleans, LA.
- *Fiocca, S., **Carrier, S.J.**, & *McGowan, J. (2024) *Turning the classroom inside out: Supporting elementary teachers' outdoor learning*. Coalition for Education in the Outdoors (CEO). January 11-14. Black Mountain, NC.
- Carrier, S.J.** & *McGowan, J. (2024). *Incorporating citizen science in elementary schools: Teacher and student experiences with outdoor learning*. Coalition for Education in the Outdoors (CEO). January 11-14. Black Mountain, NC.
- *McGowan, J. & **Carrier, S.J.**, Smith, P.S., Goforth, C., Sachs, L., Hayes, M., Safley, S., Scharen, D.R. (2023). *Students as scientists: How citizen science intersects with outdoor learning*. North American Association for Environmental Education (NAAEE). Research Symposium. October 12-13. Virtual Conference
- Carrier, S.J.**, & *McGowan, J., Smith, P.S., Goforth, C., Sachs, L., Hayes, M., Safley, S., Scharen, D.R. (2023). *Supporting elementary teachers' citizen science instruction*. North American Association for Environmental Education (NAAEE). Research Symposium. October 12-13. Virtual Conference.
- Goforth, C.L., **Carrier, S.J.**, & Smith, P.S. (2023). *Identifying essential features for successful teacher support for in-school citizen science*. Citizen Science Association (CSA). May 15-26. Tempe, AZ.
- Carrier, S.J.**, Hensler, L., *McGowan, J., Smith, P.S. (2023). *Elementary teachers as collaborators: Developing educative support materials for citizen science projects*. National Association for Research in Science Teaching (NARST). April 18-21. Chicago, IL.
- Carrier, S.J.**, Goforth, C., & Smith, P.S. (2022) *It's raining ladybugs: Supporting elementary teachers' citizen science*. North American Association for Environmental Educators (NAAEE) Research symposium, October 11-12. Tucson, AZ.
- *Fraulo, A.B., & **Carrier, S.J.** (2022). *Development and validated results of outdoor educator identity research instrument*. North American Association for Environmental Educators (NAAEE) Research symposium, October 11-12. Tucson, AZ.
- Luft, J., Jones, M.G., **Carrier, S.J.**, Jackson, D.F., Madden, L., Park, S., Mamlock-Naaman, R., & Paves, J. (2022). *Symposium-The Handbook of Research in Science Teacher Education: Current and future*

directions for research. National Association for Research in Science Teaching (NARST), March 27-March 30, 2022. Vancouver, British Columbia, Canada.

Carrier, S.J. & *Scharen, D.R. (2022). *Teacher educators and elementary teachers share goals for authentic science and literacy integration in the 20th century realities of 21st century classrooms*. National Association for Research in Science Teaching (NARST), March 27-March 30, 2022. Vancouver, British Columbia, Canada.

Carrier, S.J. & *Fraulo, A.B., Kendall, C., Leeds, A., John, T., Folta, E., Lukas, K.E. (2022). *UNITE for the environment: Examining the impact a sustainable livelihoods program on pro-environmental behaviors in Ugandan student households near a biodiversity hotspot*. National Association for Research in Science Teaching (NARST), March 27-March 30, 2022. Vancouver, British Columbia, Canada.

*Refvem, E.J., Jones, M.G., **Carrier, S.J.**, *Rende, K., *Nieuwsma, J., Lee, T.D., & Taylor, A.R. (2022). *An expanded understanding of the influence of antecedent socialization on the choice to become a science teacher*. National Association for Research in Science Teaching (NARST), March 27-March 30, 2022. Vancouver, British Columbia, Canada.

*Scharen, D.R., & **Carrier, S.J.** (2022). *Blending elementary science and literacy: Teachers' calls for support*. Association of Science Teacher Education (ASTE), January 6-8, 2022. Greenville, SC.

Refvem, E., Jones, M.G., **Carrier, S.**, Lee, T., Taylor, A., Nieuwsma, J., Rende, K. (2022, January 5-8). *The influence of role-taking experiences and individuals on science teaching career choice* [Paper presentation]. Association of Science Teacher Education (ASTE) Conference, Greenville, SC, United States.

*Rende, K., Jones, M.G., *Nieuwsma, J., **Carrier, S.**, Delgado, C., Grifenhagen, J., Gordon, K., *Refvem, E., & *Huff, P. (2021, August). *Evoking awe: Incorporating epistemic emotions in science instruction*. [Paper presentation]. European Science Education Research Association (ESERA) Conference, August 30-September 3, 2021. (virtual)

*Nieuwsma, J., Jones, M. G., *Rende, K., *Refvem, E., **Carrier, S. J.**, Delgado, C., Grifenhagen, J. F.(2021). *Gasps and chills: teachers' perceptions of awe in science instruction.*, European Science Education Research Association Annual Conference, European Science Education Research Association, Virtual.

*Refvem, E., Jones, M.G., **Carrier, S.**, Lee, T., Taylor, A., *Nieuwsma, J., *Rende, K. (2021). *Formative experiences that influence science teacher career aspirations*. [Paper presentation]. European Science Education Research Association (ESERA) Conference, August 30-September 3, 2021. Braga, Portugal.

*Rende, K., Jones, M.G., *Refvem, E., **Carrier, S.**, *Nieuwsma, J. (2021). *Selecting for success: A review of application-based informal science programs for high schoolers* [Roundtable Session]. American Educational Research Association Conference. April 9-12, 2021. Covid-based virtual conference.

*Refvem, E., Jones, M.G., *Rende, K., *Nieuwsma, J., **Carrier, S.**, Ennes, M. (2021). *Nurturing science teaching career aspirations in a museum volunteer program* [Roundtable Session]. American Educational Research Association (AERA) Annual Meeting, April 9-12, 2021. Covid-based virtual conference.

*Nieuwsma, J., Jones, M. G., *Rende, K., *Refvem, E., **Carrier, S. J.**, Grifenhagen, J. F., Delgado, C. *Huff, P., *Teachers' sense of awe: A tool for teaching science*, AERA, American Educational Research Association (AERA) Annual Meeting, April 9-12, 2021. Covid-based virtual conference.

- *Nieuwsma, J., Jones, M. G., *Rende, K., **Carrier, S. J.**, Grifenhagen, J. F., Delgado, C., Huff, P. (2021). *Evoking meaning and connection: Using awe to teach science*, National Association for Research in Science Teaching Educational Research Association (NARST). April 7-10, 2021. Covid-based virtual conference.
- *Rende, K., Jones, M.G., *Refvem, E., **Carrier, S.**, Ennes, M. (2021). "A Leg Up": Accelerating high school students' career trajectories through informal STEM programs [Paper Presentation]. National Association for Research in Science Teaching Educational Research Association (NARST). April 7-10, 2021. Covid-based virtual conference.
- *Leavens, T., *Alexander, A., *Boulden, D., **Carrier, S.**, *Rachmatullah, A. & Wiebe, E. (2021) *Science teaching efficacy beliefs and outcome expectancy among national board certified teachers*. American Education Research Association (AERA). April 9-12, 2021 Covid-based virtual conference.
- Carrier, S.J.**, Jones, M.G., *Nieuwsma, J, *Rende, K., *Refvem, E. (2021). *Teachers' feelings of awe: An examination of the role of awe in science instruction and student learning*. Association of Science Teacher Education (ASTE). January 14-15, 2021. Covid-based virtual conference.
- Carrier, S.J.**, *Fraulo, A.B., *Romeo, L.M., Stevenson, K.T. & Peterson, M.N. (2020). *Supporting elementary teachers' pedagogical change to include outdoor learning*. North American Association for Environmental Education (NAAEE). October 8-10, 2020. Covid-based virtual research symposium.
- Stevenson, K.T., *Hartley, J., Lawson, D.F., DeMattia, E., Peterson, M.N., Busch, K.C. **Carrier, S.J.**, & Strnad, R.L. (2020, February). *Youth as community change agents: How marine and coastal education are shaping how communities view coastal challenges*. NOAA Social Coast Forum, Charleston, SC.
- Carrier, S.J.**, Minogue, J., & *Fraulo, A.B. (2020). *Elementary teachers' first year as teachers: Negotiating science instruction and discourse* Association for Science Teacher Education. (ASTE), January 8-11. San Antonio, TX.
- Lee, T., Jones, M.G., Chesnutt, K., **Carrier, S.**, Madden, L., Cayton, E., & Ennes, M. (2019). *What you wear can make a difference in elementary students' perceptions of STEM careers*. Paper presented at the European Science Education Research Association. (ESERA), August 26-30. Bologna, Italy.
- Jones, M. G., Ennes, M., Lee, T., **Carrier, S.**, Madden, L., Cayton, E., Chesnutt, K., *Huff, P., *Phillips, L., (2019). *The effect of white lab coats on elementary students' science self-concept*. American Educational Research Association. April 5-9. Toronto, CA.
- Carrier, S.J.**, Minogue, J., & *Fraulo, A.B. (2019). *Examining novice teachers' developing teacher practices: Planning for instruction and discourse*. National Association for Research in Science Teaching. (NARST), March 30-April 3. Baltimore, MD.
- *George, S., & **Carrier, S.J.** (2019). *An evaluation of training transfer for citizen scientists in a large-scale water quality research project*. Citizen Science Association (CitiSci2019), March 13-17, 2019. Raleigh, NC.
- *Hartley, J., Stevenson, K.T., Peterson, M.N., Strnad, R., **Carrier, S.J.**, Busch, K.C., Diamatta, E., Bondel, H., Lawson, D. (2019). *Students as environmental change agents: investigating the empowerment of students to make discoveries and community-level change through citizen science*. Citizen Science Association (CitiSci2019), March 13-17, 2019. Raleigh, NC.
- Carrier, S.J.**, Grifenhagen, J.F., *Corsi-Kimble, R. (2019). *Elementary pre-service teachers' preparation of science vocabulary and instruction strategies*. Association for Science Teacher Education (ASTE), January 2-5, 2019. Savannah, GA.

- *Ennes, M., Jones, M.G., Lee, T., **Carrier, S.** Madden, L., Cayton, E., *Chestnutt, K. *Huff, P. (2019). *Changing stereotypes: Lab coats and science self-concept*. Association for Science Teacher Education (ASTE), January 2-5, 2019. Savannah, GA.
- *Ennes, M., Jones, M. G., Cayton, E., *Phillips, L., *Huff, P., Chesnutt, K., Lee, T., Carrier, S., *Ward, R., (2018). *“Feeling like a real scientist”: Creating tomorrow’s scientists*_Presentation at National Science Teachers Association Regional Conference. Charlotte, NC.
- Jones, M. G., Lee, T., Cayton, E., Madden, L., **Carrier, S.**, Chesnutt, K., Ennes, M., *Huff, P., *Phillips, L., Bellino, M. (2018). *Science identity, encllothed cognition and self-efficacy: Kids in white lab coats*. National Association for Research in Science Teaching. (NARST), March 9-13. Atlanta, GA.
- *Jones, M. G., Lee, T., Chesnutt, K., **Carrier, S.**, Madden, L., Ennes, M., Bellino, M., Cayton, E., *Phillips, L., *Huff, P., (2018). *Encllothed Cognition: The effects of lab Coats on students' science identities and career aspirations*. National Association for Research in Science Teaching. (NARST), March 9-13. Atlanta, GA.
- ***Carrier, S.J.**, Grifenhagen, J.F., *Hunter, D.C., *Kimble, R.S., *Nguyen, H.T. (2018). *Preparing elementary teachers to support academic vocabulary in science*. Association for Science Teacher Education (ASTE), January 3-6, 2018. Baltimore, MD.
- *Grifenhagen, J.F., **Carrier, S.J.**, ** Hunter, D.C., & *Kimble, R.S. (2017). *Supporting elementary pre-service teachers’ science vocabulary knowledge and practice*. Literacy Research Association (LRA). November 29-December 2, 2017. Tampa, FL.
- *Szczytko, R., Stevenson, K. **Carrier, S.**, Strnad, R. (2017). *Leveraging environmental education’s catch-up effect*. North American Association of Environmental Education (NAAEE). October 17-18, 2017, Puerto Rico. (Note: Due to island destruction from Hurricane Maria, the conference was cancelled)
- *Lawson, D, Stevenson, K. **Carrier, S.**, Strnad, R. (2017). *Evaluating climate change education through the lens of intergenerational transfer*. North American Association of Environmental Education (NAAEE). October 17-18, 2017. Puerto Rico. (Note: Due to island destruction from Hurricane Maria, the conference was cancelled).
- * Szczytko, R., Stevenson, K., Peterson, N., **Carrier, S.**, & Strnad, R. (2017, June). *Relationships between children’s outdoor activities and environmental attitudes by gender and race: Alone time outside predicts positive environmental attitudes*. International Symposium for Society and Natural Resource Management, Umea, Sweden.
- *Szczytko, R., Stevenson, K., Peterson, N., **Carrier, S.**, & Strnad, R. (2017, June). *Impacts of environmental education on students with emotional and behavioral disabilities*. International Symposium for Society and Natural Resource Management, Umea, Sweden.
- * Lawson, D.F., Stevenson, K.T., Peterson, M.N., & **Carrier, S.** (2017, June). *Evaluating intergenerational transfer for climate change concern and behavior*. Oral Presentation at the 23rd Annual International Symposium on Society and Resource Management, Umeå, Sweden. (Proposal contribution, did not present)
- * Adams, E., Minogue, J., **Carrier, S.J.**, & Walkowiak, T.A. (2017). *Utilizing an instructional log to examine novice teachers’ science instruction: Profiles of practice*. National Association for Research in Science Teaching (NARST), April 21-25, 2017. San Antonio, TX.
- *Adams, E.L., Walkowiak, T.A., Porter, S.R., **Carrier, S.J.**, & Minogue, J. (2017). *Utilizing instructional profiles to compare graduates’ outcomes: A quasi-experimental evaluation of a STEM-focused elementary*

teacher preparation program. American Association of College and Teacher Education (AACTE), March 2-4, 2017. Tampa, FL.

Carrier, S.J., *Whitehead, A.N., Walkowiak, T.A., *Luginbuhl, S.C., & Thomson, M.M. (2016). *Examining the development of elementary teachers' science teacher identities*. National Association for Research in Science Teaching (NARST), April 14-17, 2016. Baltimore, MD.

***Carrier, S.J.,** *Whitehead, A.N., *Luginbuhl, S.C., & Thomson, M.M. (2016). *Exploring science teacher identity development of elementary teachers*. Association for Science Teacher Education (ASTE), January 7-9, 2016. Reno, NV.

*Luginbuhl, S. & **Carrier, S.J.** (2015). *The influence of an outdoor science professional development program on participants' views of the outdoors as a learning environment*. North American Association for Environmental Education (NAAEE), October 15-18, 2015. San Diego, CA.

Carrier, S.J., *DiFrancesca, D., & *Greive, E.L. (2015). *Examining the relationship of beginning elementary teachers' beliefs and practice*. Paper presented at: National Association for Research in Science Teaching International Conference (NARST), April 11-15, 2015. Chicago, IL.

*Greive, E.L., & Carrier, S.J. (2015). *The use of the science instructional log to understand elementary science instruction*. Paper presented at: National Association for Research in Science Teaching (NARST), April 11-15, 2015. Chicago, IL.

Carrier, S.J., *DiFrancesca, D., *Greive, B., Thomson, M.M. (2015). *STEM-Focused teacher preparation: Discovering a relationship between beginning teachers' beliefs, teaching goals, and enacted practice*. Association for Science Teacher Education (ASTE), January 7-10, 2015. Portland, OR.

Carrier, S.J., *DiFrancesca, D., *Greive, B., Thomson, M.M. (2015). *STEM-Focused teacher preparation: Discovering a relationship between beginning teachers' beliefs, teaching goals, and enacted practice*. Association for Science Teacher Education (ASTE), January 7-10, 2015. Portland, OR.

Carrier, S.J., Stevenson, K.T., Peterson, M.N. (2015). *Supporting environmental literacy in elementary classrooms: Obstacles and solutions*. Association for Science Teacher Education (ASTE), January 7-10, 2015. Portland, OR.

*Greive, E. L., **Carrier, S. J.,** Minogue, J., Walkowiak, T. A., & Zulli, R. A. (2014). *The development of a science instructional log to measure science instructional practices in elementary classrooms*. Paper presented at the Annual Meeting of the American Education Research Association (AERA), April 2-4, 2014. Philadelphia, PA.

*Tugurian, L., & **Carrier, S.** (2014). *Finding a place for the outdoors in elementary school science*. National Association for Research in Science Teaching International Conference (NARST), March 29-April 2, 2014. Pittsburgh, PA.

Carrier, S. & *Tugurian, L. (2014). *Elementary Education in the Outdoors: Addressing gender, ethnicity, and testing*. National Association for Research in Science Teaching International Conference (NARST), March 29-April 2, 2014. Pittsburgh, PA.

Carrier, S.J., Faulkner, V.N., & Bottomley, L. (2014). *Introducing true integration of STEM with elementary pre-service teachers*. Association for Science Teacher Education (ASTE), January 15-18, 2014. San Antonio, TX.

Carrier, S. J. (symposium organizer and presider) (2013). Anderson, C.W., McGinnis, J.R., Walsh, E., Golden,

B. (presenters). *Symposium on climate change: Policies and implications*. National Association for Research in Science Teaching (NARST), March 29-April 2, 2014. Pittsburgh, PA.

Carrier, S.J. (2013) *Climate change and policy implications*. North American Association for Environmental Education (NAAEE), October 8-13, 2013. Baltimore, MD.

***Carrier, S.J.** & *Tugurian, L.P. (2013) *Two elementary schools' efforts toward outdoor instruction*. North American Association for Environmental Education (NAAEE), October 8-13, 2013. Baltimore, MD.

*Thomson, M.M., *Difrancesca, D., McIntyre, E., Porter, S., **Carrier, S.**, Lowe, R. (2013). *Beliefs and knowledge: Exploring relationships between science and mathematics teaching self-efficacy beliefs, PCK and domain knowledge among preservice teachers*. American Educational Research Association (AERA), April 27-May 1, 2013. San Francisco, CA.

***Carrier, S.J.**, Thomson, M.M., & *Tugurian, L.P. (2013). *Elementary science teaching: A mixed-methods analysis of teaching and learning science and environmental science*. National Association for Research in Science Teaching (NARST), April 5-9, 2013. Rio Mar, PR.

***Carrier, S.J.**, & *Difrancesca, D. (2013). *Elementary preservice teachers' developing identities as science teachers during STEM-focused teacher preparation*. National Association for Research in Science Teaching (NARST), April 5-9, 2013. Rio Mar, PR.

Carrier, S. J. (symposium organizer and presider) (2013). Anderson, C.W., McGinnis, J.R., Walsh, E., Golden, B. (presenters). *Symposium on climate change: Policies and implications*. National Association for Research in Science Teaching (NARST), April 5-9, 2013. Rio Mar, PR.

McIntyre, E., Fleener, J., Maher, M., **Carrier, S.** Walkowiak, T., & Faulkner, V. (2013). *STEM-Focused elementary teacher preparation: Program features and research on teacher development and effectiveness*. American Association of Colleges for Teacher Education (AACTE). February 28-March 2, 2013. Orlando, FL.

***Carrier, S.J.**, *Difrancesca, D., & McIntyre, E. (2013). *The relationship of elementary preservice teachers' memories of science and science teaching with their developing identities as teachers of science*. Association for Science Teacher Education (ASTE), January 9-12, 2013. Charleston, SC.

Carrier, S.J. (2012). *Place based practices in school yard settings*. National Science Teachers' Association (NSTA), March 29-April 1, 2012. Indianapolis, IN.

Carrier, S. J. (symposium organizer and presider) (2012). Anderson, C.W., McGinnis, J.R., Phillipson-Mower, T., & Walsh, E. (presenters). *Science education and climate change: Policy in K-12 education in diverse global contexts*. National Association for Research in Science Teaching (NARST), March 25-28, 2012. Indianapolis, IN.

Carrier, S.J., Pop, M. & *Tugurian, L. (2012). *Reflections on outdoor experiences: An analysis of the views expressed by students, parents, and educators*. Association for Science Teacher Education (ASTE), January 4-7, 2012. Clearwater Beach, FL.

Carrier, S.J., Pop, M., & *Tugurian, L. (2011). *Elementary science: Indoor and outdoor learning*. North American Association for Environmental Education (NAAEE), October 12-15, 2011. Raleigh, NC.

Carrier, S. J. (2011). *Communicating science: Sharing words and strategies with preservice teachers*. American Educational Research Association. (AERA), April 8-12, 2011. New Orleans, LA.

- Carrier, S.** (2011), *Elementary preservice teachers' knowledge and application of science vocabulary*. National Association for Research in Science Teaching (NARST), April 3-6, 2011. Orlando, FL.
- Carrier, S.**, Wiebe, E., Gray, P., & Teachout, D. (2010). *BioMusic: Science and music interdisciplinary curriculum development for the elementary classroom*. National Association for Research in Science Teaching (NARST), March 21-24, 2010. Philadelphia, PA.
- Carrier, S.**, Wiebe, E., Gray, P., & Teachout, D. (2010). *Universal BEATS (UBEATS): Connecting science and music in the natural world*. Association for Science Teacher Education (ASTE), January 14-16, 2010. Sacramento, CA.
- Kamen, M., Rogers, M., Pongsnaon, K., Akerson, V., Minogue, J., **Carrier, S.**, Demir, A., Czerniak, C. Alozie, N., & Kim, J. (2009). *Symposium Panel: Reflective practices and professional development through Japanese lesson study*. Symposium for National Association for Research in Science Teaching (NARST), April 17-21 2009. Garden Grove, CA.
- McIntyre, E., Jeffries, M., **Carrier, S.**, & Wiseman, A. (2009). *Enhanced lesson study in teacher education: Focusing on technique in college and elementary classrooms*. American Association of Colleges for Teacher Education (AACTE), February 6-9, 2009. Chicago, IL.
- Carrier, S.** (2009). *Preservice teachers' outdoor science activities with elementary school students impacting their confidence in teaching science*. Association for Science Teacher Education (ASTE), January 7-10, 2009. Hartford, CT.
- Carrier, S.**, Wiebe, E., Gray, P., & Teachout, D. (2009). *Universal BEATS—Interdisciplinary teams: development and implementation of elementary school curriculum connecting science and music*. Association for Science Teacher Education (ASTE), January 7-10, 2009. Hartford, CT.
- Teachout, D., **Carrier, S.**, Gray, P., & Wiebe, E. (2008). *Universal BEATS: Universal BioMusic Education Achievement Tier in Science*. National Science Foundation (NSF) DR K-12 PI Meeting: Transforming STEM Education through Research. November 12-14, 2008. Washington, DC.
- Carrier, S.**, Wiebe, E., Gray, P., & Teachout, D. (2008). *Bringing music into the elementary science classroom*. National Science Teachers Association (NSTA), October 30-November 2, 2008. Charlotte, NC.
- Carrier, S.** (2008). *Gender differences in elementary school students' environmental education*. National Association for Research in Science Teaching (NARST), March 30-April 2, 2008. Baltimore, MD.
- Carrier, S.** (2008). *Schoolyard science meeting the needs of boys and girls*. Association for Science Teacher Education (ASTE), January 10-12, 2008. St. Louis, MO.
- Carrier, S.** (2007). *The role of gender in environmental education in the schoolyard*. National Association for Research in Science Teaching (NARST), April 15-18, 2007. New Orleans, LA.
- Carrier, S.** (2007). *The importance of using accurate terminology in the elementary science classroom*. Association for Science Teacher Education (ASTE), January, 2007. Clearwater, FL.
- Carrier, S.** (2006). *Science fairs for learning*. International Consortium for Research in Mathematics and Science Education (ICRSME), March 9-11, 2006. Nassau, Bahamas.
- Carrier, S.J.**, & Pringle, R.M. (2006). *The impact of high-stakes science testing in elementary schools in Florida*. International Consortium for Research in Mathematics and Science Education, (ICRSME), March, 9-11, 2006. Nassau, Bahamas.

- Carrier, S.,** & Dresden, J. (2006). *From project approach to inquiry*. Eastern Education Research Association, (EERA), February 23-24, 2006. Hilton Head, S.C.
- Carrier, S.J.,** & Pringle, R.M. (2006). *The impact of high-stakes testing in science in elementary classrooms*. Association of Science Teacher Education (ASTE), January 12-14, 2006. Portland, OR.
- Pringle, R. & **Martin, S.** (2003). *The tests are coming*. National Association of Research in Science Teachers (NARST), March, 2003. Philadelphia, PA.
- Pringle, R. & **Martin, S.** (2003). *Teaching, testing, and learning: The impact of upcoming science testing on the teaching of science in elementary classrooms*. Association for Education of Teachers of Science (AETS), January-February, 2003. St. Louis, MO.
- Martin, S.,** Pringle, R., Jones, G. (2001). *Collaboration between University of Florida and P.K.Yonge Laboratory School*. National Association of Laboratory Schools (NALS), February 16, 2001. Gainesville, FL.

REGIONAL CONFERENCE PRESENTATIONS

- Carrier, S.J., Goforth, C., & McGowan, J. (2024). *Citizen science in elementary classrooms: Taking learning outdoors*. Environmental Educators of North Carolina. (EENC), September 13-14. Salisbury, NC.
- Jones, G., **Carrier, S.,** Manfra, M., Ward, R., Nieuwsma, J., Bordwieck, K., Stallard, M., Meeks, A., Ferdous, T., Shaver, B., Fiocca, S. (2023) *Climate change instruction: Science teachers' perspectives, experiences, and instructional visual displays*. Catalyst Research Symposium, October 3, 2023. NC State University. Raleigh, NC.
- Fiocca, S., McGowan, J., **Carrier, S.J** (2022). Taking elementary school lessons outside. . North Carolina Science Teachers' Association (NCSTA). November 3-4. Winston-Salem, NC.
- McGowan, J., **Carrier, S.J.,** Smith, P.S. (2022). *Citizen science in elementary classrooms*. North Carolina Science Teachers' Association (NCSTA). November 3-4. Winston-Salem, NC.
- Carrier, S.,** Goforth, C., & McGowan, J. (2022). *Supporting elementary teacher learning for citizen science*. Environmental Educators of North Carolina. (EENC), September 9-10. Raleigh, NC.
- Fraulo, A., & **Carrier, S.** (2022). *Connecting educators and researchers through the development of an outdoor educator positional identity survey instrument*. Environmental Educators of North Carolina. (EENC), September 9-10. Raleigh, NC.
- Fiocca, S., McGowan, J., & **Carrier, S.** (2022) *Turning your lessons inside out*. Environmental Educators of North Carolina. (EENC), September 9-10. Raleigh, NC.
- *Scharen, D., & **Carrier, S.J.** (2021). *Bridging elementary science and literacy: Sharing experts' voices*. Mid Atlantic Association for Science Teacher Education (MA-ASTE). September 23-25, Blowing Rock, NC.
- Smith, A., & **Carrier, S.** (2020). *Exploring science and nature in North Carolina*. Environmental Educators of North Carolina. (EENC), September 18-19. Virtual.

- Leavens, T.*, **Carrier, S.**, & Thomson, M.M. (March 2020). *Factors that influence female, African American students' science identities during childhood and adolescence*, Gender and Equity Research Symposium, Women's Center, NC State University, Raleigh, NC.
- Carrier, S.J.**, Minogue, J., & *Fraulo, A.B. (2019). *Beginning teachers' instructional planning and discourse practices*. Bridging the Gap: Uniting North Carolina K-16 STEM Education, October 22-23. Raleigh, NC.
- Carrier, S.J.**, & *Fraulo, A.B. (2019, September). *Teachers as learners: Examining Muddy Sneakers' impact on teachers*. Environmental Educators of North Carolina. (EENC), September 19-21. Gastonia, NC.
- *Leavens, T., & **Carrier, S.J.** (2019, September). *Go fish*. Environmental Educators of North Carolina. Annual Conference. (EENC). Gastonia, NC.
- Carrier, S.J.**, *May, K., *Leavens, T. (2018, September). *Environmental justice in North Carolina: Progress and process*. Environmental Educators of North Carolina. (EENC), Durham, NC.
- *Stevenson, K.T., *Jackson, S.B., Peterson, N.P., **Carrier, S.J.**, Strnad, R.L., & Olson, R.A. (2018, September). *Program evaluation partnerships: Findings, lessons & next steps*. Environmental Educators of North Carolina. (EENC), Durham, NC.
- Lawson, D., *Szczytko, R., Stevenson, K.T., Peterson, M.N., **Carrier, S.J.**, & Strnad, R. (2018, March). *Overcoming barriers to evaluation: Putting lessons from research to practice*. Southeastern Environmental Education Alliance. (SEEA), St. Petersburg, FL.
- *Szczytko, R., Stevenson, K., Peterson, N., **Carrier, S.**, & Strnad, R. (2017) *Impacts of environmental education on students with emotional and behavioral disabilities*. Environmental Educators of North Carolina. (EENC), Fuquay-Varina, NC.
- Carrier, S.J.**, & *May, K. (2017). *Environmental justice in North Carolina*. Environmental Educators of North Carolina - Research Symposium. (EENC), Agape Environmental Education Center, Fuquay-Varina, NC.
- Grifenhagen, J., & **Carrier, S.J.** (2017). *Supporting elementary students' science vocabulary (K-5)*. North Carolina Reading Association. (NCRA), March 20-21, 2017, Raleigh, NC.
- *Lawson, D.F., Stevenson, K.T., Peterson, M.N., **Carrier, S.**, & Strnad, R. (2017). *Intergenerational transfer: Can the "trickle-up" effect of information be used to increase environmental literacy?* Oral presentation at 5th Annual Southeastern Environmental Education Alliance Conference and Research Symposium.
- Carrier, S.J.**, & Grifenhagen, J. (2016) *Supporting elementary students' science vocabulary growth*. North Carolina Science Teachers' Association. (NCSTA), Greensboro, NC.
- *Luginbuhl, S. & **Carrier, S.J.** (2016, September). *Assessing the influence and sustainability of an outdoor-focused science professional development program in elementary schools*. Environmental Educators of North Carolina (EENC), Black Mountain, NC.
- *Adams, E. L., Walkowiak, T. A., **Carrier, S. J.**, & Minogue, J. (2016, February). *Understanding opportunity to learn in elementary mathematics and science classrooms: The validation of instructional logs*. Paper presented at the 39th annual conference of the Eastern Educational Research Association, Hilton Head, SC.
- *Luginbuhl, S. & **Carrier, S.J.** (2015). *Professional development in an outdoor setting: How an experiential science program affected participants' views of the outdoors as a learning environment*. North Carolina Science Teachers' Association. (NCSTA), Winston Salem, NC.

- *Luginbuhl, S. & Carrier, S.J. (2015). *The influence of an experiential outdoor professional development program on participants' view of the outdoors as a learning environment*. Environmental Educators of North Carolina. (EENC), Columbia, NC.
- Carrier, S.J. (2014). *Model of elementary integration of STEM*. North Carolina Science Teachers' Association, PDI Institute. (NCSTA), Winston Salem, NC.
- Carrier, S.J. (2014). *Teaching science outdoors: Issues and trends*. Southeastern Environmental Education Alliance. Asheboro, NC.
- *Tugurian, L.P., & Carrier, S.J. (2014). *Children's environmental identity in the context of elementary school science*. Southeastern Environmental Education Alliance. Asheboro, NC.
- *Stevenson, K.T., & Carrier, S.J. (2014). *What can we learn from significant life experience research?* Southeastern Environmental Education Alliance. Asheboro, NC.
- Bottomley, L., Carrier, S., & Faulkner, V. (2013). STEM in K-2: Designing a project-based unit. *Scaling STEM: Strategies That Engage Minds*. Durham, NC.
- Carrier, S., *Tugurian, L., & Pop, M. (2011). *Elementary science: Indoor and outdoor voices*. North Carolina Science Teacher Association, (NCSTA), Winston-Salem, NC.
- Carrier, S. (2011). *Elementary science: Indoor and outdoor challenges*. Mid Atlantic Association for Science Teacher Education. (MA-ASTE), Olive Hill, KY.
- Carrier, S. (2011). *Introducing lesson study practices early in a teacher education experience*. North Carolina Association for College Teacher Education. (NCACTE), Raleigh, NC.
- *Tugurian, L. & Carrier, S. (2011). *Why learning outside in nature is good for your students: What the research says*. 2011 N.C. Outdoor Classroom Symposium Green and Growing! North Carolina Botanical Garden. Chapel Hill, NC
- Carrier, S., & *Rutherford, H. (2010). *Effective science vocabulary instruction*. North Carolina Science Teacher Association. (NCSTA), November 11-12, 2010. Greensboro, NC
- Carrier, S., Wiebe, E., Gray, P., *Scott, C., Teachout, D. (2010). *Revealing science and music for elementary students*, North Carolina Science Teacher Association. (NCSTA), November 11-12, 2010. Greensboro, NC.
- Carrier, S. Invited attendee (2010). *Catalyzing research in science education policy*
Archie Conference Center, Warrenton, VA, National Science Foundation (NSF) supported
Award No. 095372. PI - Nancy W. Brickhouse Co-PIs - James Earl Davis, & Stephen P. Norris.
- Carrier, S. & *Tugurian, L. (2010). *Elementary students' science learning: Indoor and outdoor experience*. Mid Atlantic Association for Science Teachers Education. (MAASTE), Johnson City, TN.
- Gray, P., Wiebe, E., Teachout, D., Carrier, S., & *Scott, C. (2010). *Biomusic in elementary school*. NCDPI Raising Achievement/Closing Gaps Conference. March, 2010. Greensboro, NC.
- Carrier, S., Wiebe, E., Gray, P. & Teachout, D. (2009). *UBEATS – Music and science – Physical and biological connections in the elementary science classroom*. North Carolina Science Teachers Association. (NCSTA). Greensboro, NC.

- Teachout, D., *Scott, C., Blanton, C., Gray, P., **Carrier, S.**, & Wiebe, E. (2009). *The Universal BEATS Project: A convergence of research, teacher education, science, and music*. North Carolina Music Educators Association Conference. November 8, 2009. Winston-Salem, NC.
- Carrier, S.**, Gray, P., Teachout, D., & Wiebe, E. (2009). *BioMusic: Music-making as an information highway to the world*. Carolina State of the Arts conference. Raleigh, NC.
- Carrier, S.** (2006). *Environmental science for preservice teachers*. Southeastern Association for Science Teacher Education. (SASTE), Macon, GA.
- Pringle, R. & **Carrier-Martin, S.** (2005). *Teachers' views and the impact of standardized testing in science on their practices in elementary classrooms*. Southeastern Association of Science Teacher Education. (SASTE), Athens, GA.
- Pringle, R., & **Martin, S.** (2005). *Reclaiming academic freedom through classroom assessment in science*. Florida Council on Elementary Education. Orlando, FL.
- Martin, S.** & **Russell, J. (2004). *Science Buddies*. Florida Association of Science Teachers (FAST). Orlando, FL.
- *Pringle, R., Mayne, D. & **Martin, S.** (2003). *Learning to teach elementary science: An exploratory study of preservice elementary teachers*. Southeastern Association Education of Teachers of Science. (SAETS), Greenville, SC.
- Martin, S.** (2000). *Schoolyard research: Environmental knowledge, attitudes, behaviors, and comfort levels*. Florida Association of Science Teachers. (FAST), Miami, FL.
- Hall, D.W. & **Martin, S.C.** (1996) *Schoolyard Ecology for Elementary School Teachers (SYEFEST)*. Florida's Lead Teacher. Ecological Society of America. (ESA), Stone Mountain, Georgia.

INVITED TALKS

- Carrier, S.J.**, Goforth, C.L., Smith, P.S., Scharen, D.R, Hayes, M.L., Craven, L., McGowan, J. Bruce, A., Safley, S.E., Sachs, L., Peterson, E. (2025, April. 29). *Teacher learning for effective school-based citizen science*. National Oceanic and Atmospheric Association (NOAA) webinar.
- Smith, A. **Carrier, S.**, Daniel, B., Jenkins, A, Heckert, A.B. (2020, October 22). *Where can I find science in nature? 30 great North Carolina science adventures*. Mountain Science Expo, North Carolina Arboretum. Asheville, NC.
- Smith, A., **Carrier, S.**, Goforth, C., Dowland, M., Bogan, A. (2020, August 20). *Virtual Science Café: Exploring science and nature through adventure*. North Carolina Museum of Natural Science. Raleigh, NC.
- Jones, M.G., **Carrier, S.J.**, Grifenhagen, J.F., Delgado, C. (2020, May 6). *Bringing a sense of awe to your science instruction*. Friday Institute (adapted to virtual presentations due to Covid-19).
- Carrier, S.J.**, & Grifenhagen, J.F. (2019, December). *Integrating science and literacy*. RTI International Education Services. Invited talk at RTI, North Carolina Large District Consortium. Raleigh, NC.
- Lawson, D.F., Stevenson, K.T., Peterson, M.N., **Carrier, S.J.**, Strnad, R., Seekamp, E., Hartley, J.M., DeMattia, Busch, K.C., Brune, S., Barbieri, C., Knollenberg, W., & Reilly, C. (2019, September). *Intergenerational*

learning: Can younger generations help us work towards a more sustainable future? University of Minnesota – Duluth. Department of Biology Seminar Series. Duluth, MN.

Stevenson, K.T., Peterson, M.N., Strnad, R.L., **Carrier, S.J.**, Busch, K.C., Demattia, E.A., Bondell, H.D., Martin, K.L., Yao, Y., Zhang, Z., Lawson, D.F., Szczytko, R.E., Jackson, S.B., & *Hartley, J.M. (2018, September) *Connecting Children to Nature in an Urbanizing World*. Invited talk at the R.L. Rabb Science and Society Symposium for Urban Sustainability. Raleigh, NC.

Stevenson, K.T., Peterson, M.N., Strnad, R.L., **Carrier, S.J.**, Busch, K.C., Demattia, E.A., Bondell, H.D., Martin, K.L., Yao, Y., Zhang, Z., Lawson, D.F., Szczytko, R.E., *Jackson, S.B., & *Hartley, J.M. (2018, October). *Building Environmental Literacy* (Research). Invited panelist on Environmental Literacy and Workforce Development panel for NOAA federal site review of NC Sea Grant. Raleigh, NC.

MEDIA and WEB-BASED OUTLETS

[TL4CS Teacher Learning for Citizen Science](#): May 10-13, 2022 STEM for All Video Showcase, Access, Inclusion, and Equity. National Science Foundation

Carrier, S., Grifenhagen, J., & Scharen, D. (January 27, 2022). [The Language of Science](#) Twitter Chat: Authors from *Science and Children*.

[TL4CS: Teacher Learning for Citizen Science](#); May 22, 2021; STEM For All Video Showcase: COVID, Equity, and Social Justice

Tereda, Y. (2021, May 14) [How hidden classroom dynamics can stymie girls in STEM](#). Edutopia. George Lucas Educational Foundation.

[ATOMS: Accomplished Elementary Teachers of Math & Science](#); May 14, 2018; 2018 STEM For All Video Showcase: Transforming the Educational Landscape. National Science Foundation

Within the University and College

Bowen, J. (2021, July 13). [Elementary Education Program Spotlight: ‘We Share a Commitment to Seeing Our Students Succeed and Ensuring Our Graduates Are Excellent Elementary Teachers’](#)
NC State College of Education News.

Bowen, J. (2021, June 24). [Museum Volunteer Programs Could Play Important Role in Developing Pipeline of Much-needed Science Teachers, Says Study from College of Education Doctoral Students, Faculty](#)
NC State College of Education News

Oleniacz, L. (2021, April 6). [For Girls, Learning Science Outside Linked to Better Grades, Knowledge](#). NC State News.

Bowen, J. (2021, March 2). [Students on Associate Professor Sarah Carrier: ‘She Values Hard Work and Life-long Learning, and Models These Values for Her Students Across All Levels of the Elementary Education Programs’](#). NC State College of Education News.

Bowen, J. (2020, November 30). [Associate Professor Sarah Carrier to Help Teachers Implement Citizen Science Projects in Elementary School Classrooms Through NSF-funded Project](#). NC State College of Education News.

Bowen, J. (2020, April 16). [Sarah Carrier Receives Alumni Association Distinguished Graduate Professorship Award](#). NC State College of Education News.

Bowen, J. (2020, March 19). [Backyard Activities Can Provide Educational Respite from Cabin Fever During Coronavirus \(COVID-19\) Outbreak, Says Associate Professor Sarah Carrier](#). NC State College of Education News. **Top performing search week of March 20, 2020**

Unpublished Measures & Accompanying User Manuals

***indicates graduate student at time of development**

Carrier, S. J., Adams, E. L.*, & Minogue, J. (2013) (w/ Consulting Authors: T. A. Walkowiak & C. W. Lee). *Instructional Practices Log in Science (IPL-S)*. Unpublished measure, North Carolina State University, Raleigh, NC. (Consulting authors contributed to iterative revisions during the development process of the log, manual, and training materials).

Walkowiak, T. A. & Lee, C. W.* (2013) (w/ Consulting Authors: E. L. Adams* & **S. J. Carrier**). *The Instructional Practices Log in Mathematics (IPL-M)*. Unpublished measure, North Carolina State University, Raleigh, NC. (Consulting authors contributed to iterative revisions during the development process of the log, manual, and training materials).

COURSES

North Carolina State University – Courses taught

2007-Present

Teacher Education – TELS Seminar (ECI 709)	Doctoral
Elementary Mathematics and Science in Informal Settings (ECI 709)	Doctoral
Informal Science (EMS 594, 794)	Doctoral & M.Ed.
Methods for Teaching Elementary School Science for Initial Licensure (ELM 573)	MAT
Teaching Science in the Primary Grades (ELM 320)	Undergraduate
Special Topics (Poe Health Center) (ECI 296)	Undergraduate
Introduction to Elementary Education in a Global Society (ELM 250)	Undergraduate

Program/Course Development

Master of Education – Science Specialists’ Program	
Methods of Teaching Elementary School Science (ELM 520)	Master of Education
Issues in Elementary School Science Education (ELM 524)	Master of Education
Special Problems in Elementary School Science (ELM 539)	Master of Education
Physics (PY 599) – Co Teaching Keith Warren (PY 599)	Master of Education
Internship in Elementary Education (ELM 654)	Master of Education

Auburn University

Science and Mathematics Methods	<i>2005-2007</i> Undergraduate
Elementary Science Methods	Undergraduate

University of Florida – Adjunct professor

Elementary Science Methods	<i>1992-1999</i> Undergraduate
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University of Florida – Graduate Assistant

Elementary Science Methods	<i>1992-1999</i> Undergraduate
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GRADUATE STUDENT COMMITTEES - Current

Doctoral Committee Chair

Stephanie Fiocca, EEMS

2020-present

Doctoral Committee Membership

Laura Chalfant, SED

2023-present

Tanzimul Ferdous, SED

2023-present

Anna Howard, EEMS

2023-present

Minnie Webster, SED

2021-present

Master's Committee Major Advisor

- Grace Greene
- Marcia Hagwood

GRADUATE STUDENTS – Graduated

Chair of Doctoral Committee (defense date)

- 2024 Graduates
 - Jill McGowan (March 5, 2024)
“I Love to do Everything Outside” A Phenomenological Study of Young Children Sharing Experiences in Their Own Outdoor Spaces
- 2023 Graduates
 - Danielle R. Scharen (March 3, 2023)
Examining Elementary Pre-service Teachers’ Use of Touch-Talk-Text Science Instructional Model: An Exploratory Case Study Analysis
- 2022 Graduates
 - Aimee B. Fraulo (March 10, 2022)
Exploring Outdoor Educators’ Positional Identities: Survey Development and Validation Using Structural Equation Modeling in a Mixed Methods Study Blending Quantitative Results with Phenomenological Analysis
- 2019 Graduates
 - Shannan George, SED (December 6, 2019)
Investigation of the Scientific and Participant Outcomes of a Multi-Country Citizen Science Project in Water, Sanitation, and Hygiene
Co-chair with KC Busch
 - Sarah Luginbuhl, SED (April 25, 2019)
A Study of Elementary Teachers’ Views of Science Education and Using the Outdoors as a Setting for Teaching and Learning
- 2014 Graduates
 - Linda Tugurian, SED (March 3, 2014)
An Exploratory Investigation of Children’s Connectedness with the Natural World
Co-chair with Eric Wiebe

Doctoral Committee Member

- 2025 Graduates
 - Katlyn May, SED - KC Busch, Chair (5.14.25)
 - Amanda Hall, SED - Soonbye Park, Chair (5.3.25)
 - Kathleen Bordewieck, SED - MG Jones, Chair (3.17.25)
 - Robin Bulleri, SED - KC Busch, Chair (3.3.25)
 - Madeline Stallard - MG Jones, Chair (2.28.25)
 - Amber Meeks - MG Jones, Chair (2.17.25)
- 2024 Graduates

- Kimberly Ideus, SED - MG Jones, Chair (5.14.24)
- Julianna Nieuwsma, SED - MG Jones, Chair (4.24.24)
- 2023 Graduates
 - Rebecca Ward, SED (3.8.23)
 - Emma Refvem, SED (2.28.23)
 - Teresa Leavens, TELS (8.23)
- 2022 Graduates
 - Laura Romeo, TELS (5.5.22)
 - Jenna Hartley, CNR (1.22.22)
- 2021 Graduates
 - Zarifa Zakaria, TELS
 - Dorothy Holley, SED
- 2020 Graduates
 - Amanda Gosek Kates, EEMS
- 2019 Graduates
 - Bita Akram, CS, Graduate school representative
 - Marina Perez, SED
 - Danielle Lawson, CNR
- 2018 Graduates
 - Kathleen Gray, SED
 - Emily Cayton, SED
- 2017 Graduates
 - Sam Wheeler, SED
 - Katherine Chestnut, SED
 - Kylie Swanson Hoyle, SED
- 2016 Graduates
 - Huei-Chen Lao, SED
- 2015 Graduates
 - Lindsay Patterson, SED
 - Elysa Corin, SED
 - Tammy Lee, SED
- 2014 Graduates
 - Diane Johnson, SED
 - Kathryn Stevenson, CNR
- 2013 Graduates
 - Meredith Kier, SED
- 2012 Graduates
 - Catherine LeProvost, SED
- 2010 Graduates
 - Beth Folta, SED

Doctoral Committees (External member)

- 2019 Graduates
 - Debra Hall Texas Technological University, (chair - Rebecca Hite)

Master's Major Advisor – ELM, Graduates

Spring, 2024

- Carrie Hoke
- Elizabeth Raby
- Rusti Sharpe

- Lauren Swanson
- Ashley Zatt

Spring 2022

- Laura Graner

Fall 2021

- Lauren Ellington
- Carly Mize
- Sydney Weiss

Spring 2021

- Julie Arellano

Fall 2020

- Elizabeth Baker
- Lisa Langley
- Kimberly Hill

Spring 2020

- Kasmira Armstrong-Fulton
- Lindsey Hensler
- Taylor Hucks
- Susette McConnell
- Nakia White

Fall 2019

- Jenny Ainslee
- Tamika Gaskill
- Tisa Miller
- Renee Mitchell
- Jasmin Nabors
- Sarah Vogel Ozgunduz

Spring 2018

- Danielle Scharen
- Shane Dongilli
- Kelly Gess
- Morgan Truesdale

Spring 2017

- Caroline Chelemer
- Leslie Frink
- Maryam Khan
- Natalie Mayur Hudson
- Nicole Nance
- Catherine Tracarella

Spring 2016

- Melissa Costanzo
- Marina Wagemaker

Fall 2015

- Heather Callaghan
- Kelly Carroll
- Katy Cobb
- Rachel McIntyre Dale
- Anna Gaines
- Candice Medlin
- Elnor Patterson
- Blair Rice
- Vanessa Rossitz

- Kerry Shearer
- Jennifer Smith
- Kristine Vondervor

Spring 2014

- Heather Rutherford, SED

Summer 2013

- Asli Mutlu, MED

Spring, 2013

- Tamara Argueta
- Jennifer Cunningham
- Latoria Felder
- Irving Glenn
- Sara Ireland
- Hannah Jennette
- Courtney Nelson
- Douglas Price
- Amber Creech Wise

Fall, 2012

- Kayla Cline
- Jessica Dierk
- Morgan Wigal

Summer 2012

- Allaina Pawlowski
- Rebecca Scotton

Spring 2010

- Kim Kyungah
- Alexandra Navarre
- Dawn Russo
- Lisa Stallings

Master's Committee Member, Graduates

- Rachel Szczytko, College of Natural Resources (CNR)
- Sachi Kajitani, CNR

UNDERGRADUATE STUDENT SUPPORT

- | | |
|---|-----------|
| • Parks Scholar Mentor – Katelyn Glen | 2018-2019 |
| • Undergraduate research project mentor: Claire McIntyre & Alexandra Toti | 2016 |
| • Supervision of honors credit: Leanne Stolfus | 2015 |
| • Senior Capstone project mentor: Megan Horst | 2014 |
| • Supervision of honors credit: Ashten Morgan | 2014 |
| • Supervision of honors credit: Caroline Miller | 2012 |

HONORS AND AWARDS

University Faculty Scholar Award 2021-2022
NC State University

Alumni Association Distinguished Graduate Professorship Award 2020
NC State University

<i>Awarded Reviewer of Excellence</i> <i>International Journal of Science Education</i>	2020
<i>Bridging the Gap</i> 2019 Nominated for: Distinguished Teaching Award in STEM Education NC State University	
<i>College of Education Nominee for Alumni Association Distinguished Graduate Professorships</i> NC State University	2019
<i>College of Education Nominee for Alumni Association Distinguished Graduate Professorships</i> NC State University	2018
<i>Thank a Teacher</i> , NC State University	2013, 2014, 2017
<i>BRIDGES</i> , an intensive leadership professional development for women in higher education	2016
<i>Teacher of the Year</i> , Norton Elementary School, Alachua County Teacher Recognition Program, Gainesville, Florida.	
<i>Program of Quality</i> for ‘The Schoolyard Ecosystem’ Natural Selections: Sharing Success in Environmental Education Florida Department of Education.	
<i>Demonstration Site</i> , Save our State Environmental Education Trust Fund for the Florida Advisory Council on Environmental Education for Norton Elementary Schoolyard Ecosystem Site.	
Entomological Society of America’s first President’s Award <i>Outstanding Achievement in Primary Teaching: Using Insects as Educational Materials</i> Entomological Society of America Conference, Baltimore, MD	
1 <i>Distinguished Achievement Award for Teaching</i> University of Florida Department of Entomology and Nematology	

GRANT PROJECTS

IN REVIEW

2025-2029 - National Science Foundation DRK12 TL4CS

FUNDED

External

2024-2027 - National Science Foundation DRK12 - *Teacher Professional Development and Collaboration to Integrate CyberSecurity in Mathematics and Science Elementary Curriculum (CaMS)*. PI Florence Martin; Co-PIs Jessica Hunt and Sarah J. Carrier, NC State University; Teya Rutherford, University of Delaware. This project is designed to develop, refine, and test an innovative professional development program to support teachers to infuse cybersecurity into the 4-5th grade mathematics and science curriculum. \$2,038,068.

2020-2024 – National Science Foundation DRK12- *Teacher learning for Citizen Science (TLACS #2009212)*. (No-cost extension 2024-26) PI Sean Smith, Horizon Research; Co-PIs **Sarah J. Carrier**, NC State; Chris Goforth, NC Museum of Natural Sciences. (Awarded June 17, 2020). Teacher learning for Citizen Science (TLACS). 2009212. PI - Sean Smith, Horizon Research, Inc. This project examines how the research team's development of educative support curricula for two citizen science projects impact teachers' inclusion of citizen science projects to enhance their science instruction in their classrooms across North Carolina. \$1,995,538 - NC State subaward \$422,665.

2019-2021- NC SeaGrant - *Strengthening community networks for environmental learning and resilience through children*. PI Kathryn Stevenson, Co-PIs M. Nils Peterson, Sarah J. Carrier, KC Busch. This project developed ways to measure community-level environmental literacy (EL) to develop Citizen Science-based Environmental Education (CSEE) through intergenerational learning (IGL) through a pre-post, treatment-control experimental design. \$120,000.

2018-2021 - North Carolina Sea Grant *Improving Environmental Decision Making in Coastal Communities through Children: Building Science Literacy, Civic Engagement, and Coastal Resilience with K-12 Citizen Science*). Project impacts 30 middle grade classrooms across the CAMA counties to test impacts on knowledge of and engagement with coastal environmental challenges, environmental self-efficacy, and pro-environmental behavior among students; and increased salience of coastal environmental issues in the eyes of decision makers and community members with whom students engage. PI - Kathryn Stevenson, Co-PIs – M. Nils Peterson, Sarah Carrier, Danielle Lawson, Howard Bondell, Liz Demattia, KC Busch. \$119,998

2016-2018 - North Carolina Sea Grant *Fostering Climate Literacy and Coastal Hazard Resilience in Coastal Communities through K-12 Education*. Year-long CL curriculum designed for intergenerational transfer of CL and concern for climate-related coastal hazards by coupling existing Sea Grant funded Project WILD CL activities with a service-learning project partnering with community organizations to evaluate change in CL and concern for climate-related coastal hazards among teachers, students, and parents. PI –Nils Peterson. Co-PIs- Kathryn Stevenson, Susan Moore, Sarah Carrier, Renee Strnad. \$100,000.

2016 - *Muddy Sneakers* program evaluation. This project will rigorously evaluate the *Muddy Sneakers* program, an informal environmental science extension for schools currently focused in Western North Carolina, using evaluation data to support expansion. This project will produce evaluation instruments that will allow for ongoing evaluation and improvement of *Muddy Sneakers* and similar programs. PI – Kathryn Stevenson. Co-PIs: Howard Bondell, Sarah Carrier, Susan Moore, John Nietfeld, Nils Peterson, Renee Strnad. \$65,731

2014 – 2016 - North Carolina SeaGrant *Building Ocean and Climate Literacy in North Carolina through a Project WET Climate Literacy Module*. Create, test, and train teachers on a climate literacy module for Project WET, and existing curriculum that has yet to include climate literacy modules. NCSU collaborated with NCCU, a public Historically Black College and University, engaging minority undergraduate students in summer internships. PI – Nils Peterson. Co PIs: Sarah J. Carrier, Susan Moore, Renee Strnad, Kathryn Stevenson. Co-PI from NCCU: Laurell Malone. \$34,399.

2011-2016 - NSF-DRK-12 Project ATOMS (Accomplished Elementary Teachers of Mathematics and Science). (no-cost extension 2017-18). Project ATOMS explored an innovative Science, Technology, Engineering, and Mathematics (STEM)-focused ELM program at NCSU that examined five dimensions of teacher preparation: mathematics and science content knowledge, pedagogical content knowledge for mathematics and science, knowledge of teaching, a sense of self-efficacy, and beliefs about mathematics and science instruction. This five-year project provided insight into elementary teacher preparation in STEM areas and information about the critical link between teacher preparation, practice, and student achievement. Principal Investigator - Temple Walkowiak, Co-PIs: Ellen McIntyre, Jayne Fleener, Sarah Carrier, Margareta Thomson, Michael Maher, Steven Porter. \$3.1 million.

2008-2012 - NSF-HER/DRL DRK-12. *Universal BEATS: Modules to Help Educators Develop Universal BioMusic Education Achievement Tier in Science*. UBEATS researched the marriage of music and science to support elementary students' and teachers' learning about the role of music related product has been instructional materials for grades 2-5 that will support science instruction through music, linking physical and life sciences. PI Patricia Gray (Music Education, UNC-G). Co-PIs Eric Weibe (Science Education), Sarah J. Carrier (Elementary science education), David Teachout (Music Education, UNC-G). \$333,000 (\$153,000 for the NCSU sub-award) over 30 months.

Internal

2022-2023 – Catalyst Grant. *Climate Change Instruction: Science Teachers' Perspectives, Experiences, and Instructional Visual Displays*. North Carolina State University. PI Gail Jones, STEM; Co-PIs Sarah J. Carrier, Meghan Manfra, Rebecca Ward, FI. \$10,000. This research study examine teachers' use of graphics in climate change education.

2020-2021 – Catalyst Grant. *Elementary Pre-Service Teachers' Explorations of Awe in Science Instruction*. North Carolina State University. PI Gail Jones, STEM; Co-PIs Sarah J. Carrier, Jill Grifenhagen, TELS; Cesar Delgado, STEM; LaTricia Townsend, FI. \$10,000. This research study documented teachers' experiences with awe in personal and professional contexts.

2019 -2020– DELTA- *Transitioning Elementary Science Specialist Masters of Education Courses from Blended to Online Format*. This shift will expand program access from teachers in the 10 surrounding counties to teachers from all 100 NC counties and to teachers in other states. PI – Sarah J. Carrier. \$8000.

2018- Catalyst Grant. *The Next Generation of Scientists, Science Communicators and Science Educators* – PI - Gail Jones; Co-PIs - Sarah J. Carrier, Melanie Smith, Tamecia Jones, Lynn Cross and Sherry Freeman (\$10,000)

2017-2018 – NC State Graduate School Recruitment grant for doctoral program Elementary Learning Sciences (ELM – LS) with matching TELS Department funding. PI – Sarah J. Carrier. \$3400.

2017 - STEM Education Initiative grant from NC State to support our new Master's program for Elementary Science Teacher Leaders. PI – Sarah J. Carrier. \$20,000.

2014-2015 - NC State Graduate Student Recruitment Grant for Department of Elementary Education (2014-2015). Recruitment grant for elementary Master's program. PI - Sarah J. Carrier. \$1300.

2013-2014 - ELM department funding for research assistant. *Researching identities related to science teaching*, Review literature related to teacher identities in science. PI – Sarah J. Carrier. \$1400.

2013-2014 - Research and Innovation Seed Funding Program (RISF) *Environmental Literacy for Teachers and Students* Funded by the Office of Research, Innovation, and Economic Development. The one-year was designed to determine the level of environmental literacy of elementary teachers in NC with the ultimate goal of advancing students' knowledge and awareness of the state's environment and environmental sciences. PI – Sarah J. Carrier; Co-PIs Nils Peterson (CNR) and Susan Moore (CNR). Research assistant Kathryn T. Stevenson (CNR doctoral student). \$14,838

2012-2013 - ELM department funding for research assistant. *Qualitative data analysis of preservice teachers' memories and identities in elementary science* (2012-2013). Research revealed connections with pre-service teachers' identification of memories of elementary science instruction with potential personal identities as teachers of science. \$1400.

2012-2013 - ELM department funding for research assistant. *Qualitative data analysis of preservice teachers' memories and identities in elementary science*. Research revealed connections with pre-service teachers'

identification of memories of elementary science instruction with potential personal identities as teachers of science. **Sarah J. Carrier** \$1400.

2012 - *Developing Diverse Departments (D3) External Grant Mentoring Mini-Grant*. This project supported Dr. Richard Duschl, a national leader in science education from The Pennsylvania State University, to visit North Carolina State University on May 10-11, 2012. PI – Sarah J. Carrier. \$1200. Additional funding for the D3 project \$454

2011-2012 - Extension Seed Grant entitled *Enhancing Science Teaching in Elementary Schools: Bringing Rainforest Research to Classrooms*. This project addressed the goals of creating educational innovation and driving innovation in energy and the environment by providing practicing elementary teachers and teacher candidates (NC State students) with current research data about the rainforest and its relation to climate change and strategies that scientists use for the study of tropical rainforests on March 17, 2012. This project combined content knowledge with pedagogical strategies to help both groups learn about and participate in science inquiry. This project extended the in-kind grant of \$3120 from the Department of Elementary Education that provided Carrier, PI of this project to participate in tree canopy research in the Amazon rainforest in Iquitos, Peru in July, 2011. PI - Sarah Carrier). \$9,270 Project #261105

2011 - Faculty Research and Professional Development (FRPD). *Elementary Students' Science Learning: Indoor and Outdoor Experiences*. Approved by IRB and Durham Public Schools' research office. PI – Sarah J. Carrier. \$8000.

2011 - ELM department funding research and participant compensation support *Elementary Students' Science Learning: Indoor and Outdoor Experiences* 2010-2011. Supplemental funds for a course release for Spring, 2011, Graduate student support plan (GSSP), incentives for teacher participants, and translation services. PI – **Sarah J. Carrier**. \$11,000.

Not Funded

- National Science Foundation ITEST - *On the Edge of Education: Teaching Science for the Future*. 2021.
- RISF -Leveraging awe to increase pre-service teachers' capacity for science instruction: Integrating psychology and science education to humanize students' and teachers' experiences of science. 2021
- Catalyst. Boundary crossing in convergent STEM education - 2021
- NSF ITEST - Pathway to Impact: Students Communicating and Engaging in Science – PISCES 2021
- RISF – Awe in Science - 2020
- STEM Education Initiative - 2019
- National Science Foundation DRK12 - 2019
- Smith Richardson Policy Grant -2018
- NC State Outreach and Engagement Incentive Grant -2018
- National Science Foundation, ECR - 2017
- National Science Foundation, ITEST - 2017
- National Science Foundation, ECR -2016
- Institute of Educational Studies – 2016
- National Science Foundation -2013
- NC State Research and Innovation Seed Funding Program (*RISF*) – 2012
- National Science Foundation ECR-2015
- NC State Research and Innovation Seed Funding Program (*RISF*) – 2012
- National Science Foundation -2011
- National Oceanic and Atmospheric Association (NOAA)-2010

SERVICE ACTIVITIES

Service to professional organizations

National Association for Research in Science Teaching (NARST)	
NARST External Policy and Relations committee member	2018-2021
NARST External Policy and Relations committee member	2012-2014
NARST Co-coordinator for Policy Strand 15	2008-2012

Association for Science Teacher Education (ASTE)	
ASTE Position Statement Review Panel – Environmental and Sustainability	2021-2022
Ethnoscience and Environmental Education Strand Coordinator	2021-2022
Equity Committee member and liaison to Conference committee	2018-2020
Equity Committee member and liaison to Awards committee	2014-2016

Reviewer

Grant Review panels (ECR, DRK12, IMD, AISL)

National Academies of Science (NAS)	2025
National Science Foundation (NSF) Review Panelist	2022
National Science Foundation (NSF) Review Panelist	2021
National Science Foundation (NSF) Review Panelist	2018
National Science Foundation (NSF) Review Panelist	2016
National Science Foundation (NSF) Review Panelist	2016
National Science Foundation (NSF) Review Panelist	2014
National Science Foundation (NSF) Review Panelist	2006

Journals

Editorial roles

<i>International Journal of Science Education (IJSE)</i>	2020-present
Editor	
<i>International Journal of Science Education (IJSE)</i>	2019-2020
Editorial Review Board	
<i>International Journal of Environmental and Science Education (IJESE)</i>	2018-2020
Editorial Review Board	
<i>Journal of Science Teacher Education (JSTE)</i>	
Editorial Review Board	2014-2017;2019-2021
<i>Electronic Journal of Science Education (EJSE)</i>	
Associate Editor EJSE	2011 – 2016

Current or Former Reviewer

- *International Journal of Science Education (IJSE)*
- *Journal of Science Teacher Education (JSTE)*
- *Science Education*
- *Research in Science Education (RISE)*
- *International Journal of Mathematics and Science Education (IJMSE)*
- *Early Childhood Research Quarterly*
- *International Journal of Environmental and Science Education*
- *The Teacher Educator*
- *The Science Education Review (SER)*
- *School Science and Mathematics*

Conference Proposal Reviews

- *Association of Science Teacher Education (ASTE)*

- *National Association of Research in Science Teaching (NARST)*
- *American Educational Research Association (AERA)*

Invited External Reviews

Promotion to	August, 2025
Promotion to Professional Practice Associate Professor, Utah State University	July, 2021
Promotion to Professor, Syllabus Review, Utah State University	June, 2021
Tenure and Promotion to Associate Professor, University of South Carolina	September, 2018
Promotion to Associate Research Scientist, University of Georgia	September, 2008

Service to North Carolina State University (NC State)

University Service

Galapagos Roundtable – College of Education rep	2022-present
NC State Faculty Senator – representing College of Education	2019-2023
Personnel Policy Committee	2019-2023
The Gertrude Cox Award for Innovative Excellence in Teaching and Learning with Technology Committee	2019-2020
Alumni Association Distinguished Graduate Professor Award-reviewer	2021
University Standing Committee Council on the Status of Women.	2020-2022
NC State Faculty Well Being Committee	2019-2021
NC State Faculty Grievance (607) and Non-Reappointment Review (604)	2016-2024
Faculty Grievance Committee - Chair	2021- 2023
Mediation Roundtable	March 7, 2022
NC State Sustainability Committee	2016-2018
NC State Entomology graduate student outreach support – Kristi Backe	2015

College of Education

College of Education Investigation Committee	2022
College of Education Diversity, Equity, and Inclusion (DEI) Task Force	2022
College of Education Dean’s Nominating Committee	2021-2022
Goodnight Early Career Innovators Award Review Committee	2021& 2022
Cultural Climate/Sense of Belonging & Community Working Group	2021-present
Goodnight Distinguished Professor Search Committee Member	2020-2022
Council of Education Program Coordinators	2020-present

College of Education Dean’s Nominating Committee Dean Mary Ann Danowitz	2015-2016
College Leadership Committee (5-year review; Dean Fleener)	2014-2015
NSF Graduate Research Fellowship Program (GRFP) Mentor	2015, 2016, 2017
STEM Department Head Search Committee	2013
MAT Governance Committee 2.0	2012- 2013
Scholarship Review Committee	2010-2019
NCSU College of Education Professional Education Committee (PEC) – Co-chair.	2008- 2015
College of Education Dean’s Nominating Committee Dean Jayne Fleener	2009-2010
NCSU College of Education Professional Dispositions Review Panel development.	2009
<i>Department - Teacher Education and Learning Sciences (TELS), formerly Elementary Education (ELM)</i>	
Peer Review – Dr. Temple Walkowiak	January 8, 2024
Scholarly Reassignment – NSF-funded TL4CS grant work focus	Fall, 2023
Post Tenure Review Committee Chair	2022-2023
Graduate Program Coordinator – Elementary Education program	2015-2023
Director of Graduate Programs – Department of Elementary Education	2013-2015
TELS PhD Coordinating Committee	2021-Present
<i>Showcase Day</i> – Planned and Organized Welcome Incentive for potential EEMS students	March 7, 2022 March 22, 2021 March 25, 202 March 25, 2019
NC State’s Elementary MEd program preparing Elementary Science Specialists Sarah J. Carrier and James Minogue Applied to North Carolina State Board of Education granted on March 3, 2016 for NC State’s blueprint proposal submitted on September 15, 2015.	2015-2018
Graduate Studies Committee	2013-2015
Search Committee, Elementary Learning Science/Mathematics Education TELS Dr. Jonee Wilson	2015-2016
Faculty Mentor, Undergraduate Research Claire McIntyre and Alex Toti	2016

Department of Elementary Education Social Studies Search Committee - Chair 2012-2013
Dr. Beth Sondel

Service to Science and Education Community

Advisory Board Member – NSF-funded Noyce grant: *Gaining Retention and Effectiveness through Advancing Teacher-centered (GREAT) STEM Professional Learning* 2023-2026
Katherine Chestnutt – Appalachian State University and Ashe Co. Schools

K-12 Science Standards Advisory Team 2022-2023
Feedback Review and Development Team
New K-5 Science Standards for NC Standard Course of Study
Department of Public Instruction, State of North Carolina

Science Trail Across North Carolina working group 2021-2022
NC Department of Natural and Cultural Resources

New Jersey SeaGrant Advisory Board 2020 - present
Project SEA: Science, Education, and Action

Millbrook Elementary School EE Magnet School Advisory Board 2019 – present
Raleigh, NC

Member Environmental Education Magnet School planning and Advisory Board
Wake County Public School System 2017-2019

Carolina Biological Supply; reviewed non-fiction textbooks for science content and literacy levels with Dr. Ann Harrington November, 2017

Outside Content Reviewer (OC) for North Carolina science assessments 2014 – 2016

Education Policy Institute of Carolina – UNC-GA Teacher Quality Research Group. 2010-2011
Research Group: Dr. Sarah Carrier, Dr. Megan Manfra, Beth Greive.
Dr. Gary Henry and Dr. Charles Thompson-Project coordinators.

Presidential Awards for Excellence in Mathematics and Science (PAEMST), 2010, 2012, 2014
Review of applications for elementary science teaching awards, North Carolina Department of Public Instruction (DPI), Raleigh NC

Textbook reviews 2009, 2012, 2015

Science Fair Judge 2008, 2009, 2010, 2011, 2012, 2014, 2015, 2017

International Outreach

Consultation for Zainab Jaafar Auda from University of Basrah in Iraq November, 2016
English language support for lesson plan on planetary seasons.

PROFESSIONAL ORGANIZATIONS (current and former memberships)

Beginning

- North American Association for Science Teacher Education (NARST) 2005
- Association for Science Teacher Education (ASTE) 2003

- Mid Atlantic Association of Science Teacher Education (MAASTE)
- North American Association for Environmental Education (NAAEE) 2014
 - Environmental Educators of North Carolina (EENC)
- National Science Teachers' Association (NSTA) 2005
- North Carolina Science Teachers' Association (NCSTA) 2009
- National Science Education Leadership Association (NSELA) 2020-2021
- American Association of Colleges for Teacher Education (AACTE) 2016-2017
- American Association of Colleges for Teacher Education (AACTE) 2013-2014
- Member, American Educational Research Association (AERA) 2010-2021