

Sarah J. Carrier

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

Professor, Science Education, with tenure

2021 - Present

Teacher Education and Learning Sciences, North Carolina State University
 Director of Graduate Programs; Graduate Program Coordinator

Associate Professor, Science Education, with tenure

2013 - 2021

Teacher Education and Learning Sciences, North Carolina State University
 Director of Graduate Programs; Graduate Program Coordinator

Assistant Professor, Science Education

2007 – 2013

Department of Elementary Education, 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)*

- *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* (in press 6.25.21)
- Grifenhagen, J.F., **Carrier, S.J.**, *Scharen, D. & ***Fiocca, S. (2021). Strategies for building elementary students' science content vocabulary. *The Reading Teacher*, 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.
- 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*, 1-22.
- Carrier, S.J.**, Grifenhagen, J.F., & *Scharen, D. (2021). The language of science: Touch, talk, text. *Science and Children*, (in press 6.5.2020 – for pub Dec. 2021).
- 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. DOI: 10.3389/feduc.2018.00046. Impact factor 6.4.

<https://www.frontiersin.org/articles/10.3389/feduc.2018.00046/full>

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

Kendall, C., Leeds, A., Bigodi, T., Lukas, K.E., Folta, E., *Fraulo, A., **Carrier, S.J.** (2021) Teacher-centered sustainable livelihoods program increases pro-environmental behaviors in student households near a biodiversity hotspot. *Conservation Science and Practice* (submitted 8.22.21).

Thomson, M.M., Huggins, E, **Carrier, S.**, & Gray, D. Developmental trajectories for elementary novice teachers: Teaching efficacy, instructional beliefs, and domain knowledge. *Journal of Educational Research* (Submitted April 7, 2021).

Carrier, S.J., *Fraulo, A., *Romeo, L., Stevenson, K.T., Peterson, M.N. (2021). Teachers as learners: Lessons about science, outdoors, and students. *Electronic Journal of Research in Science and Mathematics Education* (submitted March 7, 2021; under revision)

*Rende, K., Jones, M.G., *Refvem, E., **Carrier, S.J.**, Ennes, M. (2021). Accelerating high school students' STEM career trajectories through informal science volunteer programs. *Cultural Studies of Science Education* (submitted February 22, 2021).

Carrier, S.J., Minogue, J., *Fraulo, A.B. (2021). Examining novice teachers' developing teacher practices: planning for instruction and discourse. *Journal of Science Teacher Education* (under revision).

MANUSCRIPTS IN PREPARATION

Stevenson, K.T., **Carrier, S.J.**, M. Nils Peterson, Szczytko, R., *Jackson, B., Olson, R.(2021). Leveraging park-based outdoor education to reach students who need it most. In Peter Fix and Lincoln Larson (Eds.) *The Transformative Power of Parks* (March, 2021)

BOOKS

Edited Books

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. (in press 2021). Getting down and dirty. In S. (S. K.) Jeong, L. A. Bryan, D. J. Tippins, and C. M. Sexton (Eds.) *Science classroom cases of elementary science teaching and learning – Navigating the challenges and contemplating actions in the 21st century* (pp. xx-xx). Springer.
- *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)

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

*Scharen, D., & Carrier, S.J. (2021). *Bridging elementary science and literacy: Sharing experts' voices*. Mid Atlantic Association for Science Teacher Education (MAAATE). 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.

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*

Arlie 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

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.

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	
Advanced Methods of Teaching Elementary School Science (ELM 520)	Masters of Education
Issues in Elementary School Science Education (ELM 524)	Masters of Education
Special Problems in Elementary School Science (ELM 539)	Masters of Education
Physics (PY 599) – Co Teaching Keith Warren (PY 599)	Masters of Education
Internship in Elementary Education (ELM 654)	Masters 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
Jill McGowan, EEMS	2020-present
Danielle Scharen, EEMS	2019-present
Aimee Fraulo, EEMS	2018-present

Doctoral Committee Membership

Minnie Webster	2021-present
Julianna Nieuwsma	2020-present
Kathryn Rende, SED	2020-present
Laura Romeo, EEMS	2019-present
Jenna Hartley, CNR	2019-present
Emma Refvem, SED	2019-present
Zarifa Zakaria, TELS	2018-present
Teresa Leavens, EEMS	2017-present
Katlyn May, SED	2016-present
Dorothy Holley, SED	2016-present

Master's Committee Major Advisor

Laura Graner, ELM	2020-present
Kaitlyn Hinson, ELM	2020-present
Lauren Ellington, ELM	2020-present
Carly Mize, ELM	2020-present
Sydney Weiss, ELM	2020-present
Julie Arellano, ELM	2019-present
Elizabeth Baker, ELM	2019-present
Melissa Smart, ELM	2019-present
Lisa Langley, ELM	2019-present
Kimberly Hill, ELM	2018-present

GRADUATE STUDENT COMMITTEES – Graduates

Chair of Doctoral Committee

- 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

- 2020 Graduates
 - Amanda Gosek Kates, EEMS
- 2019 Graduates
 - Bitu 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
- 2011 Graduates
 - Catherine LeProvost, SED
- 2010 Graduates
 - Beth Folta, SED

Doctoral Committees (Outside member):

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

Master's Major Advisor - Graduates, ELM

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 Dongolli

- 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

- 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

Alumni Association Distinguished Graduate Professorship Award 2020
NC State University

Reviewer of Excellence 2020
International Journal of Science Education

Bridging the Gap Nominated for: Distinguished Teaching Award in STEM Education 2019
NC State University

College of Education Nominee for Alumni Association Distinguished Graduate Professorships 2019
NC State University

College of Education Nominee for Alumni Association Distinguished Graduate Professorships 2018
NC State University

Thank a Teacher, NC State University 2013, 2014, 2017

BRIDGES, an intensive leadership professional development for women in higher education 2016

Teacher of the Year, Norton Elementary, School Alachua County Teacher Recognition Program, Gainesville, Florida.

Program of Quality for 'The Schoolyard Ecosystem' Natural Selections: Sharing Success in Environmental Education, Florida Department of Education.

Demonstration Site, 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 for *Outstanding Achievement in Primary Teaching Using Insects as Educational Materials* presented at the Entomological Society of America Conference, Baltimore, MD

Distinguished Achievement Award for Teaching. Presented by the University of Florida Department of Entomology and Nematology

GRANT PROJECTS

IN REVIEW

National Science Foundation ITEST - *On the Edge of Education: Teaching Science for the Future*. This project will team students from high needs populations with teachers of excellence to participate in science experiences that they will share with their peers. PI M. Gail Jones, Co-PIs Sarah J. Carrier, Lynn Cross, (Museum of Natural Sciences) Erin Apple (Museum of Natural Sciences) submitted August 9, 2021.

FUNDED

External

2020-2024 – National Science Foundation DRK12- *Teacher learning for Citizen Science (TL4CS)*. PI Sean Smith, Horizon Research; Co-PIs Meredith Hayes, Horizon Research; **Sarah J. Carrier**, NC State; Chris Goforth, NC Museum of Natural Sciences. (Awarded June 17, 2020). This project develops teacher supports for citizen science projects for teachers across North Carolina and evaluates their effectiveness in guiding students' science and outdoor learning. \$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-12Project ATOMS (Accomplished Elementary Teachers of Mathematics and Science). (no cost extension 2017-18) ATOMS examined an innovative Science, Technology, Engineering, and Mathematics (STEM)-focused ELM program at NCSU. In this study we are examining 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. Value added data of student achievement will help us further understand the effectiveness of NCSU graduates. This five-year project (currently in the second year) will provide insight into elementary teacher preparation in STEM areas and information about the critical link between teacher preparation, practice, and student achievement. Principal Investigator is Temple Walkowiak (ELM Mathematics). Co-PIs include: Ellen McIntyre (Dean UNC-Charlotte), Jayne Fleener (Dean of NCSU College of Education), Sarah Carrier (NCSU Science Education), Margareta Thomson (NCSU Educational Psychology), Michael Maher (Assistant Dean College of Education NCSU), Steve Porter (NCSU). \$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

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

- 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,*
- 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

National Science Foundation (NSF) DRPreK-12 Alexandria, VA	January, 2018
National Science Foundation (NSF) ITEST Arlington, VA	September, 2016
National Science Foundation (NSF) DRK-12 Arlington, VA	February, 2016
National Science Foundation (NSF) AISL Science Learning + Planning Arlington, VA	August, 2014
National Science Foundation (NSF) Instructional Materials Division (IMD) Arlington, VA	May, 2006

Journals

Editorial roles

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

Backyard Activities – Covid Response - March 19, 2020

<https://ced.ncsu.edu/news/2020/03/19/backyard-activities-can-provide-educational-respite-from-cabin-fever-during-coronavirus-covid-19-outbreak-says-associate-professor-sarah-carrier/>

Top performing search week of March 20, 2020

The Gertrude Cox Award for Innovative Excellence in Teaching and Learning with Technology Committee	2019-2020
NC State Faculty Senate	2019-2022
Personnel Policy Committee	2019-2022
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	2019-2022
NC State Mediation Committee	2018-2020
NC State Faculty Grievance (607) and Non-Reappointment Review (604) Committee	2016-2024
NC State Sustainability Committee	2016-2018
NC State Entomology graduate student outreach support – Kristi Backe	2015

College of Education

Goodnight Distinguished Professor Search Committee Member	2020-present
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

Department - Teacher Education and Learning Sciences (TELS), formerly Elementary Education (ELM)

Graduate Program Coordinator – Elementary Education program	2015-Present
Director of Graduate Programs – Department of Elementary Education	2013-2015
TELS PAS Coordinating Committee	2021-Present
<i>Showcase Day</i> – Planned and Organized Welcome Incentive for potential EEMS students	March 25, 2020
<i>Showcase Day</i> – Planned and Organized Welcome Incentive for potential EEMS students	March 25, 2019
NC State's Elementary program's MEd teacher preparation as 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 Dr. Beth Sondel	2012-2013

Service to Science and Education Community

Science Trail Across North Carolina working group NC Department of Natural and Cultural Resources	7/2021-present
New Jersey SeaGrant Advisory Board <i>Project SEA: Science, Education, and Action</i>	2020 - present
Millbrook Elementary School EE Magnet School Advisory Board Raleigh, NC	2019 – present
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. Research Group: Dr. Sarah Carrier, Dr. Megan Manfra, Beth Greive. Dr. Gary Henry and Dr. Charles Thompson-Project coordinators.	2010-2011
Presidential Awards for Excellence in Mathematics and Science (PAEMST), Review of applications for elementary science teaching awards, North Carolina Department of Public Instruction (DPI), Raleigh NC	2010, 2012, 2014
Textbook reviews	2009, 2012, 2015
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Science Fair Judge	2008, 2009, 2010, 2011, 2012, 2014, 2015, 2017

International Outreach

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

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- North American Association for Science Teacher Education (NARST) 2005-present
 - Association for Science Teacher Education (ASTE) 2003-present
 - Mid Atlantic Association of Science Teacher Education (MAASTE)
 - North American Association for Environmental Education (NAAEE) 2014-present
 - Environmental Educators of North Carolina (EENC)
 - National Science Teachers' Association (NSTA) 2005-present
 - North Carolina Science Teachers' Association (NCSTA) 2009-present
 - National Science Education Leadership Association (NSELA) 2020-present
 - American Association of Colleges for Teacher Education (AACTE) 2016-2017
2013-2014
 - Member, American Educational Research Association (AERA) 2010-present