

**Science Education Graduate Program  
Department of Curriculum and Instruction  
Purdue University**

**Brief Description of Program**

The science education graduate program offers K-12 teachers, curriculum specialists, scientists and other education professionals the opportunity to investigate contemporary issues related to science learning, teaching, assessment, curriculum, and teacher professional development. The science education faculty are internationally known and are engaged in fundamental and applied research, and curriculum and teacher professional development. The faculty also hold joint and courtesy appointments in the Departments of Biology; Chemistry; Physics and Astronomy; Earth, Atmospheric, and Planetary Science; Agricultural Sciences Education and Communication; Technology Leadership and Innovation; and the School of Engineering Education. Graduate students may specialize in the following areas within the science education program: biology, chemistry, earth/space science, elementary science education, geoenvironmental, physics and astronomy, and K-12 integrated STEM.

**The Graduate Program**

The master’s program is designed primarily for the continued preparation of school teachers. The program is comprised of coursework in science education, science content, and curriculum and instruction (see table below). The PhD program is designed primarily for students who want to specialize in science teacher education and science education research (see table below). The doctoral program is research-oriented, and graduates provide leadership in science education through positions at colleges and universities in both education and science departments, school districts, informal education settings, and governmental agencies. Both graduate programs are highly individualized and the graduate student, along with his/her committee, design a plan of study that meets the student’s background and educational and professional aspirations.

Area of Emphasis	MS	PhD
Science Education Requirements	<ul style="list-style-type: none"> <li>○ EDCI 51700, Survey of Science Education (3cr.)</li> <li>○ EDCI 51800, The Nature of Science in Science Teaching (3cr.)</li> <li>○ EDCI 51000, Research Colloquium in Science Education (1 cr.)</li> </ul>	<ul style="list-style-type: none"> <li>○ EDCI 51700, Survey of Science Education (3cr.)</li> <li>○ EDCI 51800, The Nature of Science in Science Teaching (3cr.)</li> <li>○ EDCI 51000, Research Colloquium in Science Education (1 cr.)</li> <li>○ EDCI 69500, Internship in Science Education (3cr.)</li> <li>○ Science Education: Select two courses from: EDCI 56700, EDCI 60500, EDCI 61800, EDCI 61900, EDCI 62200</li> </ul>
Science Education Elective Requirement	<ul style="list-style-type: none"> <li>○ Select two courses from: EDCI 50600, EDCI 51600, EDCI 53900, EDCI 55800, EDCI 56700, EDCI 60500, EDCI 61800, EDCI 61900, EDCI 62000, CHM 61000</li> </ul>	<ul style="list-style-type: none"> <li>○ Select two courses from: EDCI 50600, EDCI 51600, EDCI 53900, EDCI 55800, EDCI 56700, EDCI 60500, EDCI 61800, EDCI 61900, EDCI 62000, CHM 61000</li> </ul>

Science Content Requirement	Depending on prior science coursework and professional experience, at least 6 credits science content	Depending on prior science coursework and professional experience, at least 9 credits science content
Curriculum and Instruction Foundations	<ul style="list-style-type: none"> <li>○ EDCI 58500, Multicultural Education</li> <li>○ C&amp;I Elective (3cr.)</li> </ul>	<ul style="list-style-type: none"> <li>○ EDCI 62800, C&amp;I Doctoral Seminar I</li> <li>○ EDCI 63800, C&amp;I Doctoral Seminar II</li> <li>○ EDCI 58500, Multicultural Education</li> <li>○ C&amp;I Elective (3cr.)</li> </ul>
Educational Research Design	<ul style="list-style-type: none"> <li>○ EDPS 53300, Introduction to Research in Education or equivalent</li> </ul>	<ul style="list-style-type: none"> <li>○ EDPS 53300, Introduction to Research in Education or equivalent</li> <li>○ EDCI 61500, Qualitative Research I</li> <li>○ Introductory Statistics (STAT 50100 or STAT 51100)</li> <li>○ Advanced Elective (EDCI 61600 or quantitative method)</li> <li>○ EDPS 63000, Research Seminar</li> </ul>
Science Education Research	<ul style="list-style-type: none"> <li>○ EDCI 69800, Research MS Thesis (6cr.) or EDCI 59000, Individual Research Problems (3-6 cr.)</li> <li>○ Competencies Portfolio</li> </ul>	<ul style="list-style-type: none"> <li>○ EDCI 69900, Research PhD Thesis</li> </ul>

Please note that depending on prior coursework additional courses in EDCI and/or EDPS may be required.

### Program Highlights

- The science education faculty are extremely successful in obtaining external funding as PIs and Co-PIs that supports research, science teacher professional development, and curricular development initiatives.
- The science education program has the highest concentration of jointly appointed faculty from the Colleges of Science, Engineering, Agriculture and the Purdue Polytechnic Institute. Because of these joint appointments, we engage in highly productive collaborations with faculty from science, engineering, agriculture and technology on externally funded projects, undergraduate and graduate teaching, and course design and development.
- The program has initiated and developed the integration of engineering design in core undergraduate science courses for elementary education majors; and in collaboration with the Center for Advancing the Teaching and Learning of STEM (CATALYTS), an integrated STEM degree concentration for undergraduate teacher education majors, a graduate level integrated STEM degree certificate, and an integrated STEM concentration for graduate students seeking an online Master's degree through the Department of Curriculum and Instruction.

### Program Faculty and Staff

Lynn Bryan

Professor, Department of Curriculum and Instruction and Department of Physics and Astronomy; Director, Center for Advancing the Teaching and Learning of STEM (CATALYST)

[labryan@purdue.edu](mailto:labryan@purdue.edu)

Research Focus: Science teachers' development and enhancement of knowledge and skills for teaching science through the integration of STEM disciplines; teaching science at the nanoscale in grades 7-12; science teaching and learning through modeling-based inquiry approaches in primary grades; science teaching and learning in culturally, linguistically, and socioeconomically diverse settings.

Brenda Capobianco	<p>Professor, Department of Curriculum and Instruction          Courtesy Appointment, School of Engineering Education</p> <p><u>Research Focus:</u> Science teachers' and teacher educators' engagement in action research; young women's participation in STEM and the role teachers play in supporting young women's participation; issues of gender, culture, and identity in science and engineering education.</p>	<a href="mailto:bcapobia@purdue.edu">bcapobia@purdue.edu</a>
David Eichinger	<p>Associate Professor, Department of Curriculum and Instruction and Department of Biological Sciences;          150<sup>th</sup> Anniversary Professor</p> <p><u>Research Focus:</u> Collaborative problem solving and its role in the teaching and learning of science; the nature of science and its importance for both teachers and students, and the integration of engineering design with science inquiry teaching and learning.</p>	<a href="mailto:deich@purdue.edu">deich@purdue.edu</a>
Selcen Guzey	<p>Assistant Professor, Department of Curriculum and Instruction and Department of Biological Sciences; Assistant Director CATALYST</p> <p><u>Research Focus:</u> Integrated STEM education and biology education, teachers and youth creating productive and engaging learning environments.</p>	<a href="mailto:sguzey@purdue.edu">sguzey@purdue.edu</a>
Muhsin Menekse	<p>Assistant Professor, School of Engineering Education and Department of Curriculum and Instruction</p> <p><u>Research Focus:</u> Students' conceptual understanding in engineering and science; verbal interactions that enhance productive discussions in collaborative learning settings; metacognition and its implications for learning; technology enhanced learning environments.</p>	<a href="mailto:mmenekse@purdue.edu">mmenekse@purdue.edu</a>
Sanjay Rebello	<p>Professor, Department of Physics and Astronomy and Department of Curriculum and Instruction</p> <p><u>Research Focus:</u> The use of visual cueing and feedback to facilitate problem solving in STEM, facilitating student learning using physical and virtual manipulatives, and infusing pedagogical content knowledge into physics course for future elementary teachers.</p>	<a href="mailto:rebellos@purdue.edu">rebellos@purdue.edu</a>
Alberto Rodriguez	<p>Mary Endres Chair of Elementary Teacher Education; Professor, Department of Curriculum and Instruction</p> <p><u>Research Focus:</u> The use of sociotransformative constructivism (sTc) as a theoretical framework that merges critical cross-cultural education with social constructivism. Thus, investigating how educators make their pedagogy and curriculum more culturally and socially relevant to all students.</p>	<a href="mailto:rodri193@purdue.edu">rodri193@purdue.edu</a>

Daniel Shepardson	Professor, Department of Curriculum and Instruction and Department of Earth, Atmospheric, and Planetary Sciences	<a href="mailto:dshep@purdue.edu">dshep@purdue.edu</a>
	<u>Research Focus:</u> Students' understanding and ways of reasoning about earth and environmental phenomena. This research looks at students' conceptual frameworks/mental models and how their frameworks are challenged and restructured by science investigations and social interactions.	
Hui-Hui Wang	Assistant professor, Department of Agricultural Sciences Education and Communication and Department of Curriculum and Instruction	<a href="mailto:huiwang@purdue.edu">huiwang@purdue.edu</a>
	<u>Research focus:</u> How teachers integrate STEM in agricultural, food and natural resources (AFNR) contexts to support students' learning.	
Dean Ballotti	Continuing Lecturer, Departments of Curriculum and Instruction and Earth, Atmospheric, and Planetary Sciences	<a href="mailto:ballotti@purdue.edu">ballotti@purdue.edu</a>
Virginia Bolshakova	Assistant Research Professor, Department of Curriculum and Instruction	<a href="mailto:vbolshakova@purdue.edu">vbolshakova@purdue.edu</a>
	<u>Research Focus:</u> Understanding the dynamics of coupled human and natural systems as they relate to food systems, natural resource management, and integrated STEM education.	

For additional information and to apply to the science education graduate program please visit:

<https://www.education.purdue.edu/academics/graduate-students/degrees-and-programs/graduate-programs/science-education/>