Center for STEM Education
UNC Charlotte
January - March 2019 Report
The Center for Science, Technology, Engineering and Mathematics Education (STEM) is to promote a regional vision for STEM education and outreach, to increase capacity in leadership, and to facilitate collaborate partnerships for addressing STEM priorities for PreK-20.

This report highlights our efforts focused on addressing STEM teaching and learning needs and providing a voice for STEM education.
Gaston County School Board of Education recognized the school district’s partnership with the UNC-Charlotte Center for Science, Technology, Engineering, and Math Education. Alisa Wickliff, Associate Director and Premkumar Pugalenthi, Graduate Research Assistant was instrumental in implementing the “Innovation Station” program in the Gaston County elementary schools by providing training for teachers about how to effectively deliver engineering lessons in the classroom.

The STEM Pre-College Program served 77 students in the three Saturday Academy: one in each of the 3 months. STEM Pre-College students competed in several competitions and events: You Be the Chemist Challenge regional round held at Queen’s University where Deborah Cathcart won one of the challenges; and Regional Science Olympiad held at Philip O. Berry Academy of Technology where Aarsh Dave and Aneesh Sudigala received special mentions for their performance in the Battery Buggy Event. Over 50 Students from schools in Greater Charlotte Region participated in Pre-College Outreach event held at UNC Charlotte. The outreach included hands-on activities including Coding Game, Makey-Makey, Logic Circuits, Biotechnology and Robotics for Grades 5-12 students.

The Center is sponsoring a second year of the STEM Education Leadership Professional Learning Community. STEM Education Leaders from multiple districts meet for day-long opportunities to share, learn, and develop leadership capacity that supports STEM school development and recognition. For the January meeting, the participants engaged in a day-long workshop on research based NCDPI resources for mathematics classrooms at elementary and secondary level. For the February meeting, the participants were engaged in workshop on integrating arts into STEM classrooms and developing a plan for getting NC DPI STEM School Recognition for their schools. For the March meeting, the participants attended the travelling lecture series Hidden NO MORE: STEM women of Color co-organized by UNC Charlotte Center for STEM Education and Morehead Planetarium.

Premkumar Pugalenthi, Graduate Research Assistant at UNC Charlotte Center for STEM Education placed third at the 19th Annual Graduate Research Symposium held at UNC Charlotte. His dissertation research titled, "Reconceptualizing Science, Engineering, Technology and Mathematics (STEM) Integration" focuses on understanding how the new age STEM classrooms should look like by providing a research based framework for STEM Integration. This design research is a result of collaboration between faculty and graduate students from Eindhoven University of Technology, UNCG School of Education, UNC Charlotte Cato College of Education, UNC Charlotte College of Engineering, UNC Charlotte Chemistry Department and teachers from JN Fries Magnet School in Cabarrus County Schools.
Review of Our Work

526 HOURS through CSTEM provided professional development, coursework, enrichment activities, consultation with faculty, competitions, and other support

2699 NUMBER OF INDIVIDUALS SERVED through CSTEM activities and events

- PK-12 School Personnel, 422, 11%
- Community/Business Representatives, 204, 5%
- Parents, 904, 23%
- University Faculty & Staff, 408, 11%
- PK-12 Students, 1802, 47%
- Undergraduate/Graduate Students, 134, 3%
<table>
<thead>
<tr>
<th>Awarded Grants</th>
<th>Amount</th>
<th>Funder</th>
<th>PI</th>
<th>Co-PIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEOP Strategic Partner Grant</td>
<td>$50,000</td>
<td>AEOP</td>
<td>Alisa Wickliff</td>
<td>Lisa Rhodes/SMT</td>
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<tr>
<td>NC JS HS</td>
<td>$21,000</td>
<td>Triservices</td>
<td>Alisa Wickliff</td>
<td>Dr. David Pugalee</td>
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<tr>
<td>Noyce 49er Teach</td>
<td>$698,123</td>
<td>National Science Foundation</td>
<td>Dr. David Pugalee</td>
<td>Dr. Kathy Asala, Chemistry; Dr. Pedram Leilabady, Physics; Dr. Michelle Stephan (MDSK; Mathematics); Dr. Warren DiBiase (MDSK)</td>
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<tr>
<td>Noyce Culturally Responsive Teaching (CResT)</td>
<td>$1,194,928</td>
<td>National Science Foundation</td>
<td>Dr. Anthony Fernandes (Mathematics)</td>
<td>Dr. Kim Harris (Mathematics) &amp; Dr. David Pugalee</td>
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<tr>
<td>Collaborative Research: Broadening Participation with the STEM Ecosystem, Developing a Scalable Model Using a RPP Approach</td>
<td>$497,176</td>
<td>National Science Foundation</td>
<td>Dr. Mary Lou Maher (Computing and Informatics)</td>
<td>Drs. Mohgsen Dorodchi, Lijuan Cao &amp; Audrey Rorrer (Computing and Informatics), Dr. David Pugalee</td>
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<tr>
<td>5E Model of Professional Development in Science Education for Special Educations</td>
<td>$270,764</td>
<td>US Department of Education</td>
<td>Dr. Shawnee Wakeman (PI, Special Education and Child Development)</td>
<td>Dr. David Pugalee</td>
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<td>AEOP REAP</td>
<td>$6,500</td>
<td>AEOP</td>
<td>Dr. David Pugalee</td>
<td>Dr. Shagufta Raja, Alisa Wickliff</td>
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<td>NC JS HS Supplemental Funding</td>
<td>$13,161</td>
<td>AEOP</td>
<td>Alisa Wickliff</td>
<td>Dr. David Pugalee</td>
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**Grant Evaluation**

Dr. David Pugalee

Camp Invention, Burroughs Welcome Fund, Charlotte-Mecklenburg Schools
IPASS, National Science Foundation, College of Computing and Informatics
UNCC S STEM Engineering Academic Pathways, National Science Foundation, College of Engineering
STEM Contributors of the Quarter

Faculty Associate
Dr. Michelle Stephan, Associate Professor
Department of Middle, Secondary, and K-12 Education
Dr. Michelle Stephan is an Associate Professor of Mathematics Education. She has a joint appointment in the Department of Middle/Secondary Mathematics and the Mathematics Department at UNC Charlotte. She partners with Center for STEM education in her research, teaching and service work at UNC Charlotte College of Education. She is actively involved in research activities in the center in the areas of STEM Integration, Inquiry in STEM, and so on. She has also co-written and obtained several grants with Center for STEM Education Faculty. Dr. Stephan has been very involved with Center for STEM education outreach activities namely judging at Regional Science and Engineering Fair, Regional Science Olympiad, and NC JSHS.

K-12 Associate
Bianca Yavelak, Science Curriculum Facilitator, 9-12
Gaston County Schools
Yavelak serves as a secondary science curriculum facilitator for Gaston County Schools. During her time in the classroom, Mrs. Yavelak pulled on her background as a research scientist to help build and grow the Gaston Regional Science and Engineering Fair—a feeder fair for the Region 6 Science and Engineering Fair hosted annually by the UNC Charlotte Center for STEM Education. Currently, she is involved in the NC STEM PLC, the Center for STEM Education’s effort to connect educators from across the region. The PLC has offered opportunities to engage with new instructional strategies for STEM classrooms and to build relationships among participants that support STEM teachers in growing the future scientists of North Carolina. Through her work with the Center for STEM Education and the NC STEM PLC, Mrs. Yavelak has created opportunities for teacher growth and student interest in research science.

Employee
Dr. Joyce Dunlap, STEM Pre-College Program Instructor
Center for STEM Education
I have had the pleasure of working with the STEM PRE-College programs on and off for a number of years during my professional career. I have worked as a high school science teacher, high school administrator and college adjunct professor. In every stage of my career in education, I have thoroughly enjoyed providing the Pre-College students with enrichment activities in all areas of science. New and innovative technological advances have made it possible to offer more in-depth experiences for the students in addition to the traditional hands-on activities. It has been rewarding to work with students in the sixth grade and watch them as they mature as seniors. The Pre-College program helps the students to develop skills in critical thinking, problem solving, and working collaboratively in groups.
PUBLICATIONS


PRESENTATIONS

Eric Wiebe, Tiffany Barnes, Sharon Freeman, David Frye, Mary Lou Maher, Lijuan Cao, Mohsen M Dorodchi, David Pugalee, Audrey S. Rorrer, Danielle Boulden and Veronica Catete (February, 2019). "EcoCS: Developing a Systemic, Scalable Model to Broaden Participation in Middle School Computer Science." Presentation at the Research on Equity and Sustained Participation in Engineering, Computing, and Technology, Minneapolis, MN.


Anna Athanasopoulou, Michelle Stephan, and David Pugalee (March, 2019). "Students’ Proportional Reasoning with the Pantograph." In Research Council on Mathematics Learning National Meeting, Charlotte, NC.


Eric Wiebe, Tiffany Barnes, Sharon Freeman, David Frye, Mary Lou Maher, Lijuan Cao, Mohsen M Dorodchi, David Pugalee, Audrey S. Rorrer, Danielle Boulden and Veronica Catete (March, 2019). "A Systemic, Scalable Model to Broaden Participation in Computer Science." Presentation at the Special Interest Group on Computer Science Education: SIGCSE 2019, Minneapolis, MN.


Selected Activities

Cabarrus County School STEM Advisory Board, David Pugalee, Member

College of Computing and Informatics Undergraduate Task Force, David Pugalee, Member

Council for the Accrediation of Educator Preparation, David Pugalee, Team Chair, Site Visits

Expanding Magnet Program Options, Widening Educational Reach, Cabarrus County School, David Pugalee, I3 Grant Advisory Committee

Mathematics Educator for the Future Project, David Pugalee, International Programme Committee

National JSHS Executive Advisory Board, Alisa Wickliff, Board Member

North Carolina Science and Engineering Fair Foundation Board, Alisa Wickliff, Regional Director

North Carolina Science Leadership Association Board/Executive Board, Alisa Wickliff, Past President

North Carolina Science Olympiad Board, Alisa Wickliff, Board Member & Communications Chair

STEM West, Alisa Wickliff, Board Member

Strengthening Claims-based Interpretations and Uses of Local and Large-Scale Science Assessment Scores, David Pugalee, Technical Advisory Committee

Symposium on Elementary Mathematics Education, David Pugalee, International Advisory Board
Center Personnel

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