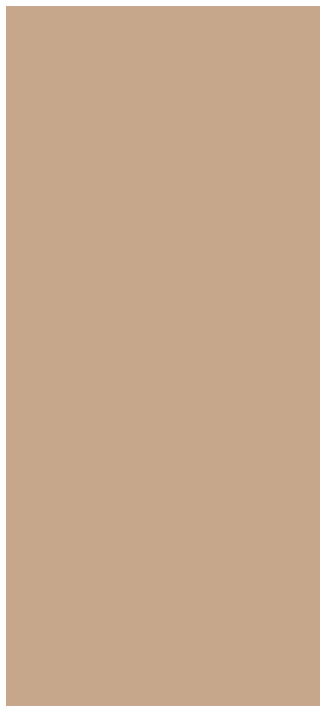
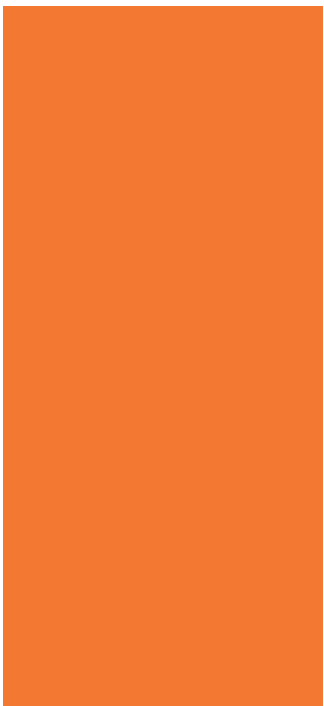


Connections • Communication • Collaboration

ANNUAL REPORT 2016

Fiscal Year 2016
(July 1, 2015 - June 30, 2016)



FY 2016 NWO Staff

W. Robert Midden

Emilio Duran

Jonathan Bostic

Gabriel Matney

Jessica Belcher

Susan Stearns

Lisa Addis

Jenna Pollock

Beth Ash

Judith Steiner

Director

Faculty Associate Director

Faculty Associate

Faculty Associate

Associate Director of Finance and Operations

Assistant Director of Programming and Development

Graphic Designer/Marketing Director

NWO Education Program Manager

Research Program Manager

iEvolve with STEM Project Manager

NWO Mission

The Center's mission is to advance science, technology, engineering, and mathematics (STEM) education for people of all ages.

NWO Vision

The Northwest Ohio Center of Excellence in STEM Education at BGSU aims to advance science, technology, engineering, and mathematics (STEM) education for people of all ages. Our purpose is to work with community partners to (a) generate new knowledge about the science of teaching and learning, (b) apply this knowledge by developing the expertise of K-12 educators and higher education faculty, (c) increase public support for, and understanding of, the STEM subject areas, and (d) stimulate the interest of young people, especially those in underrepresented groups, in these rewarding fields of study and career opportunities.

Table of Contents

2 ••• NWO Goals

3 ••• NWO Advisory Board

4 ••• Educator Professional Development and Outreach

- “NWO STEM Connection” E-Newsletters
- NWO STEM Education Inquiry Series
- NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching (NWO Symposium)

7 ••• Faculty Professional Development and Collaborative Education Research

- COSMOS STEM Education Learning Community
- COSMOS Team
- NWO Faculty Participants

10 ••• Grant Projects

- Advancing the Science Skills of Elementary Teachers and Students (ASSETS)
- Black Swamp Math Teachers’ Circle (BS – MTC)
- Common Core for Achievement & Middle Grades Mathematical Proficiency (C²AM²P Middle Grades)
- Common Core for Mathematical Proficiency in Elementary and Middle Schools ((CO)²MP Elementary and 6 – 8)
- Inquiry and Engagement to Invigorate and Optimize Learning for Everyone (iEvolve) with STEM
- iTraining
- Ohio Junior Science and Humanities Symposium (OJSHS)

18 ••• School and Community Activities and Outreach

- Falcon BEST Robotics
- Math Camp
- STEM in the Park
- Women in STEM
- You Be The Chemist Challenge

24 ••• Student Scholarship Programs and Grants

- Academic Investment in Mathematics and Science (AIMS)
- Collaborative Research: AGEP-T: Northern Ohio AGEP Alliance (NOA-AGEP)
- Building Ohio’s Sustainable Energy Future (BOSEF)
- Granting Access to Math and Science (GRAMS)
- Science and Math Education in ACTION

28 ••• Research Programs and Grants

- Identifying the Best Strategy to Reduce Phosphorus Loads to Lake Erie from Agricultural Watersheds Survey of Local Sources of Nutrients in the Upper Portage River Watershed (Sea Grant)
- Mitigation of Agricultural Nutrient Loss by Novel Manure Treatment (OWDA)

30 ••• FY 2016 NWO Budget

34 ••• Appendices

A: Faculty and Student Recognition
B: Falcon Best Recruitment Email
C: iEvolve with STEM Recognition
D: iTraining Advertising
E: Math Camp Recognition
F: NWO STEM E-Newsletters

G: NWO STEM Inquiry Series Advertising
H: NWO Symposium Advertising & Recognition
I: OJSHS Advertising & Recognition
J: STEM in the Park Advertising
K: Women in STEM Advertising
L: You Be The Chemist Challenge Recruitment Email



NWO GOALS AND CORRESPONDING ACTIVITIES

2 |

Goal 1: Develop the expertise of pre-service and in-service teachers in STEM and STEM education disciplines.

Goal 2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

Goal 3: Conduct and communicate collaborative research in STEM and STEM education disciplines.

Goal 4: Develop and sustain a regional collaborative alliance including university, school, informal education, and business partners through a shared vision and collaborative spirit for tackling current STEM education issues.

Goal 5: Support higher education faculty and future faculty in pursuit of the best practices in STEM and STEM education disciplines to enhance undergraduate and graduate education.

FY 2016 NWO Advisory Board

Melissa Basinger	Putnam County ESC
Eric Baumgartner	Ohio Northern University
Anne Bullerjahn	Owens Community College
Mary Caprella	BP Refinery, LLC
Dave Enzerra	Lubrizol
Julie Gerke	St. Henry Local Schools
Anjali Gray	Lourdes University
Jim Gunner	Perkins Local Schools
Sonny Hamizadeh	SSOE
Beth Hench	Ayersville Local Schools
Gary Herman	Putnam County ESC
Stephanie Johnson	Battelle/OSLN
Andy Jorgensen	The University of Toledo
Mitchell Magdich	Toledo Zoo
Sloan Mann	Imagination Station
Bob Mendenhall	Toledo Public Schools
Dusty Miller	WGTE
Rod Moorman	Mercer-Auglaize Business Education Alliance
Jan Osborn	Putnam County ESC
Jed Osborn	Ball Corporation
Kevin Parkins	Cardinal Stritch Catholic High School
Julie Payeff	The Andersons
Gwynne Rife	University of Findlay
Eugene Sanders	Sandusky City Schools
Michelle Shafer	Maumee City Schools
Joel Steinmetz	Lima Senior High School
Tom Stuckey	Northwest State Community College
Sybil Truster	Shelby County ESC



Educator Professional Development and Outreach

4 |

“NWO STEM Connection” E-Newsletters

The NWO e-newsletter is focused on bringing attention to new opportunities, programs and events happening in STEM K-16 education. Monthly e-newsletters feature stories about area K-12 schools with a focus on STEM learning. Each month also includes feature stories from community partner organizations detailing how business and non profit organizations are working with K-12 schools to enhance STEM teaching and learning. A hands-on, inquiry based STEM activity is also included for teachers to use in K-12 classrooms, upcoming teacher professional development and student opportunities and STEM resource announcements. The e-newsletter is distributed electronically to 8,000+ contacts within the NWO database covering regional school districts and their teachers and administrators. See Appendix F for an example of an e-newsletter for FY 16. **Meets NWO Goals: 1, 2, & 4**

NWO STEM Education Inquiry Series

Brief Description

Sustained professional development is offered by NWO throughout the academic year through the NWO Inquiry Series. The Inquiry Series is a series of STEM professional development workshops that continues to be highly popular with educators in the region. It also functions as a monthly platform for affiliated NWO grant projects and regional educators to come together for project-specific professional development. The Inquiry Series is open to in-service and pre-service teachers, higher education faculty, and business/community partners in the region. Participants can opt to attend only one event or all the Inquiry Series events. **Meets NWO Goal: 1**

FY 2016 Activity Information

In an effort to reduce the competition for recruiting STEM teachers in northwest Ohio, the 2015-16 NWO Inquiry Series was a partnership with existing education agencies and projects. These partnerships allowed both parties to benefit from the professional development provided and offered a more streamlined list of opportunities for teachers in the region.

The first partnership was with the Black Swamp – Math Teachers Circle (BS – MTC). This was a free program offered 7 times throughout the year for two hours each evening for K – 16 math teachers. The dates and attendance data for these meetings is listed below.

During the winter of 2016 NWO partnered with Xcite Learning to present the “Supercharged Science Mini-Series” for grades 3 – 8 teachers. This two part series took place on two consecutive days from 8:30 AM – 3:30 PM. Teachers who participated paid \$250/person to attend and this included all of their meals and materials. The dates and attendance for this series is listed below. See Appendix G for examples of the advertisement materials for this program.

Black Swamp – Math Teachers Circle (BS – MTC)		
Dates	Location	Attendance
August 25, 2015	North Baltimore Elementary School, North Baltimore, OH	20
September 22, 2015	North Baltimore Elementary School, North Baltimore, OH	21
October 20, 2015	North Baltimore Elementary School, North Baltimore, OH	21
November 7, 2015	North Baltimore Elementary School, North Baltimore, OH	19
January 28, 2016	Life Science Building, BGSU, Bowling Green, OH	21
March 3, 2016	Life Science Building, BGSU, Bowling Green, OH	13
April 21, 2016	Life Science Building, BGSU, Bowling Green, OH	20

Supercharged Science Mini – Series (Xcite Learning)		
Dates	Presenters	Attendance
January 28, 2016 & January 29, 2016	Dr. Jodi Haney, Xcite Learning and Jenna Pollock, NWO	30

NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching (NWO Symposium)

Brief Description

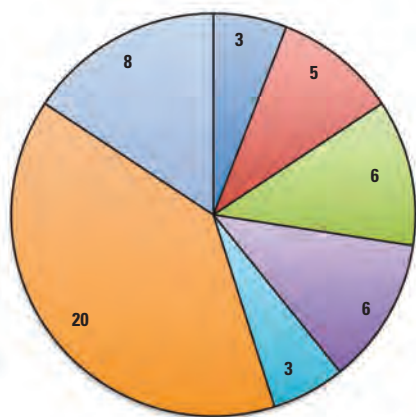
Over the past several years, the NWO Symposium has brought together hundreds of participants to exchange effective strategies for teaching STEM. This popular event has provided the Center with huge visibility in the community, attracting educators to our long-term professional development opportunities and giving all participants resources and ideas they can use immediately in their classroom or setting. **Meets NWO Goals: 1 & 5**

FY 2016 Activity Information

The 2015 NWO Symposium was held on the BGSU campus on Saturday, November 21. The Symposium began with a keynote address from BGSU Professor of Teaching Excellence Dr. Daniel Brahier titled: "Science and Mathematics for a New Generation", and continued with five one-hour blocks of seven different content strands. A registration fee of \$35 was charged to educators and administrators and a \$5 fee was charged to undergraduate and graduate students. Presenters remained free and for the first time the Symposium did not include a vendor area. Session strands continued to help participants determine what sessions were ideal for their personal professional development. Fewer sessions were offered during each block to maximize attendance in each offered session during the block. The 2015 Symposium had a heavy focus on mathematics sessions to accompany the mathematics themed keynote. Below is breakdown of the sessions offered by strand (51 total) and the overall attendance of 425. See Appendix H for examples of the Symposium advertising & recognition. The evaluation report can be found at: www.nwocenter.org/reports.

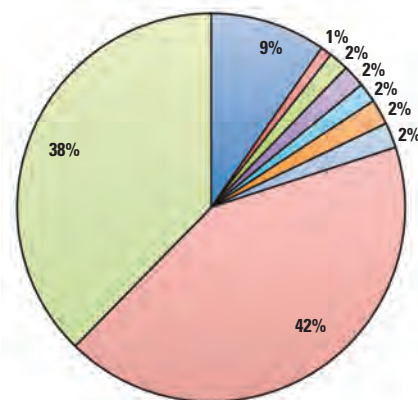
6

NWO Symposium Sessions by Strand



- Research Based Instructional Practices in the College Classroom: Enhancing the Undergraduate Experience
- Integrating Technology in the Classroom
- Putting Creativity to Work: Teaching STEM With Innovation
- STEM in the Community: Thinking Outside the Classroom
- Teaching and Learning in ENGINEERING
- Teaching and Learning in MATHEMATICS
- Teaching and Learning in SCIENCE

NWO Symposium Attendance by Participant Group



- College / University Faculty or Staff
- For-Profit Education Organization Staff
- Graduate Student
- Informal Educator
- NWO Staff & Keynote Speaker
- Other
- PreK-12 Administrator (or Retired Administrator)
- PreK-12 Teacher (or Retired Teacher)



Faculty Professional Development and Collaborative Education Research

| 7

COSMOS Research Learning Community

Brief Description

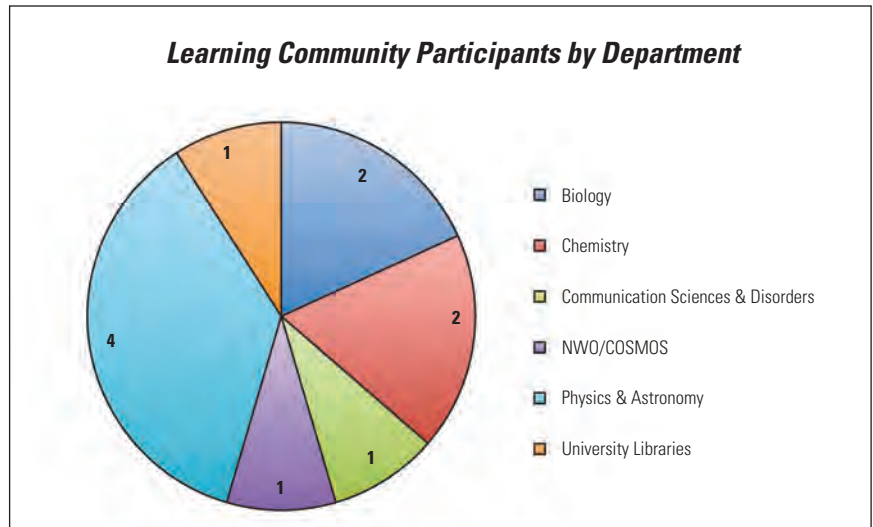
Faculty, graduate students, and others with a common interest in STEM teaching and learning come together throughout the academic year to collaboratively examine and design high tech and highly engaging environments to enhance student attitudes, motivation, engagement, and ultimately success. The learning community supports the overriding goal of enhancing STEM education for people of all ages. **Meets NWO Goals: 3 & 5**

FY 2016 Activity Information

The 2015-16 faculty learning community was led by Dr. Kate Dellenbusch of the Department of Physics and Astronomy. Participants explored the misconceptions BGSU students come to STEM classes with and how those misconceptions can be overcome. During the Fall semester the meetings focused on discussing the literature on misconceptions. Participants also identified the specific misconceptions held by BGSU students in their courses using formative assessments. This was used to form a repository of the common misconceptions held by college students in the STEM disciplines represented by the learning community members (e.g. astronomy, physics, biology, chemistry, etc.).

Continued on page 8

Participation in the COSMOS Research Learning Community shows a diverse group of faculty participants from 7 university departments and 3 corresponding colleges (Arts & Sciences, Health & Human Services and Technology, Architecture & Applied Engineering). The community consisted of 11 regular attendees and met regularly throughout the academic year.



COSMOS Team

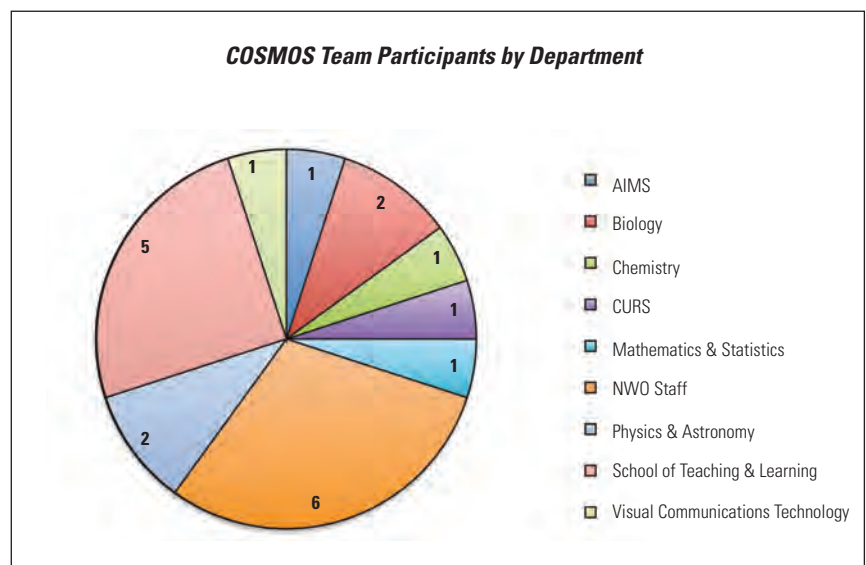
Brief Description

8

The Center Of Excellence in Science and Mathematics Education: Opportunities for Success (COSMOS), the BGSU branch of NWO, hosts the COSMOS Team meeting for BGSU faculty and administrators to work with NWO staff to communicate, collaborate, and champion STEM initiatives at BGSU and throughout the northwest Ohio region. This enthusiastic and supportive group has been meeting as a formal group for over 10 years and is committed to advancing STEM education for people of all ages. **Meets NWO Goal: 3**

FY 2016 Activity Information

Participation in the COSMOS Team demonstrates a diverse group of faculty participants from 9 university departments and 3 corresponding colleges (Arts & Sciences, Education & Human Development, and Technology, Architecture & Applied Engineering). Additional representatives from the AIMS (Academic Investment in Mathematics and Science) and CURS (Center for Undergraduate Research and Scholarship) were also in attendance at each meeting. The team consisted of 20 total attendees and met once in Fall 2015 and once in Spring 2016.



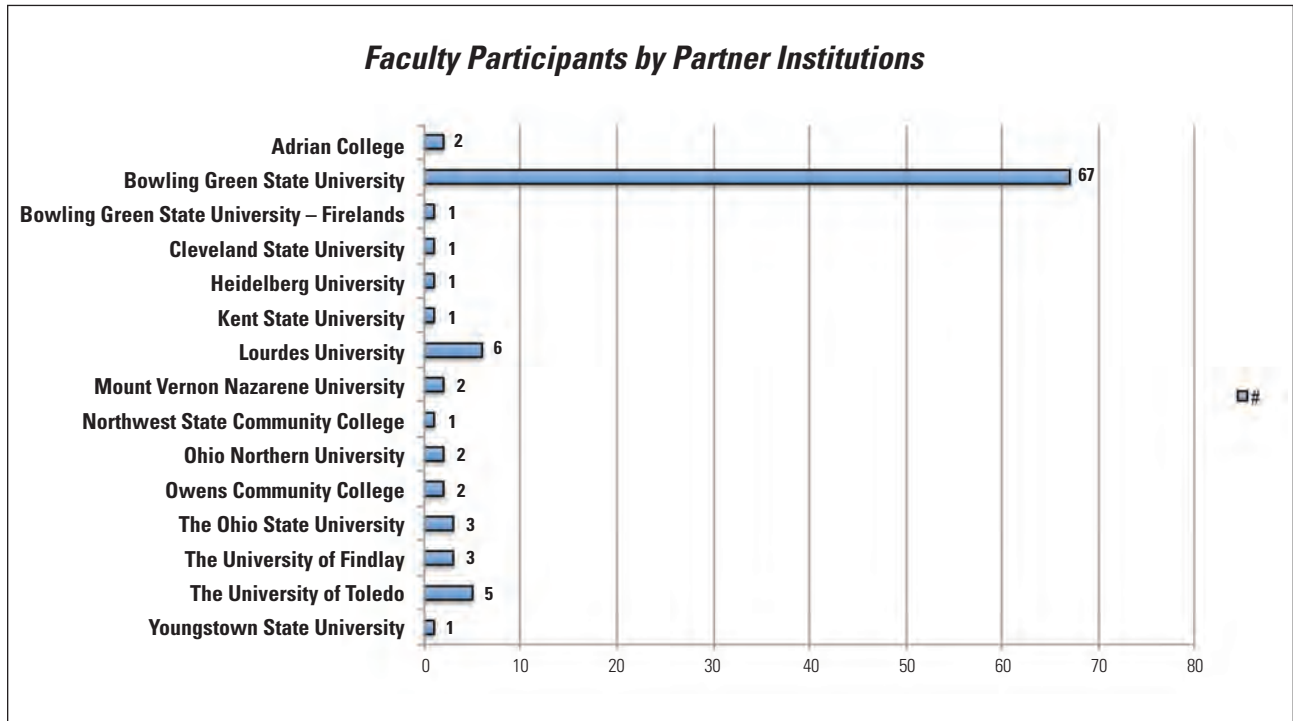
NWO Faculty Participants

Brief Description

NWO has partners in colleges and universities all over northwest Ohio and southeast Michigan. These faculty assist NWO in many ways, including participating in and/or presenting at the following NWO events: (a) NWO STEM Education Inquiry Series, (b) NWO Symposium, (c) STEM in the Park, (d) OJSHS, (e) NWO Advisory Board, (f) COSMOS STEM Education Learning Community, (g) COSMOS Team, and (h) multiple NWO grant projects.

Meets NWO Goals: 3 & 5

FY 2016 Activity Information





Grant Projects

10 |

Advancing the Science Skills of Elementary Teachers and Students (ASSETS)

Brief Description

Project ASSETS: Advancing the Science Skills of Elementary Teachers and Students is a collaborative partnership among many northwest Ohio school districts, the School of Teaching and Learning and the School of Intervention Services at BGSU and the College of Natural Sciences and Mathematics at the University of Toledo. The goals of ASSETS are (1) Improve the academic achievement of students in partnering school districts; (2) Develop deep science teacher content knowledge by facilitating professional development that uses active learning experiences and incorporates research-based best practices consistent with local, state, and national standards; and (3) Expose participating teachers to effective inquiry and 6E models and strategies for reaching diverse learners to improve science teaching and assessment. **Meets NWO Goals: 1, 3, 4, & 5**

FY 2016 Activity Information

The cohort of 28 grades 3 – 5 teachers are participating in a three-phase program which will offer over 100 contact hours of high quality professional development. The first phase of the project was the Kick-Off in May 2016 and was devoted to team building, training on the 6E Instructional Model, and guidance through Ohio's Learning Standards in Science. An introduction and overview of Phase Two was presented to each grade level by the respective Teaching Team.

Continued on page 11

Phase Two consisted of an eight-day summer workshop in June 2016 emphasizing rigorous and engaging learning experiences devoted to grade level specific content standards in Earth and Physical science as well as general education topic sessions. Unique to phase two were co-teaching teams of three (classroom educator, special educator, and content expert) at each grade level. General sessions covered topics such as formative assessment, technology tools, growth mind-set, student motivation & engagement, text-set design, and differentiation.

The teachers will continue into phase three of the project during the 2016 – 17 academic year as they meet monthly in professional learning networks called “Science Communities”.

NWO Role in ASSETS

- Grant project management
- Financial management of the grant budget
- Instruction of grant professional development

Black Swamp Math Teachers’ Circle (BS – MTC)

Brief Description

Black Swamp Math Teachers' Circle (BS – MTC) is a one-year Improving Teacher Quality grant from the Ohio Board of Regents. BS – MTC focuses on preparing K – 12 in-service teachers for the Common Core State Standards for Mathematics (CCSSM). This preparation includes about 100 hours of professional development throughout the grant period of January 2015 – May 2016. Through the program teachers learn about best practices in teaching mathematics including ways to promote the 8 Standards for Mathematical Practice expected by the CCSSM. A major focus of this grant project is deepening teachers mathematical problem solving power. Teachers work to solve rich mathematical tasks that start with mathematical ideas around grade 4 and grow to levels of complexity that professional mathematicians would work on. By reflecting on and explicating the problem solving techniques used in these mathematical tasks teachers deepen their own abilities and gain insight into pedagogical spaces for their students to do the same. Teachers then go on to explore and practice these BS – MTC techniques with their own students, and share their findings with others at state level conferences. **Meets NWO Goals: 1, 3, 4, & 5**

FY 2016 Activity Information

A total of 18 mathematics teachers from schools around northwest Ohio participated in the 2015-2016 Black Swamp – Math Teachers’ Circle. Teachers in the program begin their work with the project in April 2015 for an evening kick-off which was followed by a 5 day intensive training in July 2015. The summer training ran from 8:00 AM – 8:00 PM Monday – Friday and teachers were provided a hotel room in Findlay, OH during the workshop. The academic year follow-up to the summer training took place over 7 evenings between August 2015 – April 2016. The academic year events were open to the public in addition to the grant participants. See NWO Inquiry Series for details on the attendance at the academic year events.

NWO Role in BS – MTC

- Financial management of the grant budget
- Grant project management assistance

Common Core for Achievement & Middle Grades Mathematical Proficiency (C²AM²P Middle Grades)

Brief Description

C²AM²P Middle Grades is a Math Science Partnership project funded by the Ohio Department of Education. C²AM²P serves grades 6-8 mathematics teachers from around northwest ohio. This grant is a partnership between K-12 school districts and Bowling Green State University's Colleges of Education and Human Development and Arts and Sciences as well as the Northwest Ohio Center for Excellence in STEM Education. Teachers will become familiar with the content and practices embedded in the new mathematics standards and develop instructional strategies that promote problem solving through rich tasks, technology, and research-based practices such as teaching through problem solving. The project will run from August 2014 through August 2016. See Appendix A for examples recognition. **Meets NWO Goals: 1, 3, 4, & 5**

FY 2016 Activity Information

C²AM²P Middle Grades served 26 grades 6-8 mathematics teachers from Findlay, Hardin-Houston, Jackson Center, Lima, McComb, and Vanlue Schools during it's second year of programming from August 2015 – June 2016. Teachers met with the instructional team nine times during the 2015 – 16 academic year and conducted two lesson studies (one in the Fall of 2015 at Jackson Center and Hardin-Houston Schools and one in the Spring of 2016 at Findlay City Schools). The teachers concluded their year two work with an eight-day summer institute in June 2016 where they worked on writing a series of lessons for use by their entire grade level team. Year three of the grant has been officially funded and will begin in August 2016 with work concluding in June 2017.

NWO Role in C²AM²P Middle Grades

- Financial management of the grant budget
- Grant project management assistance

Common Core for Mathematical Proficiency in Elementary and Middle Schools ((CO)²MP Elementary and 6-8)

Brief Description

(CO)²MP is a Math Science Partnership project funded by the Ohio Department of Education. (CO)²MP is a collaboration between several northwest Ohio schools and Bowling Green State University's Colleges' of Education & Human Development and Arts & Sciences as well as the Northwest Ohio Center for Excellence in STEM Education. Through this partnership K-5 and 6-8 teachers from school districts in the Sandusky area will take part in professional development focused on the greatest areas of their students' mathematical content and mathematical proficiency needs. The project will run from August 2014 through August 2016. **Meets NWO Goals: 1, 3, 4, & 5**

FY 2016 Activity Information

Through this partnership 30 elementary and 16 middle school teachers from five school districts in the Sandusky area (Margaretta, Perkins, Sandusky Central Catholic, and Sandusky City Schools) took part in professional development focused on the greatest areas of their students' mathematical content and mathematical proficiency needs. Teachers met with the instructional team eight times during the 2015 – 16 academic year and conducted two lesson studies (one in the fall of 2015 and one in the spring of 2016). The teachers concluded their year two work with an eight-day summer institute in June 2016. Year three of the grant has been officially funded and will begin in August 2016 with work concluding in June 2017.

NWO Role in (CO)²MP

- Financial management of the grant budget
- Grant project management assistance

Inquiry and Engagement to Invigorate and Optimize Learning for Everyone (iEvolve) with STEM

Brief Description

The iEvolve with STEM project is funded by the National Science Foundation: Math and Science Partnership Program. This project is designed to transform teaching and learning in grades 3-8 of two moderate sized school districts by fully integrating the practice of science research throughout the curriculum, with the goal of substantially improving student achievement of Ohio science standards. The project also aims to improve undergraduate science instruction by increasing science and mathematics research faculty engagement with K-12 education. Building on past experience in prior NSF-funded work, this will increase awareness and appreciation of best practices in teaching among higher education faculty and will foster a greater commitment to improving the STEM pipeline as well as the effectiveness of undergraduate learning.

Based on nearly a decade of highly successful collaboration in STEM education research and reform and the experience gained from more than \$20 million of externally funded STEM initiatives, the key innovations in this project are: 1) students mastering rigorous state and national science standards by practicing science in national citizen-science research projects led by professional scientists and fully integrated into classroom learning; 2) participation of teachers and administrators for an extended 3-year period in a rigorous program of professional development as members of Professional Learning Communities; 3) teachers and students learning to lead through dissemination of their findings to their peers, to their communities, and to their profession; 4) implementation of best practices for differentiating instruction to maximize learning for all students.

The primary research questions focus on some of the most salient issues that STEM educators currently face: how student engagement and motivation relate to achievement of rigorous learning outcomes. NWO will examine how participation in citizen-science research affects these variables across the grades 3-8 range. NWO is working with nationally renowned Horizon Research, Inc. for evaluation of project outcomes.

Two cohorts of approximately 50 teachers will evolve through an intense 3-year professional development program involving more than 400 hours in direct contact, additional project activities, and research with their students, collaborating with more than 20 professional scientists in 5 different disciplines to accomplish sustained, transformational change in 3th-8th grade science instruction. The instructional innovations practiced by iEvolve teachers are expected to improve learning for more than 6,000 students in grades 3-8 during the 5 years of this project, and through the sustained transformation of these districts, tens of thousands of additional students will be affected. This impact is expected to increase as the influence of iEvolve teachers and students is spread throughout the region through their dissemination of their achievements.

This project is implementing strategies that have been previously found effective for increasing the engagement and success of all students, especially in high-needs schools like those involved in this project. A central theme of iEvolve will be differentiating instruction within all contexts so that every student participates, every student learns, and every student succeeds, as each one becomes a practicing scientist-learner. iEvolve teachers will use action research with the support of Professional Learning Communities to promote continuous improvement of their teaching. They will also learn how to disseminate their action research findings and their students' findings in their science research projects to their peers, their local communities, and their professions. Through

this dissemination they will influence the region, shifting the culture towards a greater level of engagement and interest in science discovery and innovation in education. Improving the quality and effectiveness of science education for all students will benefit our society due to higher economic productivity and better participation of citizens in democratic decision-making involving complex STEM issues. The project is led by NWO at BGSU with Dr. W. Robert Midden acting as the Principal Investigator. Project partners include Bowling Green State University, Erie Soil and Water Conservation District, Lourdes University, Toledo Area Metroparks, NWO, The Ohio State University: Stone Lab, Perkins Local Schools, Sandusky City Schools, The University of Toledo, and the Toledo Zoo. **Meets NWO Goals: 1, 2, 3, 4, & 5**

FY 2016 Activity Information

The first cohort of 54 teachers in grades 3-5 completed their third formal year of the project, continuing the implementation of inquiry science and Citizen Science Research projects. Citizen Science Research included studies of pollinators for 3rd grade, rain garden soil infiltration and FrogWatch USA for 4th grade, and water quality monitoring of local streams and the Sandusky Bay for 5th grade. The focus for this final formal year for this cohort, however, was action research and dissemination of research. To accomplish this, teachers attended their third summer institute, which included work with renowned inquiry science educator and author, Page Keeley, who led sessions on research-based formative assessment and action research. Teachers also continued to attend monthly professional development sessions and worked in grade level professional learning teams. Citizen Science Research partners, who continued to provide support for teachers and students, included The Toledo Zoo, Erie Soil and Water Conservation District, BGSU's Herpetology and Marine Labs, as well as The Ohio State University Stone Lab.

Some notable dissemination efforts of the elementary cohort's teachers and students include the installation of a pollinator garden at a community hospice memorial site, an Earth Day booth highlighting the importance of protecting amphibians, and a presentation at a local grocery store to build awareness of how our food is impacted by the health of pollinators. Additionally, two Student Research Symposia were held—one each for partner school districts with more than 1200 students giving presentations about the science research they had conducted during the year.

The second cohort for grades 6 – 8 teachers also formally began this year, with their focus on new inquiry science materials and cross-curricular connections to science content themes. 43 teachers across all content areas participated in their first summer institute, monthly professional development sessions and professional learning team work. Master teachers from three other districts for middle school science were instrumental in inquiry training, both during the first summer institute and evening school year sessions.

Also during this year, middle school Citizen Science Research projects were developed for implementation in the following school year. Many of these projects focus on more targeted studies of water quality and aquatic life, as well as for vernal pools and soil—all utilizing NASA's GLOBE program for data entry and analysis for 6th and 7th grades. Research for 8th grade will focus on the genetics of pollinators and native plants. Some partners are the same as for cohort 1, with the Toledo Zoo, Erie Soil and Water Conservation District and The Ohio State University Stone Lab continuing. A new partner, the Metro Parks of the Toledo Area, has also begun their work in the project. All partners are involved in the second summer institute, training teachers in how to lead students in their respective Citizen Science Research projects.

Both cohorts' Curriculum Design Teams met throughout the year, with representative teachers from all grade levels and content areas. The elementary team worked to finalize cross-curricular connections and create formative assessments for all learning targets for science content, designed to balance all levels of cognitive demand required by state learning standards. The middle school team began to align the new science curriculum with state learning standards and create cross-curricular connections. They also helped to refine Citizen Science Research projects.

Although not originally planned, because of district interest and requests for additional on-going support, some activities will be continued on a limited basis, at least for the coming school year for cohort 1. These include 3 evening professional development sessions, additional Curriculum Design Team work, helping to implement new teacher orientation modules, and assisting with other sustainability measures. See Appendix C for examples of recognition.

iTraining

Brief Description

NWO has implemented classroom technology professional development training sessions for teachers in the districts of Putnam County, Ohio since 2013. This year we reached out to Van Wert City schools as well. This program was funded by the Martha Holden Jennings Foundation and NWO. **Meets NWO Goals: 1 & 4**

FY 2016 Activity Information

The iTraining III program provided two training sessions to teachers in the Van Wert City schools during the fall of 2015. These trainings were geared toward implementing Google Education software tools in the Project Based Learning classroom.

Three sessions with similar content were provided to teachers in the school districts of Putnam County. A total of 124 teachers participated in this program. The components of these trainings included practical applications of effective digital classroom management, and building and advancing teachers' level of knowledge on how to effectively engage their students with appropriate Google Education software applications in the digital classroom. Monthly session surveys and a pre and post survey were conducted to assess program success. See Appendix D for examples of the teacher recruitment for this program.

Ohio Junior Science and Humanities Symposium (Ohio JSHS)

Brief Description

OJSHS brings some of the best and brightest students from Ohio middle and high schools together for a competition to highlight and judge the quality of their research projects in the sciences and humanities. This event is an excellent opportunity for the recruitment of the next generation of scientists, mathematicians, engineers, and teachers. OJSHS is co-sponsored by NWO and a grant from the Academy of Applied Science. Paper and poster presentations by these students demonstrate a level of achievement that would rival some of the very best junior and senior undergraduate students with some even approaching what is expected of beginning graduate students. Past Ohio winners have gone on to win the top award at the National competition, demonstrating the extraordinary talent and achievement of these students. **Meets NWO Goal: 2**

FY 2016 Activity Information

Bowling Green State University hosted the 3-day event for the eighth year in a row from March 16 – 18, 2016. This year marked the 53rd Anniversary of the OJSHS program. Dr. Gabriel Matney, a Bowling Green State University faculty member in the School of Teaching and Learning gave the keynote address. There were 24 paper presentations and 83 poster presentations. Graham Lane from University School was the 1st place winner for paper presentations with his project titled “Pannexin-1 in EG7 Murine Thymoma Acts as a Functional Channel During Apoptosis”. Graham along with 3 other OJSHS winners traveled to the National JSHS in Dayton, Ohio in April 2016. A complete program and other information about the 2016 OJSHS can be found at www.ojsHS.org. Below is a breakdown of attendance data for the 2016 Symposium. The 2016 OJSHS Evaluation Report offers a more thorough account of the implementation and impact of the event, and can be found at www.nwocenter.org/reports. See Appendix I for examples of the Ohio JSHS recruitment materials and recognition.

Participant Group	Total Attendance for 2016
High School and Middle School Students	115
K-12 Educators	13
Higher Ed Faculty (Poster & Paper Judges)	41
Staff and Volunteers	12
Parents and Guests	30
TOTAL	211



School and Community Activities and Outreach

18 |

Falcon BEST Robotics

Brief Description

The Falcon BEST Hub at Bowling Green State University is a proud participant in BEST (Boosting Engineering, Science and Technology) Inc. - a national organization that inspires middle and high school students to consider careers in science, technology, engineering, and mathematics (STEM) through participation in a sports-like, science- and engineering-based robotics competition.

However, BEST is more than just a robotics competition; it offers several opportunities for many students to be involved in different parts of the competition. The competition consists of an engineering notebook, robotics competition, spirit competition, marketing presentation, and display presentation with awards given for each of these aspects of the event. All of these pieces are combined to get the score for the overall "BEST" award. Because awards are given for these other aspects of the competition, students with a diverse array of skills are rewarded for their participation and thus a broader array of students benefit than from some other types of

Continued on page 19

robotics competitions. Students who participate in BEST: (1) understand the practical use of math concepts and applied physics, (2) solve real-world science and engineering problems, (3) gain training that is transferable to all academic disciplines and career pursuits, (4) increase their interest in science, technology, engineering, and mathematics (STEM), (5) learn what engineers “do”, and (6) experience “design-to-market” product development.

The Falcon BEST Hub is a partnership between BGSU’s College of Technology, Architecture and Applied Engineering and the Northwest Ohio Center for Excellence in STEM Education. The Hub was created in 2013 and the first competition was held that fall. The top teams from the Falcon BEST Hub join teams from several other states at the Northern Plains Regional Competition each year. This is the highest level of advancement for BEST as a national competition does not exist. Each year a new Hub around the nation designs the competition for that year and each new year brings a completely new robotics task for the participating students. **Meets NWO Goals: 2 & 4**

FY 2016 Activity Information

The third Falcon BEST Robotics Competition was held in the fall of 2015 and started with 16 teams. The six-week competition called “PayDirt” started on September 12 with the Kick-Off for teams. At this event they received their robotics materials and got their first look at the robotics game. Teams had the next four weeks to work on their robot and other aspects of the BEST competition before participating in Mall/Practice Day on October 10. Mall/Practice Day allowed the teams to test out their robots on the game field and learn what others were doing and share ideas. The Falcon BEST Game Day took place in the Stroh Center on October 24. One team was not able to complete their robot before Game Day and as a result only 15 teams competed. The first place “BEST Award” and the first place “Robotics Game Award” were earned by to the team from Hamilton Southeastern High School. The top teams performed well at the Northern Plains Regional BEST in Fargo, ND December 3rd – 5th with the Millstream Career Center winning 4th place in the regional robotics competition. Three other Falcon BEST teams won awards at regionals and altogether this was the best showing at regionals for the Falcon BEST hub in our three year’s of participation. A full list of winners and more information about Falcon BEST and BEST robotics is available at: **<http://www.bgsu.edu/technology-architecture-andapplied-engineering/falcon-best-robotics-competition/events/2013-events.html>**. See Appendix B for an example of recruitment materials.

Math Camp

Brief Description

Math Camp is an energetic and active day of teamwork, problem solving, and development of skills for K-12 students. Students engage in fun filled experiences about mathematics, the connections between mathematics and the real world, and mathematicians all in a camp atmosphere where there is song, dance, and silliness. Each math camp is specifically designed by the preservice teachers of the Bowling Green Council of Teachers of Mathematics (BGCTM) at BGSU with oversight from BGSU's mathematics education faculty. The camps are aligned with the Common Core and New Ohio Learning Standards for Mathematics. The BGCTM preservice teachers work with each schools liaison to identify specific areas of mathematical need for the students in order to design a worthwhile and focused camp experience. Camps are conducted for one grade level at a time to ensure that the mathematics tasks are targeted to the specific needs of the students attending the camp.

Research has shown that students who attend BGCTM Math Camp's demonstrate statistically significant improvement in their mathematical self-efficacy, are more comfortable with mathematics, and become more flexible in their problem solving strategies. **Meets NWO Goals: 1, 2, 3, 4 & 5**

FY 2016 Activity Information

The 2015 Collegiate Training Camp took place at McComb High School September 11 – 12 with around 78 college students in attendance. Four K – 12 camps were held during the 2016 spring semester; Napoleon Schools on February 6, McComb Schools on February 27 and two camps at Imagine Clay Avenue School on March 19. The four K – 12 camps were each organized and enacted by teams of college students who were trained at the fall training camp. See Appendix E for an examples of recognition.

NWO Role in Math Camp

- Financial management of the camp funds
- Assistance purchasing materials for camps
- Advertising assistance

STEM in the Park™

Brief Description

STEM in the Park is a free NWO event for all northwest Ohio families and the entire community to stimulate public interest and encourage learning in science, technology, engineering, and mathematics (STEM). Held on the campus of Bowling Green State University, the event features four hours of engaging hands-on STEM activities from over 50 area businesses, schools, and organizations along with take-home STEM activity cards for parents and children to continue STEM exploration at home. By increasing awareness in STEM facilities, programs and activities in the area, STEM in the Park is an opportunity for businesses, universities, K-12 schools, and non-profit organizations to showcase innovation, educational opportunities, careers, and to promote positive attitudes toward STEM teaching and learning. **Meets NWO Goal: 2**

FY 2016 Activity Information

The Sixth Annual STEM in the Park event was held on September 26, 2015 and showcased 144 hands-on activities from 101 unique activity station providers from many NWO community and business partners and university departments. Once again a free hot lunch was provided for all participants and catered by Tony Packo's. Presenting Sponsors for the event were BGSU, BP, Emerson Climate Technologies, First Solar, Lubrizol Foundation, and Verizon with community support from Hanson Digital Agency, John Deere, NWO, Perrysburg Rotary, Spectra Group, Thayer Family Dealership, and Wal-Mart and general support from Bowling Green Community Foundation, Cooper Tire, Dura Magnetics, K12, Kroger, and SSOE. In-kind donations were provided by Biggby Coffee, Bostdorff's Greenhouse, Carolina Biological, Costco, Hampton Inn, Kroger, and Tony Packo's.

The event was held at the Perry Field House for the fifth consecutive year. The attendance was the largest to date, with a total of 4,373 attendees/exhibitors/staff/volunteers. The event attracted families from 104 different cities and towns (in 35 different counties) in Ohio and Michigan. A complete list of exhibitors as well as a video and pictures of the event is available at www.STEMinthepark.org. The evaluation report can be found at www.nwocenter.org/reports. See Appendix J for examples of the advertising.

Women in STEM

Brief Description

Women in STEM is an outreach and engagement program that exposes sixth through eighth grade girls from the region to STEM education and professions. The program goal is two-fold as it (1) aims to connect high impact and fun-filled STEM-based activities to the real world while (2) inspiring students to pursue higher education and careers in STEM fields.

The annual Women in STEM program is held on BGSU's main campus to give students the experience of the college setting. Scores of dedicated BGSU students and staff members volunteer to escort students around campus and share their collegiate experiences. The schedule of events begins with a welcome and interactive keynote address followed by over 40 hands-on breakout sessions provided by dynamic and devoted STEM professional role models. Additional information can be found on the NWO website at <http://www.bgsu.edu/nwo/programs/women-in-stem.html>. **Meets NWO Goal: 2**

Continued on page 22

FY 2016 Activity Information

The 2015 Women in STEM program was held on the Bowling Green State University main campus on November 6th. The program attracted 352 sixth through eighth grade young women from the northwest Ohio area. A program fee of \$20 was charged for all student attendees and \$15 for school chaperones; which is a reduction in both charges from previous years and made possible due to the support of BP and John Deere. The keynote presentation by MIT Engineer and producer/host of FOX's Xploration Outer Space, Emily Calandrelli, was sponsored by Texas Instruments.

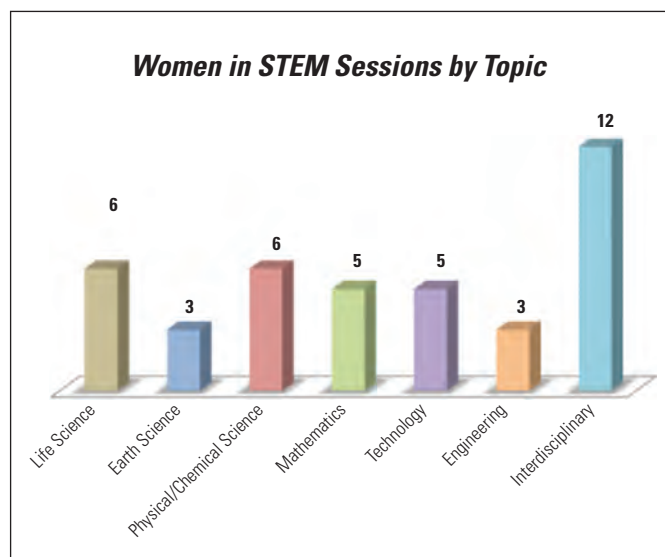
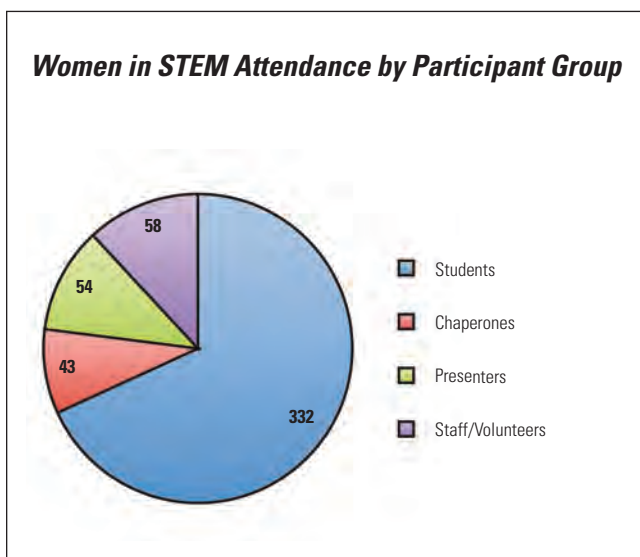
Students remained in their school groups (a change from previous years where girls were randomly assigned to mixed school groups) and each group engaged in multiple program activities including the opening remarks, an engaging keynote presentation, and two hands-on fun-filled STEM-based workshops. The schedule for the day is below.

8:40 AM – 9:00 AM	9:00 AM – 10:00 AM	10:10 AM – 11:05 AM	11:15 AM – 12:10 PM	12:20 PM – 1:15 PM	1:25 PM – 2:15 PM
Check-in and Welcome by BGSU President, Dr. Mary Ellen Mazey	Keynote Address by Emily Calandrelli	Session 1	Lunch (students split)	Lunch (students split)	Closing Remarks, Admissions Raffle, Imagination Station Presentation
			Session 2 (students split)	Session 3 (students split)	

22

Many dedicated BGSU staff members and students volunteered their time and shared their experiences in STEM education and employment with the middle school girls throughout the day. Over 54 STEM professional role models from BGSU faculty, students and the surrounding community facilitated the hands-on workshops.

Below is a breakdown of the sessions offered by content area and the overall attendance (487). Many sessions were offered more than once during the day. The evaluation report can be found at www.nwocenter.org/reports. See Appendix K for examples of advertising.



You Be The Chemist Challenge

Brief Description

The You be the Chemist (YBTC) Challenge is a fun and innovative academic competition that engages 5th – 8th grade students in learning about important chemistry concepts, discoveries and chemical safety. Challenge competitions are exciting events that take place across the country, encouraging the collaboration of community organizations, schools and the chemical industry, as together they educate students about the benefits and value of the study of chemistry. Ohio schools take part in local challenges within their school districts, and winners attend a state competition held in northwest Ohio to qualify for the YBTC National Challenge. **Meets NWO Goal: 2**

FY 2016 Activity Information

This year's statewide competition took place at Bowsher High School in Toledo on April 9th. 39 students from all over Ohio came together to try and earn the top prize of representing Ohio at the National YBTC in June. This year's winner was Tom Schlomi from Palmer Holland who went on to place second at the National competition! Along with 2nd place, Tom earned a \$5,000 educational scholarship, a TI-84 Plus Calculator, a U.S. National Park Annual Pass, and a chemistry set.

All participants at the state competition earned certificates and trophies were awarded to the top three students. The Local and State Challenges were sponsored by NWO, The University of Toledo's American Chemical Society, Toledo Public Schools, PVS Nolwood Chemicals, Inc., and Imagination Station.

NWO Role in YBTC

- Funding for student awards and certificates of participation
- Advertisement/recruitment via Constant Contact to 8,000+ regional K –16 contacts
- Announcement in NWO e-newsletter



Student Scholarship Programs and Grants

Academic Investment in Mathematics and Science (AIMS)

Brief Description

The Purpose of the Academic Investment in Math and Science (AIMS) Program is to increase the number of women and students of color who graduate from BGSU with majors in Science, Technology, Engineering & Mathematics (STEM), and who proceed to get terminal degrees in their fields then ultimately perform cutting-edge research and/or teaching.

All AIMS Scholars have a unique array of resources to help them strengthen their academic skills and to increase their likelihood for academic success in college, by developing professional leadership skills required for advancement in mathematics and the sciences. The AIMS Program requires study leading to a bachelor's degree in STEM related fields or teacher education with majors in these areas. The AIMS program has two scholarship packages with distinct requirements. The AIMS Standard scholarship is traditionally awarded to women and students of color with STEM majors. The AIMS BOSEF scholarship targets Ohio residents majoring in the following programs: chemistry, physics, biology, geology, environmental science, applied mathematics, engineering technology and those students with career goals related to renewable and sustainable energy. More information about AIMS can be found at www.bgsu.edu/aims.html. **Meets NWO Goals: 1, 2, & 3**

NWO Role in AIMS

- Oversight and management of the project including financial management of the budget
- NWO Director also serves as the AIMS Director
- Assist in the management of scholarship awards and renewals
- Assist with student advising
- Assist with academic mentoring and support

Collaborative Research: AGEP-T: Northern Ohio AGEP Alliance (NOA-AGEP)

Brief Description

With support from the National Science Foundation, the Northern Ohio Alliance for Graduate Education and the Professoriate (NOA-AGEP) was created to increase the number of underrepresented minority students completing science, technology, engineering, and mathematics (STEM) doctoral degrees and to prepare them for entry into the professoriate. NOA-AGEP is a collaborative effort among seven universities in Northern Ohio. The fall 2016 NOA-AGEP Scholar cohort will serve as a model for ongoing research to improve underrepresented minority student participation, preparation and success in STEM graduate education, an approach that, hopefully, can be exported nationally. Each year, NOA-AGEP Scholars receive a stipend enhancement, travel allowance to attend a research conference, and opportunities to participate in professional development activities/community building events (e.g. academic coaching, mentoring circles, NOA-AGEP research symposia).

NWO Role in NOA – AGEP

- Develop marketing materials for BGSU doctoral programs that could qualify for NOA-AGEP
- Develop and manage BGSU's NOA-AGEP website and email account
- Plan a Summer Bridge event for all NOA-AGEP scholars and mentors
- Oversight and management of the project including financial management of the budgets

Building Ohio's Sustainable Energy Future (BOSEF)

Brief Description

BOSEF is a scholarship project funded by the Choose Ohio First program of the state of Ohio. BOSEF increases the recruitment, training, and graduation of STEM students to supply the growing job markets in renewable energy and sustainable environment technologies. Northwest Ohio has a growing reputation for research, development, and manufacturing in the high technology, renewable energy fields of photovoltaics (PV) and wind. In addition, northwest Ohio has major research and development strengths in environmental analysis and remediation technologies. The University of Toledo (UT), and Bowling Green State University (BGSU), work together to leverage the enormous public interest and burgeoning job markets in these fields to recruit, educate, and retain the best and brightest of Ohio's students to support these rapidly developing high tech professions. Student success is enhanced through a summer bridge program focused on mathematics, undergraduate research experiences for all, and integration with the Wright Center for PV Innovation and Commercialization, the Lake Erie Research Center,

Center of Photochemical Sciences, and the Environmental Remediation and Restoration Experimental Park. It prepares students for scientific and technical careers by providing internships with business, industry, agencies, and non-profits in renewable energy and environmental sustainability fields. Although the primary program focus is on the undergraduate STEM pipeline, it also includes masters and PhD students. The participating institutions have a comprehensive and vertically integrated approach to STEM education that maximizes student success and provides skilled professionals in these crucial STEM areas. **Meets NWO Goals: 2 & 3**

NWO Role in BOSEF

- Oversight and management of the grant project including financial management of the grant budget
- Direct recruitment of students through AIMS and the chemistry and physics departments at recruiting events
- Advertisement/recruitment to ~ 4,300 regional K-12 contacts
- Advertisement/recruitment at NWO Inquiry Series
- Management of scholarship awards and renewals
- Career development
- Student advising
- Academic mentoring and support

Granting Access to Mathematics and Science (GRAMS)

Brief Description

GRAMS (Granting Access to Mathematics & Science) is a scholarship up to \$10,000 per student each year for up to four years program supported by two 5-year grants totaling \$1,200,000 from the National Science Foundation. In this project, Bowling Green State University collaborates with two regional community colleges, Owens and Terra, to increase the number of highly qualified and capable students who are able to complete degrees in STEM majors by providing approximately 20-30 need-based scholarships up to \$10,000 per student each year for up to four years and a proven support program to foster student success. Student persistence and success was fostered with two major projects: (a) BGSU's NSF-funded STEP grant project Science, Engineering, and Technology Gateway Ohio (SETGO) which ended in 2013 and (b) the BGSU Academic Investment in Mathematics and Science (AIMS). These programs include a 4-week summer bridge for entering students, to prepare them for the rigors of college science and math courses; a tiered system of mentoring by peers and faculty; learning communities with monthly events that draw students and faculty together by merging academics and social networking; and summer research opportunities. These strategies have been proven in BGSU's AIMS program to increase student persistence and success, particularly of under-represented minority students majoring in science and math disciplines and are based on research that has identified the factors that most account for student attrition from these disciplines.

Meets NWO Goals: 2 & 3

NWO Role in GRAMS

- Oversight and management of the grant project including financial management of the grant budget
- Direct recruitment of students through AIMS and the chemistry and physics departments at recruiting events
- Advertisement/recruitment to ~ 4,300 regional K-12 contacts
- Advertisement/recruitment at NWO Inquiry Series
- Management of scholarship awards and renewals
- Career development
- Student advising
- Academic mentoring and support

Science and Math Education in ACTION (ACTION)

Brief Description

BGSU received \$3,000,000 in funding from the Ohio Board of Regents through the Choose Ohio First program to recruit and train undergraduates to become Ohio mathematics and science teachers. ACTION focuses on the use of innovative strategies for preparing highly effective science and mathematics teachers for grades 5-12. Students involved in the project participate in: (a) a 4-week summer bridge program preceding the first regular semester of college; (b) a collaborative science or mathematics research team that addresses a real community problem or concern; (c) a co-op or internship work experience in a regional science or mathematics related business or industry in their second year; (d) early teaching experiences in a regional school; and (e) the creation of a capstone project that involves applying research techniques to determining the best teaching practices that advance the students' learning. **Meets NWO Goal: 1, 2, & 3**

NWO Role in ACTION

- Assistance with the undergraduate research component of the project
- Assistance and advice for project activities and logistics



Research Programs and Grants

28 |

Identifying the Best Strategy to Reduce Phosphorus Loads to Lake Erie from Agricultural Watersheds Survey of Local Sources of Nutrients in the Upper Portage River Watershed (Sea Grant)

Brief Description

BGSU is working with Heidelberg University on this project with the goal of identifying the best strategy to reduce phosphorus loading to Lake Erie. In an effort to accomplish this, BGSU will sample subwatersheds of the Portage River using automated sampling equipment and sensors to collect empirical water quality and quantity data. The samples will be analyzed for all standard nutrient analyses, including soluble reactive phosphorus (P), total P, nitrate, total nitrogen, and ammonia. Sampling results will be evaluated to identify potential sources of high levels of nutrients.

Continued on page 29

NWO Role in Grant Project

- Reviewed geography of Portage River Watershed and determined that sampling should start upstream of the main branch of the Portage River.
- Identified initial sites (three in the North Branch, two in the Middle Branch and one in the South Branch) close to the start of the main branch to start monitoring and obtained permission from landowners to use sites. Data from each branch will be analyzed for significant differences and used to plan future sampling.
- Collected samples at each site following a rain of 0.5 inches or more and analyzed for nutrient levels.

Mitigation of Agricultural Nutrient Loss by Novel Manure Treatment (OWDA)

Brief Description

Through an Ohio Water Development Authority (OWDA) Research and Development (R&D) Grant, Bowling Green State University is collaborating with the United States Geological Survey (USGS) on a research project to develop and field test dairy manure dewatering treatment processes. BGSU is testing different dewatering dairy manure treatments for their abilities to slowly release nutrients; these laboratory studies are ongoing. The treatments typically involve a combination of coagulants and polymers. To test these treatments in a pilot field setting, BGSU assembled a team of collaborators that included The Ohio State University Agricultural Research and Development Center (OARDC) Northwest Agricultural Research Station (NWARS) in Wood County and the City of Ottawa, Ohio. The OARDC-NWARS offered the use of pilot test plots for application of the treated dairy manure and the City of Ottawa offered the use of their wastewater treatment plant for treating the dairy manure.

The project is funded in two phases, both done at the NWARS site—phase 1 is to test and install equipment and establish baseline conditions; phase 2 is to test two treatments, analyze samples for nutrients, and compute nutrient loads in surface and tile samples. An additional R&D proposal was submitted to OWDA in June 2015 and funds were secured for phase 2. Phase 1 was conducted in FY2015 and is continuing into early FY2016.

NWO Role in Grant Project

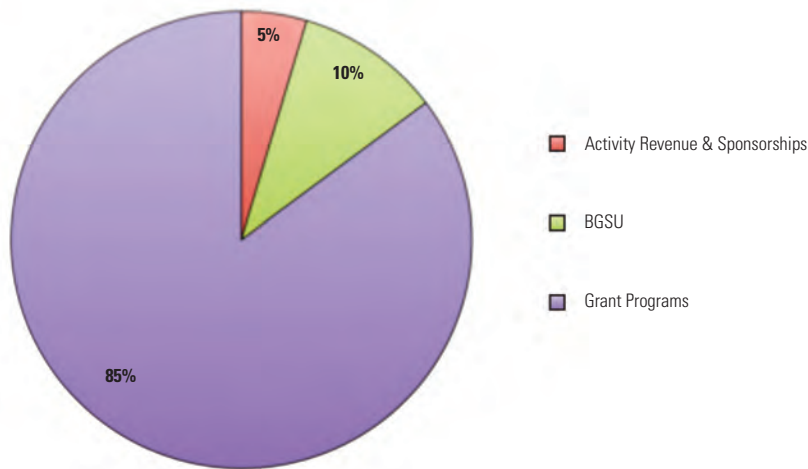
- Conduct lab-scale experiments to develop manure treatment protocol.
- Evaluate treated manure as a slow-release fertilizer.
- Collect and analyze runoff water samples from test plots during significant rain events.
- Evaluate the flow profile of test plots to understand similarities and differences in plots.



FY 2016 NWO Budget

30

FY 2016 Income Sources



TOTAL INCOME FOR FY 2016

\$2,835,349.38

The table below shows funding provided by Bowling Green State University for FY 2016.

BGSU FUNDS	
Agency: Program	Award Amount
Bowling Green State University Fiscal Support for NWO	\$186,369.01

The table below shows funding sources that supported FY 2016 NWO Activities.

GRANT PROGRAMS		
*Funding amount listed is for the grant award period which could be longer or shorter than the NWO fiscal year.		
Agency: Program	Description	Award Amount
Academy of Applied Science	Ohio Junior Science & Humanities Symposium	\$20,000.00
Martha Holden Jennings Foundation	iTraining	\$16,100.00
National Science Foundation	Collaborative Research: AGEF-T: Northern Ohio AGEF Alliance (NOA-AGEF) (Year 1 of 3)	\$110,367.00
National Science Foundation	iEvolve: Inquiry and Engagement to Invigorate and Optimize Learning for Everyone (Year 4 of 5)	\$1,553,408.00
National Science Foundation	GRAMS II: Granting Access to Mathematics and Science II (No Cost Extension of 6 year grant)	\$0.00 Additional Funding; \$291,704.81 Spent in FY 16
Ohio Department of Higher Education	Advancing the Science Skills of Elementary Teachers and Students (ASSETS)	\$92,041.00
Ohio Department of Higher Education	Black Swamp – Math Teacher’ Circle (BS-MTC)	\$46,597.00
Ohio Department of Higher Education	BOSEF: Building Ohio’s Sustainable Energy Future	\$95,780.00
Ohio Department of Higher Education	Identifying the Best Strategy to Reduce Phosphorus Loads to Lake Erie from Agricultural Watersheds Survey of Local Sources of Nutrients in the Upper Portage River Watershed (Year 1 of 2)	\$51,239.00
Ohio Department of Higher Education	Survey of Local Sources of Nutrients in the Upper Portage River Watershed (Year 1 of 2)	\$53,223.00
Ohio Department of Education	Common Core for Mathematical Proficiency in Elementary and Middle Schools ((CO) ² MP Elementary and 6 – 8) (Year 2)	\$349,422.00
	Common Core for Achievement & Middle Grades Mathematical Proficiency (C ² AM ² P Middle Grades) (Year 2)	\$226,434.00
Ohio Water Development Authority	Mitigation of Agricultural Nutrient Loss by Novel Manure Treatment #1 (Year 1 of 2)	\$291,801.00
Ohio Water Development Authority	Mitigation of Agricultural Nutrient Loss by Novel Manure Treatment #2 (Year 1 of 2)	\$277,796.00
OSLN/Battelle Foundation	Battelle Hub Grant	\$25,000.00

**We wish to thank the following for their support of
NWO activities during FY 16!**



**BGSU
Foundation Inc.**







Appendices

- A: Faculty and Student Recognition
- B: Falcon Best Recruitment Email
- C: iEvolve with STEM Recognition
- D: iTraining Advertising
- E: Math Camp Recognition
- F: NWO STEM E-Newsletters
- G: NWO STEM Inquiry Series Advertising
- H: NWO Symposium Advertising & Recognition
- I: OJSHS Advertising & Recognition
- J: STEM in the Park Advertising
- K: Women in STEM Advertising
- L: You Be The Chemist Challenge Recruitment Email

Appendix A: Faculty and Student Recognition

Thursday, January 28, 2016

ZOOM news BOWLING GREEN STATE UNIVERSITY



Bob Midden meets with AIMS students, who are among the target population for the new minority graduate student recruitment effort.

BGSU PARTNERS TO BUILD DIVERSITY IN FACULTY RANKS FROM GRADUATE LEVEL UP

As the national need for professionals and higher education faculty in the science, technology, engineering and mathematics (STEM) disciplines has grown, the number of minority students going into those disciplines has remained disappointingly low, leaving much rich potential untapped.

"We consider it a value to change that," said Dr. Bob Midden, director of BGSU's Academic Investment in Math and Science (AIMS) program and the Northwest Ohio Center of Excellence in STEM Education (NWO/COSMOS).

To help prepare more graduate students to step into these important roles, the University is partnering with seven other public and private northern Ohio universities to recruit, support and mentor talented students through graduate school and ultimately into the ranks of faculty.

The new graduate student effort is sponsored by the National Science Foundation (NSF) as part of its [Alliances for Graduate Education and the Professoriate](#) (AGEP) programs. BGSU will receive \$200,000 over three and a half years to support student recruitment, mentorship, professional development and research activities. Case Western University is the lead institution on the grant.

Appendix A: Faculty and Student Recognition cont.

BOWLING GREEN STATE UNIVERSITY

f t p v w h

BGSU NEWS

FACULTY SENATE PRESENTS COMMUNITY INVOLVEMENT AWARD TO EMILIO DURAN

[Bowling Green State University](#) / [News](#) / [2016](#) / [April](#) / Faculty Senate presents Community Involvement Award to Emilio Duran

[Tweet](#) [Like](#) [Share](#) 0

Dr. Emilio Duran, associate professor in the [School of Teaching and Learning](#) at Bowling Green State University, received the Community Involvement Award at the Faculty Excellence Awards Ceremony and Reception April 14.

This award, presented by the Faculty Senate, recognizes a faculty member for outstanding contributions to the community or to other local, state, national or international communities and includes a \$1,000 prize.

Dr. W. Robert Midden, who nominated Duran for this award, wrote that Duran's "extensive contributions to numerous community partnerships and initiatives have markedly raised the profile and increased the visibility of BGSU in our locale and throughout the region."

One of Duran's most notable contributions has been the development of STEM in the Park, which has become a signature community engagement event. The purpose of this event is to increase awareness, interest and knowledge in STEM and STEM careers by providing engaging and meaningful opportunities for people of all ages, especially children and underrepresented communities, to explore the many aspects and applications of STEM in their lives. STEM in the Park started in 2010 and last year included more than 4,300 participants in more than 140 activities. Duran has recruited sponsorships and support from 35 corporate, non-profit and educational partners for this event.

"STEM in the Park is a premier example of a program that enhances the relationship between BGSU and our community," Dr. Tim Murnen, director, School of Teaching and Learning, wrote in his nomination of Duran. "The feedback from the community about this program is simply phenomenal and undoubtedly conveys a positive message about BGSU and its commitment to the community we serve. We appreciate the work Dr. Duran continues to do regarding community involvement."

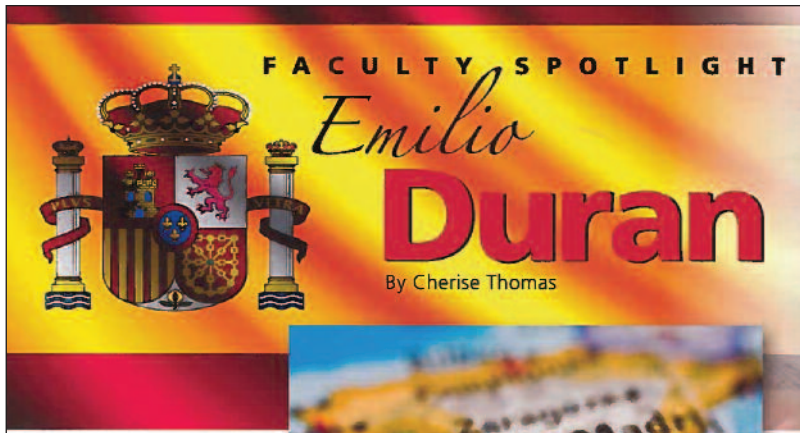
Another highlight of Duran's community involvement includes coordinating the Annual Symposium on STEM Teaching, which brings together as many as 600 educators and administrators from throughout the region to exchange best practices and new knowledge about how to most effectively promote our students' success.

Duran's other contributions to the community include serving as lead faculty member for the Ohio Junior Science and Humanities Symposium and contributing to Women in STEM, the NWO Inquiry Series and Literacy in the Park. He also serves in numerous community organizations and groups, including as a member of the Toledo School for the Arts STEAM Lab Advisory Panel; as a guest scientist at Ottawa Hills Elementary School and the Montessori School of Bowling Green; as a member of the Ottawa Hills Elementary Science EXPO, Elementary School Day and Strategic planning committees; and as a guest presenter or teacher at various elementary and middle schools.

Outside of education, Duran has served as a grant consultant for the Toledo Football Academy and as a member of the Board of Directors, Executive Committee, Scholarship Committee, Honors Day Committee, Art Exchange Committee and Youth Development Committee of the Association of the Two Toledos.



A |



FACULTY SPOTLIGHT

Emilio Duran

By Cherise Thomas

“I liked doing research in biology, but teaching... was speaking to my soul.”

— Emilio Duran
Associate Professor, Biology



Spain native and Bowling Green State University associate professor, Emilio Duran, discovered the place for him was not his homeland, but Northwest Ohio, where he found his niche in aiding students.

He came here in 1981 as a foreign exchange student.

“They asked me, ‘Where would you like to go?’ Duran said. ‘I said California and they sent me to Toledo, Ohio.’

He says his experience turned out to be a life-changing event.

Duran says it was the people here that made him want to remain here in Northwest Ohio.

While in high school, he considered the family he was staying with as his own family. “I called them Mom and Dad,” Duran said.

However, originally his first three or four months in Toledo were difficult, he was homesick and didn’t know much English.

Duran said his experience changed sometime after Christmas, where he had his first dream in English.

“Somehow from that point forward everything changed,” he said. “It just felt like home.”

“There was something about my

expe

Tole

lack

and

child

prof

lear

that

of Sp

cul

man

U.S.



“My favorite part is anything that has to do with students, whether it is the research or the service or the teaching. As long as there are students involved that is the part that makes me happiest.”

— Emilio Duran
Associate Professor, Biology

“Spending a year here really changed a lot of things for me,” Duran said.

Following the completion of his senior year at Ottawa Hills High School, Duran returned to Spain and started medical school.

Duran explained that medical school in Spain and Europe is a six-year program that is taken after high school.

However, he returned to Toledo after a few years and received his bachelor’s, master’s and doctorate degrees in molecular biology at the University of Toledo.

He was a faculty member at UT, but later became a faculty member at BGSU, where he has been working for eight years.

“I was at a point that, I felt I had to change (from) doing research in biology. A lot of professors in sciences, they became professors because they want to do research and that’s the same for me,” Duran said.

In his research work he discovered his desire to teach.

“I liked doing research in biology, but teaching... was speaking to my soul,” Duran said. “I felt it was a very important thing for me to do.”

He began collaborating with faculty at BGSU, within a program called COSMOS, now known as NWU COSMOS, a program that included faculty from different colleges working together in STEM education and grant projects.

“I think that is what attracted me to come to BGSU because I didn’t have that at UT,” Duran said.

He said it was a big change for him because he had to switch from the College of Arts and Sciences to the College of Education.

“I changed from doing research with parasitic worms to now doing research with science teachers,” Duran said. “That was a big change... a scary change.”

But he said his new job at BGSU lets him do both and he is able to combine his love for teaching, research and service.

“I think there is something very passionate about helping people and I can see my impact more directly now than I did when I was a biologist,” Duran said.

He is now associate professor in the School of Teaching and Learning and a jointed appointment in biological sciences.

He is also faculty associate director of the Northwest Center of Excellence in STEM Education, the director of The Ohio Junior Sciences and Humanities Symposium and faculty co-director of “STEM in the Park.”

“When you’ve been in academia for as long as I have, you accumulate a lot of titles,” Duran said.

According to the BGSU “STEM in the Park” page, STEM in the Park is a program that offers a hands-on experience and has interactive displays and activities created by universities, community partners and local businesses.

“It’s just a free community event. We bring about 4,000 people from this area and we engage families and their children in hands-on experiences,” Duran said.

Third-year student, Journalism Public Relations major and Communication minor, Hannah Tempel experienced STEM in the Park, and described it as something she sees her children going to in the years to come.

“It was a cool type of place to be. It’s kind of nice that BG puts on something like that and also provides a learning environment for young children,” she said.

“STEM in the Park is a very special event,” Duran said. “It’s a validation of why I got into education in the first place.”

Duran says his favorite part of his job is working with students.

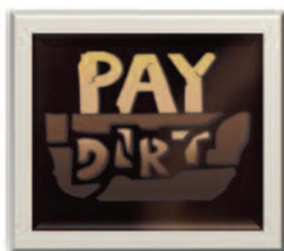
“My favorite part is anything that has to do with students, whether it is the research or the service or the teaching. As long as there are students involved that is the part that makes me happiest,” he said.

“I don’t know how many people love their jobs... I love my job. I really do,” Duran said. “I am blessed in a way that I am being paid to do things that I love to do.” ■ KEY

Appendix B: Falcon Best Recruitment Email

Recruitment Email

FALCON BEST ROBOTICS



Registration for the FalconBEST 2015 PAYDIRT Robotics Competition is open!

FalconBEST is a robotics competition and much, much more! This year's game is PAYDIRT, which will be revealed at the September Kick-off event. Dates and registration instructions are below!

Follow the instructions below to register. **If registration is full, please put your school on the wait list.**

Registration Instructions

**Please be sure your school can participate before you register.*

**We would like to have all 16 slots filled on game day.*

1. Go to <http://www.bestinc.org/>
2. Click the "Get Involved" link
3. Select "Register as a team"
4. This year **you must register for all three events:**
 - a. Select 2015 FalconBEST Kickoff Day
 - b. Select 2015 FalconBEST Practice Day
 - c. Select 2015 FalconBEST Game Day
5. Follow the instructions to register.
6. If registration is full, please add your school to the wait list. If a team drops, we will go to the next team on the wait list.

Schedule of Events

Teacher Workshop - Mon., August 10, 2015. Mileti Alumni Center

Kickoff - Sat., Sept. 12, 2015 Olscamp Hall Room 101

Practice Day - Sat., Oct. 10, 2015 Woodland Mall, Bowling Green

Game Day - Sat., Oct. 24, 2015, Stroh Center, BGSU

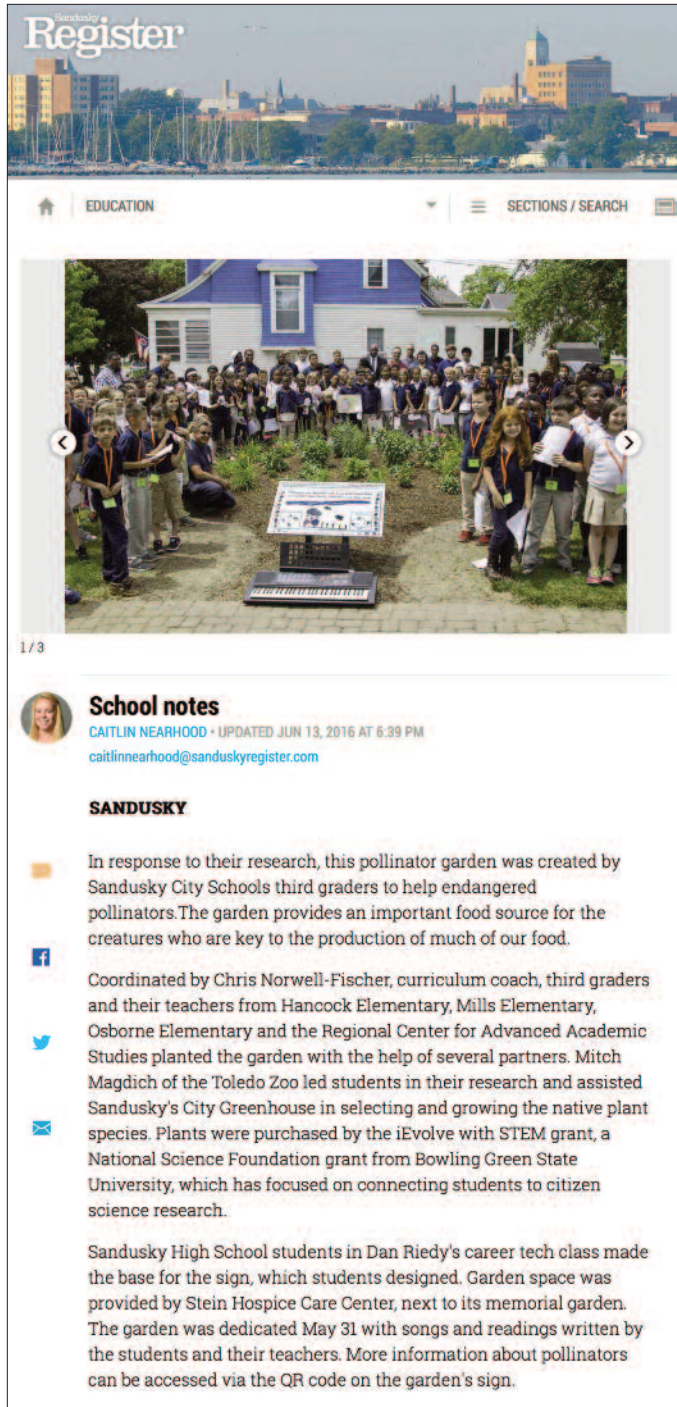
For more information visit the website at: <http://bit.ly/Falconbest>

BGSU | THE COLLEGE OF
TECHNOLOGY, ARCHITECTURE
AND APPLIED ENGINEERING
BOWLING GREEN STATE UNIVERSITY



Appendix C: iEvolve with STEM Recognition

iEvolve with STEM Recognition



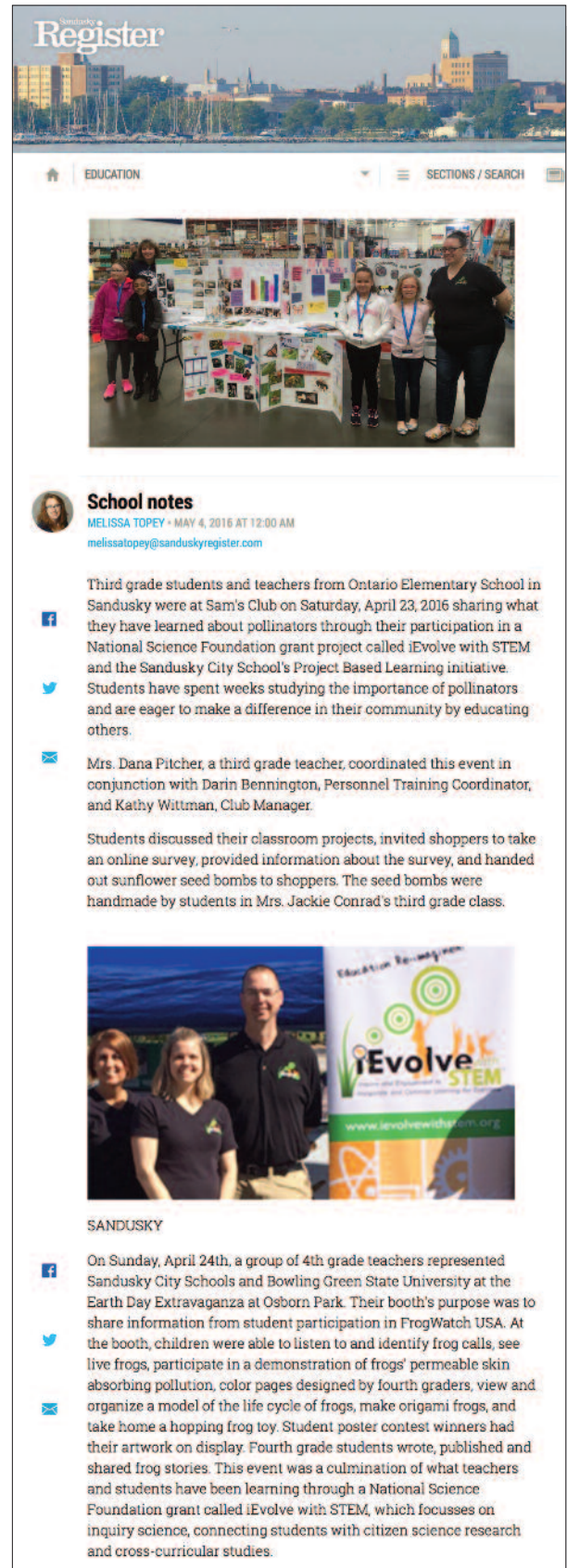
School notes
CAITLIN NEARHOOD • UPDATED JUN 13, 2016 AT 6:39 PM
caitlinnearhood@sanduskyregister.com

SANDUSKY

In response to their research, this pollinator garden was created by Sandusky City Schools third graders to help endangered pollinators. The garden provides an important food source for the creatures who are key to the production of much of our food.

Coordinated by Chris Norwell-Fischer, curriculum coach, third graders and their teachers from Hancock Elementary, Mills Elementary, Osborne Elementary and the Regional Center for Advanced Academic Studies planted the garden with the help of several partners. Mitch Magdich of the Toledo Zoo led students in their research and assisted Sandusky's City Greenhouse in selecting and growing the native plant species. Plants were purchased by the iEvolve with STEM grant, a National Science Foundation grant from Bowling Green State University, which has focused on connecting students to citizen science research.

Sandusky High School students in Dan Riedy's career tech class made the base for the sign, which students designed. Garden space was provided by Stein Hospice Care Center, next to its memorial garden. The garden was dedicated May 31 with songs and readings written by the students and their teachers. More information about pollinators can be accessed via the QR code on the garden's sign.



School notes
MELISSA TOPEY • MAY 4, 2016 AT 12:00 AM
melissatopey@sanduskyregister.com

Third grade students and teachers from Ontario Elementary School in Sandusky were at Sam's Club on Saturday, April 23, 2016 sharing what they have learned about pollinators through their participation in a National Science Foundation grant project called iEvolve with STEM and the Sandusky City School's Project Based Learning initiative. Students have spent weeks studying the importance of pollinators and are eager to make a difference in their community by educating others.

Mrs. Dana Pitcher, a third grade teacher, coordinated this event in conjunction with Darin Bennington, Personnel Training Coordinator, and Kathy Wittman, Club Manager.

Students discussed their classroom projects, invited shoppers to take an online survey, provided information about the survey, and handed out sunflower seed bombs to shoppers. The seed bombs were handmade by students in Mrs. Jackie Conrad's third grade class.

SANDUSKY

On Sunday, April 24th, a group of 4th grade teachers represented Sandusky City Schools and Bowling Green State University at the Earth Day Extravaganza at Osborn Park. Their booth's purpose was to share information from student participation in FrogWatch USA. At the booth, children were able to listen to and identify frog calls, see live frogs, participate in a demonstration of frogs' permeable skin absorbing pollution, color pages designed by fourth graders, view and organize a model of the life cycle of frogs, make origami frogs, and take home a hopping frog toy. Student poster contest winners had their artwork on display. Fourth grade students wrote, published and shared frog stories. This event was a culmination of what teachers and students have been learning through a National Science Foundation grant called iEvolve with STEM, which focuses on inquiry science, connecting students with citizen science research and cross-curricular studies.

Appendix D: iTraining Advertising

Van Wert City Schools



Program Overview

NWO and Bowling Green State University, in conjunction with Van Wert City Schools, proudly announce the funding of *iTrainingIII*, a series of professional development sessions for teachers of Van Wert City Schools, Ohio.

A three-session training for **grades 4-12 teachers** will take place in the fall. Class size is limited to 35 teachers. This project will provide 35 teachers with thorough professional development designed to train teachers in effective and engaging Google Education software tools for the PBL classroom.

- implementing and using Google tools;
- managing PBL classrooms;
- effective online communication between students and teachers.

Fall session for **grades 4-12 teachers**: Wednesday November 11, 2015, from 4:30-7:30 pm at Van Wert High School, 45891. **Please note:** a follow-up session will be added in the spring.

***Must attend all three sessions, registration is FREE**

Snacks and beverages will be provided

Please note this class is **not for beginners

Please register at www.nwocenter.org/iTraining

Putnam County Schools



Program Overview

NWO and Bowling Green State University, in conjunction with Putnam County Schools, proudly announce the funding of *iTrainingIII*, a series of professional development training sessions for teachers.

A three-session training will take place in the Spring of 2016. Class size is limited to 35 teachers. This project will provide 35 teachers with six hours of thorough professional development designed to train teachers in effective and engaging Google Education software tools for the classroom.

- implementing and using Google tools;
- effective online communication between students and teachers.

Sessions will take place on Wednesdays January 20, February 17, & March 16 at Putnam County ESC, 124 Putnam Parkway, Ottawa OH 45875. Please contact Susan Stearns at stearns@bgsu.edu for more information.

***Must attend all three sessions, registration is FREE**

Snacks and beverages will be provided

Please note this class is **not for beginners

Please register at www.nwocenter.org/iTraining



Appendix E: Math Camp Recognition

Math Camp Facebook Post

BOWLING GREEN STATE UNIVERSITY

BGSU NEWS

CULTURE AND LEARNING COURSE EXPLORES MATH EDUCATION

Bowling Green State University / News / 2016 / March / Culture and Learning course explores math education

BGSU students gain invaluable teaching experience in Thailand



Ten students from the [School of Teaching and Learning](#), experienced teaching and learning in Thailand during the [Culture and Learning in Thailand course](#) this past winter. Led by Dr. Gabriel Matney, associate professor in the School of Teaching and Learning, the group spent three weeks during their winter vacation preparing and teaching math to over 200 fourth- through sixth-graders from Thailand.

"Ask any mathematics teacher in the U.S. if their students naturally love learning about mathematics and you will get the same answer, no. In my past experiences with Thai professors, many express these same difficulties of engaging Thai students in mathematics learning," Matney said. "This problem intrigued me because our cultures really aren't that similar. I wanted my students to see how teachers in other cultures combat this problem and give our students the opportunity to teach and engage in new learning techniques."

Although this course is designed around mathematics teaching and learning, Matney's course is open to all majors. In fact, he said, a telecommunications student registered for the course a few years ago to film a documentary.

Students enrolled in the course are immersed in the Thai culture from the very beginning. Prior to leaving for Thailand, each student is instructed to prepare learning activities to teach to the Thai preservice teachers and professors. Shortly after arrival, BGSU students are expected to teach mathematics activities in actual Thai public school classrooms.

"As a [college](#), we have been looking for ways to get our students classroom experience earlier in their careers," Matney said. "Through this course, BGSU preservice teachers are handed a classroom full of students and trusted by those teachers to give their students a quality learning experience. BGSU preservice teachers enrolled in this course were given complete control of an entire classroom and were able to teach mathematics."

Brianna Lawless, a junior majoring in [middle level education](#), was one of the 10 students enrolled in the course. For her, the experience solidified the fact that she wanted to be a teacher.

"Because of my training at BGSU, I think I was well prepared for the experience," stated Lawless. "However, I was nervous to get in front of the class and teach because it is something I hadn't done on my own prior to this course. After about 10 minutes I started getting comfortable in front of the class, and I could tell the students appreciated and even enjoyed what I was teaching them. This experience confirmed for me that I want to be a teacher, and I'm grateful for the practice."

"The experience we received in a nontraditional setting really forced us to think hard about how we were communicating the material."

Not only did BGSU students have the opportunity to teach a classroom of students, they also taught math camp at multiple locations. BGSU students paired up with fourth-year students from Kamphaeng Phet Rajabhat University (KPRU) to plan math camp. Each BGSU student was assigned a team of ambassadors from KPRU upon arrival to serve as a guide throughout the three-week course. Students from both universities taught and learned from each other. The KPRU students taught the BGSU students games, dances, songs and mathematics learning strategies.

BGSU students learned from, and relied on, the KPRU students during the experience. Each student had a different role at math camp. From planning the activities to securing the proper materials needed, BGSU students were responsible for putting on a top-notch math camp for the children. The KPRU students were instrumental in the planning process, especially when the BGSU students were trying to overcome the language barrier.

"We had to learn to communicate effectively with our Thai students during math camp," said Davis Gerber, a junior majoring in [education to young adult mathematics](#). "The experience we received in a nontraditional setting really forced us to think hard about how we were communicating the material."

This course isn't just about receiving teaching experience for BGSU students, the students are taught different games and activities to bring back to their classrooms and lesson plans. In addition, the students gain perspective about other educational systems.

"The most interesting part of this course is that our students go and do service," concluded Matney. "They interact with Thailand preservice teachers (individuals studying to be teachers) and helped them improve their English. I want students to know that this course is not a trip. It is truly a learning course with the singular objective to teach and learn mathematics in a different culture."

Lawless summed up the experience by stating she would have regretted not taking the course. "Outside of learning and teaching in the classroom, we experienced the culture and the country. I was able to challenge myself and I believe I became a better student by watching the Thai students struggle to learn and understand our way of teaching."

Find more information on the Culture and Learning in Thailand course and courses similar to it that go to China, Australia, and Fiji by visiting the [International Programs website](#).

BGSU College of Education & Human Development
March 8 at 1:00pm · 🌐

Check out this video from Napoleon Elem. School of our Bowling Green State University preservice teachers at Math Camp (<https://www.youtube.com/watch?v=T0sy-bvmyWY&feature=youtu.be>). Interested in setting up a Math Camp at your school? Contact gmatney@bgsu.edu or visit the website.



Math Camp

Math Camp is an energetic and active day of team work, problem solving, and development of skills. Students engage in fun filled experiences about teamwork, problem solving, mathematics, and the connections between mathematics and...

E

Appendix F: NWO STEM E-Newsletters

NWO
Advancing science, technology, engineering, and mathematics education for people of all ages

Vol. 7, Issue #0
September 2015

Community STEM in the NEWS
State of Ohio Kicks off Million Women Mentors Advocacy Campaign

K-16 STEM in the NEWS
Sylvania Teen Advances in Elite Event

STEM Opportunities
STEM in the Park
Announcing the 2015 MWC Symposium on STEM Teaching
NWO Hands-On STEM Activity

Black Swamp Match Teachers' Circles
Lowe's Teacher for Education Grants
Crossing Boundaries: Transforming STEM Education
Link Engineering
NWO Hands-On STEM Activity

K-16 STEM in the NEWS
Sylvania Teen Advances in Elite Event

Solar project among 1 in 90 Google Science Fair finalists
BY BRIAN BLUCKEY
BLADE STAFF WRITER

Richard Jin, a Sylvania resident and Maumee Valley Country Day School student, is one of 90 finalists in the Google Science Fair for his research on bio-cost and environmentally friendly solar cells.

Richard, 17, is one of three finalists in Ohio, with his project chosen from thousands of submissions around the world. "I heard about the Google Science Fair through some research on the Internet, and I thought it was a really cool opportunity," Richard said. "I never participated in an online science fair before, so I took the project and submitted it online. I was really surprised to find out I made it to the top 90 in the world. It was really exciting to hear that news."

Richard's project, titled "Sulfurization of Thin Copper Antimony Sulfide for Low Cost and Environmental Friendly Solar Cells," was developed on research he did at the University of Toledo's Research in Science and Engineering internship program in the summer of 2014.

"Initially I made a solar cell using a new material called copper antimony sulfide and improved to convert efficiency," Richard said. "Currently solar energy is the most abundant energy source available. However, one problem is that current solar cells use materials that are either too expensive, too silicon, or they're toxic, such as cadmium. So they need the greatest use of solar energy. With my material it's both low cost and environmentally friendly."

Richard's mentors in the research program were University of Toledo professor Yan Yan and graduate student Mark Franzer.

"During the RSE program, Richard was keen to work in the laboratory to synthesize and characterize solar cell materials and fabricate and characterize thin-film solar cells," Yan said. "He was very self-motivated. He spent hours and hours in learning how to operate advanced scientific research equipment. Richard would not stop asking questions until he understood the project, which is one of the best ways to learn."

Richard, who will be a senior at Maumee Valley this fall, said he enjoys most scientific activities and is particularly interested in energy conversion.

Using the same solar project, Richard participated May 16 to 8 days most of his time at Ohio State University and also qualified for the Intel International Science and Engineering Fair from May 10-15 in Pittsburgh.

Google will announce 20 global science fair finalists Tuesday. Finalists get a trip to Google headquarters in Mountain View, Calif., where they will present their project before judges.

The winner of the competition receives \$50,000 in scholarships.

"That would be really cool," Winnie Jin, Richard's mother, said of the possible trip to California. "We visited the Google building before, but back then he was in elementary school. It's always so funny and it is cool to win that it would be awesome."

Photo Credit:
"I was really surprised to find out I made it to the top 90 in the world," says Richard Jin of Sylvania, a student at Maumee Valley Country Day School, who was chosen as a finalist for the 2015 Google Science Fair competition. Google will announce 20 global science fair finalists Tuesday.

THE BLADE/DON KING
This article reprinted with permission from The Blade

[\[back to top\]](#)

STEM Opportunities

Join us for STEM in the Park!
Saturday, September 26, 2015, 10:00am - 2:00pm
in the Perry Field House @ BGSU.

A free event for all northwest Ohio families and the entire community. STEM in the Park features:

- Four hours of engaging, hands-on STEM activities from over 100 area businesses, schools and organizations.
- Free lunch and other refreshments (while supplies last).
- Free take-home activities.
- Free STEM materials, and best of all,
- Fun for the whole family!

SAVE TIME... Pre-register online by [Clicking HERE!](#) and be entered into a drawing to win a \$25 gift card to Amazon!

Visit the website for more info at www.steminthepark.com

Announcing the 2015 NWO Symposium on STEM Teaching

Northwest Ohio Symposium on Science, Technology, Engineering, and Mathematics Teaching

A local professional development conference for PreK-12 teachers, administrators, pre-service teachers, college faculty/staff, and informal educators.

Featuring a keynote presentation by BGSU Professor of Teaching Excellence, Dr. Daniel Brahler!

A passionate and dedicated educator for 27 years, Dr. Brahler continues to have a tremendous impact on mathematics education nationwide. He has written several books, including the top-selling textbook for middle and high school mathematics teacher preparation, and is the co-author of *Principles in Action*, an NCTM-endorsed guidebook centered on mastering teaching practices with core principles for today's educators.

Dr. Brahler has taught mathematics and science at many levels during his career. He currently teaches mathematics education courses at BGSU, and serves as the Director of Science and Math Education in ACTION, a program designed to train STEM teachers in current and effective teaching methods.

Saturday, November 21, 2015 at Bowling Green University from 8:30 AM - 4:00 PM.

Online registration is now open! [Click here](#) for more info, and to register.

VERIZON INNOVATIVE APP CHALLENGE

Student teams across the nation are now invited to create novel ideas for the mobile app marketplace in the Verizon Innovative App Challenge. The competition offers middle and high school students the opportunity to apply their STEM knowledge and submit an idea for a mobile technology application that can be used to solve a societal or community problem. Registration for the contest is now open and eight teams will win "Best in Nation" honors, each earning a \$50,000 cash grant for their school. No app building experience is necessary! Only an app idea is required for submission by a faculty advisor, who guides a team of five to seven students in the conceptualization process. This is the fourth year of this exciting competition by the Verizon Foundation, in partnership with the Technology Student Association. Registration and entry instructions can be found on the Verizon Innovative App Challenge website at: <http://appchallenge.versoz.com>

Black Swamp Match Teachers' Circles

Math Teachers' Circles bring together teachers and mathematics to enrich the teachers' experience of mathematical problem solving. There are four goals:

- Increase the confidence of math teachers in problem solving.
- Deepen teachers' content knowledge through exploring mathematically rich problems and develop an arsenal of techniques to solving unfamiliar and challenging problems.
- Form long-term professional relationships among teachers and mathematicians, through regular, highly interactive meetings.
- Provide support for teachers who want to bring richer mathematical experiences to their students.

The fall sessions are FREE and open to K - 12 math teachers in northwest Ohio. Space is limited to register today to secure your spot.

Participants will receive:

- Great professional development.
- Networking with mathematicians, higher education faculty and other classroom teachers.

BS-MTC will meet on the following dates from 6:30 - 8:30 PM (snacks provided):
September 22, 2015
October 20, 2015
November 17, 2015

All meetings will be held at:
Powell Elementary
900 North Main Street
North Baltimore, OH

Please complete your registration for ONE or MORE of the fall meetings at the link below:
http://docs.google.com/forms/d/1g4CUPVHjG068h727WV2CwN1vHj6E_0hN4JQ7m1_Q/viewform

If you would like more information, please contact Dr. Debra Gallagher, Bowling Green State University, at dgallagher@bgsu.edu.

Lowe's Charitable and Education Foundation Accepting Applications for Toolbox for Education Grants

The Lowe's Charitable and Education Foundation has announced the opening of its Fall 2015 Toolbox for Education program, which supports projects that encourage parent involvement in local schools and build stronger community spirit.

One-year grants of up to \$5,000 will be awarded in support of projects that have a permanent impact on a school community such as facility enhancement (indoor or outdoor) or landscaping/clean-up projects. Toolbox grants also can be used as part of a large-scale project like a playground as long as the playground is used to complete a phase of the project that can be completed within twelve months of the award.

To be eligible for a grant, applicants must be a public K-12 school or nonprofit parent group associated with a public K-12 school. Parent groups that are applying (PTO, PTA, etc.) must have an independent EIN and 501(c)(3) tax-exempt status under the Internal Revenue Code. Preschools are not eligible.
<http://www.toolboxforeducation.com>

Crossing Boundaries: Transforming STEM Education A Network for Academic Renewal Conference:

November 12-14, 2015
Seattle, Washington
Register by September 24, 2015, for best conference rates

Registering Boundaries: Transforming STEM Education will explore the latest research on integrative, cross-disciplinary STEM teaching and learning; inclusive excellence and broader participation in STEM; STEM faculty support and reward systems; and institutional transformation to advance hands-on learning and increase the achievement of key learning outcomes for all students.

Designed to assist colleges and universities as they work to make inclusive excellence the foundation for institutional practice, the conference will also focus on the intricately linked goals of both increasing STEM baccalaureate degree earners and ensuring that all college graduates achieve scientific learning outcomes essential for responsible citizenship in a complex world.
Association of American Colleges & Universities: www.aacu.org

Ohio
OHIO'S PREK-12 DIGITAL LIBRARY

NFOhio's FREE Professional Development offerings are an easy way to meet required CEUs while learning about great resources and tools to use with students!

Next webinar: September 17, 2015 3:30pm - 4:30pm EDT
Tools to Support Ohio's Pathways to Graduation, College, and Career

Please see website for other webinars and offerings: <https://www.nfohio.edu/educators/pdoh>

Integrating STEM Activities into the Elementary Science Curriculum

Bob Cigmar's online course, Introduction to Integrating STEM activities into the Elementary Science Curriculum, is available online. The purpose of this course is to provide educators the opportunity to understand and experience integration of STEM lessons into the pre-K - 6 science curricula. The course will include discussing the development of STEM literacy in school-age students, experiencing hands-on activities that serve as exemplars for integrating STEM concepts with academic standards for science, understanding how scientific inquiry and engineering design can guide implementing STEM projects in elementary science lessons and reviewing resources for elementary STEM. As a final project, attendees will develop their own integrated STEM lessons based on a science concept standard they teach at their grade level.

The class begins the week of **September 14** and run for **10 weeks** until November 20. The cost is \$150. One semester of graduate credit from Ashland (OH) University is available for an additional \$175. Please email rob@ashland.edu

Kids in Need Foundation Teacher Grants

The Kids in Need Foundation, a national nonprofit organization dedicated to providing free school supplies to economically disadvantaged school children and underfunded teachers, is accepting applications from K-12 teachers for grants in support of classroom projects.

The grants are funded by a number of different private sponsors, including Fred Meyer, Jo-Ann Fabric and Craft Stores, and Elmer's Products. Grants of up to \$600 will be awarded to teachers to support projects that strengthen creativity, critical thinking skills, and/or core knowledge by engaging students in the learning process. Grant awards are based on the creativity of the projects being proposed. All certified K-12 teachers in the United States are eligible to apply.

See the Kids in Need Foundation Web site for complete program information and application guidelines: <http://www.kinfn.org/grants>

Google for Education Training Center

New, Improved Google for Education Training Center

Want to learn how Google tools can help in the classroom? Check out the new and improved online Training Center. Google just announced the free, interactive, online platform that helps educators apply Google's tools inside of class and beyond.

<http://edu.google.com/trainingcenter/>

The Mickelson ExonMobil Teachers Academy

The school year has only just begun, but if you're a third- to fifth-grade teacher, it's not too early to think about your summer plans! The Mickelson ExonMobil Teachers Academy, a partnership among professional golfer Phil Mickelson, ExonMobil, NSTA, and Math Solutions, will take place at the Liberty Science Center in Jersey City, New Jersey, in July 2016. Applications are currently being accepted!

This unique program provides third- to fifth-grade teachers with an all-expense-paid, week-long professional learning experience that equips them with new ways to inspire their students in math and science. For more information and to apply to the Academy or nominate a fellow teacher go to: www.senryteacher.com. Please share this with the teachers in your school today and join the almost 5,000 teachers nationwide who have attended since 2005.

[\[back to top\]](#)

NWO Hands-On STEM Activity

Why Apples Turn Brown

This month's Hands-On Activity is from www.schoolofdragons.com

This simple 5th grade science activity helps you learn the reason why apples exposed to the air turn brown.

You will need:

- An apple
- Lemon juice
- Tap water
- Shallow bowl
- Knife

Instructions:

- Slice the apple into three pieces.
- Fill the bowl with just enough water to cover a slice of apple completely.
- Place a slice into the bowl
- Peel another slice of apple with lemon juice
- Leave the third slice out in the open without doing anything to it.
- Wait for 20 minutes and observe what happens.

Download a pdf of the complete hands-on activity by [clicking here!](#)

[\[back to top\]](#)

Share Your Story!
Thank you for your support of NWO, our programs, our activities, and our partners. Please send us updates, press releases, and news of STEM happenings at your school, district, or organization. Please submit to info@nwo.edu. We are always looking for great STEM education stories to feature in upcoming newsletters.

Join NWO on Facebook


Follow NWO on Twitter

Find Even More Ohio STEM Education Resources
Visit our STEM clearinghouse, www.ohiostemresources.com, for more STEM activities, programs, and information.

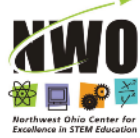
Print and eNewsletters from the past!
Looking for past articles from our print and eNewsletters?
[Click here](#) view and download from our **Print Newsletter** archives.
[Click here](#) view and download from our **eNewsletter** archives.

F


Appendix G: NWO STEM Inquiry Series Advertising



Partnering with ...



Back By Popular Demand...



Supercharged Science Mini-Series

From Science Activity to Supercharged Inquiry

*For Grades 3-8 Teachers, Pre-Service Teachers,
Administrators, and Informal Educators*

- Are you searching for ways to go beyond simple science activities and further engage your students with supercharged science inquiry lessons that integrate powerful literacy strategies?
- Are you looking to better prepare your students for the more rigorous learning and assessment expectations that exist today?
- Do you need strategies for grasping your students' understanding of concepts in order to promote higher achievement in your classroom?

If so, you will want to be a part of this Science Mini-Series!

Dates and Times: A two day workshop; 8:30 am - 3:30 pm (14 hours total).

Thursday, January 28 & Friday, January 29, 2016

Topics Covered:

- Science Inquiry (Observations/Inferences/Designing Experiments)
- Life Science (Food Chains, Energy Flow, Ecosystems)
- Physical Science (Force & Motion, Electrical Circuits)
- Earth/Space Science (Earth's Resources)

Registration Fee and Space Limitations:

- \$250/participant [\$225/participant for teams of 2 or more/ district].
- Light breakfast, lunch, beverages, and snacks provided.
- Each participant receives a science activity book and hands on science classroom materials valued at \$50.
- **Space is limited** to 30 participants.

[Register today to guarantee your spot in the training!](#)

Location:
The 577 Foundation - Main House
577 East Front St.
Perrysburg, OH 43051

Facilitators:

Dr. Jodi Haney, Jodi is a Professor Emeritus from Bowling Green State University where she holds a joint appointment in the departments of Teaching and Learning and Environmental Sustainability. She is now an educational consultant and owner and operator of Xcite Learning. Jodi's journey in education began as a middle and high school science teacher in the public schools where she served for nearly a decade. She then spent the next 22 years on faculty at BGSU. Dr. Haney's research and professional work focuses on student attitudes, motivation, and engagement needed for deep learning. Jodi has taught numerous science education courses, curriculum courses, and courses in environmental studies and sustainability at BGSU. A productive grant writer, she has earned and directed over 20 million dollars in local, state, and federal funding to support science and environmental education programs. As an educational consultant, Haney has worked with well over 100 Ohio schools. Jodi believes that teaching is the essence of her identity and she is passionate about her role to inspire the love of learning through active, engaged, and authentic experiences both within the classroom and the local community. Her favorite hobbies include spending time with her family and **ALL THINGS OUTDOORS** (biking, gardening, hiking, vacationing in warm places).

Jenna Pollock:
Jenna has been employed at BGSU for 11 years, and is currently working with NWO: The Northwest Ohio Center for Excellence in STEM in a variety of roles. Jenna holds a Master's degree in Elementary Education from the University of Toledo. Her graduate degree and experience in elementary science education teaching and curriculum led her back to BGSU (where she received her undergraduate degree) to be involved in a multi-million dollar National Science Foundation grant, TAPESTRIES. Through TAPESTRIES she served as a Science Support Teacher and Curriculum Specialist for local school districts and gained much experience in facilitating teacher professional development events and writing and managing professional development grant projects. Her work at BGSU/NWO now focuses on educational outreach and developing partnerships with other departments on campus, local businesses, informal education institutes and other local higher education institutes for the shared interest in promoting STEM education to educators and the community. She is also a liaison between NWO and the Ohio Department of Education through her Network Regional Leader role to stay current in educational policy and reform. Jenna's favorite role however is being a **mom to three science-loving children** (10th grade, 8th, and 5th).

Key Professional Development Learning Targets:

Learn how to effectively use all of these tools and build a repertoire of strategies that can not only promote learning, but also change the culture of your classroom!

- Uphold the basic tenets of the **5E Instructional Model** (this is embedded in Ohio's New Learning Standards for Science).
- Examine **science inquiry**, from cookbook inquiry (using basic processing skills) to guided and open inquiry including student investigation, citizen science research, problem-based learning (PBL) and more.
- Integrate inquiry that goes beyond basic skills to meet the more challenging state and national **science standards and assessment** expectations.
- Integrate **common core reading strategies** into the 5E model in ways that **CONTRIBUTE** to (vs. distract from) scientific inquiry.
- Align classroom activities to BOTH national and state standards and assessment guidelines, including both **content and skills-based standards** (inquiry, technology, engineering practices).
- Infuse "on-line science simulation tools", free, internationally benchmarked online science **performance-based assessments**, and the free Nearpod presentation tool (with embedded assessment and feedback features - works on all platforms and devices) into the 5E Picture Perfect Science Lessons to supercharge the inquiry experience even further.
- Learn how to properly use **formative assessment** probes and strategies to inform classroom instruction, address student misconceptions about science concepts and use student ideas to **design learning experiences that promote deep and lasting understanding**.






Registration Information

Fee:

- \$250/participant [\$225/participant for teams of 2+ participants/district].
- The registration fee must be received in full 5 business days [January 21, 2016] before the first meeting date.
- Check with your district to see if you can use Title I Part A funds, Title III funds or School Improvement Funds to pay for this training.

Payment Information:
You can either pay online (PayPal) or mail a check or purchase order payable to:

Xcite Learning
c/o Jodi Haney
2112 River Rd.
Maumee, OH 43537

- Individuals, click here to pay by PayPal 
- 2 person teams, click here to pay by PayPal 
- 3 person teams, click here to pay by PayPal 
- 4 person teams, click here to pay by PayPal 
- 5 person teams, click here to pay by PayPal 


If you have any questions, please contact jhaney3@mac.com or 419-350-8469.

Registration Fee Includes:

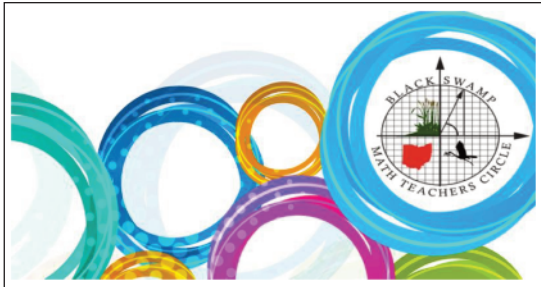
- Light breakfast, lunch, beverages, and snacks each evening.
- Contact Hour Certificate for the 14 hour series.
- \$50/participant in teaching resources and hands-on science classroom materials. [All participants will receive "Picture Perfect Science Lessons," an award-winning program loaded with science lessons that combine science and reading in a natural way and provides easy-to-grasp background in physical science, life science, and Earth and space sciences. The classroom-tested lessons are aligned with both national and state science standards].

Click here to **REGISTER TODAY** for the Supercharged Science Mini-Series.

For more information contact Jodi Haney (jhaney3@mac.com).



Appendix G: NWO STEM Education Inquiry Series Advertising cont.



Black Swamp Math Teachers' Circle (BS - MTC)

We are very happy to be bringing Math Teachers' Circles to Northwest Ohio!

Math Teachers' Circles started in 2006 and have since spread across the United States. Math Teachers' Circles bring together teachers and mathematicians to enrich the teachers' experience of mathematical problem solving. There are four goals:

1. Increase the confidence of math teachers in problem solving.
2. Deepen teachers' content knowledge through exploring mathematically rich problems and develop an arsenal of techniques to solving unfamiliar and challenging problems.
3. Form long-term professional relationships among teachers and mathematicians, through regular, highly interactive meetings.
4. Provide support for teachers who want to bring richer mathematical experiences to their students.

We would love to have you be part of this great adventure in mathematics. **The fall sessions are FREE and open to K - 12 math teachers in northwest Ohio.** Space is limited so register today to secure your spot.

Participants will receive:

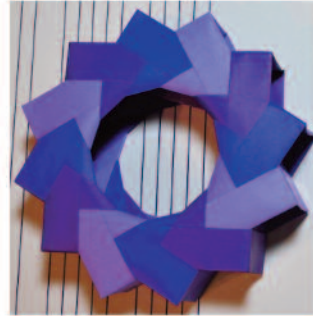
1. Great professional development.
2. Networking with mathematicians, higher education faculty and other classroom teachers.

The final BS-MTC meeting for Fall 2015 will be on November 17, 2015 from 6:30 - 8:30 PM (snacks provided).

All meetings will be held at:

Powell Elementary
500 North Main Street
North Baltimore, OH

The November session will feature Karen Daugherty who is a retired math teacher and consultant for the Ohio Department of Education. She will be presenting the art of **Origami and Paper-folding**. Participants will make a simple box and ideas will be shared as to how this activity can be used in the classroom for a project. The second item will be the Chinese Wheel. These simple modules will WOW your friends! Paper will be provided. Come ready to fold!



If you would like more information, please contact Dr. Debra Gallagher, Bowling Green State University, at dgallag@bgsu.edu or 419-704-1920.

Please complete your registration for the November 17 meeting at the link below.

https://docs.google.com/forms/d/1deFUWdKj5b9a0h72JYIWOx5W1nJIRcE_0hNUGQ7mf_Q/viewform



Black Swamp Math Teachers' Circle is a partner of NWO

Appendix H: NWO Symposium Advertising

2015 NWO Symposium



Northwest Ohio Symposium on Science, Technology, Engineering, and Mathematics Teaching

A STEM Education Professional Development Conference for preK-12 in-service and pre-service teachers, informal educators, and college faculty.

**Saturday
November 21, 2015**
8:30 am - 4:00 pm Olscamp Hall
Bowling Green State University

<http://nwocenter.org/nwoSymposium>



Featuring a keynote presentation by BGSU Professor of Teaching Excellence, Dr. Daniel Brahier! A passionate and dedicated educator for 27 years, Dr. Brahier continues to have a tremendous impact on mathematics education nationwide. He has written several books, including the top-selling textbook for middle and high school mathematics teacher preparation, and is the co-author of *Principles to Action*, an NCTM-published guidebook centered on mastering teaching practices with core principles for today's educators.

Dr. Brahier has taught mathematics and science at many levels during his career. He currently teaches mathematics education courses at BGSU, and serves as the Director of Science and Math Education in ACTION, a program designed to train STEM teachers in current and effective teaching methods.

Pre-Registration Fee \$35 (deadline Nov. 15); \$45 on-site • \$5 Undergraduate Students

Multiple Participant Discount (\$30/person) for 5 or more participants from the same school

Registration Fee Includes:

- 7 hours of high quality professional development
- Keynote address by Dr. Daniel Brahier, BGSU Professor
- Conference bag
- Light breakfast & full lunch

Contact Hour Certificate Available

For more information or to register visit: <http://nwocenter.org/nwoSymposium>

4 x 6 Postcard

Sponsored in part by



1516267_072015_7500

Appendix H: NWO Symposium Advertising cont.

Recruitment Email - Attendee



**2015
NWO Symposium**

A STEM Education Professional Development Conference for preK-12 in-service and pre-service teachers, informal educators, and college faculty.

**Saturday
November 21, 2015**
8:30 am - 4:00 pm Olscamp Hall
Bowling Green State University
<http://nwocenter.org/nwoSymposium>

**2015 NWO Annual Symposium on Science,
Technology, Engineering, and Mathematics Teaching**

Online registration is now open!
[Click here to register](#)

November 21, 2015 8:30 am - 4:00 pm

**Olscamp Hall @
Bowling Green State University**


Registration Fee:

- \$35 (deadline Nov. 15); \$45 onsite
- \$5 Undergraduate Students
- *Multiple Participant Discount (\$30/person) for 5 or more participants from the same school*

Registration Fee Includes:

- 7 hours of high quality professional development
- Keynote address by Dr. Daniel Brahier, BGSU Professor
- Conference bag
- Light breakfast and full lunch

Contact Hour Certificate Available




**Featuring a keynote presentation by
BGSU Professor of Teaching
Excellence, Dr. Daniel Brahier!**

A passionate and dedicated educator for 27 years, Dr. Brahier continues to have a tremendous impact on mathematics education nationwide. He has written several books, including the top-selling textbook for middle and high school mathematics teacher preparation, and is the co-author of *Principles to Action*, an NCTM-published guidebook centered on mastering teaching practices with core principles for today's educators.

Dr. Brahier has taught mathematics and science at many levels during his career. He currently teaches mathematics education courses at BGSU, and serves as the Director of Science and Math Education in ACTION, a program designed to train STEM teachers in current and effective teaching methods.

For more information or to register visit:
<http://nwocenter.org/nwoSymposium>

Sponsored in part by




H |

Appendix H: NWO Symposium Advertising cont.

Recruitment Email - Presenter

Deadline: September 20, 2015



The Northwest Ohio Center for Excellence in STEM Education

brings you the 2015 NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching

Saturday, November 21, 2015
8:30 AM - 4:00 PM
Olscamp Hall, Bowling Green State University
Bowling Green, OH 43403

Featuring the 2015 keynote speaker:
Dr. Daniel Brahler, BGSU Professor of Teaching Excellence

Presentation Proposal Information

Thank you for your interest in presenting at the 2015 NWO Symposium on Saturday, November 21st at Bowling Green State University. To submit a presentation proposal, please click the link below and complete the online form. *Please review the Symposium Strands listed below; you will need to choose one of these strands for your presentation.*

[Click Here To Apply by September 20](#)

All presentation proposals must be submitted by SEPTEMBER 20th at 5:00PM. Beginning September 21, NWO staff will review the proposals and notify prospective presenters if their proposal has been accepted. Accepted presenters will not be charged a registration fee.

For more information visit the Symposium website at nwocenter.org.

Questions? Contact nwo@bgsu.edu.

2015 NWO Symposium Strands

- 1. Inquiry in the College Classroom: Enhancing the Undergraduate Experience**

Inquiry-based teaching practices and active learning strategies are often difficult to implement in the high-enrollment courses that tend to make up much of the early undergraduate experience. These difficulties, however, are not insurmountable. *Sessions in this strand will demonstrate how inquiry-based practices and active learning strategies can effectively be implemented in undergraduate STEM courses, especially those that are high-enrollment.*
- 2. STEM in the Community: Thinking Outside the Classroom**

Making STEM relevant for students serves an instrumental purpose in improving motivation and learning. Showing students the applications of STEM outside the classroom is a great way to get them engaged. There are dozens of valuable community resources in northwest Ohio that can supplement and support your STEM teaching efforts. *Sessions in this strand will demonstrate some of the community resources that are available, and how they can be integrated into the classroom.*
- 3. Putting Creativity to Work: Teaching STEM With Innovation**

Creativity and innovation might aptly be described as the drivers of educational growth and success. New and innovative approaches to STEM teaching and learning result in deeper and more meaningful STEM learning for students. *Sessions in this strand will explore some innovative ways to teach STEM.*
- 4. Integrating Technology in the Classroom**

Sessions in this strand will focus on how to use technology in STEM teaching focusing more on the technology being used than a specific content area.
- 5. Teaching and Learning in SCIENCE**


Sessions in this strand will focus on deepening science content and/or exploring interesting and effective ways to teach science.
- 6. Teaching and Learning in MATHEMATICS**

Sessions in this strand will focus on deepening mathematics content and/or exploring interesting and effective ways to teach mathematics.
- 7. Teaching and Learning in ENGINEERING**

Sessions in this strand will focus on deepening engineering content and/or exploring interesting and effective ways to teach engineering.

Appendix I: OJSHS Advertising & Recognition

Recruitment Email Sample



Registration is now OPEN!

Join us for the 53rd Ohio Junior Science and Humanities Symposium.

**March 16-18, 2016
at Bowling Green State University**

Student Presenter and Delegate Registration Deadline is Friday, Feb. 21, 2016

Ohio JSHS **Student Presenters and Delegates** - [Click here](#) to register.

Teacher Registration Deadline is Friday, Feb. 21, 2016




Ohio JSHS **Teacher Chaperones/Advisors** - [Click here](#) to register.

Parents and Guests Registration Deadline is Friday, Feb. 21, 2016

Ohio JSHS **Parents and Guests** - [Click here](#) to register.

More information on the 2016 Ohio JSHS can be found at http://cosmos.bgsu.edu/nwo_ojshs/

Questions should be directed to NWO (nwo@bgsu.edu).

The National Association of Secondary School Principals has placed this program on the NASSP National Advisory List of Student Contests and Activities for 2015-2016

Appendix I: OJSHS Advertising & Recognition cont.

OJSHS Recognition


Ohio STEM Learning Network

SCHOOLS HUBS NE

LATEST NEWS & INFO

Ohio's young scholars meet for competition

Posted on March 20, 2016 in [Events, Students, Teachers](#)
[9 Comments](#)



"Water Quality in Aquaponic Systems," "Bacteriophage Proliferation Dynamics," "Acute Morphological Effects of Cosmetics-Derived Microplastics Exposure." These aren't articles from a science journal. They are papers by students presenting at the **53rd Ohio Junior Science and Humanities Symposium**.

The event gives Ohio middle and high school students the chance to show off the incredible science they can do. All before even graduating!

Keep reading to see what Ohio teachers and our staff saw at the event. Want to get involved? [Contact Dr. Emilio Duran](#) at Bowling Green State University.

And stay tuned for more photos and updates from the national competition in April, held in Dayton, Ohio.



OSLN
@OSLN

8 students, \$5,000+ in this pic MT @NWOSTem 2016 Ohio Junior Science & Humanities Symposium winners!
[#NWOhioJSHS](#)

6:15 PM · 18 Mar 2016

2 2



"The Connections that students make through testing their authentic conjectures allows STEM & the Humanities to become greater than any set of static knowledge to be learned." - Gabriel Matney, Associate Professor, School of Teaching + Learning, BGSU

Deborah Bogard
@Sciencesinger

[#nwohojshs](#) @DCS_Pacers @Pacer_STEMClubs


8:52 PM · 17 Mar 2016

1

Appendix I: OJSHS Advertising & Recognition cont.

OJSHS Recognition




the **WHITE HOUSE** PRESIDENT BARACK OBAMA Contact Us Get Email Up

 BRIEFING ROOM | ISSUES | THE ADMINISTRATION | PARTICIPATE | 1600 PENN

HOME · BLOG

Science Fair 2016: Meet the Next Generation of America's Innovators

APRIL 8, 2016 AT 9:00 AM ET BY [AMANDA STONE](#)

Summary: Meet the students who will be exhibiting their fascinating and innovative projects at the 2016 White House Science Fair.


This Wednesday the White House will transform for the day into a hands-on showcase of student innovation: robots, prototypes, tools to help us fight climate change and cancer – all researched, built, and designed by the next generation of America's scientists.

On April 13th, President Obama will host his sixth and final [White House Science Fair](#), welcoming more than 100 top science, technology, engineering and math students from across the country to show us how they are going to change the future of America.

Find out more below about the students participating in this year's Science Fair, and share YOUR science projects on social media using #WHScienceFair.

Meet This Year's Exhibitors

This Team Is (Intentionally Not) On Fire!



Team FireArmor is one of the five winners of the 2015 Conrad Spirit of Innovation Challenge, an honor bestowed upon a team of high-school inventors and entrepreneurs. The competition challenges high-school students to use science, technology, engineering, and math (STEM) skills to develop commercially viable, technology-based products that address real-world challenges. FireArmor is an innovative protective apparel designed to protect firefighters or anyone who faces extreme temperatures.

It was created by then Centreville, Virginia, and Gahanna, Ohio team members, Savannah Cofer, 18, Valerie Chen, 18, Matthew Sun, 17, and Varun Vallabhaneni, 17. Unlike any protective apparel on the market today, FireArmor is composed of an inorganic, endothermic fiber that absorbs heat from its environment and keeps the firefighter safe even at dangerously high temperatures. Current firefighter turnout gear rapidly degrades above 300 degrees Celsius and provides less than six seconds of protection in flash fire conditions. In contrast, FireArmor keeps the firefighter safe even above 1000 degrees Celsius and provides up to five minutes of protection in flash fire conditions. The team was inspired to create FireArmor two years ago, when 19 Arizona firefighters were surrounded and killed during a flash fire. After the Arizona tragedy, the team started thinking about whether an endothermic chemical reaction like that used in instant ice packs could be used to offer a dramatic improvement in firefighter apparel. Team FireArmor is currently working on both a patent and a trademark.

Appendix J: STEM in the Park Advertising

Free Family Event



SAVE TIME... Pre-register online!
 at www.STEMinthepark.org
 and be entered into a drawing to win
 a \$25 gift card to Amazon!



STEM
 in the **PARK**[™]
Science, Technology, Engineering, and Mathematics

Saturday, Sept. 26, 2015

10 am – 2 pm at BGSU

Perry Field House

STEM in the Park is moving full STEAM ahead!
 Science, Technology, Engineering and Mathematics meet up with the Arts! #GetyourSTEMon

STEM in the Park will feature interactive displays and activities created by area universities, community partners, and local businesses to engage children of all ages in science, technology, engineering, and mathematics.

Join us for a family day of **hands-on fun** at Bowling Green State University, featuring everything from giant bubbles to edible DNA. Families will receive take-home STEM activities and a free lunch. You won't want to miss it!

FREE Lunch catered by Tony Packo's (while supplies last)

Presenting Sponsors: 

Community Sponsors: 

General Sponsors: 




New This Year!

Two STEM Stages featuring Super-Sized Demos from the Toledo Zoo and Imagination Station along with several performances by popular musical groups.

Get up close and personal with a life-size dinosaur! **Ride the T-Rex** will be there live!

Computer Equipment Recycling

Please bring your unwanted computer hardware equipment to recycle with ERG Environmental Services (i.e. laptop, keyboard, printer, mouse, tower) PLEASE NO MONITORS

The Science of Sports

How fast can you run?
 How high can you jump?
 How far can you throw a ball?
 Analyze your golf or tennis swing.

You can do all of that and MORE in this exciting addition to STEM in the Park!

Roots to STEM Pre K-2 Zone

Featuring activities that cater specifically to younger children



Visit the website for more info at www.STEMinthepark.org

8.5 x 11 Flyer
 11 x 17 Poster

4 x 6 Postcard

Free Family Event



SAVE TIME... Pre-register online!
 at www.STEMinthepark.org
 and be entered into a drawing to win
 a \$25 gift card to Amazon!



STEM
 in the **PARK**[™]
Science, Technology, Engineering, and Mathematics

Saturday, Sept. 26, 2015

10 am – 2 pm at BGSU

Perry Field House

FREE Parking and Lunch



Visit the website for more info at www.STEMinthepark.org




| J

Appendix J: STEM in the Park Advertising cont.

Recruitment Email - Attendee



STEM
in the **PARK**
Science, Technology, Engineering, and Mathematics

**MEET US
AT THE PARK**

**For The 6th Annual
STEM in the Park**

**Saturday, September 26, 2015
10:00am-2:00pm**

**Held at the Perry Field House
Bowling Green State University**

FREE Lunch catered by Tony Packo's (while supplies last)


SAVE TIME... Pre-Register Online!

[BGSU Campus Map](#)

STEM in the Park is moving full STEAM ahead!
Science, Technology, Engineering and Mathematics meet up with the Arts! #GetYourSTEMon

STEM in the Park will feature interactive displays and activities created by area universities, community partners, and local businesses to engage children of all ages in science, technology, engineering, and mathematics.

Join us for a family day of **hands-on fun** at Bowling Green State University, featuring everything from giant bubbles to edible DNA. Families will receive take-home STEM activities and a free lunch. You won't want to miss it!



September is
**HUNGER
ACTION
MONTH**

food
for thought

NWO's **STEM in the Park** is teaming up with **Food for Thought** in an effort to help **squash** hunger. Please bring a food item or a basic household/personal care necessity with you to **STEM in the Park** on September 26th. There will be a mobile pantry on site to accept your donations.

[Click here](#) to download a (pdf) that list all the things needed.

Thank you! Your generous support allows **Food for Thought** to continue serving our community in a thoughtful manner!


Visit the website for more info: <http://www.feedtoledo.org/>

NEW This Year!

The STEM Stages

Two STEM Stages featuring Super-Sized Demos from the Toledo Zoo and Imagination Station along with several performances by popular musical groups.

Rexie the T-Rex



*Get up close and personal with a life-size dinosaur!
Rexie the T-Rex will be there live!*

Back by Popular Demand in 2015!

The Science of Sports

Check out our new featured zone dedicated to the *Science of Sports!*

*How fast can you run?
How high can you jump?
How far can you throw a ball?
Analyze your golf or tennis swing.*

You can do all of that and MORE in this new and exciting addition to **STEM in the Park!**

Appendix J: STEM in the Park Advertising cont.

Roots 2 STEM Pre K-2 Zone

Featuring activities that cater specifically to younger children

HopeLine from Verizon

Donate your no-longer-used wireless phones, batteries and accessories in any condition from any service provider to benefit victims of domestic violence. HopeLine will have boxes at **STEM in the Park** for your donations.

Computer Equipment Recycling

Please bring your unwanted computer hardware equipment to recycle with **ERG Environmental Services** (i.e. laptop, keyboard, printer, mouse, tower)
PLEASE NO MONITORS

THANK YOU to the following organizations hosting Activity Stations this year!

For a complete list, please visit our website.

www.STEMinthepark.org

AIMS
American Chemical Society Toledo Local Section
Aviation Studies
BG Science Education Council
BGSU - Many Colleges and Departments
BGSU Firelands
BOSEF: Building Ohio's Sustainable Energy Future
BP
Biology Graduate Student Association
Bowling Green Council of Teachers of Mathematics (BGCTM)
Bowling Green Early Childhood Learning Center: My Montessori!
Bowling Green Fire Division
Challenger Learning Center of Lake Erie West
Costco
Crazy Craig
E.S. Wagner
ECO Discovery!
ERG Environmental Services
First Solar, Inc.
Girl Scouts
Horizon Science Academy of Toledo
Imagine Madison Avenue School of Arts
K12/ OHVA/ ISOH
Kumon math & reading of Sylvania
Lake Erie Adventure Play (LEAP)
Leave No Child Inside NW Ohio
LiveFIT
Lourdes University
Lubrizol & BIG Fab Lab
Makey Makey with Perrysburg STEM
Maumee Valley Country Day School
Maumee Valley Historical Society
NWOET
Nature's Nursery
New York Life
Ohio Northern University Engineering Education
Owens Community College
PEHE Methods
Rainbow Cooperative Preschool
Rita the Balloon Lady
Robinson Elementary, Toledo Public Schools


SECO/NSTA
SSOE Group
Sandusky City Schools
Saturn V Education
Sauder Village
Science & Math Education in ACTION
Spark! Learning
Sylvan Learning of Bowling Green
Sylvania Historical Village
Tau Beta Sigma - National Honorary Band Sorority
Thayer Family Dealerships
The Spoiled RN
The University of Findlay College of Education
Toledo Botanical Garden/Toledo Grows
Toledo Football Academy
Toledo Museum of Art
Toledo Zoo
Toledo-Lucas County Rain Garden Initiative
UT StACS - UT Student Chapter of the American Chemical Society
University of Toledo SCOPE Program-College of Natural Sciences and Mathematics
VEX Robotics
Verizon

Please visit our website for event details:

www.STEMinthepark.org

Appendix J: STEM in the Park Advertising cont.

Recruitment Email - Exhibitor



ANNOUNCING STEM in the Park 2015

September 26, 2015
10am-2pm
Perry Field House
BGSU

We are excited to invite you/your organization to participate with NWO at our sixth annual **STEM in the Park** event! Last year's event drew over 3,500 people! This is due to amazing exhibitors like YOU! This family day of exciting hands-on STEM activities is growing thanks to your participation!

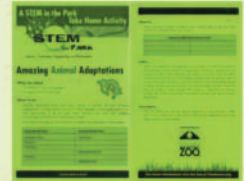


What is STEM in the Park?

STEM in the Park offers hands-on, family-friendly science, technology and mathematics activities, displays and/or equipment at a number of locations arranged in an open, festival-like atmosphere. We invite you to bring an activity or interactive display to bring to the event. In 2014, over 3,500 people, including some 1,500+ children attended STEM in the Park with their parents, teachers and neighbors. STEM in the Park is a highly sought opportunity for businesses, universities, colleges, and non-profit organizations to increase awareness and showcase regional STEM leaders and innovation across northwest Ohio. We anticipate close involvement in the 2015 event.

Exhibitor provides:

- Hands-on activity plus materials for attendees to complete the activity
- The text for a STEM in the Park Take-Home Activity (see example, if desired)
- Take-Home brochures and marketing material featuring your company, department, college or campus organization (if desired)



Registration:

[Please click here to complete registration form](#)

Questions? Contact Jenna Pollock at NWO (jpolloc@bgsu.edu) or Dr. Emilio Duran (eduran@bgsu.edu), School of Teaching and Learning.

Information regarding the previous years' STEM in the Park events can be found at www.STEMinthePark.org




NWO/COSMOS
241 Math Science, BGSU
Bowling Green OH 43403
419-372-2718
nwo@bgsu.edu

If this email was forwarded to you and you would like to be placed on our contact list for updates about this particular event, please email Jenna Pollock at jpolloc@bgsu.edu. We will see that you receive future communications regarding STEM in the Park 2015.



Appendix K: Women in STEM Advertising


Recruitment Email - Attendee



**Women
in
STEM**
Science, Technology, Engineering, & Mathematics

*Empowering young women in science, technology, engineering,
and mathematics. Fostering confidence and inspiration.*

Friday, November 6, 2015



For 6th through 8th Grade Girls

NWO is excited to announce the 31st annual **Women in STEM** program at Bowling Green State University for 6th, 7th and 8th grade girls.

A full day of fun-filled and interactive learning experiences for young women led by area STEM professionals!

**Your school is limited to 20 students,
please register by October 16, 2015.**

The goal of the **Women in STEM** program is to provide a rewarding experience for 6th - 8th grade girls that connects STEM education to the real world and sparks an interest in pursuing STEM majors in college and ultimately STEM careers.

Women in STEM provides young women with a positive experience at BGSU and offers them a variety of engaging hands-on activities that allows them the opportunity to learn and interact with a wide variety of successful STEM role models. The format for the break out sessions will be to provide hands-on, fun-filled, critical thinking/learning activities. The ultimate goal of this program is to help young women recognize the wide array of options available in STEM fields that inspire them to take classes in the STEM fields throughout their educational careers.

Schedule:

8:15 - 8:45 AM	Schools Check-In
8:45 - 9:00 AM	Welcome
9:00 - 10:00 AM	Opening Keynote Presentation
10:10 - 11:05 AM	Session 1
11:15 - 12:10 PM	Session 2/Lunch A
12:20 - 1:15 PM	Session 3/Lunch B
1:25 - 2:00 PM	Closing Keynote Presentation
2:00 - 2:30 PM	Closing Activities/Adjournment and Departure

Fee: (includes lunch)

- Students - \$20
- Adults - \$15

Notes:

- Groups need to arrive by 8:15 am.
- Each school is limited to 20 students.
- Each group of students must be accompanied by a teacher or parent throughout the day (one adult per 10 students).
- Adults and chaperones need to register and attend all sessions with students.
- Campus maps, parking permits, and additional information will be sent to the registered adults from each school.

Please note: There may be reptiles, including snakes at the hands-on activities.

Students attending this program will:

- Get first hand exposure to STEM education outside of the classroom.
- Have one-on-one interactions with Women in STEM role models from various STEM careers to include engineering, medicine, the sciences and healthcare.
- Engage in fun and exciting hands-on activities throughout the day that demonstrate how science, technology, engineering and mathematics is involved in everyday life experiences.
- Meet other regional students and learn from and with peers.
- Experience STEM programs in a college setting that fosters confidence in academic abilities while creating a greater vision of the STEM fields.
- Learn the facts about women's roles in STEM fields and see how they can make a difference in the world through STEM education.

School Registration

Please click on the link below to register students.
https://docs.google.com/forms/d/1uTrj8n7nBbykikdyhDGoRrao2TC_an5SVktnOniKUC/viewform


Registration deadline is October 16, 2015

BGSU



Appendix K: Women in STEM Advertising cont.


Recruitment Email - Presenter



**Women
in STEM**
Science, Technology, Engineering, & Mathematics

Empowering young women in science, technology, engineering, and mathematics. Fostering confidence and inspiration.

Friday, November 6, 2015



For 6th through 8th Grade Girls

Presentation Proposals are now being accepted for the 31st Annual Women in STEM program!

The goal of the **Women in STEM** program is to provide a rewarding experience for 6th - 8th grade girls that connects STEM education to the real world and sparks an interest in pursuing STEM majors in college and ultimately STEM careers.

Women in STEM provides young women with a positive experience at BGSU and offers them a variety of engaging hands-on activities that allows them the opportunity to learn and interact with a wide variety of successful STEM role models. The format for the break out sessions will be to provide hands-on, fun-filled, critical thinking/learning activities. The ultimate goal of this program is to help young women recognize the wide array of options available in STEM fields that inspire them to take classes in the STEM fields throughout their educational careers.

Students will:

- Participate in hands-on learning activities throughout the day
- Attend an interactive opening and closing keynote presentation
- Enjoy lunch on the BGSU campus

Schedule:

8:15 - 8:45 AM	Schools Check-In
8:45 - 9:00 AM	Welcome
9:00 - 10:00 AM	Opening Keynote Presentation
10:10 - 11:05 AM	Session 1
11:15 - 12:10 PM	Session 2/Lunch A
12:20 - 1:15 PM	Session 3/Lunch B
1:25 - 2:00 PM	Closing Keynote Presentation
2:00 - 2:30 PM	Closing Activities/Adjournment and Departure

We rely on the support of our presenters and volunteers like you in order to continue to provide this unique experience for this group of girls. We are thrilled to host the 31st annual Women in STEM program at BGSU and look forward to your participation!

Presenters:

Keynote: The Opening Keynote presentation will be approximately one hour. The Closing Keynote presentation will be approximately 30 minutes. All presenters are welcome to attend the keynote presentations and are invited to attend lunch at the Oaks, a BGSU dining facility.

Breakout Sessions: There will be groups of approximately 15 -20 girls with adult supervision in each session. Students will attend two breakout sessions and lunch which will last approximately 55 minutes each. Sessions should include innovative and creative hands-on activities that are fun-filled and engaging. We would like to foster a collaborative growth minded atmosphere in the breakout sessions that gives students opportunities to interact with one another and YOU as a STEM academic/career role model.

We provide classroom and/or lab space, AV equipment and support.

Please click the link below to apply to be a presenter.

<https://docs.google.com/forms/d/1jVi6dB9jHRnw-kNvP30ADnZQSJWdkDPg-YEHJF80s8/viewform>

Registration Deadline: October 10, 2015

You will be notified of your presentation acceptance to present by October 12, 2015.

Students attending this program will:


- Get first hand exposure to STEM education outside of the classroom.
- Have one-on-one interactions with Women in STEM role models from various STEM careers to include engineering, medicine, the sciences and healthcare.
- Engage in fun and exciting hands-on activities throughout the day that demonstrate how science, technology, engineering and mathematics is involved in everyday life experiences.
- Meet other regional students and learn from and with peers.
- Experience STEM programs in a college setting that fosters confidence in academic abilities while creating a greater vision of the STEM fields.
- Learn the facts about women's roles in STEM fields and see how they can make a difference in the world through STEM education.

BGSU



Appendix L: You Be The Chemist Challenge Recruitment Email

Recruitment Email



Teachers: Announcing an exciting learning opportunity for students grade 5-8 called **You Be the Chemist Challenge**

You and your students are invited to participate in the You Be The Chemist Challenge®, an interactive academic contest that uses the drama of competition to excite grade 5-8 students about science. The Challenge tests students' knowledge of chemistry concepts, their real-world applications, and other topics that are included in standard science curriculum, such as:

- the scientific method
- properties of matter
- chemical formulas & equations
- chemistry in the human body

Participating schools and students have an opportunity to receive national recognition, scholarships, and prizes. The Challenge Champion, one chaperone, and one educator from each state even receive an expenses-paid trip to the national competition in Philadelphia in June! There is no cost to participate, and participation requires a minimal time commitment from schools and educators. Study materials are provided free online to help students prepare for the competition. For a listing of school and student participation requirements and to download the study materials, visit www.chemed.org.


The Challenge was created by the Chemical Educational Foundation ® (CEF) a national non-profit organization dedicated to enhancing science education for our youth. The 2014-2015 Challenge involved 34 states as well as the District of Columbia and Puerto Rico with nearly 40,000 students. We continue to grow the program each year and hope to get your school involved! Please let me know if you have questions or would like to register your school for the Challenge. For more information please visit www.chemed.org. **REGISTRATION CLOSES February 15, 2016.**

Please email **Bob Mendenhall** Curriculum Director at rmendeh@tps.org or call (419) 671-8320 for more information.

Robert Mendenhall
Curriculum Director
(419) 671-8320
rmendeh@tps.org

Bob Midden
NWO/COSMOS Director
(419) 372-0563
midden@bgsu.edu

This event is supported by



| L