



The Mallinson Institute for Science Education Fall 2021 Newsletter

From the Director



This past year has been by far the most unusual in my 20 years at Western Michigan University. In Spring 2020, all of our in-person classes were suddenly moved online. Even though things were different during COVID-19, we continued our work at MISE. Our faculty, staff, and graduate student instructors did a great job continuing high quality education under these difficult conditions. Later in this newsletter you will learn about the science lab kits developed by Dr. Betty Adams as an innovative way to keep the hands-on aspect of our classes for elementary education majors. We continued to meet for presentations, classes, and get-togethers, and learned how to successfully navigate Webex and Zoom to do these things. We had 9 PhD students and 11 MA students graduate from the program. Faculty, staff, and students published 28 papers.

I hope you enjoy this issue of our newsletter.

Sincerely,

Dr. Charles Henderson

Mallinson Institute for Science Education



MISE End of Year Celebration
Spring 2021 via WebEx.

Megan Grunert Kowalske Emerging Scholar Award 2021-2022

Megan Grunert Kowalske was awarded the 2021-22 Emerging Scholar Award that recognizes rising stars among WMU faculty. Named chair of Western's Department of Chemistry in July 2020, Grunert Kowalske is the lead on a nearly \$1 million National Science Foundation S-STEM grant aimed at fostering a sense of belonging and fostering the success of chemistry and biochemistry transfer students at Western. She is

also the principal investigator on a \$1.25 million National Science Foundation grant exploring the science identities, social networks, and sense of belonging of STEM doctoral students from historically excluded groups. "The findings of Megan's research can inform institutional change that has the potential to significantly and positively affect the lives of many students in

the future and is, therefore, essential," Orgill says. "If I think about the people who REALLY change a field, they are those who provide a new way of thinking about or examining an issue. Megan's development of methodologies for examining diversity-related issues in STEM education will continue to influence STEM education for years to come."



"I remember the first time I became aware of Megan and the research that she is doing. I was contacted by a senior researcher in the field of chemistry education who said, 'Look out for Megan. She's sharp. She's going to be a leader in our field,' " says Dr. MaryKay Orgill

Distinguished Alum - 2021 Mary Brown

Dr. Mary Brown was a Professor of Physical Science and Biology for 35 years at Lansing Community College. She received her PhD in Science Education from WMU in 2005. She worked to help non-science majors develop an understanding of science by integrating science disciplines. She also sought to reduce science anxiety in non-science students by developing an instrument to measure science anxiety and teaching strategies for confidence building. By all accounts she was an excellent teacher and highly dedicated to her students. She was selected as the 2014 Michigan College Teacher of the Year by the Michigan Science Teachers Association. As one of her students wrote in one of the many positive reviews on rate my professor, “Dr. Brown is by far the best instructor I have

ever had. Her tests are very difficult and the course material is challenging, but her enthusiasm makes it fun to learn. You will never have an instructor who cares more for her students than Dr. Brown. You have to show up and work hard in her class.” Since retiring from LCC in December 2013, Dr. Brown has become an active volunteer with Voters Not Politicians, a non-partisan organization focused on preserving democracy through efforts such as promoting anti-gerrymandering policies by educating the public about the history and effects of gerrymandering. This statewide activism has consumed much of her time over the last few years along with volunteering at the local public library, participating in multiple book clubs, genealogy research, supporting her spouse’s musical endeavors, and traveling.

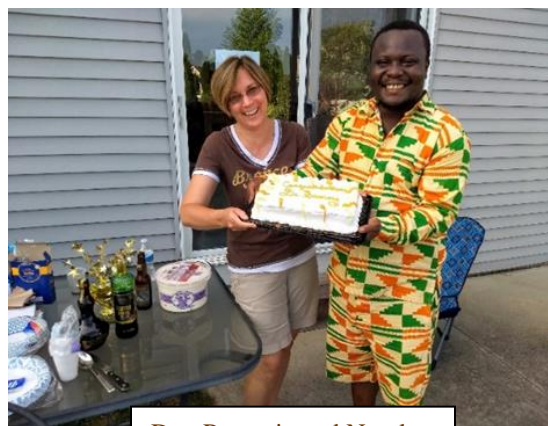


Drs. Henderson and Brown

Graduate Student Spotlight: Samuel Nyarko

Dr. Samuel Cornelius Nyarko is a Postdoctoral Research Fellow in the STEM Education Innovation and Research Institute (SEIRI) at Indiana University & Purdue University, Indianapolis. He graduated from Western Michigan University’s Mallinson Institute for Science Education in 2021 with a Ph.D. in Science Education – Geosciences. As a post-doc, he works with SEIRI staff on research to integrate Artificial Intelligence (AI) into STEM courses and the lead evaluator for SEIRI and NSF research projects at IUPUI. He also carries out research in collaborative learning practices and climate change education, diversity, equity and inclusion. He has published works on students’ climate science knowledge, ethical research, and teamwork skills development in the geosciences. He is a champion of inclusive learning practices and currently serves as member of the National Association of Geoscience Teachers (NAGT) and the American Geophysical Union (AGU) interdisciplinary Diversity, Equity, and Inclusion (DEI) committees. Dr. Nyarko will be

the keynote speaker for the Earth science strand talk at the Minnesota Science Teachers Association conference this year. He will also be convening and chairing a session on soft skills development and training at this fall’s American Geophysical Union (AGU) conference in New Orleans. He is a social constructivist and shares in the philosophy that diversity in knowledge creation is the closest we can go to achieve accurate knowledge; hence, inclusive learning practices are priorities.



Drs. Petcovic and Nyarko

As Seen on TV: Forensic Science

In Summer 2021, we once again were able to offer Forensic Science Workshops for K-12 teachers. These are led by master teacher Kathy Mirakovits (a MISE alumni!). The students immersed themselves in the science and practice of forensic crime scene observation, processing and assessment, data collecting techniques, and analytics. Participants also learned about how to teach forensic science topics to

students in an engaging and hands-on way. The Summer 22 workshop is happening July 11 to 15, 2022.

Interested? Follow the link below!

<http://www.forensicscience-ed.com/>



Pig Autopsy

SAMPI

Over the past year, Robert Ruhf (SAMPI Senior Research Associate) and Cody Williams (Director of SAMPI) have been working on a collaboration with the WMU Evaluation Center on a report to NSF related to student participation in their Advancing Technical Education (ATE) program. As part of this work, they have interviewed 9 project PI's to understand the number of students

they served and the outcomes for these students in terms of credentials. In August, they formally submitted this report to NSF and it is being used to inform a report to congress. In addition, they are presenting this work at the American Evaluation Association Conference in November and a manuscript is in review at the International Journal of STEM Education.

MISE Graduates 2020-2021

Ph.D.

Adam Channell
 Etsy Haryani
 Eva N. Nyutu
 Jasvir Pannu
 Khalid Abdullah H Kariri
 Ntiana (Diana) Sachmpazidi
 Saman Khan
 Samuel Nyarko
 Tasia Bryson

Master's

Brian Jacobs
 Daniel Newton
 Jeremy Cronk
 Kate Hojnacki
 Laura Tinigin
 Manal Ajran S Almalki
 Melissa Hutchison
 Megan Block
 Michael Williams
 Samuel Diekevers
 Sarah Pettrey



Drs. Henderson and Khan

MISE Science Lab Kits

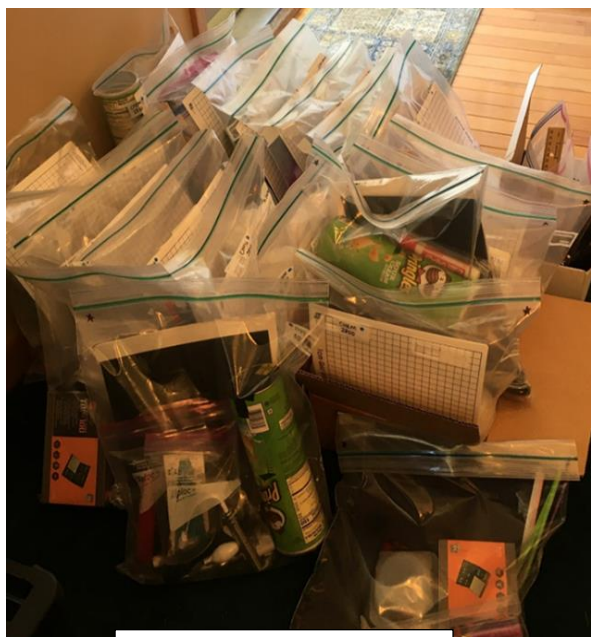
In Spring of 2020, after all of our courses went online, Dr. Betty Adams realized that it might be a while until we could once again offer in-person classes. MISE teaches six science courses for elementary education majors. An important feature of these courses is that they model best practice teaching strategies by being hands on and lots of small group interactions. In order not to lose this feature of the classes, starting in Summer 2020, Dr. Adams developed lab kits for four of these courses: Biology, Chemistry, Geography, and Physics.

Each lab kit contains useful items for conducting exploratory science learning activities while away from campus. Common, tangible materials can help make any shared learning experience more engaging, more enjoyable, and more educational. Dr. Adams compiled and mailed these kits to all students taking courses that summer. As she put it “We want our students to benefit from the convenience of having elements of their science learning labs delivered right to wherever they are staying.”

Thanks to her innovation and commitment to our students, MISE was able to provide high quality hands-on instruction even during remote learning.



Physics Kit Materials



Physics Kits for Delivery

Physics Kit Contents

- whiteboard/card and markers
- protractor
- safety compass
- plastic mirror (should peel off protective plastic)
- maglite (tell them about removing top for a point source)
- light/laser pet toy (tell them about safety)
- refraction water tray (or oil, etc.)
- V-filament bulb (in night light holder! be safe with electricity)
- extended source bulb (white)
- three index cards and R for shadows
- three clips for holding optics cards/blocker/screen
- black cardboard blocker (slider with various apertures)
- Pringles can camera obscura (with tissue slider inside!)
- tuning forks 256 hz and 512 hz
- kazoo (last and probably least)

MISE degree programs: Help us spread the word!

Master of Arts in Science Education: This program is designed for K-12 science teachers who wish to expand their teaching skills and broaden their science content knowledge. It is available entirely online and available to students anywhere in the world. In addition, the program serves Michigan K-12 teachers by providing a pathway for the desirable DI (integrated science) endorsement.

Doctor of Philosophy in Science Education: This program is designed for those with a science or science education background who wish to pursue careers as college or university science teachers, science education researchers, science teacher educators, curriculum specialists, high school science department chairs, or professionals in government agencies or school districts.

Concurrent Program (Master's + PhD): This special program is designed for those wishing to become college- or university-level science teachers or researchers in science education. The concurrent program allows students to be simultaneously admitted to a science master's degree program in Biology, Chemistry, Physical Geography, Geology, or Physics, and the Mallinson doctoral program in science education.

College Science Teaching Certificate: This new 3-course certificate is intended to enhance the skills of individuals who wish to improve as instructors of science in a college setting. The program is open to current graduate students in science departments and to college-level instructors and faculty of science elsewhere.

PEOPLE OF MISE

Dr. Charles Henderson – Director of the Mallinson Institute for Science Education and Professor of Physics

Dr. William Cobern – University Distinguished Professor of Biological Sciences and Science Education

Dr. Heather Petcovic – Chair of Geological and Environmental Sciences and Professor of Science Education

Dr. Brandy Pleasants – Faculty Specialist for Laboratory Instruction

Dr. Betty Adams – Laboratory Supervisor and Affiliate Faculty

Dr. David Rudge – Professor of Biological Sciences and Science Education

Dr. Megan Grunert Kowalske – Chair and Associate Professor of Chemistry and Associate Professor of Science Education

Ms. Paige Upchurch – Administrative Assistant

SAMPI

Dr. Cody Williams – Director of SAMPI

Mr. Mark Jenness – Emeritus Researcher

Ms. Ninah Miller – Research Data Analyst

Ms. Michelle Munetsi – Finance Assistant Senior

Mr. Robert Ruhf – Senior Research Associate

Donations

Your support makes learning possible. Making a donation to the Mallinson Institute for Science Education ensures you are empowering the next generation of smart leaders, creative thinkers, and global citizens. Every gift has a direct impact on our students, empowering them with the tools and resources needed to become leaders and givers of tomorrow. Your support make possible the extra margin of excellence in the Mallinson Institute for Science Education at Western Michigan University, helping to support a graduate student, their research, and professional development.

If you would like to make a donation, please make your check out to Western Michigan University, Mallinson Institute, and send it to:

WMU Gift Processing
1903 W Michigan Ave
Kalamazoo MI 49008-5403 USA

You can also give directly via credit card to the Mallinson Institute for Science Education by following the link below.

<https://secure.wmualumni.org/s/give?funds=D407>

We greatly appreciate your support!



Some of our MISE PhD students... from near and from [very] far

MISE faculty and graduate student publications

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 - Highlighted in Chemical & Engineering News [<https://cen.acs.org/education/undergraduate-education/Faculty-beliefs-active-learning-hinder/99/i9>] and Inside Higher Ed [<https://www.insidehighered.com/quicktakes/2021/04/07/what-impacts-active-learning-stem>]
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- Haryani, E., Cobern, W. W., Pleasants, B. A.-S., & Feters, M. K. (2021). Analysis of Teachers' Resources for Integrating the Skills of Creativity and Innovation, Critical Thinking and Problem Solving, Collaboration, and Communication in Science Classroom. *Jurnal Pendidikan IPA Indonesia*, 10(1), 92-102. <http://journal.unnes.ac.id/nju/index.php/jpii/article/view/27084/11449>
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