**Multi Department Activities**

Science Express-The Chemistry, Biological Sciences, Earth and Atmospheric and Planetary Sciences, and Physics Departments of the Purdue College of Science deliver research-grade instruments to high schools in 17 Indiana counties. Numbers for the month of December are as follows:

Teachers/Classrooms Visited – 51

Student/Instrument Interactions - 3422

**Biology Outreach**

   1.)  Purdue MANRRS (Minorities in Agriculture, Natural Resources and Related Sciences) Research symposium

        Biology Outreach participated in the School of Agriculture research symposium for MANRRS students. Students in the Purdue MANRRS program from Thea Bowman Academy in Gary IN. attended the annual Research Symposium held at Purdue Saturday February 16th. The daylong conference centered around student research presentations and workshops on STEM careers. Biology Outreach met with Biology teachers and presented on programs and methods for enhancing Biology instruction in the classroom. Discussions were also held about instituting an AP Biology course at the school.

2.)  Biology Outreach at the 48th Annual HASTI conference February 17-19, 2019

     Biology Outreach attended the Annual HASTI (Hoosier Association of Science teachers) conference held in Indianapolis. Together with the College of science K-12 Outreach group, the following presentations were made: Monday, February 18th:  7th Grade Science Activities; Topic; Cells.

     Tuesday, February 19th: Middle School Content Blast:  Topic; 6th grade lesson on; Living Organisms.

3.) NMSI Conference Presentation;

     Attended the NMSI (National Math and Science Initiative) daylong Conference and presented an AP Biology Student Study Session to 80 students at the David Speer Academy in Chicago IL. Saturday February 23, 2019. Topics covered included the AP Biology curricular areas of Matter and Energy.

4.) February; Science Fair month. Students prepare for regional competition. Dr. Clark Gedney directs this program and is the lead mentor assisting many students in designing and preparing their projects.

**Physics Outreach**

Faculty Broader Impact HASTI

Physics and Astronomy Outreach presented at HASTI with faculty member Andrew Mugler on the topic of “Counting What You Cannot See,” presenting current research in biophysics in the context of statistics for 7th grade classrooms.

SMAP

Physics and Astronomy Professor Matthew Lister presented Radio Astronomy to the SMAP students this month. Service learning student Alex Loomis was instrumental in 3D printing components for parabolic mirrors used in the presentation.

Service Learning

Coordinator Sederberg is working with service learning students at BIDC with on-going design and 3D printing projects for SMAP and Science Express.

Sederberg began work with Debbie Beck, high school physics teacher, on service learning projects for the spring semester. Debbie is enrolled in the graduate level service learning course.

PUR 1 Reactor

Sederberg organized a tour for students from Cary Quad for PUR 1, the nuclear reactor in Purdue Nuclear Engineering.

QuarkNet

Outreach Coordinator David Sederberg initiated work with graduate student Marla Glover to organize an upcoming QuarkNet Masterclass workshop for high school students in particle physics.

**Earth, Atmospheric, and Planetary Sciences Outreach**

* + *Goal 1:* ***Support for K-12 science and mathematics educators***
    - Teacher Professional development
      * A Science Express teacher training was held on campus.
      * Hosted and co-facilitated a teacher professional development Using Lockboxed in your science instruction for 15 middle and high school teachers on campus.
      * Co-presented Elements of Earth and Sky Lockbox at the HASTI conference with 27 teachers attending.
      * Co-presented Successfully Using Science Research Projects in the 6-12 Classroom at the HASTI conference with 35 teachers attending
      * Co-presented 6th Grade Middle School Content Blast at the HASTI conference with 32 teachers attending.
      * Co-presented  8th Grade Middle School content Blast  at the HASTI conference with 25 teachers attending.
      * Helped staff the College of Science K-12 Outreach Booth at the HASTI conference with nearly 500 teachers attending.
      * Helped led a lesson for a preservice and inservice teacher teaching cloud chambers at Tecumseh Jr. High, with Sarah Nern from Chemistry outreach.
      * Working with conferences to organize a STEM professional development for high school and middle school teachers in July of 2019.
      * Collaborating with the Indiana Department of Education to offer a number of teacher professional developments for *Inquiry in the Classroom*.
      * Collaborating with Lafayette Jefferson High School to offer a Technology workshop for teachers summer 2019
      * Collaborating with Purdue University Fort Wayne to offer a middle school teacher workshop in the summer of 2019.
    - Equipment loan programs
      * Our participation is **Science Express** is proving to be beneficial in that we have high school science teachers.
      * Added a 2nd AR sandbox to the SE delivery schedule and facilitated software and equipment updates to the original AR sandbox .
      * We have small equipment that we loan out to faculty and students. It is mostly used by pre-service classes and some local in-service teachers.
    - Getting information out
      * We publish a **newslette**r that goes out to nearly 500 educators. The January newsletters theme was *STEM in the Classroom*. We are drafting the March newsletter now.
      * We have Facebook accounts for both EAPS Outreach and the Science Express program
        + <https://www.facebook.com/EAPS.out/>
        + <https://www.facebook.com/PurdueSE/>
    - Teacher Resources:
      * We have a EAPS K-12 Outreach Pinterest page to help teachers find resources in our content area.
  + *Goal 2:****Create and facilitate programs that develop scientifically literate K-12 students***
    - Student groups visited campus
      * AP Friday Groundwater Contamination hosted 33 students from both Western and South Central High schools. Professor Andy Freed spoke with students about his research and courses offered.
      * AP Friday on Electrochemistry hosted 30 students form Twin Lakes, Covenant Christian, and North Putnam High Schools. Professor Christina Li presented and assisted with the labs.
      * We have been working on preparing the AP Friday events that we have lined up this semester.
      * Collaborating with Purdue Conferences to offer Grandparents University summer 2019.
      * Collaborating with EAPS Graduate students to organize activities for the Apollo 11 50th Anniversary event
    - School /event visits
      * Taught Cloud chambers lesson at Tecumseh Jr. High for 120 students.
  + *Goal 3:****Create opportunities for broader impact***
    - Met with professor Julie Elliott to discuss broader impacts of her NSF grant.
    - Met with professor Robin Tanamachi to discuss her NSF Career proposal.
    - Met with professors Dan Chavas and Dan Dawson about an NSF proposal on modeling and theory of severe thunderstorms.
    - Met with **faculty and staff** from around campus collaborating on a STEM Summer Professional Development for educators.
    - Working with **faculty** to present at various AP Friday events.
    - Attended planning meetings as a committee member for organizing the **GLOBE North American Regional Meeting** which will will be held at NASA Langley.
    - Attended meetings for the **GLOBE U.S. Partner Forum**. Steven Smith (EAPS K-12 Outreach Coordinator) is the U.S. At Large Representative.
    - Collaborating with the **Indianapolis Children's’ Museum** to offer a STEM professional development for elementary teachers in July of 2019
    - Collaborating with the **Indiana Department of Education** to offer a number of teacher professional developments for *Inquiry in the Classroom*.
    - Collaborating with **Lafayette Jefferson High Schoo**l to offer a Technology workshop for teachers summer 2019 as part of the Title 4 grant that we co-wrote with them.
    - Working with the **Indiana STEM Education Taskforce** to promote STEM education in Indiana.
    - Collaborating with **Purdue Conferences** to offer Grandparents University summer 2019.
    - Collaborating with **Clinton County Healthy Communities** on an outdoor educational area.
    - Collaborating with **Tom Ratkus from EAPS** to update the augmented reality sandbox that we built for outreach.
    - Collaborating with **Purdue University Fort Wayne** to offer a middle school teacher workshop in the summer of 2019.
    - Steven Smith is serving on the advisory board for **National Geographic Education** for Indiana
    - Funding for January 2019:
      * Met with alumni’s about funding an endowment for CoS K-12 Outreach and donating funds to support our summer GLOBE workshop.

Additional outreach efforts this month included:

* Taking a National Geographic Educator certification course.
* Met with video conferences to discuss the possibility of using Purdue as a satellite to live broadcast teacher professional development workshops from Michigan in June 2019.
* Assisted in the nomination of Professor Corey Thompson from the Department of Chemistry for the Faculty Engagement Scholar Award (He has helped us with a number of AP Friday events).

**Chemistry Outreach**

* **Outreach for Indiana K-12 Educators**
  + Worked with Steven Smith from EAPS Outreach to help a Purdue pre-service student teacher provide instruction over a cloud chamber lesson to approximately 120 8th grade students at Tecumseh Middle School.
  + Met with video conferences to discuss the possibility of using Purdue as a satellite to live broadcast teacher professional development workshops from Michigan in June 2019.
  + Hosted a Lockbox PD for 15 middle and high school teachers in HAMP 2244.
  + Co-presented Elements of Earth and Sky Lockbox at the HASTI conference with 27 teachers attending.
  + Co-presented Successfully Using Science Research Projects in the 6-12 Classroom at the HASTI conference with 35 teachers attending.
  + Co-presented 6th Grade Middle School Content Blast at the HASTI conference with 32 teachers attending.
  + Co-presented 8th Grade Middle School content Blast at the HASTI conference with 25 teachers attending.
  + Helped staff the College of Science K-12 Outreach Booth at the HASTI conference with nearly 500 teachers attending.
  + Taking a National Geographic certification course.
  + Nominated Mrs. Natasha Ploss, high school chemistry teacher at McCutcheon High School, for the 2019 ACS Division of Chemical Education Award for Excellence in High School Teaching.
* **Faculty collaborations**
  + Helped nominate Professor Corey Thompson from the Department of Chemistry for the Faculty Engagement Scholar Award.
  + Professor Andrew Freed from EAPS spoke with students from South Central High School and Western High School came to Purdue to participate in an AP Friday lab session on February 8.
  + Participated with the GLOBE 2019 North American Regional Meeting (NARM) planning committee to help organize the meeting scheduled at NASA Langley in early March.
  + Professor Christina Li from Chemistry led students in a “build a battery” challenge and spoke about her research with students from Twin Lakes High School, North Putnam High School, and Covenant Christian High School when they visited Purdue to participate in an AP Friday lab session on February 22.
  + Met with Professor Julie Elliott to discuss broader impacts of her NSF grant.
  + Met with Professor Robin Tanamachi to discuss her NSF Career proposal.
  + Met with Professors Dan Chavas and Dan Dawson about an NSF proposal on modeling and theory of severe thunderstorms.
* **Science Express Labs and Instrumentation**
  + Conducted a Science Express content area workshop for existing SE users.
  + Helped Steven Smith (EAPS Outreach) and Bill Bayley (Director of Outreach) to add a 2nd AR sandbox to the SE delivery schedule and facilitate software and equipment updates to the original AR sandbox.
  + Students participating in the February 8 AP Friday lab session used Science Express Porosity kits and Spectrovis Plus spectrophotometers.

Students participating in the February 22 AP Friday lab session used Science Express Labquest 2’s and Vernier voltmeters. Hosted new teacher training for Vernier equipment at Purdue.

**Computer Science Outreach**

Our service learning classes continued their excellent work in the community. The ROCS group had a number of events in February, including a visit to Fillmore Elementary, a new Coding Program at the West Lafayette Public Library, and their monthly trip to help students at the CoderDojo at Purdue’s Anvil. The Fillmore trip had us engaging students from all 6 grades at the school in both unplugged tasks and programming tasks with Scratch. My students and I noticed that these students seemed to have much greater exposure to coding than in years past, which is a positive sign of how things are changing in Indiana schools. The WL Public Library Coding program will see some of our students helping out on a weekly basis for drop-in coding time. The teen librarian has been very helpful in getting that program off the ground, and we look forward to making that a regular part of our activities. Lastly, the CoderDojo program occurred at the end of the month. The style of instruction has changed this year and I’m not sure we’ll continue to support CoderDojo going forward, but we’ll wrap up the year with them. The MAGIC program continued to visit the four schools that they see weekly, and have started to put together plans for their upcoming field trip to Luther Consulting in Carmel, IN.

February saw some of my time dedicated to our efforts to re-launch Peer2Peer mentoring in the department. With our attached service learning course unable to get past the gatekeepers for these things, we elected to try and run a series of weekend mentor training sessions assuming that we could recruit enough students. Unfortunately, this did not occur and so the program is on temporary pause. I believe that it can succeed and potentially flourish with adequate support from the department, and that it could have a valuable impact on our incoming groups of students.

A limited part of my monthly activity included my participation in a session at the Hoosier Association of Science Teachers, Inc (HASTI) conference. I co-lead a session with Dr. David Sederberg from Physics and Isidore Julien from Biology. The format only gave me a window of 10 minutes to present about computer science, which was not adequate for helping the teachers in attendance, but I’m hoping the visibility will help us with some of our efforts this summer to work with K-8 teachers interested in learning more about teaching CS.

A more effective engagement activity for computer science outreach was our part in the first Indiana CS Curriculum Showcase which was held in Greenwood at Center Grove’s Innovation Hub. Here, we connected with dozens of educators that were in attendance to learn more about their options for implementing existing CS curriculum in their classrooms in the 19-20 school year. I was there representing our Computer Science Outreach program, the CS180x MOOC on edX, and our state CSTA chapter. I was able to sign up about 20 educators to our CSTA chapter, and had great interest in the online course as a resource for helping teachers in their efforts. I also met and connected with a few of my peers in the state and was able to design some plans for upcoming PD sessions for teachers.

At the end of the month, I traveled with Victory Soe to Minneapolis, MN for the annual SIGCSE conference. The conference had great sessions, some of which I felt would have made a difference with some of our faculty members. It was heartening to see that both George Adams and Jeff Turkstra were in attendance with us. Some items that I picked up on from an instructional standpoint included the subtle usage of data sets that address topics that appeal to a more diverse group of learners in CS1, the use of “productive failure” as a teaching strategy that incorporates debugging, and an intervention using test cases to help students focus on metacognitively addressing their problem solving ability. On top of this, I also attended a number of sessions focused on addressing both gender diversity, anti-racist teaching, and safe spaces for the LGBTQ+ community. I’m happy to share what I learned with anyone who is interested.