**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 February are as follows:

Department       School Visits       Student/Instrument Interactions

Chemistry           20 1391

Biology                 13 695

Physics                 6 547

EAPS                      13 505

Planning for the Summer Middle School teacher’s workshop. We have Over 90 Middle School teachers coming to participate in multiple labs in different content.

Planning for the Lafayette Jefferson and Central Catholic summer teacher workshop. We are working with teachers to enhance the one to one technology used in their classrooms.

**Biology Outreach**

Family science Night: Vinton Elementary School Lafayette: Biology Outreach participated in "Family Science night" at Vinton Elementary school Lafayette. With the assistance of the Biology students club, the hands on activity “Spooling of DNA” was presented. Parents and students of the Elementary school took part in the activity.

National Math and Science Initiative (NMSI): Student Study session: Presented an AP Biology Student Study Session to over 60 students on Saturday March 24 at the West Fargo High School in ND. Topic presented was Ecological Dynamics.

Biology Outreach hosted 22 Students from Shonan High school Japan on March 27. They visited the Outreach lab and participated in a three hrs. hands-on laboratory exercise conducted by Dr. Clark Gedney (director of the Department’s Bio Media Center for instructional Computing). This activity showed the Japanese students how high school science classes are conducted in the United States .An emphasis on the STEM approach to teaching and learning was highlighted. They also heard from Biological Sciences Department head Dr. Stephen Konieczny and Dr. David Sanders, professor of biology.

**Physics Outreach**

SMAP – Saturday Morning Astrophysics

Our March SMAP was a presentation for Searching for Exoplanets, in collaboration with Computer Science, with Avery Archer giving the tech talk introduction. Exoplanets is a computer simulation with accompanying inquiry lesson. We had 21 SMAP students and even some parents attending, with 8 undergrads and service learning students assisting. We have an article in preparation for this lesson ready to submit to The Physics Teacher.

### Outreach atNiswonger Aviation Technology Building

Service learning student Yahia Aly and Outreach coordinator Dave Sederberg met with Sergey Dubikovsky and other faculty members in designing an outreach presentation at Purdue Airport. The inter-departmental collaboration program will coordinate the expertise of Aviation Technology, Aerospace Engineering and Physics and Astronomy in a lesson designed to introduce students to flight surfaces and aircraft control, and considerations in engineering design.

Service learning

Outreach coordinator David Sederberg introduced two undergraduate service learning students (freshman Alex Loomis and sophomore Mitch Brown, both Physics majors) to BIDC (Bechtel Innovation and Design Center), to begin the design process of components for a Michaelson Interferometer. Physics and Astronomy faculty member Chen-Lung Hung is providing additional resources and expertise for this project, the purpose of which is to create 8 of these devices for SMAP and Science Express classroom use. The optical components for the devices will be held in place magnetically, with students being able to assemble the devices themselves.

Shonan High School, Japan

Physics and Astronomy Outreach hosted 22 students from Shonan High School in Japan in March with a presentation of the Searching for Exoplanets. Coordinator David Sederberg recruited six Purdue undergraduates from various disciplines, including Physics and Astronomy, to talk to the visiting students about their interests in science, personal history, possible career paths, and life at Purdue. In addition, Sederberg arranges for representatives from the International Center and the Japan Student Association to address the group.

Sycamore School

Physics and Astronomy Outreach coordinated participation in the annual Curiosity Confidence and Challenge program at Sycamore School in Indianapolis. The program, attended by over 400 middle school girls from around the state, is designed to give young women insight into career alternatives. Post Doc May Kim and Coordinator David Sederberg presented the topic of cryogenics and superconductivity.

Collaborative NASA Grant Submission

I agreed to be Co-PI in a collaboration with Matthew Route in the submission of a grant to NASA. If funded, the proposal will “provide resources for SMAP and Physics Inside Out to develop and implement activities related to solar observations, spectroscopy, and magnetism that will serve K-12 students in the surrounding diverse, economically disadvantaged, largely rural, community.”

Science Express Training

Outreach Coordinator David Sederberg, with Crown Point High School Physics teacher Maryanne Nicks, participated in the Virtual Reality training session at the Envision Center. Maryanne will write a physics related VR lesson which she and Sederberg will present to Science Express teachers at the summer training.

Faculty Broader Impact

Coordinator David Sederberg met will several faculty in March to craft grant related broader impact initiatives, among them, Chen-Lung Hung, Andrew Mugler, and Qi Zhou.

Space Grant Consortium

Outreach Coordinator David Sederberg submitted an INSGC grant proposal in March, the purpose for which was to provide funds for the ongoing SMAP program. The amount of the request was $5800, with half of that amount matching funds from the Department.

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

* Equipment loan
  + Our participation is Science Express is proving to be beneficial in that we have teachers of college bound students using equipment in our content areas.
  + We have a number of EAPS kits and small equipment items that we loan out to teachers as well as university faculty and students. EAPS 102 borrowed a number of items this month.
  + Imagination Station has our Traveling Solar System Wall on display.  Hundreds of visitors visit the museum to see the exhibit monthly.
* GLOBE
  + North American Meeting
    - GLOBE Partners from all over the U.S. came to Purdue to attend this meeting. Participants included persons from NASA, UCAR, and universities from all over the U.S. Outreach served on the planning committee and moderated the meeting.
  + Master Trainer Workshop
    - Assisted in the planning, and facilitation of the GLOBE Master Trainer workshop as part of the Master Trainer training.
  + Train the Trainer workshop
    - Helped mentor people signed up to be trainers in pedosphere. Assisted in the set up all labs for the training.
  + Soils Professional development workshop.
    - Helped set up labs, recrute, teachers, and assist in instruction of soils data collection.
  + Attended meetings for the GLOBE U.S. Partner Forum. Steven Smith (EAPS K-12 Outreach Coordinator) is the U.S. At Large Representative.
  + GLOBE Weather Network: We are working with central Indiana locations that have a weather station, to post their data to the GLOBE web site under the Purdue University partnership. We now have one station posting automated data to GLOBE from Purdue Ag farms.
* Disasters Happen: Are You Ready event at Imagination Station
  + This was a very successful event with 468 persons attending. We had the Doppler on Wheels there with EAPS faculty giving tours and explaining to the general public how it works. Chemistry and EAPS outreach ran activities inside for students and adults.
* Collaborations,  including broader impacts and instrumentation
  + Working with Rebecca Smith, EAPS. for use of Spectrometers in NSF grant and to create a new outreach lab.
  + Assisted instructing EAPS 102 class and presented to a couple of others
  + Collaborated with Prof. Lisa Welp on organizing our Halliburton Foundation  grant.
    - We are having EAPS grad students make introductory videos to allow K-12 students to know who they are. Steven Smith has begun recording and posting the videos. <http://www.eaps.purdue.edu/outreach/people.html>
    - We are having EAPS 137 students make videos for this as a project.
    - Teaches came to the soils workshop in March
    - We are planning a summer professional development for the other spheres and for student research projects using data.
  + Student events:
    - Student groups visited campus
    - AP Friday’s had a small group visit campus.
      * <http://www.eaps.purdue.edu/outreach/ap_friday.html>
    - Science fair mentoring
      * Outreach is helping middle and high school students on projects
* Looking forward
  + In April and May we will have a groups visiting campus, going to schools to do activities, start planing summer teacher professional development workshops.

**Chemistry Outreach**

* **Outreach for Indiana K-12 Educators**
  + Participated in planning meeting for 2018 summer middle school (grades 6-8) science teacher workshop that will be hosted here at Purdue.
  + Helped with the event: Disasters Happen: Are You Ready? This Imagination Station event was sponsored by the College of Science and utilized equipment from Science Express.
  + Travelled to Fieler Elementary School in Merrillville, IN with Bill Bayley to do a liquid N2 show for their Positive Behavioral Interventions and Support incentive program.
  + Completed my CITI program training and am currently working on getting IRB approval for events such as AP Fridays at Purdue. K-12 Outreach would like to track student response toward participating in events like the AP Friday lab sessions.
* **Faculty collaborations**
  + Travelled with Corey Thompson to all Lafayette area high schools to present information about the 2018 summer cohort for the Project SEED summer internship program.
  + Met with Kavita Shah and her graduate students to give them a tour of the Science Express facilities. Dr. Shah is working to develop a summer program for high school teachers to learn an assay that can be completed with their students (Fall 2018 semester) using available equipment.
  + Met with Nate Slade to discuss and plan the Atmospheric Chemistry high school visits that will be happening in April.
* **Science Express Labs and Instrumentation**
  + Working to develop a set of wave machines. The first wave machine was tested with a student group visiting campus from Champaign-Urbana, IL.
  + Worked with Jeanne Meyer to re-stock FTIR solutions for Science Express kits.
  + Total of 10 students from Blackhawk Christian High School came to Purdue to participate in an AP Chemistry lab session on Friday, March 23. Students used Science Express laptops along with the newly purchased Vernier Go Direct SpectroVis Plus Spectrophotometers to complete a kinetics lab related to rate laws.
  + Helped facilitate and lead a two-day Train-the-Trainer workshop involving Indiana high school teachers along with scientists throughout the United States. Participating teachers learned how to conduct protocols related to soil science and incorporate these protocols into their science curricula. Two specific protocols involved the Chemistry I concept density (C.1.7): Bulk Density and Particle Density. Science Express was able to loan most of the equipment needed to conduct this workshop.
  + March 2018 Science Express totals
    - 20 high school chemistry classroom visits
    - 1,391 student/instrument interactions for the discipline of chemistry
* **Faculty collaborations**
  + Helped Prof. Corey Thompson by contacting chemistry teachers in Lafayette, IN about recruiting students for 2018 Project SEED summer internship program.
  + Met with Dr. Jennifer Barce (College of Education) to discuss possible future collaborations between Purdue pre-service/student teachers and K-12 Outreach with the College of Science.
  + Prof. Dave McMillin prepared and delivered a mini-lecture related to spectrophotometry during the February 23 AP Friday Chemistry lab session.
  + Worked with Prof. Gaurav Chopra and George Takahashi to present a Virtual Reality pilot workshop for four Indiana high school teachers at the Envision Center.
    - Participating teachers learned about best practices when using the Science Express virtual reality equipment.
    - Participating teachers had the opportunity to speak directly with Dr. Chopra about science content classroom needs and the possibility of developing new programs to deliver relevant science content via virtual reality.
  + Worked with Steven Smith, EAPS outreach coordinator, to present information from HASTI conference: “Literacy, Science, and Your Morning Calendar”; by Skype for two groups of pre-service teachers at Purdue Fort Wayne with Professor Matthew Perkins Coppola.
  + Served as a member of an EPICS mid-semester design review to help provide input for the team to ensure that their project is appropriate, safe, and robust.
* **Science Express Labs and Instrumentation**
  + Worked with Prof. Gaurav Chopra and George Takahashi to update the MINT molecular modeling software on the Science Express virtual reality equipment for demonstration at HASTI.
  + Total of 34 students from four Indiana high schools came to Purdue to participate in an AP Chemistry lab session on Friday, February 23. Students used Science Express laptops along with the newly purchased Vernier Go Direct SpectroVis Plus Spectrophotometers during this lab session.
  + February 2018 Science Express totals
    - 14 high school chemistry classroom visits
    - 1,121 student/instrument interactions for the discipline of chemistry

**Computer Science Outreach**

My two service learning courses participated in a number of events which I will describe here in limited detail. Early in the month, my ROCS students and I traveled to Fillmore, IN and ran CS activities for every student at their school. This is a small rural community that has limited exposure to CS and STEM activities, and we have been committed to these types of schools in our work in my time since arriving at Purdue. Later in the month, ROCS students also helped me to organize a field trip for all Lafayette Catholic School System sixth graders to campus. The students participated in some problem solving exercises, saw a group of Buster Dunsmore’s senior design students describe and demonstrate their projects, and then went to visit the Envision Center in Stewart to learn about how VR and AR can be used to support scientific research. As per usual, MAGIC students visited all of the Lafayette-area high schools weekly and continued their work to encourage high school women in computing.

Our online computer science course began the last segment of the course in March. CS180.4x has almost 1500 students participating and learning about object-oriented programming and algorithms in this final course. We’ll wrap up in a few weeks with some AP CS A exam review, and then we’ll focus on some course maintenance for the ’18-19 offering of the course, which is the final year in our contract with edX.

I am working with a couple CS students to plan for this year’s CS Summer Camp, which is almost officially sold out for this year. We will have about 40 students participating in grades 6-11, and will focus this year on teaching programming via discussion of “Big Data” and the types of strategies that we employ to solve data-oriented problems. We’ll continue this work through April and May so that our camp is up to the normal standard of excellence for June.

We are also working on planning a Middle School Workshop for the week after CS Summer Camp during which I will be presenting these teachers with introductory programming activities and some thoughts on how to integrate their existing lessons with computer science in order to meet the new K-8 computer science standards that have been adopted.

I’m working with Brenda Capobianco from the College of Education on some Computational Thinking materials for her EDCI 365 course. This group of pre-service elementary education students will be asked to teach computing to their students, so we’ll find some activities that touch on the concepts most relevant to their practice and in line with the new standards. My guest lecture for this course will be at the end of April.