Greetings from the Center for Science Teaching and Learning (CSTL) and welcome to the first edition of our newsletter! We are doing many exciting things here in CSTL and we wanted to inform you of our activities. We hope to publish our newsletter regularly and keep you apprised of events and happenings in the CSTL. Since this is our first newsletter, it is jammed packed with our accomplishments.

The CSTL is a thriving department in the College of Engineering, Forestry and Natural Sciences and we have grown to 21 employees. In the rest of this newsletter you will read about the many grants and projects that our professional development staff are involved with and you’ll learn about our growing NAUTeach program.

Enjoy your reading and please let us know if there are other things you would like to see in future newsletters.

Janet McShane

HIGHLIGHTS OF OUR ACADEMIC PROGRAMS

NAUTeach Program

NAUTeach continues in its 5th year of developing high quality educators to meet the shortage of secondary science and mathematics teachers in Arizona and nationwide. Through this program, modeled after the successful UTeach program at UT Austin, students can earn a Bachelor of Science in Secondary Education in science or mathematics in four years with specialized science and mathematics education coursework, and also gain real classroom experience from their very first semester to their last semester. The program continues to benefit from generous gifts of $1 million dollars from the Helios Education Foundation and funding from the National Math and Science Initiative.

Our NAUTeach program continues to grow with 17 student teachers placed in schools around Arizona in the spring of 2012. As of last Spring (2011), we have 318 students in NAUTeach! Our goal is, within 5 years, to double the number of graduates from our programs.

We graduated our first eleven graduates! Four students graduated in the spring, all of whom are currently teaching in secondary schools. Seven students graduated in the fall, most of whom found teaching positions this year.

Three new faculty joined the program: Brian Beaudrie in the Department of Mathematics and Statistics, and Scott Fray and Suzanne Pyle in the CSTL (for more on our new faculty, see page 4).

We offered three sections of Step 1 and two sections of Step 2 this past fall, allowing for students to gain mentored classroom experiences at the beginning of their undergraduate program.

The Research Methods course, where students engage in research through four different inquiries, continues to be a strong collaboration between an NAUTeach master teacher and faculty members from CEFNS. This past fall Dave Thompson, CSTL, and Mark James, Department of Physics and Astronomy, taught the course.

We continue to build our learning community, a residential living experience for freshmen in the NAUTeach program, which increases student success and retention in our program.

The WeTEACH Club helped with fundraising to sponsor the Coconino High School Robotics Team, the CocoNuts, this year. The Club also sponsors a monthly symposium featuring local outstanding teachers as speakers on various professional topics.

To continue to build the pipeline from Mesa Community College (MCC) to NAU, four NAUTeach faculty traveled to Mesa Community College in December to train MCC faculty to teach EDU 112 (equivalent to NAU’s Step 2).

Graduate Programs

A new program, Master of Arts in Teaching Science with Certification (MAT-S) was approved by NAU’s Curriculum Committee, and now provides graduate-level coursework and science teaching preparation with professional mentoring for post-baccalaureate students.

Between the MAT-S program and our other post-baccalaureate program, Graduate Certificate- Mathematics or Science Teaching (C-MOST), we have 14 student teachers placed in schools around the state during Spring 2012.

Our two new induction courses were developed by Jane Kirkley and Deb Wolf to mentor and support new teachers in the field.
In May, a number of NAUTeach faculty traveled to Austin, TX to disseminate our activities and findings with the larger UTeach Community.

- Dr. Jennifer Claesgens and Kristi Fredrickson presented their innovative approach to the Project-Based Instruction (PBI) course, integrating GIS technology with project-based curriculum.
- Deb Wolf and Sharon Cardenas highlighted the web-conferencing technologies we use in our coursework to support synchronous on-line and in-person learning.
- Dave Thompson presented NAU’s innovations to the collaborative Research Methods course.

NAUTeach faculty and staff participated in the Arizona Science Teachers Association (ASTA) Conference in September in order to recruit mentor teachers for our rapidly growing programs.

James Southall works with us as our local liaison in the greater Phoenix area. In addition to supervising student teachers, Mr. Southall is recruiting mentor teachers to expand future student teaching opportunities in the state.

**NOYCE Fellowship Program**

The NOYCE Fellowship Program at Northern Arizona University, funded by the National Science Foundation, had a busy start-up year. This program is a partnership between the CSTL, the Department of Mathematics and Statistics (PI Dr. Shannon Guerrero), and Maricopa Community College District.

Six NAU undergraduates and post-baccalaureate students received $15,000 merit-based scholarships to support them in their final year in NAU’s secondary mathematics and science teacher education programs, including their student teaching semester.

Congratulations to our NOYCE Fellows: Sarah Aitken, Allison Loesel, Mitchell Mangiapane, Megan McKenna, Amanda Stalvey and Amy Van Gundy!

Mesa Community College, a grant partner, placed 36 freshmen and sophomores in short-term summer internships in STEM education programs around the state to promote interest in STEM teaching.

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**Broadening Horizons**

**CSTL STAFF**

Janet McShane: Interim Director
Sharon Cardenas: Assoc. Director, Academic Programs
Jennifer Claesgens: Asst. Prof.
Scott Fray: Master Teacher
Susanne Pyle: Master Teacher
Dave Thompson: Master Teacher
Deb Wolf: Master Teacher
Nena Bloom: Evaluation Coordinator
Jackie Menasco: Assoc. Director, Professional Development
Joëlle Clark: Professional Development Coordinator
Kristi Fredrickson: Professional Development Associate
Lori Hare: Professional Development Coordinator
Laura Jauron: Professional Development Coordinator
Kenric Kesler: Professional Development Coordinator
Jane Kirkley: Professional Development Coordinator
Trenda Vannette: Professional Development Coordinator
Jennifer Koshnick: Materials Mgr.
Rhett Pepe: Web Designer

**PROGRAM EVALUATION**

*Nena Bloom*, Evaluation Coordinator, continues to serve as an evaluator on the following projects:

- Northern Arizona University NOYCE Fellowship Program
- Initiative for Maximizing Student Diversity Program at Northern Arizona University
- Northern Arizona Power of Data Project
- International Research Experiences for Students: Tropical Ecology Mentorship Program of Southern California at California State University, Dominguez Hills
- Integrative Biosciences: Genes to Environment, The Integrative Graduate Education and Research Traineeship at Northern Arizona University
- Research Experience for Undergraduates in Environmental Sciences: Shima’ nahasdza’a’n bee ‘iina’ (Mother Earth Gives Life) at Northern Arizona University

**Professional Development**

The professional development staff worked with over 350 educators in 2011, through the following professional development workshops and institutes:

- Middle and high school teachers from Northern Arizona and around the state, participated in the Northern Arizona Power of Data project, a Math Science Achievement grant administered through Science Foundation Arizona. This project partners a math or science teacher with a career and technical education (CTE) teacher to use Geographic Information Systems (GIS) with students as a tool to improve science and/or math achievement. Through these teacher partnerships, students also develop 21st century workforce skills and are exposed to careers in STEM. The CSTL (Professional Development Coordinators Lori Rubino-Hare and Kristi Fredrickson) partnered with the Geology Program and the GRAIL lab at NAU, and the Coconino Association for Vocation, Industry and Technology (CAVIAT) on this project.
- Examining Your Environment through the Power of Data (EYE-POD), an National Science Foundation ITEST project, mentored its third cohort of teachers this year. This project provides teachers with the means to implement interdisciplinary,
technology-integrated, project-based learning modules with a weather and climate focus, in their classrooms. Teachers then help students learn science and math concepts as they collect and analyze data in an attempt to solve a community problem, and communicate solutions through the use of Geographic Information Systems (GIS) software. This project also supported two advanced workshops in summer 2011 for teachers from around the nation, to support experienced teachers as they develop their own project-based learning units. The CSTL (Lori Rubino-hare, Kristi Fredrickson and Dr. Jennifer Claesgens) partnered with the Geology Program (PI Dr. Jim Sample) and the GRAIL lab on this project.

- A GEMS Space Science Workshop was held to lead middle school teachers through an exploration of the new GEMS core curriculum sequence focused on the relationship of the earth and other objects in the solar system, galaxy and universe. This program, sponsored by the NAU/NASA Space Grant (PI Dr. Nadine Barlow), was held for over 20 middle school teachers in the greater Phoenix area in March 2011. Participating teachers received the GEMS Space Science Sequence kit so they can implement the lessons in their classroom.

- Professional Development Coordinators Trenda Vannette and Joëlle Clark provided leadership to the Sedona STEM Council, which is composed of ten teachers who represent all schools and grade levels in the Sedona Oak Creek Unified School District. The council has been charged with exploring existing school-based STEM programs and developing a strategic plan for a district-wide STEM program.

- CSTL is a partner in the NSF-funded Climate Change Science and Solutions: Creating Innovative Education Tools for Native Americans and Other Rural Communities on the Colorado Plateau. The purpose of the grant is to create a climate change curriculum that will be used by school districts serving primarily rural and Native American students on the Colorado Plateau. CSTL (Professional Development Coordinator Joëlle Clark) is working with the Department of Biological Sciences (PI Dr. Jane Marks), the College of Social and Behavioral Sciences, the Department of Applied Indigenous Studies and the School of Earth Science and Environmental Sustainability on this 2 year planning project.

- CSTL continued involvement in informal science education around the Four Corners area, with Joëlle Clark serving as the Principal Investigator for three projects. 1) A collaboration with Mesa Verde National Park includes developing an inquiry-based virtual education game of the park and its resources, developing a docent education program, and updating interpretive park materials. 2) Joëlle Clark continues to serve as the Arizona state coordinator for Project Archaeology, a comprehensive, award-winning education program in science and social studies. In addition to being the state coordinator, Joëlle serves on the national Project Archaeology leadership team and is part of the national program's curriculum and professional development staff. 3) Joëlle Clark, Nikki Cooley, and Lyle Balenquah serve as co-directors for the Native Voices on the Colorado River program, which is a cultural interpretive program for Grand Canyon Colorado River outfitters on Native American perspectives of the Grand Canyon. The goal of the program is to increase understanding and communication about the relationships of affiliated tribes with the Grand Canyon from their own perspectives.

- Jr. BIOTECH has completed its second successful year recruiting and providing professional development for 24 teachers from around the state. In Year 3 of this program we look forward to working with another 24 teachers and continuing to support teachers with our Biotech Kit lending program. This project is funded by the Helios Education Foundation, and is a partnership between the CSTL (Professional Development Coordinator Kenric Kesler) and the University of Arizona’s BIO5 Institute.

- BIOTEC is wrapping up its 4th year of placing STEM graduate students in K-12 classrooms in Flagstaff, while making monthly visits to Jeddito Elementary School on the Navajo Reservation. This NSF funded GK-12 project is a partnership between the CSTL (Professional Development Coordinator Kenric Kesler) and the Department of Biological Sciences (PI Dr. Catherine Ueckert) at NAU.

- ARISE, a NSF Math and Science Partnership-Start project, worked to develop the partnership with the following school districts: Cedar Unified School District, Cottonwood/Oak Creek School District, Mesa Public Schools, and Williams Unified School District. The goal of this partnership is to design, develop and submit a full Math Science Partnership-Targeted proposal for the next solicitation. NAU Partners engaged in this project include the CSTL (Professional Development Coordinators Jane Kirkley and Trenda Vannette), the Department of Biological Sciences (Dr. Egbert Schwartz), the Geology Program (PI Dr. Jim Sample) and the Department of Physics and Astronomy (Dr. Kathy Eastwood).

- CSTL professional development staff provided 105 hours of professional learning to a cohort of 30 Mesa Public School elementary teachers (grades 3-6) in physical science, integrative literacy strategies, and effective elementary science pedagogy through the Science and Literacy for the i-Generation project, a Math and Science Partnership program. Professional Development Coordinators facilitated an eight-day summer institute and four weekend follow-ups sessions during this past Fall 2011 semester. In addition to these intensive learning sessions, each teacher participated in two one-on-one classroom observation/coaching sessions designed to support their efforts in leading inquiry-based science instruction. This project is funded by the Arizona Department of Education, and is a partnership between the CSTL (Professional Development Coordinators Trenda Vannette and Kristi Fredrickson) and Mesa Public Schools.

- In the Science and Integrated Literacy for Teachers project, a Math and Science Partnership Program, the CSTL is currently working with 32 Pre-K through 6th grade teachers in Navajo County. By using problem-based learning, we have taken a slightly different approach to our previous MSP projects. With Kenric Kesler as our fearless content instructor, participating teachers spent three days working on a “problem”, and researched the processes used to create the constructed wetlands at Pin Tail Lake in Show Low. The teachers were out in the field working in collaborative groups collecting data to support their claims. For many teachers, this was their first opportunity to actually experience and research the ecological dynamics of the constructed wetlands. This project is funded by the Arizona Department of Education, and is a partnership between the CSTL (Professional Development Coordinators Laura Jauron, Kenric Kesler, and Kristi Fredrickson) and the Navajo County Educational Services Agency (PI Lannie Gillespie).
Meet our new Staff

Annie Archuleta is our new Administrative Associate. She has worked at NAU for 11 years, starting in the Athletic Department in the Training Room as the Medical Service Coordinator for 7 years, then taking the position as the Administrative Assistant/Office Manager for the Department of Criminology and Criminal Justice for 4 years.

Jennifer Koshnick is our new Materials Manager. She recently moved to Flagstaff, is excited to be working at the CSTL and looks forward to exploring all that NAU and the community have to offer.

Thanks to our student workers, Nicole Coussens, Bryan Tubera, and Ben Wyatt who assist faculty, professional development staff and students.

Meet our new Faculty

Scott Fray, Master Teacher NAUTeach, moved from the field of wildlife biology into teaching science because he believes in the importance of a scientifically literate public for our modern world. During the summers, he and his wife Maureen take students to Peru with the company they founded, Wonder Treks. During these adventures their focus is on teaching ecology, conservation, and culture, and the interactions between the three components of this trilogy. Scott is thrilled to be working here in the CSTL, teaching future science and math teachers, as he sees it as a way to continue impacting education here in America.

Susanne Pyle, Master Teacher NAUTeach, was a high school math instructor for 21 years, first in Glendale and then at Flagstaff High School. Says Susanne “I’m excited to be part of NAUTeach and move to the next level in my education career. I now have the opportunity to teach students about teaching students. The highlight is observing our students teach in the classroom. It is exciting and rewarding to watch our students grow from their very first teach to their third teach. I have to say it’s been an interesting and enlightening first semester. What an experience!”

Awards and Celebrations

- In his “spare” time, Dave Thompson continues to coach the Coconino High School Robotics Team aka “The CocoNuts”, with Coconino High School teacher Christine Sapio. In 2011, the team again was the recipient of the Chairman’s Award at the Arizona Regional, earning a place at the World Championship in St. Louis! The team also mentors younger teams in Northern Arizona in the FIRST Lego League (FLL), and recently hosted the fourth Annual North Region FLL Qualifying Tournament at Coconino High School in Flagstaff.
- Project Archaeology received a 2011 Secretary of the Interior’s Partnerships in Conservation award. This award is an honor for the CSTL, which has been a partner with Project Archaeology since 1996 through the leadership of Joëlle Clark.
- Lori Rubino-Hare was selected to participate in the Hewlett Packard Catalyst Initiative as an Associate Member in the Pedagogy 3.0 Consortia. She attended the Summit in Delhi, India in March 2011 as part of an international community studying the future of STEM teacher training, including how to prepare teachers to facilitate 21st century learning experiences for students.
- Dr. Jennifer Claesgens was awarded funding through the Faculty Grant Program (FGP) for her project “Measuring Quantitative Reasoning in Chemistry”, researching what mathematics knowledge students bring to their understanding of chemistry.
- Kristi Fredrickson, who resides in Williams, began her four-year term on the Williams Unified School District school board after winning a city-wide election.

Dissemination of our work in 2011:
In 2011, CSTL faculty and staff shared our work through presentations and posters at the following venues:
- National Association for Research in Science Teaching
- National Science Teachers Association
- Arizona Science Teachers Association
- American Evaluation Association
- Microcomputers in Education Conference
- The Annual UTeach Conference
- Esri Education User Conference
- Gordon Research Conference on Chemistry Education Research and Practice
- The American Geophysical Union Conference
- Hewlett Packard Catalyst Summit in New Delhi, India
- European Science Education Research Association conference in Lyon, France.

For more information about these presentations, see our website at: http://nau.edu/cefns/cstl/