ENERGIZE NEW MEXICO

NEW MEXICO EPSCOR

YEAR 1 ANNUAL REPORT

2013—2014

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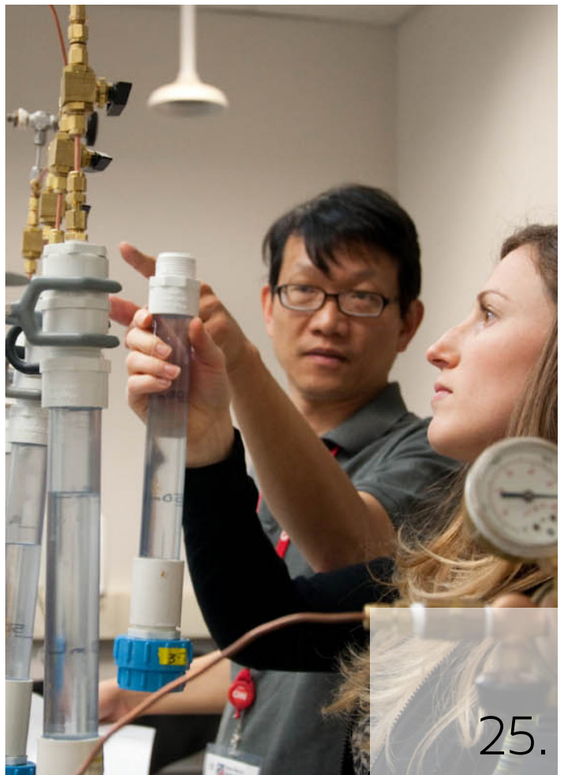
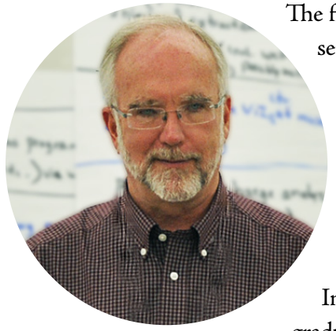


From the Director

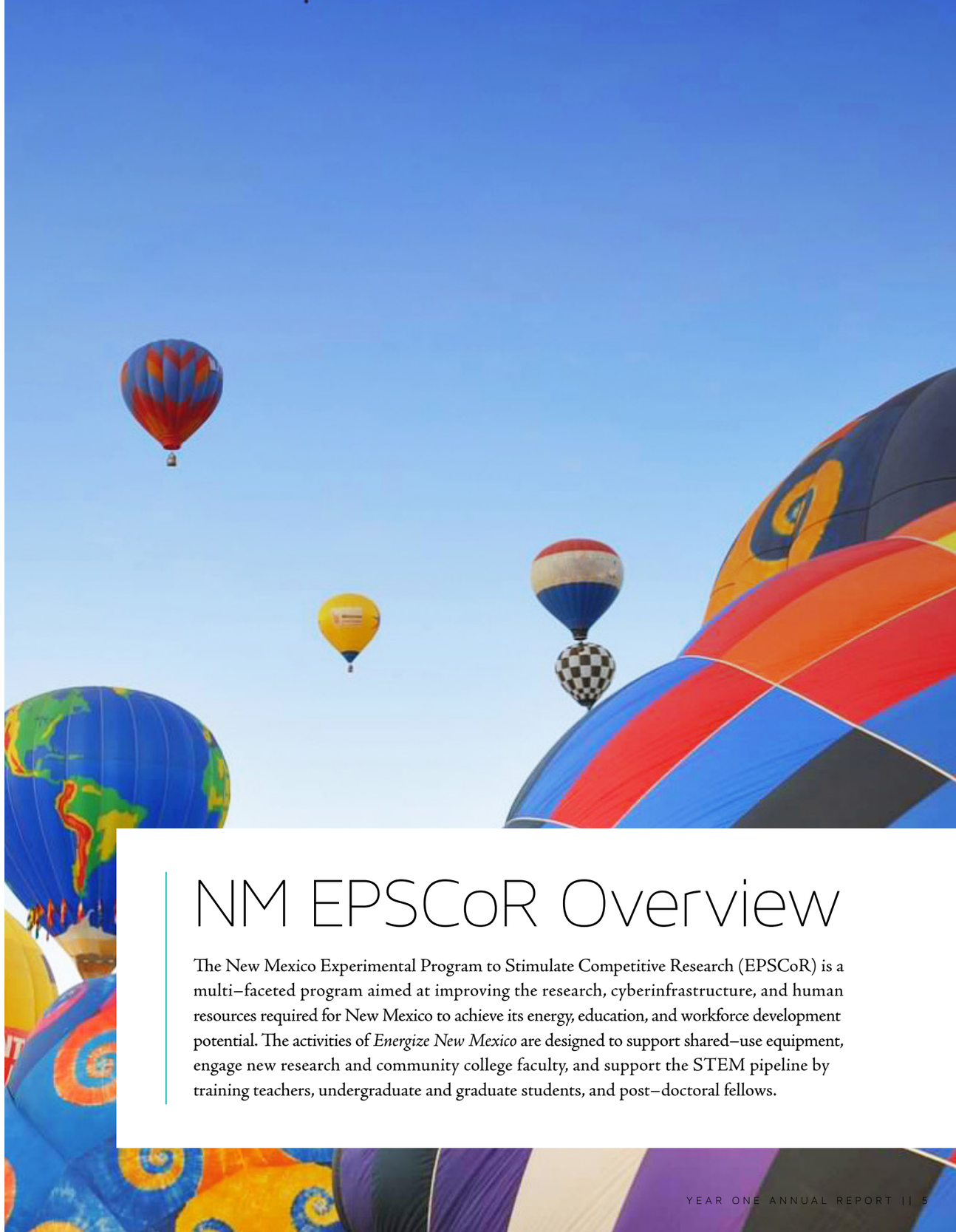


The first year of *Energize New Mexico* has been highly productive and has set the foundation for four more years of research and education efforts that will benefit New Mexico and the nation. We began the year by gathering input from all of the project's components to develop a five–year Strategic Plan that guides our work and provides metrics by which we—and NSF—can measure our progress towards our goals. The body of this report provides information about each of our project's components and their achievements to date.

In Year one, we hired needed personnel, including new faculty hires, graduate research assistants, technicians and post docs. By the end of Year 1, *Energize New Mexico* had 121 participants, representing 14 institutions and organizations. We emphasize inter–institutional and inter–disciplinary collaboration; individual researchers working in isolation cannot solve the research challenges facing us. We also recognize that we need to include and engage the wide diversity of New Mexicans—at all educational levels and from all corners of the state—in STEM in order to have the workforce and academic capability necessary for New Mexico to prosper and lead the nation in sustainable energy research.

As we move into the second year of our project, we will continue the work that has begun and foster new synergies between the project's various components. I am confident that by working together, we will realize our vision of *leading the nation in harnessing and promoting sustainable energy resources, cultivating a well–qualified STEM workforce, and developing a sustainable culture of innovation and entrepreneurship.*

—Dr. Bill Michener
Director of New Mexico EPSCoR



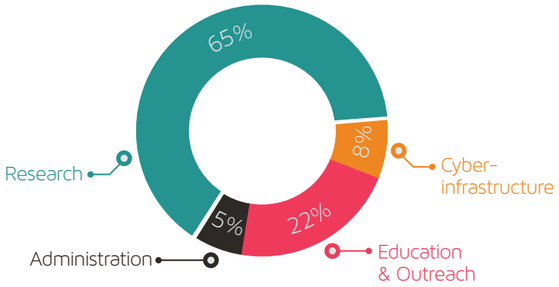
NM EPSCoR Overview

The New Mexico Experimental Program to Stimulate Competitive Research (EPSCoR) is a multi–faceted program aimed at improving the research, cyberinfrastructure, and human resources required for New Mexico to achieve its energy, education, and workforce development potential. The activities of *Energize New Mexico* are designed to support shared–use equipment, engage new research and community college faculty, and support the STEM pipeline by training teachers, undergraduate and graduate students, and post–doctoral fellows.

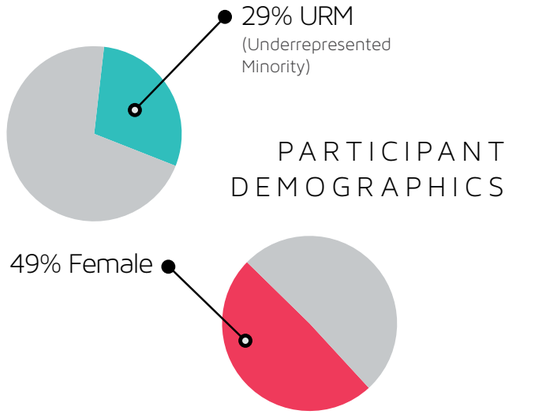
YEAR 1: JUNE 2013—MAY 2014

Year 1 of *Energize New Mexico* began on June 1, 2013 and officially ended May 31, 2014. In that time, the brand–new project found its feet by investing in new equipment for participating universities, hiring new faculty and students, reaching rural and native communities through outreach and education, and partnering with local organizations to foster collaborations. Inter–institution and inter–disciplinary collaboration is essential if research is to be productive, so team co–leads established team meetings as a norm to keep the project moving forward.

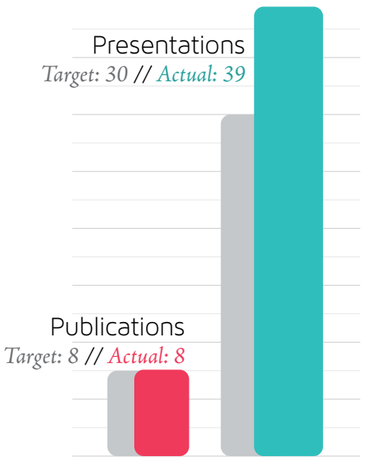
ENERGIZE NEW MEXICO FUNDING



PARTICIPANT DEMOGRAPHICS



EXTERNAL ENGAGEMENT

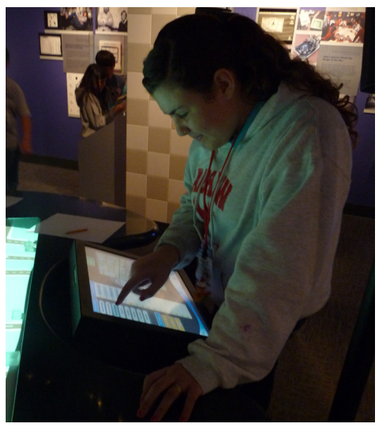


Over 900 individuals were engaged in outreach activities across the state through travel, presentations, and publications.

COMMITMENT TO DIVERSITY

Diversity is a key component of all *Energize New Mexico* program activities. The 5–year target is 50% representation by women and underrepresented minorities in all NM EPSCoR–supported programs. The Diversity Team is made up of nine individuals of different ethnicities and genders from organizations throughout New Mexico, and works to ensure and enhance diversity within NM EPSCoR. Through monthly meetings, the Team created a NM EPSCoR Diversity Strategic Plan and a Faculty/Student Mentor Plan, supported Diversity Innovation Working Groups (IWGs) led by individuals from non–research institutions, and supported all *Energize New Mexico* components in diversity matters.

In Year 1, NM EPSCoR's Diversity Coordinator worked with organizations to gather resources to support diversifying STEM and providing opportunities to underrepresented minorities. A partnership with the Alliance for Minority Participation (AMP) was established; AMP student researchers participated in the NM EPSCoR/NM Academy of Science Joint Annual Meeting, and the co–lead for the Geothermal component is co–PI for an AMP–funded project. In addition, three Diversity IWGs were held in Year 1: *Determining the Drivers of STEM Educational Success in New Mexico* led by José Herrera (Western New Mexico University); *Development of Primary to Bachelor's STEM Education Pathways for Underrepresented Populations of Northern New Mexico Using Sustainable Technologies Curricula* led by Stephen Gomez (Santa Fe Community College) and *Leveraging the after–school community and STEM stakeholders in New Mexico* led by Armelle Casaus (New Mexico Voices for Children).



TOP: NM EPSCoR Diversity Coordinator Chelsea Chee; Credit: http://presencefour.com/

MIDDLE: Enjoying dinner after working hard at a Diversity IWG

BOTTOM TWO: SFI–sponsored field trip for GUTC students to the NM Museum of Natural History and Science

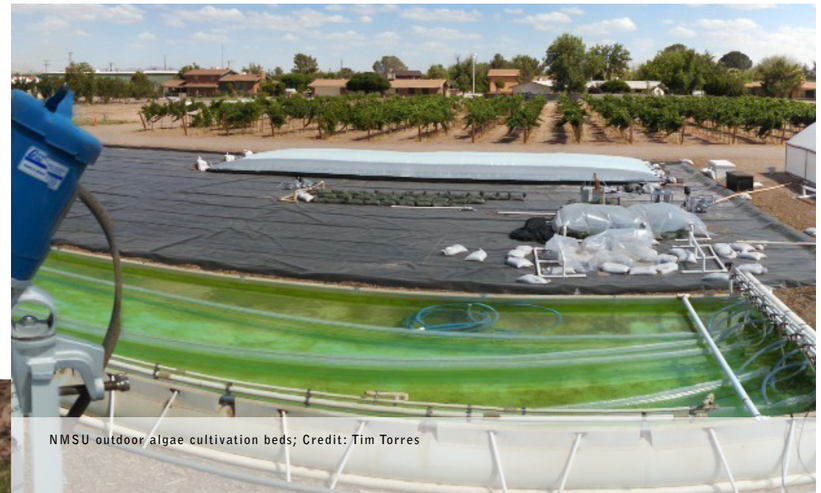
Science

Consider the following question: How can New Mexico realize its energy development potential in a sustainable manner? The six science components in the *Energize New Mexico* project—Bioalgal Energy, Geothermal Energy, Osmotic Power Development, Solar Energy, the Social & Natural Science Nexus, and Uranium Transport & Site Remediation—are working toward achieving their own strategic goals based on sustainability, efficiency, and resource utilization while minimizing risk to water and the environment.

BIOALGAL ENERGY

Bioalgal energy development can play a key role in creating a future that better utilizes alternative fuels and resources. Through *Energize New Mexico*, New Mexico EPSCoR is investing in research aimed at overcoming the challenges of developing algal biomass in a desert environment where water is precious. Faculty and students from Eastern New Mexico University (ENMU), New Mexico State University (NMSU), the University of New Mexico (UNM), and Santa Fe Community College (SFCC), as well as colleagues from the New Mexico Consortium (NMC), are working together to develop bioalgal energy as a sustainable, economically viable component of a renewable energy portfolio in New Mexico.

In Year 1, an algal turf scrubber was installed at ENMU to study the use of dairy effluent to grow algae. The scrubber acts as a filter, removing chemicals from wastewater while allowing sunlight to support the growth of algae. NMSU conducted outdoor summer growth tests for a heat-tolerant alga from volcanic hot springs, *Galdieria sulphuraria* at the Fabian Garcia Science center in Las Cruces outdoor testbed. *Chlorella sorokiniana*, a more temperate strain was grown in outdoor, closed cultivation systems during February-May, 2014. Publications based on initial research added to our knowledge about the composition of biofuels produced from algal biomass, nutrient removal rates by *G. sulphuraria*, and development of molecular markers in outdoor photobioreactor systems. UNM purchased and installed instrumentation to serve as the core of a Small-scale Experimental Ecological Design (SEED) facility. Researchers at UNM successfully encapsulated algae in both silica gels and alginate as part of a process to increase algae productivity. Santa Fe Community College was awarded a $50,000 Infrastructure Seed Award for instrumentation that will improve their ability to monitor algal growth in their college's industrial-scale bioreactors and provide additional research experiences for their students.



NMSU outdoor algae cultivation beds; Credit: Tim Torres

USING ALGAE TO CLEAN URBAN WASTEWATER

Urban wastewaters are laden with high levels of organic carbon and different forms of nitrogen (N) and phosphorous (P) that must be removed prior to discharge into receiving waters. Although traditional wastewater treatment plants (WWTPs) equipped with secondary treatment meet the discharge standards for organic carbon (BOD), they fall short of meeting the discharge standards for nutrients.

The Bioalgal Component Team at NMSU conducted a study that proposes a potentially energy-positive WWTP process specifically intended for warm-to-hot, arid regions such as New Mexico. The study presents the nutrient removal ability of an algal extremophile, *Galdieria sulphuraria*, with a broad genetic capacity for organic carbon utilization. Both laboratory assessment of nutrient removal capability and outdoor cultivation results are presented in the full study.

The team involved concluded that *G. sulphuraria* can be cultivated in primary effluent to achieve high nutrient removal efficiencies and at removal rates comparable to other strains. *G. sulphuraria* is especially useful because it can thrive in extreme conditions, including an acidic environment with temperatures up to 56°C, conditions that many competitors, predators, viruses, and pathogens cannot tolerate. These results bode well for further optimization of the overall system to reduce the footprint of an algae-based wastewater treatment system.

Dr. Peter Lammers; Credit: NMSU

Masson Farms Geothermal Greenhouses in Radium Springs, New Mexico

GEOTHERMAL ENERGY

New Mexico is ranked 6th in the nation for geothermal potential. *Energize New Mexico* is helping the state realize its geothermal power development potential through research that establishes a new understanding of the geologic and tectonic controls on the plumbing and longevity of geothermal systems as well as the practical and environmental limitations involved with geothermal energy development. The project also emphasizes workforce training in geothermal exploration and sustainability at all academic levels.

The Geothermal team (UNM and NMT) traveled across the state in Year 1 to several geo–thermal systems including systems in Truth or Consequences, the Socorro Magma Body, and the Jemez Mountains, with several others planned. Team members not only assessed the energy potential of each system, they also examined the water quality effects of geothermal outflows as well as the sustainability of geothermal development and its impact on the environment, local aquifers, communities, and the local economy. The team performed hydrochemical sampling for selected wells and natural groundwater springs.

To build infrastructure for creating the most accurate 3D and cross–sectional models of these geothermal systems, NM EPSCoR funded a Magnetotelluric (MT) System, the first of its kind in New Mexico. The equipment was purchased and delivered in Year 1, with training and initial field deployments anticipated in Year 2.

Team members also created a geothermal database based mostly on existing data and modeling (http://geothermal.nmt.edu). New collaborative efforts are underway with members of the Cyberinfrastructure component of *Energize New Mexico* to develop real and accessible data products that are open access and readily usable by other scientists. Year 1 resulted in significant expansion of the Geothermal team to include industry and National Lab partners, collaborations with geothermal exploration companies (ORMAT, James Witcher & Associates) and new UNM academic partners, and recruitment of graduate and undergraduate students, including women and minorities.

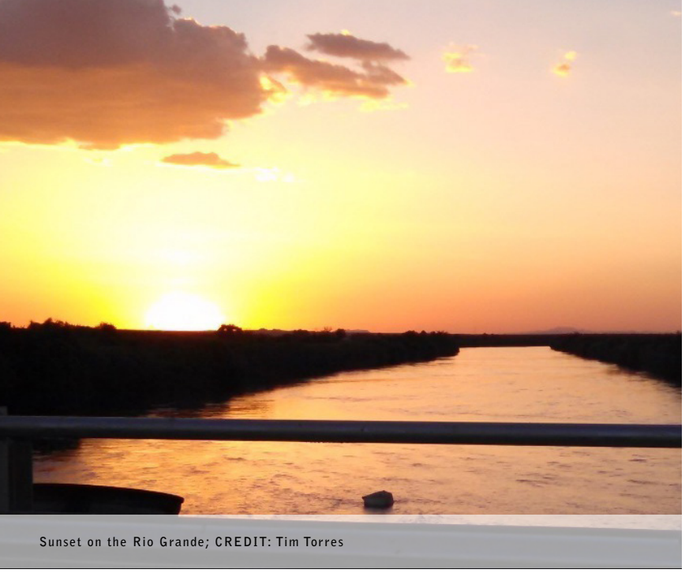
LEFT TO RIGHT: Mark Person and Shari Kelley measure salinity of geothermal wastewater; Sampling in Truth or Consequences, New Mexico; Component co–lead Laura Crossey takes a sample directly from the Soda Dam hot spring in Jemez Springs, NM.

OSMOTIC POWER

Oil and gas production generates billions of gallons of water, with New Mexico alone generating about 28 billion gallons of produced water annually—22 billion gallons from the oil–rich Permian Basin in the southeastern corner of the state. Much of the water contains very high concentrations of molecular inorganic and organic matter, called total dissolved solids (TDS), and often is discarded as wastewater. However, the Osmotic Power Development component team of *Energize New Mexico* are trying to remedy this problem through a process called pressure retarded osmosis (PRO), which uses the dissolved solids to generate clean energy, thereby offsetting both the disposal costs and the carbon footprint of the oil and gas industry.

Team members identified an oil field in the Permian Basin near Eunice, NM as a test site for produced water, and collected samples through collaboration with the Apache Corporation. Visits to the site helped the team understand basic practices in the oil fields. Students and faculty also began designing and building equipment for the PRO system. NMT and New Mexico Highlands University (NMHU) team members are collaborating with ENMU, NMSU, LANL, and SNL on the fabrication of hollow–fiber membranes that withstand a higher trans–membrane pressure and increase efficiency of the process. The process for creating the hollow–fiber membrane is unique among research universities in New Mexico, and results will have positive impacts on research across a multitude of disciplines.

CLOCKWISE FROM TOP: Gun barrel for oil-water-solid separation; Heater treater tank for gas-oil-water separation; Oil drilling outside Artesia, NM; Members of the Osmotic Power team examine a possible test site for produced water experimentation.

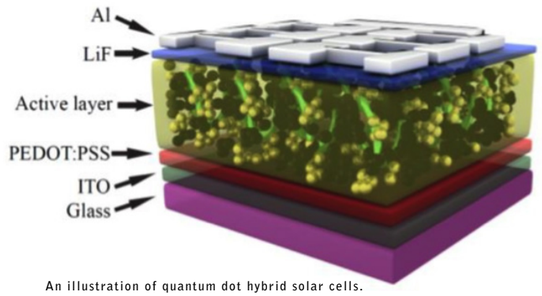


Sunset on the Rio Grande; CREDIT: Tim Torres

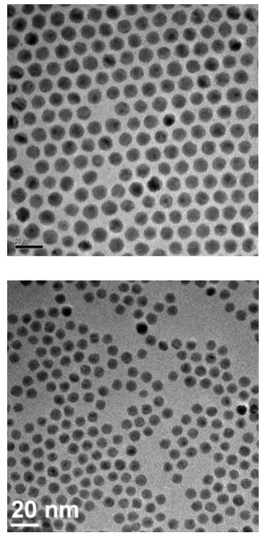
SOLAR ENERGY

With 300+ days of sunshine a year, New Mexico is prime real estate for solar energy research. The Solar Energy Research component of *Energize New Mexico* focuses mostly on team collaborative projects that utilize spectroscopic methods to understand systems in which electrons have absorbed energy, known as excited state processes. The team, with members from UNM, NMSU, NMT, and NMHU plans to contribute to the design of more efficient organic solar photovoltaic cells, and explore solar energy potential for creating alternative fuels including the conversion of carbon dioxide (CO_2) to methanol and hydrogen fuel through solar–driven water oxidation.

In Year 1, the team began addressing and experimenting with the use of the nanoparticle Zinc sulfide (ZnS) as the catalyst for the reduction of atmospheric CO_2. The team has published recent work detailing how to modify excited state lifetimes in a controlled manner. This will contribute to a better understanding of how to design new dyes for solar cells and for photonics. New Mexico EPSCoR funded a Spectroscopic Laboratory featuring a new magnetophoto–luminescence spectrometer that contributed to part of UNM's $16 million renovation of the Chemistry and Chemical Biology department.

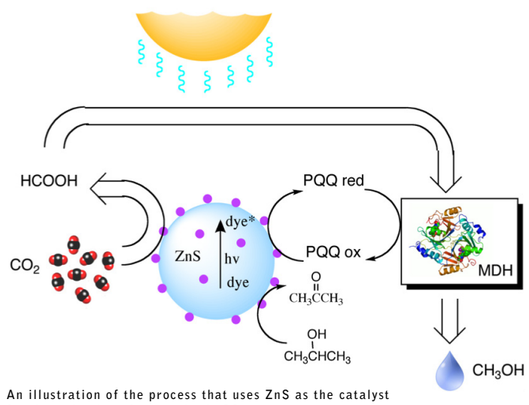


An illustration of quantum dot hybrid solar cells.



Microscopic views of quantum dots, used to increase the efficiency and reduce the cost of photovoltaic cells. TOP: CdSe quantum dots; BOTTOM: PbSe/CdSe

Overall Catalytic Pathway of CO_2 to Methanol



An illustration of the process that uses ZnS as the catalyst for the reduction of atmospheric CO_2.

The SN² Component Team at the 2014 Annual Meeting.

SOCIAL & NATURAL SCIENCE NEXUS

Energy industries are important to the economy of New Mexico, yet energy development is often constrained by environmental impacts and water resources. In order to determine the best options for energy development, powerful and integrative modeling tools are needed. These tools are used to evaluate energy development and source viability in light of water, environment, and socioeconomic considerations and concerns.

The Social & Natural Science Nexus (SN^2) component team is creating innovative ways of using a systems dynamics (SD) modeling framework and detailed environment, water, energy and socioeconomic budgets. SD models increase understanding of the behavior of many complex systems over time—complex systems like the interaction of water, the environment, energy and people—and deal with internal feedback loops that can affect the behavior of the entire system.

Creating a useful model based on complex data is often difficult, so the team spent most of Year 1 laying the basic groundwork for the project, including identifying data sources for human, energy, infrastructure and regulatory data, as well as identifying major data holes. An experimental economics lab at UNM for data analysis is nearing completion.

Because New Mexico has long been without a comprehensive water budget, the SN^2 team hosted a workshop to start developing a state–wide working water budget. Scientists, experts, managers, and government representatives from around the state attended. This budget will eventually be included in the final model.

Outreach is also extremely important to the SN^2 component. Reaching out to state agencies, policymakers, and stakeholders will eventually lead to a collaborative working group that can address challenges requiring a new, interdisci–plinary approach.

RESEARCHING URANIUM IN WATER

BY KAREN WENTWORTH, UNM

José M. Cerrato, a new NM EPSCoR faculty hire in the UNM Department of Civil Engineering, has a smile that lights up a room when he talks about his work.

"I feel blessed to have this job because it is not merely technically teaching a subject," he says. "It is impacting people's lives."

At UNM he is a member of a team of researchers from New Mexico Tech and UNM working on the *Energize New Mexico* grant to identify strategies for the development of long–term energy resources in New Mexico. The Uranium Transport and Site Remediation team is looking carefully at how uranium moves in the environment.

Cerrato will be working in the lab to understand how uranium moves at the interface of soil and water. The team is particularly interested in exploring how bacteria might be used to change ura–nium (VI) into uranium (IV) and whether uranium (IV) can be stabilized so it does not move freely in the environment.

"The question we have as engineers is how do we know that this uranium (IV) is going to be stable for a long time," Cerrato said.

Initial results are expected to be released in the next year and a half.

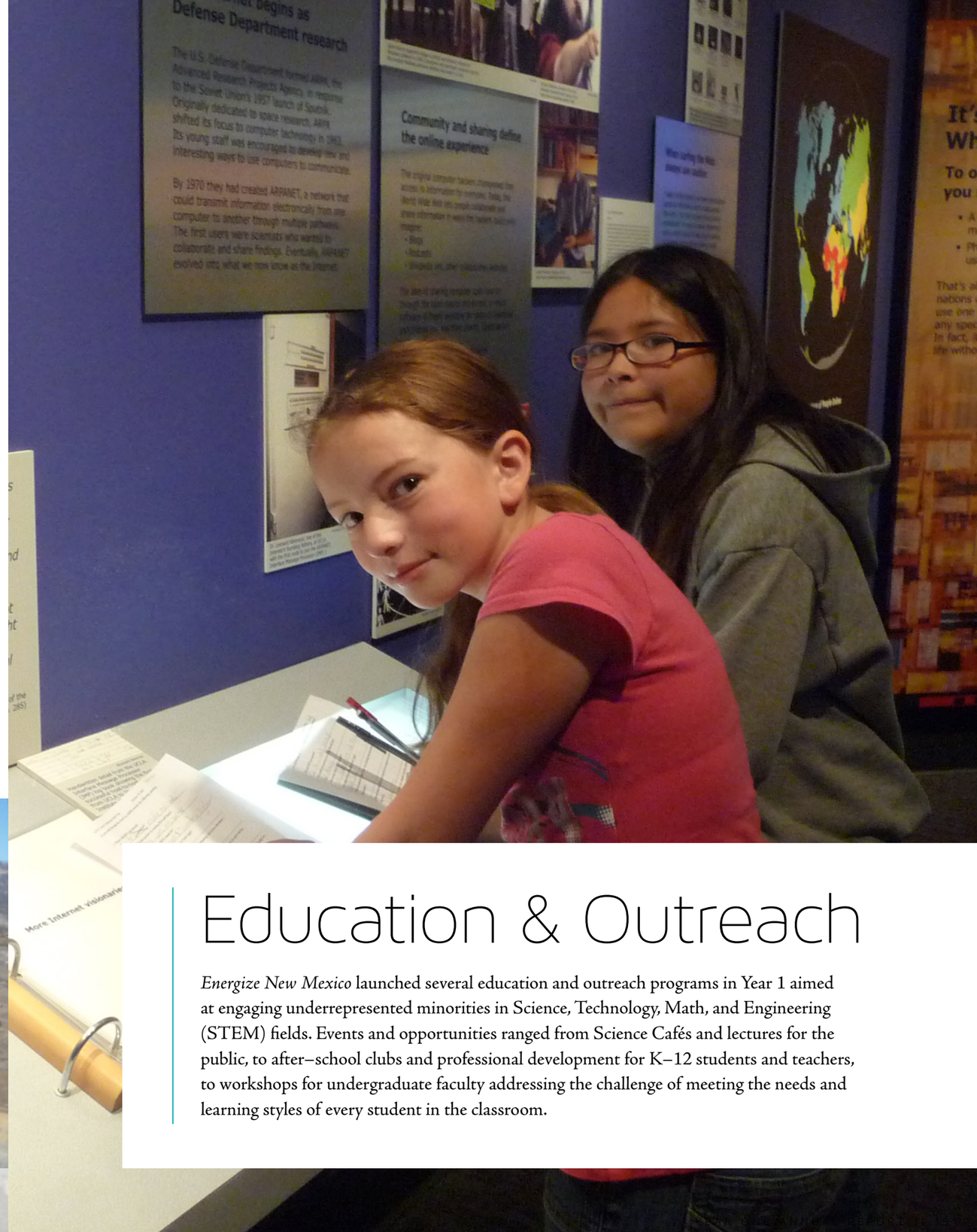
URANIUM TRANSPORT & SITE REMEDIATION

Until 1979, New Mexico produced 50% of the country's supply of uranium. Nuclear power may cut down on carbon emissions, but sustainable use of the state's abundant uranium resources will depend on developing methods for extraction, processing, and remediation that do not leave behind a legacy of contamination harmful to water, ecosystem or human health. Western New Mexico is home to several uranium mines, including a few on the Navajo Nation and Laguna Pueblo.

Energize New Mexico focuses on the lack of information and under–standing about how uranium reacts and interacts with the environment, as well as the biogeochemisty and mobility of uranium molecules. The Uranium Transport & Site Remediation team is focused on the mobility of uranium in groundwater and arid environments, if uranium can be quickly extracted without long–term contamination, and new options on how to restore a contaminated aquifer while preventing further harm to the groundwater.

In Year 1, the team met several times with representatives of the New Mexico Environment Department to identify uranium contamination sites as possible research locations. A database of New Mexico uranium mining and processing sites was collected and imported into a geographic information system (GIS) to help in selecting the sites with the most potential. Work with the Navajo Nation and other Native communities is ongoing.

The Jackpile Uranium mine from above. This mine is located in Laguna Pueblo about 40 miles west of Albuquerque in Cibola County, NM, in an area of canyons and arroyos to the east of the village of Paguate.



Education & Outreach

Energize New Mexico launched several education and outreach programs in Year 1 aimed at engaging underrepresented minorities in Science, Technology, Math, and Engineering (STEM) fields. Events and opportunities ranged from Science Cafés and lectures for the public, to after–school clubs and professional development for K–12 students and teachers, to workshops for undergraduate faculty addressing the challenge of meeting the needs and learning styles of every student in the classroom.

FACULTY LEADERSHIP AND PROFESSIONAL DEVELOPMENT

The Faculty Leadership and Professional Development Institute (FLPDI), led by SFCC, brings together STEM faculty from New Mexico community and Tribal colleges and non–research universities in order to improve undergraduate STEM instruction for diverse student populations.

Each year, faculty from undergraduate schools participate in a one–day workshop, followed by online training. Faculty acquire research–based pedagogical tools for today's adult learners and strategies for recruiting and retaining underrep–resented students in STEM fields. Participants will create an online community of colleagues involved in professional development and research.

In addition, NM EPSCoR research faculty work with participating community college faculty to identify research projects that can be scaled to a community or Tribal college to build the colleges' capacity to offer authentic research experiences for their students.

The FLPDI meeting in September 2013, at which 16 participants from 9 undergraduate institutions attended, focused on Micromessaging to Reach and Teach Every Student™ from the National Alliance for Partnerships in Equity (NAPE). Based on research across multiple disciplines, the interactive day–long workshop provided a professional learning community of peers, as well as access to equity experts. The focus was to translate research into practice for STEM educators through active learning, small– and large–group activities, reflection journal prompts, and scenario–based learning. Under–graduate faculty learned how to transform their classrooms to meet the learning needs and styles of every student. Three community college faculty members were selected to participate in the STEM Faculty Summer Research Professional Development Program. They will be developing research implementation plans to bring data–intensive research opportunities to their campuses.

GROWING UP THINKING COMPUTATIONALLY

Growing Up Thinking Computationally (GUTC) has a very specific strategic priority: to increase student access to and engagement in STEM education and research in K–12. Activities such as teacher professional development workshops and after–school clubs expose participants to and engage them in the use of computational models for scientific inquiry and research, thereby addressing workforce preparation issues.

In Year 1, GUTC provided after–school clubs, day classes that integrate the full GUTC curricular units, and courses offered at the Supercomputing Challenge Kickoff Conference in Fall 2013. Overall, of the 332 students participating in GUTC activities, 74% were from historically underrepresented groups in STEM and computing, 46% were female, and 26% were socio–economically disadvantaged.

Several GUTC–sponsored special events took place in Year 1. The New Mexico Museum of Natural History and Science hosted the Fall Career Connections Conference in October 2013. GUTC club members heard from several STEM and computer science professionals who use computational modeling and simulation in their work, visited the "Start Up" exhibit, and took part in a whole group participatory simulation on water resources. The Fall Roundtable took place in December 2013 at SFCC; club members demonstrated their projects and shared ideas before an audience of STEM professionals, facilitators, family members, and fellow students in a symposium setting.

GUTC also offered summer, fall and spring professional development workshops for teachers; these workshops helped teachers bring STEM to their classrooms and after–school clubs. 83% of participants were female and 25% were underrepresented minorities.

GUTC club members tour the "Start Up" exhibit at the NM Museum of Natural History and Science.

GUTC BRINGS STEM TO K–12 TEACHERS

With funding from NM EPSCoR, GUTC offered a summer professional develop–ment workshop for teachers and after school clubs for middle school students on August 1st through 4th 2013, just prior to the beginning of the school year. GUTC implemented two systematic approaches to STEM education:

1. Inspire public school students to stay engaged in school through applying cutting–edge technology tools to study community issues during after school hours; and
2. Prepare teachers to serve as after–school club leaders and to integrate computational modeling into their STEM classes.

GUTC prepared the teachers for Compu–tational Thinking and Computer Science content within the GUTC curriculum and for the first six weeks of club meetings.

These teacher professional development workshops exposed participants to and engaged them in the use of computational models for scientific inquiry and research. Teacher participants were able to imple–ment what they learned in GUTC club meetings over 13 weeks at 12 school sites. Student participants in the clubs were introduced to STEM or computing content by these teachers, as well as given hands–on and computational modeling activities.

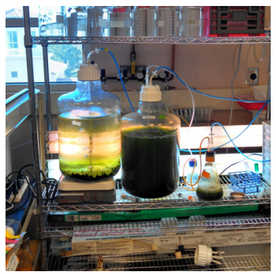
Teachers participate in a computational modeling workshop provided by NM EPSCoR & GUTC.

INFORMAL SCIENCE & EDUCATION NETWORK (NM ISE Net)

In order to communicate current research to the public, NM EPSCoR is working with a network of museums across the state. In late 2012, participants in an EPSCoR Innovation Working Group (IWG) formed the New Mexico Informal Science and Education Network (NM ISE Net) to provide opportunities and resources for informal educators to work together to impact science teaching, science learning, and science awareness throughout New Mexico. During the course of the grant, *Energize New Mexico* will fund new exhibits at the New Mexico Museum of Natural History and Science, ¡Explora! Science Center and Children's Museum, and the National Museum of Nuclear Science and History. These three museums are located in Albuquerque, but NM ISE Net participants stretch from Farmington to Lea County.

NM ISE Net acquired additional funding in Year 1 through the National Center for Science and Civic Engagement (award #DRL–123743) that will enable it to exceed the goals originally proposed in the Strategic Plan. The group has met several times with researchers to learn about their work for NM EPSCoR, and to begin formulating ways to share this cutting–edge science with public school teachers and public audiences.

MORE ACTIVITIES FROM EDUCATION AND OUTREACH



New Mexico STEM Advancement Program

The New Mexico STEM Advancement Program (STEMAP) provides summer research experience with EPSCoR researchers to students from New Mexico undergraduate institutions. Eleven students from 7 institutions were selected as the first cohort; their program begins June 2014. Their research areas are:

- Encapsulating Living Cells for Biofuel & Bioproducts
- Visualizing Function in Live Cells for Bioenergy Applications
- Assessing Uranium Contamination on the Navajo Reservation
- Solar Energy Research: Always an Excited State!
- Algae for Energy: Algal Cultivation and Extraction Research

STEMAP will also support these students through the following academic year, providing additional opportunities to build their skills in STEM research and communication.

Institute for Creative & Cultural Entrepreneurship

The Institute for Creative and Cultural Entrepreneurship (ICCE) focused on creating its own market analysis and strategic plan in Year 1. This led to the identification of a market opportunity to create a creative entrepreneurship accelerator. Toward this end, ICCE attracted a core of 22 mentors/visiting faculty (including Brian Hardgroove and Patricia Michaels, pictured left) who will work with participating entrepreneurs and serve as lecturers, while a marketing plan was developed to continue to attract more mentors and faculty. ICCE also created a pool of investors to guide entrepreneurs in their financing.

The entrepreneurship accelerator, named Creative–Startups, will launch in Year 2, and the first cohort is planned for fall 2014. Plans for several "thinking like an entrepreneur" workshops for faculty researchers are in development.

Cyberinfrastructure

At New Mexico EPSCoR, *Energize New Mexico* is making it easier for scientists, educators, and the public to discover, acquire, and use data. Information from research and learning modules developed and acquired by NM EPSCoR will be cataloged and stored in a data portal for easy access.

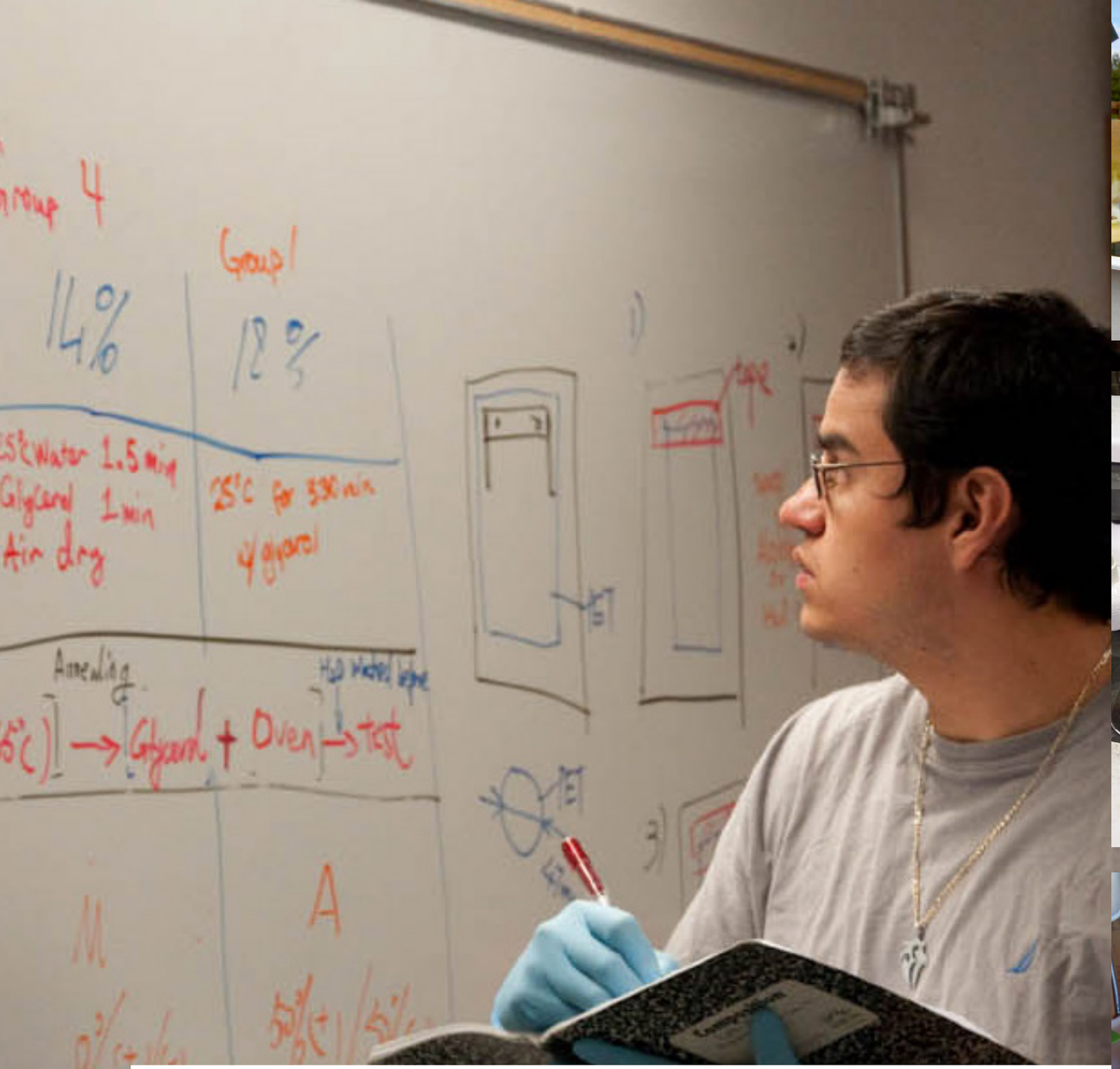
CI: ENABLING COLLABORATION

Cyberinfrastructure (CI) plays a critical role in *Energize New Mexico*, enabling collaboration across project components, and making it easier for scientists, educators and the public to discover and use the data, information, and learning modules developed and acquired by NM EPSCoR. Building upon investments made by previous EPSCoR projects as well as by the State of New Mexico, the CI group has enhanced the underlying data platform managed by UNM's Earth Data Analysis Center (EDAC) so that data are managed more efficiently and can be published through different data services.

Each *Energize New Mexico* component has a CI team liaison to better support research efforts and help them manage and prepare their data for inclusion in the EPSCoR data portal. In Year 1, CI team lead Karl Benedict offered introductory data management training to EPSCoR graduate students; other members of the team will continue to provide data–related training throughout the project. The CI team is also providing access to tools that can support collaboration within and across project teams, an important element for this complex project.

CLOCKWISE FROM TOP: Graduate students participate in an activity at the Student Research Conference; CI component lead Karl Benedict speaks to group to prepare them for another activity to learn data management; Karl examines a computer program with an EPSCoR graduate student.

CLOCKWISE FROM TOP LEFT: Graduate students participate in an activity at the Student Research Conference at NM Tech; Stock tank and recovery unit in Southeastern New Mexico used by the Osmotic Power team; GUTC student participants smile before the Fall Career Connections Conference at the NM Museum of Natural History & Science; Students listen to Axel Hungerbuehler from the Mesalands Museum explain how the jaw of a T-Rex works at the 2014 All Hands Meeting; Dr. Pete Lammers leads a Science Café about his bioalgal research at the Las Cruces Museum of Natural History; Members of the Osmotic Power team hard at work in the lab; Bioalgal tanks at the SFCC Center for Excellence.



The Future: A Glance at Year 2

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DISCLAIMER

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