CBBG

Center for Bio-mediated & Bio-inspired Geotechnics

Newsletter ▪ Spring 2016 ▪ Volume 2

As I See It: View from the Director's Chair

As the CBBG ERC moves into its second half-year of operations, our momentum continues to build. The first mid-year meeting of the Center, held at ASU on April 4 and 5, was the first opportunity for many Center participants, including guests and advisory board members, to see the impressive breadth of CBBG activities. The meeting included presentations on the 21 research projects that constitute CBBG's initial portfolio of projects, on our education, outreach, and diversity initiatives, and on facility developments at ASU and Georgia Tech. PDF files of these presentations will be posted to a "Members Only" web page once the newly renovated CBBG web site is live. In the interim, these presentations have been made available to Center members through a Drop Box.

Group meetings during the two-day event included the Student Leadership Council, the Science Advisory Board, and, for the first time, our internal Science Policy Board and Industrial Practitioner Advisory Board. Particularly fruitful, from my perspective, were the ad hoc working group meetings on the afternoon of the second day, when investigators from the four partner Universities working on related subjects (e.g., microbial ecology) got together, along with interested representatives of our industrial partners, to exchange notes and ideas and make plans to collaborate.

Edward Kavazanjian, Jr., Ph.D., P.E., D.Ge, NAE
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Breakout sessions at CBBG mid-year meeting

The CBBG Innovation, Diversity, and Education & Outreach Activities (IDEA) working group is busy making plans for our first set of summer programs, including a Research Experience for Teachers (RET) program, a Research Experience for Undergraduates (REU) program, and a Young Scholars program. In the RET program, 8 greater Phoenix area K-Community College teachers will spend 5 weeks at ASU working in our laboratories to develop biogeotechnical-oriented lesson plans that they will take back to their classrooms in the fall. Under the Young Scholars program, 8 ASU-area high school students will work alongside CBBG researchers for 5 weeks this summer.

The REU program is for undergraduate students who are not from any of the four CBBG partner universities. We had a tremendous response to our solicitation for candidates, receiving over 130 applications for eight summer slots, and are currently applying to NSF for additional funds, so we can support additional students in this program. These students will spend their first week together (with the teachers and Young Scholars) at ASU and then, in pairs of two, will spend seven additional weeks at one of the four CBBG partner universities. The IDEA team is also working on an initiative to engage Native American students from New Mexico and Arizona in CBBG educational programs.

Upcoming events

May 31-July 1, 2016
Research Experiences for Teachers (RET) and Young Scholars Program
Arizona State University

May 31-July 22, 2016
Research Experiences for Undergraduates (REU)
All partner universities

July 18-22, 2016
Sustainable Engineering Workshop for Middle School Teachers
University of California, Davis

July 25-29, 2016
Girls Saving World through Engineering Day Camp
University of California, Davis

August 1, 2016
Project Center Closes for Grant Year

September 21, 2016
CBBG Annual Report Due to NSF

October 25, 2016
CBBG Rehearsal Day for NSF Site Visit

October 26-27, 2016
NSF Site Visit to CBBG

Research Highlights

Forbes Recognizes UC, Davis as Best Value for STEM Women

Forbes named the University of California, Davis as the No. 1 college in the nation for launching women into STEM professions. Forbes said of UCD's ranking, "the University of California, Davis came in at No. 1 on our list of best value colleges for women in STEM, with 56 percent female enrollment and 29 percent of the student body specializing in STEM." Congratulations to UCD for this outstanding achievement!

For more information, please go to:

Forbes Article: http://www.forbes.com/sites/nataliesportelli/2016/03/29/13-best-value-stem-colleges-for-women/#3eb512745245

Davis Enterprise article (featuring UC Davis): http://www.davisenterprise.com/local-news/ucd/forbes-says-uc-davis-is-best-value-for-stem-women/

Tree Pullout Exploratory Test at UC, Davis

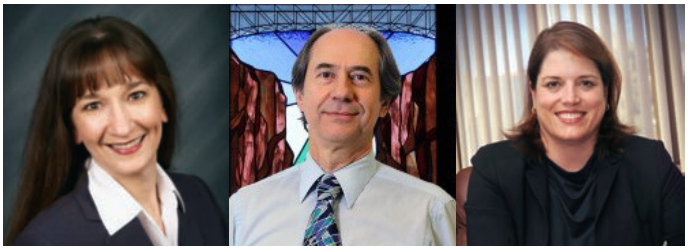
Matthew Burrall, Dan Wilson, Tom Kohnke, Anatoliy Ganchenko, Charles Graddy, Mike Gomez, Alexandra San Pablo, Gabby Hernandez, Max Rossiter, Theodore DeJong, Astrid Volder, faculty, graduate students, undergraduate students, and staff from the Center for Geotechnical Modeling and from Plant Sciences worked together in the first of a planned series of tree pullout tests. Matthew Burrall was the lead.

CGM staff aided greatly with test setup and implementation. Graduate students and faculty made observations and took photographs. Analysis of the obtained data is supplemented with a 3D model of the extracted root system, which was produced using photogrammetry.

Pictured on the left (top to bottom):

- Extracted root system after partial removal of soil
- Forklift view
- Root extraction in progress
- Top of peach tree root system

New Mexico State University wins NSF S-STEM Program Award



CBBG faculty members at New Mexico State University recently were awarded a five-year grant totaling $1 million from the NSF S-STEM program. Dr. Paola Bandini (Civil Engineering, CBBG Co-PI) is the principal investigator (PI), Dr. Lambis Papelis (Civil Engineering) and Dr. Martha Mitchell (Associate Dean and Chemical Engineering, CBBG Diversity Director) are among the co-PIs of the grant.

The project will support a cohort of twenty (20) academically-talented students, who demonstrate financial need, with the S-STEM Scholarship and the Cohort Academic and Research Experience (CARE), including individualized self-assessment and monitoring, academic success workshops, one-on-one relationships with faculty mentors, and training to increase self-efficacy, metacognitive self-awareness and self-study skills. The Project also will collaborate with existing programs and services—including the New Mexico AMP Program, Student Success Center, the Office of Career Services, and the Math Success Center—to further enhance students' educational experiences and professional preparation.

Leon A. van Paassen to Join ASU, CBBG

Leon A. van Paassen will be joining ASU and the Center for Bio-mediated and Bio-inspired Geotechnics (CBBG) Engineering Research Center (ERC) as Associate Professor in the School for Sustainable Engineering and the Built Environment (SSEBE) in January 2017.

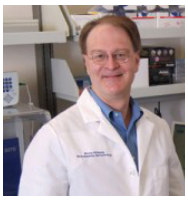
Dr. van Paassen has been working on bio-mediated improvement of the physical properties of soil since his Ph.D. work at Delft University of Technology on sustainable ground improvement by microbially-induced carbonate precipitation (MICP). van Paassen's work in this area includes MICP via both hydrolysis of urea (the subject of his Ph.D. thesis) and dissimilatory reduction of nitrogen. He was principal investigator for one of the first field trials of MICP. His current research on sustainable bio-based methods in geotechnical engineering also includes using plants to sequester carbon dioxide in soil, improve slope stability and erosion resistance, and accelerate drainage in land reclamation and tailings dewatering.

van Paassen is a member of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), the International Society for Rock Mechanics (ISRM), and the International Association of Engineering Geologists (IAEG). He is the recipient of the ISSMGE Young Member Award.

Awards and Recognition

Ximin He, Assistant Professor of Materials Science and Engineering in the School for Engineering of Matter, Transport and Energy, in the Ira A. Fulton Schools of Engineering at ASU, has received a prestigious Air Force Young Investigator Award for her project, "Bio-inspired Artificial Homeostatic Multifunctional Material Microsystems (AHM3) Based on Self-sustaining Structures." This award is a significant recognition of her creativity and track record of the early stages of her career.

Narayanan Neithalath, Associate Professor in the School of Sustainable Engineering and the Built Environment, in the Ira A. Fulton Schools of Engineering at ASY, was awarded the 2016 ASCE Walter C. Huber Award "For research and dissemination of fundamental microstructure-property studies on sustainable cementitious materials thereby facilitating rational performance-based design, culminating in practical applications." The selection committee particularly noted his research efforts that chart novel paths to ensure materials-related sustainability.



Bruce Rittmann, Director of the Center for Environmental Biotechnolgy in the Biodesign Institute at ASU, accepted the 2016 Gordon Maskew Fair Award from the American Academy of Environmental Engineers and Scientists at their April 14th ceremony at the National Press Club in Washington DC. The award is given for Bruce's "substantial contribution to the status of the profession by exemplary professional conduct, recognized achievements in the practice of environmental engineering and science, and significant contributions to improvement of the quality of the world's environment."

R. Kerry Rowe, Professor of Civil Engineering at Queen's University and member of CBBG Science Advisory Board, was elected as a Foreign Member to National Academy of Engineering.

Delia Saenz, Professor of Psychology at ASU and CBBG Diversity Lead at ASU, won the Faculty Women's Association's 2016 Outstanding Faculty Mentor Award. This award recognizes faculty members who have demonstrated outstanding mentorship to students and/or to other faculty members, particularly women and other underrepresented groups.

Wilhelmina Savenye, Professor of Educational Technology in the Division of Educational Leadership and Innovation in the Mary Lou Fulton Teachers College at ASU, was selected to be one of 12 faculty making up the Inaugural Class of ASU Provost's Teaching Award, 2015-2016.

CBBG Graduating Students Spring/Summer 2016

Daniel Franco, MSCE, Civil Engineering (Geotechnical), New Mexico State University

Deviyani Gurung, MSCE, Civil & Environmental Engineering, University of California, Davis

Angel Gutierrez, Ph.D., Civil, Environmental & Sustainable Engineering, Arizona State University

Lorenzo Martinez, BSCE, Civil Engineering, New Mexico State University

Sean O'Donnell, Ph.D., Civil, Environmental & Sustainable Engineering, Arizona State University

CBBG Moves into Its New Digs

On Friday, April 1st, the CBBG team at ASU moved into their newly-renovated space on the first floor of the Goldwater Center for Science and Engineering. While this was perhaps not the best time to move, considering the mid-year meeting started Monday, April 4th, everyone was excited about the wonderful new space we now occupy, more than 4,614 square feet.

Our new space includes fully mediated conference and training rooms, with state of the art video conferencing and distance learning capabilities. However, some of us are still adjusting to the idea that, in this digital age, modern offices do not require many bookshelves.

Please stop by and visit us if you happen to be in the greater Phoenix area. Our new address and contact information is as follows:

Center for Bio-mediated and Bio-inspired Geotechnics (CBBG)
School of Sustainable Engineering and the Built Environment (SSEBE)
Arizona State University
P.O. Box 873005
650 E. Tyler Mall
Tempe, Arizona 85287-3005

Office: 480-965-2489
Fax: 480-965-0977

Web Site: biogeotechnics.org

Education & Outreach

DiscoverE Day

The CBBG Innovation, Diversity, Education, and Outreach Activities (IDEA) working group hosted its very first major public event on February 12, 2016, and it was a rousing success. CBBG hosted a large booth at the ASU Fulton School of Engineering DiscoverE Day. In this program, 1500 third through eighth grade students came to the ASU Tempe campus. Of these, 466 young people experienced interactive demos given by the CBBG "Dream Team" graduate students, aided by some volunteers from the Teachers College. These young students learned about Soil Liquefaction and Surficial Soil Stabilization by doing hands-on activities guided by the graduate students.

Night of the Open Door

On February 27, 2016, CBBG hosted a booth at the Night of the Open Door event on ASU's Tempe Campus. The public was invited to a "behind-the-scenes" look at the innovative projects happening across the campus, including our very own CBBG! There were 662 engaged visitors who participated in demonstrations, hands-on activities, videos, and discussions on biogeotechnics. Adults and children enjoyed a hands-on experiment using hydrogels; the shaking sieve demonstration; building sand castles; and discussing soil properties.

Professional Learning Library (PLL)

Jean Larson, Willi Savenye and Anna Reed attended Learning Resource training conducted by Rick Baker, Melissa McGehee, and Gloria Minnihan in January. They learned aspects of how to use and train teachers on the PLL, the cyber-platform to be used by CBBG for building Professional Learning Networks among teachers, students, and all members of the CBBG.

Design Thinking

Willi Savenye and Jean Larson attended Learning, Literacies and Technologies Ph.D. Student, Krissy Elwood's Design Thinking presentation at the Mary Lou Fulton Teachers College Summit, which will be included in the CBBG summer programs.

Community Helpers

Kindergarteners at Archway Classical Academy Scottsdale learned about the field of biogeotechnical engineering on April 14, 2016, when Dr. Jean Larson (right) gave a brief presentation and demonstration for their Community Helpers unit.

CBBG and Interdisciplinary Research

Affiliated PhD student, Anna Reed (left) presented a poster on her leadership research being conducted with CBBG, at a welcome session for new PhD students at the Mary Lou Fulton Teachers College.

American Indian Science and Engineering Society (AISES), Region 3 Conference

With thanks to the recommendation from Dr. Otakuye Conroy-Ben, ASU Civil Engineering Professor, CBBG hosted a Career and College booth at the AISES Region 3 conference, March 11-12 in Farmington, New Mexico. We met over 30 young Native American high-school and college students, along with their teachers, families, and mentors. Many students were interested in the CBBG Young Scholar and Research Experience for Undergraduates programs. Of note is that the high school students at Navajo Preparatory School asked their principal, Mrs. Betty O'Jay, and their teachers if they could host the conference and apparently were the first high school to do so!

Navajo Trails Task Force

Dr. Ed Kavazanjian met with the Navajo Trails Task Force at the Navajo Nation Museum (www.navajonationmuseum.org/), in Window Rock, Arizona on March 4, 2016. He was accompanied by Education Director, Willi Savenye, and CBBG friend and colleague, Dr. Victor Begay, Academic Community Liaison Director for the ASU Mary Lou Fulton Teachers College. The meeting discussed partnership projects as well as possible ways that the CBBG education and outreach group may collaborate with teachers and community leaders of the Navajo Nation.

Phoenix Indian Center Visits CBBG

On March 16, 2016, a group of 15 Native American high school students from the Phoenix Indian Center's Youth College and Career Readiness Program visited the CBBG labs on the ASU Tempe campus. The morning started with a wonderful introduction to the center by Director, Ed Kavazanjian. The expert panel (Drs. Zapata, Conroy-Ben, and Hamdan, and PhD students, Miriam and Angel) then shared stories of how they decided to study engineering and encouraged the youth to pursue studies and further research at the university. After the panel discussion, the group was given engaging tours of the Geotech Lab, Swette Center for Environmental Biotechnology Lab, and the Microbial Ecology and Evolution Lab. Some of the students became so interested in the research that they applied for the CBBG Youth Scholar Summer Program!

American Indian Initiatives

Annabell Bowen (Director, Office of American Indian Initiatives), Sahmie Joshevama (Student Liaison, Office of American Indian Initiatives), and Jean Larson met to discuss collaboration on initiatives to engage Native American Students in the CBBG.

American Indian/Indigenous Teacher Education Conference (AIITEC)

Nasser Hamdan, Jean Larson and Jon Reyhner (Professor of Bilingual Multicultural Education at NAU) met (by phone) to discuss CBBG involvement in the upcoming AIITEC conference.

CBBG Attends Phoenix Indian Center Silver and Turquoise Ball

Dr. Nasser Hamdan, CBBG Industry Liaison Officer, and his wife, Dr. Abeer Hamdan, attended the 33rd Annual Silver & Turquoise Ball signature fundraiser event held at the gorgeous Scottsdale Resort in McCormick Ranch, and sponsored by the Phoenix Indian Center, a CBBG educational partner

The event featured an outdoor silent auction, followed by a live auction after dinner in the luxurious main dining room. Guests enjoyed a delicious three-course dinner reflecting the unique tastes of American Indian cuisine prepared by American Indian Chef Freddie Bitsoie.

Guests were treated to traditional and modern cultural entertainment. A main highlight of the evening was the American Indian dancers adorned in brightly colored and intricate American Indian garb, who skillfully displayed their traditional dances on separate stages simultaneously to immerse the audience in the evening's cultural experience.

The most impressive aspect of the Silver & Turquoise Ball was the Phoenix Indian Center youth attending this event. These elegantly dressed high school age students served as hosts and greeters throughout the evening. They exhibited exceptional enthusiasm and sincerity that added to this wonderful experience. These youth are incredible indicators of the work that the Phoenix Indian Center undertakes in its mission to serve the American Indian community.

Industrial Engagement

Companies are welcome to join the CBBG ERC industrial consortium. The membership program provides benefits, including access to the Center's researchers and facilities, a seat on the Industry Advisory Board, advanced access to technology, and early access to intellectual property. For more information about this program, please contact Nasser Hamdan, CBBG Industrial Liaison Officer, at nasser.hamdan@asu.edu or (480) 965-2277.

Education and Outreach Activities at UC, Davis

Doug Nelson, Professor of Biology at UC, Davis gave an invited plenary talk about bio-cementation at the Northern California American Society for Microbiology Annual Meeting in San Francisco, California on March 16, 2016.

Michael Gomez, CBBG Student Leadership Council President and UC, Davis Scholar, attended the Geotechnical and Structural Engineering Congress 2016 this past February in Phoenix, Arizona, and presented on a recent large-scale MICP experiment completed at UC Davis. The presentation, "Large-Scale Bio-cementation Improvement of Sands," focused on results from geophysical and biogeochemical monitoring and geotechnical improvement assessment using cone penetration testing.

Michael Gomez also was one of five graduate students participating on panel on March 9, 2016, to an upper-division undergraduate class (ECI 190). He discussed his pathway to graduate school and unique opportunities through CBBG (e.g., networking with industry).

In a roundtable discussion on March 31, 2016, Michael Gomez, Charles Graddy, Matthew Burrall, Gabby Hernandez, Alexandra San Pablo, and others presented their research to industry and government professionals.

Colleen Bronner, Professor of Civil and Environmental Engineering at UC, Davis gave an interactive talk at the Region ABJ Conference for the Society of Women Engineers in February 2016 on strategies to develop outreach that uses ladder-mentoring to recruit and motivate female engineers. The talk focused on CBBG outreach activities occurring or planned at UCD.

On March 12, 2016, Professor Bronner discussed challenges engineering students face (with an emphasis on female students) and strategies to help overcome those challenges to parents attending an outreach event for high school girls. Approximately 15 parents participated. Jillian Walke (a senior civil engineering student and president of UC Davis EWB) sat on student panel to answer questions raised by these parents. Afterwards, Professor Bronner and Ms. Walke participated in a mentoring lunch with high school girls and their parents.

Professor Bronner made a presentation on April 13, 2016, to small group of students on research opportunities through CBBG and CGM and the research culture in the UC Davis Geotechnical Engineering Group that develops the whole engineer (emphasis on research, professional development, and outreach).

During the Spring 2016 semester, Colleen Bronner along with Diane Moug, Jaclyn Bronner, Alex Sturm, Max Rossiter, Hannah Currey, Jeanette Newmiller, Andreas Gavras engaged graduate students to design and test educational modules for use in undergraduate education and K-12 outreach.

UC, Davis faculty, graduate students, and undergraduate students participated in an outreach activity on Picnic Day on April 17, 2016. Children and adults participated in four hands-on activities: make your own earthquake; surveying a watershed for topographic map development; retrofitting buildings for earthquakes; and analyzing buildings for different types of earthquakes. The event attracted 365 participants, including 174 children.

UC, Davis to Host Two K-12 Events on Campus This Summer:

Sustainable Engineering Workshop for Middle School Teachers runs from July 18th to July 22nd, and is geared toward 6th, 7th, and 8th grade teachers of science and/or math. At the workshop, the teachers will learn to develop classroom lessons based on geotechnical and environmental engineering applications and aligned with Next Generation Science Standards. This includes surveying & topographical maps; assessing variability and uncertainty in soils; and designing for earthquakes.

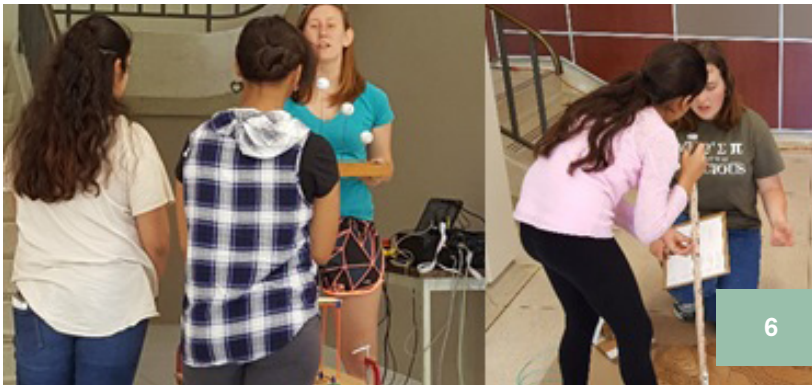
This group will discuss strategies to help girls overcome barriers to engineering, and will participate in follow-up activities for the 2016-2017 school year by collaborating with an engineering graduate student or faculty partner to refine "sustainable engineering" lessons; and bringing classes on UC Davis field trips for hands-on activities, presentations and tours.

Registration is open at http://www.eventbrite.com/e/sustainable-engineering-workshop-for-middle-school-teachers-tickets-24762409032

Girls Saving the World through Engineering (Day Camp) runs from July 25th through July 29th, and is geared towards girls entering 3rd, 4th, and 5th grades. At this camp, the girls will learn how geotechnical and environmental engineers design sustainable projects to protect public infrastructure through hands-on activities and design competitions (managing watersheds; assessing variability and uncertainty in soils; and designing for earthquakes.

The girls will discover the innovative ideas imagined when civil engineers work with biologists and use nature to inspire design (designing buildings inspired by trees, and using microorganisms to help stabilize and/or treat soils), and will discuss strategies to help girls overcome barriers to engineering careers (maintaining self-confidence in middle school and high school; exploring different pathways to becoming an engineer who helps save the world).

Registration for this camp is available at http://www.eventbrite.com/e/girls-saving-the-world-through-engineering-day-camp-tickets-24789427846



CBBG Joins Vertically Integrated Projects

Arizona State University (ASU) is a new member of the approximately 20-University VIP (Vertically Integrated Projects) Consortium (http://www.vip.gatech.edu/2015-consortium-launch). The VIP program enables undergraduate students to get involved early (i.e., in freshman or sophomore years) in large ongoing research projects as part of a project team. Students stay with the project throughout their undergraduate career, taking on progressively more challenging tasks, earning academic or honors credits, and mentoring newer participants in the VIP program. Georgia Tech has been participating in the VIP program for over a decade and enthusiastically recommended it to ASU. ASU will participate in the VIP program beginning next year with bio-mediated and bio-inspired design as one of its VIP themes. The program will allow the participating undergraduates to gain an in-depth understanding of the emerging field of Biogeotechnics, get ready to contribute to it in the workplace, or to advance to graduate.

Under the VIP program, participating students will be exposed to the multi-disciplinary research nature of the CBBG. The program will be open to students from all of the various disciplines engaged in CBBG research. VIP program participants will gain hands-on experience in CBBG laboratories and engage in engineering analysis of practical applications of this technology and lifecycle sustainability analysis of the technology benefits. ASU VIP students in Civil, Environmental, and Sustainable Engineering (CESE), and possibly in other engineering schools at ASU at the discretion of their academic program director, will be eligible to use their CBBG experience to satisfy the project requirement of the CESE Capstone course. The CBBG VIP team is now recruiting a diverse group of innovative and entrepreneurial students attracted by the interdependence between societal wellbeing, the engineered infrastructure, and the natural world; and inspired by the inherent interdisciplinary nature of bio-geotechnical engineering solutions. Interested students can enroll or seek further information by contacting Dr. Jean Larson at jean.larson@asu.edu and by visiting the following website: https://prime.asu.edu/node/57

New Partnerships for Education, Outreach, Diversity and Innovation

The CBBG team members are happy to have extended our partnerships these past few months with some wonderful people and organizations.

For Student Veterans - CBBG representatives met with Mr. Steve Borden, Director of the Pat Tillman Veterans Center at ASU on February 1, 2016. Mr. Borden generously offered to spread the word about CBBG activities and programs not only to ASU student veterans, but also to other veterans' centers at other universities. He also recommended CBBG seek a point of contact for veterans. Mr. Marcus Denetdale, an advisor for the Engineering schools, and a veteran, volunteered to be the point of contact.

Center for Gender Equity in Science and Technology (CGEST) - CBBG Education and Outreach staff met with Dr. Gabriel Escontrias, CGEST Manager, to discuss possible collaborations between our centers. CBBG members subsequently attended the CGEST Launch event in January, hosted by their Director, Dr. Kimberly Scott.

Looking Ahead...CBBG Summer Programs

The call for innovative, sustainability-minded undergraduates, K-12 and community college teachers, and high school students to participate in CBBG summer programs (RET, REU, YSP) answered with 189 incredibly diverse, experienced, and impressive applicants for the CBBG summer programs! The Selection Committee is currently reviewing all application materials and plans to inform participants by the end of the month.

K-12 Outreach Plans for New Mexico State University

Recognizing the importance of engaging students in real STEM activities, New Mexico State University (NMSU) is developing a comprehensive outreach plan for K-12. By converting the CBBG research into age appropriate lessons, students can be excited about learning. As part of this program, NMSU will be introducing students to the engineers who are actually working on the topics they are researching. These plans also will foster pride in the community because students will understand that CBBG research benefits everyone, and that there are people in the research community dedicated to preserving the earth as well as finding better ways to live on the planet. Students love and understand relevance, and studies show many students drop out of school because they find no relevance in the classes. Therefore, it is imperative that K-12 STEM curricula reflects work they can understand and are excited about.

The New Mexico State University plan involves eight steps:

- meeting with CBBG researchers to get a complete understanding of their vision for biogeotechnics and their research activities
- visiting the researchers' lab facilities
- developing age appropriate lessons that reflects the ongoing research for 6th–8th grade students
- meeting with 6th–8th grade teachers for input on the lessons
- sending lessons to researchers for approval to make sure they capture the essence of the research
- implementing these lessons in an afterschool program
- implementing the lessons within the school day
- having the lessons available on the CBBG web site for teachers across the nation to use

There are five major CBBG research areas at New Mexico State University. In layman's terms, these areas are described as: understanding how the root systems of plants and trees stabilize soil; cleaning contaminated groundwater using a mineral mined only in NM; understanding how worms move through the ground and dig tunnels; developing new types of fertilizers, and preserving adobe structures. The goal of this outreach plan is to prepare lessons in modules that reflect these areas of research.

While NMSU takes the time to develop these modules in conjunction with the NMSU STEM Outreach Center, CBBG engineers will be guest speakers at Family Festivals at which NMSU brings the families of after-school STEM students together to work on projects and to listen to speakers that keep them informed about what is happening in the world of STEM.

The NMSU Outreach Center also hosts workshops for K-12 teachers throughout southern NM. CBBG engineers and their graduate students will participate some of the workshops, providing demonstrations of CBBG technologies. Field trips to the CBBG laboratories will also be offered for students, teachers, and community members who desire a deeper understanding of CBBG research.

Diversity

CBBG Attends AccessERC Capacity Building Workshop

Drs. Willi Savenye, Education Director, Delia Saenz, Diversity Lead for ASU, and Martha Mitchell, Diversity Director, attended an AccessERC Capacity Building workshop from February 23-26, 2016.

The University of Washington NSF-funded AccessERC project, is focused on increasing the participation of people with disabilities in Engineering Research Centers. The workshop included sessions on: universal design, including course materials and classroom and laboratory facilities; accessibility of websites; how to recruit and support persons with disabilities in research; and universal design of Engineering Research Centers.

There was a student panel where the panelists provided their perspectives on the experiences they have had as people with disabilities. The website for the project, which contains links to very helpful information about accessibility, is http://www.washington.edu/doit/programs/accesserc . The website includes many resources and videos. Some of particular interest are:

1. Equal Access: University Design of your Engineering Research Center (ERC): http://www.washington.edu/doit/equal-access-universal-design-your-engineering-research-center-erc
2. Working Together: Faculty and Students with Disabilities: http://www.washington.edu/doit/working-together-faculty-and-students-disabilities
3. Equal Access: Universal Design of Engineering Labs http://www.washington.edu/doit/equal-access-universal-design-engineering-labs

There are also many videos developed by the DO-IT program at the University of Washington. Here are two of particular interest:

1. Equal Access: Universal Design of an Academic Department: http://www.washington.edu/doit/videos/index.php?vid=65
2. Invisible Disabilities and Postsecondary Education: http://www.washington.edu/doit/videos/index.php?vid=36

Faculty Women of Color Caucus

CBBG Diversity Lead for ASU and Professor of Psychology, Dr. Delia Saenz, moderated an informative and exciting Diversity dialogue on February 18, 2016. At this session, ASU President Michael M. Crow spoke about the role of inclusion as a central tenet of the ASU Charter, and discussed the environment of innovation that drives ASU's success as the New American University.

ASU has one of the most diverse campus communities in the nation, and a robust set of community engagement initiatives. Other panelists who explored inclusion at ASU included: Ray Anderson, Vice President for University Athletics; Bryan Brayboy, President's Professor and Director; Edmundo Hidalgo, Vice President for Outreach Partnerships; and Colleen Jennings-Roggensack, Assistant Vice President of Cultural Affairs.

Recent Webinars

Geotechnical Centrifuge Modeling Seminar

Dr. Dan Wilson, Associate Director, Center for Geotechnical Modeling, presented a seminar on Friday, April 8, 2016, to introduce centrifuge modeling concepts and equipment capabilities, present examples of recent projects and outcomes, and explore ideas for applications within CBBG.

Conversation About Inclusive Excellence

Clifton McNish, Director of the Upward Bound Program in Counseling and Educational Psychology at New Mexico State University, presented a webinar on Thursday, April 28, 2016, to create a discusson and foster a greater understanding in creating a climate of inclusion.

Partner Universities

How does nature do it?

Nature has developed elegant, efficient and sustainable biologically-based solutions to many challenges that vex geotechnical infrastructure systems. Examples include ant excavation processes that are 1000 times more energy efficient than man-made tunneling machines, carbonate cemented sand that is exceptionally resistant to erosion and earthquakes, and self-sensing and self-healing tree root structures that are 10 times more efficient than any mechanical soil reinforcing/foundation system yet devised.

The NSF Engineering Center for Bio-mediated and Bio-inspired Geotechnics (CBBG) will focus on ecologically friendly, cost-effective solutions, inspired by nature, for development and rehabilitation of resilient and sustainable civil infrastructure systems. It will serve as a nexus for two transformative trends in engineering: biologically-based design and sustainability.

CBBG is a National Science Foundation (NSF) Engineering Research Center funded in 2015 under cooperative agreement EEC-1449501, and headquartered at Arizona State University.

biogeotechnics.org

IRA A. FULTON SCHOOLS OF engineering
ARIZONA STATE UNIVERSITY