Satellite images keep tabs on fall foliage

Senior scientist Xiaoyang Zhang of the Geospatial Sciences Center of Excellence and a colleague from the National Oceanic and Atmospheric Administration developed a method to monitor and predict changes in leaf coloration using satellite imagery.

Catching the fall foliage at its peak in the United States just became a little easier, thanks to the work of senior scientist Xiaoyang Zhang of the Geospatial Sciences Center of Excellence at SDSU.

He and research scientist Yunyue “Bob” Yu of the National Oceanic and Atmospheric Administration (NOAA) developed a method to monitor and predict changes in leaf coloration using satellite imagery. The first images were posted Oct. 15.

Previously, fall foliage information was based on field observations, Zhang said. “We are the first to use satellite imagery to observe the fall colors and make predictions.” The information is updated every three days using data from the Visiible Infrared Imager Radiometric Suite on the Suomi National Polar-orbiting Partnership satellite launched in October 2011.

This research is part of a larger effort to document how a changing climate affects the timing of the vegetation seasons across the world using environmental satellite data, according Zhang. The work, which began in July 2013, is supported by a three-year NOAA grant for nearly $348,000.

This research can help farmers time planting by predicting spring green-up and monitoring when drought may occur, Zhang said. It can also help foresters detect forest changes, including disease outbreaks from forest pests.

Zhang and his colleague plan to expand their online monitoring system and increase the spatial resolution and geographic coverage of the images. “We will extend this work globally with a pixel size of 500 meters,” Zhang said.

This visual image of the changing seasons may help the public gain a greater understanding of year-by-year foliage changes that might over time give them a wider view of climate change, Zhang pointed out.

Maps at http://www.star.nesdis.noaa.gov/star/news2014_201410_FallFoliage.php show the current foliage status and predict what will happen in 10 days.
SDSU has been named 11th among four-year schools by Military Times in its Best for Vets: Colleges 2015 rankings.

In their fifth year, the rankings factor in the most comprehensive school-by-school assessment of veteran and military students’ success rates.

As with all Best for Vets rankings, Best for Vets: Colleges 2015 is an editorially independent news project that evaluates the many factors that make an organization a good fit for service members, military veterans and their families.

The survey-based Best for Vets: Colleges doesn’t manipulate mainstream research to skew more “veteran.”

The detailed survey requires schools to meticulously document a tremendous array of services, special rules, accommodations and financial incentives offered to military and veteran students and to describe many aspects of veteran culture on a campus.

“We factor in what is, to our knowledge, the most detailed school-by-school data on veteran students’ academic success anywhere, including graduation, retention, persistence and course completion rates,” said Amanda Miller, editor of Best for Vets.

Two years ago, only 11 percent of the hundreds of schools surveyed could provide that level of detail. This year, that figure is up to 45 percent. “By recognizing only the schools that do the most, we believe we’re helping to raise the bar in veteran student services.”

For the full Best for Vets: Colleges 2015 rankings, go to: www.militarytimes.com/bestforvets-colleges2015.

Best for Vets: Colleges 2015 is published by Gannett Government Media. Its digital platforms and newsgroups are a trusted source for independent news and information for service members and their families, reporting on topics and issues important to their lives.

To learn more, visit www.militarytimes.com.

Contribute to IMPACT State

Is there something or someone in your college, department or unit that our colleagues should know about? Is a long-time employee retiring? Has someone received an award or published a book? Is there a story that should be told?

Send us a note at sdnews@sdstate.edu with the information, and we’ll consider it for publication in an upcoming issue.

American Indian, low-income students get college jump-start

South Dakota faces the challenge of helping American Indian, low-income students succeed in college.

With $3.6 million in federal funds, SDSU along with the state’s five other public universities and a tribal college plan to generate momentum for these students through the South Dakota Jump Start program.

The goal is to serve 900 South Dakota students through Jump Start, which is a program with the overarching goal of propelling students through the critical years of postsecondary education.

Jump Start identified obstacles students face when considering college. For example, the program plans to work with American Indian students’ fear of culture shock, lack of mentorship, fear of alienation, financial hardship and fear of leaving home.

The first step, and a key component of the Jump Start program, will involve access advisers visiting and working within South Dakota high schools.

Two access advisers, employed by the South Dakota Board of Regents, will work within 50 South Dakota high schools with high numbers of American Indian and low-income students. They will also work with students in need of support outside the target schools.

Access advisers are not recruiters. “Oasis,” in part, depicts a splash created by a falling water droplet. According to Wallace, this is meant to represent the rippling effects of the South Dakota Museum throughout the region, as well as the impact an individual can make in society. The sculpture, which took two years of design and creation, was cast in Sioux Falls.

Though he has created seven other large-scale pieces for other public university campuses, “Oasis” is Wallace’s first creation, was cast in Sioux Falls.

“Oasis,” as seen from the art museum.

It has been an amazing process to witness, from the beginning conversations to the completion and installation. We want to thank Lynn and Diane Anderson for their generosity and vision.

The Andersons, formerly of Brookings and Sioux Falls, commissioned “Oasis” to be the centerpiece of the Anderson Plaza, a space dedicated in 2010 in memory of their daughter, Brooke Kristine Anderson, and to honor those who donate their time to volunteer at the art museum.

“We are so grateful for the opportunity to finish the Anderson Plaza with this incredible sculpture,” said Lynn Verschoor, director of the museum.

“The idea is to keep students connected with campus during the summer, and help them build momentum for their upcoming school year,” said Laurie Nichols, provost and vice president for academic affairs at SDSU. “We want students to form tight learning communities and friends over the summer so they have that support throughout the school year.”

The grant provides each student with an allowance to buy books, computers or class materials.

Each campus will hire a full-time retention adviser to support students on a personal and educational level throughout their college career. These advisers will serve as support systems for the students, talking them through and helping them with any personal issues,” said Nichols. “This is an important part of the program that will likely show student success.”

At SDSU, students will have access to the Oyate Yuwitaya Tipi Inclusive Learning and Cultural Community, where they can live and connect with Native and non-Native students.

Connection with tribal college

Jump Start will break new ground by bringing together state Board of Regents universities and the tribal college, Oglala Lakota College, located on the Pine Ridge Indian Reservation.

“OLC has retained a long-standing relationship with SDSU,” said Thomas Shortbull, OLC president.

Since 1988, State has maintained academic collaborations with OLC, including credit transfer agreements, transfer student experiential learning, faculty exchanges and the Prairie Ph.D. Program.

“The grant will help address issues of access and support for underrepresented students in our rural state and reservation-based schools,” said Shortbull. “It will also assist in strengthening this collaboration with our state university systems to better serve and support the underrepresented students in our rural state and reservation based schools.”
Students

Usry, Mann take charge of University College reading program

The passion Nikki Mann and Laura Usry have for the remedial reading program within University College is contagious. Both individuals are in their first year with the Read 041 class and have made strides despite working with students for only several weeks.

Mann, who previously taught in the Department of English, and Usry, who is in her first year at State, know reading is more than just sitting down with a fiction or nonfiction book. One of the strategies they use to help the students become active learners is the SQ3R (survey, question, read, recite and review) approach.

“When students get here, they hear reading and think of reading as English, literature and fiction—that’s what they’re familiar with in high school,” Usry said. Usry and Mann said that thought process gets students in trouble as they have to switch to reading pages upon pages of informational text, which needs to be approached differently.

“We try to grab them early and help them decipher text,” Usry said. “We teach them strategies—pull details, scan, look for main ideas and have some organization—and apply them to their coursework. The skills have been the focus of our activities.”

Despite only having the classes for several weeks, Mann said the feedback she has received has been positive. Mann said that information, organize it so it makes sense and pull only the information you need for studying purposes, you’re going to retain more than 90 percent,” Mann said. “That’s because you’re rewriting it, reorganizing it, employing mnemonic devices and you’re required to apply the learning strategies to help you retain it.”

American Indian, low-income students get college jump-start

Students

continued from page 3

country applied for the First in the World grant, and South Dakota was one of 24 to receive funding. Administered by the U.S. Department of Education’s Fund for the Improvement of Postsecondary Education, the grant program awarded institutions with innovative, affordable programs aimed at student success.

The four-year grant went live the first week of October.

Marysz Rames, vice present for student affairs at SDSU and interim president at DSU serves as co-principal investigator, alongside Provost Nichols. The project director is Rhoda Smith, who served as vice president for student affairs at Northern State University for 10 years.

Under the authority of the South Dakota Board of Regents, SDSU is partnering with Black Hills State University, Dakota State University, Northern State University, Oglala Lakota College, South Dakota School of Mines & Technology and the University of South Dakota.

“We feel very fortunate to have received funding,” said Nichols. “We want to make sure we support students throughout their education, keep them engaged in the college experience and send them into the workforce prepared.”

Architecture students discuss the Kansas Mall design project with community leaders in Huron.

State student architects tackle Huron mall design project

SDSU architecture students are redesigning and building a passageway and seating area outside the Kansas Mall in Huron as part of a studio course and partnership with the city.

The project is part of an annual community commitment the Department of Architecture established in 2012. Students received experience working on projects they could see in their future careers.

Working on the project are 17 sophomore architecture students enrolled in a 5-credit hour course, taught by Brian Rex, professor and head of the Department of Architecture, and assistant professor Federico Garcia Lammers.

The architecture department is in its fifth year using grant funding from four Sioux Falls firms—Arch Inc., Koch Hazard, Perspective, TSP Inc.—and a four-year grant through the Gage Brothers Concrete Products of Sioux Falls and National Pre-cast Concrete Institute of Chicago.

The first community the department worked with was Mobridge in 2013. Next fall, they will work with the Webster community, followed by Volga.

The Kansas Mall links Huron’s main street and a public parking lot heavily used by movie theater patrons and downtown workers, visitors and shoppers. The 4,000 square foot project site has a 25-foot wide facade that goes back 165 feet to the alley to link to the parking.

The students are working with the Huron community to design a series of spaces to pass through and engage on the site. “We’ve been focusing on highlighting some of the historical buildings nearby and adjacent to the site while making a place that will be both a passage and destination for activities downtown,” Rex said.

“We’ve no longer solely focusing on space and how to shape it. The project generates new challenges relating to structural arrangement,” said Levi Wager, an architecture major from Sioux Falls.

“Through this course, I hope to gain a better grasp of the whole relationship in architectural design.”
Honors students will be better prepared to tackle some of today’s biggest challenges, thanks to a new grant from the United States Department of Agriculture.

The Van D. and Barbara B. Fishback Honors College received a three-year grant to create new courses, research projects and internships for students interested in food, agriculture and natural resources.

The USDA National Institute of Food and Agriculture Higher Education Challenge Grants Program awarded $136,500, with $36,125 in matching funds to support the “Meeting the Grand Challenges” project, directed by Fishback Honors College Dean Tim Nichols.

The USDA identified five grand challenges facing today’s society involving food, agriculture and the environment. They are sustainable energy, climate change, hunger and food access, obesity and food safety.

“We are developing educational opportunities around these grand challenges,” said Nichols. He explained the grant will help support a new series of interdisciplinary courses that bring together faculty and students from across the university to learn about these challenges in a systems-based, multidisciplinary way.

The grant will also fund a series of research experiences for students interested in pursuing summer research related to the grand challenges. “SDSU faculty are actively engaged in research around these areas of interest, and a grand grant support will help our students become more involved in this exciting work,” Nichols said.

“The minor allows students to develop leadership skills and make decisions based on best practices while learning facility administration, facility management and design, and marketing. In addition, students will learn how it takes to plan and promote successful events—an area of projected employment growth in South Dakota and throughout the United States. As a result, enrollment is expected to double by the program’s third year. “The minor is open to anyone who might be interested in becoming better at planning events or enter the field of events/facility management,” Jane Hegland, associate dean for the College of Education and Human Sciences and department head of consumer sciences, said. She added students have been asking for this minor or more courses in this field throughout her 14-year career at State.

With the right people in place, the time is right for this new minor. “Experience in this field is applicable to many fields. This minor will allow one to focus on the details that make an event great—details people only notice when things don’t go smoothly,” Hegland said.

Students will receive experience in planning, budgeting, implementing conferences, meetings and other events, as well as develop special events in the public or private sectors. There are 12 required credits that can come from a total of five classes. Of those five classes, only one—Advanced Events and Facilities Administration—is new.

“Students also have six classes as well as an internship opportunity to choose from for electives to complete the 18-credit minor.”

SDSU students comprised more than one-third of the 22,500 students enrolled in a distance education course last year at South Dakota public universities. In a report prepared recently by the South Dakota Board of Regents, South Dakota State had 7,760 students enrolled in distance education courses.

Since 2010, SDSU has increased its online student enrollment by 2,000 additional online students.

“Online learning is remaining strong at SDSU,” Lindsey Hamlin, director of SDSU’s Office of Continuing and Distance Education, said. “That trend is a direct result of the quality and rigor of our student-centered online programs.”

Distance-based students are also successful in their online coursework. “By becoming a student's family away from home, you will be able to give him or her insight into U.S. culture that many international students never get a chance to experience.”

No matter the size of the family, all local community members are invited to participate.

“Think of your student as a new member of your family. Include him or her in informal dinners, holiday celebrations, outings and campus events,” said Kirsten Linke, international student adviser.

Once a friendship family is matched with an international student, the family is asked to connect with the student and engage in activities like picking apples, viewing sports events, cheering on the Jackrabbits at an athletics event, attending a concert, etc. Friendship families are encouraged to include students on everyday activities such as grocery shopping and walking the dog to complete the experience of U.S. culture.

Through this cross-cultural relationship, our hope is that your families and our students will be able to enhance each other’s global perspectives and gain a meaningful, fulfilling and lasting friendship,” said Linke.

Applications are currently being accepted and students can be placed on an ongoing basis. To apply to become a SDSU Friendship Family, visit the Friendship Family Web page or contact the Office of International Affairs at 605-688-4122.
Professors help with Turkish ‘University Within Schools’ program

Two professors in pursuit of strengthening their global perspective headed more than 5,500 miles east from their Brookings home to Istanbul, Turkey.

A yearlong sabbatical, spent in Hande Briddick’s home village, served as an educational and rewarding adventure for her and husband, Chris. The College of Education and Human Sciences associate professors, who teach within SDSU’s Department of Counseling and Human Development, left for Istanbul in August 2013 and returned this July.

Hande, originally from Ankara, was made aware of an opportunity in 2012 regarding teaching in a Turkish university. Upon further discussion, Hande and Chris were invited to teach at Bahcesehir University in Istanbul. As part of their agreement, the professors taught both graduate and undergraduate courses within both the faculties of Educational Sciences and Art and Sciences.

The K-8 is connected with BAU’s “University Within Schools” program, which encourages each faculty member in BAU Educational Sciences to work closely with K-12 schools for continual professional development and skill enhancement.

The professors said their primary task at the K-8 school was helping where it was needed. “We asked the principal how we could assist, and she welcomed us aboard like regular staff members,” said Chris. “It was truly a welcomed adventure within an adventure.”

Hande, in collaboration with Bahcesehir Etiller principal Naime Demirbas and Bahcesehir Kollejleri counseling department chair Ozen Yuzgan, developed Life and Career Skills curriculum for elementary students. American School Counselor Association standards and 21st Century Skills provided perspective in curriculum development.

Among Hande’s other projects were two short curricula on listening skills and friendship for elementary students, prepared in collaboration with school counselors Sibel Peste, Sebnem Zeybek and Ersalantsa Girgin. “The collaboration was critical in offering culturally sensitive and appropriate materials for children,” said Hande.

Chris developed a five-week father’s club discussion group, which brought together fathers of the students to discuss issues concerning their children, campus and the community.

Dean Thorngren visits

College of Education and Human Sciences Dean Jill Thorngren took a five-day trip to Istanbul in March to meet with the faculty and search for collaborative opportunities between the two universities.

“In Turkey, universities immerse the student teachers in the elementary schools and have extended internships, which we are moving toward as well,” said Thorngren. “SDSU and BAU also share a commitment to the 21st Century Skills, which prepare students for globalization, and emphasize teamwork through critical thinking, problem-solving, communication and social responsibility.”

Thorngren said an academic collaboration between SDSU/ and BAU is on the horizon, thanks to the Briddicks’ efforts over the past year. “We worked many, many hours, but the experience was invaluable,” said Hande, who stressed the importance of students and professors taking time to study and work abroad. “We live in the era of an ever increasing global perspective, and it requires us to think and engage on that level.”

Chris and Hande said the experience helped them grow, personally and professionally. The Briddicks recognize the campus support they received across the board at both SDSU and BAU.

“The lessons learned and the informative nature of this experience will resonate with us for years to come,” said Chris. “It was transformative indeed.”

Food science professor receives grant to bring corn co-product to market

Food science professor Padmanaban Krishnan received a four-year grant geared toward getting corn co-products to the market.

With a $576,000 project budget for the Minnesota Corn Growers Association grant, Krishnan will work with the food and ethanol industries with the goal of bringing food-grade dried distiller’s grain (DDG) to the commercial marketplace.

Both industries will need research data on food ingredient quality standards, commercial processing steps, scale-up production and cost-effectiveness. Regulatory aspects of such an ingredient will also be pursued. Much of the research will focus on providing answers to research questions posed by the industry.

Krishnan’s work over the past 20 years laid the pathway for the grant when the concept of DDG use in food received national attention in 2012 and 2013. Following that, the Minnesota Corn Growers Association board of directors invited Krishnan to make a presentation at their meeting. They then invited a proposal from Krishnan.

“There is intrinsic nutritional value in something that is 38 percent protein and 40 percent dietary fiber,” said Krishnan. “Everywhere in the world someone needs protein for nutrition and someone needs dietary fiber for health and disease prevention.”

According to Krishnan, other grant outcomes will include gaining new knowledge on developing low-glucemic index ingredients in diabetic diets, isolation and recovery of high-value nutraceutical substances from corn pigments, high protein supplements for international feeding programs and gluten-free products.

Administators place priority on hiring foreign language instructors and emphasize the study of a second language to be a student’s experience as a means of providing students with a competitive edge for their futures. The Briddicks cited as examples how they school in the community and their son’s preschool setting where both English and Turkish were emphasized across the curriculum and activities. They noted their while their 4-year-old son Sam had received some prior exposure to Turkish language, the educational setting and its approach fostered his proficiency in Turkish within four months.

“DDG is currently priced at $95 per ton. It used to be sold at $269 per pound not too long ago,” Krishnan said. “At the current cost of 5 cents per pound for the raw material, it represents a product that consumers trust and enjoy. “The trick is to add modest amounts in a whole range of foods as opposed to large quantities, added “That is a difficult problem as well.”

“We live in the era of an ever increasing global perspective, and it requires us to think and engage on that level.”

Food science professor Padmanaban Krishnan received a four-year grant geared toward getting corn co-products to the market. With a $576,000 project budget for the Minnesota Corn Growers Association grant, Krishnan will work with the food and ethanol industries with the goal of bringing food-grade dried distiller’s grain (DDG) to the commercial marketplace. Both industries will need research data on food ingredient quality standards, commercial processing steps, scale-up production and cost-effectiveness. Regulatory aspects of such an ingredient will also be pursued. Much of the research will focus on providing answers to research questions posed by the industry. Krishnan’s work over the past 20 years laid the pathway for the grant when the concept of DDG use in food received national attention in 2012 and 2013. Following that, the Minnesota Corn Growers Association board of directors invited Krishnan to make a presentation at their meeting. They then invited a proposal from Krishnan. "There is intrinsic nutritional value in something that is 38 percent protein and 40 percent dietary fiber," said Krishnan. "Everywhere in the world someone needs protein for nutrition and someone needs dietary fiber for health and disease prevention."

According to Krishnan, other grant outcomes will include gaining new knowledge on developing low-glucemic index ingredients in diabetic diets, isolation and recovery of high-value nutraceutical substances from corn pigments, high protein supplements for international feeding programs and gluten-free products. Krishnan’s work is not only in adding health value to baked foods, but also in increasing corn’s economic value to farmers and the marketplace. DDG comes from the ethanol-making process. Currently, one third of the corn bushel, which is 56 pounds, is made into distiller’s grain, one third is made into ethanol, and the other third is released into the air as carbon dioxide. This co-product, CO2, can be trapped and used as a solvent in the processing steps for DDG. Under certain conditions of pressure and temperature, CO2 becomes a powerful solvent. This phenomenon is called supercritical fluid extraction. “Not different than using spritzer or club soda to remove stains from linen,” Krishnan said. "DDG can then be substituted for flour or added into baked goods, tortillas, pizza crust, noodles and more to increase fiber and protein content, while reducing calories. "The trick is to add modest amounts in a whole range of foods as opposed to large quantities, added "That is a difficult problem as well.”

"DDG is currently priced at $95 per ton. It used to be sold at $269 per pound not too long ago,” Krishnan said. “At the current cost of 5 cents per pound for the raw material, it represents a product that consumers trust and enjoy. “The trick is to add modest amounts in a whole range of foods as opposed to large quantities, added "That is a difficult problem as well.”

"DDG is currently priced at $95 per ton. It used to be sold at $269 per pound not too long ago,” Krishnan said. “At the current cost of 5 cents per pound for the raw material, it represents a product that consumers trust and enjoy. “The trick is to add modest amounts in a whole range of foods as opposed to large quantities, added "That is a difficult problem as well.”

"DDG is currently priced at $95 per ton. It used to be sold at $269 per pound not too long ago,” Krishnan said. “At the current cost of 5 cents per pound for the raw material, it represents a product that consumers trust and enjoy. “The trick is to add modest amounts in a whole range of foods as opposed to large quantities, added "That is a difficult problem as well.”
Math and statistics department assistant professors Chris Saunders, left, and Cedric Neumann eye a small portion of the math involved in creating formulas that can be used to evaluate forensics evidence. The men received a $780,300 grant from the National Institute of Justice to advance their work.

Assistant professors Chris Saunders and Cedric Neumann collaborated to prepare a grant proposal to work on the interpretation of pattern and impression evidence.

At the end of September, they received notice from the National Institute of Justice that their three-year proposal was being funded. It’s the first grant to SDSU faculty from the National Institute of Justice that their three-year proposal was being funded.

As Saunders was completing his doctorate in statistics at the University of Kentucky in 2006, he was recruited to do work for the FBI in pattern recognition and handwriting identification. He spent the next two years as an intelligence community postdoctoral research fellow at George Mason.

After the fellowship ended, Saunders continued as an assistant research professor in the document forensics lab at George Mason until coming to State.

In summer 2013, Saunders was a visiting scientist with the FBI lab doing forensics research. "The FBI is trying to build up a group of statisticians because forensics researchers at the federal level understand the need for statistical methods to quantify evidence," he said.

In a February 2012 article in Significance, the magazine of the Royal Statistical Society and the American Statistical Society, Neumann said some courts are scrutinizing fingerprints because of shortcomings in the way the probable value of the evidence is weighed and reported.

"Fingerprints have been used for more than a century as a way of identifying criminals. However, fingerprint evidence is not currently permitted to be reported in court unless examiners claim with absolute certainty that a mark has been left by a particular suspect.

"This courtroom certainly is based purely on the opinion of experts formed through years of training and experience, but not on scientific data. Less-than-certain fingerprint evidence is not reported at all, without regard for the potential weight and relevance of the evidence in a case," Neumann wrote in Significance.

By establishing the accuracy of likelihood ratios, a statistic used to quantify the probable value of forensic evidence, "courts can begin trusting statistical models when used to report evidence," Neumann said.

Saunders, whose background has been in supporting FBI investigations, added, "A uniform way of evaluating evidence will make it easier for an agency to decide whether to pursue a suspect or not."

As Saunders was completing his doctorate in statistics at the University of Kentucky in 2006, he was recruited to do work for the FBI in pattern recognition and handwriting identification. He spent the next two years as an intelligence community postdoctoral research fellow at George Mason.

After the fellowship ended, Saunders continued as an assistant research professor in the document forensics lab at George Mason until coming to State.

In summer 2013, Saunders was a visiting scientist with the FBI lab doing forensics research. "The FBI is trying to build up a group of statisticians because forensics researchers at the federal level understand the need for statistical methods to quantify evidence," he said.

He said they will start with objects that are simple in nature, such as glass fragments from a broken window, where they would look at low dimension characteristics like chemical composition and refraction index.

Neumann called that a "baby problem." As their statistical models prove accurate, they would apply them to more complex evidence, such as fingerprints, firearms and more complicated chemical data, such as the composition of fibers, he said.

The bottom line is that eventually investigators could use their work to determine the probability that a particular trace recovered at a crime scene (such as a fingerprint or a bullet) was left by a suspect or using a particular weapon.

The outcome being that forensic investigators could use established probability models to evaluate evidence. "If we can establish how good of an estimate the probability value is, it will help the agency or the court trust the forensic evidence," Neumann said.
Assistant professor Senthil Subramanian has become the first SDSU plant scientist to receive a National Science Foundation Faculty Early Career Development award. The NSF Career grant is given to junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research. Subramanian is the fifth SDSU faculty member since 1997 to receive this award.

The five-year grant for nearly $660,000 will support research to identify the plant mechanisms that direct and coordinate formation of the soybean nodule. Using this knowledge, Subramanian hopes to develop soybeans that are more efficient in making nodules and fixing nitrogen by manipulating the molecular mechanisms that regulate these functions. If this can be done with legumes, such as soybeans, perhaps this trait can be transferred to other crops that don’t fix nitrogen, he added.

Crops that produce more nitrogen will require less fertilizer, thus lowering production costs and reducing the potential for runoff that can impact the environment, according to Subramanian.

His participation in a six-month proposal development program sponsored by the Board of Regents and South Dakota’s Experimental Program to Stimulate Competitive Research which also gave him feedback through external reviewers helped him prepare a strong proposal, Subramanian said.

In addition, he said, “I am fortunate to have a hardworking team and an academic mentor and department head who get excited about my work. All this is very encouraging.”

Making usable nitrogen

While nitrogen is abundant in the atmosphere, it is not in a form plants can use. Subramanian explained. Legumes, such as soybean plants, have the capacity to form mutually beneficial relationships with bacteria in the soil to fix nitrogen.

“The plant houses the bacteria in a structure where the biochemical conditions are conducive for the bacteria to fix nitrogen,” Subramanian said. The plant provides the bacteria with carbohydrates and gets nitrogen in return.

The bacteria, called Rhizobium, enter the root cells of young plants and trigger the formation of nodules to house the bacteria, he explained. Within the nodules, two distinct zones—one that fixes the nitrogen and another that transports it to the plant—are formed from the same pre-existing root cells.

Determining target genes

The expression of specific genes in a particular root cell determine its fate—the zone in which it will function, Subramanian explained, so he is identifying which micro-RNAs directly control this differentiation. “We need to know what signal makes a cell contribute to one zone or another,” he explained.

Subramanian compared micro-RNAs to the brakes of a car. “Micro-RNA regulates the levels of the target gene’s activity,” he explained. This means keeping its activity under a particular threshold, confining the activity to specific cell types and properly timing the increase and decrease of the activity levels. These interactions affect the plant’s nodule development and its subsequent ability to fix nitrogen.

Through research funded by the U.S. Department of Agriculture, Subramanian and his research team have documented how micro-RNA 160 affects nodule development. “Micro-RNA 160 levels must be low in developing nodules, but high in mature nitrogen-fixing nodules,” Subramanian said.

Subramanian’s research has identified nearly 150 micro-RNAs that may potentially affect nodule formation through support from the Agricultural Experiment Station and the South Dakota Soybean Research Council. For the NSF Career project, he will identify the key roles of specific micro-RNAs in the formation of the two nodule zones.

In addition, a portion of the project will enable Subramanian to reach out to high school biology teachers and their students to spark interest in science and technology.

He will work closely with the SDSU Institute for STEM Education to accomplish this.

Assistant professor Senthil Subramanian examines nodules on soybean roots as part of his work to develop varieties that are more efficient in making nodules and fixing nitrogen.

Assistant professor Senthil Subramanian examines nodules on soybean roots as part of his work to develop varieties that are more efficient in making nodules and fixing nitrogen.

Assistant professor Senthil Subramanian examines nodules on soybean roots as part of his work to develop varieties that are more efficient in making nodules and fixing nitrogen.

Assistant professor Senthil Subramanian examines nodules on soybean roots as part of his work to develop varieties that are more efficient in making nodules and fixing nitrogen.

Assistant professor Senthil Subramanian examines nodules on soybean roots as part of his work to develop varieties that are more efficient in making nodules and fixing nitrogen.

Three faculty members from Northern State University and South Dakota State University have been named Dacotah Bank Scholars. Dacotah Bank will provide financial support for NSU to share curriculum and resources in banking and financial services with SDSU. The award will also support SDSU sharing its agricultural economics and agribusiness programs with NSU students.

Dacotah Bank has made a $240,000 renewable commitment for three years to support the collaboration between the universities. The announcement was made during a ceremony on the NSU campus as part of the recent South Dakota Board of Regents meeting.

Rodney Fouberg, chairman of the Dacotah Banks Inc. board, said the collaboration is what attracted the bank to the program. “It makes sense to use resources available at NSU and SDSU to enhance the educational experience. We expect that students studying banking, ag economics and agribusiness will be even better prepared when they begin their careers. When students broaden their education, Dacotah Bank benefits.”

Nicole Klein is the SDSU Dacotah Bank Scholar in agribusiness and agricultural economics. Todd Mueller and Robert Preston are the NSU Dacotah Bank Scholars in banking and financial services. Klein is a professor of agricultural marketing and farm and ranch management. Mueller and Preston are professors of banking and financial services.

The Dacotah Bank Scholars are responsible for leading the collaboration and its promotion, student recruitment and advising, engagement with industry, and course and curricula development.

Mueller said he honored to be part of this venture. “It took a great deal of vision to see this private-public partnership. I would like to see more of this kind of collaboration,” he said. Mueller, who grew up in rural North Dakota, joined NSU in 2013. He holds a bachelor of business administration degree and a law degree from the University of North Dakota. Mueller was admitted to the bar in North Dakota and Minnesota. Mueller was a law clerk for the United States District Court in Bismarck, North Dakota, and then began his 20-year career in the financial services industry, with an emphasis in trust management.

“It’s a wonderful opportunity to enhance our ability to collaborate on a needed resource for the community,” said Preston, Dacotah Bank Scholar from NSU. He has a B.A. in economics and master of business administration from the University of Minnesota, as well as a law degree from William Mitchell College of Law in St. Paul, Minnesota. Preston began teaching at NSU in 2012. In his career, he has consulted for more than 150 banks and financial institutions in a wide variety of legal, operational, and managerial capacities. He has served as a bank examiner, internal auditor, CEO, CFO, and COO of several financial organizations.

Dacotah Bank, Northern State University, South Dakota State collaborate to create Dacotah Bank Scholars

Front row, from left, Joe Senger, Dacotah Bank executive vice president; James Smith, Northern State president; Rodney Fouberg, Dacotah Banks Inc., chairman of the board; Richard Westra, Dacotah Bank president and CEO; David L. Chicoine, SDSU president; and Chad Bergan, Dacotah Bank CFO. Back row, from left, Brad Strohm, Dacotah Bank and Dacotah Bank representatives, Dave Gibson, Dacotah Bank Brookings market president; Todd Jordre, president and CEO of NSU Foundation; and Keith Mahlum, vice president for development with the SDSU Foundation.

“The collaboration will enhance learning at both institutions. The exchange of ideas and curriculum will allow the students to double their networks,” Klein said. She has a B.A. from SDSU in mathematics and economics, with M.S. and doctor of philosophy degrees from Kansas State University in agricultural economics. She served on the board of directors for the First Bank of White for 10 years. She also works with the S.D. chapter of the American Society of Farm Managers and Rural Appraisers.

President David L. Chicoine said the collaboration will build a better South Dakota. “Working directly with the stakeholders, such as Dacotah Bank that will be employing our graduates, we were able to put the right people, places and partners together,” Chicoine said.

“The collaboration makes it possible to translate and transfer knowledge where it’s needed most. Referring to the two schools’ mascots, Chicoine used levity to summarize the new program, “We want to show that Jackrabbits and Wolves can play well together.”
Ervin Colbeck has been named the October Civil Service Employee of the Month. Colbeck has been a facilities maintenance staff member with the Department of Residential Life for six years. He also worked for the university for six years in the 1970s. He is a veteran of the U.S. Navy, U.S. Navy Reserve and South Dakota Army National Guard. Colbeck and Betty, his wife of 45 years, reside in Aurora.

Colbeck served as a volunteer firefighter in Aurora for 13 years and is currently a member of the city planning and zoning board. The Colbecks have two grown children and four grandchildren.

In letters of support, coworkers said Colbeck is a hard worker who is always willing to help those who need assistance. Residential life director Jeff Hale said, “As a director who inherited numerous staff, I am pleased that Erv is willing to consider feedback, new approaches and readiness to try whatever is expected from his supervisor. Erv wants to get it right. He works hard to make sure students and staff members who depend on him have the best service we can offer. Erv makes others feel valued, recognized and important.”

Colbeck would like to extend her thanks and appreciation to everyone involved with her nomination as Employee of the Month.

Virginia Coudron has been named the September Civil Service Employee of the Month. Graphic designer Virginia Coudron has been named Civil Service Employee of the Month for September. Coudron has worked for University Marketing and Communications for 27 years. She was employed as a graphic designer for SDSU Agricultural Communications and later worked 10 years for South Dakota Public Broadcasting.

When nominating her for the employee of the month, coworkers said Coudron is a professional, dedicated and talented designer who works diligently to complete all projects to the best of her ability. "Virginia works tirelessly for the betterment of SDSU," said nominator Andrea Kieckhefer, manager of creative services and branding. "She gives the same effort to every project she's assigned, whether it's for the president's office or a student organization. There are no small projects as far as Virginia is concerned. Anyone who works with Virginia can take comfort in the fact that the finished piece will be polished and professional. In short, Virginia is an invaluable asset to SDSU and I can think of no one more deserving of the employee of the month honor."

Virginia pursues another career as a fine artist painter. She portrays western, wildlife and portraiture in her painting and does a contemporary series called "The Human Land." She displays her works at a number of midwestern art shows. Virginia is also a member of Artist Ride, an invitation-only event for contemporary western artists who meet annually on the Shearer ranch near Wall. The event features historical re-enactments used as reference materials for artists.

Virginia also enjoys fishing, camping, hiking, traveling, photography and anything dealing with the outdoors. "Virginia Coudron is an amazing asset to this office and to the university," said Mark Luebker, strategic communications coordinator. "I can't believe it's taken us so long to nominate her for employee of the month. Her work ethic is second to none. She's a true professional and has the respect and affection of everyone she works with. Any organization would be thrilled to have Virginia on the team."
University awarded $1.8 million to drive down chronic disease

The United States Department of Health and Human Services awarded SDSU a $1.8 million grant Thursday to help improve health in six South Dakota counties with high obesity rates.

SDSU Extension is leading the effort, with help from researchers with the College of Education and Human Sciences and College of Nursing. In addition, the South Dakota Department of Health will be a key partner in implementing these initiatives.

The project will utilize community-based wellness coalitions in six South Dakota high obesity counties—Bennett, Buffalo, Campbell, Corson, Union and Ziebach—to prevent and reduce obesity of children, youth and their families.

The wellness coalitions, facilitated by Extension, will conduct a community needs assessment that will guide community stakeholders to select and implement interventions that promote access to fruits and vegetables, increase healthy behaviors such as consumption of healthy food and beverages and provide access to physical activity opportunities.

The Programs to Reduce Obesity in High-Obesity Areas awards are part of a U.S. Department of Health and Human Services initiative to support public health efforts to reduce chronic diseases, promote healthier lifestyles, reduce health disparities and control health-care spending. The Centers for Disease Control and Prevention will administer the grants, which will run for three years, subject to availability of funds.

Overall, HHS awarded $4.6 million in new grant awards to six universities. The program funds land-grant universities located in states with counties that have more than 40 percent prevalence of adult obesity. Universities will work through existing cooperative extension and outreach services in those counties to improve residents' access to healthy foods and physical activity opportunities, reduce obesity, and prevent and control diabetes, heart disease and stroke.

“Research has shown us that environmental change needs to be brought about through a process of community dialogue, community decision-making and community action,” said Suzanne Stluka, food and family program director for SDSU Extension. “This fosters making the healthy choice an easy choice for individuals.”

During the first year of the program, Extension and the S.D. Department of Health will engage and support partners to create a wellness coalition in one community in each county. The coalition will identify local resources to implement community-level obesity prevention strategies among children and families.

In the second and third years, the wellness coalitions will be provided with a menu of evidence-based interventions.

“Utilizing this community-based approach allows the wellness coalition and communities to have ownership over the activities they select, which will result in greater success and sustainability,” said Stluka.

USDA grant will enhance precision farming preparation

SDSU recently received a United States Department of Agriculture grant for enhancements to the precision agriculture program.

The grant proposal titled “Precision farming workforce development: standards, working groups and experimental learning curricula” will be implemented over the next three years.

The College of Agriculture and Biological Sciences and Jerome J. Lohr College of Engineering joined to invest funds to align teaching, research and outreach to enhance economic development in the region as part of the SDSU Precision Agriculture Initiative.

According to plant science professor David Clay, the nearly $700,000 grant aims to achieve three primary objectives: improving student success and experiences within precision ag curricula; providing precision-trained agronomists for the industry; and closing the yield gap between crop genetic potential and achieved yield by producers.

The grant is part of a national project bringing together leaders from industry, federal agencies and universities to develop experiential curricula that will provide students top-notch preparation for precision agriculture.

The aim is to develop students who are technologically literate, creative, innovative and fully trained in their discipline with the skills to develop locally based solutions that will increase sustainable food production.

In addition to Clay, faculty members Scott Fausti, Doug Malo, Sharon Clay and Cheryl Reese are part of the project. Industries partners include Pioneer and John Deere, along with the International Society of Precision Agriculture and the American Society of Agronomy.