# INTRODUCING THE COLOR OF THE CO

2020 YEAR-END PUBLICATION





**Charlene Wolf-Hall** 

Founding Dean and Professor

College of Natural Sciences Welcome to the inaugural issue of the College of Natural Sciences' year-end publication. The college was founded July 1, 2018, making it the youngest college at SDSU. The university strategically realigned four existing departments to create this new academic unit. The move has already raised the profile of the programs in the college and created an infrastructure that better supports our students.

In 2019, I started as the founding dean. It has been a wonderful homecoming. I grew up in South Dakota and obtained my B.S. and M.S. degrees in microbiology from SDSU. It has also been a pleasure to work with the college's amazing faculty to develop our mission statement: the College of Natural Sciences provides a robust, integrative academic experience to foster student success, opportunities to explore the frontiers of knowledge through advanced innovative research, and demonstrates excellence in accordance with South Dakota State University's land-grant mission. My personal mission for the college is "Grow!"

In 2020, we have been very busy growing the college and establishing our external advisory board. All this activity during a global pandemic has certainly been a challenge. I am deeply appreciative of the above-and-beyond efforts of our students, faculty, staff and supporters.

Please enjoy this first issue. We hope to hear from you and that you will stay connected to us. Go Science Jacks!

# Natural Sciences by the Numbers





Graduate Students



Faculty and Staff



Million

Research

Money Awarded





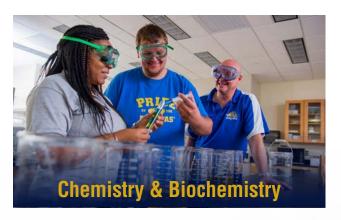
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# **OUR DEPARTMENTS**



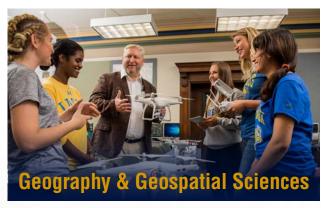
4 Majors | 2 Minors | 3 M.S. and 3 Ph.D. Programs

- College Factual ranked the biology program in the nation's top 5% for value.
- Home to a cadaver dissection lab, and the only one in the state where undergraduate students do all of the dissecting.



3 Majors | 1 Minor | 2 M.S. and 2 Ph.D. Programs

- One of only 90 programs nationwide accredited by the American Society of Biochemistry and Molecular Biology and the only accredited program in South Dakota.
- All students obtain undergraduate research experiences and student research fellowships abound.



3 Majors | 3 Minors | 2 Certificates 2 M.S. and 2 Ph.D. Programs

- Organizes the annual statewide Geography Convention, hosting public and private entities.
- Nationally and internationally ranked in the areas of drones and remote sensing.



1 Major | 2 Minors

- Society of Physics Students (SPS) chapter is nationally recognized as an outstanding chapter.
- Program areas in professional and applied physics, health and medical physics, and flexible emphasis depending on career goals.



# SDSU scientists to examine how coronavirus infects cells

Identifying the mechanisms through which the new coronavirus enters and infects cells can help scientists combat COVID-19—and perhaps other emerging viruses.

Professor Adam Hoppe, Department of Chemistry and Biochemistry, aims to identify genes that inhibit or contribute to viral infections through a National Science Foundation grant. Hoppe is the second SDSU researcher to receive funding through NSF's Rapid Response Research mechanism to address the COVID-19 pandemic.

The goal of the project, which began in July, is to figure out "how the coronavirus gets into cells to initiate infection," said Hoppe, describing the work as "a very basic science approach, aimed at broadly identifying all of the cellular machinery that affects viral entry." Hoppe, a cell biologist, is also director of the South Dakota BioSystems Networks and Translational Research center, known as BioSNTR.

For the NSF grant, Hoppe and his team of one research associate and one doctoral student will determine how each gene in the human genome affects the new coronavirus' ability to enter the cell. Hoppe said, "We will use the CRISPR gene-editing tool and an unbiased approach to identify what host cell factors either allow the virus to enter the cell or, perhaps, prevent it from entering the cell."

To study the severe acute respiratory syndrome coronavirus 2, Hoppe and his team will develop a pseudovirus they can work

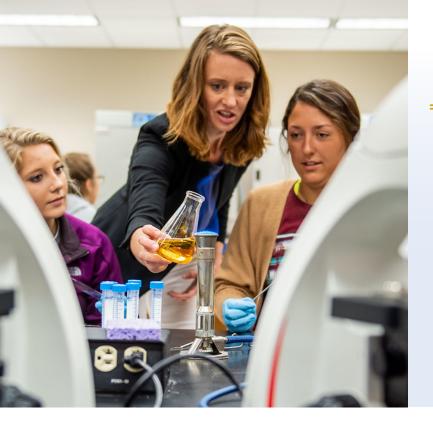
with in the lab. "We transfer the spike protein, which is responsible for allowing the virus to enter the cell,

onto the pseudovirus to study how the protein gains entry into the target cell," he explained.

The researchers will then use CRISPR gene-editing tools to shut off a single gene in a human cell using a technique Hoppe developed. They then will expose the cell to the pseudovirus. "We will screen 20,000 different genes, one at a time, and ask if their function is associated with helping or inhibiting virus entry," Hoppe said.

What they learn may help scientists develop antivirals and therapeutics to combat COVID-19. "Our findings could have implications for coming up with prophylactics to prevent viral entry and treatments to activate some of the genes that prevent the virus from getting into the cell," Hoppe said. "We hope to learn something specific to help with COVID-19, but also to generate knowledge that is applicable to new viral infections, as well as the tools to do this type of screening for other viruses, such as influenza."





### **ANTIBODY TESTING**

Natalie Thiex, assistant professor in the Department of Biology and Microbiology, and biology Ph.D. student Jordan Neises are testing regional health care workers for COVID-19 antibodies. An antibody is a protein the immune system develops in response to pathogens that infect the body, such as SARS-COV-2, the virus that causes COVID-19. The study started in May, and blood samples were collected periodically to determine the fraction of health care workers who have antibodies for SARS-CoV2 to determine the extent and fraction of mild or asymptomatic COVID-19 infections and to determine the risk factors for seroconversion. Their work is still ongoing, so be sure to read future college newsletters to see the final results.

# **BMGSA FACE MASKS**

When COVID-19 first hit, students in the Bio-Micro Graduate Student Association (BMGSA) sprang into action. They found a way to contribute toward a safer work environment while raising funds to help keep the club financially stable. Faculty purchased science-related fabrics so the club could sew and sell masks as a fundraiser. Graduate student Amrit Koirala volunteered to sew the masks. He created 50 masks total.



## **GRAD STUDENT HELPING PEERS**

Balawanth Jadhav is pursuing a doctorate in chemistry and conducting research on the conversion of biomass into value-added chemicals using environmentally friendly techniques. In addition, he led an effort to raise funds to donate groceries to nearly 40 other Jackrabbits at the start of the pandemic.

"Because a lot of students depend on part-time jobs, there is no opportunity to work, especially since international students have to work on campus," Jadhav said.

"I contacted a few of my friends to ask how they're doing, and several told me they're struggling because they lost their job and it's getting difficult to buy needed items," he continued. "When I heard this, I knew I wanted to give back. A lot of friends helped me when I came here. I had nothing, but they helped me. Now is a time I can help my fellow students and maybe others in the Brookings community." Jadhav contacted Vivek Patel, a family friend and owner of the Brookings' Quality Inn.

"I shared my idea on how to help the other students," Jadhav said. "He offered to help however he can and then asked a few others for donations. Five motel owners in Brookings donated funds, which were used to purchase groceries." Various food staples such as rice, lentils, eggs, bread, noodles, onions and potatoes were purchased for 40 students.



# Paris becomes State's 11th Goldwater Scholar



South Dakota State University student Timmy Paris was named one of 396 students to receive a scholarship from the Barry Goldwater Scholarship and Excellence in Education Foundation last spring. More than 5,000 students applied for the honor. Paris is SDSU's 11th student to receive the \$7,500 honor since the award started in 1989.

A junior from Rapid City, Paris came to SDSU on a baseball scholarship and spent the 2018 season with the Jackrabbits. However, an introduction to undergraduate research led him to step away from the sport and go full speed into research.

"A big part of my Goldwater application was about how hard it was to make that decision," said Paris, who is majoring in chemistry, biochemistry and psychology. "Initially, I was drawn to research as an academic extracurricular, something that looks good to do, but I learned it's much more than that. I learned what I do in Brookings can make a scientific impact to people all over the world—that was really inspiring and motivated me toward research."

Paris learned of his selection from a discussion with Rebecca Bott-Knutson, dean of the Van D. and Barbara B. Fishback Honors College. Paris is a member of the college.

"She asked me to call the office and when I did, I could tell she was really excited. We talked and shared a moment of triumph, per se," Paris said. "Learning of the honor, I was very excited, thankful and appreciative of everyone who helped guide me when I was composing my application.

"Because I'm pursuing an M.D./Ph.D., I knew I had to be strategic filling out the application. The foundation is concerned with how students can handle the time commitment pursuing both disciplines," he continued. "I was focused on letting them see the

passion and love I have for research, so I tried to show them that side of me in every part of the application—to see my character and work ethic shine through."

Paris plans to graduate from SDSU in spring 2021 and pursue an M.D./Ph.D. He hasn't decided where to apply yet, but he would like to pursue a career in therapeutic research at a clinical laboratory. That choice would allow him to integrate his love of organic chemistry and research and yet have a direct impact on patients as a doctor.

"Being named a Goldwater Scholar is a great honor," he said.
"I'm so thankful for what my mentors here have done for me. I appreciate what they've done for me, and I look to pay it forward by being a mentor to others."

As the result of a partnership with the U.S. Department of Defense National Defense Education Programs, Peggy Goldwater Clay, chair of the board of trustees of the Barry Goldwater Scholarship and Excellence in Education Foundation, announced that the Trustees of the Goldwater Board have increased the number of Goldwater scholarships it has awarded for the 2020-21 academic year to 396 college students from across the United States.

"As it is vitally important that the nation ensures that it has the scientific talent it needs to maintain its global competitiveness and security, we saw partnering with the Goldwater Foundation as a way to help ensure the U.S. is developing this talent," said Jagadeesh Pamulapati, director of the NDEP program, as he explained the partnership. With the 2020 awards, this brings the number of scholarships awarded since 1989 by the Goldwater Foundation to 9,047 and a scholarship total to over \$71 million.

Jace Waybright was named SDSU's 10th Goldwater Scholar in 2018. After graduating this spring, he will pursue a doctorate in plasma physics at Princeton.

The Goldwater scholarship provides up to \$7,500 for tuition and fees annually.

# Society of Physics Students (SPS) Chapter has Banner Year

The Society of Physics Students chapter at SDSU had a highly decorated year. This chapter earned three prestigious awards and is working hard to keep the streak going.

**Outstanding Chapter Award:** This honor is the highest level of distinction given to chapters and was received by less than 13% of 829 chapters nationwide.

**2020 Chapter Research Award:** This national research competition is funded by SPS and by the American Institute of Physics. SPS's research project is focused on guiding lithium deposition behavior, with the hopes to create a longer cycling life while increasing energy density and safety in lithium ion batteries.

**Outstanding Chapter Advisor Award:** This honor is made only once per year and was awarded to Robert McTaggart, faculty advisor for SDSU's SPS chapter. McTaggart is the second SDSU individual to receive the honor. Warren Hein was the first SDSU recipient in 1985.





# Student-Led Virtual Geography Convention Continues Long-Running Tradition

The Geography Club at SDSU was founded in 1974, when the department's graduate program was established, and boasts the longest-running student-organized geography convention in the nation. This annual event attracts attendees from public and private entities, both in state and out of state. The president of the American Association of Geographers (AAG) attends every year and participates as the keynote speaker, a point of pride for the club. Students are busily planning how to move this convention completely online for spring 2021, and they have already secured the current AAG president and several past presidents for a virtual panel.

# Virus Research Leads to Prestigious Scholarship

Three SDSU students were among only 10 college students selected nationwide by the National Pork Producers Council to receive 2020 Lois Britt Memorial Pork Industry Scholarships. One of the students was Molly Kroeger, a microbiology and biotechnology double major from Lennox, South Dakota.

Kroeger first became interested in swine production from growing up on her family's farm where they have a small farrow-to-finish swine operation. She also showed pigs in 4-H. In high school, she became familiar with an emerging swine disease new to the United States called Porcine Epidemic Diarrhea Virus (PEDV) and decided to compete in the FFA prepared public speaking career

development event with the topic being PEDV. She won the state contest and was a semifinalist in the national competition.



"I aspire to work at a livestock pharmaceutical company making vaccines for livestock. I'm excited to couple new advances in science with my own passion and ingenuity to provide solutions for swine and livestock producers. Additionally, I hope to continue being an Operation Main Street speaker to educate consumers about the livestock industry and agriculture throughout my career," Kroeger said.

# FISHBACK HONORS COLLEGE TEACHER OF THE YEAR:



During the 2020 Honors Convocation, Scott Pedersen of the Department of Biology and Microbiology was presented the Van D. and Barbara B. Fishback Honors College Teacher of the Year Award. He is only the second faculty member at SDSU to win this prestigious award twice. He was first named Teacher of the Year in 2014. One of the student nominators wrote, "Dr. Scott Pedersen is the anatomy professor here on campus. He is incredibly passionate about both the subject and his students. He constantly supports his students in their endeavors and is always willing to speak on their behalf. Overall, Dr. Pedersen is a fun, compassionate, well-spoken professor."

Pedersen has been teaching at SDSU a little over 20 years, and in that time more than 13,000 undergrad students have gone through his anatomy class and lab. In recent years, the numbers ramped up, and there have been about 750 undergraduates per year. There is a growing need for updated facilities and more space, which is why Pedersen has helped lead the charge to fundraise for a new Human Anatomy Lab. Plans for the new lab include space for twice as many cadavers and a virtual component. Over the years, students have repeatedly reported that their time in the lab helped to prepare them for medical school and gave them a noticeable advantage over their peers.



# **Bringing Astronomy to the Community**

Judy Vondruska, lecturer in the Department of Physics, has spearheaded a telescope checkout program in conjunction with the Brookings Public Library. This program includes a
collection of nine telescopes and a system for library patrons to check them out for use at
home. One of the goals is to make science more accessible to the community. The telescopes
are of "higher-end quality" but also "introductory," said Vondruska. They are to "share in that
amazement of discovering the sky." When participants check out a telescope, they can keep
it for a week. Each telescope comes with a set of easy-to-read instructions that a group of
Vondruska's astronomy students created for their final project. Future astronomy students
will continue to support the program by hosting telescope training sessions and developing
video directions for telescope use. The Brookings Public Library is one of the few libraries
in the country to offer telescopes to be checked out. Funding to purchase the telescopes
came from a South Dakota Community Foundation grant, the South Dakota Space Grant
Consortium, matching funds from the library and matching funds from the Science at the Pub
events, which are hosted at Jim's Tap.



Matt Miller, Department of Chemistry and Biochemistry, and Larry Browning, Department of Physics, are known around the region for their "SCI Squad" (Science Concepts Illustrations) shows. They travel around the area bringing their fun and flammable experiments to people of all ages, whether it's students in schools, teachers at a conference or adults attending a Science at the Pub event. Some audience members even find themselves as part of the fun.

Over the years, only minimal property damage has been reported, so if you'd like to take your chances, contact sdsu.naturalsciences@sdstate.edu to see about scheduling a visit from Matt and Larry.

# **USING MAPS TO SAVE LIVES**

Dapeng Li, of the Department of Geography and Geospatial Sciences, recently published a paper in the International Journal of Disaster Risk Reduction (IJDRR) on on the potential value of national address point databases in improving wildfire public safety. This is the first study on the topic and not only promoted the use of national address point databases in wildfire evacuations, but also shed light on how to use them in other applications such as the Next Generation 911 system and public health incident tracking. Li's work has been publicized by the U.S. Fire Administration, a branch of FEMA.





Address point data contains both the textual address name and the geographic coordinates of the address.

## STUDENT AWARDS

### SPS (SOCIETY OF PHYSICS STUDENTS) AWARDS

- Outstanding Chapter Award
- · Chapter Research Award

### **ACS (AMERICAN CHEMICAL SOCIETY) AWARDS**

- Student Club Honorable Mention: Chemistry Club
- Outstanding Students Sioux Valley Division:
  - · Undergraduate: Timothy Paris
  - Graduate: Mathias Anim
- Graduate Student Award in Environmental Chemistry: Joshua Kennedy
- Analytical Chemistry Award: Wesley Genant
- Biochemistry Award: Thad Indermuhle
- · Biochemistry Award: Caitlynn McGregor
- Environmental Chemistry Award: Logan Smith
- Organic Chemistry Award: Susan Grabenstein
- Physical Chemistry Award: Monique Bunkers

### **HONORS CONVOCATION**

- Excellence in Leadership Award: Moriah Flanagan
- Excellence in Service Award: Jerrod Fedorchik
- Excellence in Athletics Award: Sydney Bormann
- Excellence in Professional Preparation Award: Cole McDougall & Sophie McKee
- · Campus Champion Award: Elise Braswell
- Excellence in Research and Scholarly Activity: Abdullah al Maruf & Sarah Schweitzer
- · Land Grant Mission Award: Molly Kroeger
- · Recognition of students who have completed all requirements in fulfillment of the honors independent study:
  - Kyle Lampert
- Kacey Rosenthal
- Cole McDougall
- Amber Schuster
- Anna Milbauer
- Sarah Schweitzer
- Juliana Pederson
- Recognition of students who completed the 2019 First Year Fellowship program:
  - Kvra Hintz
  - Camille Massmann (special thanks for chairing the program)

### **CHEMISTRY & BIOCHEMISTRY DEPARTMENT SUMMER UNDERGRADUATE RESEARCH FELLOWSHIPS**

- Tanaka Fellowship: Alana Moe
- Okken Fellowship: Susan Grabenstein
- East Family Fellowships: Brandon Schuldt, Sarah Engels, Timothy Paris, Logan Smith
- NSF (National Science Foundation) Graduate Research Fellowship: Nathan Turner

### FISHBACK HONORS COLLEGE - SCHULTZ-WERTH AWARDS FOR **SENIOR PAPERS**

- Molly Kroeger
- Jace Waybright
- Juliana Pederson
- Bryanna Chipley

### URSCAD (UNDERGRADUATE RESEARCH, SCHOLARSHIP AND **CREATIVE ACTIVITY DAY) POSTER AWARDEES**

- Department of Biology & Microbiology:
  - 1. Molly Kroeger and Laura Munger
  - 2. Allison Bjornstad
  - 3. Jessica Scheer and Anyesha Sarka
- · Department of Chemistry & Biochemistry:
  - 1. Jillissa Taubel
  - 2. Sydney Woltman and Alana Moe
  - 3. Sarah Engels and Thad Indermuhle
- Department of Physics
  - 1. Jace Waybright
  - 2. Zachary Lehmann
  - 3. Abdullah al Maruf

### CNS (COLLEGE OF NATURAL SCIENCES) COVID-19 VIDEO COMPETITION

- 1st place: Sarah Engels
- 2nd place: Abdullah Al Maruf
- · 3rd place: Jennifer Kyeremateng & Vivian Osei Poku
- · People's Choice Award: Abdullah Al Maruf

### SIGMA XI GRADUATION STUDENT COMPETITIONS

- Research Proposals Ph.D
  - 2nd place: Haydee Torres
- Research Proposals M.S.
  - 1st place: Aastha Acharya

  - 2nd place: Camille Massmann
  - 3rd place: Jawata Saba
- · Research Papers Ph.D
- 3rd place: Obed Gyamfi
- Research Papers M.S.
  - 2nd place: Andrea Zavadil
- NCAA Postgraduate Scholarship: Sydney Bormann
- Phi Kappa Phi Honor Society Council appointee: Vivian Osei Poku
- · Eleanore L. & Philip R. Haskett Award Outstanding Graduate Teaching Award: Ahsan Ahmed
- Loque Award for Academic Excellence by a First Year Graduate Student: Mavis Korankye
- Loque Award for Research Excellence: Christopher Skaggs
- · AOCS (American Oil Chemists' Society) Biotechnology Student Division - Best Paper Award: Andrea Zavadil
- Mayo Clinic Graduate School of Biomedical Sciences Summer Undergraduate Research Fellowship: Zachary Lehmann
- · Sanford internship with Chief Medical Physicist: Nicholas
- · Goldwater Scholar: Timothy Paris

### **FACULTY AWARDS**

### CELEBRATION OF FACULTY EXCELLENCE AWARDS

- Timothy J. Nichols Award for Excellence in Undergraduate Advising: Nicole Grove
- Excellence in Graduate Student Mentoring Award: Brian Logue
- College of Natural Sciences Outstanding Researcher: Wanlong Li
- College of Natural Sciences Teacher of the Year: Mark Messerli
- F.O. Butler Award for Excellence in Research: Brian Logue
- Faculty Award for Global Engagement: Greg Heiberger
- Award for Faculty Engagement in International Research: Xiuging Wang
- Dr. Sherwood and Elizabeth Berg Young Faculty Award: Nicholas Butzin

### HONORS CONVOCATION

- Fishback Honors College Teacher of the Year: Scott Pedersen
- Honors Faculty Interest Group Scholarship of Teaching and Learning: Madhav Nepal

### CENTER FOR THE ENHANCEMENT OF TEACHING AND LEARNING **SUMMER COURSE ENHANCEMENT INSTITUTE**

- Anne-Marie Hoskinson
- Dapeng Li
- Jessica Mediger
- Kimberly Johnson Maier
- Larry Browning,
- Mandy Orth
- Sara Madsen

### FISHBACK HONORS COLLEGE - 2020 HONORS MEDALLION CEREMONY

Hunter Landwehr

Lauren Lindsev

Cole McDougall

Sophie McKee

Anna Milbauer

Regan Odegaard

Juliana Pederson

Julie Mochel

Lorna Wright

### Biology & Microbiology

- Helean Barwari
- Allison Bjornstad
- Mary Boksa
- Sydney Bormann
- Alaire Buysse
- Andera Cable
- Meghan Glancey
- Sarah Haberman
- Molly Kroeger
- Kyle Lampert
- Chemistry & Biochemistry
  - Paige James
  - Anna Milbauer
  - Abigail Morgan
- Physics
  - Jace Waybright

CNS undergraduate students make up under 10% of the student body at SDSU, but over 25% of the graduating Honors Students. Additionally, all three featured speakers in this year's ceremony are from the College of Natural Sciences:

- Moriah Flanagan
- Cole McDougall ('20)
- Dr. Ben Solomon ('03)

- SPS (Society of Physics Students) Outstanding Chapter Advisor Award: Robert McTaggart
- · Leo & Elaine Spinar Award for Outstanding Undergraduate Teaching: Julie Leibold
- Dr. April Brooks Woman of Distinction Award: Marjoanne Thompson
- SDSU Student Association Faculty Advisor of the Year: Jaime Lopez-Mosqueda
- SDSU RSCA (Research, Scholarship, and Creative Activity) Challenge Fund: Dapeng Li
- Biology & Microbiology Department Tom Cheesbrough Excellence in Teaching Award: Andy Ellis
- NACADA (National Academic Advising Association) Award for Excellence in Advising, Region 6: Nicole Grove
- Beyond Benign Faculty Fellowship of Toxicology in Chemical Education: Douglas Raynie
- South Dakota State University, Emeritus Status: Darrell Napton

# **WORK ANNIVERSARIES**

Sally Krueger – 48 years Mike Hildreth – 33 years Sue Schliinz – 31 years Larry Browning – 30 years Bruce Bleakley – 29 years Julie Westberg – 29 years Fathi Halaweish - 25 years Jaque Mann – 25 years Jay Shore – 25 years Yang Yen – 24 years Bruce Millett - 23 years Doug Raynie – 21 years Matt Miller – 21 years Scott Pedersen – 21 years Terry McCutcheon – 21 years Jihong Cole-Dai – 20 years Bob Watrel – 19 years Judy Vondruska – 19 years Andy Ellis – 18 years Stephanie Jensen - 18 years Xiuging Wang – 18 years Yung Huh – 18 years Donald Auger – 17 years Greg Heiberger – 17 years Melody Jewell – 17 years Radhev Kaushik – 17 years Sara Madsen – 17 years Volker Brözel – 17 years Brian Logue – 16 years Carol Doyle – 15 years Geoffrey Bonvallet – 15 years



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# **ALUMNI FEATURE**

Six graduates of South Dakota State University stretching from 1916 to 1990 have been selected for the 2020-21 class of Distinguished Alumni. Among them is a College of Natural Sciences alumni, Keith Corbett, '75/M.Ed. '87. Corbett, a chemistry major, distinguished himself with a 35-year military career and an 18-year career in academic



administration. Most recently at SDSU, he was the dean of University College from 2009 until his retirement in 2017. He currently serves as the mayor of Brookings, South Dakota.



# **GETTING INVOLVED:**

There are many ways to support the College of Natural Sciences as an alumni or friend of the college. From sharing your experiences before/after graduation to guest speaking at a class or seminar, your expertise and insights are invaluable to enhancing our students' experiences. Use your smartphone to scan the barcode above and get plugged in.