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Chemistry & Biochemistry Newsletter

Chemistry & Biochemistry

Fall 2015

Chemistry & Biochemistry Newsletter

Department of Chemistry & Biochemistry, South Dakota State University

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The Avera Health and Science Center became the home of the SDSU's Department of Chemistry and Biochemistry on September 9, 2010.

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Department of Chemistry and Biochemistry

Box 2202 SDSU Brookings, SD 57007

(605) 688-5151

Visit our website at: www.sdstate.edu/chem/

South Dakota State University

Chemistry & Biochemistry

Fall 2015



Chemistry and Biochemistry Friends, Alumni and Family -

The fall semester of 2015 brought some changes to the department as you probably have guessed by now, considering that I'm writing this message instead of Dr. James Rice. In August, Dr. Rice decided to return to faculty status to concentrate on his research and duties as EPSCoR director for South Dakota. We are in the process of identifying Dr. Rice's permanent successor, and until such time, I am serving as interim department head.

Taking the reins as department head in 1999, Dr. Rice's 15 years of service in that role led to significant growth for the department. For example:

- Undergraduate enrollment increased by 125 percent and graduate enrollment by nearly 200 percent;
- The B.S. in biochemistry, the Ph.D. in biochemistry, and the M.S. in chemistry education for practicing high school teachers were created;
- Certification of all undergraduate degrees by professional societies was achieved (American Chemical Society for the B.S. Chemistry and the American Society of Biochemistry and Molecular Biology for the B.S. Biochemistry);
- Extramural grant funding reached a three-year average of \$4 million, compared to a three-year average of \$200,000 in 1999;
- Faculty lines grew from 13 to 20;
- A new facility for the department, Avera Health and Science Center, was built, modernizing our teaching and research facilities; and
- Course offerings were expanded beyond Brookings to include University Centers in Sioux Falls and Pierre, Lake Area Technical Institute, Southeast Technical Institute and online/distance offerings.

The leadership that Dr. Rice provided, the continual guidance and a keen ability to foresee emergent trends in academia, will be missed. Please join me both in wishing Dr. Rice well in his new "old" role as professor of chemistry, and in thanking him for his incredible devotion to the department's success.

We marked other milestones this fall semester, most notably the five-year anniversary of our new home in the Avera Health and Science Center and the renovated Avera North Research Wing. While it is difficult to believe we have occupied our new digs for five years already, I can assure you we are still very happy to be in such a modern space. The building has been a boon for our recruiting efforts (both undergraduate and graduate), and has contributed significantly to our teaching and research missions. This past summer the department hosted two research experiences for undergraduate (REU) sites, one focused on environmental/green chemistry and the other on anticounterfeiting technologies. One other big deal for us: Dr. Matt Miller and the other chemistry education faculty secured SDSU as the site for the ChemEd 2017 Conference. This conference will attract between 500 and 750 high school science teachers and teacher educators to SDSU July 23-27, 2017. We are excited to host a conference this large. Details of these events (and others) can be found in the articles in this newsletter.

As always, we like to keep up to date on what's happening in your lives, so please inform us of any changes you'd like to share with others in the Jackrabbit Chemistry/Biochemistry family. If you have not done so, like us on Facebook and follow us on Twitter: sdstatechembiochem for Facebook and @SDStateChemBio on Twitter.

Wishing you all the best in 2016!

David Cartrette | Interim Department Head

Chemistry and Biochemistry at SDSU

Avera Health & Science's 5th Year Celebration

On September 30, SDSU celebrated the fifth anniversary of the Avera Health and Sciences Building, home of the Chemistry and Biochemistry Department, the College of Pharmacy and Environmental Health and Safety Offices. The project, begun in 2008, was the result of a partnership between the Avera Health Foundation and South Dakota State University. Avera Foundation contributed \$15 million to the building project, in the largest single contribution to the SDSU Foundation. Avera Health and Science Center was occupied in early summer 2010, with official dedication in September 2010.

The impacts on the instruction and research missions of all academic units who call Avera Health and Science Center home have been profound.

Dr. Brian Logue, associate professor of chemistry, said, "The new Avera building brought our research facilities into the 21st century. The facilities are an asset to the departmental research endeavor."

Dr. Adam Hoppe, associate professor of biochemistry, added, "Without the advent of new research facilities, the Ph.D. in biochemistry would have been difficult to realize."

A tangible example of the substantial impacts of the new building on research productivity in chemistry and biochemistry is demonstrated in the success of extramural grant funding. In the five years prior to construction of the Avera Health and Science Center, total grant proposal awards were about \$4.5 million for chemistry and biochemistry faculty. In the five years the department has occupied the building, total grant proposal awards have more than tripled to \$16 million.

Undergraduate and graduate instruction has improved, too. Teaching laboratories are modern and safe and have the latest innovations in effective chemistry instruction, including computers and hand-held data gathering devices. Seven out of every 10 undergraduate students at SDSU have classes and labs in the Avera Health and Science Center.

Those of you who were students or faculty at SDSU when chemistry was taught in the "Old" and "New" Shepard Hall buildings can readily understand the impact of the new building on the instructional and research missions of the department. If you have not been back for a visit since the Avera Health and Science Center was dedicated, we'd be happy to show you around. On behalf of the cepartment and SDSU, our heartfelt thanks go to the Avera Foundation and all donors who made this building a reality.



John Porter. President and CEO of Avera was the keynote speaker at the celebration in honor of the Avera Health and Sciences Center's fifth anniversary.



Guests enjoyed the remarks of Avera's John Porter.



Dr. Adam Hoppe represented the Department of Chemistry and Biochemistry at the Avera Health and Science Center's fifth aniversiry celebration.

Harvest Table Food Drive — Round Two

In fall 2015, College of Arts and Sciences Dean Dennis Papini once again challenged the college departments to collect food for the local Brookings Harvest Table. This is the second year that Dean Papini challenged the departments to "stock the pantry." The college contributed 2,875 items, with more than 1,000 of those items donated from the Department of Chemistry and Biochemistry alone. So when the challenge came again this October, we were ready and willing to defend our first place title from last year.

The stakes were similar; the department within college that donated the most nonperishable food items to help feed the Brookings community would receive root beer floats compliments of the dean's office. However, to help raise the ante and get the competitive juices flowing, the dean decided to include a traveling trophy that will be redistributed annually to the winning department for proud display. Dr. David Cartrette issued a challenge of his own: the office/research group who donated the most items within the department would be thanked with a free lunch. With the challenges issued, the healthy spirit of competition began and, once again, chemistry and biochemistry answered by donating over 1,000 items. Within the department, the office staff (Anne Eichelberg, Tonya Hohenthaner, Stephanie Jensen, Rui Li and Jaque Mann) prevailed, donating over a third of those items. They chose to have lunch at Qdoba.

In total, the College of Arts and Sciences delivered more than 2,500 individual items along with \$340 in cash donations. The department won the dean's challenge for the second year in a row, defending its title from year one.

The department was able to enjoy the spoils of victory on Wednesday, December 18. Along with thanking the department, Dr. Cartrette showed his gratitude for everyone's generosity by providing a catered deli sandwich lunch. After lunch, the support staff (Lori Maher, Erin Stanizewski, Jessica Lewis and Tiffany Petersen) from the dean's office came over to serve root beer floats for dessert, as well as present us with a certificate recognizing our accomplishment. Overall it was a very nice afternoon filled with good conversations and good food for the whole department. Not only did the Harvest Table Food Drive help the Brookings community, it also helped to build stronger bonds within our department as well.

They say that healthy competition is good for the soul, and when coupled with great generosity and the opportunity to address a real need in the community around us, this situation gives new meaning to the term "soul food." Incentives like root beer floats, trophies, catered lunches and recognition are nice, but it is most important to realize that hunger is a legitimate

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struggle for many people in Brookings, and it should not go without saying that the ultimate goal in this annual Harvest Table Food Drive challenge brought forth by Dean Papini is to help ease that struggle.



Dr. David Cartrette and part of the more than 1,000 food items collected by the department during this year's Harvest Table Food Drive.

Fall 2015 Graduates

B.S., Biochemistry: Rochelle (Wynia) Beekhuizen

Ph.D., Biochemistry: Francisca Essel (Director: Dr. Suvobrata Chakravarthy)

M.S., *Chemical Education*:

Stephanie Raney (Director: Dr. Michael Dianovsky) Jamie Flint (Director: Dr. Michael Dianovsky) Courtney McCleery (Director: Dr. Matthew Miller) Shih (Emily) Woon (Director: Dr. Michael Dianovsky) Emile Milam (Director: Dr. David Cartrette)

Ph.D., Chemistry:

Michael Stutelberg (Director: Dr. Brian Logue) Amanda Appel (Director: Dr. Brian Logue) Jianjuan (Simon) Sun (Director: Dr. Cheng Zhang)

New Graduate Students

Felix Acheampong

I completed my undergraduate and graduate education from Kwame Nkrumah University of Science and Technology in Kumasi, Ghana. My research highlights include modeling Epstein Barr virus latent infection to gain insight into endemic Burkitt's lymphoma pathogenesis, discovery of novel therapies for various cancers, infectious diseases and diabetes.

Abdullah Alluhavb

I come from Saudi Arabia where I received my bachelor's in chemistry in 2012 from Qassim University, Saudi Arabia. With the definitive goal of becoming a scientist, I am currently doing the master's degree program in analytical chemistry at SDSU. I will be seeking a Ph.D. in analytical chemistry as soon as I complete my master's.

Faez Alotaibi

I was born in 1988 and raised in Taif, Saudi Arabia. In 2012 I was awarded my bachelor's degree in chemistry from Qassim University in Saudi Arabia and in 2013 the university hired me as a teaching assistant. I arrived in the U.S. in March 2013, and I studied English as a second language at ASU [where?] for one year before coming to SDSU.

Saad Alshehri

I am from Saudi Arabia where I received my bachelor's degree in pharmacy from King Khalid University. I am a Ph.D. student in organic chemistry working under Dr. Halaweish. I am interested in natural products and medicinal chemistry and I chose SDSU because I believe it is a good Ph.D. program with good research facilities.

Shraddha Basu

I earned my M.S. in zoology from the University of Calcutta, India. After that, I spent a few years doing research work in toxicology and nanotechnology in India before coming to the U.S. in order to pursue a Ph.D. in the biochemistry program at SDSU. I have started working under the supervision of Dr. Suvobrata Chakravarty in the area of protein biochemistry

Amos Kwabena Dwamena

I earned my bachelor's degree in biochemistry from Kwame Nkrumah University of Science and Technology, Ghana and a master's degree in applied chemistry and biotechnology from South Korea. Currently, I am seeking my Ph.D. in analytical chemistry at SDSU. I chose SDSU because of the outstanding faculty and research facilities available for graduate students.

Nicole Ellis

I graduated with a bachelor's degree in biology and a minor in chemistry from SDSU. My individual research project, quantification of actomyosin binding during the crossbridge cycle, was completed under the supervision of Dr. John Robinson.





Alotaibi









Torres

I'm pursuing a Ph.D. in biochemistry, while completing my graduate research at Sanford Research in Sioux Falls.

Athukoralage "Shimara" Gunawardana

I am from Colombo, Sri Lanka, and obtained a B.S. in biochemistry from SDSU. I am pursuing a Ph.D. in biochemistry. My undergraduate research involved the assessment of chemopreventive contents of Native American juneberries. Upon completion of the rotation process I plan to continue my studies in the field of cellular and molecular biology.

Joshua Kennedv

I am a veteran of the U.S. Marine Corps where, as an environmental scientist, I aided my unit in emissions calculation and modeling, characterization and remediation of contamination. My unit was part of the initial invasion of Iraq and assisted in the rescue of an Army POW in An-Nasiriyah and was awarded the Presidential Unit Citation. I left my custom woodworking shop to study science and pursue a Ph.D. in chemistry.

Sonali Pandev

I am from Varanasi, India, and joined the SDSU Department of Chemistry and Biochemistry after receiving my bachelor's degree from the University of Pune and graduating with a master's degree from Western Illinois University in 2012. The research work that was taking place in Dr. Raynie's lab is what made me want to study at green chemistry SDSU.

Faculty Activities

Funding:

Dr. James Rice

NSF Environmental Chemical Sciences, REU Site: Green Materials and Environmental Chemistry, \$384,288, 03/15 to 03/18 NSF EPSCoR/SD GOED, The 2020 Vision: Building Research, Education and Innovation Partnershipsfor South Dakota, \$24 million, 08/14 to 08/19

Publications

Dr. Fathi Halaweish

ElSenduny, F., Badria, F., A., EL-Waseef, Chauhan, S. and Halaweish, F. Approach for chemosensitization of cisplatin-resistant ovarian cancer by cucurbitacin B, Tumor Biology, August 2105 (Early publication).

Balabathula, P.; Swathi A.; Zafar, N.; Thompson, P.; Ellis, R. T.; Halaweish, F.; Chauhan, S., Jaggi, M; Khan, Sheema S.; Chauhan, N. Nanoparticle formulation of ormeloxifene for pancreatic cancer, Biomaterials, Vol 53, 731-743, 2015. Hall, J.; Rice, N.; Kopel, I.; Halaweish, F.; Blagg, B. Cucurbitacin D is a disruptor of the hsp90 chaperone machinery, J. Nat. Prod., March 10, 2015.

Diane M. Maher; Sheema Khan, Jordan L. Nordquist; Mara C. Ebeling; Nichole A. Bauer; Lucas Kopel; Man Mohan Singh; Fathi Halaweish; Maria C. Bell; Meena Jaggi; Subhash C. Chauhan. Ormeloxifene efficiently inhibits ovarian cancer growth, Cancer Letters, Vol. 356 (2), 606-612, 2015.

Dr. Adam Hoppe

Brandon L. Scott and Adam D. Hoppe, "Optimizing fluorescent protein trios for 3-Way FRET imaging of protein interactions in living cells." Scientific Reports, 2015, July 1, 5:10270.

Dr. Jihong Cole-Dai

Peterson, Kari M., Derek L. Brandis, Erica Manandhar, and Jihong Cole-Dai (2015), Assessment of anthropogenic contribution to perchlorate in the environment using an ice core record, in Emerging Micro-Pollutants in the Environment, eds. Sudarshan Kurwadkar, Xiaogi Zhang, David Ramierz, and Forrest L. Mitchell, American Chemical Society Symposium Series, Vol. 1198, 175-185, doi: 10.1021/bk-2015-1198.ch010.

Peterson, Kari M., Jihong Cole-Dai, Derek L. Brandis, Thomas Cox, and Scott Splett* (2015), Rapid measurement of perchlorate in polar ice cores down to sub-ng L-1 levels without pre-concentration, Analytical and Bioanalytical Chemistry, in press, doi:10.1007/s00216-015-8965-y.

Dr. Cheng Zhang

"Opposite Effects of A Singlet Oxygen Quencher on Photochemical Degradation of Dicyano-Substituted Poly(phenylenevinylenes) with Different Side Chains", Logan P. Sanow and Cheng Zhang, Polymer Degration and Stability, 2015 Accepted.

"Polymer Photovoltaic Enhancement via Spacer between Benzodithiophene and Benzothiazole Comonomers and inverted device structure," Mohammad, Lal; Chen, Qiliang; Mitul, Abu; Sun, Jianyuan; Khatiwada, Devendra; Vaggensmith, Bjorn; Zhang, Cheng, Li, Jing, Qiao, Qiquan. Journal of Physical Chemistry, 2015, accepted on June 30.

"Enhanced lifetime of polymer solar cells by surface passivation of metal oxide buffer layers," Ngo, Evan; Venkatesan, Swaminathan; Khatiwada, Devendra; Zhang, Cheng; Qiao, Qiquan, ACS Applied Materials & Interfaces, Accepted.

"Photostability of Two Dicyano-Substituted Poly(phenylenevinylenes) with Different Side Chains," Logan P. Sanow, Jianyuan Sun, and Cheng Zhang, Journal of Polymer Science A, 2015, in press. DOI: 10.1002/pola.27755.

Presentations

Dr. James Rice and Dr. David Cartrette

"Utilizing Student Feedback to Inform Change." European Science Education Research Association (ESERA), September 2015. Helsinki, Finland.

Awards

Dr. Douglas Ravnie and Dr. David Cartrette

American Chemical Society's Committee of Environmental Improvement (CEI) Award for Incorporating Sustainability into Chemistry Education. Award to be accepted at ACS National Meeting in San Diego, March 2016.

Angelina Sampson

I received my bachelor's and master's degrees in biochemistry from Kwame Nkrumah University of Science and Technology, Ghana. My research has ranged from pica and its consequences in maternal health to cryptosporidium spp. contamination in irrigation water and vegetables and the associated risk. I currently work in the area of drug transporters/drug screening.















Chemistry and Biochemistry at SDSU

Havdee Torres

I am from Miami, Florida, and earned degrees in psychology and biology from Villanova University and St. Thomas University, respectively. I was exposed to research in neuroscience using zebra fish as a model system, and later I was involved in a cancer research project. I am pursuing a Ph.D. in biochemistry at SDSU, studying mechanisms of cancer metastasis.

Fall Activities of the Student Affiliates-ACS



Faking a break at the SA-ACS annual bowling party



SA-ACS members at their display during a recruitment event.

The Student Affiliates of the American Chemical Society have had a very productive Fall semester thus far. They started the semester off by hosting a department picnic that was held at Hillcrest Park. The students of SA-ACS organized the picnic and cooked the food for over 50 faculty, staff, and students who attended.

The SA-ACS has also established a great relationship with the Children's Museum of South Dakota here in Brookings, and because of that, the group was asked to Participate in their 5th Year Birthday Bash, which had a theme of science. The students spent an entire Sunday doing demonstration with the community, along with making liquid nitrogen ice cream, which was a big hit! The group hopes to continue a great working relationship with the museum.

The students also outdid themselves with their creation of a six foot tall "Chem Jack" for the Hobo Day Parade this year. Although they did not take home a prize, they are all very proud of their creation, and many parade goers commented on how great the float was.

On top of the activities listed above, the students gave away free candy molecules to passersby in Student Union on Mole day, they offer tutoring for our major's classes that include CHEM 115, 127, 229, and 332. They have meetings every Tuesday evening, with 15-20 students in attendance.

The Chapter was also selected by the ACS to receive an Honorable Mention Award for its activities during the 2014-2015 academic year. Congratulations to the Chapter for this recognition!



Putting the finishiing touches on the SA-ACS float in the 103rd Hobo Day Parade.

Faculty and Staff News Alumni Spotlight

Severine Van slambrouck, Assistant Professor



I am originally from Belgium where I earned a pharmacy degree from the School of Pharmacy of Ghent University. Immediately after graduating, I worked as the pharmacist-incharge in a retail pharmacy. I decided to continue my path in research, which started in the Laboratory of Experimental Cancer Research at Ghent University in the School

of Medicine and Health Sciences and continued at New Mexico Tech, where I earned a Ph.D. in chemistry with a biochemistry research focus. Prior to joining SDSU as an assistant professor in chemistry and biochemistry, I was an assistant professor of chemistry at St. Thomas University (Florida.), worked for five years as an associate research professor at New Mexico Tech, and obtained a fellowship from the Union for International Cancer Control (UICC) to spend several months at the Unité de Glycobiologie Structurale et Fonctionnelle of the Université des Sciences et Technologies de Lille, in France.

My research interests concern the biochemical processes of cancer cell invasion and metastasis. The major goal of my work is to understand the underlying processes and to identify possible new targets for therapy. The main project is focused on integrin receptors and glycosphingolipids, together with changes in glycosylation and how these influence signaling pathways. Other related projects include drug discovery and SAR studies using medicinal plants as well as synthetic compounds, and determining their potential mode of action, in particular, in inhibiting invasive cancer cell behavior. Over the years, I started up two new cancer research facilities and worked with many undergraduate and graduate students. I have seen my students accomplish their goals and move on in life, both of which have been a very satisfying aspect of my academic career.

Tonya Hohenthaner, Program Assistant I



I am the new program assistant for the department. Prior to this position I worked on the SDSU campus in both the Finance and Business Departments as well as for the SDSU Football program. Not only have I worked at SDSU for roughly five years, I am also an alumnus. I received my bachelor's degree in political science with a minor in criminal

justice and then continued on to complete my master's degree in sociology. I am also originally from South Dakota, but I grew in Rapid City. I am excited for this new adventure in the chemistry and biochemistry department, and I hope that I can keep the tradition of excellence thriving.

Chemistry and Biochemistry at SDSU



Col. Evan M. Renz, MD

Our alumni are an extremely integral part of the Chemistry and Biochemistry department as well as SDSU as a whole. Each graduate takes the SDSU brand with them into future careers and life events and it is exciting for the department to be able to see all of the doors opened and paths taken by students who leave campus equipped with the chemistry

and biochemistry diploma. When SDSU coined the phrase "you can go anywhere from here" one might think that Colonel Evan M. Renz, M.D. FACS, was the prototype used because his journey taken after leaving SDSU seems to be the embodiment of that statement.

Dr. Renz came to visit on September 25 to speak to our freshmen chemistry and biochemistry majors about their roles as students, and to offer words of encouragement and inspiration about their futures. Dr. Renz was also very kind to take the time to have lunch with three of our majors who happen to be interested in pursuing medical careers upon their graduation.

One look at Dr. Renz's resume and it is easy to see how the path he has taken would be inspirational and encouraging to college students thinking towards their own futures. Currently, Col. Renz is the commander at the Brooke Army Medical Center at JBSA Fort Sam Houston in Texas, but his career has taken many turns since receiving his bachelor's in Chemistry from SDSU in 1983. He went on to earn his M.D. from the Sanford USD School of Medicine in Sioux Falls, which was followed by a general surgery residency at William Beaumont Army Medical Centers in El Paso, Tex. His education did not stop there however, directly following his residency in 2003 he was awarded a Clinic Fellowship in Burn Surgery, followed by a Critical Care Fellowship and finally a Senior Executive Fellowship.

- Aside from his extensive education, Dr. Renz is currently working as an active surgeon as well as associate professor and he has received numerous awards, the most recent of which being the Joint Service Commendation Medal for service in trauma education in 2014. He has also been a part of over 80 peer-reviewed articles, 12 abstracts and 7 book chapters and other published work.
 - This is only a brief overview of this alum's numerous achievements. We were very honored to have him come and speak to our current students about the wondrous life possibilities that lie ahead of them once they live SDSU. We are also very proud to say that SDSU's Department of Chemistry and Biochemistry played at least a small role in the unfolding story of this extraordinary man's life.

Chemistry and Biochemistry at SDSU

Department to Host CHEM Ed 2017

The Department of Chemistry and Biochemistry was named

the host of ChemEd 2017,

a conference for chemistry teachers and teacher educators

(July 23-27, 2017). This oppor-

tunity to host ChemEd 2017



Engaging the Next Generation.

will bring the department's chemical education program into an international arena. The biennial conference, the largest of its kind, has brought together dedicated educators involved in high school and introductory chemistry from across North America. The theme for the 2017 conference will be "Engaging the Next Generation."

The first ChemEd conference was held at the University of Waterloo (Canada) in 1973. The general objectives of the conference were to 1) establish communication, not only in a group, but also on a one-to-one basis, which will carry on during and after the conference and 2) gain new insights on chemistry teaching methods, resulting in an improvement in chemistry learning. Our goal for ChemEd 2017 will be to continue this tradition of communication and pedagogy while incorporating the challenges of 21st century chemistry education.

Traditionally the conference has offered programming for a wide variety of educators including elementary, high school, college teachers and any other individuals interested in chemical education at the introductory level. Many have have found the ChemEd conference to be a valuable experience. A quote from a prior participant describes the value and essence of a ChemEd Conference: "If you want to attend a top-notch, knock-your-socks-off chemistry conference, I urge you to consider attending the ChemEd chemistry teacher conference. ChemEd is chemistry education's premier conference. ChemEd is a five-day conference where the best chemistry educators from around the world will gather and exchange ideas. You can expect that over 200 chemistry workshops will be offered; all of them high school chemistry related. If you are looking for chemistry content and want to learn and share ideas with other teachers, ChemEd is a 'must attend' conference."

During ChemEd, educators are immersed in a setting designed to facilitate collaboration, support, the exchange of ideas and inspiration over a period of five days. Demonstrations, hands-on labs and workshops, and chemistry sessions are among the activities seeking to further develop teachers in the chemistry field. The conference has grown over the years and has ranged from 400-800 participants.

The Department of Chemistry and Biochemistry has taken on the goal of giving conference participants an outstanding experience, one that only could be provided at SDSU and Brookings. All members of the department including faculty and staff are excited for this opportunity and are already well into the planning process. If you have any questions or are interested in being a part of this exciting program, please contact us in the department. You can also follow our progress on Facebook.

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