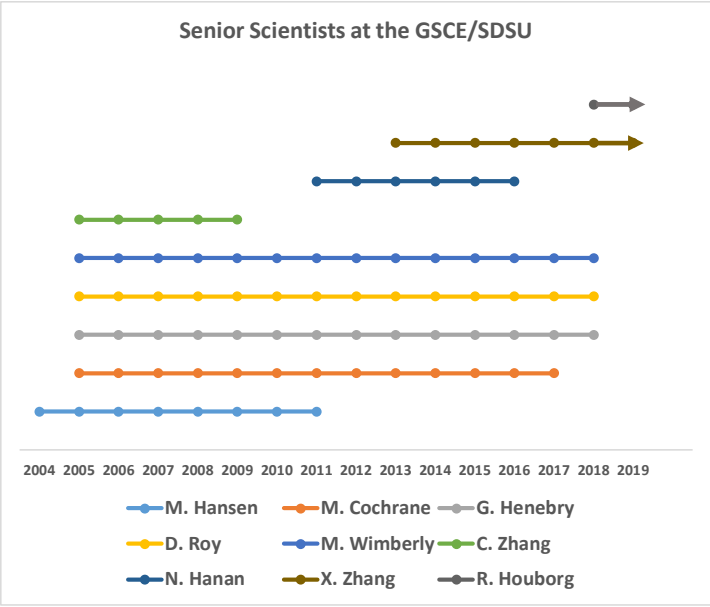
End of an Era at the Geospatial Sciences Center of Excellence

The GSCE mission is to address fundamental questions about the functioning of the biosphere and its implications for the environment and human welfare in a rapidly-changing world.

On Tuesday August 14, 2018, an email from the Office of the Vice President for Research at South Dakota State University announced: "Beginning August 22, the GSCE will move from the Division of Research and Economic Development to the Department of Geography in the College of Natural Sciences. The move will provide better alignment with the university's research strategy, a deeper integration within our university budget process, and provide for integration of the research success strategies of the center and its host college and department." Thus, ending a highly productive phase of a bold experiment in interdisciplinary science that commenced 14 years ago.

The Geographic Information Science Center of Excellence (GIScCE) was officially launched with an dedication ceremony on September 1, 2005 in from of Wecota Hall. Both of South Dakota's US Senators—Tim Johnson and John Thune—spoke at the ceremony, as did officials from SDSU and USGS. The GIScCE was a bold and innovative move to facilitate interactions between the University and the USGS Center for EROS, to increase significantly the amount of federally funded research at SDSU, and to train new generations of scientist in fundamental and applied aspects of terrestrial remote sensing. This initiative was spearheaded by Dr. Ed Hogan of SDSU and Dr. Tom Loveland, USGS Senior Scientist Tom Loveland, an alumnus of SDSU who led land cover science efforts at the USGS Center for EROS. SDSU President Peggy Miller and USGS EROS Center Director R.J. Thompson supported the vision and enabled the Center to move from vision to reality.

Dr. Matt Hansen was recruited from the University of Maryland-College Park in 2004 to set up the Center with assistance from Tom Loveland and Ed Hogan and under the supervision of Provost Carol Peterson. The initial cohort of GIScCE scientists at SDSU included Matt Hansen as Co-Director and Mark Cochrane, Geoff Henebry, David Roy, Mike Wimberly, and Chunsun Zhang as Senior Scientists. On the USGS side, the initial cohort included Tom Loveland as Co-Director and Kwabena Asante, Kevin Gallo, Shuguang Liu, Gabriel Senay, Jim Vogelmann, and Zhiliang Zhu as Senior Scientists.

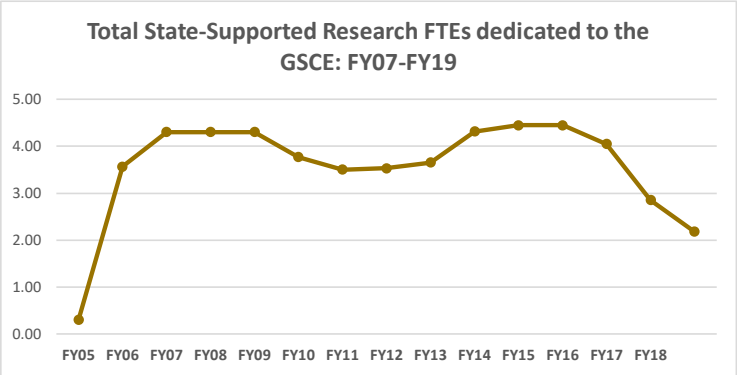


The figure at the left illustrates the composition of the Center at SDSU through the past 14 years. Matt Hansen, the founding Co-Director, returned to UMD in August 2011 with Geoff Henebry stepping up to serve as Co-Director. Chunsun Zhang left in October 2009. Niall Hanan in started in January 2011. Xiaoyang Zhang joined the Center in August 2013. Niall Hanan left New Mexico State University at the end of 2016, and Mark Cochrane left for the University of Maryland Center for Environmental Science/Appalachian Laboratory in June 2017. Rasmus Houborg joined the Center in January 2018. Mike Wimberly left for the University of Oklahoma in August 2018. Geoff Henebry left for Michigan State University in August 2018, and David Roy announced his intention to leave SDSU

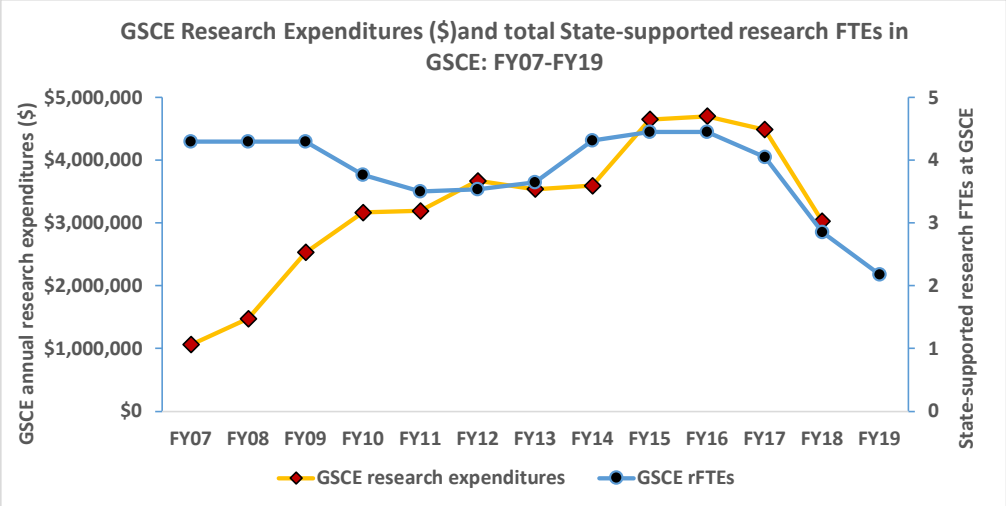
at the end of 2018 to join Michigan State University as well. Bob Watrel, interim head of the Department of Geography assumed the role of acting Co-Director following the resignation of Geoff Henebry.

Thus, the Center, which was renamed the Geospatial Sciences Center of Excellence in 2014, moved from an interdisciplinary research enterprise under the Office of the Provost (2004-2011) and then the Office of the Vice President for Research (starting in 2011) into the Department of Geography in the recently formed College of Natural Sciences.

The figure below illustrates the research FTEs in the Center that were supported through State dollars. Senior Scientist appointments had been 80% research, 10% teaching, and 10% service on a 12-month hard money contract until the 2019 Fiscal Year, starting in July 2018, at which point the Senior Scientists were moved from 12 to 9 month contracts. Co-Director research FTE appointments ranged from 30% to 45%, with the remainder allocated to administrative duties.



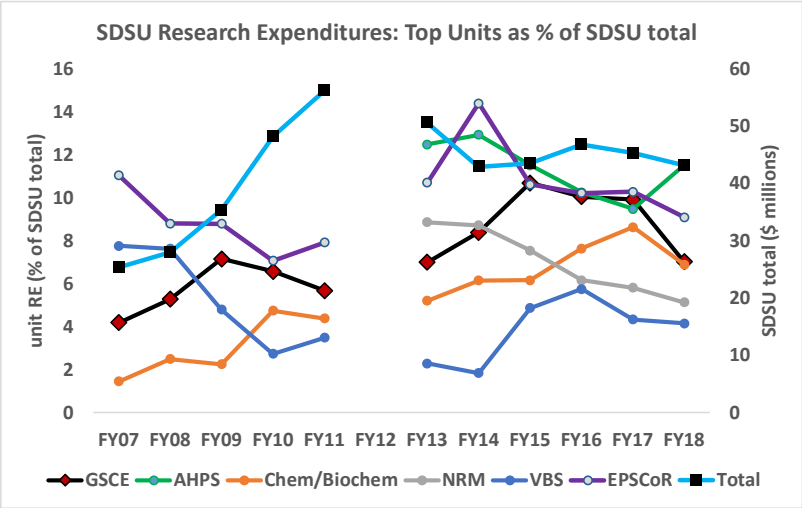
The Senior Scientists were able to compete successfully and repeatedly at the national level to receive funding support from NASA, NSF, NIH, NOAA, DOE, DOT, USDA, USGS, USFS, USAID, and more. External funding enabled the Center to hire post-doctoral fellows and geospatial analysts as well as assistant research professors in addition to students in the Geospatial Science & Engineering PhD program. Staffing peaked at 42, of which more than three-quarters were on “soft money”.



As a research center located outside of the collegiate system, the Center received 40% of the F&A generated by its external funding to provide salary for support services, including accounting, computers and networking. Some of the F&A was returned to the originating investigator(s) to enable them some

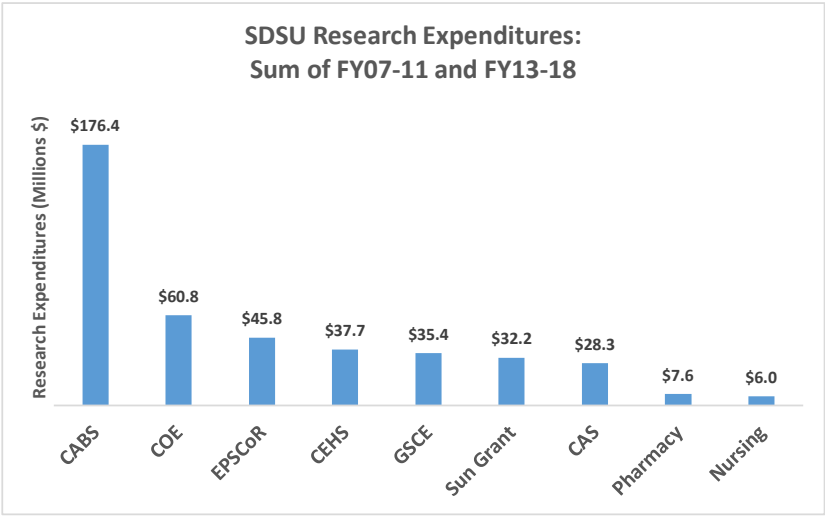
degree of autonomy in pursuing new research directions, specialized training for students or post-docs, travel to meeting or workshops, and research supplies and equipment. This modest funding stream back to the senior scientists provided "lubrication" to the research engine. It provided very successful to stimulate new and recurring external funding.

In comparison to much larger "traditional" departments and research units, the Center compared well in terms of research expenditures. (Detailed research expenditure breakdown by SDSU unit was not available for FY12.)



Legend: AHPS= Agronomy, Horticulture, and Plant Science; NRM= Natural Resource Management; VBS= Veterinary and Biomedical Sciences; EPSCOR= Established Program to Stimulate Competitive Research. N.B.: AHPS and NRM are new units blended from older units. Total= SDSU total of research expenditures.

The research activity at the Center compared favorably at the College level as well.



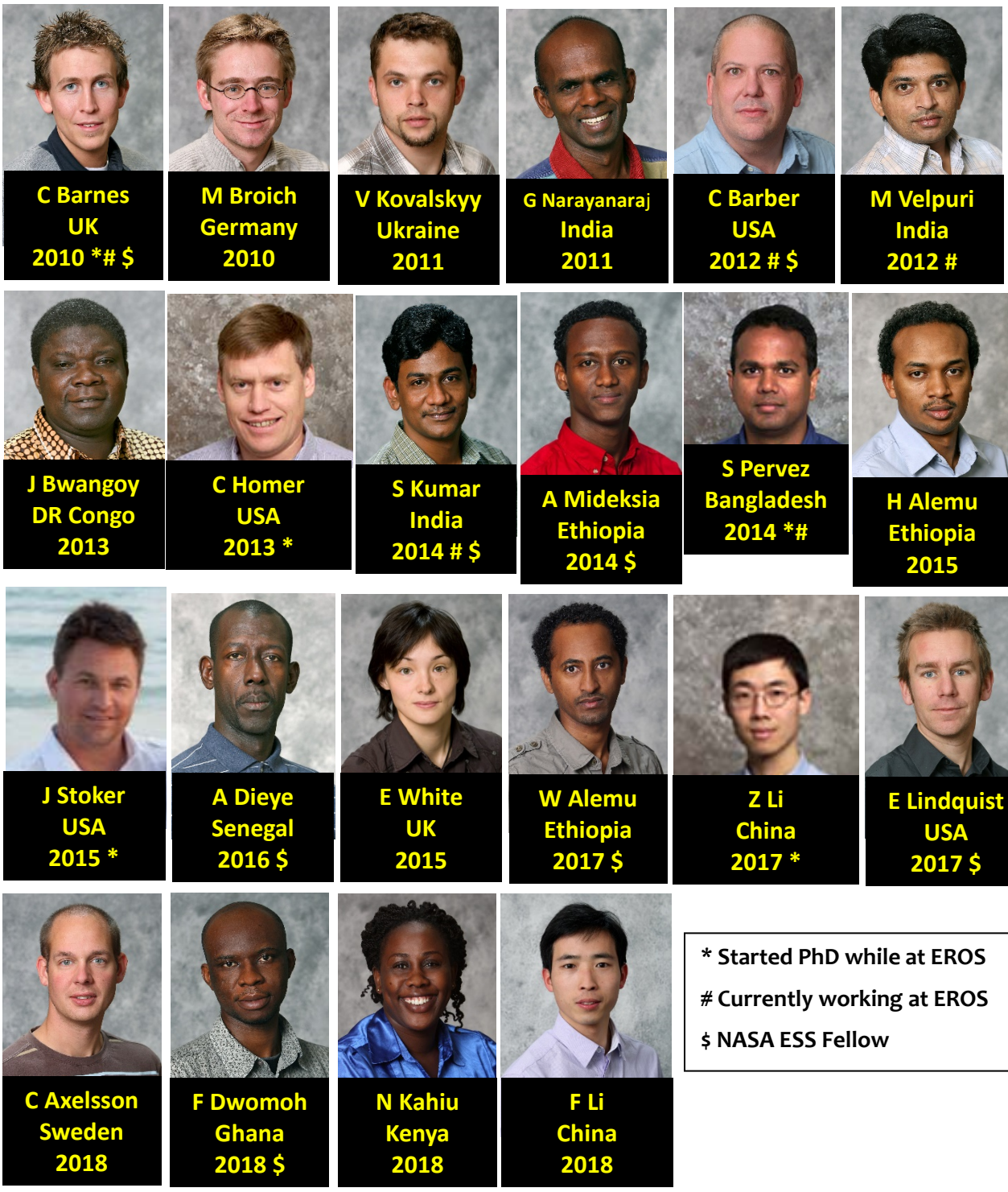
Legend: COE= College of Engineering; CABS=College of Agriculture and Biological Sciences; CAS= College of Arts & Sciences; CEHS= College of Education & Human Sciences.

Thus, the Center, working with an average of 3.99 State-supported research FTEs accounted for 7.6% of the SDSU research expenditures during FY07-11 and FY13-18.

The Center was unabashedly an international place, with faculty, staff, post-docs, and students from across the planet, including Bangladesh, Botswana, Brazil, Cameroon, China, Czech Republic, DR Congo, Egypt, Ethiopia, Germany, Ghana, India, Indonesia, Italy, Japan, Kenya, Kyrgyzstan, Mali, Nepal, The

Netherlands, The Philippines, Poland, Romania, Russia, Senegal, South Korea, Sweden, Taiwan, Ukraine, UK, USA, and Vietnam. In addition, research projects were conducted on all continents except Antarctica. The Center hosted visiting faculty and scientists from the US, China, Ethiopia, and Ghana.

Senior Scientists in the Center were responsible for advising 23 of the 26 Ph.D. graduates of the SDSU Geospatial Science and Engineering Program.



* Started PhD while at EROS

\# Currently working at EROS

$ NASA ESS Fellow

Since 2006 the prestigious and highly competitive NASA Earth & Space Science Fellowship (NESSF) has been awarded to 9 Ph.D. students in the GSE program to support their doctoral research. In addition, GSE students have been supported by the Schlumberger Foundation's Faculty for the Future program and USDA's Borlaug Higher Education for Agricultural Research and Development (BHEARD) program as well as by project and Center funds.

To do nationally competitive cutting-edge research, it was necessary to build, expand, maintain, and manage a considerable computational infrastructure, which, in turn, required dedicated computer professionals. The Center's computing infrastructure grew under the supervision and management of Anil Kommareddy until his departure in 2013, when Adam Dosch took over the task of modernizing and future proofing the complex network of servers, storage, and backup systems. Rachael Auch has been responsible for Windows operating system desktop and laptop systems since 2012. With the departure of Adam Dosch in August 2018 and the restructuring of the GSCE into the Department of Geography in the College of Natural Sciences, responsibility for the computational infrastructure will shift to SDSU central administration.

Finally, support staff through the past 14 years have been many, but one stands out for special mention. Julie Westberg, the Center's senior (and sole) accountant, joined the Center in 2011 following a long career in other parts of SDSU. Running a high-performing, high productivity research operation that relies on funding from multiple external and internal sources requires planning and monitoring budgets, spending lots of money, keeping track of expenditures, and checking that all purchases are appropriate. The GSCE has never failed an internal audit due to the diligence, hard work, and commitment of Julie Westberg. Moreover, the smooth functioning of the money side of the research engine enabled the Senior Scientists to focus on the science, scholarship, teaching, mentoring, service, and outreach.