OU Awarded $166 Million Grant by NASA for First Geostationary Vegetation, Atmospheric Carbon Mission

The University of Oklahoma has been awarded a five-year, $166 million grant by NASA to advance understanding of Earth’s natural exchanges of carbon between the land, atmosphere and ocean.

The primary goals of the Geostationary Carbon Cycle Observatory, led by Berrien Moore, OU vice president for Weather and Climate Programs, are to monitor plant health and vegetation stress throughout the Americas, and to examine the natural sources and processes that control carbon dioxide, carbon monoxide and methane in the atmosphere.

“To say this is an extraordinary achievement by Dr. Berrien Moore and our research team is an understatement,” said OU President David L. Boren. “The grant is one of the most exceptional in the history of the University and is testimony to the outstanding national stature of our research team. I cannot think of a more exciting way to observe the holiday season than with the announcement of this remarkable grant.”

The mission will launch on a commercial communications satellite to make observations over the Americas from an orbit of approximately 22,000 miles above the equator.

The OU-led geoCARB team will build an advanced payload employing otherwise unused launch and spacecraft capacity to advance science and provide societal benefit.

Mission collaborators include the Lockheed Martin Advanced Technology Center in Palo Alto, California; SES Government Solutions Company in Reston, Virginia; the Colorado State University in Fort Collins; and NASA’s Ames Research Center in Moffett Field, California; Goddard Space Flight Center in Greenbelt, Maryland; and Jet Propulsion Laboratory in Pasadena, California. Colleagues and laboratories from France, Australia and Mexico also are contributing to the project.

The mission was competitively selected from 15 proposals submitted to the agency’s second Earth Venture - Mission announcement of opportunity for small orbital investigations of the Earth system.
Palmer Recognized as National Fellow for Contributions to Atmospheric and Meteorological Radar Science

Robert D. Palmer, Ph.D., University of Oklahoma meteorology professor, associate vice president for research and executive director of the Advanced Radar Research Center, has been named an Institute of Electrical and Electronics Engineering Fellow. Among a select group of recipients recommended for the prestigious honor, Palmer is being recognized for contributions to atmospheric and meteorological radar science.

“Professor Robert Palmer has brought distinction to the University of Oklahoma in numerous ways: scientifically, academically and through service that reaches a wide array of private and public sector activities. His most recent and great honor of being made a fellow in the institute adds to this record of distinction to OU. We are particularly thrilled since this also brings much deserved distinction to Bob Palmer,” said Berrien Moore, vice president for Weather and Climate Programs, director of the National Weather Center and dean of the OU College of Atmospheric and Geographic Sciences.

While at OU, Palmer has been deeply committed to providing students a rigorous education in weather radar. In close collaboration with colleagues in the Norman weather radar community, Palmer led the development of a unique interdisciplinary curriculum in radar meteorology. Soon after joining OU, Palmer established the Advanced Radar Research Center, which is rapidly gaining recognition as one of the world’s strongest academic centers in radar meteorology.

In recent years, Palmer has focused on the application of advanced radar signal processing techniques to observations of severe weather, particularly related to phased-array radars and other innovative system designs. He has been published widely in the area of radar remote sensing of the atmosphere, with an emphasis on generalized imaging problems, spatial filter design, and clutter mitigation using advanced array and signal processing techniques.

Palmer, an OU graduate with a doctoral degree in electrical engineering, is actively engaged with his profession through involvement with the American Meteorological Society, the American Geophysical Union and the Institute of Electrical and Electronics Engineering. Internationally, he has been committed to the development of a vibrant exchange program with Kyoto University in Japan, focused on studies of the atmosphere using modeling and advanced remote sensing methods. He has received several awards for his research and teaching activities and is an American Meteorological Society Fellow as well.

The Institute of Electrical and Electronics Engineering Grade of Fellow is conferred by the Board of Directors upon a person with an outstanding record of accomplishments in any of the fields of interest. The total number selected in any one year cannot exceed one-tenth of one percent of the total voting membership. Fellow is the highest grade of the institute’s membership and is recognized by the technical community as a prestigious honor and an important career achievement.

The Institute of Electrical and Electronics Engineering is the leading professional association for advancing technology for humanity. Through its 400,000 plus members in 160 countries, the association is a leading authority on a wide variety of areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics.
Scholarly Endeavors

On December 8, the School of Computer Science hosted 60 students from Millwood Elementary as part of the CS Education Week. Several members of the CS faculty and staff led robot demonstration and coding activities. Millwood students also received 5 tablets to continue their computer science curriculum.

Publication Awards

Professor Thomas Burns (Sociology) and Beth Schaefer Caniglia received the Gerald L. Young Book Award at the 2016 International Conference of the Society for Human Ecology for their book *Environmental Sociology: The Ecology of Late Modernity* published by Mercury Academic (2016). Thomas also received the 2016 OU Good Teaching Award.

CIMMS and NOAA Collaborate Under New Agreement

The Cooperative Institute for Mesoscale Meteorological Studies at the University of Oklahoma collaborate with the National Oceanic and Atmospheric Administration on weather and climate under the terms of a five-year, $95.3 million agreement with NOAA. CIMMS, the largest and second oldest research center at OU, supports NOAA with two of its next generation, long-term planning initiatives: Weather Ready Nation and Climate Adaptation and Mitigation.

“The university is very excited by this new five-year agreement totaling over $95 million to support important weather and climate research on our campus in cooperation with the federal government,” said OU President David L. Boren. “It underlines the importance of what is happening at our university. We are proud to be national leaders in this effort.”

CIMMS contributes to NOAA’s enterprise-wide capabilities in science and technology, engagement and organization and administration in the following research areas: weather radar research and development; stormscale and mesoscale modeling research and development; forecast and warning improvements research and development; impacts of climate change related to extreme weather events; and societal and socioeconomic impacts of high impact weather systems.

“This CIMMS research improves our understanding of stormscale meteorological phenomena, weather radar and regional climate variations,” said Interim Director Randy Peppler. “Our ultimate goal is to help NOAA produce better forecasts and warnings that save lives and protect property.”

CIMMS research affiliates or associates include: Oceanic and Atmospheric Research National Severe Storm Laboratory; Oceanic and Atmospheric Research Air Resources Laboratory; National Weather Service Radar Operations Center for the WSR-88D (NEXRAD) Program; National Weather Service/National Center for Environmental Protection Storm Prediction Center; National Weather Service Warning Decision Training Division; National Weather Service Norman Weather Forecast Office; and National Weather Service Training Center in Kansas City.

CIMMS was established in 1978 through a memorandum of agreement between OU and NOAA. As a NOAA cooperative research institute, CIMMS supports scientists, engineers and students who conduct research, training and outreach in mesoscale weather, weather radar and regional-scale climate processes. For more information, contact cimms@nwc.ou.edu or visit http://cimms.ou.edu.
Student Recognition

- An OU team of Architecture and Construction Science students placed third in the Design-Build Institute of America National Student competition. The competition began with 31 teams of students from 23 universities across the country. Faculty advisors for the team were Associate Professor Tammy McCuen (Construction Science) and Associate Professor Dan Butko (Architecture).

- Kevin Curran (third-year doctoral student, Journalism) is the first recipient of the newly established Broadcast Education Association (BEA) Library of American Broadcasting Foundation Award, research scholarship. This scholarship is competitively awarded to a graduate student conducting research into broadcast history. Curran has also published a peer-reviewed article, “Emergency notifications: Twentieth century or twenty-first?” in the *Journal of Emergency Management* (2016; Vol.14, #5, pp.335-347).

- Pratik Samant (Ph.D. student, Biomedical Engineering) has been awarded a travel scholarship by SPIE-The International Society for Optics and Photonics. This is a merit-based scholarship offered to students located anywhere in the world, evaluated on their prospect for long-term contribution that they will make to the field of optics, photonics or related fields. Samant works in Liangzhong Xiang’s (Assistant Professor, Electrical and Computer Engineering) lab.

OU-Tulsa ECEI Partners with Georgetown & Harvard to Study Three-Year-Olds’ Development

85% of brain development occurs by age three, making early child education vital to a child’s future success in school. The OU-Tulsa Early Childhood Education Institute (ECEI), a research-based institute to advance the quality of early child education (ages 0-3), has been selected to work with researchers from Georgetown University and Harvard University on a new long-term study.

The study, titled SEED (School Experiences and Early Development), will follow approximately 900 three-year-olds from Educare, CAP-Tulsa, and community child-care programs from now through third grade. The study will look at literacy, math skills, self-regulation executive function, and social-emotional development, especially as it applies to children from economically-disadvantaged households, dual-language learners, and those with special needs. A combination of direct...
OU-Tulsa PhD Student Receives First Head Start Research Grant in Oklahoma

Emisha Pickens-Young, an OU-Tulsa PhD student, has been selected as one of only six doctoral students in the entire country—and the first ever in Oklahoma—to receive a prestigious and highly-competitive federal Head Start Graduate Student Research Grant.

Pickens-Young is earning a Doctorate in Instructional Leadership & Academic Curriculum in the Jeannine Rainbolt College of Education at OU-Tulsa and works as a Project Director for the Early Childhood Education Institute (ECEI) also at OU-Tulsa.

“We knew Emisha’s unique experience of attending Head Start as a child and having worked as a Head Start teacher for more than six years made her an extremely strong candidate,” said Dr. Diane Horm, Director of the ECEI. “She is a Head Start success story, and living Head Start’s mission of delivering high-quality early childhood education to children growing up in poverty gave her a unique vantage point.” Pickens-Young was a lead preschool teacher, master teacher, and coach for new teachers at CAP-Tulsa’s Head Start for six and a half years.

Pickens-Young’s dissertation research will study teaching teams at local Head Start and Early Head Start programs, specifically how the teams impact classroom quality and child outcomes. Her research will not only be important for Head Start programs across the country, but her results will also impact the larger field of Early Childhood Education and fill a current void in the research literature.
OU Professor Recognized by World’s Largest Scientific Society for Studies Linking Biogeochemistry to Geography of Ecological Communities

Michael Kaspari, a University of Oklahoma biology professor, has been named a Fellow of the American Association for the Advancement of Science for innovative studies linking biogeochemistry to the geography of ecological communities. Kaspari has sought to understand why ecological communities—the collection of plants, animals and microbes found in any one place—vary from place to place across the planet.

“I am proud to join the AAAS in recognizing the accomplishments of Michael Kaspari. This recognition demonstrates the quality of faculty that we have at the University of Oklahoma. Professor Kaspari is an integral member of the OU academic community,” said Kelly Damphousse, dean of the OU College of Arts and Sciences. “His research efforts have been important for understanding how and where animal ecosystems thrive. I congratulate him on this prestigious honor.”

Kaspari, a Presidential and George Lynn Cross Research Professor in the Department of Biology, was awarded this honor for scientifically or socially distinguished efforts to advance science or its applications. He will be recognized for his efforts on Saturday, Feb. 18, at the American Association for the Advancement of Science Fellows Forum during the 2017 Association’s Annual Meeting in Boston, Massachusetts.

“The work I am most proud of explores how adding a little sodium, the main ingredient in table salt, can accelerate the activity and abundance of animals from prairies to rainforests. The reason for this is that animals need salt and most plants do not. This simple fact underlies a host of ecological phenomena, from the wanderings of bison herds to the way that termite damage tends to hug the salty coastal communities,” said Kaspari.

Kaspari looked for the answer in the ways the Earth’s temperatures govern the pace of life, how its rainfall sustains life and how 25 chemical elements from the periodic table are used to build the living things found on our planet. Each chemical element plays a role and each has its own geography. He has shown how phosphorous sparks the way microbes break down leaf litter in the soils of the tropics and how nitrogen is used to build the grasses and grasshoppers of the Oklahoma prairies.

This year’s Fellows will be formally announced in the American Association for the Advancement of Science News & Notes section of the journal Science on Nov. 25, 2016. For more information, please contact Kaspari at mkaspari@ou.edu or visit his website at https://michaelkaspari.org.
New Class of Drugs Holds Promise for Combating Antibiotic Resistance

A new class of drugs that combat antibiotic resistance has been discovered by a University of Oklahoma researcher and team. In the study supported by the National Institutes of Health, laboratory experiments were combined with supercomputing modeling to identify molecules that boost the effect of antibiotics on disease-causing bacteria.

Helen Zgurskaya, professor of chemistry and biochemistry in the OU College of Arts and Sciences, and OU team members Narges Abdali, Julie Chaney, David Wollroscheck and Valentin Rybenkov, collaborated with Jeremy Smith, Jerry Parks and Jerome Baudry, the University of Tennessee-Oak Ridge National Laboratory Center for Molecular Biophysics; Adam Green, UT; and Keith Haynes and John Walker, Saint Louis University School of Medicine. They collectively identified four new chemicals that seek out and disrupt bacterial proteins called “efflux pumps”, a major cause of antibiotic resistance in bacteria.

“The supercomputing power of ORNL’s Titan supercomputer allowed us to perform large-scale simulations of the drug targets and to screen many potential compounds quickly,” said Zgurskaya, head of the OU Antibiotic Discovery and Resistance Group at the Stephenson Life Sciences Research Center. “The information we received was combined with our experiments to select molecules that were found to work well, and this should drastically reduce the time needed to move from the experimental phase to clinical trials,” she added.

The team focused on one efflux pump protein, known as AcrA, which connects two other proteins in a tunnel shape through the bacterial cell envelope. Disrupting this protein could essentially break the efflux pump—an approach unlike other drug design strategies that try to inhibit the biochemical processes.

The study, “Reviving Antibiotics: Efflux Pump Inhibitors That Interact with AcrA, a Membrane Fusion Protein of the AcrAB-ToIC Multidrug Efflux Pump,” was published in the American Chemical Society’s Infectious Diseases journal. Support for the project was provided by NIH grant number RO1AI052293 in the amount of $2 million. For more information about this project, please contact elenaz@ou.edu.
November New Awards

<table>
<thead>
<tr>
<th>Name</th>
<th>Dept./Center</th>
<th>Funding Agency</th>
<th>Project Title</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steven Cavallo</td>
<td>Meteorology</td>
<td>U.S. Dept. of Defense, Office of Naval Research</td>
<td>Polar predictability and dynamics through multi-scale atmospheric vortices</td>
<td>$105,000</td>
</tr>
<tr>
<td>Hjalti Sigmarsson</td>
<td>Electrical &amp; Computer Engineering</td>
<td>Omega Micro Technologies, Inc.</td>
<td>Low Cost High Temperature Multilayer Ceramic Modules (LCHTC)</td>
<td>$50,000</td>
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<tr>
<td>Phillip Chilson</td>
<td>Meteorology</td>
<td>Helios Remote Sensing Systems</td>
<td>Advancing Technology for Offshore Wind Resource Characterization</td>
<td>$45,810</td>
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<tr>
<td>Melissa Scott</td>
<td>Center for Spatial Analysis</td>
<td>State of Oklahoma, Water Resources Board</td>
<td>OWRB Web Viewer Enhancement and Upgrade</td>
<td>$21,649</td>
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<tr>
<td>Matthew Miller</td>
<td>Biology</td>
<td>Johns Hopkins University</td>
<td>Bolivian Training in Arboviruses, with a focus on arthropod transmission and Zika virus</td>
<td>$9,496</td>
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# President's Monthly Research and Development Highlights

"Creating Tomorrow"

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<thead>
<tr>
<th>Name</th>
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<th>Project Title</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melissa Scott</td>
<td>Center for Spatial Analysis</td>
<td>State of Oklahoma, Water Resources Board</td>
<td>OWRB Water Infrastructure Viewer Site Maintenance, Hosting and Backup</td>
<td>$3,271</td>
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<tr>
<td>Jizhong Zhou &amp; Zhili He</td>
<td>Microbiology &amp; Plant Biology</td>
<td>University of California, Berkeley</td>
<td>Directing Traffic in the Rhizosphere: How Phage and Fauna Shape the Flow and Fate of Root Carbon through Microbial Pathways</td>
<td>$180,000</td>
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<tr>
<td>John Dyer</td>
<td>Electrical &amp; Computer Engineering</td>
<td>U.S. Dept. of Transportation, Federal Aviation Administration</td>
<td>Data Collection and Analysis and Maintenance for Optical Tracker at KLGA</td>
<td>$89,827</td>
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<td>Brett Carpenter, Jefferson Chang, &amp; Zeev Reches</td>
<td>Geology &amp; Geophysics/ Geological Survey</td>
<td>National Science Foundation</td>
<td>RAPID: Collaborative Research: GPS observations of post-seismic deformation from the 3 Sep 2016, Mw 5.8, Pawnee, Oklahoma</td>
<td>$16,187</td>
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<tr>
<td>Susan Schroeder</td>
<td>Chemistry &amp; Biochemistry</td>
<td>University of California at San Francisco</td>
<td>Protein and Metal Ion Binding in Viral RNA</td>
<td>$38,748</td>
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<tr>
<td>Prakash Vedula</td>
<td>Aerospace &amp; Mechanical Engineering</td>
<td>Engility</td>
<td>Development of an Advanced CFD Tool for High Speed ISR</td>
<td>$170,000</td>
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<tr>
<td>John Tobin</td>
<td>Physics &amp; Astronomy</td>
<td>National Radio Astronomy Observatory</td>
<td>Spiral Structure and Clump Kinematics in the Gravitationally Unstable Disk Around L1448 IRS3</td>
<td>$29,973</td>
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<td>Robert Palmer, Boon Leng Cheong, Caleb Fulton, Jorge Salazar Cerreno, Hjalti Sigmarsson, Mark Yeary, Tian-You Yu, Guifu Zhang, &amp; Yan Zhang</td>
<td>Vice President’s Office/Advanced Radar Research Center/Electrical &amp; Computer Engineering/ Meteorology</td>
<td>U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration</td>
<td>ARRC Demonstrator Development Activities for the MPAR Program: CPPAR and Horus</td>
<td>$2,082,666</td>
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Number of new awards for the month: 14
Dollar amount of proposals funded: $3,206,277