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Published by the Office of Research Development
Five-Million Dollar NSF Grant Boosts NMSU’s Smartgrid Research

By Hamid Mansouri Rad, Office of Research Development (ORD)

An interdisciplinary team of NMSU scientists were awarded $5 million by the National Science Foundation to enhance NMSU’s research and education on smartgrids.

Through this project, entitled the Interdisciplinary Center of Research Excellence in Design of Intelligent Technologies for Smartgrids (iCREDITS), NMSU scientists from the departments of Computer Science and Klipsch School of Electrical and Computer Engineering will create a new center for research and training in smartgrids. The project’s main objectives include

• creating infrastructure to enable interdisciplinary research and training in smartgrids,
• developing research to realize an energy-delivery paradigm and sustain the design and development of smartgrids,
• developing a comprehensive interdisciplinary training pipeline in smartgrids,
• promoting participation of a diverse student population in smartgrids training and research, and
• achieving international leadership in smartgrids research and training.

This effort is co-directed by two prominent NMSU researchers, Drs. Enrico Pontelli, Chair of the Department of Computer Science, and Satish Ranade, Chair of the Klipsch School of Electrical and Computer Engineering. Although awareness is increasing regarding the need for alternative sources of energy, and we see more building structures equipped with solar panels, according to Satish Ranade, that is not enough. “In the U.S. we use about 3,500 watts per person, whereas the developing countries use 500 watts of energy per person,” he said in a
A team of faculty led by Dr. Stefan Zollner, professor and head of NMSU’s Department of Physics, has been awarded a $300,000 grant by the Department of Defense for acquisition of a high-resolution, high-power X-ray Diffractometer (XRD) for materials research and education. This instrument will replace an older powder diffractometer with lower resolution and intensity. The team also includes Drs. Heinz Nakotte and Edwin Fohtung (Physics) and Shuguang Deng and Hongmei Luo (Chemical Engineering).

“I commend Dr. Zollner for his efforts to secure this award,” says Vice President for Research Vimal Chaitanya. “Once operational, this XRD will fill a gap that our researchers presently have in order to become more competitive in pursuing research endeavors in materials science and engineering.”

While housed in NMSU’s Gardiner Hall, home of the Department of Physics, the XRD will be made available to all researchers on campus. The instrument will be integrated into the Core University Research Resources Laboratory (CURRL).

Recognizing the national need for highly skilled scientists and engineers, the Department of Defense has awarded more than 1.7 million in grants and contracts to the NMSU Department of Physics. These funds are used to train undergraduate and graduate students and to acquire equipment.

For more information, please contact Dr. Zollner at zollner@nmsu.edu.
Dr. James McAteer, assistant professor of Astronomy, has received $750,000 from the National Science Foundation’s highly competitive Faculty Early Career Award program to continue his research on the Sun.

Dr. McAteer’s project entitled “INSPIRE: An Integrated Solar Physics Program in Research and Education” addresses two fundamental questions about the Sun: how is the Sun structured, and how and why does the Sun vary.

“The topic of the Sun’s structure and evolution provides multiple research topics for both PhD students in astronomy and undergraduate students across Science, Technology, Engineering, and Math (STEM).” As such, this project allows NMSU students from across all STEM fields to participate in research. “This encourages participation from students who otherwise may have never considered scientific research as a component of their degree,” says Dr. McAteer. Further, the modular nature of this project allows for work to be combined into graduate research of a truly interdisciplinary nature.

The project provides research opportunities for ten undergraduate and four to six graduate students. Each student will have a chance to present his or her work extensively in national and international astrophysics and interdisciplinary conferences and refereed journals.

As part of the project, Dr. McAteer is partnering with a solar physics citizen-science project, Zooniverse, and developing and integrating team-based learning initiatives into his classroom. He will provide scientific input, and use the scientific outputs in addressing the research objectives of this project. The integration of research and education is a key component of the NSF Career program.

Before joining the NMSU faculty, Dr. McAteer was a fellow at Trinity College (Dublin), NASA’s Goddard Space Flight Center, and Queen’s University in Belfast.

Dr. McAteer joined NMSU in 2010 and is a member of the Solar Physics and Space Weather research group in the Department of Astronomy.

For additional information, please contact Dr. McAteer at mcateer@nmsu.edu.
Drs. Young S. Lee, Fangjun Shu, and Mingjun Wei, faculty members of the Mechanical and Aerospace Engineering (MAE), have been awarded a $500,000 grant by the US Army Research Office for acquisition of a Polytec PSV-500 scanning vibrometer, a LaVision time-resolved 3D PIV system, and an ATOS core essential 2MP 3D scanner. This equipment will facilitate NMSU faculty’s research in multidisciplinary areas such as fluid-structure interaction in flapping wings of a bio-inspired micro-air vehicle. According to Dr. Lee, they will also be used as a teaching and demonstration tool, making the learning process more interactive through more realistic visualization of mechanical principles in 3D.

These three instruments, as shown below, will be integrated into a system for laser-assisted modeling of structural/fluid dynamics and fluid structure interaction problems.

Once acquired, the three instruments will be installed in the Aerospace Structural Dynamics Laboratory, the Aero/Fluid Laboratory, and the Computational Fluids Dynamics Laboratory, all located at NMSU’s Jett Hall, home of MAE. In addition to MAE faculty members, the equipment may be used by faculty in the Departments of Civil Engineering, Industrial Engineering, Chemical Engineering, and Engineering Physics.

For more information, please contact Dr. Lee at younglee@nmsu.edu.
VPR and PSL Employee Service Awards

By Hamid Mansouri Rad, ORD

Employees of the Office of the Vice President for Research and Physical Science Laboratory (PSL) who completed a service anniversary in 2013 were recognized at a ceremony in Anderson Hall. Reminiscing about his first job at NMSU as a PSL student employee assisting with missile testing data analysis 50 years ago, President Carruthers mentioned that he is intimately familiar with the work PSL does. “The greatness of PSL, and NMSU in general, is sustained by people who have worked here over a long period of time,” he said. “That is why we honor those who have worked here for 5, 10, 15, 25, and 35 years at NMSU, one of the finest land-grant universities in the country.”

PSL was founded in 1946 to address the needs of the nation’s space and rocket initiatives. The staff at PSL played a crucial role in testing and analyzing data regarding the V-2 and the Aerobee rocket at the White Sands Missile Range. By the 1970s, PSL expanded its customer base to the U.S. Air Force and NASA.

PSL continues its support of NASA’s unmanned, high altitude (120,000 ft.) scientific balloon operations and manages the Columbia Scientific Balloon Facility in Palestine, Texas. PSL also supports the Department of Defense in the areas of telemetry and unmanned aerial vehicle systems (UAS) flight and testing. PSL manages the UAS Flight Test Center that covers 15,000 square miles of airspace over a highly varied train in the southwest U.S. “With over 300 employees, PSL is an asset to NMSU and to the nation, and we continue to
NMSU Researchers Visit India to Expand Research Collaborations

In January, Vice President for Research Vimal Chaitanya along with faculty members Jeffrey Arterburn, Regents Professor of Chemistry and Biochemistry; Brad Shuster, Associate Professor of Biology; Ross Staffeldt, Professor of Mathematical Sciences; and Jay Misra, Assistant Professor of Computer science; visited several outstanding educational institutions in India to expand NMSU’s collaborations with that country.

“The goal of these visits was to further explore areas of collaborations with Indian educational institutions that offer capabilities that are complementary to those of NMSU,” says VPR Chaitanya.

NMSU delegation visited Indian Institute of Science Education and Research (IISER) in Pune and met with the IISER administration and faculty members. They also visited several research labs and made technical presentations. During these visits many avenues of potential collaboration were discussed. Among them was a short-term and long term (10 months) exchange of students who are engaged in research activities as well as feasibility of faculty exchanges and doctoral study opportunities at NMSU.

Drs. Chaitanya and Misra also visited Maharaja Sayajirao University (MSU) in Baroda and Indian Institute of Technology in Bhubaneswar. They discussed the possibility of accepting some of their top students to NMSU graduate programs and initiating research.

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NMSU Astronomy Assistant Professor Jason Jackiewicz was granted a highly competitive $600,000 National Science Foundation CAREER award for his project to study the Sun.

The scientific goal of this project is to understand how the Sun generates and sustains its own global magnetic field. This will be carried out by studying the main ingredients of this process, which are the Sun's interior plasma flows that are associated with its east-west rotation and also the flows that go in the north-south direction to the poles and equator. These large motions in the Sun are thought to help provide new sources of magnetic-field generation potential, thus creating the solar cycle and giving rise to the violent magnetic eruptions that affect Earth.

“We will analyze the interior dynamics of the Sun using solar seismology, or helioseismology, which involves studying sound waves in the Sun using techniques very similar to what Earth seismologists use for understanding our planet's interior from earthquakes,” says Dr. Jackiewicz. “Extending our findings to other stars with magnetic fields will place the Sun in an astrophysical context.”

Two graduate students and ten underrepresented minority students will be trained in the project, giving them the technical experience they need to form a diverse, next generation of solar astronomers. In addition, professional development activities with sixth-grade teachers in southern New Mexico promoting relevant inquiry-based learning related to project science will help the team reach about 15,000 students over the next five years, leading to increased science proficiency in this critical age group.

For more information please contact Dr. Jackiewicz at jasonj@nmsu.edu.
NMSU Faculty’s Book Addresses Multimodal Composition Issues

By Hamid Mansouri Rad, ORD

The impact of visual, oral, spatial, and digital communication as a means for crafting and delivering information is a rapidly expanding area of study for rhetoric scholars. Just as print had enormous social impact by allowing mass dissemination of books and other printed materials, desktop publishing and now new media have revolutionized production of multimodal projects. Digital technology has allowed authors to easily create and incorporate visuals and sounds in a variety of materials, from marketing to complex technical documents, in order to improve readers’ understanding of the content provided to them. Despite this digital revolution, rarely do faculty across disciplines allow use of multiple media in student projects. Traditionally, the focus has been on composition and content through written words, and writers were only permitted use of text features such as type face, weight, decoration, spacing, and size to guide readers through different hierarchies of information on a paper. But the trend is changing. Scholars such as NMSU English Associate Professor Jennifer Sheppard recognize that composition has always been a multimodal process requiring us to change how we think about college composition as well. Nevertheless, if we were to accept and encourage multimodal student projects, that incorporate visuals, sounds, or movies, how do we teach them in composition courses? How do we evaluate them? These questions have driven Dr. Sheppard and her co-authors to publish the book Writer/Designer: A Guide to Making Multimodal Projects. This book draws from research in composition and the authors’ first-hand experience in teaching multimodal classrooms to introduce principal concepts used in creating multimodal projects.

Dr. Jennifer Sheppard, Associate Professor of English

Dr. Sheppard and her co-authors have been fascinated with the intersection of writing and technology since their days together in graduate school. “During our time as PhD students and in our separate careers, we each have taught various digital rhetoric, multimedia development, and electronic publishing courses, but we were never able to find a textbook that struck a happy medium between interpreting theory for students and helping them to put it into practice no matter what genre or audience they were writing for,” says Dr. Sheppard. “Our goal for the book was to help authors learn to make conscious multimodal choices in the text they create, no matter what mode, medium, or rhetorical situation they are working in.”

Writer/Designer was published in February of this year (2014) by Bedford/St. Martin’s. The book provides a set of rhetorical rubrics for analyzing multimodal projects and presents case studies to help the readers examine these principles in action. A chapter is also devoted to choosing a genre and thinking about “pitching” a project to stakeholders. In addition, the readers are provided with supporting documents, e-Pages, that can be accessed online at bedfordstmartins.com/writerdesigner.

“The audience for this book is anyone, student or instructor, who needs to learn practical strategies for communicating

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collaborations with outstanding faculty.

The group also gave talks at the Indian Institute of Technology in Indore. They visited several research labs, discussed avenues of collaboration, and met with administrative leadership and faculty members.

For additional information please contact Dr. Pontelli at epontelli@cs.nmsu.edu or Dr. Ranade at sranade@nmsu.edu.

“Five-Million Dollar NSF Grant Boosts NMSU Smart Grid Research” continues from page 2

research rally held on April 11 dedicated to the iCREDITS project. Discussing the need for comprehensive adoption of alternative energy sources, Ranade said that we need to reach a point where we don’t have to build power plants anymore.

A smartgrid is a fully automated power delivery network that monitors and controls every customer and node, ensuring a two-way flow of electricity and information between the power generators and the appliances and all points in between. The basic principle of a smartgrid is that energy must be generated, not only by power plants, but also by consumers. The grid must constantly have access to live data regarding power generation and consumer usage. “The vision of iCREDITS is to obtain sustainable generation capacity by shifting the paradigm from power delivery to energy delivery, using smartgrid concepts,” said Pontelli. “In an energy-delivery system, energy is viewed as a commodity, which can be produced, stored, and exchanged. We start this project locally, but our results are scalable to the national level.”

This project also aims to address a fundamental problem, which is dramatic shortage of workforce in smartgrids. “The education component of this project will create a comprehensive pipeline starting from K-12 and continuing to the doctoral level, serving an academically and culturally diverse student population in New Mexico,” said Pontelli.

In addition to Drs. Pontelli and Ranade, other investigators collaborating on this project are Drs. Jay Misra, William Yeoh, Huiping Cao, and Son Tran from the Department of Computer Science, Dr. Sukumar Brahma from the Klipsch School of Electrical and Computer Engineering, Susan Brown, director of NMSU’s STEM Outreach Center, and Louiza Fouli Assistant Professor of Mathematical Sciences.

For additional information please contact Dr. Pontelli at epontelli@cs.nmsu.edu or Dr. Ranade at sranade@nmsu.edu.

“NMSU Researchers Visit India to Expand Research Collaborations” continued from page 7

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“NMSU Faculty’s Book Addresses Multimodal Composition Issues” continued from page 9

effectively in multiple media,” says Dr. Sheppard. But the book will hold its promise beyond the classroom, as a reference guide for those who want to create captivating multimodal projects for work.

Writer/Designer can be found on Amazon.com. For additional information about the book, please contact Dr. Sheppard at jasheppa@nmsu.edu.
Introducing NMSU VIVO for Clinical and Translational Research

By Hamid Mansouri Rad, ORD

NMSU is one of the 13 institutions across 7 states that are part of the Mountain West Clinical and Translational Research-Infrastructure Network (CTR-IN). In order to facilitate collaboration and mentoring across the consortium, the CTR-IN plans to use the VIVO academic profile system, a web application that allows search and discovery of research and scholarship. NMSU plans to populate VIVO with profiles of faculty interested in clinical and translational sciences, irrespective of their seniority or track record with NIH.

The VIVO system will not supplant Digital Measures at NMSU—it is being used only for the purposes of identifying CTR-IN mentors and collaborators to pursue additional opportunities in clinical and translational sciences.

What is the advantage of VIVO for NMSU? Faculty and researchers who are interested in translational research can use it as an inter-institutional collaboration explorer. Current faculty who have registered with NMSU VIVO include Jeffrey Arterburn (Chemistry and Biochemistry), Cindy Kratzke and Kristynia M Robinson (Nursing), Dave Dubois (Plant and Environmental Sciences), Immo H. Hansen (Biology), and Joe Song (Computer Science). This web-based application is highly intuitive to use. Those interested in starting a VIVO profile, can send an email to hamid@nmsu.edu.

Mountain West CTR-IN Members:
- University of Alaska – Anchorage
- University of Alaska – Fairbanks
- University of Hawaii – Manoa
- Boise State University
- Idaho State University
- University of Idaho
- Montana State University
- University of Montana
- University of Nevada, Las Vegas (host)
- University of Nevada Reno, including the University of Nevada School of Medicine
- New Mexico State University
- University of New Mexico
- University of Wyoming
NMSU Research News is a quarterly newsletter published by the Office of the Vice President for Research/Research Development. Comments are always appreciated. To submit your research-related news, or to request hard copies, please contact Hamid M. Rad at (575) 646-6429 or via email at Hamid@NMSU.Edu