



NEWSLETTER

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THE DIRECTOR'S CORNER

I am grateful for the opportunity to serve as the new Director of AMRI and would like to thank Dr. Leonard Spinu for his 2 ½ years of strong leadership in this role. AMRI will face certain challenges in this next academic year, but is well positioned to deal with whatever comes our way. We are already excited about recent accomplishments by AMRI researchers. For example, a special congratulations is in order for Dr. Weilie Zhou and Dr. Matthew Tarr. Dr. Zhou has secured a grant through the Small Business Innovation Research (SBIR) program. This grant supports the joint efforts of Surface Treatment Technology (ST2) Inc. and the University of New Orleans to develop a three-dimensional sensor for chemical detection. Dr. Tarr has recently been awarded a 3 year \$450,000 National Science Foundation (NSF) grant to study how sunlight transforms oil on the surface of water and he has also received the prestigious UNO Research Excellence Prize given to a faculty member who has an outstanding and sustained record of scholarly activities. We look forward to see how the various efforts of these and other AMRI researchers unfold this year.

In anticipation of these various accomplishments, I want to go ahead and highlight the AMRI annual review, which will take place early next year on February 4, the Thursday before Mardi Gras. The exact location of the event has yet to be determined, but will likely take place on the UNO main campus or at the adjacent UNO Research and Technology Park.

--**John Wiley**

AMRI Gets New Director

We are pleased to announce the appointment of Professor John B. Wiley as the new Director of AMRI. Dr. Wiley, a President's Research Professor in the Department of Chemistry at UNO, has been the Associate Director of AMRI for 11 years. He is replacing Dr. Leonard Spinu, a University Research Professor in the Department of Physics, who served as director for over 2½ years. Dr. Spinu will be serving as a Rotator in the Division of Materials Research at the National Science Foundation (NSF) in Arlington, Virginia, splitting his time between NSF and his research program here at UNO.



2015 AMRI/Chemistry Summer Outreach Program Close-Out Poster Session and Barbecue

AMRI recently closed another year of the Summer Outreach Research Program. The 2015 AMRI/Chemistry Program began on May 26 with the undergraduate students, who were joined by the high school students and high school teachers on June 1, and continued through July 24, when the program closed with a barbecue cook-out lunch and research poster session. This program has taken place each summer since 2002, when it began as a program for high school students and teachers. In 2003, it was expanded to include undergraduate students. The purpose of the program is to increase awareness and understanding of scientific research among undergraduates, high school students and teachers. Participants conducted research on an independent project in chemistry, physics, biology, or materials science. They attended weekly seminars that allowed for discussion of current scientific issues, research concepts, and scientific ethics. Below are some pictures of the participants at the poster session and a photograph of everyone at the close-out barbecue.



Aleta Overby, a teacher from Loranger High School, points out the dynamics of a cyclic polymer to the Dean of the College of Sciences, Dr. Steve Johnson.



Kayla Moore from Spelman College explains synthesis of quantum dots.



Dr. John Wiley examines Natasha Bourgeois's research poster on West African antelope.



Julianne Lamy, a high school student, presents research on in vitro toxicity of polarized BTO nanoparticles to Dr. Dan Gonzalez.



Group photo of AMRI 2015 Summer Outreach Research Program participants.

Congratulations to Dr. Weilie Zhou for Award to Develop Chemical Sensors

Dr. Weilie Zhou will begin Phase II of a grant from the Defense Threat Reduction Agency (DTRA). This grant is a Small Business Innovation Research (SBIR) program in post-Phase II and supports joint efforts from the Surface Treatment Technology (ST2) Inc. and the University of New Orleans to develop a new sensor arrays for chemical detection. The SBIR is a federal program that awards research and development funds to small businesses to encourage them to explore their technological potential and develop new innovations that will be made commercially available to the public. Dr. Zhou and his research group will investigate sensors based on three-dimensional nanowire arrays for selective chemical detection. The total funding awarded to Dr. Zhou at UNO for this portion of the grant is \$219,443.

Dr. Matthew Tarr Wins \$450,000 Grant to Study How Sunlight Transforms Oil Spills and UNO Research Excellence Award

AMRI and Chemistry Professor, Dr. Matthew Tarr, has been awarded a 3 year \$450,000 National Science Foundation grant to study how sunlight transforms oil on the surface of water. He and his research team will expose different types of oil to simulated sunlight in order to gain a better understanding of the chemical structures that are formed when petroleum is spilled in water. They will also determine how dispersants affect the make-up of the oil.

"Many previous studies utilized ultraviolet radiation that is not representative of sunlight, and few, if any, studies have recorded findings across oil types or in the presence of dispersants," Tarr said. "This study will produce important and unique data that are needed to understand the fate and transport of oil spilled in aquatic systems."

The results of the research will allow scientists to better predict the behavior of crude oil spilled in water. It will also provide valuable guidance for future response strategies and technologies, according to Tarr. The project will include an educational component. Undergraduate students will gain important experience while working as part of the research team. High school students and teachers will participate in summer research experiences that will broaden their own perspectives.

Tarr, who joined the UNO faculty in 1995, is a member of the American Chemical Society. He has served as a principal investigator on more than \$4 million worth of externally funded grants and worked as key personnel on more than \$11 million in sponsored programs. He is the 2015 recipient of the UNO Research Excellence

Prize, given to a faculty member who has achieved the rank of associate professor or professor and who has an outstanding and sustained record of creative or scholarly activities.



Shining a New Light on New Solar Cells

Dr. Weilie Zhou, working with researchers at the National Renewable Energy Laboratory (NREL) in Golden, Colorado and Brown University in Providence Rhode Island, helped to better illuminate the behavior of the new generation of perovskite based solar cells. This work was highlighted in the recent publication “Carrier separation and transport in perovskite solar cells studied by nanometre-scale profiling of electrical potential,” Chun-Sheng Jiang, Mengjin Yang, Yuanyuan Zhou, Bobby To, Sanjini U. Nanayakkara, Joseph M. Luther, Weilie Zhou, Joseph J. Berry, Jao van de Lagemaat, Nitin P. Padture, Kai Zhu and

Mowafak M. Al-Jassim, *Nature Communications*, 2015, 6; doi:10.1038/ncomms9397. Their work highlighted the need for improvements in carrier mobility as the key to further advance these types of solar cells.

New Faces at AMRI

AMRI welcomes Mark Granier, a recent Bachelor of Science graduate from the Department of Chemistry at the University of New Orleans. Mark will work as a gratis Research Associate for Dr. John Wiley’s research group.

Recent Publications

“Thermal Stability and High Temperature Polymorphism of Topochemically-Prepared Dion-Jacobson Triple-layered Perovskites” Stephen L. Guertin, Elisha A. Josepha, Dariush Montasserasadi, and John B. Wiley, *J. Alloys Compd.* 2015 (in press). DOI: 10.1016/j.jallcom.2015.06.045

“Formation of Scrolled Silver Vanadate Nanopeapods by both Capture and Insertion Strategies,” Taha Rostamzadeh, Shiva Adireddy, and John B. Wiley, *Chem. Mater.* 2015, 27, 3694–3699. DOI: 10.1021/acs.chemmater.5b01161.

“Electrochemically Synthesized Polyethylene Glycol Coated Ferromagnetic Nanowire Arrays,” Jagnyaseni Tripathy, Shankar Khanal, Jose M. Vargas, Leonard Spinu, and John B. Wiley, *Mater. Res. Bull.* 2015, 68, 60-65. DOI: 10.1016/j.materresbull.2015.03.032.

“Carrier separation and transport in perovskite solar cells studied by nanometre-scale profiling of electrical potential”, Chun-Sheng Jiang, Mengjin Yang, Yuanyuan Zhou, Bobby To, Sanjini U. Nanayakkara, Joseph M. Luther,

Weilie Zhou, Joseph J. Berry, Jao van de Lagemaat, Nitin P. Padture, Kai Zhu, and Mowafak M. Al-Jassim, **Nature Communications**, 6, 8397, DOI: 10.1038/ncomms9397.

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-- a publication of the
**Advanced Materials Research Institute,
College of Sciences,
University of New Orleans
New Orleans, LA 70148**

Phone: (504) 280-6840 / Fax: (504) 280-3185

E-mail address: amri@uno.edu
www.uno.edu/amri

Compiled by: Jennifer Tickle,
Research Associate II