Research & Creative Activity (RCA) Innovation Awards Presentation and Reception

Tuesday, April 26
4:30pm—6pm
High Country Conference Center
Agassiz/Fremont Room

NORTHERN ARIZONA UNIVERSITY
Message from the President & Vice President for Research

Dear Faculty Members, Awardees, and Guests,

Welcome to the 2016 Research and Creative Activity Innovation Awards. The work presented here represents the trajectory of Northern Arizona University – innovative, relevant, and with an eye toward solving difficult problems with data and creativity.

These awards highlight our dedication to building a world-class institution where research and creative activities thrive. Our awardees have demonstrated a commitment to excellence and a passion for their fields, garnering recognition from colleagues both within and beyond the borders of our campus.

This thirst for knowledge resonates across our campus, generating opportunities for collaboration, enhanced learning for both graduate and undergraduate students, connections to the community, and technology transfer. Our awardees are leaders and mentors who weave threads of innovation throughout their work.

Please join me in celebrating the achievements of this exceptional group. Their creativity, problem-solving, leadership, and passion will guide the university forward. We are thrilled to shine a spotlight on their work today.

Congratulations to our recipients and we look forward to celebrating their continued success!

Sincerely,

Rita Hartung Cheng
President

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Sincerely,

William Grabe, Ph.D.
Vice President for Research
Order of Events

Reception

Opening Remarks
William P. Grabe, Vice President for Research

Awards Presentation
Most Promising New Scholar
Most Promising Postdoctoral Researcher/Scholar
Most Promising Graduate Student Researcher/Scholar
Research Mentorship Award
Most Significant Research/Scholarly Work
Most Significant Artistic/Creative Work

Inventors’ First Patents
Early Career Innovator
Bruce Reiprich’s music has been described as having “unapologetic lushness” (NewMusicBox), as “postromantic radiance” (Danbury News-Times), “a deeply personal mediation on the poet’s feelings” (San Francisco Classical Voice), “very powerful” (All Music Guide), “lovely and evocative” (Guitar Review-New York), “very impressive” (Cumhuriyet-Turkey), and “of special interest” (Guitar International-England).

Dr. Mommert’s research is focused on studying the properties of asteroids and comets. After completing his studies and finishing his Ph.D. in Germany, he moved to Flagstaff in 2013 to work as a Postdoctoral Researcher at NAU’s Department of Physics and Astronomy. Using ground- and space-based observations, he explores the properties of asteroids and comets and what they can tell us about the formation and evolution of the Solar System.

Nick McKay grew up in Flagstaff before getting Bachelor’s and Master’s degrees at NAU in Environmental Science and Geology. Nick got his Doctoral degree at the University of Arizona before returning to Flagstaff in 2012, and has been an Assistant Professor in the School of Earth Sciences and Environmental Sustainability since the Fall of 2014. Nick’s research spans the discipline of paleoclimate dynamics, including reconstructing past environments, using data and models to understand past climate dynamics and building paleoclimate informatics cyberinfrastructure. Nick is married to another Flagstaff native (Amber), and has three boys, Carter (8), Ethan (6) and Landon (4).

Romy Ghanem is a PhD candidate in Applied Linguistics. Ms. Ghanem speaks four languages and has always been passionate about language learning. Her research interests are speech perception/production and language structure. She has conducted research on the perception of nonnative speakers and teachers as well as accented speech. Her dissertation investigates the manner in which nonnative speakers modify their speech to accommodate different interlocutors. More specifically, she examines the way in which communication success is achieved through accommodation and adjustment strategies. Her goal is to narrow the gap between linguistic theory and the practical use of language.

Romy Ghanem
Department of English
Most Promising Graduate Student Researcher/Scholar

Nicholas McKay, Assistant Professor
School of Earth Sciences and Environmental Sustainability
Most Promising New Scholar

Michael Mommert
Department of Physics and Astronomy
Most Promising Postdoctoral Researcher/Scholar

Bruce Reiprich, Professor
"Flowing Waters Caress Fallen Petal" and "Lambent." Music compositions by Bruce Reiprich, Professor, School of Music
Most Significant Artistic/Creative Work

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The RCA Awardees
His music has been heard abroad with performances in Brazil, Romania, Portugal, China, Poland, Germany, England, Turkey, and Mexico, throughout the United States, and in numerous radio broadcasts. His music is published by the American Composers Alliance-American Composers Edition.

Kees Jan van Groenigen, Assistant Research Professor

Faster Decomposition Under Increased Atmospheric CO₂ Limits Soil Carbon Storage

Most Significant Research/Scholarly Work

Van Groenigen, who earned his PhD degree at Wageningen University (the Netherlands), joined NAU in 2010. He started off as a post doc and last year he became an Assistant Research Professor in the Center for Ecosystem Science and Society. His research focuses on how human activities and environmental changes affect the flow of carbon and nitrogen through land ecosystems. Van Groenigen studies the role of soil microbes in these processes through lab incubation experiments and other approaches. He also spends a lot of time synthesizing findings in his field of research, using a range of statistical methods.

Dave Wagner, Associate Professor

Department of Biological Sciences

Research Mentorship Award (tie)

Dave Wagner conducts research on a number of different infectious diseases. In particular, he’s developed an international reputation for his work on plague, including the use of contemporary and ancient DNA studies to understand the geographic source of the three historical human plague pandemics. He’s the Associate Director of the Center for Microbial Genetics and Genomics and mentors a large research group of staff and students, including many undergraduate students. His students are treated as junior colleagues and participate in cutting-edge research, obtain training in advanced scientific techniques, and regularly earn authorships on research presentations and publications.

Chun-Hsing Jun Ho, Assistant Professor

Department of Civil Engineering, Construction Management and Environmental Engineering

Research Mentorship Award (tie)

Dr. Jun Ho is an assistant professor in Civil Engineering at NAU. His research interests lie in transportation systems and construction materials. Jun has been with NAU for almost four years. To date, Jun and his research team have received 13 awards at national/international competitions, published 23 papers in peer-reviewed professional journals and conference proceedings, and presented 46 presentations at professional conferences. He has graduated at least 20 undergraduate students from his research lab, and many of them have successfully admitted to their chosen graduate school such as Columbia University, Northwestern University, Virginia Tech, University of California-Berkeley, and University of Washington.
The Innovators

Michael Shafer, Assistant Professor
Early Career Innovator

Dr. Michael Shafer is an Assistant Professor of Mechanical Engineering at Northern Arizona University who earned Ph.D. and M.S. degrees in mechanical engineering from Cornell University and is also a graduate of NAU. His past experience includes work at NASA’s Jet Propulsion Laboratory, where he helped develop the sky crane system used to land the Curiosity rover on Mars. His research interests include energy harvesting, bio-inspired engineering systems, wind turbine control, and advanced actuation technologies. Since joining the NAU faculty in 2013, Dr. Shafer has disclosed several inventions, with two technologies that are actively being developed and are in the process of being commercialized by NAU Innovations.

Andrew Koppisch, Assistant Professor
Early Career Innovator

Dr. Andrew Koppisch is an Assistant Professor of Biochemistry at Northern Arizona University who earned his doctorate degree in chemistry at the University of Utah. His past experience includes postdoctoral work at Stanford University and Los Alamos National Laboratory. His research interests include ionic liquids and deep eutectic solvents for biomedical applications, development of new antibiotics through inhibition of bacterial secondary metabolism, and biosynthetic production of commodity chemicals. Since joining the NAU faculty in 2011, Dr. Koppisch has disclosed numerous inventions, with ongoing collaborations with researchers at other institutions and two technologies that are actively being developed and are in the process of being commercialized by NAU Innovations.
Inventors’ First Patents

**Patent Number:** US 8,444,115  
**Title:** Cable Manipulator  
**Inventors:** John T. Tester, Andrew J. Dethlefs

**Summary**  
A device for manipulating heavy-gauge cables allows workers to extend, retract, hold and position cables using a relatively small input torque to generate a large output force. Commercial-grade electrical power cables are typically manipulated manually by utility company linemen within confined spaces, resulting in hazardous working conditions that can lead to injury. The cable manipulator reduces the difficulty of manipulating heavy-gauge cables and provides significant improvement in safe working conditions.

**Patent Number:** US 8,480,377  
**Title:** Integrated electro-magnetohydrodynamic micropumps and methods for pumping fluids  
**Inventors:** Constantin Ciocanel, Nazmul Islam

**Summary**  
A micropump for pumping fluid through a flow channel includes electrodes and magnets positioned adjacent a flow channel such that the fluid can be moved in response to electric potentials placed across the electrodes, or in response to magnetic fields produced by the magnets, or by a combination of the two processes. This device can be used in micro-electro-mechanical systems and offers the advantages of highly controllable reversible flow over a wide range of flow rates, reduced frictional losses, and a lack of moving parts.

**Patent Number:** US 8,997,167  
**Title:** Live streaming video sharing system and related methods  
**Inventors:** John C. Georgas, Lee Bliss, Jenean M. Perelstein, Britt Weber Mullen, Bryce Evan Carey, Waylon Jay-Shije Dixon, Chad Michael Ellsworth

**Summary**  
A live-streaming point-of-view video sharing system includes a hands-free video camera that wirelessly transmits video and audio to a mobile device, which in turn uploads the content wirelessly to a video streaming server. Content is shared with other users through one or more channels of related content that can be public or private, the public content being fully indexed and searchable. This invention has potential applications in social media, entertainment, distance learning, and law enforcement.

**Patent Number:** US 9,222,559  
**Title:** Elastic motor-spring actuator  
**Inventors:** Kiisa Nishikawa, Theodore A. Uyeno

**Summary**  
A biomimetic actuator design based on the Winding Filament Hypothesis more closely replicates the behavior of biological muscle contractions. Rapid movement is accomplished by elastic energy storage and a tunable compliance. The actuator design can be used to improve the power-to-weight ratio, dynamic stability, and thermodynamic efficiency of actuators for use in a variety of fields, including robotics and prosthetics.