

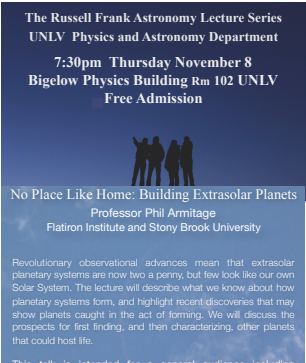


2018 Fall Semester Research Newsletter

Major Events:

- The College of Sciences is celebrating its [50th anniversary](#). In 1958, UNLV's College of Science and Mathematics was formed. The following year, Robert Smith began serving as founding Dean, with nearly 500 undergraduate and 41 graduate students enrolled. In Fall 2018, the college has approximately 2,700 undergraduate students and 250 graduate students in five core academic areas: **life sciences; chemistry and biochemistry; geoscience; mathematical sciences; and physics and astronomy**. To commemorate the 50th anniversary, College faculty will present public lectures on each of the five core areas in Spring 2019. An alumni symposium event and an exhibit of Art in Science Research are planned for later in the year.
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- UNLV faculty and students presented their research at the annual [Nevada-INBRE](#) meeting on August 23, 2018, at the Grand Sierra Resort in Reno. Drs. **Brian Hedlund** and **Kelly Tseng** (Life Sciences) discussed their findings, and nine UNLV undergraduate students presented posters on their research projects. Nevada-INBRE is funded by **National Institutes of Health** (NIH) through a \$17 M grant to improve the biomedical research infrastructure in Nevada. Information on research opportunities can be found at: <https://med.unr.edu/inbre>.
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- Department of Physics and Astronomy sponsored two public lectures in Fall 2018. Dr. Mario Livio (UNLV adjunct professor) gave the lecture "The Golden Ratio" on October 18, 2018. Prof. Phil Armitage (Flatiron Institute and Stony Brook University) was the speaker for the **Russell Frank Astronomy Lecture Series** on November 8, 2018. The title of his talk was "No Place Like Home: Building Extrasolar Planets."
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- On Saturday, November 17, 2018, the College of Sciences hosted a one-day Campus workshop on Grant Opportunities in the **National Science Foundation (NSF) Division of Undergraduate Education**. Thirty-six faculty from six universities and institutions (University of Nevada, Reno, College of Southern Nevada, Desert Research Institute, Southern Utah University, Cedar City, and Dixie State University, St. George, Utah) attended this meeting. Twenty-two UNLV faculty participated in the event, nine from the College of Sciences, seven from the College of Education, and six from the College of Engineering.



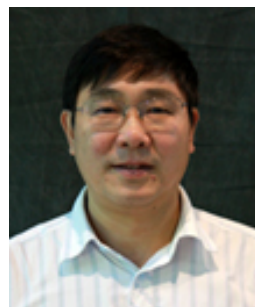
Faculty Searches and New Appointments:

There are four ongoing faculty searches in the College, in the areas of:

- High-Pressure Physics
- Atomic, Molecular, Optical Physics
- Bioanalytical Chemistry
- Sedimentary Geology.

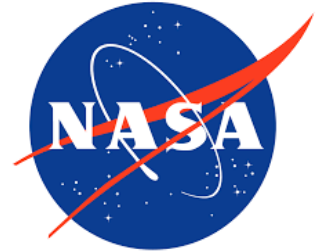
Newly Awarded Major Research Grants (>\$100,000):

1. **Hui Zhang** (Chemistry and Biochemistry) was awarded a new [National Institutes of Health \(NIH\)](#) R15 grant (\$437,202) entitled “Regulation of Stem Cell Protein Stability by Novel Ubiquitin Ligases” to support research in embryonic stem cells.
2. **Matthew Lachniet** (Geoscience) received a three-year (\$479,099) grant from the [National Science Foundation](#) for his project entitled “Collaborative Research: P2C2--What is the Driver of Orbital-Scale Central American Monsoon Variations? Tests of the



Insolation and Sea Surface Temperature Hypotheses.” Lachniet and his research team will work in caves in Guatemala and elsewhere in Central America to determine what factors control the strength of the monsoon on long timescales. This investigation will improve our ability to make more accurate projections about rainfall patterns.

3. **Daniel Proga** (Physics and Astronomy) was awarded a three-year grant (\$464,618) from [NASA's Astrophysical Theory Program \(ATP\)](#) to study radiation-magnetohydrodynamics of clouds in active galactic nuclei (AGNs), a common astronomical phenomena that show active emission properties in a fraction of galaxies. Proga and his collaborators will continue their quest to develop a comprehensive and quantitative theory for cloud formation, destruction, and acceleration based on high-resolution computer simulations. The results of this project will reveal the basic physical properties of flows in AGNs with unprecedented accuracy and detail. The theoretical predictions from this project will be compared with observations by both current and future NASA missions.

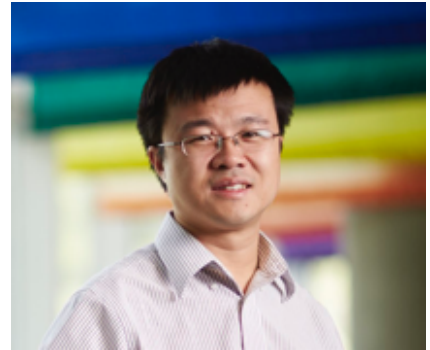


4. **Arya Udry** (Geoscience) was awarded two NASA program grants. The first one is a three-year (\$330,540) [NASA Solar System Working Program](#) grant entitled “Petrogenesis of Poikilitic Shergottites and Implications for Martian Geochemical Reservoirs.” This grant is to study a comprehensive suite of Martian meteorites called the poikilitic shergottites. These meteorites are exceptional, because they record the evolution of the magma from the mantle to the surface of Mars. They also provide significant information about geochemical heterogeneities in the Martian interior. The second one is a [NASA Planetary Major Equipment Program](#) grant (\$240,250) for the acquisition of a new laser ablation system for UNLV. The new equipment will be coupled with Assistant Professor **Shichun Huang**’s inductively coupled plasma mass spectrometer to allow the researchers to measure trace elements (<1%) in minerals. Trace elements can be analyzed for many geological purposes, including to



understand the origin of sedimentary rocks, alteration processes, and magma evolution and sources.

5. **Rebecca Martin** and **Zhaohuan Zhu** (both Physics and Astronomy) are part of a multi-institute research team that was awarded a three-year [NASA's Theoretical and Computational Astrophysics Networks](#) grant. The grant, "Origin of the giant planet dichotomy: Multi-scale modeling of planetary envelope accretion," was funded for \$1,497,749, of which UNLV will receive \$479,000. The other members of the research team are from Stony Brook University; University of Colorado, Boulder; and the University of Arizona.

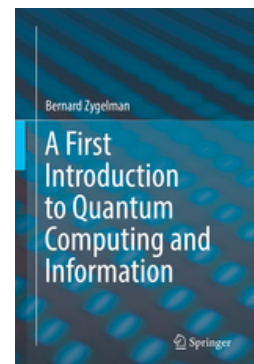


6. **Eduardo Robleto** (Life Sciences) was awarded a three-year grant (\$428,000) from the [National Institutes of Health](#) (NIH) to study mechanisms of evolution in stressed bacteria. His research team includes international scientists and seeks to understand how microbes, including bacterial pathogens, adapt to inhospitable environments or become resistant to antibiotics.



High-impact publications:

1. **Bernard Zygelman** (Physics and Astronomy) has published the book "[A First Introduction to Quantum Computing and Information](#)". The textbook, published by [Springer Nature](#), addresses and introduces new developments in the field of quantum information and computing (QIC) for a primary audience of

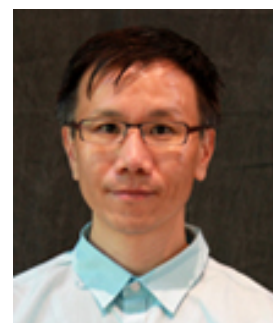


undergraduate students. Developments over the past few decades have spurred the need for QIC courseware at major research institutions. This book broadens the exposure of QIC science to the undergraduate market. The subject matter is introduced in such a way that it is accessible to students with only a first-year calculus background.

2. **Arya Udry** (Geoscience) co-authored the manuscript "[Martian Magmatism from Plume Metasomatized Mantle,](#)" which was recently published in *Nature Communications* (2016 IF = 12.1). This study shows that the two main types of Martian meteorites (shergottites and nakhlites) could have formed from the same volcanic processes that create volcanoes in Hawaii, as demonstrated by meteorite chemical data. Udry also co-authored the article "[1.34 Billion-Year-Old Magmatism on Mars Evaluated from the Co-genetic Nakhlite and Chassignite Meteorites,](#)" which was recently published in *Geochimica et Cosmochimica Acta*. The paper focuses on the formation and emplacement of meteorites on Mars' surface. The authors showed that these rocks were formed from the same parent magma from different lava flows, similar to features observed in terrestrial volcanic systems.



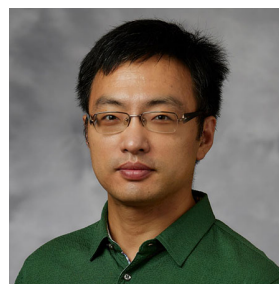
3. **Jun Yong Kang** (Chemistry and Biochemistry) and his research team (Hai Huang and Jeffery Ash) published a research article, "[Tf2O-Promoted Activating Strategy of Phosphate Analogues: Synthesis of Mixed Phosphates and Phosphinate,](#)" in *Organic Letters* (2017 Impact factor = 6.5). This research reports an efficient, mild synthetic method of phosphates and phosphonates. Phosphonate derivatives are prevalent in bioactive small molecules, pharmaceuticals, and agrochemicals. This synthetic methodology will have a significant effect on organophosphorus chemistry by avoiding the use of toxic metals and hazardous chloride reagents. Coauthor Jeffery Ash is an undergraduate student in Dr. Kang's research laboratory.



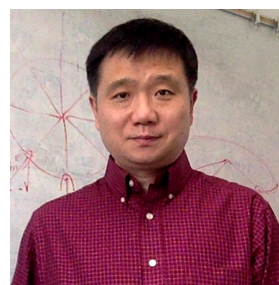
4. **Balakrishnan Naduvalath** (Chemistry and Biochemistry) and his team published a paper entitled "[Unraveling the Stereodynamics of Cold Controlled HD-H2 Collisions](#)" was published in *Physical Review Letters* (2017 Impact factor = 8.8), and was selected as Editors' Suggestion.



5. **Le Chen** (Mathematical Sciences) is the first author of the article "[Comparison Principle for Stochastic Heat Equation on \$R^d\$](#) ", which was published in the *Annals of Probability*, one of the top journals in the field of probability.



6. **Bing Zhang** (Physics and Astronomy) is a co-author of a recently published paper in *Nature Communications* (2016 impact factor: 12.1). The paper is titled "[Strongly lensed repeating fast radio bursts as precision probes of the universe](#)". He Gao, a former UNLV Ph.D. student in Zhang's group and a professor at Beijing Normal University, is the corresponding author of the paper. This paper reports the prospects of using gravitational lensed repeating fast radio bursts to constrain cosmological parameters.



7. **David Hatchett** (Chemistry and Biochemistry) and his group published a paper in *Electrochimica Acta*. The group produced a Nickel metal precursor that was used in the controlled electrochemical deposition of the metal to form conductive polymer/Nickel metal composite materials. The paper documents the first electrochemical preparation of the composites and their use for the catalytic oxidation of methanol for fuel cell applications.



8. **Clemens Heske** (Chemistry and Biochemistry) co-authored two papers published in high-impact journals. The [first paper](#) was published in *ACS Applied Materials & Interfaces* (2017 Impact factor = 8.1). The [second paper](#) was published in *Progress in Photovoltaics: Research and Applications* (2017 Impact factor = 6.4).



9. **Brian Hedlund** (Life Sciences) is a coauthor of a paper published in *Nature Communications* (2016 impact factor: 12.1). The paper is titled "[Genomic inference of the metabolism and evolution of the archaeal phylum Aigarchaeota](#)".



Featured research:

1. The research of paleontologist **Stephen Rowland** (Geoscience) and his students on excavating and studying a 20,000-year-old mammoth fossil was featured in [*Las Vegas Review Journal*](#).
2. **Stephan Rowland** (Geoscience) and his team are studying the “oldest known footprints” (footprints of an early reptile-like animal) found in Grand Canyon. Their work was featured in multiple media, including [*National Geographic*](#), [*Fox News*](#), [*The London Economics*](#), [*IFU News*](#), [*LiveScience*](#), [*KNPR*](#), [*KIZZ*](#), and [*Cronkite News*](#).
3. **Jason Steffen** (Physics and Astronomy) spoke at Clark Planetarium, Salt Lake City, Utah, and explained the exoplanet missions Kepler and TESS. The story was featured in [*Deseret News*](#). Earlier, Steffen wrote a piece on this subject for [*The Conversation US*](#), and the story was widely distributed in various media, including [*Inverse*](#), [*Sci Fi Generation*](#), and [*Pacific Standard*](#). Additionally, the airplane boarding method named after him, i.e. Steffen’s method, was featured in [*Travel Weekly*](#).
4. Research by **Jason Steffen** (Physics and Astronomy) and his student Ian Rabago suggested that moons around “rogue planets” that drift in interstellar space may harbor life without the need of a star. The work was featured in [*ABC News*](#).
5. **Frank van Breukelen** (Life Sciences) was featured in the article [*"Bear hibernation is a superpower, but it comes with a cost"*](#) published in [*mashable.com*](#).
6. The research of **Brian Hedlund** (Life Sciences) and his group was featured in [*NBC News*](#).
7. **Martin Schiller**’s research lab (Life Sciences, Executive Director of the Nevada Institute of Personalized Medicine) was featured in [*Las Vegas Review Journal*](#). The research



of **Daniel Thompson** (Life Sciences) was featured [U.S. Fish & Wildlife Service](#).

8. As a climate change expert, **Matthew Lachniet** (Geoscience) was featured in the article ["Earth's carbon dioxide levels are likely the highest they've been in 15 million years"](#) published at [playboy.com](#), [Yahoo!News](#), and some foreign media. He was featured in another article ["What 'Cli-Fi' gets right about our environmental doomsday"](#) published at [mashable.com](#). Lachniet also explained what climate change means for Nevada at [News 3 Las Vegas](#) and [News wise](#).

9. The research of **Donald Price** (Director of the School of Life Sciences) and his lab was published in [Behavior Ecology](#) and reported in [UNLV Accomplishments](#).



10. The story written by **Bing Zhang** (Physics and Astronomy) for [The Conversation US](#) on his recent work on “relativistic astronomy”, a new concept of making astronomical observations using cameras traveling near speed of light, was reported in various media including [Scientific American](#), [Universe Today](#), and [Astronomy Connect](#).

11. **David Lee** (Life Sciences) and his comparative biometrics lab was featured in [UNLV News Center](#). Dr. Lee’s lab researches evolutionary questions behind the mechanics of how animals get around. What they’re learning is informing the design and control of legged robots and robotic prosthetics on humans.



12. The research **Qingxi Jeffery Shen** (Life Sciences) and his lab was featured in an article titled “Food for all” at [UNLV News Center](#). Dr. Shen reports that grant support from the USDA has allowed his research team to study the stress properties of rice genes, with the goal of increasing yields for major crops such as wheat, maize, sorghum, barley, and millet.



13. **UNLV Research Week** is held in October of each year, and celebrates the research, scholarly, and creative activities of our faculty and students. This year, a series of Campus events (undergraduate research fair, graduate

research showcase, etc) were carried out during the [*Research Week*](#) (October 8-12) to feature the broad research activities of the College of Sciences faculty and students.

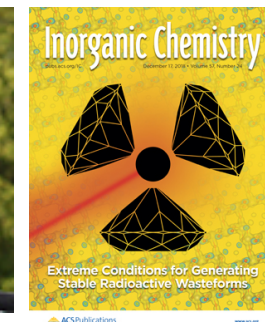
14. **Brett Riddle** (Life Sciences) was featured in an interview at [*UNLV News Center*](#). Dr. Riddle's research focuses on how a dynamic Earth history has played a role in such things as the generation of biological diversity, the assembly of communities of species, and the rearrangement of species and community distributions across time and space.



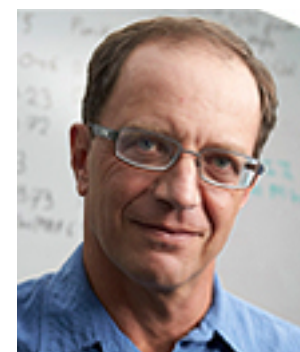
15. **Zhaohuan Zhu** (Physics and Astronomy) and his graduate student, Shangjia Zhang, coauthored 10 papers with the Atacama Large Millimeter Array (ALMA) collaborations, which are featured in a major international joint press release among National Radio Astronomical Observatory (NRAO) and Harvard University, Rice University, and California State University in the US and other universities and institutions from Chili, Germany, France, and China. See [*UNLV Press Release*](#) and news at [*Las Vegas Channel 3 report*](#).



16. The article of **Ashkan Salamat** (Physics and Astronomy) was featured on the cover page of the journal [*Inorganic Chemistry*](#).








17. **George Rhee** (Physics and Astronomy) created an online climate change calculator that quantifies the difference that a shift to renewables makes in a rapidly changing climate. The results are featured in a KNPR story entitled [*Do the Math*](#). He was also one of the speakers at "Grey-Green-Fold: German-American [*Colorado River Dialogues 2018*](#)".

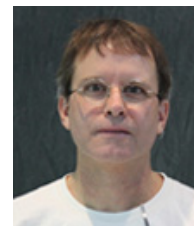


Awards and honors:

Faculty Awards and Honors:

1. **Dennis Bazylnski** (Life Sciences) was selected as the UNLV nominee for the 2019 Nevada **Regents' Distinguished Researcher Award**. 
2. **Brian Hedlund** (Life Sciences) was selected as the UNLV nominee for the 2019 Nevada **Regents' Mid-Career Researcher Award**.
3. **Zhaohuan Zhu** (Physics and Astronomy) was selected as the UNLV nominee for the 2019 Nevada **Regents' Rising Researcher Award**.
4. **Alison Sloat** (Faculty in Residence) was selected to receive the **UNLV Foundation Distinguished Teaching Award** and to be UNLV's nominee for the 2019 Nevada Regents' Teaching Award for non-tenure-track faculty. Dr. Sloat will also be honored by the Provost at UNLV's Best Teaching Practices Expo on January 29, 2019. 
5. Six College of Sciences faculty were named recipients of the 2018 Faculty Opportunity Awards, totaling nearly \$108,000. These awardees were **Christopher Adcock** (Geoscience), and **Allen Gibbs, David Lee, Qingxi Jeffery Shen, Ai-Shun Tseng, and Philippos Tsourkas** (all from Life Sciences).
6. **Mira Han** (Life Sciences) won the [National IDeA Symposium of Biomedical Research Excellence](#) (NISBRE) Young Investigator/Student Travel Award. 
7. **Artem Gelis** (Chemistry and Biochemistry) was awarded a U.S. patent granted by the U.S. Patent and Trademark Office for the technology, "Immobilization of Organic Radioactive and Non-radioactive Liquid Waste in a Composite Matrix." 
8. **Aude Picard** (Life Sciences) was awarded a Research Infrastructure Grant (\$45,000) from the Nevada Space Grant Consortium for her research project "Evaluating the Impact of Oxidation on Biosignatures Preserved in Minerals". 

9. **Jay Nietling** (Physics and Astronomy) among others was this year's recipients of UNLV [Professional Development Awards](#).



10. **Daniel Thompson** and Mandy Mountain (both Life Sciences) were awarded the Faculty Award for the UNLV Image of Research for their image entitled "*Caterpillar of the Endangered Mount Charleston Blue Butterfly Attracting an Ant Mutualist*".



11. **Jun Yong Kang** (Chemistry and Biochemistry) was awarded a patent granted by the U.S. Patent and Trademark Office for the invention "Methods and Compositions for Substituted Alpha-Aminophosphonate Analogues."

Student Awards and Honors:

1. **Katherine Thornock Luebke** (Chemistry and Biochemistry) won an award for best poster presentation at the annual Department of Energy (DOE) National Nuclear Security Administration (NNSA) Defense Nuclear Nonproliferation Research and Development (DNN R&D) University Program Review (UPR) meeting in June, 2018.
2. Two former School of Life Sciences students, **Angelica Bustos** and **Nha Trang "Vivian" Sam**, received Outstanding Graduate Awards at the 10th anniversary celebration of UNLV's Academic Success Center (ASC).
3. **Timothy Waters** (Ph.D. Physics and Astronomy; Advisor: **Daniel Proga**) won the College of Sciences' Outstanding Dissertation Award.
4. **Jacqueline Phan** (M.S. Chemistry and Biochemistry; Advisor: **Ernesto Abel-Santos**) won the College of Sciences' Outstanding Thesis Award.
5. **Joy Immak** (Ph.D. Life Sciences, Advisor **Helen Wing**) won the College of Sciences' Outstanding Graduate Teaching Award.

6. Four College of Sciences students were honored outstanding students and student speakers at 2018 Winter Commencement: **Anabel Castro**, B.S. in Geology (with Prof. **Brenda Buck**); **Kevin Ashi**, B.S. in Biological Sciences; **Schetema Nealy**; Ph.D. in Chemistry Education (with Prof. **MaryKay Orgill**); and **Surbhi Sharma**, Ph.D. in Cell and Molecular Biology (with Prof. **Martin Schiller**).



7. **Noam Dadon** (B.S. Biological Sciences) was the Honors College Medallion Ceremony Student Speaker.

