# UNLV | COLLEGE OF SCIENCES



**SPRING 2021**

# Harnessing the Power of Proteins in Our Cells to Combat Disease

**UNLV SCIENTIST GARY KLEIGER AT THE FOREFRONT OF A POTENTIAL NEW DRUG MODALITY.**

Over many decades now, traditional drug discovery methods have steadily improved at keeping diseases at bay and cancer in remission. And for the most part, it's worked well.

But it hasn't worked perfectly.

A lab on UNLV's campus has been a hub of activity in recent years, playing a significant role in a new realm of drug discovery — one that could potentially provide a solution for patients who have run out of options.

"It's starting to get to the point where we've kind of taken traditional drug discovery as far as we can, and we really need something new," said UNLV biochemist Gary Kleiger.

**Gary Kleiger's lab on UNLV's campus has been a hub of activity in recent years, playing a significant role in a new realm of drug discovery. Pictured is a protein complex vital to Kleiger's recent research.**

Traditional drug discovery involves what is called the small molecule approach. To attack a protein that's causing disease in a cancer cell, for instance, a traditional drug has to - in a very targeted way - find that protein and shut down its activities.

It'd be like filling a baseball player's glove with a bunch of cement.

"The glove gives a baseball player the ability to do his job and catch a baseball," Kleiger said. "But if we were to take cement, and fill the pocket of the baseball glove with that cement, it would effectively shut down the ability of that baseball player to function on the team. That's what traditional drugs do."

There's a big but, however. Up until this point, traditional drugs have only had the capability to target proteins that are participating in the disease that also have activities that are amenable to the small molecule approach, or, like the baseball player, actively engaging in the sport on the field.

These proteins make up a seemingly small percentage of the disease-causing proteins in our bodies.

So, as you can imagine, Kleiger said, while this model has helped effectively treat HIV and cancer, and helped treat everyday diseases through the use of antibiotics, it has some major setbacks.

"Cancer cells are clever," Kleiger said. "They can evolve very, very quickly. So, a drug might be working at first - targeting an enzyme and telling that enzyme, 'stop doing your activity,' which can stop the cancer cells from growing. Those cancer cells appear to lie dormant, but all the while there are still little things that happen that eventually enable those cancer cells to bypass that drug." The upshot is that, to stay ahead of cancer's capacity to evolve drug resistance, we need to be able to target many additional disease-causing proteins, and thus, limiting the landscape of druggable proteins is a serious disadvantage.

There might be a better way, and recent research published in the journal Nature by Kleiger and his collaborator Dr. Brenda Schulman (Max Planck Institute of Biochemistry in Munich, Germany), is helping a consortium of both academic and industry-based researchers who are developing this novel approach.

## An 'unbelievable new playing field'

The new approach uses a family of human enzymes called ubiquitin ligases that exist in human cells. Enzymes are proteins in the cells of the body that speed up chemical reactions occurring at the cellular level and which help your body perform essential functions. There are roughly 20,000 known proteins in the human body, and perhaps some 5-10% are enzymes.

Kleiger first became interested in the ubiquitin protein as a postdoctoral fellow at the California Institute of Technology in the 2000s. At the time, Kleiger heard of a researcher who

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# Harnessing the Power of Proteins in Our Cells Continued

was working in what was then already appreciated to be an important field but that had yet to fully blossom.

"I didn't have any idea that the field was going to become this important. I just thought it sounded really cool, and something I wanted to explore," he said.

Now, nearly 20 years later, Kleiger and colleagues are helping to uncover how ubiquitin ligases work in molecular detail. And this has become especially important, considering that these enzymes are now being employed in a totally novel type of drug discovery modality.

Instead of targeting enzymes that have an active role in the disease — like the baseball player on the field — there might be a way to target practically any protein that has a role in making a person sick. Think of a baseball team manager or the owner, Kleiger said.

"They're not a part of the team on the field, but they nevertheless can have a huge role to play in making the baseball team work," he said. "If I want to get rid of that protein, I can't use the traditional approach."

That's where the ubiquitin ligase comes in. In the presence of special new drugs first envisioned by Kleiger's post-doctoral mentor Dr. Ray Deshaies and his collaborator Dr. Craig Crews, the ubiquitin ligase is now guided to the disease-causing protein to strategically target that protein for degradation, essentially killing it.

"People believe in this new modality, this new therapy so much that every major pharmaceutical company is now at various stages of developing this," Kleiger said. Indeed, a phase two clinical trial led by the pharmaceutical company Arvinas is already testing the approach in patients for the treatment of prostate cancer. "This would be like the equivalent of you stepping into a batting cage for the old modality, to now being inside of Allegiant Stadium — this is an unbelievable new playing field."

### Why it's happening now

To do this work effectively, scientists needed to understand the biology of ubiquitin ligases — work that has been going on for less than 30 years, which is a short time in the grand scheme of science and discovery, Kleiger said. And in that time, the technology has gotten sharper and more efficient. So efficient that for the first time, Kleiger's collaborators are using new, state-of-the-art cryo electron microscopes to be able to take pictures of what the ubiquitin ligases look like when they're at work.

"It's enabling us for the first time to really be able to see how they work, which is going to have huge impacts on the pharmaceutical industry's ability to make new drug therapies," Kleiger said. "It's truly a sea change moment."

The microscope is able to photograph these enzymes, and in his lab on UNLV's campus, Kleiger and collaborators use the photographs to hypothesize how the enzymes are working. He then measures the activity of 'mutated' enzymes that should now be defective in their activities if their hypothesis is correct.

The work would be similar to a 50,000-year old society being given a picture of a bicycle, and asked to explain how it works.

"They might hypothesize that it's a bicycle, and that you would use it to ride from point A to point B, or if there was a cart attached, you would use it to transport stuff," Kleiger said. "You'd then have to test that hypothesis, and that's what we do at UNLV."

Kleiger examines the picture, and if it were the bicycle, uncovers that a gear on the bike is very important to its operational ability.

"If you were to bend that gear, now the bike's not going to work — the chain will just fall off," Kleiger said. "We can do that at the molecular level with the enzymes."

His work, in collaboration with colleagues at the Max Planck Institute of Biochemistry and published in the journal Nature, has implications for how diseases will be treated in the future, and could especially be a lifeline for those suffering from diseases beyond cancers such as autoimmune conditions — diseases like rheumatoid arthritis, inflammatory bowel disease, lupus, or multiple sclerosis.

"These are diseases that millions of people around the world suffer from, so that's one of the reasons why this is such great news," Kleiger said. "For the first time ever, we're seeing atomic resolution pictures of the ubiquitin ligase at work, and that's undoubtedly going to be synergistic with pharmaceutical companies that are creating drugs harnessing the power of the ubiquitin ligase. It really could be a game changer."

# UNLV Continues Research in Nuclear Science as Part of National Consortium

UNLV's radiochemistry program is partnering with the University of California, Berkeley and a consortium of universities and national laboratories for research and development in nuclear science, engineering, and security.

The consortium is supported by a five-year, $25 million grant from the U.S. Department of Energy's National Nuclear Security Administration (NNSA). UNLV's radiochemistry program is expected to receive $2 million. This is the third round of funding for UNLV as part of the Berkeley-led team.

Radiochemistry professors Artem Gelis, Ken Czerwinski, and Frederic Poineau lead UNLV's research team on the grant. According to Gelis, the university will receive funds over the next five years to support Ph.D. students in radiochemistry and research on isotope production for medical applications, molten salt chemistry for nuclear reactor application, and microfluidic separations for nuclear fuel cycle applications.

**UNLV's radiochemistry program is partnering with a consortium of universities and national laboratories for research and development in nuclear science, engineering, and security.**

"Congratulations to UNLV for receiving this funding, which will help to advance their research in nuclear science, engineering, and safety – all issues important to the state of Nevada," said U.S. Sen. Jacky Rosen, who serves as a member of the Senate Armed Services Committee's Subcommittee on Strategic Forces. "I know the benefits that nuclear science and engineering provide our nation. The research UNLV is conducting will further our goals of development, while working to advance measures that keep our nation's nuclear stockpile safe and secure."

In addition to UNLV's work, consortium members will carry out R&D in five focus areas: nuclear physics and nuclear data; radiochemistry and nuclear chemistry; nuclear material science; radiation detection; and nuclear chemical engineering and nuclear engineering.

UNLV's radiochemistry program, started in 2004, has grown into one of the nation's most respected programs of its kind for research and education. Radiochemists explore the radioactive and chemical characteristics of elements and compounds to address technical needs in many areas, including the behavior of contaminants in the environment, radioactive waste treatment and disposal, and the beneficial uses of radioactive materials throughout the medical profession.

The program previously hosted the Department of Energy sponsored Radiochemistry Fuel Cycle Summer School, and students received 10 top placement awards in the DOE's Innovations in Fuel Cycle Research Award competition. Graduates of the program routinely secure internships, positions, or other opportunities at Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Argonne National Laboratory, and Pacific Northwest National Laboratory.

"A strong pipeline of new technical talent for our laboratories is critical to our mission of supporting U.S. national security objectives in reducing global nuclear security threats," said Kasia Mendelsohn, acting deputy administrator for defense nuclear nonproliferation at NNSA. "Over the past decade, nearly 500 degrees have been awarded through our three university consortia, resulting in more than 140 new career placements at the national laboratories."

Additional consortium members include Air Force Institute of Technology; George Washington University; Michigan State Universty; North Carolina State University; Texas A&M University; University of California, Davis; University of Illinois, Urbana-Champaign; University of New Mexico; University of Tennessee, Knoxville. The 11 universities are partnering with five national laboratories: Los Alamos National Laboratory, Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, and Sandia National Laboratories.

# Encountering the Unexpected in the Laboratory and in Life

**JACKIE PHAN REFLECTS ON HER MANY YEARS AT UNLV AND WHAT INSPIRES HER AS SHE PURSUES HER PH.D. IN BIOCHEMISTRY.**

Jackie Phan describes herself as "UNLV grown." As she currently works on her fourth degree from the university, a Ph.D. in biochemistry, her roots at UNLV have never been stronger.

Phan started her UNLV journey as an undergraduate where her mentor, biochemistry professor Ernesto Abel-Santos, encouraged her to pursue her passion for research.

"I joined Dr. Abel-Santos's lab to assist in animal research and fell in love with our mission to combat infectious diseases by learning many new laboratory techniques."

Now as a graduate student, Phan said, "I feel very supported and have found that there are many programs at UNLV designed to help graduate students succeed. By looking at resources and putting myself out there at events, I've met many inspiring people and created many lasting bonds."

One such event was this year's Inspiration, Innovation, Impact: A Celebration of Graduate Student Research event, hosted by the Graduate College.

Phan's research focuses on *Clostridioides difficile* Infection (CDI), a bacterial infection she compares to "a Trojan horse" that "hatches into toxic-producing cells once they make their way to a favorable environment such as our guts."

"Similar to current approaches with COVID-19, our goal focuses on methods of prevention," Phan explained. "My research aims to produce synthetic compounds that resemble compounds we have naturally in healthy individuals that can act as prophylactic drugs to help protect individuals against CDI."

**"One of the great surprises about scientific research is that you sometimes discover new and unexpected findings through failed attempts which lead to even more new research."**

When it comes to research, Phan's mantra is: "Success is 99 percent failure."

"One of the great surprises about scientific research is that you sometimes discover new and unexpected findings through failed attempts which lead to even more new research."

The unexpected has been a theme of everyone's past year, but especially for Phan.

"During the pandemic, I had a new baby born three months early. It has been especially trying to manage graduate school responsibilities as well as tending to her special preemie needs."

Phan says that parenthood is both her "biggest motivation and also biggest challenge."

"Every day is a juggling act. Almost every day, I look back on the previous day and wonder how I made it through. Nevertheless, I want to inspire my kids to work hard toward their goals no matter their situation, and I also want to show other parents that it's not too late to follow your dreams!" Phan said.

Always looking for ways to inspire a new generation of scientists, Phan has used her position as president of the UNLV American Society for Microbiology Student Chapter to reach out to local elementary schools where the group teaches students about microbiology.

Although much has changed since Phan first set foot on campus as an undergraduate, one thing that's never wavered is her passion for learning.

"Since I was a kid, I loved learning about the human body and diseases. My specific program has allowed me to combine my fascination for both these subjects."

# Spring 2021 Outstanding UNLV Graduates

**AN ENDURING COMMENCEMENT TRADITION CONTINUED THIS SPRING AS UNLV PRESIDENT HONORS OUTSTANDING STUDENTS WHO EXEMPLIFY THE ACADEMIC, RESEARCH, AND COMMUNITY IMPACT OF THE GRADUATING CLASS.**

Resilience. It's a term that's been thrown around a lot the past 14 months, but few words better capture the Spring 2021 Graduating Class.

This class has endured the uncertainty of the COVID-19 pandemic that has dominated daily life for us all – in our work, our health, and certainly our education. For more than a year, they've adapted to a new academic reality, and they've excelled.

More than 3,300 students will join the ranks of UNLV alumni this spring, each one proving that when faced with adversity, Rebels find a way to make it happen. And, for the first time in more than a year, graduates will have the opportunity to once again physically cross the commencement stage.

The Class of 2021 is made up of graduates from 41 states and 56 foreign countries, many are the first in their family to graduate from college, and well over half – 63 percent – are from ethnically diverse backgrounds. This year's class ranges in age from 19 to 76, with an average age of 27. Since 1964, UNLV has awarded more than 150,000 degrees.

An enduring UNLV commencement tradition that dates back decades is for the president to honor a select group of outstanding graduates who exemplify the academic, research, and community impact of the graduating class.

This spring's honorees include a researcher making strides in the race for a cure for Alzheimer's; an educator and mentor committed to increasing student success and diverse representation in STEM fields; a future doctor with a passion for politics; two mathematics standouts who have a knack for numbers that's matched only by their passion for paying it forward; an honors student and anthropologist with a lengthy list of research and academic accolades who's committed to capturing the rich history and contributions of the region's Latinx communities; and a public health leader who took a non-traditional path and is now on a quest to serve marginalized communities facing health challenges.

The College of Sciences had four of the seven outstanding graduates.

**Khadija Bhatti**
**B.S. in Biology, B.A. in Political Science (Honors)**

Khadija Bhatti has certainly made the most of her college experience. The Honors College student will graduate this spring Magna Cum Laude with two bachelor's degrees — one in biology and another in political science — as well as with three minors — addictions treatment, addictions prevention, and neuroscience.

Her grade point average? An impressive 3.8.

She has achieved all this while serving four years in student government, including one year as chief justice of the organization's judicial branch. In 2019, she was elected president of the Honors College Student Council. She also served as a student representative on the inaugural College of Liberal Arts Dean's Student Advisory Council, and has mentored peers through the Honors College and the Louis Stokes Alliance for Minority Participation program.

In 2016, she founded T.H.I.N.K, an educational outreach organization to connect local low-income and minority background high school students interested in STEM with mentors in college. As of 2021, the team has helped 37 students graduate high school and enroll in college. Additionally, for the past five years she has served as the UNLV campus ambassador with the nonprofit foundation The Gift of Life to help support patients battling blood cancer.

Recently, Khadija spent a summer as a policy research intern in the office of U.S. Sen. Catherine Cortez Masto. That same year she presented her work at a conference at MIT. This spring, she finalized her capstone research project in which she evaluates the impact of political partisanship on the COVID-19 pandemic.

Khadija has devoted equal energy to STEM research, participating in clinical research with the emergency department at

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# Spring 2021 Outstanding UNLV Graduates Continued

University Medical Center, studying novel water purification technology, and serving as a research assistant studying pulmonary hypertension at Sunrise Hospital's Children's Heart Center. Already she has received the 2021 Nevada Area Health Education Center Scholarship. Soon she will receive a Nevada Women in STEM award from U.S. Sen. Jacky Rosen.

What's next for the first-generation college grad? She's headed to medical school.

## Alvaro Carbonero

**B.S. in Mathematics (Honors)**

Mathematics major Alvaro Carbonero graduates Summa Cum Laude with an impressive 3.95 GPA as a member of the Honors College.

After immigrating to the United States from Peru at age 18, Alvaro began his college career as a business major before discovering his passion for math - and he's since used that passion to help others achieve their potential in high-demand STEM fields.

In 2019, Alvaro was selected for an eight-week grant-funded research experience on discrete geometry at Lafayette College. His stellar research work earned him national recognition again in spring 2020 when he won the Goldwater Scholarship, the nation's premier undergraduate award in mathematics, natural sciences, and engineering. Later that year, Alvaro was selected for another grant-funded summer research experience, this time with the Rochester Institute of Technology.

Under the guidance of UNLV professor Michelle Robinette, Alvaro completed his Honors College thesis, "On the Structure of Graphs with Either Convergent or Divergent Sequences of Pn-Line Graphs." His work on graph theory, which is essentially the study of vertices connected by edges, has also led to multiple academic publications in leading math journals.

Though Alvaro has proven that he knows his way around an equation, it's his fierce commitment to helping others find their place in STEM fields that sets him apart from his peers.

Throughout his time in the Honors College, Alvaro served as a peer-instructor and peer-mentor, and he regularly serves as a tutor in mathematics in the Las Vegas community. In 2020, he co-organized a student-led digital resource fair for fellow math majors nationwide. In addition to the Goldwater Scholarship, Alvaro also received the Hispanic Society Foundation Scholarship and the Honors College Bennett Mentor Scholarship.

This fall, Alvaro will begin his Ph.D. in mathematics at the University of Waterloo – one of the top programs in the world for research in combinatorics and optimization.

## Lorena Samentar

**Ph.D. in Cell and Molecular Biology**


Passion, commitment, and resiliency – these are the words that make up Ph.D. graduate Lorena Samentar's college career.

Lorena Samentar graduates with a Ph.D. in Cell and Molecular Biology stream with a GPA of 3.99. Lorena is also recognized as a prestigious member of Honor Society of Phi Kappa Phi and the recipient of the Graduate College Medallion for Spring 2021.

Born and raised in a remote village in the Philippines, Lorena became the breadwinner of the family once her father passed away. Despite the emotional and financial hardships, Lorena finished her Bachelor of Science in Biology cum laude from the University of the Philippines, later saving up money from relatives and friends to continue her academic journey in the United States.

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# Spring 2021 Outstanding UNLV Graduates Continued

Lorena joined the UNLV's Ph.D. program in Fall 2015 as a Graduate Recruitment Scholar, being one of the semester's top recruits of the College of Sciences. Lorena has since helped UNLV researchers through projects, mentorship, and research throughout her academic career.

Her dissertation project on the Development of a Novel Alzheimer's Therapy and co-authorship of three papers in degenerative diseases from the UNLV Caberoy Laboratory has offered critical results that supports the race towards the development of a cure for Alzheimer's disease.

Lorena's research and presentation skills have earned her first place for two consecutive years as podium presenter during the GPSA research forum. She also won third place out of more than 70 participants during the 4th Rebel Grad Slam 3-Minute Research Rumble, leading Lorena to become one of UNLV's representatives for the 1st Southwest Showdown 3-Minute Grad Slam in Phoenix, Arizona.

And throughout her time as teaching assistant in Molecular Genetics, Lorena has since been the only instructor who has been given a perfect evaluation by everyone in her class.

Lorena Samentar will be the first in her family and in her village to earn a Ph.D. Once graduating, Lorena plans on returning to the Philippines to use her training towards the improvement of science research and teachings in her home country.

## Michael Schwob

**B.S. in Mathematical Sciences (Honors)**

The numbers add up when it comes to math major Michael Schwob's selection for UNLV's Spring 2021 class of outstanding graduates: A 3.96 GPA, five peer-reviewed journals, two prestigious national awards, and over 500 volunteer hours teaching local high school students about academic research and the benefits of attending college.

To top it off, he's helped multiple students from marginalized communities choose the college route.

And he's just getting started.

Michael published his first peer-reviewed journal by the end of his sophomore year, following that up with four research papers each exploring a different scientific discipline, "revealing his intellectual curiosity and ability to complete a project from its inception," wrote one of his nominators. The Honors College student has also worked with interdisciplinary teams at the national Air Force Research Laboratory and Colorado State University.

In recognition of his impressive undergraduate research portfolio, Michael garnered two competitive national awards — the Goldwater Scholarship in 2019 and a National Science Foundation Graduate Research Fellowship in 2021 — as well as several local awards, including the Sam Lieberman Regents' Scholar Award.

In addition to his research and academic successes, Michael founded two new student groups, served as a peer mentor for the Honors College and the College of Sciences, an ambassador for the Office of Undergraduate Research, and a rebel recruiter for the Office of Admissions.

He also helped establish the university's Army Education Outreach Program, where he volunteered over 500 hours to help local, marginalized communities engage with higher education and academic research. His efforts were acknowledged with a Congressional Award.

Following graduation, Michael will be pursuing a Ph.D. in statistics at the University of Texas at Austin beginning this fall. He was accepted into all of the graduate programs to which he applied, including Johns Hopkins and Emory for biostatistics.

"He is undoubtedly representing UNLV to the highest possible degree and has exceeded all of our expectations," another nominator wrote. "Mr. Schwob's character and academic contributions should be celebrated with equal measure."

# Seeing the Bigger Picture

**AT UNLV, ASTRONOMY PH.D. GRADUATE JEREMY SMALLWOOD RACKS UP SCIENTIFIC PUBLICATIONS RATHERN THAN STRESSING ABOUT INDIVIDUAL GRADES.**

After receiving his bachelor's degree in astrophysics from Baylor University, Jeremy Smallwood came to UNLV because of the outstanding professors and researchers in the department of physics and astronomy. He said he wanted to be a part of the fantastic and exciting research being done at UNLV.

"There have been numerous people who have impacted my work throughout my Ph.D.," he said. "The one person I want to acknowledge further is my advisor, Dr. Rebecca Martin. From day one, she has been an inspiration to me, and she has been instrumental in getting me to where I am today."

Smallwood has made the most of his time at UNLV. He has already received his master's degree in astronomy from UNLV and is now becoming a spring 2021 Ph.D. graduate. He has been published 11 times, believed to be the most of any graduate student in the department, and is the first author on eight of those publications.

### This isn't how you imagined finishing your degree; how has the pandemic affected your final year?

Considering I completed all my coursework by the time the pandemic occurred, I was not affected all that much. However, not being able to deliberate amongst fellow graduate students and faculty in person about research topics has had a negative impact.

### Your research

My research deals with highly topical areas in astrophysics, such as planet formation and habitability, stellar evolution, white dwarf pollution, origin of fast radio bursts, and dynamics of accretion discs in binary star systems. The majority of my research is dedicated to the latter — the dynamics of accretion discs in binary star systems. Planets are thought to form embedded within the gaseous and dusty discs surrounding stars during their early formation stages. Indeed, such discs in and around binary systems are observed. Contrary to the naive expectation that discs in the binary star systems are too disturbed to form planets, discoveries from both ground-based and space telescopes such as Kepler have revealed an abundance of planets around binary star systems.

Understanding how protoplanetary discs evolve in and around binaries is fundamental in explaining the formation of planetary systems since the planet's orbital identity is dependent on the disc structure. I use analytic and numerical methods in gas and dust dynamics to study the theory of these processes. These studies are particularly important in assessing the robustness of planet formation.

### Next steps

I have accepted a prestigious postdoctoral fellowship at the National Center for Theoretical Sciences in Taiwan.

### Favorite memory of UNLV

Every Friday morning, the students and faculty in astronomy would meet for our weekly "astro coffee," where we would discuss any relevant scientific papers and chat over science gossip. I especially looked forward to this because being social is also essential for scientific advancement. Unfortunately, with the pandemic, we have not been able to meet in person for some time now.

### Parting words for other students

Do not take everything so seriously, and do not sweat the small stuff. Sometimes it's easy to get caught up in the little details, but instead, we should be thinking about the bigger picture. I remember being stressed out about not getting that particular grade on an assignment or research project. However, I have learned throughout my academic career that grades do not define your potential.

# Student Success Tips from an Honors Star

When UNLV math and science student Michael Schwob graduates, packs up his life in a U-Haul, picks up his girlfriend, and drives to the University of Texas at Austin this summer, it will be his first time in Texas. The first time he passes through New Mexico. The first time he lives anywhere but Las Vegas.

It will be the farthest he's been from his deeply analytical family: his dad has a bachelor's in mechanical engineering from UNLV and is working on his doctorate here; his sister is working on her bachelor's in mechanical engineering at UNLV, his step-father is a construction superintendent on the Strip, and his mom is a secondary science teacher. One imagines their dinner conversations — "We definitely learn from each other," he said.

Schwob will graduate with a bachelor's in mathematics and will be pursuing his doctorate in statistics. At UNLV, the Honors College student racked up dozens of awards and scholarships, published multiple papers, and accumulated accolades galore. National recognition includes the prestigious Barry Goldwater Scholarship and a 2018 Congressional Scholar award.

**Michael Schwob, who graduated this spring, is a recipient of the National Science Foundation Graduate Research Fellowship.**

At UNLV, he has received the Bhatnagar Award, Brenda and Russell L. Frank Honors Scholarship, Chris McNamee Memorial Scholarship, and an LV Sands Sustainability Research Award. To cap it off, he is a recipient of the National Science Foundation Graduate Research Fellowship (2021-26).

You might think a guy who published "Modeling Cell Communication with Time-Dependent Signaling Hypergraphs" would be difficult to talk with, but you'd be wrong. Schwob is an easy-going, funny brainiac who, like the rest of us, has spent the pandemic binge-watching Netflix and fighting off the temptation to snack constantly.

"My girlfriend and I are watching Ink Master," he says of his latest TV indulgence. "That's what it's come down to."
His girlfriend, Angelica Mayor, graduated with a bachelor's in social work in winter 2020 and is headed to Austin with him to start her career.

Schwob is quick with a joke, but also happy to offer his advice for the next generation of UNLV STEM undergraduates. What made his undergraduate career so successful, besides coming from a family full of "quantitative personalities"?

Here's the lowdown from Michael Schwob, a smart guy who couldn't decide what to wear for his photo session ("I had a little fashion show for my girlfriend to help me decide."):

- **Reach out to your professors**. Professors held my hand for as long as I needed it. A professor let me read a formal research paper when I was a freshman, and I had a near mental breakdown because it seemed so far out of my range but eventually I grew into it. The professor took a chance on me. I had no tangible skill set – I could play soccer. But it's important to get comfortable with the professors and they will help you. So I say, don't hesitate to reach out to professors.

- **Have fun with your research**. My first tangible goal was to publish a research paper before I graduated, and it happened way quicker than I thought (sophomore year). Then after that I just started having fun with my research, I just started to play around with ideas, and I've published more by exploring and having fun and it's great. When I started focusing less on accolades and more on having fun, I was able to produce more research papers.

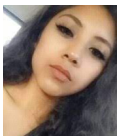
- **Build a support system**. I have a really good support system. I want to emphasize that my success is crowdsourced in a way. Family and friends and professors have all helped build a support system for me. I never had to look far for help. UNLV has a lot of resources.

If the timing is right, Schwob "would love to come back and teach at UNLV." He plans to be a professor in a research-track position, and chose UT Austin because of a relationship with a particular professor there. But, said the lifelong Las Vegan, he's a Rebel at heart.

# Awards, Recognition, and Recent Grants

## OFFICE OF UNDERGRADUATE RESEARCH AWARDS

*Champions of Undergraduate Research Award*
**School of Life Sciences**



*Best Oral Presentation in Health & Natural Sciences & Engineering*
**Tiffany Mata, Life Sciences; Mentor: Ernesto Abel-Santos, Chemistry and Biochemistry**

## OTHER AWARDS

*Student-Choice Most Timely and Accurate Advising Center*
**College of Sciences Advising Center**

*2020-21 Outstanding Advising Administrator*
**Peter Clancy, College of Sciences Advising Center**

*2021 Outstanding Department Chair*
**Zhijian Wu, Mathematical Sciences**

*UNLV Foundation Distinguished Teaching Award*
**Kathryn Rafferty, Life Sciences**

*UNLV Foundation Distinguished Teaching Award*
**Jenifer Utz, Life Sciences**

*Presidential Fellow*
**Kevin McVay, College of Sciences Advising Center**

*Presidential Fellow*
**Monika Neda, Mathematical Sciences**

*Presidential Fellow*
**Alison Sloat, College of Sciences Dean's Office**

*Presidential Fellow*
**Eduardo Robleto, Life Sciences**

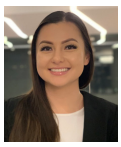
*UNLV Leadership Experience*
**Frederic Poineau, Chemistry and Biochemistry**

*UNLV Leadership Experience*
**Cory Nelson, College of Sciences Dean's Office**

## STUDENT AWARDS

*2021 Sam Lieberman Regents' Award for Graduate Student Scholarship*
**Cindy Kha, Life Sciences**

*2021 National Science Foundation Graduate Research Fellowship*
**Sarah York, Chemistry and Biochemistry**



*Lance & Elena Calvert Award for Undergraduate Research*
**Isabella Chung, Life Sciences**

*Lance & Elena Calvert Award for Undergraduate Research*
**Natalie Johns, Chemistry and Biochemistry**

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# Awards, Recognition, and Recent Grants Continued

*National Science Foundation Graduate Research Fellowship*
**Michael Schwob, Mathematical Sciences**

*Lance & Elena Calvert Award for Undergraduate Research*
**Michael Schwob, Mathematical Sciences**

*Regents' Outstanding Undergraduate Award*
**Michael Schwob, Mathematical Sciences**

2020-21 Bhatnagar Award for Top Math Major
**Michael Schwob, Mathematical Sciences**

2020-21 Bhatnagar Award for Top Math Minor
**Kevin Ayala Pineda, Physics and Astronomy Major**

## RECENT GRANTS

**Gary Kleiger, Chemistry and Biochemistry**
Project: "How Ubiquitin-carrying Enzymes Contribute to Ubiquitin Ligase Specificity"
Agency: National Institutes of Health
Amount: $1,500,000

**Qiang Zhu, Physics and Astronomy**
Project: "Data-driven Discovery of Inorganic Electrides for Energy Applications"
Agency: U.S. Department of Energy
Amount: $750,000

**Boo Shan Tseng, Life Sciences**
Project: "The bacterial biofilm as a multicellular organism: from molecules to populations"
Agency: International Human Frontier Science Program
Amount: $300,000

**Boo Shan Tseng, Life Sciences**
Project: "Use of DNA nanostructures as viral surrogates in potable reuse applications"
Agency: Water Research Foundation
Amount: $53,734

**Joshua Island, Physics and Astronomy**
Project: "A platform for broadband terahertz spectroscopy of 2D materials and heterostructures"
Agency: National Science Foundation
Amount: $513,227

**Aude Picard, Life Sciences**
Project: "RII Track-4: Role of minerals in long-term survival and viability of sulfate-reducing bacteria"
Agency: National Science Foundation
Amount: $175,987

**David Hatchett, Radiochemistry**
Project: "Efficient Formation of Plutonium"
Agency: U.S. Department of Energy
Amount: $237,921

**Brenda Buck, Geoscience**
Project: "UNLV-Forest Inventory and Analysis"
Agency: U.S. Department of Agriculture
Amount: $450,000

**Cory Rusinek, Radiochemistry**
Project: "Long-term Monitoring of Pertechnetate and Other Radionuclides in Groundwater Using Passive Sampling and a Novel Spectroelectrochemical Sensor"
Agency: U.S. Department of Energy
Amount: $292,500

**Allyson Hindle, Life Sciences**
Project: "Harnessing of Deep-diving Seal Cardioprotective Factors as Novel Therapy for Myocardial Ischemia-Reperfusion Injury"
Agency: Regional Alliance of INBRE Networks/National Institutes of Health
Amount: $20,000

**Art Gelis, Frederic Poineau, Ken Czerwinski, Radiochemistry**
Project: "Nuclear Science and Security Consortium 3"
Agency: U.S. Department of Energy
Amount: $2,000,000

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# Awards, Recognition, and Recent Grants Continued

**Brian Hedlund, Life Sciences**
Project: "Novel Repair Replicase"
Agency: National Institutes of Health
Amount: $399,485

**Brian Hedlund, Life Sciences**
Project: "Investigating the link between modern spring activity and associated paleospring mounds in Death Valley, NP"
Agency: National Science Foundation
Amount: $191,470

**Art Gelis, Radiochemistry**
Project: "X-Ray Experiments"
Agency: U.S. Department of Energy
Amount: $40,000

**Simon Jowitt, Geoscience**
Project: "Identifying Routes Towards Increased Te Production from Gold and Magmatic Sulfide Mineral Deposits Phase II"
Agency: First Solar, Inc
Amount: $40,000

**Ken Czerwinski, Radiochemistry**
Project: "Microbially Influenced Separation of Uranium Isotopes"
Agency: U.S. Department of Energy, Savannah River National Laboratory
Amount: $25,000

**Scott Abella, Life Sciecnes**
Project: "Developing ecologically and cost-effective desert habitat rehabilitation techniques"
Agency: 2021 Troesh Center Research Grant, UNLV Lee Business School
Amount: $5,000