



Pioneers in

Research

Faculty research expertise of the College of Pharmacy at
The University of New Mexico Health Sciences Center



Vision, Mission & Values

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Vision

To prepare tomorrow's leaders through innovative teaching, research and clinical practices that translate scientific discoveries into new treatments and models of care to improve both health and quality of life.

Mission

The mission of the UNM College of Pharmacy is to develop pharmacists, educators and scientists whose leadership, dedication and innovation improve the health of our local and global communities.

Values

The UNM College of Pharmacy is committed to the following values:

- **Excellence:** continuously striving for the highest quality of performance and outcome.
- **Integrity:** steadfast adherence to moral and ethical principles.
- **Accountability:** being held responsible for one's actions.
- **Collaboration:** work in teams to achieve excellence in education, research/scholarship, patient care and service.
- **Continuous Learning:** strive to acquire knowledge or skills by study, instruction or experience.
- **Diversity in People and Thinking:** embracing inclusiveness, access and equity for all; recognizing and appreciating the totality of the many ways individuals are similar and different in an atmosphere that promotes and celebrates individual and collective achievements.
- **Compassion:** feeling and exhibiting concern and empathy for others.

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From Dean **Donald A. Godwin, PhD**

The UNM College of Pharmacy has 75 years of achievement and success in education, research, and patient care for the state of New Mexico. Our Mission is develop pharmacists, educators and scientists whose leadership, dedication and innovation improve the health of our local and global communities. The pharmaceutical and biomedical research that we do is the foundation of College. Our activities spans across the translational research spectrum from bench to bedside to community.

One measure of success of the College's research mission is dollars awarded and national rankings. In 2019, the COP ranked 17th in the country in National Institutes of Health funding (\$10.6M), 20th in Total Federal Grants (\$11.5M), and 25th in Total Grant funding (\$11.7M). 2020 has been a

very successful year (\$14.4M Federal funding including \$13.8M in NIH funding) that very well could land our College in the Top 10 nationally.

However, beyond the dollars, we measure our research success by the positive impact that our research has on the people of New Mexico. In this publication, you will read how our research examines the effect of substance use by pregnant women on the development of their children; how we are aiding in the fight against methicillin-resistant *Staphylococcus aureus* (MRSA) infections; and how we are investigating the deleterious effects on our Native American population of metals in the environment leftover from decades of uranium mining as well as looking at the potential benefit of some metals (zinc) in the fight against cancer.

Other stories will highlight our clinical research is providing better patient care in HIV, hepatitis C, tuberculosis, atrial fibrillation, and hypertension. These discoveries help expand the scope of practice of pharmacists in New Mexico and the U.S. leading to better health care and patient outcomes. You will also learn about how the College of Pharmacy is a leader in big data mining whether that be in the New Mexico Poison and Drug Information Center or in health care outcomes research. Finally, you will read about the innovation and entrepreneurial spirit of our faculty as they pursue patents for some of their discoveries and form companies to commercialize those discoveries and add to the economic development of New Mexico.

While the College has had 75 year of great success, that is only the beginning of an even better next 75 years. Our brilliant faculty are constantly working to make the next great discovery that will lead to better health care both at the individual level and in the community as a whole. It is my honor and privilege to lead the College to support the faculty, staff and students in this never-ending quest for discovery. I invite you to read this publication to learn more about what makes research at the UNM College of Pharmacy so great.

From Associate Dean for Research **Jim Liu, PhD**

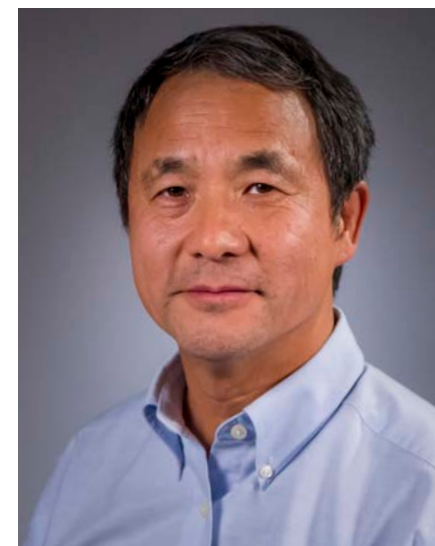
Faculty researchers at the College of Pharmacy are committed to improving the health of New Mexicans, especially our state's most vulnerable populations, and tackling the world's most challenging and pressing public health issues. As you'll see in the pages to follow, our faculty are engaged in diverse areas of research, from studies on an array of substance use disorders to cardiovascular disease, cancer, infectious disease, and pharmaceutical dosing formulation studies.

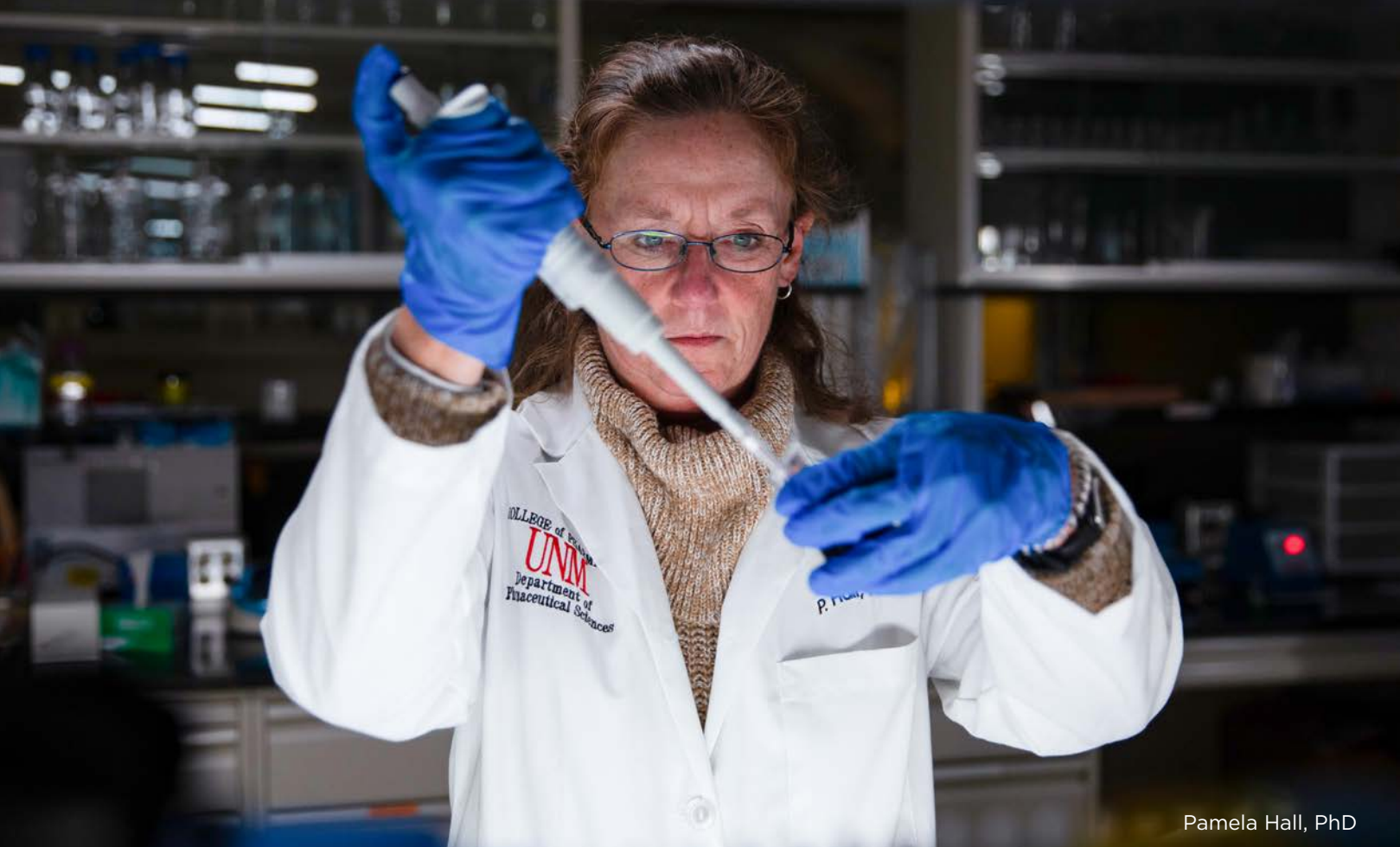
Our scientists are problem solvers. Our faculty hold a combined 55 active U.S. patents as well as dozens of pending patents and are continuously developing innovative solutions to diagnose and combat deadly diseases and devastating health conditions. Faculty inventions have led to multiple start-up companies that seek to provide clinicians worldwide with better diagnostic and monitoring technology for pneumonia, cystic fibrosis, and treatment of tuberculosis.

The College proudly holds four environmental health-focused center/programmatic grants from the National Institutes of Health. Our newest center, the UNM Center for Metals in Biology and Medicine, a P20 Center of Biomedical Research Excellence, focuses on the adverse health outcomes of metal contaminants in the Southwest as well as training the next generation of scientists. Our recently renewed P50 Center allows our researchers to continue their longstanding partnerships with indigenous communities as they study the health implications associated with exposure to toxic metals from abandoned mines, and most importantly, to develop critical mitigation strategies for these communities. In addition, the College has a P42 Superfund Research Program Center grant, and a UH3 Environmental influences on Child Health Outcomes (ECHO) Program.

Our college consistently ranks in the top tier of colleges of pharmacy in the country. In recent years, the College ranked as high as 13th nationally by the American Association of Colleges of Pharmacy in terms of both NIH funding and total federal funding. Over the past 5 years, our annual extramural grant funding has averaged about \$11 million, a remarkable increase compared with our historical funding trends. Our faculty typically submit roughly 90 proposals each year and about half are funded.

Part of our research growth is attributed to the College's research pilot project program, which promotes multi-disciplinary research collaborations and aims to enhance our areas of research excellence and other high impact outcomes. Now in its 8th year, our faculty have used this pilot program as a launching pad to gather critical preliminary data and form strategic partnerships on their way to securing extramural funding. I am truly inspired by the work that our researchers perform as they dedicate themselves to improving public health, and, as you learn about our research in the coming pages, I believe that you, too, will be inspired.





Pamela Hall, PhD

Creating a Helping Hand

A Novel Vaccine Could Aid the Immune System in Tamping Down MRSA Infections

Methicillin-resistant *Staphylococcus aureus* infection—commonly known as MRSA—is a costly and deadly global health threat.

MRSA is the direct cause of tens of thousands of deaths in the United States each year and results in hundreds of thousands of hospital visits. The persistent bacterial infection is often acquired and spread in hospitals, but it has become increasingly common in settings outside of hospitals where people are in close contact – from prisons to sports facilities to day care centers. Nagging skin infections can

worsen and lead to pneumonia and sepsis. “It really is a big deal,” says Pamela Hall, associate professor of Pharmaceutical Sciences at the UNM College of Pharmacy. “It causes a lot of pain and suffering.”

Hall’s laboratory, aided by National Institutes of Health grant funding, has been studying MRSA since 2011. She is currently mid-way through a \$1.25 million, five-year NIH grant supporting vaccine research.

Hospital patients often are infected by MRSA because of their weakened immune systems.

But healthy people outside of hospital settings also become sickened by the bacteria, and Hall posits that community-acquired MRSA is a more virulent strain because it must overcome a healthy immune system. It is that strain that has Hall’s attention.

Her approach targets the system that coordinates most of the gene regulation for the virulence of the bacteria. The *S. aureus* communication system – a peptide-pheromone known as an autoinducing peptide, or AIP – dials up the bacteria’s virulence and causes a more invasive infection. Hall hopes to produce an antibody response to the AIPs, either preventing infection or keeping it mild.

Because those peptides are too tiny to create an immune response, Hall and her collaborators’ technique focuses on chemically attaching the peptides to larger virus-like particles, making them more immunogenic.

There are four types of AIPs – 1 through 4. Hall’s technique has been successful in producing immune response to skin infections on AIP-1 in mice. In mice, the vaccine makes the lesions much smaller and go away quicker.

She is currently working on expanding the vaccine’s success to the other AIPs and to other infections and models of immunocompromised patients.

Vaccines against other community-acquired MRSA infections have progressed to clinical trials, but none has been successful in the long run.

“People don’t develop a natural immune response on their own. They can be re-infected over and over,” Hall explains. “So targeting something that isn’t exposed to the immune system is, in our minds, a reasonable approach. I don’t think there’s another vaccine made against such a small molecule to control an entire system of virulence regulation. It would be something new.”

If successful, the vaccine would most likely be given preventatively to people with compromised immune systems. It might not

completely prevent an infection, but it would help the immune system defend itself. Hall’s laboratory is also exploring the question of whether estrogen is protective against MRSA skin infections. Women who get a systemic staph infection are more likely to die than men. But Hall has found that female mice are much more resistant than males to staph infections of the skin.

Her team stumbled on the gender difference after realizing they needed more of the bacteria to infect female mice and documenting that female mice clear the bacteria more quickly and have smaller lesions than males. Female mice with ovaries removed showed no difference from male mice.

Hall did not set out to work in vaccine research, or even infectious disease. Her background is in protein crystallography, but after completing her PhD in pharmacology at Case Western Reserve University, she did a post-doc in Hantavirus research and found she liked the complexity of infectious disease.

Vaccine research and development is a long game, and Hall has hopes for an effective vaccine but has no timetable in mind.

“It’s all basic science,” Hall says. “The best you can hope for is that something you discover will be clinically relevant somewhere down the road.”



Seth Daly, PhD working within the Hall Laboratory.

NUTRIENTS, MEDICINES & CONTAMINANTS

Metals Are
Under the
Microscope



UNM's College of Pharmacy is carving out a niche of expertise in the study of metals, with scientists delving into the effects of long-term environmental exposures, unlocking the mechanisms by which metal contaminants promote cancer growth and suppress immune response and deepening the understanding of how certain nutrient metals, such as zinc, can improve health outcomes, while others can help deliver medicines.

Research efforts under Professor Johnnye Lewis, PhD, have resulted in the establishment of the UNM Superfund Research Program Center, which focuses on the effects of exposures to mixed metals from mining waste in Native American communities in the Southwest. Lewis and colleague Debra MacKenzie, PhD, also direct the Center for Native American Environmental Health Equity Research, which examines toxicities of metal mixtures and microplastics across multiple tribes in the Western United States, and the Navajo Birth Cohort Study, one of 29

award sites in the nationwide Environmental influences on Child Health Outcomes initiative (known as ECHO), which focuses on the effects of exposure to metals on children.

Professor and Associate Dean Jim Liu's biennial Conference on Metal Toxicity and Carcinogenesis, launched in 2000, continues to bring together scientists from across the country to Albuquerque to discuss the links between metal and cancer.

And the latest addition to the College's metal portfolio is the UNM Center for Metals in Biology and Medicine, funded by a five-year \$11.5 million NIH Center of Biomedical Research Excellence grant.

BUILDING A CORE FOR CHEMISTRY

Directed by Matt Campen, PhD, a Regents' Professor in the College's Department of Pharmaceutical Sciences, the new center is building out research laboratory space in the

basement of the Nursing/Pharmacy building, where state-of-the-art bioanalytical chemistry equipment and expert analysis will be available to UNM Health Sciences Center scientists, as well as physicians and researchers outside of the University.

The center's laboratory will be especially useful to a team of junior faculty attached to the center, who will launch studies exploring both the usefulness and danger of metals to human health.

For **Campen**, the Center for Metals in Biology and Medicine represents an exciting opportunity to build on a legacy of metals research and to support a new generation of scientists who will add to the body of knowledge.



Research supported by the center will span the diverse and complicated roles metals play in human biology and medicine – from using metals for drug delivery or diagnostic imaging, to better understanding the effects of metal exposure linked to New Mexico's long history of mining, to looking at the effects of nutritional supplements on the molecular pathways.

Colleague Changjian Feng, PhD, a professor of Pharmaceutical Sciences, is managing and overseeing the bioanalytical chemistry resources and services as director of what is known as the Integrative Molecular Analysis Core, or IMAC.

"The goal," says Feng, "is to provide the members of the UNM Center for Metals in Biology and Medicine with in-house analysis, expertise and the tools for a variety of modern molecular analysis in a centralized state-of-the-art hub." Those advanced techniques include inductively coupled plasma mass spectrometry, biological mass spectrometry and electron

paramagnetic resonance spectroscopy – expensive tools that can be shared among laboratories.

The major components of the initiative – the IMAC facility and the mentorship of junior faculty – are intended to be synchronistic and self-supporting over time.

IMAC resources will be available to mentored faculty and help them build research careers and attract research grants, which will in turn help sustain the IMAC’s funding.

“We are really very excited, because this creates a great platform for decades of cutting-edge research,” Feng says. “This is great framework to further strengthen our metals expertise at UNM.”

Campen says the four junior faculty members chosen from the Health Sciences Center to be mentored principal investigators will form the core of the center.

“This is kind of an early rung on the ladder for them toward independence,” he says. “We provide a level of mentorship. We give them money to do research.”

He offers an analogy from nature: The Center for Metals in Biology and Medicine is the bird’s nest; the junior faculty are the hatchlings and he, colleague Feng, Associate Dean Liu and other senior faculty are the momma birds helping them learn to fly.

“Our job is to push them out of the nest, which comes once they have secured an NIH RO1 or similar type of grant of their own,” Campen says. “It’s really nice, because they get to pursue their research and generate papers of their own, generate some data, do some discovery work, and then in a year or two the real hand-holding starts where we get them to write that NIH-level grant.”

Success will be measured by important research as well as the promise of more funded research when those junior faculty begin receiving their own grants of \$2 million or more.

The faculty supported by the center are:



Alicia Bolt, PhD, an assistant professor in the College of Pharmacy, who is studying tungsten, a naturally occurring element that is frequently used in metal alloys. One of her concerns is the effects of tungsten embedded in the body, either from shrapnel wounds or surgical devices left behind, sometimes by accident, in promoting cancer metastasis. Her other concern is inhaled tungsten and its relationship to pulmonary fibrosis.



Xixi Zhou, PhD, a research assistant professor in the College of Pharmacy, who studies DNA mutation. He is looking at arsenic in its particulate form and the patterns of DNA damage it causes in lung cancer.



Xiang Xue, PhD, a research assistant professor in the School of Medicine’s Department of Biochemistry & Molecular Biology, who is studying how iron as a nutrient can change the metabolic profiles of colon tumor cells, making them more prone to grow.



Rama Gullapalli, MD, PhD, an assistant professor in the departments of Pathology and Chemical and Nuclear Engineering, who is looking at the high incidence of gallbladder cancer in New Mexico, especially among Native Americans, and better understanding how cadmium and uranium act in conjunction with genetics as potential drivers of gallbladder cancer. He will be collecting samples of surgical discards and investigating how specific genotypes may promote a sensitivity to those metals and cancer progression.

The analytical lab will conduct analysis for clients outside UNM for a fee and provide improved space and equipment for everyone in the Health Sciences Center – including Lewis’s large metals team and Campen’s own lab, which is studying the effects of airborne dust from abandoned mine sites on tribal lands, in addition to other metals projects.

“We built the center around the idea that we wanted to stabilize a lot of the efforts that had grown up already,” Campen says. With the growth of Lewis’s funding and scope of work, the mission has only grown.

“We’re not stabilizing. We’re growing,” Campen says. “Everybody’s on the same page and it’s a crazy amount of success, honestly. We’re working hard. We’re having fun. We have a lot of great people who are really motivated to do great things in New Mexico. We’re fired up to do good work.”

INVESTIGATING THE LEGACY OF METALS EXPOSURE



Johnnye Lewis wears a lot of hats in the College of Pharmacy – from research professor to director of the College of Pharmacy’s Community Environmental Health Program, director of the UNM METALS Superfund Research Program Center and co-director of the Center for Native

American Environmental Health Equity Research.

Add a new title to the list: Principal investigator of the Navajo Birth Cohort in a far-reaching national study of children. The ECHO, or Environmental influences on Child Health Outcomes, study will follow tens of thousands of children across the nation to mine data on how various environmental factors – anything from obesity to parental stress to chemical exposures – affect growth and development.

Partners in the research include the Southwest Research and Information Center and Navajo Nation Department of Health’s Community Health Worker and Outreach Program, with support from several IHS and tribally managed hospitals on the Navajo Nation.

Lewis’s piece of the puzzle will involve uranium and metals exposure and Native American families, an extension of a years-long relationship between the College of Pharmacy and the Navajo, or Diné, people of New Mexico, Arizona and Utah.

The Navajo Birth Cohort Study began in 2010, looking at the effects of metals exposure in Navajo parents near abandoned uranium mining sites on the Navajo reservation and tracking those effects during pregnancy and in the first years of a child’s life.

The study found higher-than-normal metals levels in participants and suggests that being



Inside of research trailer, Jackpile-Paguate Uranium Mine site

exposed to a combination of metals during pregnancy increased the likelihood of pre-term birth; that some babies are born with high levels of uranium and other metals; and that there is evidence that these exposures in children continue to increase at least through early childhood.

Lewis is excited about the prospect of extending the study and broadening it and is working with the Indian Health Service and other health care providers on the Navajo Nation to inform evidence-based pediatric treatment.

“A lot of those impacts of environmental exposures develop later in life, so this gives us the opportunity to follow those kids through age 8,” she says. This study also includes cohorts from the Cheyenne River Sioux and Oglala Sioux tribes. With a much larger sample, “You get a much better sense of what is common over multiple populations and you get to think about how well treatment strategies work in different cultures. IHS has never had Navajo-specific data to drive treatment decisions. So, we’re really excited about that.”

In addition to the ECHO study, which brings \$4.2 million into the College of Pharmacy annually until 2023, Lewis has three other large ongoing grants.

A \$1 million annual grant from NIEHS and the EPA funded the creation of the UNM Center for Native American Environmental Health Equity Research. In its first five years, with Melissa Gonzales from the School of Medicine as co-director, the center worked with tribal partners on the Navajo Nation, the Crow Tribe in Montana and the Cheyenne River Sioux Tribe in South Dakota conducting biomedical and environmental research looking into how exposure to metal mixtures affect health.

A \$1.4 million annual extension of that grant through 2025 allows the center to continue working with those tribal partners but changes the focus to how solid waste disposal techniques, especially burning plastics, exacerbate metals exposures and increase disease risk.



The newly renewed center is funded by the National Institute on Minority Health and Health Disparities. It includes collaborators from the University of Oklahoma and Montana State University in Billings, and includes leadership roles for two former Career Development Investigators in the original center who have begun new faculty careers at those institutions: Joe Hoover will serve as MPI with Lewis and MacKenzie, and Jorge Gonzalez Estrella will lead the microplastic investigations.

Lewis’s METALS (Metal Exposure and Toxicity Assessment on tribal Lands in the Southwest) Superfund Center is funded for five years at \$1.2 million each year through 2022 by the National Institute for Environmental Health Sciences. It is the first such center focused on integrated health-based and environmental science research on metal mixtures within Native American communities.

Along with collaborations from the UNM School of Engineering, Earth and Planetary Sciences, Geography, Statistics, the Comprehensive Cancer Center and the School of Medicine, the center includes collaborations with Laguna Pueblo and Navajo communities as well as the Southwest Research and Information Center, the Indigenous Education Institute and Stanford University.

The work has led to the important finding that the material left behind in some mining sites, when exposed to the weather, is reduced to

nano-sized particles, making them potentially even more dangerous.

If there is a theme to all this, it is doing science that is collaborative and solutions-oriented.

“We have a really strong connection to Native American communities and we’ve made a really important contribution,” Lewis says. “I think we’ve shown the value of the approach of moving from the environment to people to the laboratory and back to people. And the value of solution-oriented research. We work to understand how things happen and come up with interventions Native communities can benefit from.”

THINKING ZINC

An example is a clinical trial called “Thinking Zinc” in two Navajo communities in New Mexico. A team of three College of Pharmacy faculty –Laurie Hudson, PhD, a UNM Regents’ professor of pharmaceutical sciences; MacKenzie, a research assistant professor and deputy director of the Community Environmental Health Program; and Esther Erdei, PhD, a research assistant professor – are several years into an investigation to determine whether dietary zinc supplements can mitigate the effects on the immune system of toxic exposure to uranium and arsenic. The clinical study builds off laboratory work by Hudson and Liu that showed the ability of zinc to repair DNA and change immune response.

If researchers know that arsenic and uranium can displace zinc in proteins involved in immune responses and the repair of DNA, the Hudson, MacKenzie and Erdei team asked, might supplementing zinc – one small 15 milligram tablet – each day help repair the damage?

Participants in the study are Navajo and live near mine spill sites. Participants are monitored for six months before taking zinc and six months while they take the supplements, looking for changes in immune response and DNA repair.

“It’s the kind of intervention that fits really well in the community way of thinking about science,” Lewis says, “because you’re looking at a system that’s been disturbed and you’re putting it back into balance by reintroducing metal that should have been there all along.”

MacKenzie, an immunologist and molecular biologist and MPI for both the Navajo Birth Cohort Study/ ECHO study and the UNM Center for Native American Environmental Health Equity’s recent five-year renewal,, said the team is excited to expand its research into the connection between exposure to metals and microplastics through open trash burning in tribal communities – the Navajo, the Crow and the Cheyenne River Sioux.

Study participants in the Native American Environmental Health Equity Research study will wear a silicone wrist band that measures chemical exposure.

“We’re looking at the movement of microplastics and chemicals through the community and overlaying that on top of what we know about metals,” MacKenzie says, further expanding UNM’s portfolio of metals research.

“We’ve focused on metals and now we’re building on top of understanding metals exposure and expanding our understanding to a broader dynamic of exposures,” she says. “It’s very exciting work.”

MINING DATA

When it comes to drawing meaningful conclusions, bigger really is better

Susan Smolinske, PharmD, director of the New Mexico Poison and Drug Information Center, is immersed daily in the world of poisonings – be they an accidental drug overdose, a bee sting or a bad burrito.

While the center, which is a 24/7 free service of the Health Sciences Center and the College of Pharmacy, fields some 30,000 calls a year, Smolinske is interested in the larger world of toxicology.



And to better understand the risks of designer drug bath salts or the diet drug ephedra, for example, casting a wider research net yields bigger case samples and stronger conclusions.

To do that, **Smolinske** taps into huge national databases.

“The big databases I work with involve **millions of cases** of exposures to poisoning per year,” says Smolinske. “So, when I think big, **I think really big.**”

Additionally, she uses state poison control center data, a dataset of nationwide bedside consultations of poison patients that includes

hundreds of thousands of cases, and RADARS (Researched Abuse, Diversion and Addiction-Related Surveillance System) a nationwide system of 50 centers that collects data on prescription drug abuse. Through that database, of which the UNM poison control center is a member, Smolinske can access information about some three million opioid abuse cases.

“In the poisoning world, bigger is better,” says Smolinske, a professor of Pharmacy Practice and Administrative Sciences. “You can’t take very much home and it’s not going to change your medical practice to have a single case report, for example. But by the time you get a million cases a year, the error rate washes out and your conclusions are stronger.”

Using large sets of data from across the country also illuminates how the effects of poisonings and rescue therapies may differ among populations or show strong national patterns.

“It’s more generalizable,” says Smolinske. “It’s the entire country, not just your little corner of America.”

Using just the RADARS data set, Smolinske has studied the differences in outcomes of pregnant women versus non-pregnant women in opioid overdoses; examined the effects of oxycodone and other opioids on hearing loss; and found a connection between the use of a certain weight loss drug and severe side effects on opioid-dependent patients.

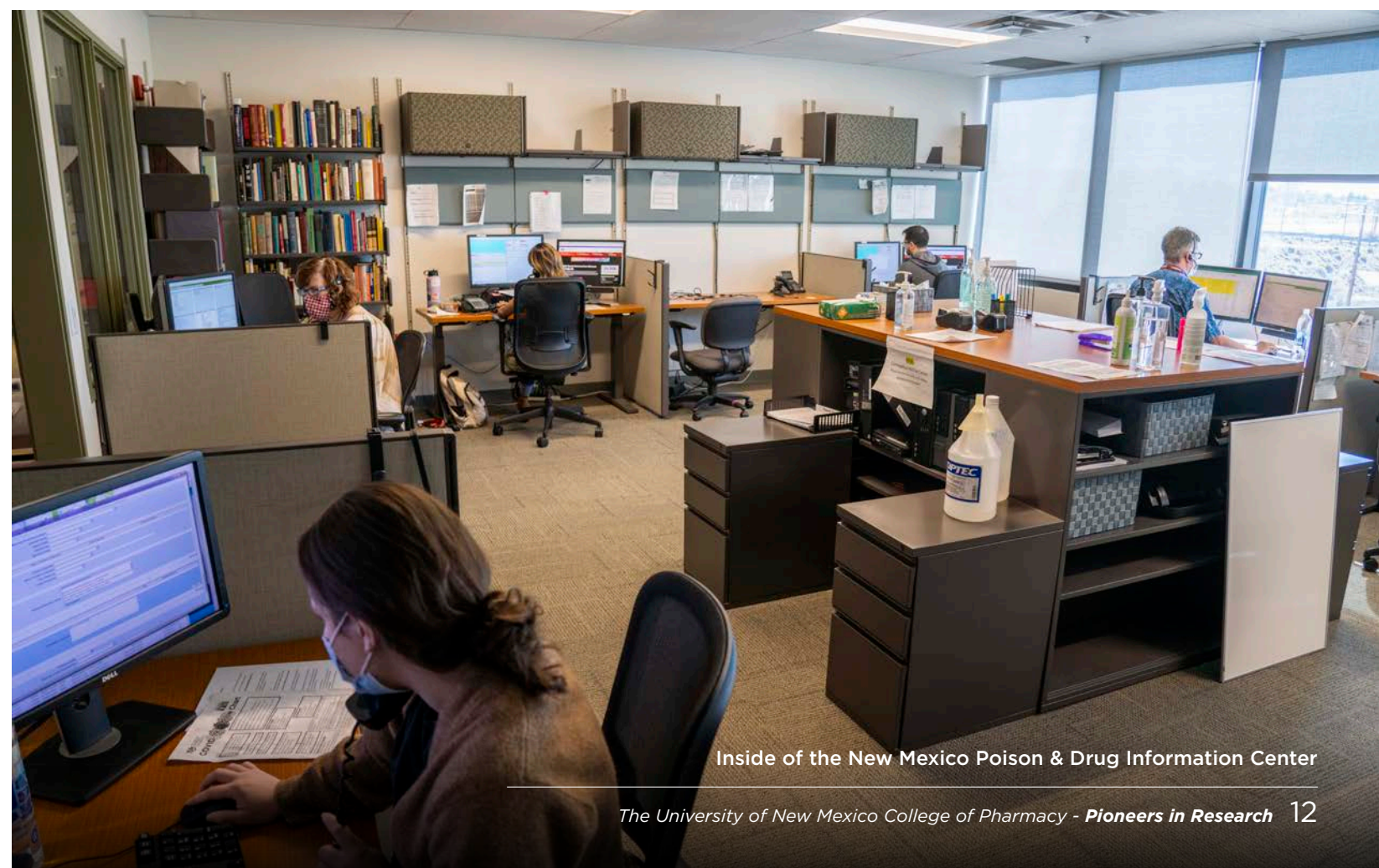
Smolinske has also found that testing an accepted hypothesis gained from a small data set against a larger data set can yield larger truths.

Smolinske tested a long-standing convention in toxicology – that patients presenting with aspirin overdoses with levels of under 100 milligrams per deciliter would not benefit from hemodialysis treatment to remove the aspirin from the bloodstream.

Smolinske queried the huge National Poison Center database for the serum level at the



Susan Smolinske, PharmD



Inside of the New Mexico Poison & Drug Information Center

time of death for people who died of aspirin overdoses.

“We found that 25 percent of those who died had levels below 50,” Smolinske says. “So, we could have saved those with hemodialysis.”

DO DRUGS PERFORM?

The world of available data is growing in volume as systems to store, process, analyze and access improve with technology. Much of the data Smolinske uses comes to her in a form most people are familiar with – an Excel spreadsheet.

Her colleague, Melissa Roberts, PhD, an assistant professor who specializes in health care outcome research, has seen data sources expand and data sets become more accessible since she began computer programming 20 years ago. Roberts still writes code, and much of her sensitive analysis is done on secure servers on campus. But, she says, even as data tranches have gotten bigger, “These days your laptop can do a lot of this.”

For her work, Roberts can query large troves of health insurance claims, electronic medical records and national health registries.

Roberts uses data to show the effectiveness of various pharmaceutical treatments.

“Randomized clinical trials are really the gold standard of demonstrating efficacy of treatments,” Roberts says, “but they’re very expensive and the populations included in randomized controlled trials tend to be restrictive. They exclude a lot of people.”

In the real world, though, the drugs once approved are prescribed for a varied population who may be much different from clinical trial participants.

“So these big databases are useful for determining in practice how does this drug treatment perform?” Roberts says. “You’re able to look in the actual practice, how is the uptake of this medication going? Is it helpful in reducing hospitalizations or urgent care visits? What’s the cost effectiveness?”



Does a higher-cost drug reduce expensive hospitalizations? Does it improve quality of life for patients? These are things that are helpful for insurers and patients to know.”

Roberts also uses the large databases, including analyses of the FDA adverse event database, to look for signals of adverse outcomes.

Clinical trials usually last only a few months, and Roberts says, “It may be that after a drug is out in the real world used over longer periods of time that some signals start to appear about the safety.”

Much of Roberts’ work focuses on chronic obstructive pulmonary disorder, or COPD, which affects about 12 percent of the population 65 and older.

Most medications for COPD are brand name drugs and tend to be expensive. Using national insurance claims data – including information on inpatient stays and outpatient visits, lab work, scans and medications used – and health data from electronic medical records, Roberts is able to make head-to-head comparisons between commonly prescribed bronchodilators on the disease progression in patients.

Outside of COPD and head-to-head drug treatment comparisons, Roberts and College of Pharmacy colleague Esther Erdei, PhD, have also used big data sets to look at the prevalence of certain autoimmune disorders among different populations. Using a database of 16 million people, they were able to determine that rates of rheumatoid arthritis were higher among Native American populations.

“You need very big data to look at these conditions that have a very low rate of incidence. And when you’re trying to stratify within that population how it differs among men and women or across races, then you need a really big population,” Roberts says.

IT STARTS WITH A QUESTION AND LEADS TO BETTER PATIENT CARE

Could a \$99 device and an iPhone cut the nation’s rate of strokes? Does offering tuberculosis testing in pharmacies lead to more tests and better follow-up? What changes in clinical settings or pharmacies might encourage patients to better control their blood pressure? Are hospitals prepared to deliver babies of HIV-positive mothers?

While many faculty in the College of Pharmacy conduct laboratory-based research to better understand basic science or discover or improve medicines, others turn their research focus to how pharmacists can take on ever more meaningful roles on health care teams and better serve patients.

New Mexico has been a leader in expanding the role of pharmacists – from legislation that allows prescribing authority to parity of reimbursement for advanced practice pharmacists. Researchers within the College are putting new models under the microscope to find even more opportunities for expanding the role of pharmacists in patient care.

Expanding Clinical Trials

If not for the COVID-19 pandemic, Renée-Claude Mercier, PharmD, an associate medical director of UNM’s Truman Health Services, would most likely have one or more clinical trials underway.

Mercier, an infectious disease specialist and pharmacist clinician at Truman, has been working with drug manufacturers to include Truman as a site for clinical trials on drugs targeting HIV and hepatitis C.

The Truman clinic specializes in treating patients who are living with HIV and hepatitis C, as well as transgender individuals. Participating in drug trials could potentially help those patients receive better drug therapies and at no cost, Mercier says.

“We are an academic health center and we should offer the latest, newest therapy for our patients,” Mercier says. “And by doing that it allows you to oftentimes get the medication for free. It would really expand access to our patients.”



Renée-Claude Mercier, PharmD

Despite the delay, Mercier is hopeful a trial at Truman will be underway in 2021.

Meanwhile, Mercier and colleagues are involved in other research – evaluating health literacy among patients, and asking whether a clinic run solely by a pharmacist can deliver the same quality of health care as one with an MD also on staff.

Mercier is also conducting two large studies that look at pregnant women with HIV in the delivery room.

One study examined the record of every baby born to an HIV-positive mother at UNM Hospital in the last 20 years to track the health of those children.

“There were 50 children born to HIV-positive moms,” Mercier says. “We have looked at what was the prenatal care given? What was the delivery like? What medications were given? What was the outcome of the babies?”

The study followed the children for 18 months, until the time they were determined to be HIV-negative or positive. In the last six years, none of the children born at UNM Hospital to HIV-positive mothers became HIV-positive themselves.

Because of advances in medicine, it is possible for women with HIV to reduce their viral load to undetectable levels before delivery and therefore protect their baby from transmission. But without prenatal care, HIV-positive mothers may still present at hospitals in labor with high viral loads.

Another of Mercier’s studies is surveying hospitals in the United States to see whether they are prepared to safely deliver babies to HIV-positive women who have not had prenatal care in adherence with federal guidelines that require certain medications for both infant and mother given at the time of labor and within 12 hours of delivery.



Mercier says the outcome of the study may help hospitals be better prepared for such deliveries.

“Because of medications we have now that are so good and so powerful, there should not be a baby born with HIV in this country,” Mercier says.

Testing Tuberculosis In a Pharmacy Setting

Also at Truman Health Services, Bernadette Jakeman, PharmD, an associate professor in Pharmacy Practice & Administrative Sciences, has studied medication risks associated with antiretroviral drug interactions in patients with HIV. She and her collaborators at the Albany College of Pharmacy described the frequency of contraindicated drug-drug interactions with different antiretroviral regimens using historical data from UNM and the Veterans Affairs Health Care System. The study team also found that drug-drug interactions increased patients’ risk for hospitalization.

Jakeman, in collaboration with the New Mexico Department of Health and the New Mexico Pharmacists Association, has also been involved with a pharmacist-administered TB testing initiative. Jakeman and colleagues Matthew Borrego, PhD, Amy Bachyrycz, PharmD, and Melissa Roberts, PhD, have published three papers on the subject since New Mexico granted pharmacists authority to prescribe, administer and interpret TB tests in 2011. Their group found that visits required very little time and patients found their experiences positive, noting convenience of the service. And 93% of patients returned to the pharmacy to have their tests read.

“That was pretty impressive,” **Jakeman** says. “I think that just shows that it’s easier to get to your pharmacy rather than making a doctor’s appointment.”



The overall test positivity rate was higher than originally anticipated, at 4%, and pharmacists appropriately referred patients to the NM Department of Health.

In response to the study results, Jakeman and her team conducted a feasibility study of pharmacist-administered 12-week latent TB infection treatment at community pharmacies.

After training pharmacists in administering the therapy, “We tracked side effects and a pharmacist’s ability to manage non-serious medication side effects, which is why a lot of people stop the therapy,” Jakeman says.

Pharmacist-administered latent TB treatment in the community pharmacy setting resulted in 75% treatment completion rates, which was higher than historical rates at the health department.

If there is a theme to Jakeman’s research, she says it is the important role pharmacists play as part of the interdisciplinary health care team. She is particularly interested in innovative projects that seek to improve patient outcomes by further integrating pharmacists into the care process.

“A lot of times these advances come from a community need and pharmacists are more than willing to step up and provide these important public health services to support their communities,” Jakeman says.

Advancing the Practice

The ability of pharmacists to step into new roles and expand the scope of their practice is a key element to much of the clinical research undertaken within the College.

“Certainly, a lot of the research that we do in the clinical area is around advocacy and advancing the practice of pharmacy,” says Melanie Dodd, PharmD, associate dean for Clinical Affairs. “It asks, ‘How are we going to move our profession forward?’”

Dodd, a pharmacist clinician herself, who practices in UNM’s Senior Health Clinic, also advocates for the expanded role of pharmacists and finds research results help bolster arguments for pharmacists to take on expanded role on health care teams.

Much of her research involves surveys and database mining. Earlier this year, Gretchen Ray, PharmD, pharmacist clinician Ngoc-Yen Pham, Dodd and other colleagues surveyed the perceptions of advanced practice pharmacists

in New Mexico among physicians and other health care providers. The outcome found that familiarity was key to positive perceptions.

“When they had the opportunity to work with pharmacist clinicians, **it was very positive**. Where they have less exposure, it was less.”

Dodd and colleagues have also tested the teaching model of using case studies in a public health course within the College taken by PharmD students in their third year. The survey asked students to gauge their confidence in the role of pharmacists in providing public health intervention to patients after taking the course.



Dodd recently published a study that looked at bedside delivery of medications before patients

were discharged from UNM Hospital. “We were looking at getting medications into the hands of the patients before they left the hospital and rates of hospital readmission,” Dodd says. The question was could providing this new service, rather than sending prescriptions to a neighborhood pharmacy to be picked up on the way home, help reduce patients’ rehospitalization rates. While rehospitalization rates were lower in those that received the bedside medication delivery, it was not statistically significant.

“It likely increased adherence,” Dodd says, “and the hope would be that it would benefit patients in the long term. It also suggests that a single intervention is not sufficient for



Students performing heart rhythm screenings for the public

decreasing rehospitalization rates.”
Know Your Heart, Know Your Rhythm

Joe R. Anderson, PharmD, assistant dean for Curricular Affairs, holds in his hand an object about the size of a business card that could hold the key to reducing strokes among New Mexicans. It’s a mobile device that College of Pharmacy students have been using to screen for atrial fibrillation – an irregular heartbeat that can lead to strokes and heart failure.



In a project with Barry Bleske, PharmD, chair of Department of Pharmacy Practice & Administrative Sciences, pharmacy students conducting health screenings offer the test to people who might be at greater risk of atrial fibrillation – those who are obese or have diabetes or metabolic syndrome. By simply placing two fingers on each end of the device, it measures heart rhythm and delivers a medical-grade electrocardiogram to

an app on an iPhone. The pharmacy student along with a pharmacist preceptor reviews the results and, if it indicates a problem, can recommend follow-up with a physician.

It’s a big deal for community health, they say, because atrial fibrillation affects some 30 million people worldwide and the condition increases the risk for stroke by a factor of five. Often the condition causes dizziness, shortness of breath or chest pains.

“But for a number of patients, it’s silent,” **Bleske** says. “They don’t know they have it. And, if we can identify them, we can prevent the stroke.”



The College routinely sends pharmacy students out in the community to do blood pressure, diabetes, BMI and other health screenings. To determine whether to incorporate atrial fibrillation testing into the menu of available screenings, Anderson and Bleske devised



a study in which 697 participants were screened at a number of health fairs over six months. Students found that 2.3% of the participants had possible atrial fibrillation that was previously undetected, and all were asymptomatic. Nearly seven in 10 of those participants were at moderate-high risk of stroke.

With a catchy slogan – “Know Your Heart, Know Your Rhythm” – the two are excited about the possibility that this low-cost screening method could be scaled up, especially in community pharmacies in rural communities. The College has already embedded the service in its community pharmacy rotation.

Paying Attention to Hypertension

Another heart-related clinical initiative partners the College with the New Mexico Department of Health to prevent heart attacks and strokes in New Mexicans.

Anderson is working with Associate Professor James Nawarskas, PharmD, on hypertension screening initiatives under a \$100,000 annual contract with the state. Both are pharmacist clinicians and treat hypertension – a leading risk factor for heart attack and stroke – in their clinics.

As part of the U.S. Centers for Disease Control and Prevention’s Million Hearts Initiative – a goal of preventing one million heart attacks and strokes within five years – Anderson and Nawarskas are focusing on controlling high blood pressure.

“Many patients don’t know that they have hypertension,” Anderson says, “but have that risk for heart attack and stroke.”

The CDC and Department of Health wanted to involve community pharmacists in screening for high blood pressure and helping people with hypertension to control it by encouraging adherence to medication and diet and lifestyle modifications.

About one-third of cases of hypertension are undiagnosed. Of the two-thirds that are diagnosed with hypertension, only about half of patients keep their blood pressure in a healthy range.

“Non-adherence to medications is a big part of that,” Anderson says, “and a role community pharmacists can play is educating patients about the importance of taking their medications and making sure they’re on the right medications and the right doses.”

Anderson and Nawarskas investigated whether community pharmacists could play that role, but interviews with focus groups showed that community pharmacists were willing to take on the task but did not have a way to be

reimbursed for their time. Their next approach was to test whether pharmacists practicing in clinical settings might take a lead role in hypertension management. They negotiated a pilot project with the Lovelace Medical Group to have Anderson and Nawarskas each work one day a week in the practice focusing on hypertension.

The contract was signed on Feb. 21 and several weeks later the world was shut down by the novel coronavirus pandemic. The project is on hold as health care systems adjust. But once it begins, the two intend to test their theory that developing blood pressure control plans with patients, sending them home with blood pressure monitors and monitoring their progress with remote telehealth visits would encourage better blood pressure controls.



How would they know whether the approach works?

“The lowest-hanging fruit is blood pressure control,” Nawarskas says. “That’s something that can be pretty easily monitored by us. And it’s clearly established that if you can get patients to blood pressure goals, they’re going to do better. You can make the correlation that if we can get them to blood pressure goal, then strokes, heart attacks, heart failure – all those outcomes improve.”



Ludmila Bakhireva, MD, PhD, MPH

Nature or Nurture?

A decade-long look at mothers and children may discover how substance use affects development

Almost no one is more vulnerable than a pregnant woman or a newborn. Ludmila Bakhireva, MD, PhD, MPH, a professor of Pharmacy, Family Medicine, Epidemiology and Biostatistics, could focus her research lens anywhere in the public health field, but she has chosen mothers and their babies for multi-disciplinary clinical studies that have attracted millions of dollars in funding from the National Institutes of Health.

“I felt that this is a population that really deserves more knowledge, empowerment and more resources,” Bakhireva says. “If we can help vulnerable populations in pregnancy and childhood, this is where we can make a huge difference. By providing supportive environments, resources, access to care and specialized care we can change the developmental trajectory of affected children. And for me that’s a big motivation.”

Bakhireva, a medical doctor in her native Russia, came to the United States in 2000 to study public health. At UNM, her focus has been on studying substance use and its effects on children exposed to drugs and alcohol in utero. It is, unfortunately, a field rich with opportunity in a nation beset by opioid and alcohol use disorders.



But there is a large knowledge gap about precisely what happens in those first critical years of exponential brain development and how in utero exposure to alcohol and drugs – and even stress and trauma – affect children.



Substance Use Research & Education Center Team

Bakhireva's latest research project, part of a massive nationwide study, hopes to unlock some answers.

"By studying early brain development from the prenatal period into early and middle childhood and evaluating the effects of substance use and family environment, we can identify strategies to mitigate adverse outcomes," Bakhireva says.

Bakhireva received \$542,000 in NIH funding for UNM's part in Phase 1 planning for the HEALTHy Brain and Child Development study in collaboration with the Mind Research Network.

The study will recruit between 7,000 and 10,000 pregnant mothers – both substance-using and not – and follow them and their children until age 10.

"With a large and diverse sample monitored over a decade, the study will be unprecedented," Bakhireva says, "and may shed light on what factors most affect brain development."

"We start at the prenatal period and will follow up frequently during the first years of a child's life to capture key developmental milestones," she says. "It's so difficult to untangle the effects of prenatal substance exposures versus social and environmental factors. We need to look very comprehensively at both aspects."

While large longitudinal studies are logistically challenging, Bakhireva is hoping for a big payoff that could influence best practices for helping children at risk.

"This can have a big national impact," she says. "We hope to have significant findings

that will influence clinical guidelines and recommendations. Such a large longitudinal study should be able to help us untangle the effect of nature versus nurture and identify early intervention strategies."

In addition to acting as principal investigator on numerous NIH-funded grants, mentorship, and teaching, Bakhireva is also the director of the SURE Center (Substance Use Research & Education) at the UNM College of Pharmacy and co-director of the UNM Brain and Behavioral Health Institute.

Bakhireva's other large study is now in its seventh year of a 10-year grant. With some \$6.5 million in NIH funding over its lifetime, the ENRICH (Ethanol, Neurodevelopment, Infant and Child Health) birth cohort study evaluates the effect of prenatal opioid and alcohol use on infant development. In its second phase, it concentrates on the connections between alcohol exposure in utero and maternal stress on infants.

The question is: does maternal stress and alcohol use during pregnancy affect fetal programming of stress regulation and predispose infants to higher emotional reactivity later in life. Better identification of factors that confer resilience builds the foundation for novel early intervention programs with affected families.

"This is important because we have found that infant adverse behavioral outcomes are often more challenging for parents than cognitive impairments," Bakhireva says, "and they interfere with maternal-child bonding and how the child adapts to the learning environment in school."

NOVEL IDEAS

College Faculty Hold 55 U.S. Patents

It starts with basic research – scientists asking questions and using the tools of their minds and their labs to look for answers.

There's plenty of that in the College of Pharmacy, where faculty and students work every day to unravel the mysteries of the body and disease.

Sometimes that research leads to novel discoveries. On occasion those discoveries result in inventions of a novel treatment or diagnostic tool. And even more rarely, that invention is deemed unique enough to warrant a patent from the U.S. Patent and Trademark Office.

UNM's College of Pharmacy faculty members have 55 patents associated with their work, each representing the culmination of an "aha" moment. But that is only the start of the lengthy and difficult process of bringing that novel concept to the marketplace.

"A patent is just an idea," says Jim Liu, PhD, the associate dean for research in the College of Pharmacy and a professor of Pharmaceutical Sciences. **"It's the start. Next is how do you turn that idea into a product?"**

Graham Timmins, PhD, an associate professor of medicinal chemistry in the Department of Pharmaceutical Sciences, has had dozens of innovative ideas, mostly surrounding the diagnosis and treatment of lung disease. In all, Timmins' work has resulted in 15 U.S. patents and one in the United Kingdom.



With two of those inventions – a rapid breath test to detect and monitor bacterial pneumonia and other pulmonary infections and treatment for drug-resistant tuberculosis – Timmins has managed to make the leap from patent to start-up company.

Still, the road from laboratory to the marketplace is a long one. While commercializing those patents is left to UNM Rainforest Innovations, the University's tech transfer entity, and raising money is left to the venture capitalists, College of Pharmacy faculty members go back to the bench to find more inventions.

REACHING THE MARKETPLACE

Timmins hasn't had a haircut since before Christmas, and his unruly mop only adds to the distracted inventor vibe. He has to dig into his computer to find the precise number of patents he has been awarded.

"Honestly, I don't know," he says. "I've stopped counting. When you get one you get a dopamine buzz, but it's gone in five minutes. It's an ongoing process, and if you were to make a huge deal of it and sit back, you'd waste time and you wouldn't be working."

Most of Timmins work in the past decade has been around diagnosis and treatment of lung disease. He has several patents on breath-test technology for early detection and treatment of bacterial pneumonia and other pulmonary infections and on stable isotope-labeled

versions of existing antimycobacterial drugs for tuberculosis that overcome resistance.

Two companies have resulted. Avisia Pharma was formed in 2011 around his rapid breath-test technology and SpinCeutica was formed in 2016 around his treatment for drug-resistant TB, which is found now mostly in developing countries.

SpinCeutica is an example of the obstacles that can prevent a great idea from reaching the marketplace.

“The technology is amazing, but it’s not appropriate for trying to beat TB in developing countries because it’s just too expensive and the market is just too small. If the drug costs you \$5,000 to make, you can’t expect that that’s going to be deployed, unless you have a philanthropist willing to fund it and not expect to make money.”

Early in 2020, SpinCeutica was near a funding deal with just such a benefactor, but then the novel coronavirus pandemic hit, and that investor was no longer in a position to provide the capital.

“That was a hard lesson,” says Timmins. “We know the drug works in cultured TB. We know it works in animals with TB. It’s overwhelmingly likely it works in humans. It’s frustrating, but you know, it’s the way the world works.”

Avisia is an example of how the process can work well. Its trademarked Avisia BreathTest, a drug/device combination, has been successful in three trials detecting and monitoring pneumonia, cystic fibrosis and tuberculosis, and is in early-stage trials in emergency room settings.

The company is going public on the Toronto Stock Exchange and hoping to raise \$35 million for the final clinical steps to get FDA approval. If it reaches the market, clinicians will have a new tool to help them better and quickly decide whether to administer antibiotics when they see lung infections.

A BLOOD TEST FOR STROKE

Timmins’s latest three patents are in collaboration with Liu, Rong Pan, a research assistant professor and Wenlan Liu, a former research associate professor in the College. The team was looking at the evidence of ischemic stroke and had discovered that when the blood-brain barrier is damaged during stroke, a certain protein molecule sheds and can be detected in the bloodstream.

“This was pure research,” Liu says. “We were asking, ‘What happens in the brain when someone has a stroke?’ and finding that we could detect that small piece of protein and describe precisely what is going on in the blood vessel during stroke.”

Timmins was attending a seminar held for College of Pharmacy colleagues on the topic and thought, if you can detect that in the blood, then you could potentially diagnose how bad the blood vessels were damaged and be able to better determine how to treat it.

“Because I’ve been in the breath test diagnostics field, my mind was primed for rapid diagnostics,” Timmins says.

Their invention (Blood Biomarker for Early Blood Brain Barrier Disruption in Ischemic Stroke) is a quick blood test that measures the amount of protein in the blood and can give doctors an idea of the severity of the damage much more quickly than an MRI scan.

“And when you have a stroke, time is life,” Liu says. “At the end of the day, you want to save human lives.”

Conversations with neurologists confirmed that there was a market for a quick diagnostic tool to determine whether to administer the clot-busting drug tissue plasminogen activator (tPA), whether to go in and remove a clot or whether it is safer to do nothing. Timing is essential and the window for administering tPA after the onset of a stroke is currently four hours.

But because blood vessel damage among stroke patients varies, a real-time blood test could

identify patients for whom tPA could be safe and useful outside the four-hour window.

The team has been able to correlate the amount of protein fragments measured with the severity of injury to the brain, initially using mice and rats as stroke models. They are now using blood samples collected from stroke patients from University Hospital and have confirmed the correlation.

Liu has confidence, but he knows that the journey from idea to product is long and filled with roadblocks.

“We believe in what we are doing,” Liu says. “But believing in what you’re doing is one thing and the real world is complicated and competitive. And having a good product doesn’t guarantee it will be successful. The real question is, there are so many who are competing and who is coming up with a better mouse trap.”

OTHER PATENT AWARDEES

Two patents (Modulators of GTPases and Use and Modulators of GTPases And Their Use In Relevant Treatment) issued to **Laurie Hudson, PhD**, a professor of Pharmaceutical Sciences, resulted from her work with a nine-member team of UNM colleagues screening drugs that are now off patent for their original purpose for new uses. They found that pulling apart two components of a nonsteroidal anti-inflammatory drug approved for pain relief controlled GTPases, the chemical switches inside a cell that regulate cell growth, and their patents relate to using that mechanism to slow the growth and spread of ovarian cancer.



Todd A. Thompson, PhD, an associate professor, and his wife, **Debra MacKenzie, PhD**, a research assistant professor, hold two patents (Methods and Related Compositions for the Treatment of Cancer) related to screening technologies and compounds that encourage autophagy in cancer cells. Using high-throughput flow cytometry that can test hundreds of thousands of cells in seconds, the library of off-patent drugs can be searched for likely candidates that could increase intracellular granularity associated with autophagy and decrease the cellular adherence of cancer cells, inhibiting proliferation and leading to cancer cell death. New drug candidates for the treatment of prostate cancer and melanoma are being explored.



Independent from his research at UNM, Thompson has received four patents to utilize chroman-derived anti-androgens for the treatment of androgen-mediated disorders, primarily for the treatment of prostate cancer.

Pamela Hall, PhD, an associate professor of Pharmaceutical Sciences, holds two patents (Inhibition and Treatment of Bacterial Infections by Sex-Specific GPER Targeting and Frankiamicin A Compositions and Methods) related to treating *Staphylococcus aureus* infections. The first concerns the use of compounds that modulate the G protein Coupled Estrogen Receptor and the second is a discovery of the compound Frankiamicin A, which has the potential to treat a range of infections, including methicillin-resistant *Staphylococcus aureus*.





RESEARCH TALENT ROSTER



Joe R. Anderson, PharmD, PhC, BCPS

Assistant Dean for Curricular Affairs
Associate Professor of Pharmacy Practice & Administrative Science
Associate Professor of Medicine

PharmD, The University of Texas at Austin and The University of Texas Health Sciences Center at San Antonio, 1995
BS, Pharmacy, The University of New Mexico, 1991
BS, Biology, The University of New Mexico, 1988

Anderson's research interests are in cardiovascular pharmacotherapy (specifically related to heart failure and primary and secondary ASCVD prevention) and health outcomes, particularly as they pertain to advanced pharmacy practice.

Anderson has more than 20 years of experience in clinical trial research serving as a principal investigator, co-investigator, research coordinator and serving on DSMB committees. He has collaborated on several clinical translational science projects with Dr. Mary Walker in the Department of Pharmaceutical Sciences. This research aims to identify and validate a novel biomarker of cigarette smoke-induced CV disease with a goal that the biomarker could become a target for prevention of cardiovascular disease associated with cigarette smoke. Recently, he has collaborated with Dr. Barry Bleske in implementation of a rapid screening method for atrial fibrillation in the community pharmacy.

Honors & Awards

- Pharmacist of the Year, New Mexico Society of Health-System Pharmacists, 2005
- Innovative Pharmacy Practice Award, New Mexico Pharmacists Association, 2008
- Dorothy Dillon Memorial Award, New Mexico Society of Health-System Pharmacists, 2010
- Distinguished Alumni Award, The University of New Mexico College of Pharmacy, 2018

Grants (Last 5 Years)

PI, NM DOH-funded contract, "Heart Disease and Stroke Prevention Program Health Systems Intervention Project"

PI, NM DOH-funded contract, "Health Systems Data management and Use of Team Based Healthcare"

Co-PI, Bristol-Myers Squibb grant, "Pharmacy-based Population Health Model for the Detection of Silent Atrial Fibrillation"

Co-I, NHLBI-funded R15, "Vasoprotective mechanisms of n-3 PUFA epoxides"

PI, NM Pharmacists Association contract, "Physical Assessment for the Pharmacist Clinician"

PI, COP pilot award, "Developing Instrumentation for teaching practice inventory in pharmacy curriculum"

Select Publications (Last 10 Years)

Anderson JR, Hunter T, Dinallo JM, Glaser D, Roybal LK, Segovia A, Raley R, Bleske BE. Population screening for atrial fibrillation by student pharmacists at health fairs. *J Am Pharm Assoc* 2020;60: e52-e57.

Zehr KR, Segovia A, Shah M, Walsh-Wilcox MT, Brumbach BH, **Anderson JR**, Walker MK. Associations of medium and long chain omega-3 polyunsaturated fatty acids with blood pressure in Hispanic and non-Hispanic smokers and nonsmokers. *Prostaglandins Leukot Essent Fatty Acids* 2019;144:10-15.

Shen X, Bachyrycz A, **Anderson JR**, Tinker D, Raisch DW. Improving the effectiveness of pharmacist-assisted tobacco cessation: a study of participant- and pharmacy-specific differences in quit rates. *Ann Pharmacother* 2015;49(3):303-310. doi: 10.1177/1060028014563949.

Wiest EF, Warneke A, Walsh MT, Langsfeld M, **Anderson J**, Walker MK. Association of serum aryl hydrocarbon receptor activity and RBC omega-3 polyunsaturated fatty acids with flow-mediated dilation in healthy, young Hispanic cigarette smokers. *Toxicology Letters* 2015;232:422-8.



Kelsea G. Aragon, PharmD, PhC, CDCES

Assistant Professor of Pharmacy Practice and Administrative Sciences

PharmD, The University of New Mexico College of Pharmacy, 2017

Aragon's research interests are in student pharmacist and pharmacy resident well-being, health outcomes for gender expansive patients and cardiovascular risk reduction.

Aragon's clinical practice and clinic research includes patients with gender dysphoria and cardiovascular risk reduction for people living with HIV. She is also passionate about improving student pharmacist and pharmacy resident well-being and provides an elective course in this area. She has maintained professional involvement in the American Pharmacists Association throughout her time as a student pharmacist, and now as a new practitioner.

Honors & Awards

- AACP Walmart Scholar, 2018
- APhA-ASP Worthen National President Award, 2017
- New Mexico Pharmacists Association Community Pharmacy Clinical Achievement Award, 2017
- Joy H. Donelson Leadership Award for Women Students in Pharmacy, 2017

Grants (Last 5 Years)

PI, Retrospective cohort study describing rates of adherence to cardiovascular risk reduction guidelines in a single HIV specialty clinic in New Mexico with an embedded pharmacist clinician providing chronic metabolic disease state management.

Select Publications (Last 10 Years)

Gallegos Aragon K, Elamaoued AA, Pharm NT, Conklin JR, Ray GM. Long-Acting Basal Insulins: A Review of the More Recently Approved Agents. *Cardiol Rev*. 2019. 27(5):260-266. doi: 10.1097/CRD.0000000000000266.

Gallegos K, Conklin J, Lenell A, Rhodes LA, Marciniak MW. Examining Community-based Pharmacist Perceptions on the Care of Transgender Patients. 2019. 59(4S):S62-S66. doi: 10.1016/j.japh.2019.03.014.

Carpenter D.M., Dhamanaskar A.K., **Gallegos K**, Shepherd G., Mosley S.L., Roberts C.A. Factors associated with how often community pharmacists offer and dispense naloxone. *Res Social Adm Pharm*. 2018. (18)30630-2. doi: 10.1016/j.sapharm.2018.07.008.

Gallegos, K. Academies unite to make an impact in patient care. *J Am Pharm Assoc*. 2017. 57(2), 142-145. doi:10.1016/j.japh.2017.02.001



Amy Bachyrycz, PharmD

Assistant Professor, UNM College of Pharmacy
Shared Faculty, Walgreens Patient Care Center

PGY1, New Mexico VA Healthcare System, Albuquerque, 2005
PharmD, University of Connecticut, College of Pharmacy, 2004
BSPHarm, University of Connecticut, College of Pharmacy, 2002

My research focuses on areas of need specific to public health and the community, while utilizing the outpatient/community pharmacy setting and developing innovation with an emphasis on pharmacy profession advancement and advancement of pharmaceutical care.

Bachyrycz is involved heavily in the New Mexico Pharmacists Association as past president and current District Counselor on the Executive Board. She also has a strong focus on public health and volunteers as various preventive health events throughout the state for those in need. She has authored and co-authored manuscripts specific to community pharmacy outcomes, public health and preventive medicine, while continuing to write protocol and policy to help advance the pharmacy. She has written protocols that have become law specific to the areas of pharmacist prescriptive authority, including tuberculosis testing and hormonal contraception. Because of these laws, pharmacists in the outpatient community pharmacy setting can now prescribe, administer and read tuberculosis tests and prescribe birth control for their patients in New Mexico. She is writing other protocols for areas of need within the state, such as pharmacist prescribing in conjunction with point-of-care testing, that will help to advance the profession and responsibilities of a pharmacist, while better serving those areas of need specific to New Mexicans.

Honors & Awards

- Upsher Smith Excellence in Innovation Award, 2020
- New Mexico Immunization Coalition Immunizer Champion Award, 2018, 2015
- New Mexico Pharmacists Association New Mexico Ernie Welch Award, 2017
- New Mexico Pharmacists Association New Mexico Bowl

of Hygeia Award 2016, 2015

- HealthInsight Shining Star Award 2014
- Cardinal Health Generation Rx Award 2014
- Immunization Coalition NMSIIS Champion 2014
- Pharmacy Times Next Generation Award 2013
- Pharmacy Times Provider of the Year Award 2013
- American Pharmacists Assoc. Leadership Award 2013

Grants (Last 5 Years)

PI, Seqirus funding, "Pharmacy vaccination education/assessment and COVID-19 evaluation program."

PI, PPAS pilot funding, "Patient perspectives and needs regarding hormonal contraception in female patients living with HIV: A qualitative study"

Consultant, Department of Health funding, "Consider Project; naloxone community pharmacy outreach."

Select Publications (Last 10 Years)

Jakeman B, Logothetis SJ, Saba M, Anderson D, Acosta JM, Borrego ME, Roberts MH, **Bachyrycz A**, et al. patient perceptions of tuberculosis testing program provided in the community pharmacy setting. *Public Health*. 2020.

Jakeman B, Logothetis SJ, Roberts MH, **Bachyrycz A**, et al. Addressing latent tuberculosis infection treatment through a collaborative care model with community pharmacies and a health department. *Prev Chronic Dis*. 2020.

Bachyrycz, A, Takeda MY, Wittstrom K, Bleske B. Opioid overdose response training in pharmacy education: An analysis of students' perception of naloxone use for opioid overdose prevention. *Curr Pharm Teach Learn*. 2019.



Ludmila N. Bakhireva, MD, PhD, MPH

Professor and Director, College of Pharmacy Substance Use Research & Education Center
Co-Director, UNM-HSC Brain and Behavioral Health Institute

MD, Omsk State Medical Academy, 1999
MPH, Boston University, 2001
PhD, University of California, San Diego, 2007

Bakhireva's primary research interests are in the area of substance use disorders/addiction medicine, maternal and child health and pharmacoepidemiology

Bakhireva has extensive expertise in establishing and successfully following up cohorts of high-risk vulnerable populations. She is leading several multi-disciplinary clinical studies involving substance-using pregnant women and children affected by substance use disorders, including the ENRICH cohort and the HEALTHY Brain and Child Development study at UNM. Her research portfolio also includes studies examining safety of medications and effects of environmental exposures on perinatal outcomes. She is a Co-I in the NIDA Southwest Clinical Trial Node and is leading clinical trials of innovative pharmacy-based interventions. Bakhireva has been continually funded by the NIH since 2010 and authored over 70 manuscripts. She serves in leadership positions both at the College of Pharmacy and at the national level. Her commitment to mentorship is demonstrated by success and prestigious awards received by her trainees.

Honors & Awards

- The University of New Mexico College of Pharmacy William M. Hadley Distinguished Scholar Award (2017)
- University of New Mexico Faculty Research Excellence Award in Population Science (2015)
- University of New Mexico Regents' Lecturer Award (2011)

Grants (Last 5 Years)

PI, NIAAA-funded R01 grant, "ENRICH-2: Stress Reactivity and Self-Regulation in Infants with Prenatal Alcohol Exp."

PI, NIDA-funded R34 grant, "6/6 Planning for the HEALTHY Early Development Study"

PI, NICHD-funded R21 grant, "Epigenetic Markers for Neonatal Abstinence Syndrome: Mechanistic Insights from an Established Birth Cohort"

PI, NM DOH-funded contract, "NM Pharmacist & Pharmacy Technician Naloxone Training Project"

PI, NM DOH-funded contract, "Enhancing Pharmacy-based Naloxone Distribution"

Select Publications (Last 10 Years)

Bakhireva LN, Savich RD, Raisch DW et al. The Feasibility and Cost of Neonatal Screening for Prenatal Alcohol Exposure by Measuring Phosphatidylethanol in Dried Blood Spots. *Alcohol Clin Exp Res*. 2013 37:1008-15

Bakhireva LN, Bautista A, Cano S, Shrestha S, Bachyrycz A, Cruz T. Barriers and Facilitators to Dispensing of Intranasal Naloxone by Pharmacists. *Subst Abus*. 2017;1-11

Page K, Leeman L, Bishop S, Cano S, **Bakhireva LN**. Hepatitis C Cascade of Care Among Pregnant Women on Opioid Agonist Pharmacotherapy Attending a Comprehensive Prenatal Program. *Matern Child Health J*. 2017;22:1778-1783.

Bakhireva LN, Shrestha S, Garrison L et al. Prevalence of Alcohol Use in Pregnant Women with Substance Use Disorder. *Drug Alcohol Depend*. 2018;187:305-310.

Bakhireva LN, Holbrook B, Shrestha S, et al. Association between Prenatal Opioid Exposure, Neonatal Opioid Withdrawal Syndrome, and Neurodevelopmental and Behavioral Outcomes at 5-8-months of Age. *Early Hum Dev*. 2018; 128:69-76.



Barry E. Bleske, Pharm D, FCCP

Chair & Professor
Department of Pharmacy Practice and Administrative Sciences

Pharm D, University of Minnesota, 1986
BS Pharmacy, Wayne State University, 1984

Bleske's research interest is in the area of cardiovascular medicine, with a focus on heart failure and nitric oxide, and has included both basic and clinical research. In addition, he has also recently focused his research in the area of environmental toxicology.

Bleske has authored and co-authored more than 150 published abstracts, articles and book chapters. He has published in journals such as *American Heart Journal*, *American Journal of Cardiology*, *Journal of the American College of Cardiology*, *Pharmacotherapy*, and *American Journal of Pharmacy Education*. Bleske has received research funding from industry, foundations and the National Institutes of Health. He is working on a number of different research initiatives. In the laboratory setting, one area of focus is to evaluate the role of a natural product WS-1442 in attenuating systemic inflammation and neuroinflammation following heavy metal exposure. In the clinical setting, he is developing a new clinical model to assess atrial fibrillation in the community setting.

Honors & Awards

- Fellow, American College of Clinical Pharmacy (1997-Present)

Grants (Last 5 Years)

Subaward PI, University of Michigan/NIH, "Genetic Determinants of ACEI Prodrug Activation"

PI, Bristol-Myers Squibb, "Pharmacy-based Population Health Model for the Detection of Silent Atrial Fibrillation"

PI, NACDS, "Community Pharmacy Practice Innovation through Curricular Initiatives"

PI, Schwabe Pharmaceuticals, "WS 1442 Reg. of eNOS Expression via Epigenetic Mech. - Focus on MicroRNAs."

Select Publications

Hwang HS, Boluyt MO, Converso K, Russell MW, Ghannam MMJ, **Bleske BE**. Effects of hawthorn on the progression of heart failure in an aortic constriction model. *Pharmacotherapy* 2009;29:639-648.

Dorsch MP, Nemerovski CW, Ellingrod V, Cowger JA, Dyke DB, Koelling TM, Wu AH, Aaronson K, Simpson RU, **Bleske BE**. The effect of vitamin D receptor genetics on extracellular matrix biomarkers and hemodynamics in systolic heart failure. *J Cardiovasc Pharmacol Ther*. 2014 Sep;19(5):439-45.

Albaba M, Brenner J, Nicklas J, Hummel S, McCormick M, Pawlowski J, Remington T, Gure T, Dorsch M, **Bleske BE**. Hyponatremia, Cognitive Function, and Mobility in an Ambulatory Heart Failure Population. *Med Sci Monit*. 2016 Dec 18;22:4978-4985.

Wang X, Liang Y, Shi J, Zhu HJ, **Bleske BE**. Crataegus Special Extract WS 1442 Effects on eNOS and microRNA 155. *Planta Med*. 2018 Apr 16. doi: 10.1055/a-0601-7083. PMID: 29660753

Bleske BE, Remington TL, Wells TD, Klein KC, Tingen JM, Dorsch MP. A Randomized Crossover Comparison between Team Based Learning and Lecture Format on Long Term Learning Outcomes. *Pharmacy* 2018;6(3) PMID: 30081547

Anderson JR, Hunter T, Dinallo JM, Glaser D, Roybal LK, Segovia A, Raley R, **Bleske BE**. Population Screening for Atrial Fibrillation by Student Pharmacists at Health Fairs. *J Am Pharm Assoc* (2003). 2020 Jan 31. pii: S1544-3191(20)30003-0. doi: 10.1016/j.japh.2019.12.021. PMID: 32014442



Sarah J Blossom, PhD

Professor of Pharmaceutical Sciences

PhD, Immunology, University of Arkansas for Medical Sciences, 1999
BS, University of Arkansas, 1992

Blossom's research interests are in the effects of industrial solvents, such as trichloroethylene, and other pollutants on the immune system and their role in hypersensitivity disorders including allergy and autoimmunity.

Dr. Blossom is an immunologist with specialized expertise in the immunotoxicity of solvents. Her research is dedicated studying how environmental contaminants promote immune-mediated inflammatory diseases which include hypersensitivity responses (e.g., allergy) and autoimmunity. She has also expanded her research to study the interaction between inflammation and neurological outcomes using experimental pre-clinical models, as well as in the clinical setting. Her primary research focus involves identifying mechanistically how the industrial solvent and major environmental pollutant, trichloroethylene (TCE), alters the epigenetic landscape of CD4+ T cells to promote autoimmune disease. She has expanded this research to examine how TCE modulates hypersensitivity responses through changes in the microbiome.

Honors & Awards

- National Academies of Sciences Committee on the Use of Emerging Science for Environmental Health Decisions, 2020.
- Chair, Continuing Education Course: "The Microbiome in Immunotoxicology: State of the Science. Society of Toxicology Annual Meeting, Baltimore, MD, 2019.
- Editorial Board: Toxicology and Applied Pharmacology, 2019-present.
- Scientific Technical Advisor, Agency for Toxic Substances and Disease Registry: Camp LeJeune Community Assistance Panel, 2017-present.

- Book Series Co-Editor: Molecular and Integrative Toxicology, 2016-present

Grants (Last 5 Years)

PI, NIEHS-funded Epigenetic Modulation of CD4 T cell Differentiation and Autoimmunity by Trichloroethylene (R01).

PI, NIEHS-funded CD4 T cell Mediated Neurotoxicity with Continuous Developmental Exposure to Trichloroethylene (K02 NIH Independent Scientist Award).

Co-PI, NIEHS-funded Developmental Programming of TCE-Induced Autoimmune Disease (R01).

Select Publications (Last 10 Years)

Blossom SJ, Gokulan K, Arnold M, Khare S. Sex-dependent effects on liver inflammation and gut microbial dysbiosis after continuous developmental exposure to trichloroethylene in autoimmune prone mice. *Frontiers in Pharmacology*. 2020 Oct; 11: 569008 (epub ahead of print).

Byrum SD, Washam CL, Patterson JD, Vyas KK, Gilbert KM, **Blossom SJ**. Continuous Developmental and Early Life Trichloroethylene Exposure Promoted DNA Methylation Alterations in Polycomb Protein Binding Sites in Effector/Memory CD4+ T Cells. *Frontiers in Immunology*. 2019. Aug 28; 10:2016.

Blossom SJ, Melnyk SB, Li M, Wessinger WD, Cooney CA. Inflammatory and oxidative stress-related effects associated with neurotoxicity are maintained after exclusively prenatal trichloroethylene exposure. *Neurotoxicology*. 2017 Mar; 59:164-174.



Alicia M. Bolt, PhD

Assistant Professor of Pharmaceutical Sciences

PhD, Pharmacology & Toxicology, University of Arizona, 2012
BS, Biological Sciences, University of Northern Colorado, 2003

Bolt's research interests are in Metals Toxicology, Environmental Carcinogenesis, and Immunotoxicity.

Dr. Bolt has extensive research experience investigating how metals affect human health. Notably, her work has centered on how metals accumulate in the bone, making it a site of long-term storage and toxicity within the bone marrow compartment and extend beyond to systemic pathologies. Currently Dr. Bolt is investigating how the metal tungsten targets important cellular mediators (activated fibroblasts and pro-tumor immune cells) in the microenvironment to drive breast cancer metastasis to the lung niche. In addition, she is also extending this work to investigate how inhalation exposure to tungsten alters inflammation/fibroblast interactions to drive the pathogenesis of lung disease.

Honors & Awards

- Named Regents' Lecturer of Pharmaceutical Sciences, The University of New Mexico, 2020
- 1st Place, Best Research Assistant Professor, Staff Poster Award, UNM College of Pharmacy Research Day, 2018
- Best Postdoctoral Poster Presentation, Mountain West Society of Toxicology, Regional Meeting, 2017
- Best Postdoctoral Publication of the Year Award, Society of Toxicology, Postdoctoral Committee, 2016
- 1st Place Postdoctoral Research Award, Society of Toxicology, Metals Specialty Section, 2015
- Cole Foundation Postdoctoral Training Fellowship Recipient, 2013
- McGill Integrated Cancer Research Training Prog. Postdoctoral Research Fellowship Recipient, McGill University, 2012

Grants (Last 5 Years)

Mentored PI, NIGMS-funded P20, "University of New Mexico Center for Metals in Biology and Medicine" Project Title: Tungsten and Breast Cancer: Impact of the Tumor Microenvironment.

PI, UNM CCC ACS-IRG-funded Pilot Award, Tungsten and Breast Cancer: Impact of the Tumor Microenvironment.

PI, UNM COP-funded Pilot Award, Tungsten and Tumor Progression: Impact of the Tumor Microenvironment.

Select Publications

Bolt AM, Medina S, Lauer FT, Xu H, Ali AM, Liu KJ, and Burchiel SW. (2018) Minimal uranium accumulation in lymphoid tissues following an oral 60-day uranyl acetate exposure in male and female C57BL/6J mice. *PLoS One* Oct 24; 13(10):e0205211.

Wu T*, **Bolt AM***, Chou H, Plourde D, De Jay N, Guilbert C, Young YK, Kleinman CL, and Mann KK. (2019) Tungsten blocks murine B lymphocyte differentiation and proliferation through downregulation of IL-7 receptor/Pax5 signaling. *Toxicol. Sci.* March 26. *Co-First Authors.

Bolt AM*, Medina S*, Lauer FT, Liu KJ, and Burchiel SW. (2019) Minimal uranium immunotoxicity following a 60-day drinking water exposure to uranyl acetate in male and female C57BL/6J mice. *Toxicol. Appl. Pharmacol.* 372, 33-39. *Co-First Authors.

Guilbert C, Chou H, **Bolt AM**, Wu TH, Luo VM, Orthwein A, Mann KK. (2020) A functional assay to assess toxicity during murine B cell development in vitro. *Curr Protoc Toxicol.* 83(1):e91 March.



Matthew E. Borrego, PhD, RPh

Professor, Department of Pharmacy Practice & Administrative Sciences

PhD, Pharmacoeconomics/Social and Administrative Sciences, University of Arizona College of Pharmacy, 1998

MS, Hospital Pharmacy Administration, The University of New Mexico College of Pharmacy, 1995

BS, Pharmacy, The University of New Mexico College of Pharmacy, 1989

Borrego's research interests include pharmacoeconomics/health outcomes, health policy, health disparities, health literacy and pharmacy education.

Borrego is the College's Director of Graduate Studies and serves as the co-director of Investigator Development Core for the NIH-NIMHD, Specialized Centers of Excellence Grant (U-54). TREE (Transdisciplinary Research Equity and Engagement) Center for Advancing Behavioral Health. NIH Grant # U54 MD004811-06. He maintains an active research program in three primary areas: 1) applied pharmacoeconomics/health outcomes research, 2) pharmacy profession and practice/clinical study outcomes and 3) scholarship of teaching and learning around pharmacy and interprofessional education. He also serves as a mentor for MS and PhD students in the College's Pharmacoeconomics, Epidemiology, Pharmaceutical Policy and Outcomes Research Graduate Program.

Honors & Awards

- Sabra Woolley Memorial Award. Best oral presentation at 5th Health Literacy Annual Research Conference, National Academy of Sciences, Washington, D.C., (October 2013)
- American Pharmacists Association, Journal of the APHA, Clinical Research Paper Award (March 2011)
- Lyman Award Honorable Mention American Journal of Pharmaceutical Education (2000)

Grants (Last 5 Years)

Co-I, NIH-NIMHHD, Specialized Centers of Excellence Grant (U-54).TREE (Transdisciplinary Research Equity & Engagement) Center for Advancing Behavioral Health. NIH

Grant # U54MD004811-06. 2017-22.

Co-I. NIH-National Center on Minority Health and Health Disparities, Exploratory Centers of Excellence Grant (P-20).New Mexico Center for Advancement of Research, Engagement & Science (NMCARES) on Health Disparities. NIH Grant # P20 MD004811. 2010-17.

Select Publications (Last 10 Years)

Cruz TH, **Borrego ME**, Page-Reeves J. Increasing the Number of Underrepresented Minority Behavioral Health Researchers Partnering with Underresourced Communities: Lessons Learned from a Pilot Research Project Program. Health Promot Pract. 2020 Feb 26.

Barqawi Y, **Borrego M**, Roberts M, Abraham I. Cost-effectiveness of abiraterone plus prednisone, cabazitaxel plus prednisone and enzalutamide for visceral metastatic castration resistant prostate cancer after docetaxel therapy resistance. J Med Econ. 2019 Sep 17:1-8.

Chen C, **Borrego ME**, Roberts MH, Raisch DW. Comparison of post-marketing surveillance approaches regarding infections related to tumor necrosis factor inhibitors (TNFI's) used in treatment of autoimmune diseases. Expert Opin Drug Saf. 2019 Aug;18(8):733-744.

Eckstein MA, Newsome CC, **Borrego ME**, Burnett A, Wittstrom K, Conklin JR. A cross-sectional survey evaluating transgender-related care education in United States pharmacy school curricula. Curr Pharm Teach Learn. 2019 Aug;11(8):782-792.

Devraj R, **Borrego M**, Vilay AM, Gordon EJ, Pailden J, Horowitz B. Relationship between Health Literacy and Kidney Function. Nephrology (Carlton). 2015



Matthew J. Campen, PhD, MSPH

Professor of Pharmaceutical Sciences
Chair, Environmental Health Signature Program

PhD, Environmental Health, University of North Carolina at Chapel Hill, 2000

MSPH, Environmental Health, University of North Carolina at Chapel Hill, 1997

BS, Biochemistry, Virginia Tech, 1994

Campen's research interests are in the cardiovascular health effects of inhaled pollutants, such as ozone, combustion emissions and nanomaterials.

Campen is an expert in the cardiopulmonary health effects of air pollution. He is also broadly interested in the cross-talk of the cardiovascular and respiratory system in health and disease, conducting basic and clinical research into the nature of comorbidities that promote cardiovascular illness. His primary research focus involves the impact of inhaled toxicants, especially common air pollutants, on vascular function and injury. He has expanded this research to examine other systemic impacts of inhaled toxicants, on the cerebrovasculature, placental development and cellular aging.

Honors & Awards

- Named Regents' Professor of Pharmaceutical Sciences, UNM, 2017
- Research Paper of the Year, Cardiovascular Toxicology Specialty Section, Society of Toxicology, 2017
- Society of Toxicology Achievement Award, 2014
- Young Investigator Award, Inhalation and Respiratory Specialty Section, Society of Toxicology, 2013
- Research Paper of the Year, 2007, Inhalation and Respiratory Specialty Section, Society of Toxicology
- Graduate Volunteer Faculty Award, 2006, College of Pharmacy, University of New Mexico
- Mary O. Amdur Award for Environmental Inhalation Toxicology, Society of Toxicology Meeting, 1999

Grants (Last 5 Years)

Director, NIGMS-funded P20, "University of New Mexico Center for Metals in Biology and Medicine"

Director, Mentored Career Development Program (KL2), UNM Clinical and Translational Science Center

Deputy Director, NIEHS-funded P42, "UNM Metal Exposure Toxicity Assessment on Tribal Lands in the Southwest (METALS) Superfund Research Program"

PI, NIEHS-funded "Vascular Consequences of Gas and Particulate Phases of Near-Roadway Pollution"

PI, NIEHS-funded "Mechanisms of Vascular Toxicity from Inhaled Toxicants"

PI, NIEHS-funded "Inhalation of Contaminated Mine Waste Dusts as a Route for Systemic Metal Toxicity"

PI, NIGMS-funded University of New Mexico Clinical and Translational Science Center

Select Publications (Last 10 Years)

Aragon M, Topper L, Tyler CR, Sanchez BN, Zychowski KE, Young T, Herbert G, Hall P, Erdely A, Eye T, Zeidler-Erdely P, Ottens AK, **Campen MJ**. Serum-Borne Bioactivity Caused by Pulmonary Multiwalled Carbon Nanotube Exposure Induces Neuroinflammation Via Blood Brain Barrier Impairment. Proc Natl Acad Sci USA, 114:E1968-E1976, 2017.

Zychowski KE, Sanchez B, Pedrosa RP, Lorenzi-Filho G, Drager LF, Polotsky VY, **Campen MJ**. Serum from obstructive sleep apnea patients induces inflammatory responses in coronary artery endothelial cells. Atherosclerosis. 254:59-66, 2016.

Tyler CR, Zychowski KE, Sanchez BN, Rivero V, Lucas S, Herbert G, Liu J, Irshad H, McDonald JD, Bleske BE, **Campen MJ**. Surface area-dependence of gas-particle interactions influences pulmonary and neuroinflammatory outcomes. Part Fibre Toxicol. 13:64, 2016.



Karen L. Cooper, PhD

Research Assistant Professor

PhD, Biomedical Sciences, The University of New Mexico, 2006
MS, Biology, New Mexico Institute of Mining and Technology, 2001
BS, Biology, South Dakota State University 1986

My research focuses on the toxicity of metals (singly and in mixtures), in combination with UV radiation in a variety of cells types (keratinocytes, melanocytes and kidney cells), animal models, and in human population studies.

Cooper specializes in toxicity of metals, combinations of metals and in combination with DNA damaging agents in a variety of cells types (keratinocytes, melanocytes and kidney cells) and animal models. Specific interests are in mechanisms of the inhibition of DNA damage repair by these environmental toxicants. She completed her dissertation research in Dr. Laurie Hudson's lab and continued as a contributing lab member during her post-doctoral training and currently as a Research Assistant Professor. She is currently investigating the disruption of zinc finger containing DNA repair enzymes by arsenic, uranium, and other environmentally relevant metals and the potential intervention by dietary zinc.

Honors & Awards

- Society of Toxicology, Member and Secretary/Treasurer of Mountain West Chapter (2012-present)
- Member Society of Toxicology (2002-present)

Grants (Last 5 Years)

Co-I, NIEHS R01, "Arsenic Co-Carcinogenesis with UVR: Nitrosation and Oxidation of Target Proteins"

Co-I, NIH/EPA P50, "Environmental Health Disparities Research Center"

Co-I, NIEHS P42, "UNM Metal Exposure Toxicity Assessment on Tribal Lands in the Southwest (METALS) Superfund Research Program"

Co-I, NIEHS R01, "Zinc Chemoprevention of Arsenic Co-Carcinogenesis"

Co-I, NIEHS R01, "Mutational Signatures of a Combined Environmental Exposure: Arsenic and Ultraviolet Radiation"

Select Publications (Last 10 Years)

Ding X., Zhou, X., **Cooper, K.L.**, Huestis, J., Hudson, L.G., Liu, K.J. Differential sensitivities of cellular XPA and PARP-1 to arsenite inhibition and zinc rescue. (2017). *Toxicol Appl Pharmacol* 15(331): 108-115.

Cooper, K.L., Dashner, E., Tsosie, R., Cho, Y.M., Ong, J., Lindsay, C., Lewis, J., Hudson, L.G. (2016). Inhibition of poly(ADP-ribose)polymerase-1 and DNA repair by uranium. *Toxicol Appl Pharmacol* 15(291): 13-20.

Zhou, X , **Cooper, K.L.** , Sun, X., Liu, K.J., Hudson, L.G. (2015). Selective sensitization of zinc finger protein oxidation by reactive oxygen species through arsenic binding. *JBC* 290(30): 18361-9.

Cooper, K.L., Yager, J.W., and Hudson, L.G. (2014). Melanocytes and keratinocytes have distinct and shared responses to ultraviolet radiation and arsenic. *Toxicology Letters* 224(3):402-15.

Cooper K.L., Hayden, B.K., Sandoval, M., Liu, K.J. and Hudson, L.G. (2013). Reduction of arsenite-enhanced ultraviolet radiation-induced DNA damage by supplemental zinc. *Toxicol Appl Pharmacol* 269(2):81-8.

King, B.S., **Cooper, K.L.**, Liu, K.J. and Hudson L.G. (2012). Poly(ADP-ribose) contributes to an association between Poly(ADP-ribose)polymerase-1 and Xeroderma pigmentosum complementation group A in nucleotide excision repair. *JBC* 287(47):39824-33.



Erica J. Dashner, PhD, PMP

Research Assistant Professor of Pharmaceutical Sciences

PhD, Biological Sciences, University of Delaware, 2014
BS, Cellular & Molecular Biology, University of Michigan, 2007

My primary research interests involve investigating how exposure to environmentally relevant metal and metalloid mixtures results in immune dysregulation and seeking to discover novel ways to mitigate their effects on vulnerable populations.

Dashner investigates the health effects of oxidative stress and DNA damage generated following exposure to mixed metals in cell-based model systems and human populations. Additionally, she manages the Thinking Zinc clinical trial that is based on seminal work carried out in Dr. Laurie Hudson's laboratory demonstrating zinc supplementation as a means of mitigating arsenic-induced DNA damage in cells and in mice. Dashner is an ad hoc reviewer for Toxicology and Applied Pharmacology. She enjoys volunteering for the Undergraduate Diversity Program with the Society of Toxicology and has mentored students in the Undergraduate Pipeline Network summer research program and NIH-funded Post-Baccalaureate Research Education Program at UNM.

Honors & Awards

- Society of Toxicology, Member, 2015-Present
- Mountain West Society of Toxicology, Postdoctoral Representative, 2017-2019
- Lightning Talk Award, Oregon State University Superfund Research Program Research Day, 2018
- NIGMS Institutional Research and Academic Career Development Award ASERT Fellow, 2014-2017
- Poster Award, 8th Conference on Metal Toxicity and Carcinogenesis, 2014
- Postdoctoral Poster Award, Mountain West Region Society of Toxicology, 2014

Grants (Last 5 Years)

PI, P50 Center for Native Health Equity-funded Pilot Award, "Determination of immunotoxicity from environmental metal exposures"

Co-PI, P42 METALS SRP ES025589-funded Pilot Award, "Effects of Uranium and Arsenic on T-cell differentiation"

Co-PI, P42 TRIC SRP Center ES016465-funded Pilot Award, "The impact of developmental exposure to uranium on embryonic zebrafish"

Co-PI, P42 METALS SRP ES025589-funded Pilot Award, "RNA transcriptome sequencing of T-cells exposed to uranium and arsenic"

Select Publications (Last 10 Years)

Wong CP*, **Dashner-Titus EJ***, Alvarez SC, Chase TT, Hudson LG, and Ho E. Interactions between arsenic exposure and zinc deficiency on zinc status, oxidative stress, and inflammatory response. *Biol Trace Elem Res*. 191:370-381, 2019. Pubmed PMID: 30635848.

Dashner-Titus EJ*, Hoover J*, Li L, Lee JH, Du R, Liu KJ, Traber MG, Ho E, Lewis J, and Hudson LG. Metal exposure and oxidative stress markers in pregnant Navajo Birth Cohort Study participants. *Free Radic Biol Med*. 124:484-492, 2018. PubMed PMID: 29723666.

Cooper KL, **Dashner EJ**, Tsosie R, Cho YM, Lewis J, and Hudson LG. Inhibition of poly(ADP-ribose)polymerase-1 and DNA repair by uranium. *Toxicol Appl Pharmacol*. 291:13-20, 2016. PubMed PMID: 26627003.



Paulina Deming, PharmD

Clinical Associate Professor of Pharmacy Practice & Admin. Sciences
Assistant Director of Project ECHO Viral Hepatitis Programs

PharmD, The University of New Mexico, 2004

My research interests are in chronic hepatitis C virus (HCV) therapeutic outcomes, HCV elimination programs and expanding access to HCV therapies.

Deming's expertise is in chronic HCV infections. She maintains a clinical practice specializing in HCV infections within the University-based HCV clinic, Truman HIV-HCV coinfection clinic, and Project ECHO (Extension for Community Healthcare Outcomes). Through Project ECHO she supports HCV treatment in the community, New Mexico correctional system and in the Indian Country teleECHO sessions.

Honors & Awards

- New Mexico Society of Health Systems Pharmacists Dorothy Dillon Memorial Lecture Award Recipient, 2018
- Society of Infectious Disease Pharmacists: Gita Patel Best Practices Recognition Award, 2014

Grants (Last 5 Years)

Co-I, HRSA grant, "Expanding Substance Abuse Services through the ECHO Model"

Co-I, NM Department of Health grant, "Hepatitis and HIV Clinical Consultant Project"

Co-I, Northwest Portland Area Indian Health Board grant, "Indian Health Services TeleECHO Clinic Support"

Co-I, New Mexico Corrections Department grant, "NM Department of Corrections Hepatitis C"

Co-I, Bristol Myers Squibb, Inc. Foundation, "Reducing Disparities in the Prevention and Care"

Co-I, HRSA grant, "Ryan White HIV/AIDS Program Part

D Coordinated HIV Services and Access to Research for Women, Infants, Children, and Youth (WICY)"

Co-I, HRSA grant, "Ryan White Part C Outpatient EIS Program"

Select Publications (Last 10 Years)

Mera J, Joshi K, Thornton K, Box T, Scott J, Sedillo M, **Deming P**, David C, Essex W, Manch R, Kohli A. Retrospective study demonstrating high rates of sustained virologic response after treatment with direct-acting antivirals among American Indian/Alaskan Natives. *Open Forum Infect Dis.* 2019;6: ofz128. doi: 10.1093/ofid/ofz128

Martin MT, **Deming P**. Closing the gap: the challenges of treating hepatitis C virus genotype 3 infections. *Pharmacotherapy.* 2017;37:735-747.

K Thornton, **Deming P**, Manch RA, Moore A, Kohli A, Gish R, Sussman NL, Khaderi S, Scott J, Mera J, Box T, Qualls C, Sedillo M, Arora S. Is response guided therapy dead? Low cure rates in patients with detectable hepatitis C virus at week 4 of treatment. *Hepatology Int.* 2016 Jul;10:624-631.

Deming P, Martin MT, Chan J, Dilworth TJ, El-Lababidi R, Love BL, Mohammadra R, Nguyen A, Spooner LM, Wortman SB. Therapeutic advances in HCV genotype 1 infection: Insights from the Society of Infectious Diseases Pharmacists. *Pharmacotherapy.* 2016 Feb; 36:203-17.

Arora S, Thornton K, Murata G, **Deming P**, Kalishman S, Dion D, Parish B, et al. Outcomes of treatment for hepatitis C virus infection by primary care providers. *N Engl J Med* 2011 Jun 9;364(23):2199-207.



Melanie A. Dodd, PharmD, PhC, BCPS, FASHP

Associate Dean for Clinical Affairs
Associate Professor of Pharmacy in Geriatrics

Pharmacy Practice Residency, Presbyterian Healthcare Services, Albuquerque, NM, 1997-1998
PharmD, The University of New Mexico College of Pharmacy, 1997
BS, Pharmacy, Purdue University, 1994

My research focuses on the development, implementation, financial models and impact of new advanced practice pharmacist clinical practice models, including interprofessional teams, on patient outcomes and sustainability. In addition, I also have an interest in the scholarship of innovative teaching methods, with a focus on geriatric interprofessional education.

Dodd is an expert in the area of geriatric pharmacotherapy. She is a pharmacist clinician with prescriptive authority at the UNM Senior Health clinic providing chronic disease and medication management for older adults. She has played an active role in development of new advanced practice pharmacist clinical practice models, credentialing processes and pursuit of pharmacist reimbursement at UNM. Her research has focused on the development and impact of new clinical practice models involving the pharmacist as an essential member of the team, including pharmacists in advanced roles such as the pharmacist clinician. She has also been actively engaged in providing innovative geriatric interprofessional education.

Honors & Awards

- Distinguished Service Award, American Society of Health-System Pharmacists, Section of Ambulatory Care Practitioners (2020)
- Fellow, American Society of Health-System Pharmacists (2017)
- Dorothy Dillon Memorial Lecture Award, New Mexico Society of Health-System Pharmacists (2011)
- Pharmacist of the Year, New Mexico Society of Health-System Pharmacists (2000 and 2010)
- American Society of Health-system Pharmacists, Section of Amb. Care Practitioners, Chair (2014-15)

Grants (Last 5 Years)

PI, First Nations Community Healthsource, Inc. contract
PI, New Mexico Department of Health, "OSI Formulary Filings Review"

PI, First Choice Community Healthcare, "Professional Service Agreement"

PI, UNM Medical Group Clinical Sites, "COP Consulting Services"

PI, UNM Medical Group Truman, "COP Consulting Services"

PI, Hospice of New Mexico, "COP Consulting Services"

Co-Investigator, Sunovion Pharmaceuticals, "A case-control analysis of the prevalence of frailty, cognitive impairment, and limited expiratory airflow among elderly persons with chronic obstructive lung disease."

Select Publications (Last 10 Years)

Dodd MA, Rafi J, Jakeman B, Arabyat RM, Babb SN, Raisch DW. Students' Confidence and Perceptions of Pharmacists' Roles in Public Health Interventions after Case Study Exercises. *Current in Pharmacy Teaching and Learning.* 2020;12:817-26.

Patel A, **Dodd MA**, Sarangarm P, D'Angio R, Hellinga R. Impact of discharge pharmacy medication to bedside delivery service on hospital reutilization rates. *Am J Health-Syst Pharm* 2019;76(23):1951-1957. <https://doi.org/10.1093/ajhp/zxz197>

Marshik PL, Kharat A, Jakeman B, Borrego M, **Dodd MA**, Bachyrycz A, Anderson JR, Bond R, Deming P, Mercier RC, Nawarskas JJ, Ray G, Salazar K. Complementary and Alternative Medicine and Therapy Use in a Diverse New Mexican Population. *J Altern Complement Med.* 2016;22(1):45-51.



Esther Erdei, PhD, MPH, MScHons

Research Assistant Professor of Pharmaceutical Sciences

PhD, Immunology, Lorand Eotvos University of Budapest, 2003
MPH, Epidemiology, The University of New Mexico, 2010

My research focuses on integrating bench top immunology experimentations with community participatory research approaches among underrepresented communities in the United States, supporting mainly underserved minority and tribal communities. Recent works are centered on various immunological effects of chronic, community-level exposures to uranium, mercury and other heavy metals in tribal community members both in the Southwestern United States and in the Midwest.

Erdei has been working on public health problems for her entire scientific career. She served as a public health officer for the WHO European offices in Germany and Italy in 1998-2003. She is an expert in molecular epidemiology, immunology, autoimmune molecular markers, autoimmune disease epidemiology and environmental health research focusing on toxicant exposures and adverse health effects. She has been funded by the NIH to carry out tribal environmental health research and contributed to cancer epidemiology and prevention research for the past 17 years. Erdei has collaborated with Dr. Lewis and the CEHP for the last 12 years building Tribal community relations and earning trust for translational immunotoxicological research. Since 2018, she has also served as the UNM Health Sciences site director for Mountain West Institutional Research Network's Community Engagement and Outreach Core, making health disparity research more meaningful for communities in our region.

Honors & Awards

- "Pro Hygiene" Award, Hungarian National Public Health Award, National Institute of Environmental Health, National Center for Public Health, 2000
- Elected member of the Immunology Committee of the Hungarian National Academy of Sciences 2003-current
- Steering Committee Member, New Mexico Immunization Coalition, New Mexico, 2004-current

Grants (Last 5 Years)

Co-PI, COP pilot program, "Environmental Microplastic Exposure and Potential Health Effects - Development

of an Interdisciplinary Research Team and Assessment Methodology"

Co-PI, COP Pilot program, "Autoimmune disease rates by ethnicities and gender using Health Facts Cerner system information database"

PI, COP pilot program, "Metal exposures and the exposome on the Cheyenne River"

Subaward PI, NIH/IHS-funded NARCH VII research grant, "Immune Status Evaluation on the Cheyenne River Sioux"

Select Publications (Last 10 Years)

Hoover, J., **Erdei, E.**, Begay, D., Gonzales, M., Jarrett, J.M., Po-Yung Cheng, Johnnye Lewis, and NBCS Study Team. Exposure to uranium and co-occurring metals among pregnant Navajo women. *Environ Res.* 2020; Jul 17;190:109943. doi: 10.1016/j.envres.2020.109943. Online ahead of print.

Scammell, MK, Sennett, C., Laws, RL., Rubin, RL., Brooks, DR., Amador, JJ, López-Pilarte, D., Cajero, M., Ramirez-Rubio, O., David J. Friedman, DJ., McClean, MD., Lewis, J., **Erdei, E.** Urinary metals concentrations and biomarkers of autoimmunity among Navajo and Nicaraguan men *Int J Environ Res Public Health.* 2020; 17(15), 5263; <https://doi.org/10.3390/ijerph17155263> - 22 Jul 2020.

Lin, Y, Hoover, J., Beene, D., **Erdei, E.**, Liu, Z. Environmental risk mapping potential for abandoned uranium mine contamination on the Navajo nation, USA, using GIS- based multi-criteria decision analysis approach. *Environ Sci Pollut Res Int.* 2020; Aug;27(24):30542-30557. doi: 10.1007/s11356-020-09257-3. Epub 2020 May 28.

Roberts MH, **Erdei E.** Comparative United States autoimmune disease rates for 2010-2016 by sex, geographic region, and race. *Autoimmun Rev.* 2020;19(1):102423. doi:10.1016/j.autrev.2019.102423



Linda A. Felton, PhD

Professor of Pharmaceutics
Chair, Department of Pharmaceutical Sciences

PhD, Pharmaceutics, University of Texas at Austin, 1997
BS, Pharmacy, University of Texas at Austin, 1986

Felton's research interests are in polymeric film coating and modified release drug delivery systems (including delayed and sustained release and taste masking); and formulation development, blinding and GMP manufacturing of solid dosage forms for use in clinical trials.

Felton is an internationally recognized expert in modified release drug delivery and polymeric film coating technology. She has authored more than 65 scientific papers and book chapters and is a named inventor on several patents and invention disclosures. Ongoing studies are investigating the film-tablet/capsule/particle interface, novel methodologies to characterize the physical, mechanical, adhesive and drug release properties of coated solids, and the influence of formulation and processing variables on product performance. In addition, Dr. Felton routinely develops oral solid dosage forms that are subsequently manufactured under cGMP for investigational clinical studies.

Honors & Awards

- 2016 Evonik Award recipient, in recognition of outstanding research on polymer deposition onto hydroxypropyl cellulose molded capsules of polymer during pan coating
- International Pharmaceutical Excipients Council- Americas Foundation Scientific Advisory Committee
- Editor, *Aqueous Polymeric Coatings for Pharmaceutical Dosage Forms*, 4th edition, CRC Press, 2016
- Manufacturing Section Editor for the 21st and 22nd editions of "Remington: The Science and Practice of Pharmacy"
- Editorial board member, *AAPS PharmSciTech*, *Drug Development and Industrial Pharmacy*, and *Journal of Drug Delivery Science*

Grants (Last 5 Years)

PI, NIH-funded R21, Aqueous-Based Two-Step Spray Drying As a Taste Masking Drug Delivery Platform

PI, Biomedical Research Institute of New Mexico, "Formulation Development Services"

PI, VA/U.S. Department of Veterans Affairs, "Formulation & Batch Records for the VA Medical Centers"

MPI, NIH UH, Autophagy-based HDT for tuberculosis Co-I, Leidos Biomedical Research, "NCI Chemical Biology Consortium"

Select Publications (Last 10 Years)

E. Macchi and **L.A. Felton**, Substrate considerations when coating solid dosage forms, *Aqueous Polymeric Coatings for Pharmaceutical Dosage Forms*, 4th edition, CRC Press, New York City, 2016.

L.A. Felton, Use of polymers for taste masking pediatric drug products, *Drug Development and Industrial Pharmacy*, 44, 1049-1055, 2018.

J. Nawarskas, J. Koury, D. Lauber, and **L.A. Felton**, Open-label study of the stability of nitroglycerin sublingual tablets, *American Journal of Cardiology*, 122 (12), 2018.

J. Nawarskas, D. Lauber, and **L.A. Felton**, An explanation for the effect of different storage conditions on sublingual nitroglycerin tablet stability, *American Journal of Cardiology*, 124 (6), 2019.

J. Koury, M. Johnson, S. Sturtevant, C. Wiley, and **L. Felton**, Treatment of a Kaposiform Hemangioendothelioma in a premature neonate using Sirolimus, *Journal of Pediatric Pharmacology and Therapeutics*, accepted 6/2020.



Changjian (Jim) Feng, PhD

Professor of Pharmaceutical Sciences

PhD, Inorganic Chemistry, Nanjing University, 1998

Feng's laboratory is interested in how metal ions play critical structural and functional roles in biological molecules. His primary research focus is on the structure-dynamic-function relationship in nitric oxide synthase (NOS), a flavo-hemoprotein responsible for biosynthesis of nitric oxide (NO), which is a ubiquitous signaling and effector molecule in mammalian cell biology.

Feng is an expert in biochemistry and biophysics of metalloproteins and oxidoreductases. He has authored more than 96 scientific manuscripts and has been continually funded by the NIH. He is an active grant reviewer for NIH, NSF and French National Research Agency. His lab focuses on the central question of how Nature has optimized protein dynamics to promote electron transfer. This question forms his life's work and is a source of endless fascination for him. The Feng laboratory is active in an innovative combination of cutting-edge approaches, including laser flash photolysis, pulsed EPR, ultrafast 2D IR, genetic code expansion and computational chemistry. The goal is to understand what the function of a biological relevant metal site is, how it achieves its function, and what factors dictate its function. Feng's recent studies of the NOS proteins demonstrate that functional domain motions and interdomain docking play a central role in NOS isoform function by modulating key electron transfer processes. Molecular mechanisms of NOS regulation are potentially key targets for development of direct, selective new pharmaceuticals for treating several diseases that currently lack effective treatments.

Honors & Awards

- P-1 Faculty Appreciation Award, UNM College of Pharmacy (2020)
- Young Investigator Award, Gordon Research Conference on Nitric Oxide (2007)

- Japan Society for the Promotion of Science Postdoctoral Fellowship (declined; 2000)
- Asia-Pacific EPR Society Distinguished Service Award (1999)

Grants (Last 5 Years)

PI, NIGMS-funded R01, "Defining the conformational control of nitric oxide synthases by a multipronged Approach"

Core Director (Integrative Molecular Analysis Core), NIGMS-funded P20, "UNM Center of Metals in Biology and Medicine"

PI, NSF-funded Transitions award, "Conformations and Dynamics of Modular Redox Enzymes via Site-Specific 2D Infrared Spectroscopy"

Select Publications (Last 10 Years)

Zheng, Huayu; Li, Jinghui; **Feng, Changjian**. (2020) Heat shock protein 90 enhances the electron transfer between the FMN and heme cofactors in neuronal nitric oxide synthase. *FEBS Lett.*

Astashkin, Andrei V.; Li, Jinghui; Zheng, Huayu; **Feng, Changjian**. (2019) Positional distributions of the tethered modules in nitric oxide synthase: Monte Carlo calculations and pulsed EPR measurements. *J. Phys. Chem. A* 123, 7075-7086.

Li, Jinghui; Zheng, Huayu; **Feng, Changjian**. (2019) Effect of macromolecular crowding on the FMN - heme intraprotein electron transfer in inducible NO synthase. *Biochemistry*, 58, 3087-3096.

Zheng, Huayu; He, Jingxuan; Li, Jinghui; Yang, Jing; Kirk, Martin L.; Roman, Linda J.; **Feng, Changjian**. (2019) Generation and characterization of functional phosphoserine incorporated neuronal nitric oxide synthase holoenzyme. *J. Biol. Inorg. Chem.* 24, 1-9.



Donald A. Godwin, PhD

Dean, The University of New Mexico College of Pharmacy
Professor of Pharmaceutical Sciences

PhD, Pharmaceutical Sciences, University of South Carolina, 1996
BA, Biological Sciences, University of Delaware, 1991

My research interests lie in the area of the Scholarship of Teaching and Learning, specifically in the development and implementation of innovative programs to enhance student progression and graduation rates in a Doctor of Pharmacy curriculum. Recent work has been done on curricular changes to improve the critical thinking and problem-solving skills of pharmacy students.

Godwin is a skilled educator, administrator, and scientist and is highly respected across the College of Pharmacy, Health Sciences Center, and The University of New Mexico. He has garnered a statewide and national reputation for advocacy for the profession of pharmacy and for enhancement of the reputation and standing of his college. He is especially passionate about the success and well-being of the faculty, staff, students, alumni and supporters of the College of Pharmacy.

Honors & Awards

- American Association of Colleges of Pharmacy Academic Leadership Fellow (2006-2007)
- Chair, AACP Student Services Personnel Special Interest Group (2008-2009)
- Nominations Committee, AACP Administrative Services Section (2014-present)
- P4 Faculty Appreciation Award (2016-2017)
- The University of New Mexico College of Pharmacy Distinguished Educator Award (2017-2019)
- AACP James Robertson Jr Excellence in Student Services award 2020

Grants & Contracts (Last 5 Years)

PI, National Association of Chain Drugstores Foundation, "Pharmacy Readiness Bootcamp"

PI, National Association of Chain Drugstores Foundation, "Supporting professional development of an underrepresented student pharmacist cohort"

Co-PI, Con Alma Foundation, "UNM/NMSU Cooperative Pharmacy Program Summer Experience"

Relevant Publications (Last 10 Years)

Schoelles - Williams, J., English, D., **Godwin, D.**, Hammond, L., Mason, H., Petrelli, H., Roni, M., Sousa, K., Van Ambergh, J., Ross, L. Report of the 2018 - 2019 Student Affairs Standing Committee. *American Journal of Pharmacy Education* (2019) 77 (7): Article 144.

Fulford, M., Early, J., **Godwin, D.**, Gonyeau, M., Griffin, S., Rattinger, G., Shields, K., Sousa, K., Nemier, R. Report of the 2017 - 2018 Academic Affairs Standing Committee. *American Journal of Pharmacy Education* (2018) 82 (7).

Cone, C., **Godwin, D.**, Salazar, K., Thompson, M., and Bond, R. Incorporation of an Explicit Critical-Thinking Curriculum to Improve Pharmacy Students' Critical-Thinking Skills. *American Journal of Pharmacy Education* (2016) 80 (3): Article 41.

Bond, R., Thompson, M., Wittstrom, K., and **Godwin, D.** Preceptor Perceptions of the Importance of Experiential Guidelines. *American Journal of Pharmacy Education* (2013) 77 (7): Article 144.

Dawn, S., Smith, M., Peterson, S., Cone, C., Salazar, K., Bond, R., and **Godwin, D.** Electronic portfolios: questions, implementation, and lessons learned in a doctor of pharmacy program. *Currents in Pharmacy Teaching and Learning* (2011) 3: 164-170.



Martha Martinez Grimes, PhD

Research Assistant Professor of Pharmaceutical Sciences

PhD, Molecular Biology, Minor in Applied Statistics, New Mexico State University, 2013

MS, Molecular Biology, Minor in Applied Statistics, New Mexico State University, 2009

BS, Microbiology, New Mexico State University, 2006

My research interests are in the area of drug repurposing and novel experimental therapeutics in metastatic ovarian and breast cancer.

Grimes has a background in drug discovery and novel therapeutics with expertise in diverse models. Research investigations carried out in the laboratory include biochemical, cell biological and in vivo models as approaches to discovering new treatments. She is now researching the mechanisms of anti-cancer actions for drug identification by high-throughput screening and gene expression analysis, including RNA sequencing. Her primary focus involves understanding the mechanism by which GTPase Rac1 regulates epithelial-to-mesenchymal transition in ovarian cancer and the effectiveness of R-ketorolac, a Rac1 inhibitor, on blocking these responses in vivo, as work carried out by Dr. Laurie Hudson. Grimes has mentored students in the NIH-funded FlyBase Post-Baccalaureate Research Education Program, Initiative for Maximizing Student Development program, and the UNM Undergraduate Pipeline Network research program. She enjoys volunteering at Research Day events at UNM and offering science workshops for students at the Central Expanding Your Horizons conferences as well as elementary and middle schools throughout New Mexico.

Honors & Awards

- American Association for Cancer Research (AACR) Minority Scholar in Cancer Research Award, 2019
- The Faculty Research and Education Development (FRED) Program Award, Minority Affairs Committee at The American Society for Cell Biology, 2016-2017

- National Research Mentoring Network Compact for Faculty Diversity Institute on Teaching and Mentoring Award, 2015-2016
- New Mexico NSF EPSCoR Post-Doctoral Leadership Award, 2015
- NIH-NIGMS Institutional Research and Academic Career Development Award (IRACDA)
- ASERT Fellowship Award, 2013-2016

Grants (Last 5 Years)

PI, UNM College of Pharmacy Individual Project Pilot Award "Rac1 overexpression promotes epithelial to mesenchymal transition (EMT) in ovarian cancer cells"

PI, NCGR NM-INBRE Sequencing and Bioinformatics Core Pilot Award "R-Ketorolac inhibition of Rho GTPases during carcinogenesis"

PI, UNM Comprehensive Cancer Center Postdoctoral Fellow Pilot Award "R-Ketorolac treatment can reverse Rac1-dependent EMT programming in ovarian cancer models"

Select Publications (Last 10 Years)

Hudson, L.G., Cook, L.S., **Grimes, M.M.**, Muller, C.Y., Adams, S.F., Wandering-Ness, A. (2019). Dual actions of ketorolac in metastatic ovarian cancer. *Cancers* 11: 1049.

Peretti, A.S., Dominguez, D., **Grimes, M.M.**, Hathaway, H.J., Prossnitz, E.R., Rivera, M.R., Wandering-Ness, A., Kusewitt, D.F., Hudson, L.G. (2018). The R-enantiomer of Ketorolac delays mammary tumor development in mouse mammary tumor virus-polyoma middle T antigen (MMTV-PyMT) mice. *The American Journal of Pathology* 188(2): 515-524.

analysis of students' perception of naloxone use for opioid overdose prevention. *Curr Pharm Teach Learn*. 2019.



Pamela R. Hall, PhD

Professor of Pharmaceutical Sciences,
Regents' Lecturer

PhD, Pharmacology, Case Western Reserve University, 2004

MS, Molecular Biology, University of Alabama in Huntsville, 1999

BS, Microbiology, University of Alabama in Huntsville, 1989

My research focuses on understanding host innate defense against *Staphylococcus aureus* infection, especially host factors responsible for innate sex bias, as well as on development of novel vaccines and therapeutics to prevent and treat such infections.

Infections caused by methicillin-resistant *Staphylococcus aureus* are a serious threat to human health. *S. aureus* utilizes a peptide-pheromone based communication system, called quorum-sensing, to switch from a colonizing phenotype to a virulent phenotype capable of causing invasive infection. The peptides responsible for signaling this change in virulence are called autoinducing peptides, and are part of the accessory gene regulator (*agr*) system. Our laboratory utilizes a variety of infection models, flow cytometry and immunological assays to investigate mechanisms used by our innate immune system to inhibit *agr* signaling and prevent *S. aureus* invasive infection. Also, in collaboration with investigators from the UNM School of Medicine and the University of Kansas Medical Center, we are investigating the use of virus like particles as platforms for novel vaccines to prevent invasive *S. aureus* infection, through targeting *agr* and specific virulence factors.

Honors & Awards

- W.M. Hadley Distinguished Scholar (2019)
- UNM College of Pharmacy Regents' Lecturer (2015)
- Junior Faculty Excellence in Research Award, UNM Health Sciences Center (2013)

Grants (Last 5 Years)

PI, NIAID R01, "Vaccine-Mediated Control of Bacterial Virulence Regulation and Infection"

PI, NIAID R01, Research Supplements to Promote Diversity in Health-Related Research

PI, NIAID R21, "Sex-Dependent Phagocyte Clearance of *Staphylococcus Aureus*"

PI, NIAID R21, "Inducing Immune Control of Bacterial Virulence Regulation"

Subaward PI, NIH R01, "Mechanistic Control of Metabolism and Virulence by Fatty Acid Kinase in MRSA"

Select Publications (Last 10 Years)

Pokhrel S, Triplett KD, Daly SM, Joyner JA, Sharma G, Hathaway HJ, Prossnitz ER and **Hall PR**. Complement Receptor 3 contributes to the sexual dimorphism in neutrophil killing of *Staphylococcus aureus* (2020) *J Immunol*. Aug 7:ji2000545. doi: 10.4049/jimmunol.2000545.

Joyner JA, Daly SM, Peabody J, Triplett KD, Pokhrel S, Elmore BO, Adebajo D, Peabody DS, Chackerian B and **Hall PR**. Vaccination with VLPs Presenting a Linear Neutralizing Domain of *S. aureus* Hla Elicits Protective Immunity (2020) *Toxins*, 12(7), 450; <https://doi.org/10.3390/toxins12070450>.

Triplett KD, Pokhrel S, Castleman MJ, Daly SM, Elmore BO, Joyner JA, Sharma G, Herbert G, Campen MJ, Hathaway HJ, Prossnitz ER and **Hall PR**. GPER activation protects against epithelial barrier disruption by *Staphylococcus aureus* α -toxin (2019) *Scientific Reports*. Feb 4;9(1):1343. doi: 10.1038/s41598-018-37951-3..

Castleman MJ, Pokhrel S, Triplett KD, Kusewitt DF, Elmore BO, Joyner JA, Femling JK, Sharma G, Hathaway HJ, Prossnitz ER and **Hall PR**. Innate Sex Bias of *Staphylococcus aureus* Skin Infection Is Driven by α -Hemolysin. (2017) *J Immunol*. Dec 8. pii: jii1700810. doi: 10.4049/jimmunol.1700810.



Alexandra Herman, PharmD

Assistant Professor – Clinician Educator

PharmD, The University of New Mexico College of Pharmacy, 2015
BS, Environmental Science, College of Santa Fe, 2009

My research focuses on pharmacist provision of contraception and family planning services as well as scholarship of teaching and learning.

Herman's research focus is in women's and reproductive health, particularly in pharmacist provision of contraception in order to increase contraception access in underserved communities. As the coordinator of the College's pharmacy skills lab series, she is also interested in scholarship of teaching and learning, particularly as it relates to standardized assessment of hands-on skills.

Honors & Awards

- UNM College of Pharmacy Faculty Appreciation Award, PS-4, 2019

Grants (Last 5 Years)

PPAS Pilot Fund, UNM College of Pharmacy, "New Mexico pharmacists' knowledge and perspectives of mifepristone and misoprostol for early pregnancy loss," 2020

PPAS Pilot Fund, UNM College of Pharmacy, "Patient perspectives on contraception use and needs in female patients living with HIV: a qualitative study," 2020

AACP Scholarship of Teaching & Learning Award, "Standardized Patient Assessment of Communications in Pharmacy and Medical Students," 2018

Society of Family Planning Research Fund (Grant #SFPRF17-30), "Perspectives on Prescribing Hormonal Contraception Among Rural New Mexican Pharmacists & Women (PHARM)," 2017

Select Publications (Last 10 Years)

Herman A, McCauley G, Thaxton L, Borrego M, Sussman A, Espey E. Perspectives on prescribing hormonal contraception among rural New Mexican pharmacists. *Journal of the American Pharmacists Association*. 2020 Sept/Oct;60(5):e57-e63. Doi: <https://doi.org/10.1016/j.japh.2020.02.026>

Thaxton LD, **Sible A**, Clark E, Sussman A, Espey E. Perspectives on pharmacy access to hormonal contraception among New Mexican Women (PHARM) [poster abstract]. *Obstetrics & Gynecology*. 2019 May;133(5S):173S



Laurie G. Hudson, PhD

Professor of Pharmaceutical Sciences
UNM Regents' Professor

PhD, Pharmacology and Toxicology, Harvard University, 1985
BS, Zoology & BS, Biology, University of Washington, 1980

Hudson's research interests include the effects of environmental metals in experimental systems and human populations and novel cancer therapeutics, with an emphasis on ovarian cancer.

Hudson has expertise in skin and ovarian cancers and cellular mechanisms that lead to cancer development and progression. She has authored more than 120 peer-reviewed scientific manuscripts and book chapters. She has been continually funded by the National Institutes of Health for more than 25 years and is an active reviewer for various foundations and NIH panels. The Hudson laboratory conducts studies using biochemical, cell biological, in vivo and human translational approaches. The ovarian cancer research has led to pilot clinical trials to investigate the pharmacokinetics and pharmacodynamics of a candidate therapeutic drug. Investigations on environmental metal toxicity have culminated in a clinical trial of zinc intervention to alleviate adverse effects of metal exposure in human populations. In addition she has a strong commitment to supporting the development of the next generation of scientists through her mentorship activities.

Honors & Awards

- Faculty Teaching Excellence Award for Biomedical Sciences, UNM School of Medicine, 2004
- UNM Regent's Professor, 2005
- Teacher of the Year, PS-1, UNM COP, 2014
- Nominee, NM Women in Technology Award, 2014
- Featured Inventor, UNM Sci. & Tech. Corporation, 2014
- Recipient, UNM Health Sciences Research Award, 2014
- Recipient, UNM Science Technology Corporation Innovator Award, 2016
- Teacher of the Year, PS-1 UNM COP, 2017

- Exceptional Mentor Award from American Medical Women's Association, 2017

Grants (Last 5 Years)

MPI, NIEHS R01, "Zinc Chemoprevention of Arsenic Co-Carcinogenesis"

PI (research project 1), NIH/EPA P50, UNM Center for Native Environmental Health Equity Research Project 1 (Hudson) "Metals and metal mixtures in DNA damage and repair"

MPI, (research project 3), NIEHS P42, "Superfund Center UNM Metals Exposure and Toxicity Assessment on Tribal Lands in the Southwest (UNM METALS)"

MPI, NIEHS R01, "Mutational Signatures of a Combined Environmental Exposure: Arsenic and Ultraviolet Radiation"

Select Publications (Last 10 Years)

Hudson LG, Cook LS, Grimes MM, Muller CY, Adams SF, Wandinger-Ness A. Dual Actions of ketorolac in Metastatic Ovarian Cancer. *Cancers (Basel)*. 2019 Jul 24;11(8):1049. doi: [10.3390/cancers11081049](https://doi.org/10.3390/cancers11081049).

Hudson LG, Gillette JM, Kang H, Rivera MR, Wandinger-Ness A. Ovarian Tumor Microenvironment Signaling: Convergence on the Rac1 GTPase. *Cancers (Basel)*. 2018 Sep 27;10(10):358. doi: [10.3390/cancers10100358](https://doi.org/10.3390/cancers10100358).

Dashner-Titus EJ, Hoover J, Li L, Lee JH, Du R, Liu KJ, Traber MG, Ho E, Lewis J, **Hudson LG**. Metal exposure and oxidative stress markers in pregnant Navajo Birth Cohort Study participants. *Free Radic Biol Med*. 2018 Aug 20;124:484-492. doi: [10.1016/j.freeradbiomed.2018.04.579](https://doi.org/10.1016/j.freeradbiomed.2018.04.579).

Cooper KL, Dashner EJ, Tsosie R, Cho YM, Lewis J, **Hudson LG**. Inhibition of poly(ADP-ribose) polymerase-1 and DNA repair by uranium. *Toxicol Appl Pharmacol*. 2016 Jan 15;291:13-20. doi: [10.1016/j.taap.2015.11.017](https://doi.org/10.1016/j.taap.2015.11.017).



Bernadette Johnson Jakeman, PharmD, PhC, BCPS, AAHIVP

Associate Professor - Clinician Educator,
Pharmacy Practice & Administrative Sciences

PharmD, The University of New Mexico College of Pharmacy
BS, Chemistry, Willamette University
Infectious Diseases Resident, The University of New Mexico
Pharmacy Practice Resident, New Mexico VA Healthcare System

My current research focuses on HIV care in special populations, including women and patients >65 years of age.

Honors & Awards

- Faculty Preceptor of the Year, UNM College of Pharmacy, 2020
- Outstanding Alumni Award, Phi Delta Chi, UNM Chapter, 2020
- Pharmacist of the Year, New Mexico Society of Health-System Pharmacists 2016
- Teacher of the Year, UNM College of Pharmacy 2012

Grants (Last 5 Years)

PI, NACDS Foundation grant, "Tuberculosis (TB) Testing and TB Infection Treatment in Pharmacies"

PI, PPAS-funded pilot award, "Medication use in patients living with HIV >65 years of Age"

Co-I, PPAS-funded pilot award, "Patient perspectives on hormonal contraception in female patients living with HIV: A qualitative study"

Co-I, PPAS-funded pilot award, "Cardiovascular risk reduction in a HIV."

Select Publications (Last 10 Years)

Tucker K, Benning M, Keenan KL, Walraven C, **Jakeman B**. Appropriateness of empiric extended infusion piperacillin/tazobactam in the intensive care unit. *Journal of Pharmacy Technology* 2020;36(5):196-201.

Jakeman B, Logothetis SJ, Saba M, Anderson D, Acosta J, Borrego ME, Roberts MH, Bachyrycz A, Fortune D, Burgos M. Patient perceptions of tuberculosis testing in the community pharmacy setting: An initiative to expand testing access. *Public Health* 2020;181:135-140.

Jakeman B, Logothetis S, Roberts M, Bachyrycz A, Fortune D, Borrego ME, Ferreira J, Burgos M. Treatment of latent tuberculosis infection with rifapentine and isoniazid in New Mexico pharmacies. *Prev Chronic Dis* 2020;17:e14. doi:10.5888/pcd17.190263.

Hadlock GC, Moler KA, Pineda LJ, **Jakeman B**. Identification of risk factors for potentially preventable readmissions among persons living with human immunodeficiency virus infection. *AIDS Care* 2020. doi: 10.1080/09540121.2019.1709613.

Dodd M, Rafi J, **Jakeman B**, Arabyat RM, Babb SN, Raisch D. A case-based learning exercise to increase students' understanding of the pharmacist's role in public health interventions for individual patients. *Curr Pharm Teach Learn* 2020;12:817-826. doi: 10.1016/j.cptl.2020.02.004.

Sangiovanni RJ, **Jakeman B**, Nasiri M, Ruth L, Mahatme S, Patel N. Relationship between contraindicated drug-drug interactions and subsequent hospitalizations among HIV-infected patients initiating combination antiretroviral therapy. *AIDS Res Hum Retrov* 2019;35:430-433.

Ryan KL, **Jakeman B**, Conklin J, Pineda LJ, Deming P, Mercier RC. Treatment of patients living with or at risk of acquiring HIV or hepatitis C by pharmacist clinicians in a patient-centered medical home. *Am J Health Syst Pharm* 2019;76:821-828. doi: 10.1093/ajhp/zxz059.

Logothetis SJ, Borrego M, Roberts M, Bachyrycz A, Timmins G, **Jakeman B**. Pharmacist perceptions of the NM pharmacist-performed TB testing program. *J Am Pharm Assoc* (2003) 2018;58:647-651.

Goolsby T, **Jakeman B**, Gaynes RP. Clinical relevance of metronidazole-associated peripheral neuropathy: A systematic review of the literature. *Int J Antimicrobial Agents*. 2018;51(3):319-325.



Johnnye L. Lewis, PhD

Research Professor of Pharmaceutical Sciences
Director and Founder, Community Environmental Health Program

PhD, Pharmacology, University of Manitoba, 1989
MA, Psychology, University of Victoria, 1976
BA, Psychology, Miami University, 1970

My research uses community-partnered, multidisciplinary iterative methodologies to assess relationships between environmental exposures and community health in primarily indigenous communities to inform transdisciplinary prevention and intervention strategies.

The Community Environmental Health Program and its related Centers (below) integrate strong science with an understanding of complex cultural and environmental influences on health and an appreciation of jurisdictional complexities to facilitate research partnerships respectful of the varied cultures of all partners, including researchers, clinicians, policymakers and communities, to understand health and collaboratively reduce risk.

- **Metals Exposure and Toxicity Assessment on Tribal Lands in the Southwest (METALS) Superfund Research and Training Center** brings together a vast multidisciplinary team to examine characteristics of uranium mine waste, and mechanistic toxicological impacts resulting from community exposures to associated metal mixtures.
- The **Navajo Birth Cohort Study, Environmental influences on Child Health Outcomes** examines how environment, broadly defined to include uranium and metal mixtures, as well as behavioral, social, toxicants and health status, influences pre-, peri-, and postnatal outcomes, neurodevelopment, obesity, respiratory health and immune development, from prenatal to middle childhood.
- The **Center for Native Environmental Health Research Equity** is a collaboration to study the composition, migration and toxicity of open-burning-generated microplastics in water, soil, air and plant pathways and their cumulative interactions with metals.

Honors & Awards

- Invited member, NIH Blue Ribbon Panel to Advise on the Risk Assessment of the National Emerging Infectious Diseases Laboratory, Advisory Panel to the

Director, 2008-2011

- Invited member, Navajo Nation Water Task Force, 2010-Present
- Faculty Research Excellence Award for Population Research, UNM HSC, 2011
- Protocol Implementation and Evaluation Committee Liaison, National ECHO Program, 2018-present

Grants (Last 5 Years)

Director, NIEHS P42 center, "UNM Metal Exposure Toxicity Assessment on Tribal Lands in the Southwest (METALS) Superfund Basic Science Research and Training Program" (2017-2022)

MPI, P50, Center for Native Environmental Health Equity (2015-2020 NIEHS/EPA); (2020-2025 NIMHD)

MPI, NIH UG3/UH3, "Understanding Risk Gradients from Environment on Native American Child Health Trajectories: Toxicants, Immunomodulation, Metabolic syndromes, & Metals Exposure"

Select Publications (Last 10 Years)

Lewis J, Hoover J, MacKenzie D. Mining and Environmental Health Disparities in Native American Communities. *Curr Environ Health Rep*. 2017 Jun;4(2):130-141. PMID: 28447316 Review.

Hoover JH, Erdei E, Begay D, Gonzales M; NBCS Study Team, Jarrett JM, Cheng PY, **Lewis J**. Exposure to uranium and co-occurring metals among pregnant Navajo women. *Environ Res*. 2020 Jul 17;190:109943. doi: 10.1016/j.envres.2020.109943. Online ahead of print. PMID: 32750552

La Rosa VY, Hoover J, Du R, Jimenez EY, MacKenzie D; NBCS Team, **Lewis J**. Diet quality among pregnant women in the Navajo Birth Cohort Study. *Matern Child Nutr*. 2020 16(3): PMID: 32026554



Ke Jian “Jim” Liu, PhD

Distinguished Professor of Pharmaceutical Sciences
Associate Dean for Research

PhD, Radiation Biochemistry, University of Leeds, 1988
BSc, Chemistry, Peking University, 1982

Liu’s research interests are in toxicity and carcinogenesis of metals; role of zinc in physiology and pathophysiology; mechanism and neuroprotection of brain injury in neurological diseases.

Liu’s research is broadly focused on the role of essential metal (such as zinc) in regulating physiological processes, and on the molecular mechanisms of toxic metals (such as arsenic and chromium) in disrupting these normal processes, leading to the development of various diseases, including cancer, anemia and brain injury. Research in the Liu lab utilizes multidisciplinary approaches, including techniques ranging from chemical and biochemical to biophysical, at the levels of molecule, cell, animals and human patients, to answer specific biological questions. Liu has authored more than 220 scientific manuscripts and his research program has been continuously supported by National Institute of Health grants over the past 25 years. He has been frequently invited to present at national and international conferences, and give seminars at academic institutions around the world.

Honors & Awards

- Excellence in Research Award (Basic Science), University of New Mexico Health Sciences Center, 2016
- Earl Walker Award for Outstanding Achiev. in Neurosci. Research, The University of New Mexico, 2013
- William M. Hadley College of Pharmacy Distinguished Faculty Scholar Award, 2010
- Outstanding Oversea Scientist Award, Chinese National Natural Science Foundation, 2002
- Established Investigator Award, American Heart Association, 2000

Grants (Last 5 Years)

- PI, NIH/NIEHS R01, “Arsenic, GATA-1, and Hematotoxicity”
- MPI, NIH/NIEHS R01, “Mutational Signatures of a Combined Environmental Exposure: Arsenic and Ultraviolet Radiation”
- Subaward PI, NIH R01, “Particulate Cr(VI) Toxicology in Human Lung Epithelial Cells and Fibroblasts”
- MPI, NIH/NIEHS R01, “Arsenic co-carcinogenesis with UVR: nitrosation and oxidation of target proteins”
- MPI, NIH/NCI R01, “Zinc Chemoprevention of Arsenic Co-Carcinogenesis”
- PI, NIH/NIEHS R13, “The 10th and 11th Conference on Metal Toxicity and Carcinogenesis”
- PI, NIH/NIGMS P30, “Integrative Program in CNS Pathophysiology Research”

Select Publications (Last 10 Years)

- X. Zhou, K.L. Cooper, X. Sun, **K.J. Liu**, L.G. Hudson, “Selective sensitization of zinc finger protein oxidation by ROS through arsenic binding,” *J. Biol. Chem.*, 290:18361-9 (2015).
- X. Zhou, K.L. Cooper, J. Huestis, H. Xu, S.W. Burchiel, L.G. Hudson, **K.J. Liu**, “S-nitrosation on zinc finger motif of PARP-1 as a mechanism of DNA repair inhibition by arsenite,” *Oncotarget*, 7:80482-80492 (2016).
- R. Pan, K. Yu, T. Weatherwax, H. Zheng, W. Liu, **K.J. Liu**, “Blood occludin level indicates the extent of early blood brain barrier damage in ischemic stroke,” *Sci. Rep.* 7, 40331 (2017).
- Y. Zhao, F. Yan, J. Yin, R. Pan, W. Shi, Z. Qi, Y. Fang, S. Li, Y. Luo, X. Ji, **K.J. Liu**, “Synergistic interaction between zinc and reactive oxygen species amplifies ischemic brain injury in rats,” *Stroke*, 49:2200-2210 (2018).



Debra MacKenzie, PhD

Research Assistant Professor

PhD, Immunology & Virology, The University of New Mexico, 1990
BS, Biology, New Mexico State University, 1983

My research interests center around understanding mechanisms of immune regulation and immunotoxicity.

MacKenzie is the Deputy Director of the Community Environmental Health Program, helping to coordinate and manage multiple research programs. Her main research interests center around understanding mechanisms of immune regulation and immunotoxicity. She is MPI for the Navajo Birth Cohort Study Environmental influences on Child Health Outcome (ECHO) cohort investigating the effects of mixed metal exposure including arsenic and uranium, on birth outcomes, child health and development as well as immune measures in both mother and child. She is MPI of the UNM Center for Native Environmental Research investigating the immunotoxicity of microplastics, chemicals and metal mixtures within three tribal communities. As an investigator within the UNM METALS Superfund Center, MacKenzie studies metals-induced immunotoxicity and potential mitigation by dietary zinc. MacKenzie is also an experienced molecular biologist and has studied the androgen receptor as a target for cancer chemotherapy.

Honors & Awards

- Member, Kappa Psi Pharmaceutical Fraternity, 2010-Present
- First Year Pharmacy Students Teacher of the Year Award, The University of New Mexico, 2009, 2010, 2013
- Vice-President Elect, Mountain West Regional Society of Toxicology, 2017-2018
- President, Mountain West Regional Society of Toxicology, 2018-2019

Grants (Last 5 Years)

MPI, NIH UG3/UH3, “Understanding Risk Gradients from Envir. on Native Amer. Child Health Trajectories: Toxicants, Immunomodulation, Metabolic Syndromes, & Metals Expo.”

MPI, P50, NIMHD, Center for Native American Environmental Health Equity Research

Project Co-PI, NIEHS/EPA P50, Environmental Health Disparities Center, “UNM Center for Native American Environmental Health Equity”

Project PI/Core Co-I, NIEHS P42, “UNM Metal Exposure Toxicity Assessment on Tribal Lands in the Southwest (METALS) Superfund Research Program”

Subaward PI, NIH OIF supplement, “Using Silicone Wristbands as Non-invasive, Passive, Environmental Monitors to Evaluate Seasonal and Within-Family Correlation for Environmental Exposures”

Select Publications (Last 10 Years)

- Fajardo AM, **MacKenzie DA**, Olguin SL, Scariano JK, Rabinowitz I, Thompson TA. Antioxidants Abrogate Alpha-Tocopherylquinone-Mediated Down-Regulation of the Androgen Receptor in Androgen-Responsive Prostate Cancer Cells. *PLoS One*. 2016 Mar 17;11(3):e0151525. doi: 10.1371/journal.pone.0151525. PMID: 26986969
- Ezeh, P, F. Lauer, **D. MacKenzie**, S. McClain, K. Liu, L. Hudson, A.J.Gandolfi, S. Burchiel. Arsenite Selectively Inhibits Mouse Bone Marrow Lymphoid Progenitor Cell Development In Vivo and In Vitro and Suppresses Humoral Immunity In Vivo. *PLoS One*. 2014 Apr 8;9(4):e93920. doi: 10.1371
- Lewis, J, Hoover, J, **MacKenzie D**. Mining and Environ. Health Disparities in Native American Communities. *Curr Environ Health Rep* 2017; pp 130-141, June 4(2). PMC5429369
- Nozadi SS, Li L, Clifford J, Du R, Murphy K, Chen L; Navajo Birth Cohort Study Team, Seanez P, Burnette C, **MacKenzie D**, Lewis JL. Use of Ages and Stages Questionnaires™ (ASQ) in a Navajo population: Comparison with the U.S. normative dataset. *Child Care Health Dev*. 2019 Sep;45(5):709-718. PMID: 31276599



Patricia L. Marshik, PharmD

Associate Professor of Pharmacy Practice and Administrative Sciences

PharmD, University of Minnesota, 1993
BS, Pharmacy, University of Minnesota, 1992

My research focuses on the use and delivery of medications in the treatment of pediatric pulmonary diseases.

Marshik's expertise is in pediatric pulmonary diseases. She has authored scientific manuscripts, review articles and book chapters on medications used for the treatment of these diseases. She has received funding from the NIH, pharmaceutical companies and organizations. She is an active reviewer for the Pharmacist's Letter and Prescriber's Letter for medications used for respiratory diseases. She has also been actively involved in the training of pharmacy students, pharmacy residents and graduate students to help develop their research skills.

Honors & Awards

- New Mexico Department of Health Council on Asthma member (2013)

Grants (Last 5 Years)

Co-I, NM Department of Health, "CMS Outreach"

Co-I, HRSA, New Mexico Pediatric Pulmonary Center - Continuation

Co-I, HRSA, UNM - Pediatric Pulmonary Center

Select Publications (Last 10 Years)

Marquez J, Togami JC, Dant CR, Herrera A, **Marshik P**, Burnett AE. Peri-procedural antithrombotic management: time to burn the bridge? *Journal of Thrombosis and Thrombolysis* 2018;45:337-344. doi:10.1007/s11239-018-1616-3.

Kunda NK, Hautmann J, Godoy SE, **Marshik P**, Chand R, Krishna S, Muttill P. A novel approach to study the pMDI plume using an infrared camera and to evaluate the

aerodynamic properties after varying the time between actuations. *International Journal of Pharmaceutics* 2017;526:41-49. doi:10.1016/j.ijpharm.2017.04.051.

Ross J, Rankin S, **Marshik P**, Mercier R, Brett M, Walraven C. Antimicrobial stewardship intervention and feedback to infectious disease specialists: a case study in high-dose daptomycin. *Antibiotics* 2015;4:309-320.

Hautmann J, Godoy SE, **Marshik P**, Chand R, McConville JT, Krishna S, Krishna S, Muttill P. Effect of Time Between Actuation on the Dose Variability for Three Metered Dose Inhaler. In: *RDD Europe 2013*. Dalby RN, Byron PR, Peart J, Suman JD, Young PM, Traini D, eds, Virginia Commonwealth University, Richmond, VA. Vol 2 429-434.

Marshik PL. Omalizumab. In: *Encyclopedia of Medical Immunology: Allergic Diseases*. Mackay IR, Rose NR, Ledford DK, Lockey RF eds. Springer Publishing Product Development, New Delhi, India. 2014.



Jason T. McConville, PhD

Associate Professor of Pharmaceutics

PhD, Pharmaceutics, University of Strathclyde, 2002
BSc (Hons), Applied Chemistry, University of Coventry, 1994

My research focuses on overcoming hurdles associated with targeting the delivery of therapeutic agents. Research areas include aerosol drug delivery to the lungs, thin film and transmucosal targeting, and 3D printed delivery platforms for oral drug delivery.

McConville earned an applied chemistry bachelor's degree with honors from the University of Coventry, England, in 1994, before working on inhalation drug delivery as a research scientist at the University of Bath in England for five years. He moved to Scotland in 1999, and earned his PhD at the University of Strathclyde in 2002, working on targeted oral chronopharmaceutical drug delivery. He then moved to Austin, Texas, where he worked as a post-doctoral fellow at the University of Texas at Austin, where he was later appointed to assistant professor. McConville joined the UNM in June 2012. His research interests include thin film delivery systems, pulmonary targeting for local and/or systemic therapy of anticancer drugs, as well as anti-infective agents, and 3D printed drug delivery platforms for oral drug administration. McConville serves as an adjunct professor in the Department of Pharmaceutical Technology at the University of Bonn, Germany, where he teaches and jointly supervises in the graduate program. Additionally, he serves as the associate editor for Drug Development and Industrial Pharmacy, and on the editorial advisory boards of *Inhalation*, *Journal of Biopharmaceutics and Therapeutic Challenges*, and *Pharmaceutics*, and as a scientific advisor to the Aerosol Society annual Drug Delivery to the Lungs conference.

Honors & Awards

- Inducted as Member of the Tom L. Popejoy Society, The University of New Mexico, 2018
- Guest Editor: *Formulation and Delivery of Macromolecules*, AAPS PharmSciTech 18, 2017
- Research Award "Antisolvent Co-Precipitation Synthesis of D,L-Valine/Lysozyme," IPEC Americas, 2014
- Associate Editor, *Drug Development and Industrial*

Pharmacy, 2015-present

- Member of the Society for Teaching Excellence, University of Texas at Austin, 2011
- University of Texas System Regents' Outstanding Teaching Award (Nominated), 2011

Grants (Last 5 Years)

PI, ASD Healthcare Contract, "Wireless Medication Packaging Research"

PI, STC GAP Funding, "Lipase Inhibitors to Prevent Rancidity in Expressed Human Milk During Storage"

PI, JRS Pharma, "Novel ProsolvTM Based Drug Delivery Approaches"

PI, Various Donors, "Targeted Drug Delivery using Thermal Gelation"

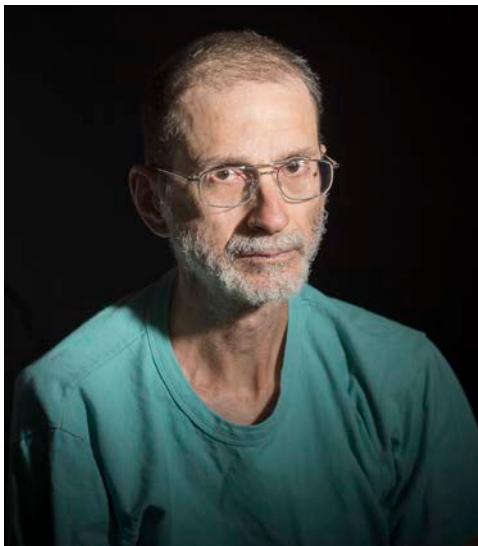
PI, Various Donors, "Nanoemulsion Aerosol Development Studies with Co-enzyme Q10"

Select Publications (Last 10 Years)

J.O. Morales, S. Huang, R.O. Williams III, **J.T. McConville**, Films loaded with Insulin-coated nanoparticles (ICNP) as potential platforms for peptide buccal delivery, *Colloids and Surfaces B: Biointerfaces*, 122(2014), 38-45.

I. Rossi, F. Sonvico, **J. McConville**, F. Rossi, E. Fröhlich, S. Zellnitz, A. Rossi, E. Del Favero, R Bettini, F. Buttini, Nebulized Coenzyme Q10 Nanosuspensions: A Versatile Approach for Pulmonary Antioxidant Therapy, *European Journal of Pharmaceutical Sciences*, 113 (2018), 159-170.

K. Berkenfeld, K. Hauschild, **J.T. McConville**, A. Lamprecht, Cascade Impactor Performance of Commercial pMDI Formulations using Modified Induction Ports, *Molecular Pharmaceutics*, 17 (2020), 1491-1501.



Curtis Miller, PhD

Research Assistant Professor

PhD, Statistics, Iowa State University, 2005
MS, Statistics, Kansas State University, 2000
PhD, Mathematics, Indiana University, 1994
MA, Mathematics, Brown University, 1985
BA, Mathematics, Haverford College, 1982

I use a variety of statistical methods to model data from studies of environmental factors on health outcomes. Most of my research is statistical analyses for these studies. This involves combining measures of environmental exposure, socioeconomic factors and clinical measures to model disease occurrences or biomarker measurements. I also use this collaboration as a starting point for research in statistical methods – that is, research in statistics itself. Currently I am working on conditionally specified logistic regression and possible extensions of this method.

Miller is a statistician and modeler. He has worked at the Community Environmental Health Program since February 2011, participating in the DiNEH Project, the Navajo Birth Cohort Study, and the study of environmental contamination on Cheyenne River Sioux tribal lands. In the graduate program at Iowa State, and in postdoctoral studies from then until 2011, he worked on a variety of projects, most of which had a large component of modeling. Much of this work involved modeling motion data or ecological data.

Grants (Last 5 Years)

Co-I, NIH R01, “Inhalation of Contaminated Mine Waste Dusts as a Route for Systemic Metal Toxicity”

Co-I, NIH UG3/UH3, “Understanding Risk Gradients from Environment on Native American Child Health Trajectories”

Co-I, NIEHS P42, “UNM Metal Exposure Toxicity Assessment on Tribal Lands in the Southwest (METALS) Superfund Research Program”

Co-I, NIEHS R15, “Interactive Effect of Environmental Exposures and Alcohol in the Navajo Birth Cohort”

Co-I, CDC grant, “A Prospective Birth Cohort Study Involving Uranium Exposure in the Navajo Nation”

Co-I, P50, NIMHD, Center for Native American Environmental Health Equity Research

Select Publications (Last 10 Years)

Soberón, J. and **Miller, C.** (2009) Evolución de los nichós ecológicos [Evolution of ecological niches], *Miscelánea Matemática*, 49, 83-99.

Miller, C., Christman, M., and Estevez, I. (2011) Movement in a confined space: Estimating path tortuosity, *Applied Animal Behaviour Science* 135, 13-23.

Lira-Noriega, A., Soberón, J., and **Miller, C.** (2013) Process-based and correlative modeling of desert mistletoe distribution: a multiscalar approach, *Ecosphere* 4(8), doi: 10.1890/ES13-00155.1

Ong, J., Erdei, E., Rubin, R., **Miller, C.**, Ducheneaux, C., O’Leary, M., Pacheco, B., Mahler, M., Henderson, P.N., Pollard, K.M., and Lewis, J. (2014) Mercury, Autoimmunity, and Environmental Factors on Cheyenne River Sioux Tribal Lands, *Autoimmune Diseases* 2014, doi: 10.1155/2014/325461.

Hund, L., Bedrick, E., **Miller, C.**, Huerta, G., Nez, T., Cajero, M., and Lewis, J. (2015) A Bayesian framework for estimating disease risk due to exposure to uranium mine and mill waste on the Navajo Nation, *Journal of the Royal Statistical Society, Series A*, January 2015, doi:10.1111/rssa.12099.

Miller, C. (2019) Marginal probabilities and point estimation for conditionally specified logistic regression. *Communications in Statistics -Theory and Methods*. Published online: www.doi.org/10.1080/03610918.2019.1643478



Pavan Muttill, PhD

Associate Professor of Pharmaceutical Sciences

PhD, Pharmaceutics, Central Drug Research Institute, 2006
MS, Birla Institute of Technology & Science, Pilani, 2001

My expertise is in the area of designing and developing novel delivery systems for drugs and vaccines, including for pulmonary, oral, and transdermal routes of administration. These delivery systems are also evaluated in animal models for their efficacy. The delivery systems for vaccines are needle-free and can potentially elicit a mucosal immune response. We also study the stabilization of drugs and vaccines using various drying methods (spray-and freeze-drying) that would not require cold-chain during storage and distribution.

The Muttill laboratory focuses on the formulation development and preclinical evaluation of vaccines and drugs as a needle-free delivery mechanism. We have shown these formulations to improve the stability of various vaccines, including live bacteria, peptides and proteins, virus-like particles, etc. Muttill’s laboratory uses drying technology to develop thermostable vaccines that are further evaluated in appropriate animal models for their safety and efficacy. Projects currently underway include a) Novel spray drying technology to achieve drug microencapsulation for taste-masking and controlled-release; b) Pulmonary delivery of drugs and vaccines against tuberculosis and non-tuberculous mycobacteria; c) Needle-free vaccination strategies (oral-films and transdermal-microneedles) against infectious diseases; d) Developing thermostable vaccines against infectious diseases (tuberculosis, malaria, polio, etc.); e) Novel formulations of virus-like particles (VLPs) as a mucosal vaccination strategy (oral, transdermal, and pulmonary); f) Development of smart inhalers for asthma and COPD to improve patient compliance.

Honors & Awards

- Ad hoc NIH grant reviewer, 2017-2020
- Chair, American Association of Pharmaceutical Scientists, Rocky Mountain Discussion Group, 2017
- American Foundation for Pharmaceutical Education – Research mentor for pharmacy students, 2015 & 2017
- UNM COP Faculty Appreciation Award, 2016
- UNM COP Grad. Stu. Faculty Appreciation Award, 2015
- Bill & Melinda Gates Grand Challenges Exploration grant, 2012

Grants (Last 5 Years)

Sub-PI, NIH/NIGMS (STTR sub-award), “Multi-layered microneedles for delivering VLP-based vaccines”

Sub-PI, NIH/NIAID (SBIR sub-award), “An inhaled clofazimine formulation for the treatment of tuberculosis”

Sub-PI, NIH/NHLBI (SBIR sub-award), “Development of NH101: A Simple and Efficient Outpatient Dry Powder Amphotericin dry powder nebulizer for Treatment of Susceptible and MDR Aspergillus/ Fungal Infections”

Sub-PI, NIH/NICHHD (R21 sub-award), “Aqueous-based two-step spray drying as a taste masking drug delivery platform”

Sub-PI, NIH/NCATS (CTSA sub-award), “Development of a Smart-Inhaler to Improve Care for Asthma Patients”

Select Publications (Last 10 Years)

Price, D., Kunda, N., Ellis, R., **Muttill, P.*** (2020) Design and optimization of a temperature-stable dry powder BCG vaccine *Pharmaceutical Research* 37(1), 1-14 (Impact factor- 3.9)

Kunda, N. K.*, Peabody, J., Zhai, L., Price, D., Chackerian, B., Tumban, E., **Muttill, P.*** (2019) Evaluation of the thermal stability and the protective efficacy of liquid and spray-dried HPV vaccine, Gardasil® 9 Human Vaccines and Immunotherapeutics, DOI: 10.1080/21645515.2019.1593727 (Impact factor- 3.64)

Kunda, N., Price, D., **Muttill, P.*** (2018) Respiratory tract deposition and distribution pattern of microparticles in mice using different pulmonary delivery techniques *Vaccines*, 6(3), 41

Price, D., Stromberg, L. R., Kunda, N., & **Muttill, P.*** (2017) In vivo pulmonary delivery and magnetic-targeting of dry powder nano-in-microparticles *Molecular pharmaceuticals*, 14(12), 4741-4750 (Impact factor- 4.44)



Sara Nozadi, PhD

Research Assistant Professor

PhD, Child Development and Family Studies (with a Specialization in Measurement and Statistics), Arizona State University, 2014
MS, Child Development & Family Studies, Arizona State University, 2011
BS, Psychology, San Francisco State University, 2008

My research is focused on modeling the interplay between environmental and psychosocial risk factors in development of children from underserved communities.

Nozadi's expertise is in understanding how complex relations between early risk factors, including individual (e.g., temperament), social (e.g., family, peers), and broader environmental factors (e.g., metal exposure), can shape children's cognitive and socioemotional development from infancy to middle childhood. The majority of her work within the Community Environmental Health program has been focused on developing and testing new analytical and methodological, e.g. eye-tracking, approaches to understand developmental outcomes in children from the Navajo Birth Cohort Study.

Honors & Awards

- Society of Research in Child Development Travel Grant, Austin, Texas, 2017
- Temperament and Attention Biases in AT- Risk Children. Graduate and Professional Student Assoc. Intramural Research Grant, Arizona State University, 2013
- Intensive Summer Interdisciplinary Experience Graduate Fellowship (ISIE), Arizona State University, 2013
- Student Scholarship Award, Western Psychological Association, 2008
- Summer Research Opportunity Program Fellowship, University of Michigan, 2007

Grants (Last 5 Years)

Project PI, Opportunity and Infrastructure Fund funded through the Environmental Influences on Child Outcomes Coordinating Center, "Attentional Mechanisms Underlying Information Processing in a Sample of Navajo Children"

Select Publications (Last 10 Years)

Bush, N., Wakschlag, L. S., LeWinn, K., Hertz-Picciotto, I., **Nozadi, S. S.**, Lewis, J., Biezonski, D., Blair, C., Deardorff, J., Neiderhiser, J., & Posner, J. (2020). Family environment, neurodevelopmental risk, and the Environmental Children's Health Outcomes (ECHO) initiative: Looking back and moving forward. *Frontiers in Child and Adolescent Psychiatry*.

Nozadi, S. S., Li, L., Clifford, J., Du, R., Murphy, K., Chen, L., Navajo Birth Cohort Study Team, Seanez, P., Burnette, C., MacKenzie, D., & Lewis, J. (2019). Utility of Ages and Stages Questionnaire (ASQ) for neurodevelopmental screening of Navajo children. *Child: Care, Health and Development*, 45, 709-718. doi: 10.1111/cch.12704

Nozadi, S. S., White, T. L., Degnan, K. A., & Fox, N. A. (2018). Relations between behavioral inhibition and longitudinal patterns of social information processing: Moderating role of parents' supportive reactions to children's negative emotions. *Social Development*, 27. doi: 10.1111/sode.12286

Nozadi, S. S., Spinrad, T. L., Johnson, S. P. & Eisenberg, N. (2017). Relations of emotion-related temperamental characteristics to attentional biases and social functioning. *Emotion*. doi: 10.1037/emo0000360. PMID: 28872340

Nozadi, S. S., Troller-Renfree, S., White, L., Frenkel, T., Degnan, K. A., Henderson, H., A., Bar-Haim, Y., Pine, D. S., & Fox, N. A. (2016). The moderating role of attention biases to threat on the link between behavioral inhibition and anxiety in children. *Journal of Experimental Psychopathology*, 7, 451-465.



Gretchen M. Ray, PharmD, PhC, BCACP, CDCES

Associate Professor of Pharmacy Practice

PharmD, The University of New Mexico College of Pharmacy, 2006

As a clinician educator and pharmacist clinician, my research has focused on patient outcomes following the implementation of pharmacist clinical services.

Ray practices as a pharmacist clinician within two Family Medicine Clinics at UNM. Her specialty area is in diabetes management and cardiovascular disease. She is also on the hub team for the UNM Endocrinology teleECHO clinic. Her interests include the implementation of pharmacist services within the ambulatory care setting, especially among patients with diabetes. She is the director of a PGY2 pharmacy residency in ambulatory care and is involved in ambulatory care-based research with her residents.

Grants (Last 5 Years)

PI: PPAS-Funded Pilot Grant, UNM College of Pharmacy. Description, awareness, and perception of advanced practice pharmacists in New Mexico. 2019

CO-I: PPAS-Funded Pilot Grant, UNM College of Pharmacy. Retrospective cohort study describing rates of adherence to cardiovascular risk reduction guidelines in a single HIV specialty clinic in NM. 2018

Co-I, Helmsley Charitable Trust grant

Select Publications (Last 10 Years)

Pham NYT, Yon CM, Anderson JR, Dodd MA, Roberts M, Yang SM, **Ray GM**. Awareness and perceptions of advanced practice pharmacists among health care providers in New Mexico. *J Am Pharm Assoc*. 2021;61(1):101-8.

Aragon KG, Elmaoued AA, Pham NYT, Conklin JR, **Ray GM**. Long-acting basal insulins: a review of the more recently approved agents. *Cardiology in Review*. 2019 Sept/Oct;12(5):260-66

Ray GM, Rodriguez C, Schulman SM, Sarangarm P, Bardack M, Bouchonville MF. Empagliflozin induced diabetic ketoacidosis unmasking a type 1 diabetes diagnosis. *Clin Pract Cases Emerg Med*. 2019;3(2):140-43

Newsome C, Mallawaarachchi I, Conklin J, **Ray G**. Health literacy of student pharmacists. *Curr Pharm Teach Learn*. 2018 Mar;10(3):340-343

Newsome C., Mallawaarachchi I., Garcia J., **Ray G**. (2016). Association between health literacy and diabetes control in a pharmacist-run disease state management clinic. *Cogent Medicine*. 2016; 6;3(1)

Conklin JR, Togami JC, Burnett A, Dodd MA, **Ray, GM**. Care Transitions Service: A pharmacy-driven program for medication reconciliation through the continuum of care. *American Journal of Health System Pharmacy*. 2014;71:802-809

Sarangarm P, London MS, Snowden SS, Dilworth TJ, Koselke LR, Sanchez CO, D'Angio R, **Ray G**. Impact of pharmacist discharge medication therapy counseling and disease state education: Pharmacist Assisting at Routine Medical Discharge (Project PhARMd). *American Journal of Medical Quality*. 2013 Jul-Aug;28(4):292-300

Chuang L-T, Glew RH, Li C-C, VanderJagt DJ, Broyles JS, **Ray GM**, Shah VO. Comparison of the fatty acid composition of the serum phospholipids of controls, prediabetics, and adults with type 2 diabetes. *Journal of Diabetes Mellitus*. 2012;2(4):393-401

Johnson B, **Ray G**, Sarangarm P, D'Angio R. Letters: Collaborating on a residency research project. *American Journal of Health System Pharmacy*. 2012 August;69:1362-63.

Ray GM, Nawarskas JJ, Anderson JR. Alteration in blood pressure monitoring techniques impacts hypertension treatment. *Journal of General Internal Medicine*. 2012 June;27(6):623-9.



L. Douglas Ried, PhD, MS, BSPHarm, FAPhA

Professor of Pharmacy Practice and Administrative Sciences
Associate Dean, Assessment

PhD, Social and Administrative Pharmacy, University of Minnesota, 1983
MS, Social and Administrative Pharmacy, University of Minnesota, 1982
BS, Pharmacy, University of Washington, 1972

Ried's research interests are in patient Health Reported Outcomes and Quality of Life focusing on mental health medications, Pharmacoepidemiology, Geriatric Psychiatry, Curriculum Development, Curriculum and Programmatic Assessment.

Ried is an expert in the clinical effectiveness and adverse outcomes of mental health medications among geriatric patients, especially antipsychotics and antidepressants. His focus is on improved mortality after stroke with early treatment with antidepressants. Another area of interest is reducing adverse events and improving quality of life with second-generation antipsychotics. He is also broadly interested in the assessment and evaluation of student learning and faculty teaching, especially of novel teaching methods such as online and active learning strategies, especially team-based learning.

Honors & Awards

- Rufus Lyman Award, Best Paper of the Year, American Association of Colleges of Pharmacy, 1987, 2003, 2016
- Brodie Scholar-in-Residence, American Association of Colleges of Pharmacy, September 2007-August 2008
- Fellow, American Pharmaceutical Association, 1997
- G.D. Searle Postdoctoral Pharmacoeconomics Fellow, 1991
- Rho Chi Scholastic Honorary

Select Publications (Last 10 Years)

Ried LD, Ried DB. Predicting the 2016 US News & World Report rankings using a reputation and prestige model. Submitted to *Curr Pharm Teach Learn*. (in-print).

Ried LD, Ried DB. Elucidation of a Resource Reputation Model to Explain USNWR Ranking Using Path Analysis. Submitted to *Curr Pharm Teach Learn*. (in-print).

Ried LD. Length of advanced pharmacy practice experience and first-time NAPLEX pass rate of US pharmacy programs. *Curr Pharm Teach Learn*. 2020 Jan;12(1):14-19.

Ried LD, Douglas CA. Towards an Operational Definition of Pharmacy Clinical Competency. *Am J Pharm Educ*. 2015; 79(4): Article 54.

Ried LD, Doty RE, Nemire RE. A Psychometric Evaluation of the SUCCESS Advanced Pharmacy Practice Experience Clinical Competency Framework. *Am J Pharm Educ*. 2015; 79(2): Article 19.

Gandhi PK, **Ried LD**, Huang IC, Kimberlin CA, Kauf T. Assessment of Measurement Bias and Response Shift Among Hypertensive Coronary Artery Disease Patients. *Expert Review of Pharmacoeconomics & Outcomes Research*. 2013; 13(6):841-51.

Gandhi PK, **Ried LD**, Bibbey A, Huang IC. SF-6D Utility Index as a Measure of Minimally Important Difference in Health Status Change. *J Am Pharm Assoc*. 2012; 52(1):34-42.

Ried LD. A Model for Curricular Quality Assessment and Improvement. *Am J Pharm Educ*. 2011; 75(10): Article 196.

Ried LD, Jia H, Feng H, Cameon R, Wang X, Tueth MJ, Wu S. Does Poststroke Depression and Treatment Impact Poststroke Mortality? *Ann Pharmacother*. 2011; 45(7-8):888-897.

Jia H, **Ried LD**, Feng H, Cameon R, Wang X. Impact of antidepressant dispensing on health service utilization among veterans with stroke. *J Am Pharm Assoc*. 2011; 51(1): 65-71.

Ried LD, Jia H, Cameon R, Feng H, Wang X, Tueth MJ. Does Poststroke Depression Impact Poststroke Depression and Treatment? *Am J Geriatr Psychiatry*. 2010; 18(7):624-33.



Melissa H. Roberts, PhD, MS

Assistant Professor, Department of Pharmacy Practice & Administrative Sciences

PhD, Pharmacoeconomics, The University of New Mexico, 2013
MS, Health Systems, Georgia Institute of Technology, 1999
BS, Economics, University of Pennsylvania, 1981

Roberts' research focuses on epidemiological studies and comparative effectiveness research related to chronic disease, and in particular, health outcomes related to pharmaceutical treatment of chronic disease.

Roberts' academic training is in health economics and health systems, and her expertise is in using real-world data – data retrospectively collected from claims, electronic medical records or surveys – to aid health care decision making. Her research in the past decade has primarily focused on disease burden and comparative effectiveness studies for treatment of respiratory disease, but she also has an interest in other conditions affecting health-related quality-of-life for individuals such as autoimmune disorders and pain.

Select Grants & Contracts Funded/Completed

- Consultant, GSK/Analysis Group, Inc., "Frequency and Cost of Moderate Exacerbations in Asthmatic Patients in the US"
- PI, Sunovion Pharmaceuticals, "A Case-control Analysis of the Prevalence of Frailty, Cognitive Impairment, and Limited Expiratory Airflow Among Elderly Persons With Chronic Obstructive Lung Disease"
- PI, GSK/Analysis Group, Inc., "GSK Global Exacerbation Study"
- Co-PI, beWellNM, "Market, Utilization, and Outcomes Research"
- Co-I, NIH/NIDA, "6/6 Planning for the HEALthy Early Development Study"
- Co-I, NIH/NIAAAA, "ENRICH-2: Stress Reactivity & Self-Regulation Infants w Prenatal Alcohol Exposure"
- PI, COP pilot program, "Estimates of Autoimmune Disease Rates by Race/Ethnicity in the United States, 2010-2016"

Select Publications (Last 10 Years)

Roberts M, He X, Diaz Fuentes C, Edwardson N. Subscriber continuity in health insurance plans: factors associated with re-enrollment and coverage changes. *J Med Econ*. 2020:1-12.

Roberts MH, Mapel DW, Petersen H. Comparative causal analysis of the effects of long-acting muscarinic antagonist versus no long-acting bronchodilator use on readmission or mortality after hospitalization for chronic obstructive pulmonary disease. *Drugs Real World Outcomes*. 2019. doi: 10.1007/s40801-019-00171-w.

Roberts MH, Erdei E. Comparative United States autoimmune disease rates for 2010-2016 by sex, geographic region, and race. *Autoimmun Rev*. 2019: 102423.

Roberts MH, Takeda MY, Kindilien S, Barqawi YK, Borrego ME. Assessment of components included in published societal perspective or QALY outcome economic analyses for antiepileptic drug treatment in chronic epilepsy. *Expert Rev Pharmacoecon Outcomes Res*. 2018;18(5):487-503.

Roberts MH, Clerisme-Beaty E, Kozma CM, Paris A, Slaton T, et al. A retrospective analysis to identify predictors of COPD-related rehospitalization. *BMC Pulm Med*. 2016;16(1):68.

Roberts MH, Mapel DW, Borrego M, Raisch D, Georgopoulos L, van der Goes D. Severe COPD exacerbation risk and long-acting bronchodilator treatments: Comparison of three observational data analysis methods. *Drugs - Real World Outcomes* 2015;2(2):163-175.

Roberts MH, Mapel DW, Thomson H. The impact of chronic pain on direct medical utilization and costs in chronic obstructive pulmonary disease. *ClinicoEconomics and Outcomes Research* 7:173-184, 2015.

Roberts MH, Mapel DW, Bruse S, Petersen H, Nyunoya T. Development of a modified BODE Index as a mortality risk measure among older adults with and without COPD. *Am J Epidemiol* 178(7):1150-60, 2013.



Rong Pan, PhD

Research Assistant Professor

PhD, Neurobiology, Chinese Academy of Sciences, 2010
BS, Animal Science, China Agricultural University, 2004

My research focuses on the effects of zinc on stroke-induced brain damage, and biomarkers of blood brain barrier damage.

Pan is an expert in neuroscience who focuses on the role of zinc in stroke-induced brain damage. By using both in vivo and in vitro ischemic stroke models, she discovered that the intracellular accumulation of zinc is one of the major factors causing brain damage, and the chelation of zinc dramatically decreases brain damage caused by ischemic stroke. In addition, Pan has observed that the blood occludin level increases with increased blood brain barrier damage, indicating that elevated blood occludin directly reflects blood brain barrier damage. Since end-stage blood brain barrier damage results in intracerebral hemorrhage, blood occludin has the potential to predict the risk of intracerebral hemorrhage after acute stroke thrombolysis before thrombolysis treatment.

Honors & Awards

- Best Post Doctoral Research Poster, MWSOT 31st Annual Meeting, Albuquerque, NM, 2013
- Innovation awards, STC. University of New Mexico, 2018
- Innovation awards, STC. University of New Mexico, 2020

Grants (Last 5 Years)

PI, Brain & Behavioral Health Institute mini grant, "Zinc and autophagy cooperation plays opposite roles in different phases of ischemic stroke"

Co-PI, COP pilot program, "Blood occludin as a biomarker for cerebral ischemia induced hemorrhage"

PI, Brain & Behavioral Health Institute mini grant, "Zinc and autophagy cooperation plays opposite roles in different phases of ischemic stroke"

PI, Research Pilot Project Award/ NIH P20GM121176, "Zinc and autophagy cooperation plays opposite roles in different phases of ischemic stroke"

Select Publications (Last 10 Years)

Rong Pan, Ke Jian Liu, Zhifeng Qi. (2019) Zinc causes the death of hypoxic astrocytes by inducing ROS production through mitochondria dysfunction. *Biophysics Reports*. 5: 209-217

Rong Pan, Kewei Yu, Theodore Weatherwax, Handong Zheng, Wenlan Liu, Ke Jian Liu. (2017) Blood Occludin Level Indicates the Extent of Early Blood Brain Barrier Damage in Ischemic Stroke. *Scientific Reports*. 7:40331

Rong Pan, Ke Jian Liu. (2016) ZnT-1 expression reduction enhances free zinc accumulation in astrocytes after ischemic stroke. *Acta Neurochirurgica Supplement*. 121:257-61

Wimin Xuan, **Rong Pan** (Co-first), Yongyi Wei, Yanting Cao, Fu-Sen Liang, Ke Jian Liu, Wei Wang. (2016) Reaction-based 'Off-on' Fluorescent Probe Enabling Detection of Endogenous Labile Fe²⁺ and Imaging of Zn²⁺-induced Fe²⁺ Flux in Living Cells and Elevated Fe²⁺ in Ischemic Stroke. *Bioconjugate Chemistry*. 27:302-8

Yanting Cao, **Rong Pan** (Co-first), Weimin Xuan, Yongyi Wei, Kejian Liu, Jiahong Zhou, Wei Wang. (2015) Photo-triggered Fluorescent Theranostic Prodrug for DNA Alkylating Agent Mechlorethamine Releasing and Spatiotemporal Monitoring. *Organic & Biomolecular Chemistry*. 13:6742-8

Rong Pan, Graham S. Timmins, Wenlan Liu, Ke Jian Liu. (2015) Autophagy mediates astrocyte death during zinc potentiated ischemia reperfusion injury. *Biological Trace Element Research*. 166:89-95



Mikiko Y. Takeda, PharmD, MS

Clinical Associate Professor

Master of Science in Clinical Research, University of Kansas, 2013
Doctor of Pharmacy, Roseman University Health Sciences (formerly University of Southern Nevada), 2009
Master of Pharmaceutical Science, Nagasaki University Graduate School of Pharmaceutical Sciences, 2000
Bachelor of Pharmaceutical Science, Nagasaki University, 1998

My research focuses on opioid overdose, prevention of opioid overdose deaths among patients with chronic opioid treatment, drug-herb interactions and teaching pedagogies in pharmacy education.

Takeda is a clinical associate professor of pharmacy practice focusing on neurological diseases, especially epilepsy and pain. Her education in clinical research and public health at the University of Kansas strengthened her research skills. She also has a research background in Japan, where she received a master's degree in pharmaceutical science, evaluating the effects of preservatives in eye drops on a rabbit cornea using electrophysiological methodology. As part of her fellowship in clinical neuroscience at the University of Kansas, she initiated a safety study of Keishibukuryogan (a Japanese herbal medication) among women with epilepsy. Currently, she is a co-investigator of naloxone studies to prevent unintentional opioid overdose deaths and to identify risk factors of opioid overdose among patients with chronic opioid therapy for chronic noncancer pain.

Honors & Awards

- Teacher of the Year, UNM College of Pharmacy, 2018
- Treatment of Catamenial Epilepsy with Kampo Preliminary Study (award no.188345), the Epilepsy Foundation, November 2010
- Walgreens Diversity Scholarship, April 2009
- Saga Prefectural Scholarship for privately funded post-graduate students studying abroad, 2006- 2007

Grants (Last 5 Years)

PI, PPAS Pilot Project Awards, "Cannabis survey among pharmacists in New Mexico"

PI, UCB Pharma, Inc. contract, "MTM-like Patient Education & Adherence Program in Epilepsy"

PI, UCB Pharma, Inc. contract, "HCP Consulting Agreement"

Select Publications (Last 10 Years)

Katzman JG, **Takeda M**, Greenberg N, Moya M, Alchbli A, Katzman W, Salvador JG, Bhatt S. Association of Take-Home Naloxone and Opioid Overdose Reversals Performed by Patients in an Opioid Treatment Program. *JAMA Netw Open*. 2020;3(2):e200117.

Takeda M, Patel A, Fenton G. Energy drink-induced breakthrough seizure in a patient on valproic acid - considering herbal safety in epilepsy. *J Pharm Pract*. 2019 Oct;32(5):485-487.

Bachyrycz A, Wittstrom K, Bleske B, **Takeda M**. Opioid Overdose Response Training in Pharmacy Education: An Analysis of Students' Perception of Naloxone Use for Opioid Overdose Prevention, Currents in Pharmacy Teaching and Learning. 2019 Feb;11(2):166-171.

Takeda MY, Smith MJ, Cone CJ. Debriefing to Improve Student Ability to Assess and Plan for the Care of Persons With Disability. *Simul Healthc*. 2017 Dec;12(6):356-363.

Takeda MY, Katzman J, Dole E, Heinz-Bennett M, Alchbli A, Duhigg D, Yonas H. Co-prescription of Naloxone as a Universal Precaution Model for Patients on Chronic Opioid Therapy. *Substance Abuse Journal*. 2016 April 19:0.



Todd A. Thompson, PhD

Associate Professor

Post-Doctoral Training, University of Wisconsin Comprehensive Cancer Center, 1997-2001

PhD, Molecular and Environmental Toxicology, University of Wisconsin-Madison, 1997

BS, Pharmacy, The University of New Mexico, 1987

Research in the Thompson laboratory is focused on the development of novel cancer chemo-preventative measures and therapies, including precision medicine-based considerations for cancer prevention and treatment.

Thompson's scientific expertise is in cellular and molecular carcinogenesis. His publications encompass research on endocrine-sensitive cancers, including breast and prostate cancer, as well as colon cancer and melanoma. The androgen receptor is investigated as a critical target for both prostate cancer prevention and therapy of advanced disease. To facilitate research on the androgen receptor, the Thompson laboratory developed the Multifunctional Androgen Receptor Screening assay that can detect simultaneously androgen receptor agonists and antagonists. Tocopherol derivatives have been identified as promising interventions for prostate cancer prevention. The development of small molecule screens in the Thompson lab has led to the identification of novel treatments for advanced hormone-refractory prostate cancer targeting cellular differentiation and modulation of autophagy. Thompson has five issued patents for novel methods to treat cancer. Cancer pharmacogenomics is also investigated as an essential component of precision medicine.

Honors & Awards

- DOD Breast Cancer Research Program Doctoral Training Award (1994-1996)
- DOD Prostate Cancer Research Program Post-Doctoral Training Award (1999-2001)
- Toxicology and Applied Pharmacology Editorial Board (since 2010)
- UNM COP P3 Excellence in Teaching Award (2015)
- UNM COP Distinguished Educator Award (2019)
- Member, American Assoc. of Pharmaceutical Scientists
- Member, Society of Toxicology

Grants (Last 5 Years)

Co-I, NIH-funded R21, A Closed Loop Control System with Live Cells in the Loop

Co-I, UNM COP pilot program, "Development of Scholarship of Teaching and Learning Collaborative

Select Publications (Last 10 Years)

Fajardo, A.M., Ji, M., MacKenzie, D.A., Deck, L.M., VanderJagt, D.L., **Thompson, T.A.**, Bisoffi, M. The curcumin analog ca27 down-regulates androgen receptor through an oxidative stress mediated mechanism in human prostate cancer cells. *The Prostate* 72: 612-625, 2012.

White, K.A., Luo, L., **Thompson, T.A.**, et al. Variants in Autophagy-Related Genes and Clinical Char. in Melanoma: A Population-Based Study. *Cancer Med.* 5:3336-3345, 2016.

Price, D.N., McBride, A.A., Anton, M., Kusewitt, D.F., Norenberg, J.P., MacKenzie, D.A., **Thompson, T.A.**, Muttill, P. Longitudinal assessment of lung cancer progression in mice using the sodium iodide symporter reporter gene and SPECT/CT imaging. *PlosOne* 11(12):e0169107, 2016.

Thompson, T.A. Chapter 8: Oncology/Hematology Pharmacogenomics (Second Ed.). In: Zdanowicz, M.M. (ed.) *Concepts in Pharmacogenomics*. American Society of Health-System Pharmacists, 2017.

Nighot, P.K., Borunda, T., Laidler, L., Wong, M., **Thompson, T.**, Oprea, T., Sklar, L., Ma T.Y. Tocopherylquinone-mediated activation of aryl hydrocarbon receptor reduces intestinal epithelial tight junction permeability and severity of experimental colitis. *Gastroenterology* 154 (6):S-65, 2018.

Mandell MA, Saha B, **Thompson TA.** The tripartite nexus: autophagy, cancer, and tripartite motif-containing protein family members. *Frontiers in Pharmacology* 11: Article 308 (20 pp.), 2020.



Graham Timmins, PhD

Associate Professor of Medicinal Chemistry

PhD, Biochemistry, University of Leeds, 1990

BSc, Biochemistry, 1986

My research focuses upon reactive intermediates and metabolic transformations. Stable isotopes are used to both study and modify bacterial metabolic transformation, providing new classes of diagnostics and anti-TB drugs. Our latest research is understanding the role of a developing field, Quantum Biology, in the enzymic activation of isoniazid.

Graham is an expert in the study of reactive intermediates especially free radicals, and in the use of stable isotopes. He has 12 issued patents, many under examination, and more than 70 peer-reviewed publications. Recent work has focused upon developing rapid stable isotope based breath tests to diagnose lung infections and determine bacterial antibiotic sensitivity in a point-of-care manner. A company licensing some of the breath test UNM patents has achieved success in clinical trials and is focusing upon developing an ultra-rapid triage breath test. Other recent work is focused upon utilizing novel isotope effects to enhance the activity of key TB drugs such as isoniazid, with significant enhancement seen in vitro and in vivo. He also collaborates extensively with the Deretic group in the repurposing of agents for the control of autophagy, and has interests in the practicalities of patenting stable isotope enhanced compounds.

Honors & Awards

- UNM College of Pharmacy Hadley Award, 2015
- UNM.STC Innovation Fellow, 2013
- Who's Who in Tech. NM Business Weekly Award, 2010

Grants (Last 5 Years)

PI, NIAID R21, Pyrazinamide Breath Test for TB

MPI, NIH UH2/3, Autophagy-Based HDT for Tuberculosis

Select Publications (Last 10 Years)

AMPK, a Regulator of Metabolism and Autophagy, Is Activated by Lysosomal Damage via a Novel Galectin-Directed Ubiquitin Signal Transduction System J Jia et al. 2020 *Molecular Cell* 77 951-69

Isotope enhanced ambroxol for long lasting autophagy induction V Deretic **GS Timmins** 2020 US Patent # 10,583,099

Evidence based obviousness for use in patent prosecution and review. **Timmins GS.** *Nature Biotechnology* 2019 37 997-1000

Blood biomarker for early blood brain barrier disruption in ischemic stroke. KJ Liu et al. 2019 US Patent # 10,254,295

Potential for breath test diagnosis of urease positive pathogens in lung infections. Bishai WR, **Timmins GS.** *Journal of Breath Research* 2019 13 032002

Ambroxol induces autophagy and potentiates rifampin antimycobacterial activity. SW Choi et al. *Antimicrobial Agents and Chemotherapy* 2018, 62 (9) e01019-18

Magnetodynamic activation of 13C-acyl isoniazid and ethionamide. SW Choi, **GS Timmins** 2017 US Patent # 9,579,381

Pharmaceutical screen identifies novel target processes for activation of autophagy with a broad translational potential Chauhan et al. 2015 *Nature Communications* 6 8620

Immunological manifestations of autophagy. V Deretic et al. 2015. *Journal of Clinical Investigation* 125 75-84

Rapid in vivo detection of isoniazid-sensitive Mycobacterium tuberculosis by breath test SW Choi et al. 2014 *Nature Communications* 5 4989

Deuterated Drugs: Where are we now? **GS Timmins** 2014 Expert opinion on therapeutic patents 10 1067-75



A. Mary Vilay, PharmD

Associate Professor of Pharmacy Practice & Administrative Sciences

PharmD, University of Toronto, 2007
BSc Pharm, University of Alberta, 2000

Vilay is interested in studying drug pharmacokinetics and pharmacodynamics in patients with chronic kidney disease and acute kidney injury in order to optimize drug therapies, as well as kidney dialysis delivery.

Vilay's clinical and research expertise is nephrology. She has authored a number of papers specific to quantifying drug clearance during various modalities of dialysis and has experience in conducting both in vitro and clinical trials. Clinical studies that she has been involved with have resulted in dosing recommendations for ertapenem and daptomycin in critically ill patients undergoing continuous hemodialysis. More recently, she has become interested in strategies that will improve dialysis delivery to patients. She serves as a peer reviewer for a number of pharmacy and medical journals.

Honors & Awards

- UNM COP Teacher Appreciation Award, 2015
- American College of Clinical Pharmacy, Nephrology PRN Chair 2015-2016
- UNM COP Faculty Preceptor of the Year, 2013

Grants (Last 5 Years)

Standardized Patient Assessment of Communications in Pharmacy and Medical Students. PI: J. Nawarskas. Role: Co-Investigator. Sponsor: American Association of Colleges of Pharmacy, 6/2018 – 06/2019

Cardiovascular biomarkers in patients with chronic kidney disease: PI: A. Mary Vilay. Sponsor: University of New Mexico Health Science Center Clinical and Translational Science Center/Dialysis Clinic, Inc., 10/2016 – 09/2017

Select Publications (Last 10 Years)

Devraj R, Borrego ME, **Vilay AM**, Pailden J, Horowitz B. Awareness, self-management behaviors, health literacy and kidney function relationships in specialty practice. *World J Nephrol* 2018; 7: 41-50. PMID: 29359119

Yardman-Frank JM, Mercier, RC, Wong CS, **Vilay AM**. Iohexol transmembrane clearance during modeled continuous renal replacement therapy. *Blood Purif* 2015;39: 188-192. PMID: 25765443

Devraj R, Borrego M, **Vilay AM**, Gorden EJ, Pailden J, Horowitz B. Relationship between health literacy and kidney function. *Nephrology (Carlton)* 2015; 25: 360-7. PMID: 25661456

Kesner JM, Yardman-Frank JM, Mercier RC, Wong CS, Walker SE, Argyres DP, **Vilay AM**. Trimethoprim and sulfamethoxazole transmembrane clearance during modeled continuous renal replacement therapy. *Blood Purif* 2014; 38: 195-202. PMID: 25531772

Dilworth TJ, Leonard SA, **Vilay AM**, Mercier RC. Vancomycin and piperacillin-tazobactam against methicillin-resistant *Staphylococcus aureus* and vancomycin-intermediate *Staphylococcus aureus* in an in vitro pharmacokinetic/ pharmacodynamics model. *Clin Ther* 2014; 36: 1334-1344. PMID: 25066667

Eyler RF, **Vilay AM**, Heung M, Pleva M, Sowinski KM, DePestel DD, Sörgel F, Kinzig M, Mueller BA. Pharmacokinetics of ertapenem in critically ill patients receiving continuous venovenous hemodialysis or hemodiafiltration. *Antimicrob Agents Chemother* 2014; 58: 1320-1326. PMID: 24323468

Vilay AM, Wong CS, Schrader RM, Mercier RC, Seifert SA. Indicators for serious kidney complications associated with toxic exposures: an analysis of the National Poison Data System. *Clin Toxicol (Phila)* 2013; 51: 96-105. PMID 23331216

Vilay AM, Grio M, DePestel DD, Sowinski KM, Gao L, Heung M, Salama NN, Mueller BA. Daptomycin pharmacokinetics in critically ill patients receiving continuous venovenous hemodialysis. *Crit Care Med* 2011; 39: 19-25. PMID: 20890189



Guanghua Wan, PhD

Research Assistant Professor of Pharmaceutical Sciences

PhD, Biosphere Sciences, Hiroshima University, Japan, 2000

Wan is interested in studying the effect of environmental arsenic exposure on red blood cell formation and anemia.

Wan is a broadly trained scientist in molecular biology, biochemistry and cancer biology. She has excellent research experience in apoptosis, autophagy, cell migration and colorectal cancer metastasis. She is also very interested in the study on metal pollution caused health hazards and disease. Her current research focus on the molecular mechanisms of arsenic exposure-induced disorder of red blood cell formation.

Grants (Last 5 Years)

PI, COP RSC-funded "Arsenic exposure affects erythropoiesis via promoting an abnormal mitophagy"

PI, ACS IRG-funded "Developing QD-IHC to Predict Colorectal Cancer Metastases"

PI, SRIA (Surgery Research Investigator Award)-funded "Identification of alterations in PI3K binding proteins resulting from mutation in p110 α "

Select Publications (Last 10 Years)

Chowdhury, M. Ongchin, **G. Wan**, E. Sharratt, M. G. Brattain, A. Rajput (2013) Restoration of PTEN activity decreases metastases in an orthotopic model of colon cancer. *Journal of Surgical Oncology* 184: 755-760.

G. Wan, A. Mahajan, D. Lidke and A. Rajput. (2015) Bcl-2 together with PI3K p110 α regulate cell morphology and cell migration. *Cell Death & Disease*, 6: e2006; doi:10.1038/cddis.2015.345S.

G. Wan, C. Pehlke, R. Pepermans, J.L. Cannon, D. Lidke and A. Rajput (2015) The H1047R point mutation in p110 α changes the morphology of human colon HCT116 cancer cells. *Cell Death & Discovery*, 1: 15044; doi:10.1038/cddiscovery.2015.44

A. Greenbaum, A. Rajput, **G. Wan** (2016) Ron kinase isoforms demonstrate variable cell motility in normal cells. *Heliyon*, 2: Article e00153; <http://dx.doi.org/10.1016/j.heliyon.2016.e00153>

I. Murphy, **G. Wan**, S. Fu, Y. Liu, Y. Qiu, T. Ma, W. Laskey, H. Chand, L. Sklar and C. A. A. Hu (2020) ApoL6 Induces Dichotomous Cell Death Phenotype Involving Both Apoptosis and Necroptosis in Cancer Cells. *Clinical Oncology & Research*, 3: 6-9, <http://dx.doi.org/10.31487/j.COR.2020.07.12>



Krystal L. Ward, MA, MBA

Assistant Dean for Student Affairs
The University of New Mexico College of Pharmacy

MA, Educational Psychology, The University of New Mexico, 2013
MBA, Human Resources, University of Phoenix, 2005
BS, Biology, The University of New Mexico, 2001

My research interests include understanding student motivation in advanced degree programs, including goal orientations, mindsets and regulation of learning. In addition, my research interest involves understanding recruitment, admissions, and progression of diverse student populations within a doctor of pharmacy curriculum. Recent work has focused on student motivation and self-awareness options for pharmacy education.

Relevant Publications (Last 10 Years)

McCutchen, K. L., Jones, M. H., Carbonneau, K. J., & Mueller, C. E. (2015). Mindset and Standardized Testing over Time. *Learning and Individual Differences*, 45, 208-213.

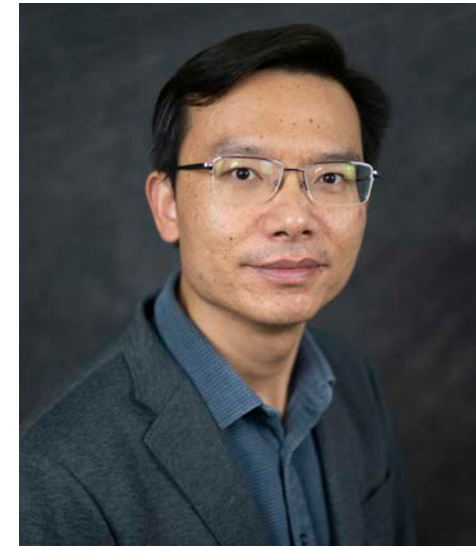
Jones, M. H., Mueller, C. E., & **McCutchen, K. L.** (2017). School Foci and Their Potential Ramifications in Urban High Schools. *Youth and Society*.

Armstrong, J., & **Ward, K. L.** (2020). Applying Visual Research Methods in Pharmacy Education. *American Journal of Pharmaceutical Education*, 84(1).

Dominguez-Salazar, K., & **Ward, K. L.** (2020). Response to Impact of Students' Strengths, Critical Thinking Skills and Disposition on Academic Success in the First Year of a PharmD Program. *American Journal of Pharmaceutical Education*, 84(2).

Service

- Secretary of Knowledge Management, AACP Administrative Services Section (2018-2020)
- Programming Committee, AACP Student Services Personnel Special Interest Group (2019-2020)
- PharmCAS advisory committee, AACP (2020-current)



Yirong Yang, PhD

Research Assistant Professor, Department of Pharmaceutical Sciences
Imaging Scientist, Preclinical Imaging Core, Brain and Behavioral Health Institute

PhD, Bioengineering, University of Illinois at Chicago, 2007
MS, Electrical Engineering, Zhejiang University, 2003
BS, Electrical Engineering, Zhejiang University, 2000

Yang is interested in magnetic resonance imaging, PET imaging, biomedical image analysis and processing with application to biological and pharmacological research.

Yang has an inter-disciplinary training in biomedical engineering, solid technical expertise in bioinstrumentation and broad research experience in biomedical imaging. He maintains and develops the UNM preclinical imaging core, which is the hub for advancing MRI and molecular MR/PET imaging in biological and pharmacological research and improve multidisciplinary and collaborative research projects. He finished two postdoctoral fellowships concentrating on MR Imaging and MR Image Analysis at Northwestern University and the Henry M. Jackson Foundation.. He has more than 10 years of experience working with the Bruker Preclinical MRI system and has a very strong background in MRI pulse sequences and protocol optimization. He is also very adept at MRI post-processing and data analysis. He has been a key contributor in charge of MRI in several research projects funded by NIH or other agencies.

Honors & Awards

- Provost Graduate Research Award, The University of Illinois at Chicago, 2005
- Distinguished Service Award, International Society for Magnetic Resonance in Medicine, 2015

Grants (Last 5 Years)

Co-PI, COP pilot program, "Blood occludin as a biomarker for cerebral ischemia induced hemorrhage"

Co-I, NINDS R01, In Vivo Inhibition of Specific Micrnas to Support Post-stroke Revascularization

Co-I, NIGMS P30, Integrative Program in CNS Pathophysiology Research

Select Publications (Last 10 Years)

Yang Y, Yang LY, Orban L, Cuylear D, Thompson J, Simon B, Yang Y. Non-invasive vagus nerve stimulation reduces blood-brain barrier disruption in a rat model of ischemic stroke. *Brain Stimul.* 2018 Jul-Aug;11(4):689-698.

Yang Y, Salayandia VM, Thompson JF, Yang LY, Estrada EY, Yang Y. Attenuation of acute stroke injury in rat brain by minocycline promotes blood-brain barrier remodeling and alternative microglia/macrophage activation during recovery. *J Neuroinflammation.* 2015 Feb 10;12(1):26.

Pena-Philippides JC, **Yang Y**, Bragina O, Hagberg S, Nemoto E, Roitbak T. Effect of pulsed electromagnetic field (PEMF) on infarct size and inflammation after cerebral ischemia in mice. *Transl Stroke Res.* 2014 Aug;5(4):491-500.



Xixi Zhou, PhD

Research Assistant Professor

PhD, Biophysics, Institute of Biophysics, Chinese Academy of Sciences, 2009

BS, Chemistry, Beijing University, 2003

Zhou is interested in the molecular mechanism of arsenite-induced toxicology and carcinogenesis, mass spectrometry analysis for metal-protein interactions and mutational processes of environmental exposures.

Zhou is an expert in protein mass spectrometry and metal carcinogenesis, working with Drs. Jim Liu, Laurie Hudson and Scott Burchiel in molecular mechanism research of arsenic toxicity and carcinogenesis. Utilizing various methods including peptide/protein mass spectrometry, specific protein redox modification analysis in cells, he performed research to assess arsenic binding selectivity to zinc finger proteins, worked on reactive oxygen/nitrogen species and revealed oxidation/nitrosation-related mechanism of arsenic inhibition of DNA repair in co-carcinogenesis of arsenic. Recent work suggests that selective arsenic binding leads to selective oxidation on zinc finger proteins, which not only reveals a new mechanism of targeted protein oxidation where arsenic binding defines which zinc finger proteins will be sensitive to oxidation by As-generated ROS, but also provides an example of how an environmental insult like arsenic may alter protein oxidation profiles and disrupt redox sensitive proteins in an important physiological process such as DNA repair.

Grants

Project PI, NIGMS P20, University of New Mexico Center for Metals in Biology and Medicine, "Mutagenesis and Carcinogenesis of Particulate Arsenic in Lung"

Co-I, NIEHS R01, "Mutational Signatures of a Combined Environmental Exposure: Arsenic and Ultraviolet Radiation"

Co-I, NIH R01, "Arsenic, GATA-1, and Hematotoxicity"

Select Publications (Last 10 Years)

X. Zhou, X. Sun, KL. Cooper, F. Wang, KJ. Liu & LG. Hudson, "Arsenite interacts selectively with zinc finger proteins containing C3H1 or C4 motifs." *J. Biol. Chem.* 286, 22855-22863 (2011).

F. Wang, **X. Zhou**, W. Liu, X. Sun, C. Chen, LG. Hudson & KJ. Liu "Arsenite-induced ROS/RNS generation causes zinc loss and inhibits the activity of poly(ADP-ribose) polymerase-1." *Free Radic. Biol. Med.* 61, 249-256 (2013). (Equally Contributed)

X. Sun, **X. Zhou**, L. Du, W. Liu, Y. Liu, LG. Hudson & KJ. Liu "Arsenite binding-induced zinc loss from PARP-1 is equivalent to zinc deficiency in reducing PARP-1 activity, leading to inhibition of DNA repair." *Toxicol. Appl. Pharmacol.* 274(2), 313-318 (2014)

X. Zhou, X. Sun, C. Mobarak, AJ. Gandolfi, SW. Burchiel, LG. Hudson & KJ. Liu "Differential binding of monomethylarsonous acid compared to arsenite and arsenic trioxide with zinc finger peptides and proteins." *Chem. Res. Toxicol.* 27(4), 690-698 (2014)

X. Zhou, SW. Burchiel, LG. Hudson & KJ. Liu "Conference Summary and Recent Advances: the 8th Conference on Metal Toxicity and Carcinogenesis" *Biol. Trace Elem. Res.* 166(1), 1-6 (2015)

X. Zhou, KL. Cooper, X. Sun, KJ. Liu & LG. Hudson "Selective Sensitization of Zinc Finger Protein Oxidation by ROS Through Arsenic Binding" *J. Biol. Chem.* M115. 663906 (2015).



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