

GOLD PAN

ALUMNI MAGAZINE • WINTER 2024

Water Research at
New Mexico Tech

FISCAL YEAR 2023

OFFICE FOR ADVANCEMENT & NEW MEXICO TECH FOUNDATION

Total Donations July 1, 2022 – June 30, 2023

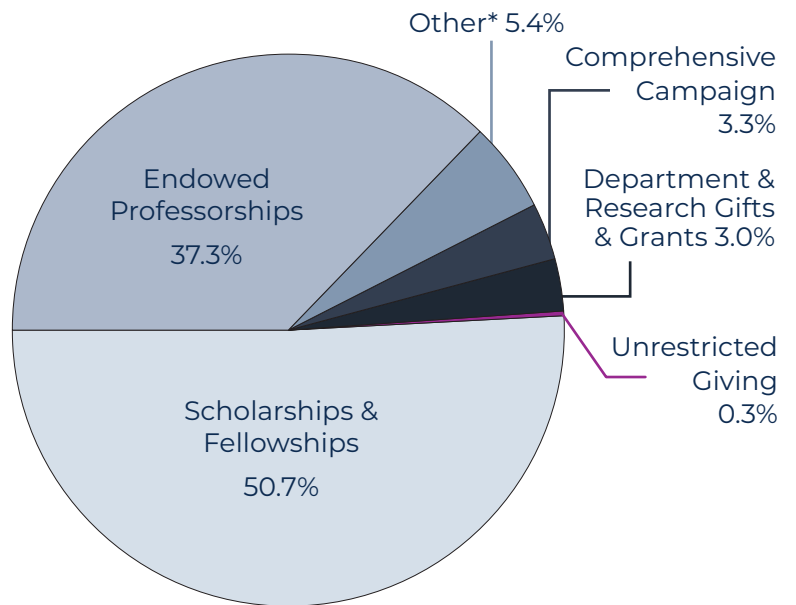
\$13,777,039.68

- **Institutional Endowment Awards**
\$3,680,133
- **Federal, State, and External Awards**
\$2,489,558
- **Undergraduate Support**

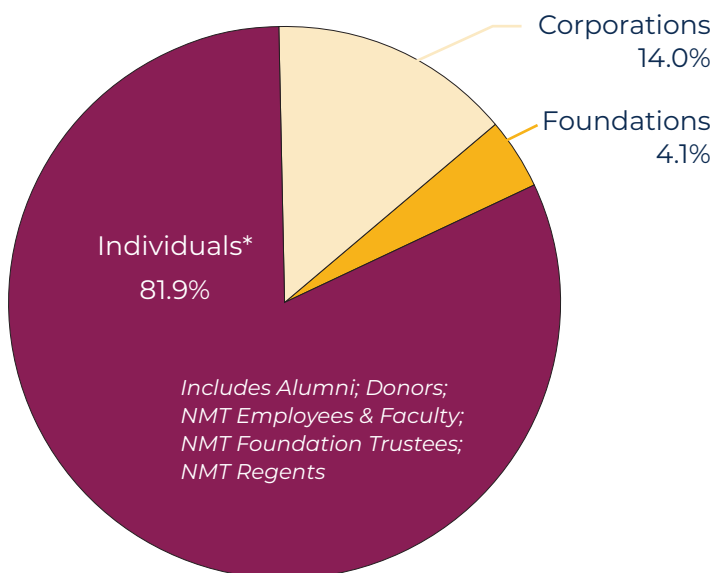
Number of undergraduates	1,094
Number awarded aid	544
Subset who graduated in 2023	234
2023 graduates who borrowed	97
Average amount borrowed	\$21,112

FY 2023 Donation Categories

*Other includes Administrative Fees, Capitol Fundraising, Internal Support, Outreach, PAS, Student Clubs, and Student Support



FY 2023 Donation Sources



NMT Cost (Tuition & Fees)

Academic Year 2022–2023
Fulltime, per academic year

Undergraduate	
Resident	\$9,228
Non-resident	\$26,482
Graduate	
Resident	\$9,548
Non-resident	\$28,022

Scholarship funds used for tuition, fees, and course materials (required textbooks, supplies and equipment) are tax-free.

Scholarship funds applied to living expenses (e.g., room and board) are taxable.

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Back Cover Photo: Winter in
Bursum Springs
Photo credit: Matt Zimmerer

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22. Climate Change in New Mexico Over
the Next 50 Years: Impacts on
Water Resources

24. Water Leader Workshops
Data Initiative

25. N⁴WPP Water Symposium
Groundwater Monitoring

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30. In Memoriam

33. Rugby

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ALUMNA & DONOR SPOTLIGHT

By Jay Ann Cox

Hydrologist Launched a Career at NMT and Now Gives Back



Peggy Barroll on Mauna Kea during the 2023 NMT Alumni Volcanoes of Hawaii Tour



Peggy Barroll Backpacking



Hans Hartse and Peggy Barroll on the NMT Winter Yellowstone Alumni Tour, 2023

When Margaret “Peggy” Barroll was shopping for graduate programs, she looked long and hard at schools with support for teaching or research assistants. Additionally, having spent many years back east, she knew she wanted to be in the Southwest to do geoscience or geophysics. In this area, after all, “you can actually see the rocks,” she said with a smile.

Back east, geology professors take their students out where the road works have carved into the geologic features, “and there you can see an anticline, for example.” The Southwest held much better promise for Peggy’s interests.

When she arrived at New Mexico Tech in 1982, the geophysics department was headed by Dr. Allan Sanford, who arranged support for Peggy as a teaching assistant in introductory physics labs. Later, she worked with Dr. Marshall Reiter at the NM Bureau of Geology and Mineral Resources as a research assistant. Reiter studied heat flow, and Peggy developed a keen interest in how water pushes the heat around under the surface.

For her degree program, she took many hydrology classes and emerged from Tech as a hydrologist (M.S. 1985 and Ph.D. 1990). Most of her career has been doing data analysis and computer modeling of groundwater and water resources.

Initially Peggy went to work for Dan Stephens and Associates, a hydrology company started by Dan Stephens, a Tech professor who employed many Tech students over the years. At that time her work centered on modeling groundwater contamination and the question, “Where is it [the contamination] going to go and how fast will it get there?”

Next Peggy went to work at the New Mexico Office of the State Engineer on water resource problems. What will happen “if people pump this much water from wells, how fast are the groundwater levels going to go down, and how much water is going to be pulled out of the river?”

These findings are important to several different groups—irrigation districts, farmers, developers, and environmentalists. Much more than science goes into these complex issues.

Peggy said, “It’s fascinating because there’s the scientific part, always an historical part, and then there’s the legal part.”

The background and research is “a mixture of very interesting stuff, and people who are fighting about water are very passionate about it.”

When it comes to water wars, she researches files as far back as 100 years, often finding that water users were fighting about the same issues back then.



Hole-in-wall

It's something, Peggy says, that people who haven't been in the desert for very long have a hard time comprehending. She recalled a time when she was giving a field presentation at a conference in Albuquerque.

"There were people there that had just flown in from Michigan. We are next to the Rio Grande, and I'm trying to explain to them that the water in that river there is all that most of the population in New Mexico has. They can pump water out of the ground but it ends up coming from that stream." Peggy adds, "I don't think they got it. I think that it's hard to imagine living in Michigan or Minnesota... where water falls from the sky."

One of the biggest New Mexico water issues in recent years is the Lower Rio Grande and the water held in the Elephant Butte Reservoir - how that water is used and how that water is distributed between New Mexico and Texas.

Farmers in both states use water from Elephant Butte, and also pump groundwater to supply their crops. The same water must also supply growing municipalities such as Las Cruces and El Paso.

"Texas had complained for years that New Mexico water users were pumping too much water from wells, and that not enough water was getting to Texas."

"It has been a controversial issue for years, and in 2013, Texas filed suit, arguing that New Mexico was in violation of the interstate Rio Grande Compact. I've been working on that case on behalf of New Mexico."



Sanders Lake



River Camp

Because the lawsuit involves a dispute between states, it is handled by the U.S. Supreme Court.

At press time, Texas, New Mexico and Colorado had arrived at a settlement, but the federal government is objecting to it.

"It's still in court, and we are probably going to argue in front of the U.S. Supreme Court this winter or next spring.... It's interesting and I got lucky (to be able to work on a Supreme Court lawsuit) with really great people."

Peggy is a donor to New Mexico Tech for one simple reason – she was helped when she started.

"It's a good school with great professors, and it's a relatively inexpensive place to get a degree... and I want to help other people."

Peggy's donations support the Stephen Wells Bright Star Scholar Program at the Bureau of Geology & Mineral Resources. Through this scholarship, undergraduates can apply for a paid internship and be mentored by one of the research scientists.

"New Mexico Tech has produced a lot of great geologists and hydrologists over the years.... I want to give back (so) other students studying geoscience can work on these problems."

Peggy is semi-retired but continues to work on the Rio Grande litigation. She and her husband Hans Hartse, a Tech alum now retired from LANL, live in Santa Fe, New Mexico.

SCHOLARSHIP SPOTLIGHT - LAURA LEYBA-NEWTON MEMORIAL AWARD



Laura Leyba-Newton

Dr. Frank Reinow and Dr. Haoying Wang of NMT's Management Department have established the Laura Leyba-Newton Memorial Award in honor of their student Laura who unexpectedly passed away in 2020 before she was able to complete her degree in Engineering Management.

The \$500 award is given each year at graduation to the most outstanding graduate student in the engineering management programs. Recipients are chosen based on their excellence in the program but also based on the passion they bring to their work and their demonstrated commitment to leadership and mentorship - characteristics that embody who Laura was and the impact she had on her advisors, colleagues, and classmates.

An accomplished electrical engineer, Laura worked at Hach Inc., the National Radio Astronomy Observatory (NRAO), NEON Inc., and eventually found herself back in Socorro through an opportunity to serve as a Deputy Division Head at the NRAO. Laura began pursuing her Master's degree in Engineering Management at NMT in 2018 while working at the NEON and continued the program when she joined the NRAO in 2019.

Dr. Reinow and Dr. Wang, Laura's advisors, were impressed by the dedication, thoroughness, and the care Laura brought to her coursework and the final project that focused on improving the efficiency of engineering systems and decision making at the NRAO. Dr. Reinow described Laura as more of a colleague than a student.



Laura at the ALMA radio telescope in Chile

"Laura's questions often went beyond clarification of concepts and theories, but more intense discussion of implications and consequences of managerial decisions with the aim of understanding their application. Laura was the definition of an autonomous learner, often going beyond course requirements to really 'get it.'"

Dr. Wang will miss Laura's infectious positivity, "I often ran into Laura on campus, she always had a smiling face even from a distance away."

While her time on this earth was short, it was full. Laura had a magnetic personality and exuded love and inspiration. Some of her personal interests were cooking, reading, and running. Everyone loved and looked forward to her cooking and dinner parties. She thrived on the accomplishments of others and was an extraordinary leader and mentor. Her dedication to serving others was only exceeded by her service to God and her family.

While only at New Mexico Tech a few years, Laura certainly left her mark and is dearly missed by both the NMT and NRAO communities. Meanwhile, the faculty, staff, students, and friends of New Mexico Tech are inspired to carry forward what Laura did not finish through this award.

To make a gift in honor or memory of Laura, please call 575-835-5352 or visit <https://advancement.nmt.edu/-nmt-foundation-giving-page> and select "Laura Leyba-Newton Memorial Scholarship." You can also make a gift by check payable to "New Mexico Tech Foundation" with "Laura Leyba-Newton Award" in the memo line. Mail to 801 Leroy Place, Socorro, NM 87801.



2023 Alumni Awards Presented During 49ers Festivities

The NMT Office for Advancement presents four special awards every year during 49ers Homecoming Weekend.

Techie of the Year is presented to an alum who has demonstrated service and loyalty to New Mexico Tech over many years.



Johann Lindig

(B.S. 1984 Petroleum Engineering; B.S. 1986 Technical Communication) has more than 30 years of experience as a consultant working within higher education and in the private sector to align programs and product development strategies to increase organizational capabilities. A longtime generous donor to New Mexico Tech,

she is also a founding member of the Women's Center Advisory Group, which is working to establish a Women's Center and a Diversity Center on the New Mexico Tech campus which will show Tech's commitment to foster equality across all genders, backgrounds, and ethnicities.

NMT Faculty-Alumni Ambassador honors a faculty member who has made outstanding contributions to the mission of the university through alumni relations, active research, educational innovation, and service to New Mexico Tech, Socorro, and the state of New Mexico.



Curtis O'Malley

joined the NMT faculty as an adjunct professor in 2013 and as a fulltime Assistant Professor in 2016. He holds a Ph.D. in Civil Engineering from Georgia Tech. He is already an award-winning STEM educator, receiving recognition for his numerous teaching, mentoring, and service achievements from the Air Force Research Lab, New Mexico

Tech Distinguished Service Award, NMT SGA Faculty Appreciation Award, BBBS STEM awards, and Insight into Diversity Magazine. He directs numerous K-12 initiatives including the Robotic STEM Outreach Program, which has impacted students and teachers at schools from every corner of the state, and it continues to grow. The program is expected to grow from 30 schools in 2022 to supporting 50 mostly rural and Title 1 schools across NM in 2023-2024. He mentors on average 100 college students a year and trains and employs more than 20 undergraduate and graduate students as he involves them in mentoring roles for K-12 outreach programs.

Rising Star is presented to an alum who graduated within the last ten years, is excelling in their profession, and is an emerging leader in their field.



Mackenzie Best

(M.S. Geochemistry, 2020) is currently pursuing a Ph.D. in Geobiology at NMT. Her research focuses on astrobiological and biotechnological applications of extreme acid-adapted microorganisms, with a focus on their potential to leach metals from electronic waste. She has worked as an ore control geologist at a high-altitude

copper mine in Espinar, Peru, an exploration geologist at the Mumi copper and cobalt mine in Kolwezi, DRC, and was the geology consultant on a project using open-access imagery to estimate uranium production at mines in East Asia. She has served as Student Trustee on the New Mexico Tech Foundation Board since 2022.

Philanthropist of the Year recognizes an alum for their longtime distinguished philanthropic contributions to support New Mexico Tech.



M. Pat Miller

(B.S. Petroleum Engineering, 1961) worked for six years as a Drilling Engineer for two drilling contractors in the United States and Mozambique after graduating from NMT. In 1967 he went to work with Texaco where he remained until his retirement in 1994. Most of his career with Texaco involved drilling, either managing projects or

supporting and helping supervise the personnel running projects. His major interest outside work has always been investing. After helping to start a very successful investment club in 1991, he became involved with the National Association of Investors (NAIC). At NMT he established the C&E Miller Scholarship (in honor of his parents) and the M. Pat Miller Investment Club fund, which supports the NMT Student Investment Club. He served a term as a NMT Foundation Board Trustee and has been an extremely generous supporter of NMT and its students for years.

Alumni Receptions and Events 2024

March

- 11 - Boulder, CO
- 12 - Denver, CO
- 13 - Colorado Springs, CO
- 23 - London, UK

April

- 8 - Dallas, TX (Solar Eclipse)
- 18 - Los Alamos, NM

May

- 10 - Commencement Eve, Socorro, NM
- 15 - Houston, TX
- 16 - Las Cruces, NM
- 17 - Silver City, NM

June

- 2 - Isotopes Albuquerque, NM
- 20 - Reno, NV
- 22 - Elko, NV
- 29 - Picnic Albuquerque, NM

July

- 18 - Rio Rancho, NM
- 19-21 - Rafting on the Chama, NM
- TBA Seattle, WA
- July 31 - August 9 Iceland

August - TBA

- Huntington Beach, CA
- San Francisco, CA
- San Jose, CA
- Palisade, CO
- Washington, D.C.
- Farmington, NM

September

- 5 - Ridgecrest, CA
- 12-13 - The Dan López
President's Golf Tournament
- 23 - SPE/New Orleans, LA
- 26 - Midland, TX

October - TBA

- Boise, ID
- 16-20 - 49ers Socorro, NM

November - TBA

- Austin, TX
- San Antonio, TX

December - TBA

- Christmas on the Pecos, NM



Total Solar Eclipse PARTY

Join NMT's Office for Advancement & Alumni Relations for a total solar eclipse viewing party
Hosted by NMT Alum John Crum Class of 1975

Eclipse glasses & lunch will be provided.
Dr. Van Romero VP For Special Research, Physicists, and Alum Class of 1977/1979 to talk about how eclipses happen

Golf Outing Sunday, April 7, 2024 with John Crum

Fundraising Games: \$5 Entry Fee Winner picks where the money is donated.
(NMT or Holly Lake Fire Department) (Corn Hole, Kayak Race, Poker, Shuffle Board, Horseshoes)

Lake Access—Want to Fish? Bring your poles!

872 Clear Water Trail
Holly Lake Ranch, TX 75765-7318

For more information contact
sandi.lucero@nmt.edu or
575-835-5618

APRIL

8

2024

10

O'CLOCK AM

Save The Date

Launching Tech to New Heights

A Fundraising

Gala

March 29

2025

Sandia Resort & Casino Albuquerque, NM

For more information contact
rhiannon.ross@nmt.edu or 575-835-5860

© Colleen Gino / Dylan Escam
A Perseid meteor passing through the Milky Way as seen from Box Canyon outside of Socorro, New Mexico.

2023 PRESIDENT'S GOLF TOURNAMENT

Citing his energy, enthusiasm, and outstanding leadership as a goodwill ambassador for the university, the New Mexico Tech Board of Regents voted unanimously October 9, 2023, to permanently rename the annual President's Golf Tournament (PGT) in honor of Interim President Daniel H. López.

López founded the PGT while serving as NMT President from 1993 to 2016. After stepping in as interim president last spring, he recently oversaw the most successful NMT golf tournament ever. The 2023 event hosted 420 players and raised almost \$350,000. Proceeds support the President's Tuition Assistance fund, which provides critical financial support to NMT students nearing the completion of their degrees.

The 31st annual NMT golf tournament, now renamed The Daniel H. López President's Golf Tournament, is scheduled for September 12 and 13, 2024.



October 16-20, 2024

For more information contact
rhiannon.ross@nmt.edu or 575-835-5860

The Dr. Daniel H. López President's

GOLF TOURNAMENT

SEPTEMBER 12-13
2024

President Mayhar Amouzegar
along with

The Office of Advancement & Alumni Relations
cordially invite you to a Graduation and Alumni
Reception in recognition of the class of

2024

New Mexico Bureau of Geology and
Mineral Resources
801 Leroy Place
Socorro, NM 87801

Friday, May 10, 2024
4:00 pm – 6:00 pm

For more information contact
rhiannon.ross@nmt.edu or 575-835-5860

Albuquerque Picnic Potluck

June 29, 2024

Kiwanis Reservation Area
Elena Gallegos Picnic Area
7100 Tramway Blvd NE
Albuquerque, NM

For more information contact
rhiannon.ross@nmt.edu
or 575-835-5860

Food
Rudy's BBQ - Tea
& Lemonade

Alumni
Please bring salad,
vegetable or
dessert to share
BYOB

Games
Volleyball,
Horseshoes, Hiking,
Kid's Games

WATER RESEARCH AT NEW MEXICO TECH

By Michael Doyle, Vice President of Research



In the heart of New Mexico, a hub of scientific innovation thrives at New Mexico Tech, where a dedicated community of researchers and students are shaping the future of hydrology. This special edition takes you on a journey from NMT's rich history in hydrology to the current groundbreaking initiatives in water science that are being pioneered at this remarkable institution.

This issue is not just a showcase of research achievements but a narrative of human determination and innovation in tackling global water challenges. Through these stories, we aim to enlighten, inspire, and spark a conversation about water's vital role in our lives and the innovative solutions needed to preserve and enhance this essential resource. Join us on this enlightening journey through the corridors of hydrological research at New Mexico Tech, where each discovery is a stride towards a more sustainable and water-secure future.



Iceland Alumni Tour 2024 July 31 – August 9

Scan to go to our website
For more information contact
sandi.lucero@nmt.edu
or 575-835-5618



Hotel: Center Hotel

- **Thursday Aug 1**, Reykjanes Tour
- **Friday Aug 2**, Thrihnukagigur Volcano/ Whale Watching
- **Saturday Aug 3**, Hekla-Landmannalaugar Tour
- **Sunday Aug 4**, Golden Circle Tour
- **Monday Aug 5**, Vik Tour
- **Tuesday Aug 6**, Free Day
- **Wednesday Aug 7**, Snaefellsnes Tour & Travel Day
- **Thursday Aug 8**, Boat Trip to Flatey
- **Friday Aug 9**, Departure Day

Estimated Cost for Guests:

\$6,500 per person for single Occupancy (\$6,500 total)
\$5,500 per person for Double Occupancy (\$11,000 total)

What's Included:

- Lodging
- Daily Breakfast
- 3 Dinners
- 1 Social Hour
- 4 Lunches
- 4 Professional Hosts & 2 Trip Hosts
- All Entry Fees to planned activities
- Daily Snacks
- Transportation to all planned destinations

Airfare not Included



Led by: Dr. Alex Gysi, Dr. Nicole Hurtig,
Dr. Nelia Dunbar (Class of 1986 & 1989) &
Dr. William McIntosh (Class of 1990)

Deadline to book May 31, 2024

HISTORY OF HYDROLOGY AT NMT

by Katie Bauer



Mahdi Hantush



E.J. Workman



C.E. Jacobs

Scientists in New Mexico Tech's Hydrology Program study rivers, streams, aquifers, hidden freshwater near coastal communities and subsurface energy systems, such as carbon capture and underground storage, in search of answers to questions about water quality, quantity, movement and more. Throughout its 67-year history, the Hydrology Program's students and researchers have made countless contributions to scientific efforts from contaminant transport to mitigating climate change, according to Director Dan Cadol, Ph.D., associate professor in the Earth and Environmental Science (E&ES) Department.

The NMT Hydrology Program launched in the mid-1950s with a focus on groundwater hydrology. Then NMT President E.J. Workman hired Iraqi hydrologist Dr. Mahdi Hantush to teach and establish a program at Tech. Dr. Hantush was famous in groundwater hydrology for developing equations to describe the pumping of a well and the effects of well pumping on surrounding aquifers.

Dr. Cadol said President Workman knew groundwater would be an important area of study for New Mexico.

"Workman somehow could sense the way the winds were blowing," Dr. Cadol said.

During his tenure as director, Dr. Hantush attracted many noted faculty members and

students. He served as advisor to Raul Deju, who earned his doctorate in hydrology at NMT and later founded the Hantush-Deju National Hydrologic Innovation Center in September 2022 in honor of his mentor.

Another key figure in the Hydrology Program's early history is Charles E. (C.E.) Jacobs, also well known for his groundwater equations. As one of the few hydrology programs in the country at the time, NMT's program produced many Ph.D. students who started hydrology programs at other universities across the country.

As the Hydrology Program grew, it was folded in with the Geology Department and the Geophysics Department and became the Department of Geosciences under Director Lynn Gelhar, who pioneered groundwater studies focused on preferential flow paths through the subsurface. His tenure included a focus on contaminant transport at a time when the Clean Water Act called for protection and treatment of groundwater, according to Dr. Cadol.

A period of interest and growth in hydrology in the mid-1970s led to increasing demand for research. Key leaders hired during that era included Dr. Dan Stephens, who later left academia to start his own consulting firm, Dr. Allan Gutjahr, a math professor who also worked in hydrology, Dr. Fred Phillips, and Dr. John Wilson. Dr. Cadol said he's

HISTORY OF HYDROLOGY AT NMT



Fred Phillips

heard from Dr. Phillips and Dr. Wilson that it was an exciting time for the Hydrology Program.

“At the peak those guys were advising 10 to 12 students at a time – grad students and master’s students,” he said. “I can’t imagine advising that many students or funding that many students. A lot of our alums are from the late 1980s, early 1990s era. They come back frequently – I hear stories about their time here.”

In the early to mid-1990s the program diversified beyond groundwater, Dr. Cadol said.

“A lot of the NSF (National Science Foundation) hydrology money was starting to go towards other directions – more related to surface water, interactions with the atmosphere, climate change was coming on the scene then, and so that was really the point where the Hydrology Program diversified to include surface water as well as groundwater,” he said.

Today’s Hydrology Program is a unit within the E&ES Department. Five faculty members focus on different areas of hydrology: two on groundwater, one on surface water, one on hydrometeorology, and one on contaminant hydrology, which involves both surface water and groundwater.



John Wilson

Many environmental science undergraduates minor in hydrology because they choose a specialty option – biology, chemistry, geology or hydrology. Most of the students studying hydrology are studying for their master’s degree. The program also offers a professional master’s in hydrology that doesn’t require a thesis but is earned with class credits, both on campus and via distance learning. Most are working professionals seeking either a 15-credit certificate or a 30-credit professional master’s degree.

“We have a lot of students from all over the country that are taking our classes online,” Dr. Cadol said. “People wanting to change careers. Folks wanting to advance within their careers.” Dr. Cadol said Hydrology Program graduates usually take three main career paths:

1. Private consulting. Many become environmental consultants in New Mexico and across the country.
2. Federal or state government. Many work for the U.S. Geological Survey at their water science centers in nearly every state.
3. Academia. Students work toward earning a Ph.D. and going into teaching and research.

HISTORY OF HYDROLOGY AT NMT

“Almost all of our students are on research assistantships and so we’re always trying to find little pots of money that can fund a graduate student,” Dr. Cadol said.

Some of the current research initiatives in the Hydrology Program include:

- Flash floods and sediment transport - In collaboration with the U.S. Bureau of Reclamation, Dr. Cadol studies flash floods, both the sediment transported during flash floods as well as the water itself. He primarily studies the Middle Rio Grande to assist the Bureau with managing the river and its resources, setting up models that measure and estimate sediment delivery to the river. This work ensures that the channel is not getting clogged up with sediment. Sometimes the Bureau of Reclamation has to dredge sections of the river where sediment plugs develop.
- Geologic sequestration of CO₂ - Assistant Professor Alex Rinehart works with the Petroleum Recovery Research Center (PRRC) on carbon sequestration projects. He helps them understand the underground reservoirs that they’re trying to inject the carbon dioxide into for storage. His knowledge of how any fluids flow

through a porous medium – such as an aquifer - helps explain how the CO₂ will flow through these rocks. His experiments use cores from the reservoirs to see how the acidic water may dissolve the rocks or affect their strength.

- Offshore freshwater - During the last Ice Age when sea levels were lower, a lot of the coastal plains were exposed. Because it was a glacial, fairly wet environment, a lot of water seeped in, storing freshwater in the aquifers. As sea levels rose again, that freshwater remained “hidden” offshore. Professor Mark Person has been working on a research project modeling how that happened and likely freshwater resource locations. One location is in Bangladesh, where the Bengal Delta advanced quickly and some of that land is so new that drilling has uncovered salt water underneath. The International Ocean Drilling Program (IODP) approved a proposal from Professor Person and his research colleagues to drill offshore near Massachusetts off Martha’s Vineyard in summer 2024. They have modeled that freshwater deposits should exist in that area. The scientists will work from a drilling rig ship set up to do scientific studies to collect data about offshore freshwater.



Mark Person



Alex Rinehart



Dan Cadol

HANTUSH-DEJU NATIONAL CENTER FOR HYDROLOGIC INNOVATION

By Kathryn Bauer



Raul Deju

Preparing to build a center of excellence for water resource and water management related research, New Mexico Tech launched the Hantush-Deju National Center for Hydrologic Innovation on September 23, 2022. In the months since the center's kickoff, it has continued to evolve, acquiring staff, a website, advisory committee members, and initial funding. The center's next steps will be determined by the outcome of a national search for a director to lead the organization and oversee its development.

Dan Stephens, Ph.D., accepted the challenge of getting the hydrology center off the ground in April 2021, and he has worked as Interim Director to keep it moving forward, toward the vision outlined by a small group he convened that summer to brainstorm ideas on the center's future. The results of that group's discussion turned out to be a roadmap for the center's direction.

"A lot of thought was put into what this center will look like," Dr. Stephens said. When a director is hired, he looks forward to "passing the baton and having someone implement it and grow it from there. I want to see the center succeed."



Dan Stephens

Dr. Stephens, a retired NMT professor, former chair of the Geoscience Department and founder of an environmental and water resources consulting firm that had its start on campus in the 1980s, applied his business expertise to developing the new hydrology center.

"Even though I hadn't been there for a while I understood well enough how Tech works to apply my business knowledge and experience mostly to getting this program – more or less a research academic program – off the ground," he said. "I enjoy helping out New Mexico Tech."

The hydrology center, named for NMT alumnus Dr. Raul Deju and for the late internationally renowned hydrologist Dr. Mahdi Hantush, was envisioned as a research organization working to develop innovative tools and answer fundamental questions pertaining to hydrology, of relevance not only to New Mexico but throughout the world. Dr. Stephens said collaboration will be key to the center's growth and success, with opportunities both on and off campus, working with other research universities, private industry, and with the state's national laboratories.

HANTUSH-DEJU NATIONAL CENTER FOR HYDROLOGIC INNOVATION



Alex Rinehart, Hydrogeodesy focus area

Since the center’s official launch, the search for a permanent director has been its foremost activity. A search committee developed objectives for the recruitment effort and defined the attributes the members most wanted to see in the center’s leader.

In addition to the interim director, the hydrology center has acquired administrative assistance from the Earth and Environmental Science (E&ES) Department, a research assistant, and two initial researchers:

- Alex Rinehart, Ph.D., assistant professor in E&ES. Dr. Rinehart’s specialty is hydrogeodesy, which has to do with how measurements of the changes in the Earth’s surface – very minute changes – are affected by water movement in the subsurface.
- Enrico Zorzetto, Ph.D., who is coming to NMT starting in spring semester 2024 from working as a postdoctoral researcher at Princeton University. His area of expertise, rainfall and snowpack modeling, will inform the hydrology center’s second major focus area, hydrometeorology. He will work part time in the center and part-time in the E&ES Hydrology Program.

Dr. Stephens said both Rinehart’s and Zorzetto’s research interests are shaping the hydrology center’s initial areas of focus. “Hydrogeodesy – it’s a new field,” he said. “About how water moves, how



Enrico Zorzetto, Hydrometeorology focus area

much water is stored, how much is depleted from storage, and when that water is huge – the mass of water amount of water in an aquifer is huge – when you deplete it, you’re taking some of the load off the surface of the Earth.”

Dr. Zorzetto’s focus on rainfall and snowpack modeling “will be a real asset to the center in terms of climate focus,” Dr. Stephens said. “Because rainfall and snowpack in the mountains here are crucial to the watershed of the Rio Grande.”

Dr. Stephens said that as the center grows more staff may be added to these areas of focus or the new center director may create another or more focus groups.

“They’re going to have a research mission themselves and they will be the chief spokesperson for the center – to communicate all the information through various means,” he said.

One of the key ways to communicate so far has been the hydrology center’s website, launched in late 2022: <https://www.nmt.edu/research/deju/>. The website includes information about the center’s namesakes, history of the Hydrology Program at NMT, and recollections from some of the first hydrology graduates in the late 1950s and early 1960s – Raul Deju, Stavros Papadopolous, Dennis Williams, and John Halepaska.

HANTUSH-DEJU NATIONAL CENTER FOR HYDROLOGIC INNOVATION



A graduate student maintaining a GPS station monitoring groundwater in southern New Mexico



An undergraduate running a regional gravity survey on Sevilleta National Wilderness Refuge

“That website is essentially a work in progress,” Dr. Stephens said. “Once a permanent director is in, I think they will be able to spend more time making it more relevant, more creative, more accessible and have better coverage externally so people start looking at it.”

Because communication is a major part of its mission, Dr. Stephens said he envisions the center starting a blog, having an active social media presence, and hosting conferences on campus,

including those that involve the center’s stakeholders and specialty conferences that involve high-level research collaborations.

One page on the center’s website lists its advisory committee, which includes four NMT alumni among its eight members, who bring an array of perspectives from their backgrounds in academia, government agencies and private industry from New Mexico, Texas, Nevada, and New York City.

Another major area of focus for the center is fundraising. Dr. Stephens said he’s very grateful for the initial funding provided by Dr. Deju, who also has established a trust that has named the center his and his wife’s beneficiary. Other funding sources include a Presidential Research Endowment, which covers the director’s salary. Funding from the state of New Mexico directed at NMT’s Geophysical Research Center provides \$300,000 a year.

Dr. Stephens said the initial funding will help the center’s staff kickstart their research and as their research develops, he foresees using the research grants to help grow the center by hiring more staff and branching out into more research areas.

As the hydrology center grows it will be located in the Speare Building, with offices and workstations for staff and students. Once the new director is hired, they will be asked to weigh in on the arrangement of that space.

Dr. Stephens said the location in the middle of campus will allow the center to be close to its key collaborators: the New Mexico Bureau of Geology and Mineral Resources, the Mathematics and Computer Science departments, the Petroleum Recovery Research Center, the Earth and Environmental Science Department, and Atmospheric Physics.

“It’s kind of coincidentally more or less in the center of campus,” he said. “One of the themes about the center in my mind is that it is success through collaboration.”

GREEN DESALINATION USING FORWARD OSMOSIS

By Kathryn Bauer

A researcher from New Mexico Tech is relentlessly exploring multiple avenues to pave the way for his innovative design to reach the market, producing clean, usable water from brackish water and seawater. Dr. Ashok Ghosh, associate professor of mechanical engineering, has devoted years to “green desalination” technology, working to perfect its design and bring it closer to marketability.

Why? Because clean, accessible water is such a valuable resource, especially in New Mexico.

“Everybody wants water,” Dr. Ghosh said. “Without water, how can you live?”

But many people do currently live without safe and adequate running water, Dr. Ghosh said. Many people, particularly members of the Navajo Nation, have to drive 25 to 40 miles to get drinking water for their families.

“We are running out of water,” he said. “We have to look for alternate sources. When you are so far from the ocean, you have to look at what you have.”

Dr. Ghosh’s research has examined cost-effective and energy-saving ways of desalinating seawater, but also brackish water, which, in many areas of New Mexico, is often the best water source available. Drilling for water is an expensive proposition, he said, with maybe one in ten efforts yielding any results.

“How can you cost-effectively drill and get that water and clean it and give it to this community,” he said. “So that is the challenge. And that can only be possible with technology that has the economics” that work.

Dr. Ghosh and his management and research teams have developed a forward osmosis solution that was tested on a small scale in a field demonstration in Jal, near Hobbs, in southeast New Mexico. An economic analysis of the data from the field demonstration examined both reverse and forward osmosis, comparing initial costs, energy costs, and operating and maintenance costs.

“Forward osmosis technology has the ability to clean dissolved salts in a cost-effective manner, something that is not possible using reverse osmosis, due to the high pressure and excessive energy required to overcome the osmotic potential¹,” he said.



Ashok Ghosh with a prototype filtration unit

The innovative engineering solution that has earned two patents for process and apparatus has two chambers with a semi-permeable membrane in between to remove both big and small particles from water, also using ammonium bicarbonate. Working with Sandia National Laboratories and with funding from the Department of Energy and other sources, Dr. Ghosh was able to add a paddle to the design, using a sweeping action to remove bigger particles from the membrane surfaces, preventing clogging.

He continues to make improvements to the mechanical design to make the process “greener” and more efficient.

“The new design helps it be more successful,” he said.

With the improved design, Dr. Ghosh hopes to conduct more tests to attract more funding from government and private sources. He’s also working closely with NMT’s Research Office and Office of Innovation Commercialization on business planning efforts, which involve seeking out funding partners to fully develop and commercialize the technology.

“We’re investigating all kinds of funding sources,” he said. “Hopefully if we get the money, then, in a couple of years, we’ll have the technology in the market.”

¹ Osmotic potential is defined as the potential of water molecules to move from a hypotonic (lower solute concentration) solution to a hypertonic (higher solute concentration) solution across a semi-permeable membrane.

MARINE HYDROGEOLOGY AND NMT

By Kathryn Bauer



Ben Norvell in front of Langseth

Two New Mexico Tech graduate students capitalized on the opportunity of a lifetime by publishing their research examining how heat flows through seafloor sediments. The students, Benjamin Norvell and Thomas Kyritz, accompanied by Dr. Glenn Spinelli, geophysics professor in New Mexico Tech's Earth and Environmental Science Department, participated in a research cruise off the coast of Oregon focusing on hydrogeology and how water and heat move around in the ocean crust.

The research cruise pushed off from the coastal town of Newport, OR, in August 2022, with a dozen scientists and 25 crew on board the Langseth, a ship owned by the National Science Foundation (NSF) and operated by Columbia University of New York. The NMT research proposal was selected by NSF for the voyage, with 20 days of ship time needed to conduct the experiments. Due to mechanical problems with the ship, the trip had to end early, but not before conducting valuable experiments.

The ongoing hydrogeology research project focuses on the subduction zone off the coast of Oregon, Washington and British Columbia. The Juan de Fuca tectonic plate is being shoved under North America, which is the reason Mount St. Helens, Mount Rainier and other volcanoes are located in the region known as Cascadia. According to Dr. Spinelli, that location is where some of the biggest earthquakes in the world happen. About three hundred years ago there was a magnitude 9 earthquake in Cascadia, equal in size to the March 2011 Fukushima earthquake in northern Japan.

"The recurrence interval, as best as we can figure, for big, big earthquakes in this subduction zone is



Glenn Spinelli

300 to 500 years," he said. "We're at 323 years. So there's the possibility for a very large earthquake."

To determine more precisely where an earthquake may happen, the researchers are trying to learn more about how water and heat move around in the ocean crust. The reason that's important is that where earthquakes happen in the subduction zones is partly controlled by the temperature, Dr. Spinelli said.

"So the fault zone itself, there's a range of temperatures where it can't be too cold and it can't be too hot," he said. "So there's a window for temperatures that are the right temperatures for making big earthquakes. And in order to estimate where those temperatures are on the fault zone, you need to understand the temperatures for the stuff that's going into the subduction zone."

The NMT team used the research voyage to study water flow and temperatures in both the seafloor, made up of basalt, and the sediment (mud) that accumulates on top of it. The ship towed equipment with eleven very sensitive thermometers to record the temperatures, providing researchers with data on how heat moves around. The team also set off explosions that sent waves down through the water to bounce off the seafloor and get recorded on pressure sensors, providing a picture of the layering in the subsurface.

"Water is flowing from the rock up through these sediments out of the seafloor fast enough to carry some heat with it," Dr. Spinelli said. "People have made these sorts of measurements all over the world and no one has ever seen water seeping through sediments that fast that are that thick."



Entering Newport Harbor

Dr. Spinelli said that the NMT team’s discovery was especially interesting because the water moving up through the sediments carries heat out of the system, with implications for what the temperatures in the subduction zone are and where earthquakes could happen on the tectonic plate interface.

“What we’re doing is saying that these are parts of the fault that are more likely to have an earthquake and these other parts are too hot for that or too cold for that,” he said.

Norvell was first author and Kyritz was second author on a research article, “Thermally Significant Fluid Seepage Through Thick Sediment on the Juan de Fuca Plate Entering the Cascadia Subduction Zone,” published last summer by the American Geophysical Union and presented at the AGU meeting in December 2023.

Other collaborators on the research project include Matt Perry (M.S. Geophysics, 2016) who now works at the Planetary Science Institute in Colorado, faculty members from Oregon State University, and graduate students from other universities, including Rutgers University and the University of California - Santa Cruz.

The research cruise gave the students valuable experience with using the equipment and temperature sensors, collecting data, and analyzing the data. Writing about the research findings and getting published were also beneficial outcomes of the project, Dr. Spinelli said.

Because of both Norvell, a master’s student in geophysics defending his thesis in November 2023,

and Kyritz, a master’s student in hydrology who plans to defend in spring 2024, other NMT students will have the opportunity to participate in the next research cruise off Oregon and Washington set for September 2024.



On the ship



Matt Perry with heat flow probe



Science Party

CLIMATE AND WEATHER CONSORTIUM

By Kathryn Bauer



Željka Fuchs

Providing better data to help New Mexicans make decisions related to agriculture and forestry, the environment, health, renewable energy and more, an interdisciplinary group of faculty members and students at New Mexico Tech work together on research and outreach projects related to climate and weather. The Climate and Weather Consortium (CWC) is made up of faculty members from across the university – applied mathematics, atmospheric physics, biology, chemistry, computer science, economics, education, engineering, geophysics, hydrology, management, and physics.

According to Dr. Željka Fuchs, research associate professor of physics and CWC Director, the group formed in 2017 to bring together interdisciplinary faculty members and physics undergraduate and graduate students to take on cutting-edge research projects related to climate and weather.

“The consortium is just this group of researchers doing different research, but having areas where we overlap” she said. “We have lots of super cool research.”

A key area of research overlap concerns water in the form of precipitation that impacts New Mexico – snow, summer monsoons and floods.

The consortium formed “not just to do research when it comes to climate and weather and water,”

Dr. Fuchs said. “But the way we saw it was for the climate and weather group to provide better climate assessments and bridge that with other fields that need to have climate assessments.”

Dr. Fuchs said the fields of biology, hydrology and engineering all use climate assessments in their research. In biology, for example, researchers study certain types of plants. Knowing whether it’s going to be wetter or drier can inform agriculture modeling.

“Knowing what kind of climate we can expect will tell us – should we still be planting alfalfa or should we move to something else?” she said. “But if you start with the wrong climate assessment, then everything after that will be wrong.”

Dr. Fuchs said the need for more accurate weather forecasts is increasing, especially with climate change and more extreme weather events, which applies to droughts as much as floods. Weather forecast models are basically mathematical equations. What can improve them is better observations and data.

“People sometimes laugh at the forecasts and don’t believe it,” she said. “If we can get more accurate, they trust us more.”

In order to have better forecasts, there’s a great need for more and better observations, measurements and data, Dr. Fuchs said.

“Not just observations from the surface you need to have, it’s also vertically because clouds form vertically,” she said. “Especially for the summer monsoons – those vertical updrafts and downdrafts are the most important for the storm.”

One example of a “cool research” project was a major field campaign funded with \$5.4 million from the National Science Foundation (NSF) involving NMT researchers and students. Collaborators from across the United States traveled to Costa Rica in 2019 to conduct research from a special jet (Gulfstream V) that could fly at an altitude of 10 miles.

Dr. Fuchs said the scientists involved in the OTREC (Organization of Tropical East Pacific Convection) project were seeking information related to convection, which produces tall cumulus clouds that produce heavy rain, mostly in

CLIMATE AND WEATHER CONSORTIUM

tropical regions. Convection is important not only for severe thunderstorms and hurricanes but also for summer monsoons. New Mexico experiences summer monsoons that use the same type of convection as hurricanes, just over land.

The researchers launched hundreds of dropsondes – weather devices that are dropped out of an aircraft at specified altitudes and, due to the force of gravity, drop to the Earth. During their descent the dropsondes collect data about the surrounding atmosphere – temperature, humidity, pressure, winds – that are remotely sent back to the aircraft by radio transmission.

She notes researchers are looking into employing drones to study convection over land. Artificial intelligence (AI) also can be useful for climate modeling, she said, examining historical data to recognize patterns.

“But it’s very important that it’s handled by people who know the subject, who know how to interpret it, who know what’s possible and what’s not possible,” she said. “Can it be a useful tool? I think so.”

The consortium also undertakes outreach projects, hoping to inspire future generations of climate researchers and to encourage students to study math. One popular outreach project involves supplying schools with portable weather stations. Schools can follow instructions to 3D print the devices, and students then put in the sensors for temperature, pressure and humidity. Older students are allowed to bring the stations home and put them into “extreme events,” such as the refrigerator and dishwasher.

“I think that it was some excellent outreach,” Dr. Fuchs said. “Behind all of that is math and we need math to be more interesting than it is. All of this is connected to math.”

More information about the consortium’s research and other activities is available on its website at <https://cwc.nmt.edu/>.



Dr. Fuchs posing in front of the plane



Portable weather station kit used in outreach



Field research always sparks lively debate



Željka Fuchs and David Raymond (Professor Emeritus, Atmospheric Physics), 2019

CLIMATE CHANGE IN NEW MEXICO OVER THE NEXT 50 YEARS: IMPACTS ON WATER RESOURCES

By Kathryn Bauer



From left, Dr. Fred Phillips, Anne Tillery, Dr. Nelia Dunbar and Dr. John Metesh, Montana state geologist and president of the Association of American State Geologists (AASG). Metesh presented the report authors with the John C. Frye Memorial Award.

A landmark report, published in March 2022, lays a firm foundation for planning and key decisions about managing the state's water resources. It was developed by a group of scientists, including several from New Mexico Tech and the New Mexico Bureau of Geology and Mineral Resources (NMBGMR). Their efforts were aimed at giving information back to the state to allow New Mexico to navigate through major climate changes foreseen in the next 50 years.

Bulletin 164 — Climate Change in New Mexico Over the Next 50 Years: Impacts on Water Resources has generated ripple effects among policymakers, government officials, activists and the public, leading to greater awareness of looming water scarcity dilemmas and engagement with possible mitigation efforts.

After New Mexico Governor Michelle Lujan Grisham tasked the Interstate Stream Commission within the Office of the State Engineer with developing a 50-year water plan for New Mexico, then-Director Rolf Schmidt-Petersen decided he

needed information on not only current climate conditions, but data looking far into the future. He turned to his trusted former NMT graduate school classmate at the state geology bureau, Dr. Nelia Dunbar, to oversee the project. The bureau, a nonregulatory, research-focused state agency, proved to be an ideal choice to lead the effort.

Dr. Dunbar, then NMBGMR director and state geologist, envisioned a report that would employ as a template a consensus study on volcanoes she was familiar with as a member of the Board on Earth Sciences and Resources of the National Academies of Sciences, Engineering, and Medicine.

“The goal of the report was to discover and integrate all the existing knowledge about New Mexico,” she said. “To really plan for managing water resources in New Mexico over the next 50 years we really need to understand what is really happening with the climate now and 50 years into the future.”

She recruited two top scientists — Dr. Fred Phillips, NMT emeritus professor of hydrology, and Dr. David Gutzler, a climatologist and emeritus professor at the University of New Mexico.

What followed was the recruitment of other scientists to contribute to the project: Kristin Pearthree, NMBGMR researcher, and Dr. Paul Bauer, emeritus principal geologist. The report's contributing authors include Dr. Craig Allen, Dr. David DuBois, Mike Harvey, Dr. J. Phillip King, Dr. Leslie McFadden, Anne C. Tillery and Dr. Bruce Thomson.

The report's timing was fortuitous, with all the contributors stuck at home during the early days of pandemic, travel and conferences canceled. They had time to invest in the report and the dozens of long Zoom meetings it took to collaborate on writing and assembling the chapters.

“We had to do this really quickly,” Dr. Dunbar said. “There was a huge amount of collaboration between the authors. Honestly, if COVID hadn't happened when it did, we never would have gotten this done.”

CLIMATE CHANGE IN NEW MEXICO OVER THE NEXT 50 YEARS: IMPACTS ON WATER RESOURCES

The report is broken into 10 chapters, each written by two or three of the scientists. The authors assessed and synthesized scientific literature on climate, hydrology, and impacts of changes on climate projections, changes to the surface water budget, ecological dynamics, landscape changes including fires and erosion, extreme precipitation and flooding, soils, water supply and water quality. The authors made the case in the study that climate change is impacting New Mexico's water resources in multiple ways, including:

- Lower streamflow and recharge because of increased aridity
- Greater interannual variability in precipitation
- Hotter, more severe droughts
- Decreasing snowpack with earlier and diminishing snowmelt runoff
- Greater demands on groundwater
- Vegetation stress
- Increasing catastrophic forest fires
- Increasing flooding/sediment transport
- Irreversible damage to soils through loss of vegetation and erosion
- Degraded quality of surface waters

The report includes data on both statewide and regional impacts, as New Mexico is a state characterized by high mountains, high desert, river valleys and basins and plains. The report points to average temperatures increasing 5 to 7 degrees Fahrenheit in different regions of New Mexico, declines in snowpack and spring streamflow, more extreme precipitation events, increased aridity because of increasing air temperatures, leading to more rapid losses of water from leaves and soil.

"Our temperature is rising and there's no reason to expect that is going to turn around," Dr. Dunbar said. "One of the messages that came through to me very clearly in this study is the impact[s] of climate change on New Mexico's water resources are quite overwhelmingly negative. But the silver lining of the process is that in order to plan for what you know is coming you need to know what is coming. And I think that was the real value of this leap-ahead analysis exercise – to provide a well-researched, robust and stable foundation upon which the New Mexico Water Plan can be developed."

According to Dr. Dunbar, the report's conclusions caught the attention of both policymakers and the public.

"I think it's been hugely impactful," she said. "People have been very receptive to the message. I think of all the things I've done in my career this may be one of the things that really has made the biggest difference to the state."

As the report was being finalized, it was used as the scientific foundation for the development of another important document. State Engineer Mike Hamman convened the New Mexico Water Policy and Infrastructure Task Force from June to December 2022 to study the state's water management and governance challenges and recommend actions. The 30-member panel, which included Drs. Dunbar and King, published Facing New Mexico's 21st Century Water Challenges in December 2022. The report contained 117 prioritized recommendations under three focus areas: Community drinking water, wastewater, and stormwater infrastructure capacity and finance; water resources management and planning; and river, aquifer, and watershed health.

Dr. Dunbar said the recommendations created a roadmap for the New Mexico Legislature detailing steps for the Legislature to focus on and recommendations about which state agencies should be working on which projects.

"That's my big takeaway -- we're going to have challenges ahead," she said. "This report and all the subsequent work I think gives us a good sense of what those challenges are going to be and lets us start planning for them."

The report recently received a prestigious national honor. The John C. Frye Memorial Award was presented by the Association of American State Geologists (AASG) at its mid-year meeting held during the Geological Society of America (GSA) Annual Meeting in Pittsburgh, PA on October 15, 2023. Three of the report's co-authors were on hand to accept the award: Drs. Dunbar and Phillips, and Anne C. Tillery.

The report is available publicly on the NMBGMR website at:

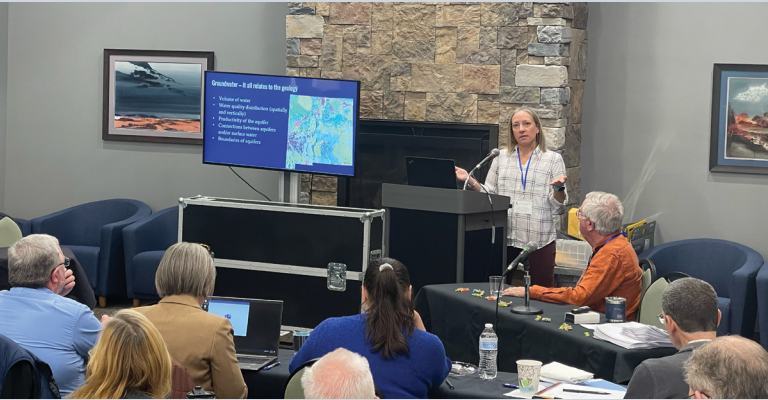
<https://geoinfo.nmt.edu/publications/monographs/bulletins/164/home.cfm>



WATER LEADER WORKSHOPS

By Kathryn Bauer

DATA INITIATIVE



Stacy Timmons, associate director of hydrogeology programs at the NM Bureau presents at the Water Leader Workshop held at the Deju House in December 2022.

The opportunity to see, hear, and learn firsthand about New Mexico’s increasing concerns with water quality, availability, and planning efforts was the aim of a two-day workshop in late 2022, hosted by the New Mexico Bureau of Geology and Mineral Resources and funded by the Thornburg Foundation. “Water Leaders Workshop: A Decision Makers Retreat and Field Trip” provided participants – including legislators, state agency staff, and others – a field trip to the Rio Grande, presentations, and facilitated discussions on water issues and next steps. These important workshops continued last year with the 2023 Water Leaders Workshop held in Las Cruces, offering participants a closer look at water issues in the Lower Rio Grande Region.

According to Stacy Timmons, associate director of hydrology programs at the Bureau of Geology, the 2022 workshop was a pilot program to gauge interest in participating in future water-centric education programs. “We’re trying to build something that helps [legislators] a) get up to speed on some of the really complex water issues, and b) gives them an opportunity to get out and see it and have that experience of building connections,” she said.

Now with leadership from Dr. Kate Leary, the new program manager for water education at the Bureau of Geology, and with state legislative funding, another Water Leaders Workshop is coming in May 2024. Based at Ghost Ranch, it will provide a closer look at water issues in Rio Arriba County. More information is available at <https://newmexicowatereducation.org/>.

In 2019, New Mexico enacted the Water Data Act to identify, share, and integrate key water data. The Water Data Initiative is the project convened by the New Mexico Bureau of Geology and Mineral Resources involving state directing agencies, including the Office of State Engineer, Interstate Stream Commission, Environment Department, and Energy, Minerals and Natural Resources Department. The statute launched a multi-year effort of communication and collaboration among these agencies and others collecting or managing water data for the state.

A key communication and coordination project is the New Mexico Water Data Catalog, with data on water quality, quantity, and uses. At the Bureau of Geology, Stacy Timmons, associate director of hydrogeology, with Rachel Hobbs, water data program manager, are leading implementation of the New Mexico Water Data Act and disseminating information to the public regularly in multiple formats, including newsletters, a blog and YouTube videos. More information is online at <https://newmexicowatereducation.org/>.



From left: Kevin Myers, hydrologist with the New Mexico Energy, Minerals, and Natural Resources Department; Stacy Timmons, associate director of hydrogeology programs at the New Mexico Bureau of Geology and Mineral Resources; Rachel Hobbs, program manager for the New Mexico Water Data Initiative (WDI); and Emily Geery, water resources planner for the WDI.

By Kathryn Bauer

A symposium aimed at engaging students in solving water supply and quality issues facing the Navajo Nation also proved to be a fun and educational way for them to consider careers in water sciences. 65 students from Four Corners area high schools participated in a variety of activities during the daylong N⁴WPP Water Symposium, held November 3, 2023, at the University of New Mexico Gallup Campus.

New Mexico Tech and Navajo Technical University co-sponsored the symposium, along with assistance from New Mexico MESA, Process Equipment and Service Co., Inc. (PESCO) and New Mexico State's College of ACES (Agricultural, Consumer, and Environmental Sciences) Center for Excellence in Sustainable Food and Agricultural Systems and Indian Resources Development.

N⁴WPP — the Navajo Technical University-New Mexico Tech-Navajo Nation Water Purification Project — aims to train students in the water sciences and in the technical aspects of water filtration at sites on the Navajo Nation using technology developed at NMT in partnership with PESCO. Part of the N⁴WPP mission is to engage high school students through an annual water symposium held at locations on or near the Navajo Nation. This year's symposium was the second such event, after a successful inaugural symposium in April 2022 in Farmington.

Students competed for prizes in two events — creating a five-minute video on water-related topics and taking a hydrology written exam based on materials they received before the event. Seventeen teams of students produced videos describing their innovative ideas to tackle water shortages on the Navajo Nation.

Symposium attendees also collected information and met with representatives from government and nonprofit organizations and private industry to learn more about their work and potential career opportunities. The day also included a keynote address from Vice President Richelle Montoya of the Navajo Nation and a panel discussion with four Navajo women discussing their professions and the paths they took to become successful. The panel included: Cherylin Atcity, interim director of New Mexico State University's Indian Resources Development; Dr. Colleen Bowman, provost of Navajo Technical University; Dr. Ranalda Tsosie, assistant professor of environmental science at NMT; and Dr. Crystal Tulley-Cordova, principal hydrologist with the Navajo Nation Department of Water Resources.

More information about the N⁴WPP is available at www.nmt.edu/restore/.



Staff at the New Mexico Bureau of Geology and Mineral Resources at New Mexico Tech have been engaged in hydrogeologic studies of New Mexico's aquifers in cooperation with partners at the New Mexico Office of the State Engineer, the New Mexico Environment Department, the U.S. Geological Survey, and other federal, state, and local agencies. Beginning with geologic mapping and aquifer analysis in the Albuquerque Basin

and a hydrogeology study in Placitas, the Bureau of Geology developed an Aquifer Mapping Program to apply a combination of geologic, geophysical, hydrologic, and geochemical information to develop descriptive models of groundwater depth and extent in important aquifers around the state. The Aquifer Mapping hydrologists are currently working to characterize the aquifers in Rio Arriba County, focusing on the communities of Chama, Dixon, Abiquiu, and El Rito. In conjunction with regional studies, the Aquifer Mapping Program also runs the Healy Collaborative Groundwater Monitoring project, which monitors depth to water in wells across the state. According to Laila Sturgis, Aquifer Mapping Program manager, work is underway on a new online dashboard for viewing and downloading water level data. More information is available on the Bureau of Geology's website at:



From left, Kristin Pearthree, research scientist; and Cris Morton and Laila Sturgis, hydrogeologists, measure the water level in a well at a residence in Hop Canyon, south of Magdalena. Their work is funded by the Healy Foundation and implemented by the Aquifer Mapping Program at the New Mexico Bureau of Geology and Mineral Resources.



Bureau of Geology



Healy Collaborative Network



Rio Arriba project

STUDENT SPOTLIGHT

By Megan Schwingle

Dr. Allan Gutjahr Fellows - Loc Luong and Mitchell McLaughlin

Dr. Allan Gutjahr came to New Mexico Tech in 1971 after working for Bell Telephone Laboratories and earning his masters from John Hopkins and PhD from Rutgers State University. While he came to NMT to teach probability and statistics, he had an incredible impact on NMT's hydrology program. Working with Dr. Lynn Gelhar, Dr. Gutjahr was one of a handful of researchers who established the field of stochastic groundwater hydrology - a statistical branch of hydrology that utilizes probabilistic modeling of hydrological processes.

Dr. John Wilson, Emeritus Professor of Hydrology, colleague and Dr. Gutjahr's dear friend, shared about Allan's integral contributions to NMT's hydrology program but said Allan's dedication to students equally defined his career.

"When I talk to some of his former students, Allan was one of the most important, if not the most important, mentor they had while they were at New Mexico Tech. He was a fine man in all the ways you could imagine. He was a good collaborator, a good mentor, a good colleague, a friend, and a reliable person to work with. All of the students who had worked with him remember that quality. They enjoyed working with Allan. Many of these students, Hydrology students, did their thesis working closely with Allan and have carried on that type of activity today in their current work. He had a great influence on their careers."



In addition to serving as a full professor, Dr. Gutjahr also served as Mathematics Department Chairman, Associate Vice President for Academic Affairs and Vice President for Research. Gutjahr received the New Mexico Tech Distinguished Teaching award in 1987 and the New Mexico Distinguished Research award in 1999.

Established by his family, the Dr. Gutjahr Memorial Endowment honors Dr. Gutjahr, beloved NMT professor, and his many contributions to NMT and the fields of math and hydrology. The endowment furthers Dr. Gutjahr's legacy through the awarding of a graduate fellowship stipend to an NMT student working on a research problem that combines math and hydrology.

To support student research,
Make an online gift today by scanning the QR code.
Or go to
<https://advancement.nmt.edu/giving>



LOC LUONG, PHD, HYDROLOGY, 2025

My research aims to use data recorded by seismometers as a means to estimate sediment transport during flash floods in Arroyo de los Piños. Our monitoring station is located in an ephemeral channel near the Rio Grande River, about 10 miles away from our campus. During the monsoon season, we chase flash floods and set up an array of instrumentation to obtain hydrologic, meteorological, and seismic data. For example, we deploy pressure transducers to measure flow stages; rain gauges to measure precipitation; seismic nodes to record ground vibrations from bedload movement, and other environmental sources such as turbulence or rainfall. The objective of my study is about developing and improving a physics-based model to determine how much sediment moves during a flood event based on the amount of seismic noise recorded by nearby seismometers.



MITCHELL MCLAUGHLIN, PHD, GEOPHYSICS, 2026



I am analyzing the seismic signals that are generated by bedload as it moves through ephemeral channels. The purpose of this research is to provide a safe, non-invasive and relatively inexpensive way to quantify bedload transport during flash floods in these channels. While we have equipment at our experimental channel to directly measure rates of bedload transport, the equipment is very expensive and requires frequent maintenance. Alternatively, deploying a seismometer is essentially just a matter of selecting a good location and digging a small hole. Since ephemeral channels make up approximately 80% of streams in the Southwestern United States, the ability to cheaply quantify bedload transport in an ephemeral channel has significant implications for infrastructure, water reclamation, and environmental projects along the Rio Grande which is being fed by many of these ephemeral channels in the summertime. My specific contribution to this project has involved analyzing the frequency and amplitude content of the terabytes of seismic signals we collect to try to understand which of them we can attribute to bedload transport and how we can empirically calibrate the seismic data to our bedload measurements. I've also focused on how to deal with noise in the seismic data, which comes from rainfall, turbulent features in the channel, nearby human activity, and even thunder. Finally, I've looked at how unique features of individual floods, like variations in the grain size of bedload, affects the signals we observe.

PEOPLE YOU KNOW

GARY ADAMS



(B.S. 1990, Physics) writes: I enjoy reading the Gold Pan, and especially the fascinating stories of Tech alumni. While being a little less than diligent about corresponding over the years with many that I shared experiences with while at Tech (and some that have sadly passed away), I am glad to see their stories in the Gold Pan.

After spending 10 years in semiconductors at Intel, I moved on to aerospace and have been in a mission assurance group supporting launch vehicles at Northrop Grumman for 18 years in the Phoenix, AZ area. While Tech provided the skills for a long career, I can also say those skills were needed to raise a family of four children with my wife of 28 years, Lorenia. Partially retired now, I am also running a family vacation rental business with my wife that is located in Bahia de Kino, Sonora, Mexico.

Recently, I came across an old 49ers t-shirt (68th annual, 1990 by Clinton Crowley). I miss the days of the Yacht Club, our sponsor Dr. Sharples, and of course, the infinite patience of many including Dean Etscorn while we embarked on our shenanigans and campus political ventures. If there are any alumni Yacht Club members (or others) that are interested, I still have the various meeting posters, Pay Dirt letters, and other documentation that I can share. Contact advancement@nmt.edu and let them know you'd like to reach me.

WALLACE “WALLY” T. CLARK, III



(B.S. 1976, Physics,) earned an MS in Physics at Idaho State in 1978 and a Ph.D. in Instrumental Sciences at Arkansas Graduate Institute of Technology in 1982. Wally pursued a career in multiple disciplines and projects, leading teams developing ultra-high vacuum exotic chemical leak detectors, fiber-optic based chemical sensors, and full-scale firing-rocket's plume electromagnetic signature antennas. He held three mid-career Chief Scientist assignments in electromagnetic pulse testing, deformable optics development, and unmanned aerial vehicle (drone) testing. He initiated integration of an electronics disruptor on a drone, was the Air Force Laboratory's Microwave Technologies Branch Chief, Laser Division Chief, and Microwave Division Chief. At the Air Force Nuclear Weapons Center he was in turn 498th Wing Chief Scientist, Division Chief of Systems Engineering, Enterprise Engineering, and Weapon Effects Survivability, then Acting Chief Scientist.

He earned numerous awards, including two Air Force Exemplary Civilian Service Medals, an Outstanding Service Medal, and the Hardened Electronics And Radiation Technology (HEART) Society Peter Haas Award. He served on a Defense Science Board and two Defense Test Resource Management Center studies. He has some 100 publications and presentations to professional journals and societies. He is nationally and internationally recognized as an expert in nuclear weapon effects, especially EMP, producing several podcasts: <https://thinkdeterrence.com>.

Retired from working full time in November 2020, Wally consults as a Senior Fellow at the National Institute for Deterrence Studies and as a Senior Technical Adviser to the National Nuclear Security Agency. He credits his success to the lessons learned at NM Tech, his family, and especially his wife Kat. Kat and Wally live in Rio Rancho, NM.

MATTHEW FORT



(B.S. 2020, Mathematics with Minors in Computer Science and History) has joined the Institute for Defense Analyses (IDA) as a research associate in the Science and Technology Division of IDA's Systems and Analyses Center. He earned his master's degree in computational linguistics from Indiana University Bloomington in 2023.

BRUCE KENNEDY



(B.S. 1973, Mining Engineering) - During my last semester I took the EIT portion of the PE exam and passed. I later took the PE exam, which allowed me to work as a consultant for several years.

At 72 years old now, I have decided to retire despite still feeling wonderful about the mining industry and proud of my part in the industry. Mining has allowed me to travel the world, visiting 35 countries and having lived in six outside the US. My mining journey allowed me to mine Potash, Uranium, Coal, Sand & Gravel, Copper, Gold, Silver, Lead and Zinc as well as Tin. Each mineral and operational area was different and I always enjoyed learning about the various mining and processing practices and have always been proud of my safety record and always strived to be a good representative of what-ever company whose shirt I was wearing.

Additionally, I was involved in damage calculations in support of a lawsuit between a mining company and the government of Colombia. Participating in a trial as a witness was a very different sort of experience compared to my more common operational roles. My best to all NMIMT graduates and my hope is that you love the industry you are in and that you find your jobs and roles to be as interesting as I have been lucky to achieve.

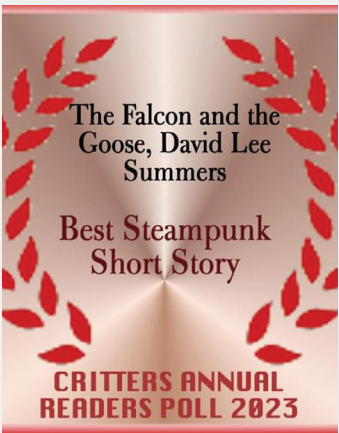
ASHLI KNOELL



(Master 2017, Science for Teachers) has received a national Milken Educator Award for 2023-24. She currently teaches three levels of STEAM and Robotics classes at Cleveland High School in Rio Rancho, NM, and her classroom is a hive of activity, creativity and collaboration. She also looks beyond her classroom walls to engage in extracurricular leadership opportunities, including sponsoring or co-sponsoring a range of STEAM and robotics clubs, highlighting her commitment to encouraging real-world applications of classroom learning for her students.

Beyond the classroom, Knoell serves as a mentor to new teachers; an instructional leader for the ninth grade; and the coordinator of the Near Peer program, providing tutoring to high school students through a grant-funded initiative. Her involvement at the state level, particularly with the International Society of Technology in Education's (ISTE) professional learning communities, reflects her dedication to continuous professional growth.

DAVID LEE SUMMERS



(B.S. 1988, Physics with Astrophysics) has had one of his short stories, "The Falcon and the Goose," selected as Best Steampunk Short Story by voters in the 2023 Critter Readers Poll. (Critters.org / Critique.org began in 1995 as an on-line workshop/critique group specifically for serious Science Fiction/Fantasy/Horror writers, then grew up into a set of workshops.)

IN MEMORIAM



Celedon Aragón



(BS 1966, Basic Sciences) was called to heaven on November 2, 2023. Born on January 13, 1945, in Valencia, NM, Celedon would become a trained physicist, rocket and nuclear scientist, and a wise civil-rights leader advocating for the advancement of Hispanos in New Mexico.

A graduate of New Mexico Tech and Cornell University, he served as a U.S. Government civil servant with the Department of Energy and the National Nuclear Security Administration for 27 years, leading numerous projects to mitigate nuclear warfare and the proliferation of nuclear weapons of mass destruction. This work led him to learn from and work with notable theoretical physicists like Edward Teller and Giovanni Rossi Lomanitz, scientists of the Manhattan Project and colleagues of the famous J. Robert Oppenheimer.

He was a fierce champion of civil rights, advocating New Mexico's Hispanos and other underrepresented groups. His dedication to this selfless work resulted in the advancement of Hispanos and other underrepresented groups to senior positions in the Department of Energy and the Department of Defense.

He is survived by his wife, Cindy; his five children, Tim, Monica, Christina, Cisco, and Carlo James (CJ); five grandchildren, and one great-grandchild.

Joshua M. Chávez



(B.S. 2022, Environmental Engineering), passed away on November 18, 2023. He was born on Easter Sunday in 1989. He and his mother, Tania Chávez, lived in Española, Socorro, Albuquerque, Cincinnati, and Santa Fe, where Abe Franklin joined the family, followed shortly by Joshua's brother, Skye Franklin, when Joshua was 10. Joshua began attending Tech in 2007 as an Environmental Engineering major. Struggling with mental illness, he returned to his parents' home in Santa Fe after three semesters. Over the following years, he attended Santa Fe Community College, Northern New Mexico College, and the University of New Mexico, always working towards completing an environmental engineering degree at Tech.

During this time, he instructed snowboarding, moved into Santa Fe's Hopewell neighborhood, became an active member of his church, and began volunteering for the Chainbreaker Collective. In 2019 he returned to Tech and completed his degree with high honors. In October, 2022 he began work as an environmental engineer at Los Alamos National Laboratory (LANL), concurrently earning a graduate certificate in carbon capture from Colorado School of Mines in May 2023. He successfully completed his first year at LANL while battling the peritoneal mesothelioma that took his life.

Joshua enjoyed travel, snowboarding, wine tasting, bicycle transportation, film, and math. He valued time with friends and family, whether around the dining room table or out camping in New Mexico's splendor. He was generous, thrifty, considerate of others' feelings, and known for sharing his honest opinions. Joshua's mother, stepfather, and grandparents Randy Chavez and Julia (Pacheco) Chavez all attended Tech.

Donations in Joshua's honor can be made online to the Chainbreaker Collective at <https://www.chainbreaker.org>.

Lee Courtney



(B.S. 1977, Mathematics with Minor in Computer Science) of Pecos, NM, passed away at his home on July 10, 2023, of natural causes.

He was born April 27, 1953, in Monterey Park, CA. During his time at New Mexico Tech, he met and married a fellow Techie named Linda Blakestad (née Gibson).

Lee's education at New Mexico Tech served him well. He was successful in multiple industries including industrial water treatment and as part owner of a large equipment, custom autoclave production company - Thermal Equipment Corporation. Recent autoclaves are primarily used for curing carbon fiber for aerospace applications.

His career ventures led him and his family all over the world, forging strong friendships across Canada, Japan, England, Singapore, and beyond. Lee's larger-than-life personality and immense generosity were readily apparent to all who met him.

In his retirement, Lee donated his time to the Pecos Valley Medical Center, served as the #1 Best Math Tutor to his grandchildren, and devoted countless hours to developing his wife's life-long dream cabin in the mountains. We will forever remember him as a devoted husband, Pops to his two successful children, Grandpa Popeye, mentor, and friend. Keep on truckin', Lee!

Edward William Ericksen, Jr.



(B.S. 1960, Geology, and Master 1994, Science for Teachers) passed away on October 21, 2023. He was born November 25, 1934, in Bay Ridge, NY.

Edward was always looking for the next great adventure. He came to Socorro on a bus from New York to attend NMT. He served as a volunteer firefighter and served in the New Mexico National Guard during his years at New Mexico Tech. He was a geologist, a teacher, an entrepreneur, a rancher, a politician, a contractor, a writer, an artist and an avid gardener through his life.

His desire to see the wonders of the world took him to the farthest corners of the globe. From Caribbean cruises to teaching English in China for a semester, he was always looking for the next adventure. He loved to share this sense of adventure by sponsoring trips for students from Socorro High School and helping others plan exciting trips abroad.

Ed was an active member of The Church of Jesus Christ of Latter Day Saints. It was his strength, his home and his family in the end.

He is survived by his daughter Kristina Ericksen-Sobieski, his son Michael Ward and four grandchildren: He will be missed by his family, his friends, and his congregation.

George Carman Evans



(M.S. 1968, Geology) passed away March 2, 2023. He was born on December 25, 1930 in Fort Stotsenburg, Philippines. His journeys took him to live in 22 states and 3 countries.

He credited his high school for giving him the background and academic skills he needed to be accepted into Yale University. He left Yale after 2 years to enlist in the army and was company commander with the Corps of Engineers in Korea. He returned to graduate from Yale in 1956 with a degree in Geology, which led to a job with Mobil Oil in Venezuela.

After Venezuela, he returned to school at NMT. He spent the rest of his career as a public servant, with a brief return to NMT as a Hydrology professor. He worked in the Navy Oceanographic Office as a physical oceanographer, with the U.S. Bureau of Mines doing environmental work, for the state of Ohio on coal mine land reclamation, and, in 1977, he transferred to Hanford where he worked on nuclear waste disposal until his retirement in 1995.

While he was working in Columbus, OH, George fell in love with and married Bette Musgrave in 1975. They shared a love of the outdoors, hiking, travel, and a commitment to community service. Together, they visited 90 countries and all 7 continents. He was an avid backpacker, often with Bette.

He was an active member of Richland Kiwanis and a past president. He was instrumental in starting the Library at the Juvenile Justice Center, for which the Kiwanis recognized George with a Hixon award. He was a talented wood worker and made furniture for his home and his church. He is survived by his wife and more loving friends and extended family than can be listed.

Meliton (Mel) Garcia



(B.S. 1959, Mining Engineering) was born on April 24, 1935, in Taos, New Mexico and passed away January 21, 2022 in Idaho Falls, ID. He also earned a Master of Public Health, Industrial Hygiene (1963), at the University of California, School of Public Health, Berkeley, CA.

Through the years he worked for San Manuel Copper Corporation in Arizona as a Mining Engineer; for the State of New Mexico, Public Health in Grants, NM as an Industrial Hygiene Technician, Uranium Miners Study; for The Boeing Company, Commercial Airplane Division in Washington as an Industrial Hygiene Engineer, Medical Dept; for Gulf Oil Corporation in Oklahoma and Texas as a Regional Industrial Hygiene Engineer (Medical Dept.); for Tenneco, Inc. as a Manager, Occupational Health Loss Control Department; for Los Alamos National Laboratory as a Ventilation Engineer; for Tenneco Automotive Company as a Manager for Corporate Safety and Industrial Hygiene; at the University of Arizona, College of Engineer & Mines as an Adjunct Professor, Department of Mining & Engineering, and Principal Investigator for a number of funded research projects; and for EG&G Idaho, Inc. as Lead Industrial Hygienist and Program Manager. Mel retired in 1996.

Mel is survived by his wife, Clara, his children Anna, Daniel, Frannie, and Juan, and many grandchildren and great-grandchildren.

Roger Kauffman



(B.S. 1970, Mining Engineering) was a beacon of knowledge and wisdom, who dedicated his life to his family and his career as a Mining Engineer. He was born January 15, 1944. After graduating from high school Roger joined the United States Navy and served as a heavy equipment operator with the Seabees in Guam. He attended college at Penn State University earning an Associate Degree in Engineering Surveying Technology before earning his B.S. from New Mexico Tech.

With over 40 years in the mining industry, Roger held the positions of Executive Vice President, COO and Vice President of Industrial Minerals with Hecla Mining Company, and President, Vice President, and COO with Amax Gold Inc.

During Roger's tenure at Hecla Mining Company, he was responsible for the operation, development and growth of Hecla's highly successful industrial minerals operations. With his early career spent at Exxon Corporation and Ranchers Exploration and Development Corporation, Roger's blend of multi-disciplined management skills, intricate mine development problem-solving and meticulous attention to detail in exploration and development led to prosperous mining operations around the globe.

A man of intellectual curiosity, he found joy in reading technical literature. Always ready to share his endless knowledge, Roger was an Honorary Professor of Mining and Geological Engineering at New Mexico Tech. His love for golfing spoke to his tireless pursuit of improvement and enjoyment of social interactions. With his family, he enjoyed traversing ski slopes in the winter and boating on the lake in the summer. A wood worker, builder, and creator in his own right, his work showcased his patience and dedication.

Roger is survived by his wife, Renée; his children: Joshua, Camille, and Charles; and his sister-in-law, Carol. In lieu of flowers, the family requests considering a donation to New Mexico Tech (<https://advancement.nmt.edu/tribute>), honoring Roger's spirit of generosity and lifelong learning.

William (Bill) Donnell Klein



(B.S. 1965, Mathematics) died on January 13, 2024. He was born November 3, 1943, in Oklahoma City, OK and lived there with his parents until 1953, when they moved to Albuquerque, NM.

Bill graduated from New Mexico Military Institute in 1961. After graduating from NMT, Bill went to Air Force Officer Training school in 1966, where he was commissioned as a First Lieutenant in January 1967. He married Robin Kay Melton on January 7, 1967. The AF sent him to school at University of Michigan; he earned his Master's Degree in Meteorology in May, 1968. In June 1968, 2 weeks after he left for RAF Bentwaters, Bill and Robin's first child was born. Their twins were born in England on his birthday in 1969. In 1971, Bill was assigned to MIT where he completed his PhD in Meteorology. He spent the rest of his 26 years in the AF as a meteorologist. He attended Squadron Officer's School, Air Command and Staff School as well as the Industrial College of the Armed Forces. Bill retired in 1992 with the rank of Colonel.

Bill was an avid photographer and an expert photo processor - his work was shown in the Albuquerque area at various venues. Bill is survived by his wife, Robin; his children, Karel Klein Ruy (David), Bill Klein (Kelly) and Marje Klein; 8 grandchildren; his brother Jim Klein; and sisters Linda Caldarelli, Dot Bodiroga and Patty Poole.

Donations in his memory may be sent to Friends of Bosque del Apache, PO Box 340, San Antonio, NM 87832.

IN MEMORIAM



Larry Michael Lee



(B.S. 1977, Environmental Engineering and M.S. 1978, Metallurgy) was born in Rupert, ID in 1952; his family soon returned to New Mexico. He was a founding member of the NMT Rugby team, captaining for five years and being capped twice. He was a member of Alpha Sigma Mu Metallurgical Honor Society, the Student Senate, and President of the Graduation Students Association.

Following graduation he married Jennifer Lee and the couple moved to Southern California where he was employed by Kaiser Steel. This was followed by thirteen years in Globe, AZ working in the copper smelter. After leaving Globe he joined Performance Associates International as a consultant and spent time in Zambia and South Africa working in the copper smelter of ZCCM and the nickel/platinum smelters of AngloPlatinum. He formed his own consultancy – JnL Consulting – in 2004 and continued working in Africa. His last position was with Ruashi Mining in the Democratic Republic of the Congo. Larry retired to his beloved desert home in Marana, AZ in 2013.

Larry is survived by his wife, Terry Ulibarri-Lee, his sister, Kelly Lee, two children – Robin Hyde and Sean Lee - and three grandchildren.

Jonathan Mark Stickland



(B.S. 1977, Petroleum Engineering) was born August 16, 1951. A remarkably intelligent kid, Jon excelled in school, skipped two classes, and graduated early from Concord High School before coming to New Mexico Tech.

After his military service, Jon's engineering career began. His goal when he started in the oilfield was to be a Vice President by the time he turned 35. At 35 and two months, he achieved his goal. Over the course of his career Jon worked in numerous locations and was highly sought after by many companies. He was renowned throughout the oil and gas industry for his knowledge, experience, expertise, and above all, his integrity. In 2022, Jon celebrated his official retirement from a 44-year career.

Jon married Jenny Spence on November 20, 1981. They had three children: Jonathan Spence, Leslie Elizabeth, and Sarah Lynne. Jon was a devoted husband and father. Jon and Jenny lived most of their 41 years of marriage in Texas, with a 7-year stint in Anchorage, AK. He was so proud of all his children, supporting them as each chose their path and expanded to families of their own. His grandkids were his greatest joy, and Papa was his most exciting adventure.

Jon's integrity, generosity, and ever-ready smile were rooted in his deep faith in Jesus Christ. People knew that when Jon entered a room, he would do so smiling, and when anyone needed it, he had a bear hug waiting. Because of his faith in Jesus, we can rest assured that he entered into his Father's arms with that same smile and hug that was returned with even more strength and love than he himself could give.

Peter Torczynski



(B.S. 2008, Basic Sciences), passed away on December 5, 2023. He is survived by his parents, John and Jeanne Torczynski, his younger sister, Karen Simmons (NMT 2010), her husband, Phil (NMT 2008), and many aunts, uncles, and cousins.

In 2004, Peter began studying Information Technology at New Mexico Tech. While an undergraduate, he was a computer science intern at Sandia National Laboratories. After graduating, he accepted an IT position at Sandia. His responsibilities ranged from supporting users of legacy systems to providing customers with cutting-edge technology solutions. Peter ultimately found his niche when he became his department's specialist in Cisco networking.

From Peter's earliest days, he was fascinated by "real things" and technology. These interests ultimately blossomed into his primary hobbies: computers, cars, 3D printing, and cats. A friend gave Peter an old computer in the 1990s. This began his lifelong enjoyment of building computers. At his home in Edgewood, Peter had plenty of space to work on his eight vehicles. He particularly loved working on old Jeeps. Peter also built many 3D printers and used CAD programs to design printable objects. In 2009, Peter acquired two rescue cats, whom he loved dearly. During his last years, Peter acquired two more rescue cats, who were a great source of comfort.

Peter loved to learn. He was a kind person and a loyal friend, and he was always generous in using his knowledge and skills to help others. A more detailed obituary can be found at <https://www.frenchfunerals.com/obituaries/peter-torczynski>. Donations in Peter's memory can be made to Animal Humane New Mexico at <https://animalhumanenm.givecloud.co/>.

Donald A. Wolfel, M.D.



longtime friend and supporter of New Mexico Tech, passed away on November 3, 2023, in Ruidoso, NM. Dr. Wolfel was born on July 25, 1928, in Baltimore, MD.

Dr. Wolfel had a long and dedicated career in medicine, graduating from the University of Maryland School of Medicine in 1952. In 1953 he entered the Army, and in 1958 he received a degree in Radiology from the American Board of Radiology. Dr. Wolfel's high point in his very long career was the 26 years he spent as the Radiologist for LCMC in Ruidoso (1992-2018). When he retired at the age of 90 in 2018, the Lincoln County commissioners recognized his service by pledging the name of the Radiology Department at Lincoln County Medical Center after him. This was unveiled on July 3, 2018.

Dr. Wolfel had served as chair of the LCMC Foundation since 2011. He also served as a member of the LCMC Board of Trustees for over 10 years.

Through his service, he touched many lives, and he will be remembered for his extensive knowledge, caring and dedication to his patients. Dr. Wolfel was also a dedicated teacher to the radiology staff as well as to the next generation of medical students.

Dr. Wolfel is survived by his loving wife, Cynthia Wolfel; son, Steve Wolfel; daughter, Donna Hale; many other family members, and special lifelong friends.

NEW MEXICO TECH RUGBY WELCOMES NEW COACH

New Mexico Tech Rugby celebrates the arrival of new head coach Jason Oliphant. A resident of a small town outside Durban, South Africa, Oliphant's playing career included the Golden Lions Under 21 side, the Guateng Falcons, and a short stint with the Old Blue of New York.

After a successful career in the restaurant business, Oliphant returned to rugby to start coaching. He immediately jumped into coaching the junior side of Valke, a team that features in the Currie Cup, a professional league in South Africa.

Since 2017, Oliphant has taken the reins of two different college sides – Wits University and University of KwaZulu-Natal. In 2023, he graduated from a highly selective, 18-month long Elite Coaching Programme run by South Africa Rugby.



THREE MINERS FIND RUGBY HEAVEN IN SOUTH AFRICA

By Taylor Dotson, NMT Associate Professor and Miners Rugby team manager

For three NMT Miners, a recent memorable summer involved playing rugby in South Africa. When the opportunity to train at the Western Province Rugby Academy in Cape Town, South Africa, came knocking, Nick Hutt (Civil Engineering), Cian Jones (Mechanical Engineering), and Jaime Terrazas (Technical Communication) jumped at the chance.

All three student athletes figure prominently in New Mexico Tech's roster. Hutt has quickly become a central pivot point in the backline. Jones was brought on as a scholarship player in 2022, typically slotting in at fullback. Terrazas leads the pack from number 8.

La Cueva High School and New Mexico Selects coach, and Cape Town native, Johan Botha reached out to Namibian NMT players-turned-coaches Freddie Puriza (Civil Engineering) and Milaan Van Wyk (Mineral Engineering) to see if any Tech players were interested in advancing their rugby skills abroad.

The schedule was demanding. The average day started with either a gym session or life skills class at 8:30 a.m., followed by on-field rugby training. The three profited from one-on-one instruction from

well-pedigreed South African coaches. Each day focused on different rugby techniques. Sometimes they worked on defensive line speed or handling.

Twice a week, the group traveled to Millnerton for a two-hour training session with Unimill RFC, a team that plays in the top amateur division in South Africa. Saturdays were rugby days. Hutt and Jones featured in Unimill's U20 (under 20) side, while 23-year-old Terrazas ended up becoming vice captain for the third team – nothing to sniff at for an American with only a few years' experience.

The highlight for Hutt and Terrazas was a match against a competing rugby training center, the Stellenbosch Academy of Sport. "The vibe was unreal," said Hutt. The trio also got a taste of South Africa's vibrant rugby culture. The stands were packed for club matches, with barbecues (called braais in Afrikaans) blazing. "Anytime you made a hit, the crowd cheered," said Hutt.

Fortunately, training sessions didn't consume the entire day. The trio had arrived just in time to take in the World Rugby U20 Championships. They were able to attend most of the matches, and rub shoulders with some of the biggest names in rugby,

RUGBY



(L to R) Cian Jones, Jaime Terrazas, and Nick Hutt

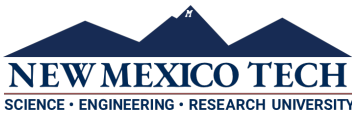


Time for a hike above Cape Town on Table Mountain

including current England No. 8 Billy Vunipola and former Springbok center Adrian Jacobs. There was also time for exploring Cape Town and hiking the city's famous Table Mountain.

Unfortunately, injuries put an early end to two of the Miners' otherwise idyllic summer of rugby. Jones suffered a season-ending rotator cuff tear and had to return stateside for surgery. Hutt sprained his ankle in a match against Atlantis Rugby two weeks before he was due home. Terrazas managed to stay game fit, but faced a problem familiar to many college students. "The biggest challenge was getting enough to eat," said Terrazas. Under the grueling training regime and with a budget stretched past its limit by international travel, he struggled to meet his caloric needs.

A passionate and dedicated supporter of New Mexico rugby, Johan Botha hopes to continue to send players to South Africa on an annual basis. Jones, Hutt, and Terrazas are keen to share their experiences and newfound skills with their teammates back home.



Office for Advancement
801 Leroy Place, Socorro, NM 87801

575-835-5352
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If you are 72 or older, you can use your individual retirement account (IRA) to support New Mexico Tech.

Please call or email to learn about how you can create your legacy by making an IRA charitable rollover gift this year.

THE NEW MEXICO TECH ORAL HISTORY PROJECT

By Steve Simpson, Dean of Arts & Sciences

Techies abound with stories, as we have recently learned from the Athena Scientifica StorySlam competition at this year's 49ers. For as good as we are at telling our stories (and we have all seen the great Frank Etscorn work his magic!), we have not always been the best at formally recording and preserving our story.

Also with a few notable exceptions, among them Paige Christensen's slim histories and Joe Chew's Storms Above the Desert, there are few written histories of New Mexico Tech, and even fewer that record history into the present day.

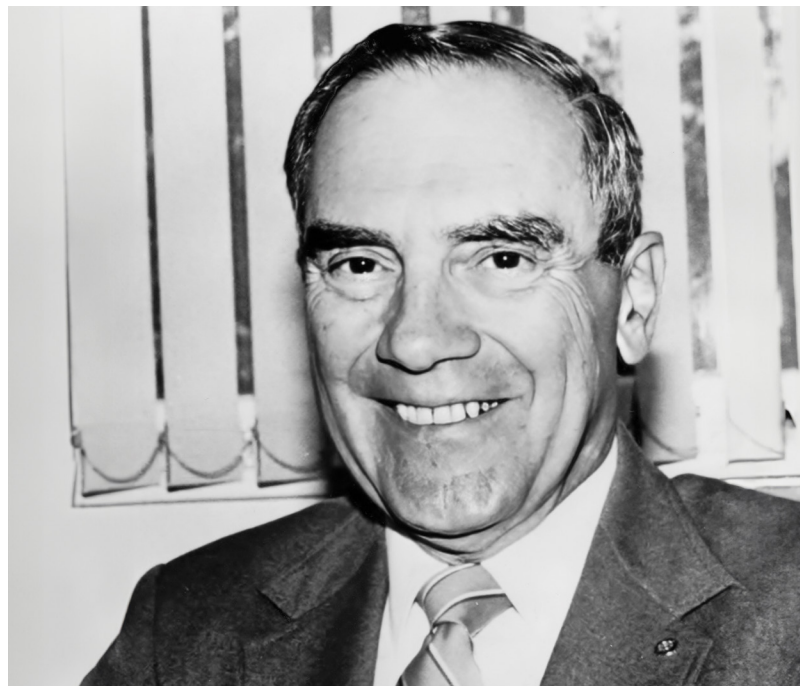
It is for this reason that the New Mexico Tech Oral History Project was started. The project goal is to collect and transcribe personal narratives of the formal and informal history of New Mexico Tech and the surrounding region. The transcribed interviews will be housed in the Skeen Library archives, with a public-facing website providing access to anyone inside or outside the Tech community.

The project commenced in Fall 2023 with interviews of former presidents Ken Ford (98 years old) and Larry Lattman (who just turned 100). Over the next year, interviews will be conducted with current and former administrators, faculty, alumni, and Socorro residents for their memories, reflections, and stories — both serious and whimsical. StorySlam contestants signed deeds of gift donating their stories to the Skeen Library archive in support of this project. I am also interested in collecting stories related to NMT's connections with the Manhattan Project and the Trinity Test. Graduate students in NMT's newly-established MS in Public Engagement in Science, Design, and Communication will be brought on board to assist with interviews, editing, and archiving. Likely, we will make submissions publically available in Fall 2024.

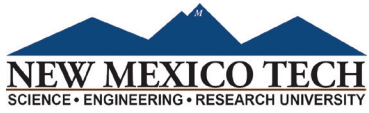
An oral history's richness lies in its overlapping tales (e.g., we have collected very different accounts of the marijuana leaf painted in the NMT swimming pool!), so we invite your participation! If you wish to be interviewed, or if you have interviewee suggestions, please email Dr. Steve Simpson, Dean of Arts & Sciences (Steve.Simpson@nmt.edu). Monetary donations to pay for transcription costs are also welcome. Donations can be made – by check or online at <https://advancement.nmt.edu/nmt-pages/donate-class> to the CLASS Department Gift Fund with the memo/comment "Oral History Project."



Ken Ford (NMT President 1975 - 1983)



Larry Lattman (NMT President 1983 - 1993)



New Mexico Institute of Mining and Technology

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