UNR imaging microscope to enhance advanced manufacturing, research

By Mike Wolterbeek

A group of UNR scientists and engineers is getting a million dollar microscope, the only one of its kind in Nevada.

It's the latest generation of focused ion-beam scanning electron microscope. Several projects are under way at the university that will use the new equipment, and it opens new avenues of materials and advanced manufacturing research.

Professor Dhanesh Chandra has been trying for several years to get funding for this specialized microscope. He just finished a three-year research project using FIB and Atom Probe tomography analyzing materials, and had to travel to Northwestern University in Illinois to use their machine for his work.

"Having this machine on campus will enhance the research productivity immensely, both for our students as well as for others here at the university who need it for their research," Chandra, who works in the materials and chemical engineering department, said.

The room-sized system, funded through the Major Research Instrumentation grant from the National Science Foundation, meets a critical need as a tool for synthesis, characterization and fabrication for materials and devices at the nanometer-to-atomic length scales. It can produce ultra-high resolution images for characterization and the fabrication of these structures.

"It has very broad applications; it's interesting to basic

science, as well as applied science," Sid Pathak, assistant professor in the chemical and materials engineering department and team leader of the proposal-team, said. "This will give us more information on the structure of material, allow us to fabricate thinner samples and much higher image resolution."

Pathak is one of several researchers who has projects that will use the dual, ion-beam microscope. Others are Mario Alpuche in the biology department, Bin Li in the chemical and materials department, and Andrew Geraci in the physics department.

Projects slated for the new scope include research on structures of galvanized, high-strength steels for automotive applications; studies at the atomic scale of glassy metals to better understand atomic arrangements or clusters; probing nanoscale damage gradients in irradiated materials, measuring non-Newtonian gravity behavior at the nanoscale with devices built using the microscope; studying laser generated strain rates of nanomaterials; and investigation of nanostructured catalytic materials for transformation of biomass to biofuel.

It will also attract new research. The microscope is essential for the research cluster for advanced manufacturing at the university, which was recently established in response to the resurgence of manufacturing at the state and national level. Applications of the focused ion-beam microscope to the ongoing research in materials science, physics, chemistry and other disciplines is expected to result in new advances and breakthroughs along these fronts.

It will advance multidisciplinary research programs in science and engineering, ranging from structural engineering materials, energy and functional materials to nanostructured materials and devices and fundamental physics.

The ion-beam microscope was funded with a 70/30 cost-share grant from the National Science Foundation, which awarded the

university $640,000.

Mike Wolterbeek works for UNR.

Government shutdown moderately impacts Tahoe

Note: *While the shutdown came to end late Monday, it could start all over again in three weeks.*

By Kathryn Reed

One of the casualties of the federal government shutdown is the impact on the meteorological conference taking place on the South Shore.

"We lost two speakers who were going to discuss fire safety issues and updates—a meaningful topic in light of Napa/Sonoma and SoCal fires. We adjusted and had another speaker talk about potential effects of shut down on weather issues," Phil Weidinger with Weidinger Public Relations told *Lake Tahoe News.*

The shutdown that started last week is fluid in that lawmakers are continuing to negotiate a deal that could resolve the situation at any time. Tied to the funding measure and complicating matters is the issue of immigration.

The U.S. Forest Service is the major government agency in the Lake Tahoe Basin. All employees were told to report to work on Monday. However, most employees will be told to go home, with law enforcement staying on. For others there are protocols to adhere to before they can turn off the office lights.

As with past shutdowns, federal government workers are not guaranteed a paycheck while not working. It is essentially forced time off without pay and without knowing when they'll be ordered back to work.

Congress members, though, continue to get paid even though they are the ones who caused the shutdown.

One agency still open is the U.S. Coast Guard in Tahoe City. "We're always open," is what they told *Lake Tahoe News.*

South Lake Tahoe has a local FBI office.

"All FBI agents and support personnel in field offices are excepted from furlough. Select personnel at FBI headquarters will be designated as excepted to provide direction and investigative support to all field operations and select headquarters functions," FBI officials said in a statement.

Carl Hasty with the Tahoe Transportation District said of the shutdown, "It affects us, but at this time it does not directly affect our bus service." There can be delays in processing requests and other administrative steps.

The shutdown is not affecting the Tahoe Regional Planning Agency's day-to-day work.

If a project involved a federal partner, communication has stopped. That's the case, though, for all entities dealing with the feds.

Douglas County will "monitor the situation as it unfolds," according to County Manager Larry Werner. He told *Lake Tahoe News* at this point there are no known impacts locally.

In the early stages the shutdown should not be problematic for any local jurisdiction.

SLT warm room proving to be a good neighbor

By Kathryn Reed

All the angst about the warm room in South Lake Tahoe opening on Rufus Allen Boulevard was for naught.

The seasonal overnight shelter, now in its third year, is just another business in the neighborhood. Even though some **residents last month balked** at the idea of having "these people" be so close, the fears have not come to fruition.

Lake Tahoe Unified School District's board received an update about the facility at its meeting last week. Bus stops and facilities are nearby. Plus, the local Boys & Girls Club chapter is at the old Al Tahoe school site, still owned by the district.

Jude Wood, who runs the after school program, told the board there have been no issues with warm room guests. In fact, she expressed how she would rather explain to her children and those she cares for that the person walking down the street is someone the community is trying to help, instead of seeing someone sleeping on the lawn at St. Theresa's and telling the child the community had turned its back on that person.

This year the warm room is operating in a building owned by the city of South Lake Tahoe that most recently housed Unity at the Lake church.

The district has been part of the solution by putting in better security at the Al Tahoe building so warm room clientele can't just wonder in.

Rachel Yaker and Annie Davidson with Tahoe Homeless Coalition made a formal presentation to the board, outlining the proactive measures undertaken to make sure everyone feels secure. In large part it has to do with the hours – when people can arrive and leave. Security has been hired as well.

This week Tahoe Homeless Coalition volunteers will be training employees at the recreation center and ice rink about how to handle this clientele.

These people were already in the area. The library is a common place for people to hang out during the day if they don't have a home to go to.

The fact that Bread & Broth has been in operation for 29 years down at the street at the Catholic Church without a problem for the neighborhood says a lot. It's not unusual for those diners to queue up an hour before the doors open.

The fact that no one spoke against the warm room at the Jan. 16 meeting, or simply brought up a concern speaks volumes for how well the facility has addressed the apprehension of the naysayers from just a month ago.

While the warm room advocates would like to find a permanent facility, funds have not allowed that happen. Plus, it's a seasonal operation, so that can be an issue with securing the same rental year-in and year-out.

California Realtors plot statewide database

By Jeff Collins, San Jose Mercury News

Is the Realtor-run property listing service in California obsolete?

Several brokers, agents and “multiple listing service” operators expressed concern during a panel discussion this month that commercial websites like Zillow, Redfin and Realtor.com have overtaken the patchwork of industry databases agents use to find homes for clients.

“The world of big data doesn’t seem to have come to the MLS in any meaningful way,” said David Silver-Westrick, a partner at San Clemente-based Keller Williams OC Coastal Realty. “We’re missing the boat on lots of big data opportunities. To the extent that consumers have better tools than we do, we just become irrelevant.”

Read the whole story

Tax overhaul a blow to affordable housing efforts

By Conor Dougherty, New York Times

The last time that Congress approved a sweeping overhaul of the federal tax code, in 1986, it created a tax credit meant to encourage the private sector to invest in affordable housing. It has grown into a $9 billion-a-year social program that has funded the construction of some three million apartments for low-income residents.

But the Republican tax plan approved last month amounts to a vast cutback, making it much less likely that such construction will continue apace. Because the tax rate for

corporations has been lowered, the value of the credits – which corporations get in return for their investments – is also lower.

“It’s the greatest shock to the affordable-housing system since the Great Recession,” said Michael Novogradac, managing partner of Novogradac & Company, a national accounting firm based in San Francisco.

Read the whole story

---

5 measures will be on 2018 ballot in Nevada

By Las Vegas Review-Journal

From bolstering protections for crime victims to eliminating taxes on tampons and medical supplies, Nevadans this year will vote on a slew of new measures.

Secretary of State Barbara Cegavske on Thursday released five questions facing voters in the November election.

Read the whole story

Deal cemented to bring

broadband to Truckee

An agreement between Truckee Donner Public Utility District and Plumas-Sierra Telecommunications is bringing broadband coverage to the Truckee area.

PST will leverage existing TDPUD fiber optic infrastructure and facilities to expand high-speed internet services in Truckee.

PST is currently serving key commercial districts where TDPUD infrastructure and fiber is present. Tahoe Forest Hospital has been on the system since August, and PST is working to activate other accounts in the area.

The area around Highway 89 and Interstate 80 are well covered by PST services as well as the business districts. Residential areas may be served depending on the level of interest and the costs for PST to connect. Expansion of broadband services to new areas will also be facilitated by TDPUD's expansion of its infrastructure.

There is an opportunity for homeowners associations and their members to work together to facilitate PST bringing services to subdivisions.

The way snow is falling and melting is changing

By Daniel Rothberg, Bloomberg

Between droughts and floods, the last decade has offered water managers in the southwest a preview of how climate change

could impact a supply largely dependent on winter snow. This year's disappointing snowpack has them worried again.

"Water and climate change are joined at the hip," said Brad Udall, a researcher at Colorado State University who published a paper earlier this year showing how climate change has reduced flows in the Colorado River. "One of the primary impacts of a warming atmosphere are changes to our water cycle."

Snowpack is 50 percent lower than the average at this point in the winter at dozens of basins in the region. It's a major concern in a region with a growing population where water supplies are often pushed to their limits, even in good years. In addition to fueling the West's winter tourism industry, the snow provides a steady supply of water for the Colorado River, which serves 40 million people spread from Denver to Los Angeles.

Read the whole story

Suspect sought in stolen credit card caper

Detectives believe this man is using stolen credit cards. Photo/Provided

Credit cards stolen from a trailhead parking lot off Mt. Rose Highway have been used at multiple locations in Kings Beach, a gas station in San Ramon, and at several locations in Reno, including Walmarts.

Washoe County sheriff's detectives want help identifying the suspect in the vehicle break-in. It occurred Jan. 1. The suspect broke the window, stole a number of credit cards along with identification and keys.

Anyone with information is asked to contact the Washoe County Sheriff's Office Detective Division at 775.328.3320 or Secret Witness at 775.322.4900.

– Lake Tahoe News staff report

Will the weather get worse in 2018?

By Lindsay Beevers, The Conversation

Last year unleashed some catastrophic weather across the world. At the beginning of 2017, Australia experienced one of the hottest summers on record in Sydney and Brisbane, followed by a killer summer heatwave across southern Europe and wildfires triggered by heat in California.

The Atlantic hurricane season was particularly active, recording three mighty category 5 hurricanes – Harvey, Irma

and Maria – resulting in significant casualties. The cost of the damage across the American continent was in excess of $260 billion.

At the same time, the 2017 monsoon season brought considerable rains to the Indian subcontinent, and resulted in devastating floods in parts of India, Pakistan, Nepal and Bangladesh (one of the most flood vulnerable countries in the world), causing more than 1,000 deaths.

At the end of 2017, we could look back at the statistics and see that globally it was the warmest non-El Nino year on record. El-Nino is the warming part of the El-Nino Southern Oscillation (ENSO) cycle which affects global ocean and atmospheric currents and can create powerful storms and hurricanes.

In a world that is getting warmer, what does that mean and what might 2018 hold for weather across the globe? Are we destined to see more and more of these "unusual" and catastrophic weather events which result in significant devastation? What effect will climate change have on our weather and will this become the new norm?

Looking at the facts

First, we need to untangle the difference between weather and climate change, something President Trump seems to confuse. In a nutshell, the difference is time. Weather is the conditions in the atmosphere over a short period of time. Climate is how the atmosphere behaves over a longer period of time. When we talk about climate change, that generally means changes in long-term averages of daily levels of temperature and rainfall. So we may see a change in average or typical weather over a number of years, but we can still experience extremes in any one year.

Recently, scientists have used robust event attribution where natural or human influences on particular events are studied

to understand the role climate change may play in particular weather events. This can help support future regional contingency planning.

This also helps us to understand the role climate change has played in past events such as heatwaves, wildfires, droughts, or extreme flooding and some of their large-scale drivers such as ocean and atmospheric patterns of warming and cooling, like El-Nino.

Looking at the past there are many factors which control the onset, spread and eventual impact of a big weather event. But not all of these factors are climatic and many relate to things such as urbanisation, engineering interventions or land-use changes.

What the future looks like

According to the Intergovernmental Panel on Climate Change IPCC, an international body set up to assess the science of climate change, we can continue to expect an increase in the average global temperature. That means we will be experiencing warmer years in the future.

But at the same time, we may see changes to the extremes, which could become more frequent in the case of high temperature or heavy rainfall, or less frequent in the case of extreme cold. This means that the distribution, occurrence and expected averages of our weather (for example, temperature and rain) throughout the year may change, resulting in warmer years on average with more extreme hot days, and fewer extreme cold days in the future.

This pattern has a direct link to such phenomena as heatwaves, which are caused by more extreme temperatures. The links to droughts or periods of extreme low flows in rivers are more complex. Global Circulation Models (GCMs) – a collection of numerical models that provide a 3D analysis of global climate interactions such as atmosphere, oceans, ice and land –

predict increases in temperatures for some regions, such as southern Europe.

In terms of tropical cyclones, the effects of climate change on these phenomena is an active area of research as the processes are complex. For example, the Clausius-Clapeyron relationship which can be related to the water vapor-carrying capacity of the atmosphere, may have an impact on the strength and intensity of such storms.

The relationship states that for every degree rise in temperature, the water-holding capacity of the atmosphere increases by 7 percent, so in a warming ocean, the air above the water has a much greater capacity to hold water and thus store more rain that can feed more powerful storms.

But sinking cold air from the upper atmosphere may prevent storms from rising in the first place. If this happens more frequently with climate change then we can expect fewer such storms. That means in the future there may be fewer tropical cyclones forming, but those that do will be stronger and more intense.

Wet, wet, wet

In a warming world, we can expect it to get wetter. The distribution of the rainfall throughout the year could change as we experience longer, drier spells, although when rain falls it may be in intense bursts. Recent research by Newcastle University analyzed the results from finer scale GCMs climate projections and suggests we may expect more intense summer rainfall in the UK in future. New climate projections from GCMs are being prepared for the UK to help predict what the future climate may look like.

Flooding from intense rainfall or river sources has many complex drivers which cause the damage in catchment areas. For example, land use changes (such as intensive farming practices or deforestation) and the degree of urbanization both play a

part in flood risk. Recent research for the UK suggests that we will see an increase in the frequency of extreme river flooding.

So what can we expect for 2018? Already Australia is experiencing extreme heat, while the eastern seaboard of the U.S. is suffering a severe cold spell, and the west coast devastating mudslides that have killed 17 people. So far 2018 seems to be picking up right where 2017 left off.

Governments need to recognize and absorb that extreme weather across the globe is likely to become more common and start to adapt accordingly, rather than treat it as shocking one-off events. Otherwise we risk increasing loss of life and environmental damage in the future.

Lindsay Beevers is a professor and chair of the Futures Forum at Heriot-Watt University.