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MONTEREY INSTITUTE FOR RESEARCH IN ASTRONOMY

SMALL INSTITUTE MAKES BIG SCIENTIFIC ADVANCES



PHOTOS BY MCKENZIE PRILLAMAN — HERALD CORRESPONDENT

Daniel Cotton discusses the recently published study he led. The research relied on a special tool called a polarimeter, which is on the desk in front of Cotton.

By McKenzie Prillaman
newsroom
@montereyherald.com

MARINA » Tucked beyond an expanding shopping center and a row of recently built houses off Highway 1 lies a cluster of Fort Ord-era buildings. In these structures — which once were a top-secret military training facility — astronomers investigate far-away worlds.

The Monterey Institute for Research in Astronomy is a privately-funded nonprofit astronomical observatory dedicated to research and education. Today, about a dozen astronomers and six community scientists comb through data provided by their observatory on Chews Ridge in the Los Padres National Forest. Donations from the group Friends of MIRA and grants from NASA and the National Science Foundation fund their work.

Although the institute is small, its scientists have published innovative re-

search during its 50-year history.

For instance, according to Bruce Weaver, director and co-founder of MIRA, the institute's scientists were the first to apply machine learning to astronomy in the early 1990s — Weaver trained a computer program to categorize stars based on a characteristic that identifies the substances in their atmospheres. Additionally, a recently published study documents how researchers used a special tool to learn features about a type of star responsible for releasing ingredients to make new galaxies.

"The vast majority of high impact astronomy research is conducted at large universities, (but) MIRA has been bucking this trend for 50 years," said Daniel Cotton, a research astronomer at MIRA and lead author of the new study. "Our (recent) discovery ... is just the latest example of this. It reaffirms that with public support, a small insti-



The Monterey Institute for Research in Astronomy offices in Marina.

tion can punch above its weight and reveal new things about the universe we live in."

Breaking away from universities

In the early '70s, a group of graduate students at Case Western Reserve University in Ohio was unhappy about their job prospects. They didn't want to work at a university because that meant teaching in conjunction

with conducting research.

Instead, in 1972, the six astronomers, one mathematician and two spouses founded MIRA, the first private observatory to open in the U.S. in the 20th century. This way, they could devote their full attention to research and avoid the bureaucracy accompanying federal funding and university affiliation.

Building their workplace came with other advantages, according to Weaver. "Since

SCIENCE » PAGE 3

CRISIS IN EUROPE

Ukraine calls the West cowards

By Yuras Karmanau
The Associated Press

LVIV, UKRAINE » Ukrainian President Volodymyr Zelenskyy accused the West of cowardice Sunday as his country fights to stave off Russia's invading troops, making an exasperated plea for fighter jets and tanks to sustain a defense as the war ground into a battle of attrition.

Speaking after U.S. President Joe Biden said in a lacerating speech that Russian President Vladimir Putin could not stay in power — words the White House immediately sought to downplay — Zelenskyy lashed out at the West's "ping-pong about who and how should hand over jets" and other weapons while Russian missile attacks kill and trap civilians.

"I've talked to the defenders of Mariupol today. I'm in constant contact with them. Their determination, heroism and firmness are astonishing," Zelenskyy said in a video address, referring to the besieged southern city that has suffered some of the war's greatest deprivations and horrors. "If only those who have been thinking for 31 days on how to hand over dozens of jets and tanks had

WEST » PAGE 3

POLITICS

Biden finds no respite at home after returning

By Chris Megerian and Aamer Madhani
The Associated Press

WASHINGTON » With the last nine, unscripted words of an impassioned speech about Russia's aggression in Ukraine, President Joe Biden created a troubling distraction, undermining his effectiveness as he returned home to face restive Americans who strongly disapprove of his performance on issues that matter most to them.

His comment that Russia's Vladimir Putin "cannot remain in power" — an assertion that his aides were forced to quickly clean up — overshadowed his larger message of solidifying the western coalition that's confronting Moscow.

BIDEN » PAGE 3

FOREIGN RELATIONS

Blinken reassures allies ahead of Iran deal

The U.S. Secretary of State tried to reassure a wary Israel ahead of a possible renewal of an Iran nuclear deal. PAGE A5



ASIA

Taliban now preserving Kabul's Buddha statues

Afghanistan's Taliban rulers are pinning their hopes on Beijing's help to salvage their economy. PAGE A8

CRISIS IN EUROPE

War shakes path to energy, climate goals

Europe's most pressing concern before Russia's war in Ukraine was reducing carbon emissions. PAGE A6

COVID-19

Don't know how to make a booster appointment?

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West

FROM PAGE 1

1% of their courage.”

Ukraine’s ambassador to the U. S., Oksana Markarova, said on NBC’s “Meet the Press” that her country had heard Biden “loud and clear.”

“Now, it’s all up to all of us to stop Putin while it’s still local in Ukraine because this war is not only about Ukraine,” she said, but “an attack on democracy.”

Russia’s invasion of Ukraine, now in its 32nd day, has stalled in many areas. Its aim to quickly encircle the capital, Kyiv, and force its surrender has faltered against staunch Ukrainian resistance — bolstered by weapons from the U.S. and other Western allies.

Zelenskyy signed a law Sunday that bans reporting on troop and equipment movements that haven’t been announced or approved by the military. Journalists who violate the law could face three to eight years in prison. The law does not differentiate between Ukrainian and foreign reporters.

Britain’s Defense Ministry said Russia’s troops are trying to encircle Ukrainian forces facing the two separatist-held areas in the country’s east. That would cut the bulk of Ukraine’s military off from the rest of the country.

Moscow claims its focus is on wresting the entire eastern Donbas region, which has been partially controlled by Russia-backed separatists since 2014. A high-ranking Russian military official said Friday that troops were being redirected to the east from other parts of the country.

The leader of one separatist-controlled area of Donbas said Sunday that he wants to hold a vote on joining Russia, words that may indicate a shift



RODRIGO ABD — THE ASSOCIATED PRESS

Members of the territorial defense warm themselves with a fire at a check point in Kyiv, Ukraine.

in Russia’s position. Leonid Pasechnik, the head of the self-proclaimed Luhansk People’s Republic, said it plans to hold a referendum on becoming part of Russia “in the nearest time.”

Russia has supported the separatist rebels in Luhansk and neighboring Donetsk since an insurgency erupted there shortly after Moscow annexed the Crimean Peninsula from Ukraine in 2014. In talks with Ukraine, Moscow has demanded Kyiv acknowledge the independence of Donetsk and Luhansk.

Kyrylo Budanov, the head of Ukrainian military intelligence, accused Russia of seeking to split Ukraine in two, like North and South Korea.

“The occupiers will try to pull the occupied territories into a single quasi-state structure and pit it against independent Ukraine,” Budanov said in a statement released by the Defense Ministry. He predicted that

guerrilla warfare by Ukrainians would derail such plans.

A Ukrainian delegate in talks with Russia on ending the war, Davyd Arakhamia, said in a Facebook post the countries would meet in Turkey beginning Monday. However, the Russians then announced the talks would start Tuesday. The sides have met previously with no deal reached.

Ukraine says that to defeat Russia, the West must provide fighter jets and not just missiles and other military equipment. A proposal to transfer Polish planes to Ukraine via the United States was scrapped amid NATO concerns about being drawn into direct fighting.

In his pointed remarks, Zelenskyy accused Western governments of being “afraid to prevent this tragedy. Afraid to simply make a decision.”

“So, who is in charge of the Euro-Atlantic community? Is it still Moscow, thanks to its scare tactics?” he asked. “Our partners must step up their aid to Ukraine.”

His plea was echoed Sunday by a priest in the western city of Lviv, which was struck by rockets a day earlier. The aerial assault illustrated that Moscow, despite assertions that it intends to shift the war eastward, is willing to strike anywhere in Ukraine.

“When diplomacy doesn’t work, we need military support,” said the Rev. Yuri Vaskiv, who reported fewer parishioners in the pews of his Greek Catholic church, likely because of fear. Referring to Putin, he said: “This evil is from him, and we must stop it.” Russian Defense Ministry spokesman Maj. Gen. Igor Konashenkov confirmed Russia used air-launched cruise missiles to hit a fuel depot and a defense plant in Lviv, about 45 miles (75 kilometers) from the Polish border. He said another strike with sea-launched missiles destroyed a depot in

Plesetske just west of Kyiv, where Ukraine stored air defense missiles.

A chemical smell lingered in Lviv on Sunday as firefighters trained hoses on flames and black smoke poured from oil storage tanks hit in the attack.

A security guard, Yaroslav Prokopiv, said he saw three rockets destroy two oil tanks but no one was hurt.

Russia’s back-to-back airstrikes shook the city that has become a haven for an estimated 200,000 people who have fled bombarded towns and cities. Lviv, which has largely been spared bombardment, also has been a waystation for most of the 3.8 million refugees who have left Ukraine since Russia invaded on Feb. 24.

In a dim, crowded bomb shelter under an apartment block near the first blast site, Olana Ukrainets, a 34-year-old information technology professional, said she couldn’t believe she had

to hide again after fleeing from the northeastern city of Kharkiv, one of the most bombarded cities.

“We were on one side of the street and saw it on the other side,” she said. “We saw fire. I said to my friend, ‘What’s this?’ Then we heard the sound of an explosion and glass breaking.”

In his video address, Zelenskyy angrily warned Moscow that it was sowing a deep hatred for Russia among Ukrainians.

“You are doing everything so that our people themselves leave the Russian language, because the Russian language will now be associated only with you, with your explosions and murders, your crimes,” Zelenskyy said.

Along with the millions of people who have fled Ukraine, the invasion has driven more than 10 million people from their homes, almost one-quarter of Ukraine’s population. Thousands of civilians are believed to have been killed.

While Russia’s advance on Kyiv remains stalled, fighting has raged in the suburbs, and blasts from missiles fired into the city have rattled the St. Sophia Cathedral, a 1,000-year-old UNESCO world heritage site that is the heart of Ukrainian spiritual and national identity.

Vadim Kyrlyenko, an engineer and conservator who is the most senior manager remaining at the church, said a strike nearby “would be a point of no return for our landmark because it is very fragile and vulnerable.”

Pointing at the cathedral’s golden domes, Kyrlyenko said the cross atop the central one toppled a month before the outbreak of World War II. “The cross on the left fell a month before this war,” he said.

Andrea Rosa in Kharkiv, Nebi Qena in Kyiv, Cara Anna in Lviv and Associated Press journalists around the world contributed to this report.

Biden

FROM PAGE 1

It punctuated another frustrating moment for an administration that’s struggled to regain its footing — and the American electorate’s support — in the face of an ongoing pandemic, escalating inflation and an increasingly complicated foreign policy crisis that raises the specter of nuclear conflict.

Although he’s forged a united front to punish Russia with sanctions for the invasion of Ukraine, polls show Americans feel no better about his leadership as the bloody war continues. Meanwhile, Democrats are in danger of losing control of Congress in November’s midterm elections, leaving Biden with limited opportunities to advance a progressive domestic agenda that remains stalled.

The president is on the verge of securing the confirmation of the first Black woman, Ketanji Brown Jackson, on the U.S. Supreme Court, yet there’s no clear path forward for him to fulfill other campaign promises around voting rights, criminal justice reform and fighting climate change. While polls show that Jackson is broadly supported by Americans, it hasn’t helped improve Biden’s standing with vot-

ers less than eight months before the midterms, which Republicans hope to frame as a referendum on the president.

The war in Russia has consumed much of the White House’s messaging bandwidth, but Biden is looking to turn the spotlight onto some of his domestic priorities this week.

He is expected to unveil a new budget proposal on Monday, which includes a renewed focus on cutting the federal deficit and a populist proposal to increase taxes on the wealthiest Americans.

If approved by Congress — far from a certainty — households worth more than \$100 million — a measurement of wealth, not income — would have to pay a minimum tax of 20% on their earnings.

The added revenue could help keep the deficit in check and finance some of Biden’s domestic priorities, including expanded safety net programs. There are few if any signs of Republican support for the proposal so far, and even some Democrats have been lukewarm to the idea.

Biden’s case isn’t helped by his approval ratings. A slim 34% of Americans think Biden is doing a good job handling the economy, which is normally the top issue for voters in an election year, according to a poll released Thursday by



CAROLYN KASTER — THE ASSOCIATED PRESS

President Joe Biden arrives on Marine One on the South Lawn of the White House after a four-day trip to Europe.

The Associated Press-NORC Center for Public Affairs Research.

His contentious assertion about Putin in his Warsaw speech did little to help things. The White House rushed to clarify that Biden wasn’t actually calling for “regime change,” but by the next day it became clear that the dramatic statement had produced some of the first overt cracks in unity among NATO nations that had just convened in Brussels for an emergency meeting.

Some leading Western European allies, including France and Germany, tend to be more cautious than the U.S. about how to confront Russia. Until Saturday night, Biden had calibrated his words carefully. French President Emanuel Macron said Biden’s remarks could

make it harder to resolve the conflict.

“I wouldn’t use those terms, because I continue to speak to President Putin, because what do we want to do collectively?” he said. “We want to stop the war that Russia launched in Ukraine, without waging war and without escalation.”

Biden has enjoyed some rare bipartisan support for his handling of the Ukraine crisis. But some Republicans who have been generally supportive of his approach to the crisis chided him for his comments.

Sen. James Risch of Idaho, the top Republican on the Senate Foreign Relations Committee, dryly noted on CNN’s “State of the Union” on Sunday, “Please Mr. President, stay on script.”

Sen. Rob Portman, R-Ohio, told NBC’s “Meet the Press” that Biden’s final comment “plays into the hands of the Russian propagandists and plays into the hands of Vladimir Putin.”

Secretary of State Antony Blinken was forced to continue clarifying Biden’s speech during a trip through the Middle East, where he had intended to focus on solidifying American partnerships as the administration seeks a renewed nuclear agreement with Iran.

Speaking at a news conference in Jerusalem, Blinken said Biden meant that “Putin cannot be empowered to wage war or engage in aggression against Ukraine or anyone else.”

Even as Biden seemed to go too far for some allies with his speech, Ukrainian President Volodymyr Zelenskyy seemed to draw little comfort from it. He accused Western nations of lacking courage to confront Russia, and he said criticized their “ping-pong about who and how should hand over jets” and other weapons to the Ukrainian military.

The speech in Warsaw was the third, and by far most consequential, of instances from the trip where Biden’s aides needed to clean up his comments.

During a news conference in Brussels on Thursday, he said the U.S. would respond “in kind” if Putin

used chemical weapons in Ukraine. The next day, national security advisor Jake Sullivan said the president meant that “we’ll respond accordingly,” not that the U.S. would use chemical weapons of its own.

And then, while speaking to members of the 82nd Airborne Division soldiers recently deployed to Poland, Biden seemed to suggest they would be going to Ukraine. Speaking about the bravery of Ukrainians, Biden said, “Look at how they’re stepping up. And you’re going to see when you’re there.”

Afterwards, the White House reiterated that Biden had no intention of sending troops into Ukraine, something the president has insisted since the beginning of the conflict.

While running for office two years ago, Biden repeatedly told voters that “the words of a president matter,” and he promised that his foreign policy experience would serve the country well on the international stage.

There’s little doubt that Biden has been able to maintain unusual unity among allies during this war. But by speaking with more passion than caution — particularly in his speech in Warsaw — Biden has also reminded Americans of his proclivity for misstatements at a precarious time for his presidency.

Science

FROM PAGE 1

we weren’t associated with a university, we could pick any place in the world to do astronomy,” he said.

After settling on the U.S. because of Americans’ support of private philanthropy, the team needed to choose a region to place their main research telescope. The East Coast’s atmospheric conditions are poor, the air down south around LA contains too much light and pollution and the skies north of San Francisco are filled with clouds, Weaver explained.

“So that leaves you with the Los Padres National Forest,” he said. “Lick Ob-

servatory (near San Jose) had done some studies of one of the mountains there and found that the stability of the images was much, much better than other places.”

With that in mind, the co-founders placed their research telescope on top of Chews Ridge, approximately 5,000 feet above sea level in the Santa Lucia Range above Big Sur. They finished assembling the 5.5-ton instrument in 1977. They named the entire structure the Oliver Observing Station in honor of scientist Bernard M. Oliver, who donated a sizeable amount of money to pay for the station’s construction.

While the telescope snaps pictures of the night sky from the forest, MIRA’s

offices, computing and educational facilities sit approximately 40 miles away in Marina. The institute acquired these buildings in the 1990s after the Army base at Fort Ord closed.

This campus is where astronomer Cotton sifted through data gathered by a special new tool attached to MIRA’s research telescope. The instrument helped him figure out how the shape of a specific type of star is distorted. Using this technique, Cotton and his research team found that a star called Beta Crucis is about 11 million years old and 14 times as massive as the sun. Scientists are interested in hot, massive stars like Beta Crucis because when they die, they produce the majority of the materi-

als found in space.

This discovery is only the beginning, though.

“One star is interesting, but a lot of stars is data,” said Cotton, explaining he will measure more stars over the next few years. “If you want to find out what the galaxy is actually doing and how it’s going to evolve, then you need to know how all these heavy stars are living their lives.”

In addition to research, MIRA’s scientists devote themselves to education. A smaller telescope housed in the Weaver Student Observatory at the Marina campus is available for intern projects and public events. An amateur astronomy club also meets regularly in the main office building, and MIRA

hosts scientific talks at Monterey Peninsula College. They plan on having their first public lecture since the COVID-19 pandemic began in a couple of months.

Overall, the scientists at MIRA are dedicated to learning about the magnificent objects beyond Earth and teaching others about them.

“Most people don’t spend the majority of their day thinking about (the universe), but they spend some fraction of their time occasionally wondering, ‘Everything’s so big. Where do we come from?’” Cotton said.

“And we’re the part of society that gets to try and answer those questions for everybody else.”

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