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Alcatraz Island on Tuesday, June 20, 2023.

Walking in two worlds: how an Indigenous computer scientist is using AI to preserve threatened languages

Michael Running Wolf leads artificial-intelligence initiatives to revive lost languages and empower Indigenous people.



AI researcher Michael Running Wolf grew up listening to his community speak Indigenous languages, an increasingly rare experience.

Credit: Taehoon Kim/Northeastern University

Colleagues routinely describe Michael Running Wolf as someone who walks seamlessly between two worlds.

As an artificial intelligence (AI) researcher at the software-development company SynthBee in Fort Lauderdale, Florida, and as co-founder of the First Languages AI Reality (FLAIR) programme at the Mila–Quebec Artificial Intelligence Institute in Montreal, Canada, Running Wolf holds a deep understanding of both the technology underlying AI and the societal benefits it could unlock. And as the son of Lakota and Cheyenne parents, he also knows how technology and data have been weaponized to harm Indigenous communities. Running Wolf therefore approaches his work — in which he revitalizes disappearing languages using AI and virtual-reality tools — with patience, empathy and a healthy dose of scepticism.

“The work that Michael does is so sophisticated and complex because it’s bridging the sacred with the science,” says Estakio Beltran, a partnership adviser at the non-profit organization Native Americans in Philanthropy in Washington DC, who collaborates with Running Wolf and is of Tolteca-Mexica and Tlatoani origin. “We’re fortunate to have him overseeing efforts to reclaim Indigenous languages because his foremost thoughts are to protect and honour Indigenous sovereignty.”

Running Wolf grew up just outside the Northern Cheyenne Indian Reservation in southeastern Montana, in a remote town called Birney (2020 population: 97). The settlement often lacked running water and electricity, but it was nevertheless a comforting place where he was surrounded by family, literally — everyone in the town was an extended relative through his mother, and Running Wolf didn’t meet a stranger until he left for university age 18. He spent his childhood learning traditional Cheyenne and Lakota artistry and hearing Indigenous languages spoken around him, an experience that is now increasingly rare.

“For decades, the US government oversaw policies of forced assimilation, and as part of that, it was illegal to speak traditional languages or to practise our cultures openly,” he says. “Those

policies were often enforced violently, and so we lost generations of fluent speakers that make it really difficult to come back from now.”

Running Wolf was a strong student from a young age, he says, and quickly developed an interest in technology, spurred by his mother’s career as a laser lithographer designing microchips for the computing firm Hewlett-Packard in Colorado. He learnt the basics of computer programming in primary school — including working out how to reprogram his graphing calculator to play games such as Snake. However, when it came to choosing a degree course at Montana State University in Bozeman in 1999, Running Wolf says he picked the then-nascent field of computer science on instinct. “No one in my family, or even my guidance counsellor, actually knew what it was.”

Even as he gravitated towards software development, Running Wolf retained an interest in Indigenous histories, noting that if he hadn’t become an AI researcher, he probably would have become an artist or a poet like his father, who holds a degree in fine arts. When he returned to Bozeman in 2007 after a three-year stint in industry to complete a master’s degree in computer science, Running Wolf’s future bridging the two fields began to take shape.

For his master’s thesis, Running Wolf drew inspiration from the work of researchers who had used oral histories to trace the origins of tales such as Little Red Riding Hood and to identify items eligible for repatriation under the Native American Graves Protection and Repatriation Act. He spent the summer of 2014 in Siberia, Russia, collecting stories from local Indigenous peoples and using a type of AI called natural language processing to look for similarities between their cultures and those closer to his home. “Ecologically, the area is very similar to the Yellowstone biome in Montana, and so I was interested in how those types of force shape language and culture,” he says. “It stopped being pure computer science and brought in aspects of anthropology.”

Around this time, Running Wolf also met his wife Caroline, a member of the Apsáalooke Nation who speaks 11 languages and was then earning her master’s degree in Native American studies. Together, the two became consumed by thoughts of how computational tools and big data could be used to improve understanding of Indigenous cultures and to reclaim lost languages. The United Nations estimates that roughly half of the world’s 6,700 languages — the majority of which are spoken by Indigenous peoples — are on track to disappear by 2100, yet Running Wolf says there are rarely rigorous plans in place to save them.

“We were both frustrated with the lack of good progress in what was being done at the time,” Running Wolf says. He adds that Caroline has since joined him in co-founding an Indigenous non-profit technology firm called Buffalo Tongue and in managing ongoing projects focused on the applications of AI and immersive technologies for reclaiming Indigenous languages and cultures. “What began as these late-night conversations eventually kicked off this whole new chapter of using technology for language reclamation, and we’ve just become enmeshed in that space.”

The challenges of AI

Indigenous languages differ from those with Latin roots in ways that make them a challenge to reconcile with existing machine-learning frameworks, Running Wolf says. Many Western

languages follow a subject–verb–object sentence structure, for example, whereas Indigenous languages tend to be verb-based and polysynthetic, meaning that a single word can include multiple elements that, in English, would be written out as entire sentences. ‘Bird’, for instance, might translate to something like ‘the winged, flying animal that caws’.

Because generative AI models predict the next word in a sentence on the basis of the preceding words, these differences mean that algorithms often do a poor job of recognizing and translating Indigenous languages. However, models perform better when they include Indigenous languages, Running Wolf says, because training on a greater diversity of data ultimately makes the underlying algorithms more adaptive and flexible, just as people who know two languages typically have an easier time learning a third. “But that does create a risk for communities when our language data are suddenly valuable,” he adds.

Already, there has been a rush by companies such as OpenAI, Amazon and Google to gain access to Indigenous data on language and more; the firms use that information to develop services and products that are then offered back to users, often at a cost. Long-standing mistrust over how their information is likely to be misused has caused some Indigenous communities to disavow themselves of ever turning to AI-based technologies, a stance that Running Wolf respects.

“A lot of this kind of research is without consent, unfortunately, and it has soured people on even trying to engage,” he says. “There’s a lot of risk with AI, and so I think that’s a very healthy response.”

Creating tools for societal good

Running Wolf is working to overcome these hesitations through creating resources by and for Indigenous communities that help to educate them both about their cultures and the technology and, in turn, give them more control over how their data are used.

His early efforts began as employee network groups, including one for Indigenous researchers at Amazon when Running Wolf was there working on the company’s AI-powered assistant, Alexa. Later, he and Caroline were involved in launching two wider initiatives, Indigenous in AI and IndigiGenius. These partner with peer groups such as the information-technology consultancy firm Natives in Tech in Oklahoma City, Oklahoma, the [Indigenous Protocol and Artificial Intelligence Working Group](#) and the [Abundant Intelligences](#) research project to shape the future of Indigenous-led AI efforts. In 2019, the Running Wolfs participated in two workshops alongside dozens of other researchers to produce a paper outlining how best to ethically design and create AI tools ([J. E. Lewis *et al.* Indigenous Protocol and Artificial Intelligence Position Paper](#); CIFAR, 2020).

In many instances, one challenge these groups face is a lack of fluent speakers of Indigenous languages to both teach the next generation and to help train AI language models. Although children once learnt their ancestral languages at home, they now mostly engage with languages in the classroom. There’s an urgent need, Running Wolf says, for curricula and other resources — not to replace Indigenous speakers, but to train new teachers and standardize how Indigenous languages are taught. “Now, we have a lot of Native Americans trying to learn in classes using methodologies that don’t have good pedagogy or even good metrics for success,” he says.

Related Articles

- [How researchers can work fairly with Indigenous and local knowledge](#)
- [From exploitation to empowerment: how researchers can protect Indigenous peoples' rights to own and control their data](#)
- [How are researchers using AI? Survey reveals pros and cons for science](#)
- [Will AI improve your life? Here's what 4,000 researchers think](#)
- [AI and science: what 1,600 researchers think](#)
- [NatureTech hub](#)

<https://www.nature.com/articles/d41586-025-01354-y>

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**From 1.5 years ago: Tech titan Elon Musk says artificial intelligence will eventually become so advanced in capabilities that it will eliminate the need for humans to have jobs. 11/5/23**  
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`University researchers aid in space exploration

Computer Science & Engineering faculty develop technologies for a new generation of autonomous space worker robots

Extract:

“We envision a new paradigm for human-robot collaboration,” Papachristos said, “ideal for surface engineering and pre-colonization of remote environments at inter-planetary distances, where human cognition persistently supervises and drives the high-level objectives of a long-term mission, with autonomous robots being the intelligent workers that execute the plan.”

The three-year project, “Prospecting and Pre-Colonization of the Moon and Mars using Autonomous Robots with Human-in-the-Loop,” is funded with \$1.1 million from NASA’s Established Program to Stimulate Competitive Research (EPSCoR) and the state of Nevada. The grant, awarded last summer to the Nevada System of Higher Education (NSHE), brings together experts from the University of Nevada, Reno; University of Nevada, Las Vegas; the Desert Research Institute; and NASA Ames Research Center to create a seamless, human-robot collaboration framework and adaptive robotic systems for remote planetary operations.

“We are thrilled that NASA has chosen to fund the Nevada team and their pioneering research,” Eric Wilcox, director of Nevada NASA EPSCoR, said. “This work will not only advance NASA’s missions but also foster significant technological development within Nevada and strengthen the collaborative relationship between NSHE researchers and the NASA Ames Research Center. This project exemplifies the innovative spirit of our state’s research community and its potential to contribute to NASA’s moon-to-Mars exploration efforts.”

Plenty of space

Nevada itself plays a role in this project: most of the state is part of the Great Basin Desert. It has barren, rocky terrain that experiences high daytime temperatures and cold nights, not unlike the moon — the perfect place to test these robotic systems.

“We are near open desert environments, which present us with the possibility of conducting Martian analog deployments,” Papachristos said, standing in his Robotic Workers Lab in the William N. Pennington Engineering Building and gesturing to the east of the University campus.

(A tribe might endeavor to become a partner in this project, providing “internships”/volunteer opportunities for community members.)

Archaeologists Found a Stunningly Preserved 5,000-Year-Old Mummy—in a Garbage Dump

<https://www.yahoo.com/news/archaeologists-found-stunningly-preserved-5-180000461.html>

National Endowment for the Arts cuts off funding, pushes for staff resignations~



Toni Burton

My daughter worked really hard over the last two months on her research assignment for the Numamuseum. Her subject was Louisa Keyser aka Dat So La Lee who was a famous Washo basket weaver. This meant alot to her as she's a decsendent of the Washo Tribe on her dad's side. My colleague Dr. Anna Camp gave her a tour of the basket vault at the NV State Museum where we learned about Louisa & viewed her exquisite baskets. What an experience! It made my heart so happy to see sister's presentation along side her classmates. She spoke in Shoshone and had memorized her entire presentation. I chipped in where I could and wouldn't you know it, we saw some Dat So's baskets at the MET in NYC last year. The stars aligned and she aced her final report. Cheers to many more sister, keep making us proud.

[The Salt Song Trail - Documentary film about the sacred journey of the Salt Songs of the Southern NUWUVI \(Paiute People\). youtube.com](#)

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**Morrison restaurant named best under-the-radar steakhouse in Colorado**

The Fort restaurant in Morrison, Colorado was inspired by the historic Bent's Fort, and the menu features a fusion of multiple cultural cuisines. (TruBlu Images via The Fort)

[https://currently.att.yahoo.com/lifestyle/morrison-restaurant-named-best-under-183925194.html?tsrc=daily\\_mail&uh\\_test=1\\_11&tsrc=daily\\_mail&segment\\_id&ncid=crm-1295960-20250503-380--A&bt\\_user\\_id=5qNg9CixpOBrb46MZFx7taDk0I0Pm2qXN4%2By7jVEdmYR%2F%2FtQm5qKI2cXoylsG6ce&bt\\_ts=1746267328697](https://currently.att.yahoo.com/lifestyle/morrison-restaurant-named-best-under-183925194.html?tsrc=daily_mail&uh_test=1_11&tsrc=daily_mail&segment_id&ncid=crm-1295960-20250503-380--A&bt_user_id=5qNg9CixpOBrb46MZFx7taDk0I0Pm2qXN4%2By7jVEdmYR%2F%2FtQm5qKI2cXoylsG6ce&bt_ts=1746267328697)

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The Four Desires Driving All Human Behavior

Bertrand Russell's magnificent Nobel prize acceptance speech and other "think" pieces (Western perspectiv) *Read when you've got time to spare.*

<https://getpocket.com/explore/item/the-four-desires-driving-all-human-behavior-bertrand-russell-s-magnificent-nobel-prize-acceptance>

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**[KAXE / KBXE](#)**

The 2025 Native Nations Fashion Night featured designers from Leech Lake, Minnesota, New Mexico and Canada. This year's theme of "I Am Water" explored the ideas of strength, adaptability and responsibility of Native communities.

[Founder Delina White https://www.facebook.com/reel/](https://www.facebook.com/reel/)

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[California Native Vote Project invites you to a vital conversation about the aftermath of the Los Angeles fires:](#)

Rising from the Ashes – Mental, Physical, and Environmental Perseverance for Native Communities in Southern California

This interactive webinar and Q&A session centers on the unique challenges facing Native American individuals and families in the wake of the recent Los Angeles fires. Together with Native mental health professionals, environmental and medical experts, we'll explore how our Native communities can care for their well-being, protect the land, and prepare for the fire season ahead.



Date: May 6



Time: 5:00 PM – 6:00 PM

As California clears the rubble, removes toxins, and rebuilds, Native communities will face layered challenges rooted in cultural, environmental, and spiritual connection. Join us to learn how to move forward, find answers to your questions and strengthen Native resilience together.

We look forward to seeing you there. Register using this link: [Rising from the Ashes Webinar](#) or using the QR code in the image above.

Shannon, Communications Manager
Juaneño Band of Mission Indians, Acjachemen Nation

Quotes from President William Henry Harrison

Some quite ironic considering his history with Tecumseh

The liberties of a people depend on their own constant attention to its preservation.

There is nothing more corrupting, nothing more destructive of the noblest and finest feelings of our nature, than the exercise of unlimited power.

I believe that all the measures of the Government are directed to the purpose of making the rich richer and the poor poorer.

Sound morals, religious liberty, and a just sense of religious responsibility are essentially connected with all true and lasting happiness.

The only legitimate right to govern is an express grant of power from the governed.

All the lessons of history and experience must be lost upon us if we are content to trust alone to the peculiar advantages we happen to possess.

The people are the best guardians of their own rights and it is the duty of their executive to abstain from interfering in or thwarting the sacred exercise of the lawmaking functions of their government.


A decent and manly examination of the acts of government should not only be tolerated, but encouraged.

We admit of no government by divine right, believing that so far as power is concerned the Beneficent Creator has made no distinction amongst men; that all are upon an equality, and that the only legitimate right to govern is an express grant of power from the governed.

The plea of necessity, that eternal argument of all conspirators.

The prudent capitalist will never adventure his capital . . . if there exists a state of uncertainty as to whether the Government will repeal tomorrow what it has enacted today.

Is one of the fairest portions of the globe to remain in a state of nature, the haunt of a few wretched savages, when it seems destined by the Creator to give support to a large population and to be the seat of civilization?

"The History of Indiana, from Its Earliest Exploration by Europeans, to the Close of the Territorial Government, in 1816". Book by John Brown Dillon, www.esquire.com. 1859. 

The chains of military despotism, once fastened upon a nation, ages might pass away before they could be shaken off.

Most quotes are from David A. Durfee, William Henry Harrison, John Tyler, United States. President (1841-1845 : Tyler) (1970). "William Henry Harrison, 1773-1841: John Tyler, 1790-1862; chronology, documents, bibliographical aids", Oceana Pubns

[In answer to my ? re what happened to the soldier that killed Crazy Horse?](#)

“I estimate the bayonet of Private Gentles would have been 10 inches or longer to inflict the wound as described. Hauntingly, soon after that September day when he killed Chief Crazy Horse, Mr. Gentles, so misnamed, died of an asthma attack on May 20, 1878, while posted at Fort Douglas in Utah Territory.”

<https://truewestmagazine.com/article/the-death-of-chief-crazy-horse>

[Why did Adam and Eve get kicked out of the garden?*](#)

Nevada seeks neighborhood ambassadors for wildfire preparedness program (mynews4.com) — The University of Nevada, Reno Extension and the Nevada Division of Forestry are launching a program to recruit local residents as ambassadors for wildfire preparedness. This initiative aims to build fire-ready neighborhoods in Reno, enhancing community safety and resilience.

New nature doc frames the Colorado River as an opportunity, not a crisis

Kate and Aaron speak with Len Necefer, CEO & Founder of NativesOutdoors, a native owned outdoor media, apparel and consulting company. You may also know him as the man behind the Sonoran Avalanche Center Instagram account. Len talks about his latest project, a documentary film about the Colorado River basin titled The American Southwest, and how he’s advocating for public lands under the second Trump administration. (Includes Presidential budget for 2026 and proposals re National Parks and Muonuments)

https://open.spotify.com/show/3bQAk8BENUQJYtXYoepvE?go=1&sp_cid=af5c28f28a67dfe792ff656f5d1de537&nd=1&dlsi=b0a95760e4ac4dc4

RIPPLE EFFECT: Status of federal funding for water projects

Tia Cavender, CEO and Founder of Dig Deep Research, makes a return visit to discuss the status of federal funding for water projects. Tia and Dig Deep have assisted clients for over 15 years and are experts in navigating the myriad of federal grant and loan programs. We have a very timely, and sobering, discussion about how recent changes to federal funding may affect both current and future water projects and how water utilities can pivot to fund these critical projects.

https://open.spotify.com/episode/2xnJGaeL4pylipus2tl4zx?go=1&sp_cid=cd005a55215205c9287fd3dde5f868de&intent=1&nd=1&dlsi=079b9724bd8e4dcd

From Fredina Drye-Romero

Education Programs Professional for Indian Education, Nevada Department of Education
Office of Comprehensive Student Services indianeducation@doe.nv.gov

For specific questions and/or information regarding Dispute Resolution, please email: disputeresolution@doe.nv.gov; for general Special Education information and/or questions, please email: specialeducation@doe.nv.gov; or for information and/or questions regarding Indian Education, please email: indianeducation@doe.nv.gov.

As Trump pares back ocean protections, California weighs expanding them



“Strands of kelp glow in the dim morning light off California’s Channel Islands as fish and sea lions weave through the golden fronds. It’s a scene of remarkable abundance — the result of more than two decades of protection in one of the state’s oldest marine reserves. But farther out in the Pacific, life in the vast Pacific Remote Islands Marine National Monument faces a very different future. The Trump administration has moved to reopen 500,000 square miles (about 1.3 million square kilometers) of previously protected waters there to commercial fishing, in a dramatic rollback of federal ocean protections. California, meanwhile, may be headed in the opposite direction. As it undertakes its first 10-year review of its marine protected area network, state officials, scientists, tribal leaders and environmental advocates are pushing not just to maintain protections but to expand them. ...” [Read more from KCRA.](#)

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### Governor Lombardo calls tariffs 'a serious risk' to lithium industry

Nevada Governor Joe Lombardo last month urged President Donald Trump to eliminate tariffs on lithium, warning they pose "a serious risk" to Nevada's budding lithium industry. Gov. Lombardo wrote in a [letter to the White House](#) that while the state is actively developing a domestic lithium industry, it's still heavily reliant on China, Canada and Mexico to refine and process lithium to standards and regulations.

“Removing the tariffs on lithium will help secure American jobs, strengthen our economy, and support our path toward energy independence,” Lombardo wrote.

While Trump paused higher tariffs on most countries for 90 days, China still faces a 145% tax on most imports (including a [173% tax on lithium-ion batteries](#)) and other countries remain subject to a 10% blanket tariff. Reporting from the Reno Gazette Journal’s Jason Hidalgo shows these trade policy changes reflect a complicated road ahead for lithium-ion battery manufacturers in northern Nevada, many of whom received significant federal investment as recently as last year.

[Learn more at rgj.com >>](#)

*"There comes a time in the affairs of man when he must take the bull by the tail and face the situation."*  
    *>W. C. Fields*

*\* Because they didn't read the Apple Terms and Conditions*



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#### FOR IMMEDIATE RELEASE:

The National Association of Tribal Historic Preservation Officers (NATHPO) released the following statement on the president's proposed budget, which reduces funding for National Historic Preservation Act, which funds the Tribal Historic Preservation Officer (THPO) program, by \$158 Billion:

**"The proposed budget, which makes massive cuts to the Historic Preservation Fund, is a step in the wrong direction when it comes to fulfilling the Federal Government's trust responsibilities to Tribal Nations," said NATHPO Executive Director Dr. Valerie Grussing. "Tribal Nations want energy projects to move forward without unnecessary delays while also protecting their sacred places and cultural resources. The best and most responsible way to do that is to provide THPOs with additional resources to ensure they have what they need to perform their sacred work. Moreover, THPOs have yet to receive their Fiscal Year 2025 funding, which was contained in the continuing resolution signed into law nearly two months ago, and it is imperative that the Administration release these funds in the very near future. We hope the Administration will reconsider their budget proposal, that they will release THPOs' overdue funds for the current Fiscal Year, and that Congress will provide THPOs the funding they need."**

In the last Congress, [legislation was introduced in both the House and Senate](#) that would permanently require \$300 million each year to be appropriated for the Historic Preservation Fund. Of that \$300 million, at least 20 percent of the funds would be required to be allocated for THPOs. These bills demonstrate a clear path to ensuring THPO funding is both sound and keeps pace with the ever-growing number of Tribal Nations who choose to exercise their sovereignty by standing up a THPO program.

Who we are – NATHPO is a national non-profit 501(c)(3) membership organization, founded in 1998, of Tribal preservation leaders protecting culturally important places that perpetuate Native identity, resilience, and cultural endurance. Connections to cultural heritage sustain the health and vitality of Native peoples. We provide guidance to preservation officials, elected representatives, and the public about national historic preservation legislation, policies, and regulations. We promote Tribal sovereignty, develop partnerships, and advocate for Tribes in governmental activities on preservation issues. For more information visit our website at [www.nathpo.org](http://www.nathpo.org).

