INDIGENOUS INNOVATIONS

Tara Astigarraga

Choctaw (Chahta)

1980–

Software Engineer

KeyBank Future Innovators in STEM

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Background

Born and raised in Arizona, Tara Astigarraga studied Spanish linguistics and communications in college, imagining that she would become a teacher or social worker. This changed during her senior year, when she was offered an internship at IBM through their diversity initiative, Project View.

Engineering Career

Astigarraga started at IBM after her graduation from the University of Arizona, initially working on webpage and database design and development. During this time, she initially experienced imposter syndrome, feeling underqualified and out of place. Her mentors were incredibly important to her growth, pushing her out of her comfort zone while offering support.

Astigarraga's first invention was created as a practical solution to a common problem—a flash drive has a "lifespan" dictated by how many times it can reliably erase and rewrite the files it stores. After losing a file just before she was supposed to give a presentation, she created an end-of-life predictor that indicates when flash drives are no longer reliable.

This invention resulted in her first patent, awarded in 2008. It also helped prove to herself that she was smart, capable, and able to make an impact moving forward. Since then, she has received more than 80 additional patents, earning recognition as an IBM Distinguished Engineer and Master Inventor. Much of her work has been guided by the digital divide faced by many Native American communities.

She has received awards from the American Indian Science & Engineering Society (AISES) and advocates for access to engineering education, especially in rural and Native American communities. She also stresses the importance of mentorship, especially for girls in STEM, saying, "Find a good mentor. Find someone that you click with, that understands where you're trying to go and can help you get there. And then, just keep learning."

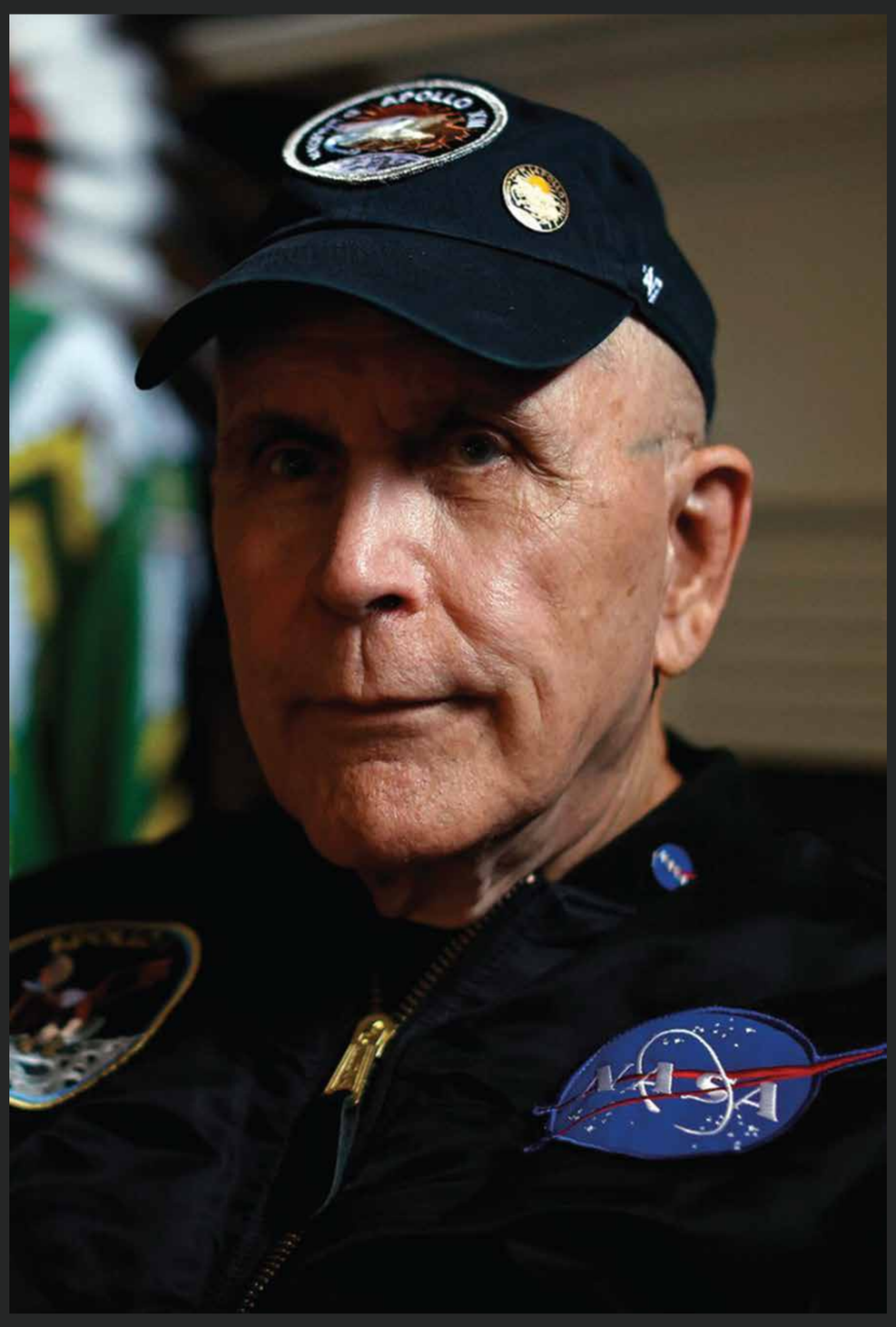
INDIGENOUS INNOVATIONS

Jerry C. Elliott

Osage (𐓏𐓘𐓵𐓘𐓵𐓐 / Wazhazhe) & Cherokee (ᎠᏂᏴᎾᏓ / Ani’-Yun’wiya)

1943–

Physicist & NASA Engineer



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Background

By the age of five, Jerry Elliott knew he was going to help people reach the Moon. With his mother’s encouragement, Elliot pushed past racial barriers and worked to make his dreams a reality. He completed a bachelor’s degree in physics and mathematics at the University of Oklahoma and was in the process of beginning a master’s degree when he received a military draft notice ordering him to report to training in two weeks.

NASA Career

Shortly after receiving his draft order, Elliott saw a notice in the school hallway that read “NASA HIRING TODAY” and went directly to the dean’s office for an interview. Despite having none of the required paperwork to apply, he spoke earnestly of his dream to help put people on the Moon. Less than 48 hours later, he received word of his selection as a NASA aerospace technologist and subsequent removal from the Vietnam War draft.

At NASA, Elliott was put to work as a guidance engineer on Project Gemini, which was about to launch its last four missions. When the Apollo project began, he was promoted to guidance, navigation, and control engineer, and later to retrofire officer. He worked on several of Apollo’s missions, including Apollo 11, that finally put men on the Moon. In 1970, he and the rest of the Missions Operation Team were awarded the Presidential Medal of Freedom for their roles in bringing Apollo 13’s crew safely home.

When Elliott was 41, he was given the name “High Eagle” by Cherokee elders in recognition of his accomplishments. Eagles (ᏬᏏᏲ / Wohali) are sacred birds in Cherokee culture, revered as masters of the sky.

AISES

In 1977, Elliott helped found the American Indian Science and Engineering Society (AISES). The society offers educational support, internships, and scholarships to Indigenous students. AISES also hosts an annual conference focused on educational, professional, and workforce development for Indigenous peoples of North America and the Pacific Islands who study or work in STEM. Current membership includes representation from over 500 tribes.

INDIGENOUS INNOVATIONS

Darcie Little Badger

Lipan Apache (Tinde)
1987–

Oceanographer & Novelist

Background

Although Darcie Little Badger spent her childhood in a variety of places, she considers Texas home. As a child, Little Badger loved creative writing, even submitting a book for publication at the age of seven (although it was politely rejected). After her high school graduation, she took the surname Little Badger (formerly Darcie Erin Ryan) in accordance with Lipan tradition.

Oceanography Career

In college at Princeton, Little Badger took an oceanography course that captivated her, and she decided to study geoscience after receiving two rejections from the creative writing program. After finishing her bachelor's with honors, she continued her studies at Texas A&M. She focused her doctoral research on *Karenia brevis*, an algae species best known for causing toxic red tides in the Gulf of Mexico. Part of her research involved sequencing a portion of the plankton's genome. This sequencing led to subsequent discoveries about the organism's genes and how to activate and deactivate them.

Writing Career

After completing her PhD in 2015, Little Badger worked as a scientific editor while continuing to write and publish fictional short stories. In 2020, she sold her first novel: *Elatsoe*. Like many of her short stories, the novel blends her love of earth sciences with supernatural elements from Lipan culture and beyond. The book's protagonist, an asexual Apache girl, navigates a tale full of fantasy, loss, and eventual justice.

Little Badger is now a full-time writer. Much of her work is influenced by Indigenous Futurism, which is an art movement that combines traditional science-fiction and fantasy with characters, stories, and themes drawn from Indigenous cultures. Her short story, *Né łe!*, features a Navajo spaceship captain, a Lipan Apache veterinarian, and 40 chihuahuas on the way to new homes on Mars.

INDIGENOUS INNOVATIONS

STEM INCLUSION SHOWCASE

TOYOTA

Onondaga Nation (Onoñda'gegá')

Firekeepers of the Haudenosaunee

ONONDAGA NATION

PEOPLE OF THE HILLS

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Background

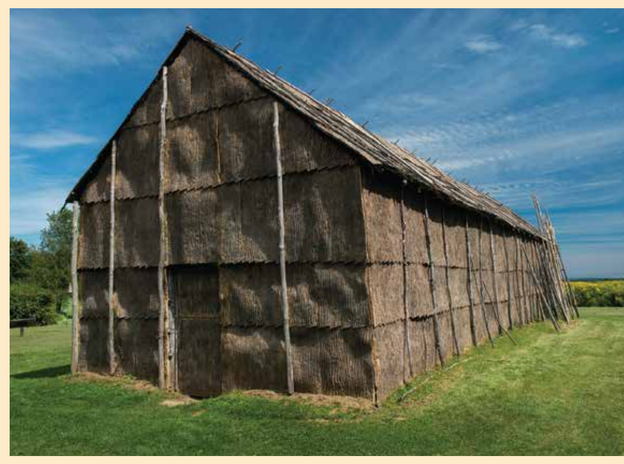
The Onondaga Nation, whose ancestral land the MOST occupies, is one of six nations that form the Haudenosaunee Confederacy. The Haudenosaunee were called the Iroquois by the French, while the English referred to them as the Five Nations (as the Tuscarora nation joined later). You can find out more by visiting **onondaganation.org** or exploring the local centers and sites below.

Educational Resources

Skä•noñh Center—The center is on the shore of Onondaga Lake, a sacred place for Haudenosaunee. Interactive exhibits teach visitors about Onondaga history and traditions, with an emphasis on oral history and the power of words. Other exhibits display historical photos, wampum belts, beadwork, and Deyhontsigwa'eh (lacrosse) sticks.

skanonhcenter.org

Ganödagë:n State Historic Site—The Seneca Art and Culture Center at Ganondagan features a full-size Seneca longhouse, educational hiking trails that identify plants and teach about their uses, and a series of rotating exhibits. Past exhibits include *Hodinöhsö:ni' Women: From the Time of Creation* and *WAMPUM/OTGOÄ Exhibition*.



ganondagan.org

Iroquois Museum—The museum features a set of permanent collections (Contemporary, Historical, & Archaeological) and rotating feature exhibitions. Their current exhibition features several Haudenosaunee creatives, from photojournalists and filmmakers to metalsmiths, burlesque dancers, guitar makers, and more.

iroquoismuseum.org