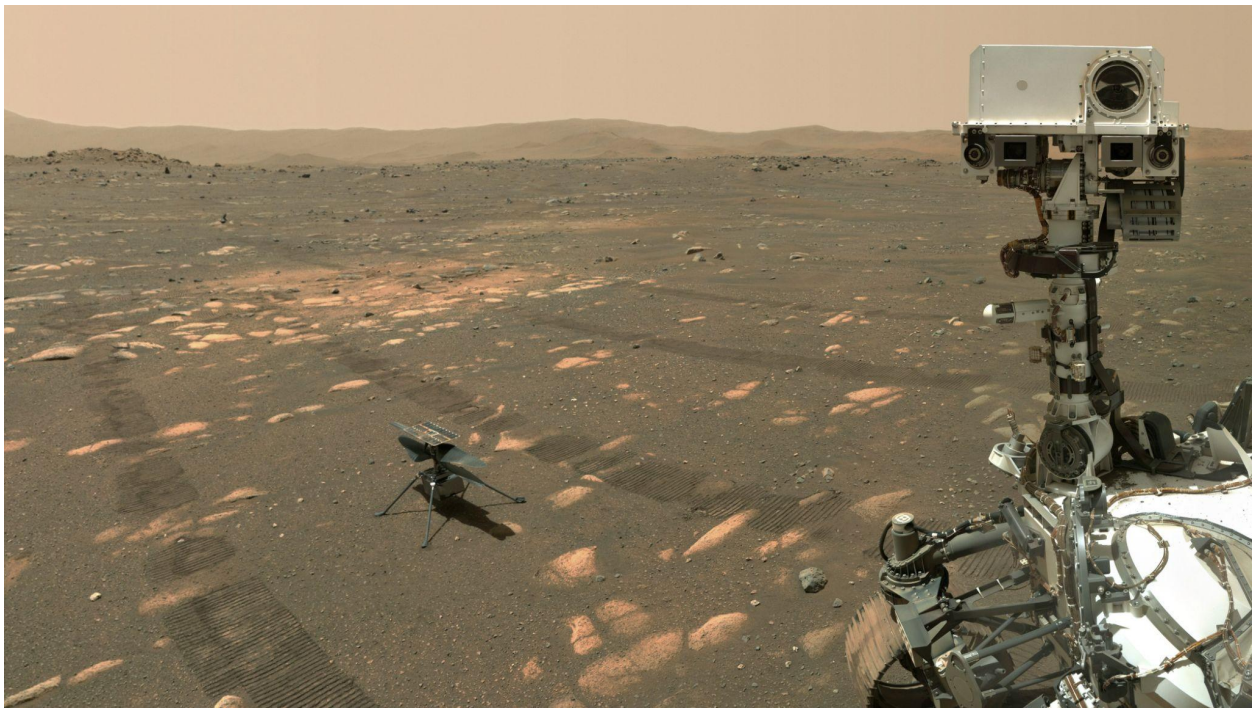
Featured Stories



NASA's Perseverance Mars rover took individual images with its WATSON camera, on April 6, 2021, that were stitched together into a single selfie. Image Credit: NASA/JPL-Caltech

2021: Pandemic for a Second Year, Achievements for the Ages

By Carl Marziali

On Mars, at least, it was as if Covid had never happened.

As its makers intended, Mars 2020 transcended human struggles. JPL landed the most advanced rover in history in 2021, and then, with historic understatement, applied the term "technology demonstration" to the first powered, controlled flight on another planet. Within months, a third milestone: The successful collection and caching of alien rock marked the start in earnest of Mars Sample Return – the first round-trip mission to the Red Planet.

Closer to home, yet still 800 miles above us, Sentinel-6 Michael Freilich is extending a long-running series of sea level measurements; on the ground, work continues on the Nancy Grace Roman Telescope Coronagraph Instrument, which will demonstrate new technologies to suppress starlight in order to study

exoplanets; and at the time of writing, the Mid-Infrared Instrument was set to launch on the James Webb telescope as soon as Dec. 24.

Other pioneering missions continued their march to launch, including Psyche, SWOT, Europa Clipper, SPHEREx, NISAR, and the newest member of the club, VERITAS.

All buildings on Lab had reopened by late summer, but most of the workforce remained on full-time telework pending a lasting decrease in Covid cases. JPL employees and affiliates had reported 71 positive Covid tests in 2021 as of Dec. 15, compared to 68 over about nine months in 2020, with no positive results from the thousands of tests taken on Lab. Looking ahead to the eventual resumption of office work, JPL announced a Voluntary Telework Policy that would offer most employees a balance of on-Lab and work-from-home options.

2021 also saw the departure of Director Michael Watkins, who returned to the Caltech faculty after five years at the helm of JPL. Larry James became the Lab's interim director while Caltech President Thomas Rosenbaum led a search for Watkins' successor.

JPL appointed its first manager of diversity, equity and inclusion, one of 10 actions announced by Watkins in 2020 in response to the unrest that followed the murder of George Floyd. And by the end of 2021, JPLers had responded once more with heartwarming generosity to the Lab's Annual Giving Campaign, raising over $495,000 for United Way and other charities.

Engineers conduct a "receiving inspection" of the James Webb Space Telescope's Mid-Infrared Instrument. Image Credit: NASA/Chris Gunn.

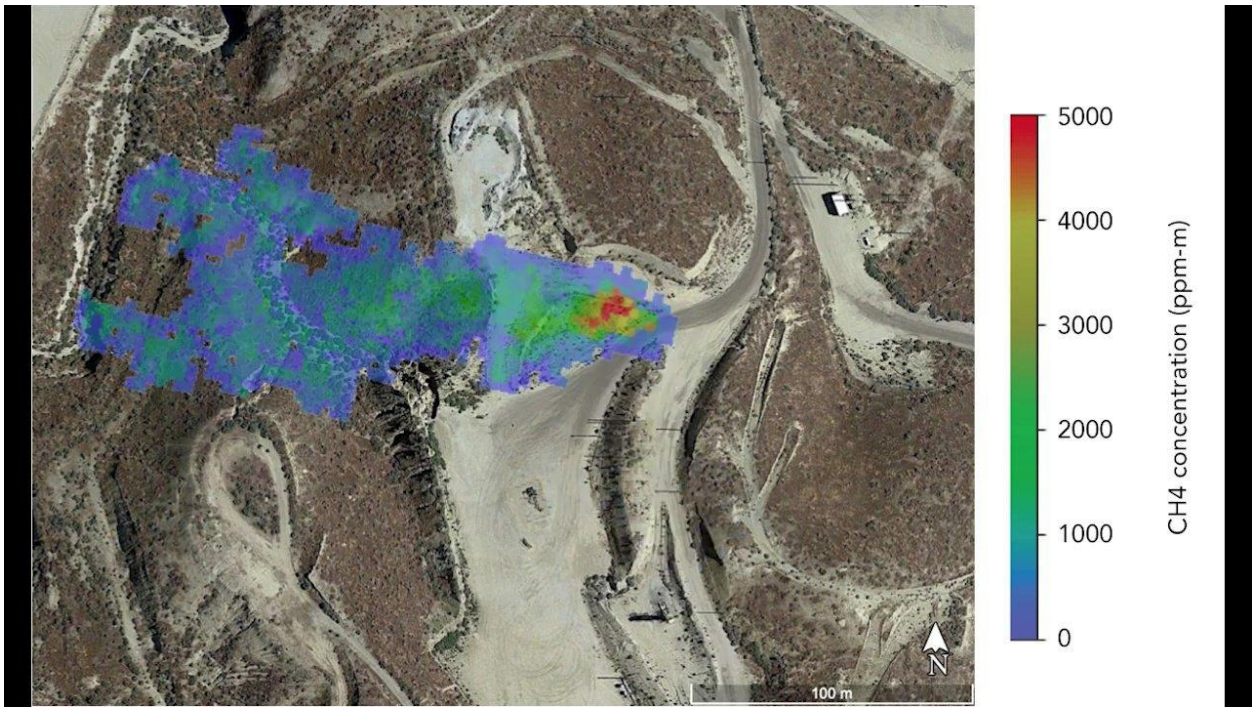
Also near the end of 2021, the **Astronomy and Physics** directorate and the entire astrophysics community were anticipating the long-postponed but imminent launch of the James Webb Space Telescope. Among the powerful instruments on board is the Mid-Infrared Instrument, MIRI, to which JPL and NASA made major contributions, including the detector system and a cooler that will keep the core of the instrument

at 7 K. MIRI's super-cooled detectors will capture the redshifted light of distant galaxies, newly forming stars, and faint comets and asteroids. A spectrograph will complement MIRI's infrared wavelength images with physical details of the distant objects observed. The operating temperature near absolute zero is required to reduce noise produced by the instrument itself to extremely low levels.

The huge range of scientific questions that can be addressed by observations at mid- and far-infrared wavelengths was one of the JPL priorities validated by the scientific community's Astro2020 Decadal Survey. Another was the observation of exoplanets, and especially Earth-like candidates. JPL has invested for decades in the science of exoplanets and in technologies to obtain their spectra, and in 2021 made great progress in building the Coronagraph Instrument, with its innovative light-masking technology, for the Roman Space Telescope.

Closer to Earth, NEO (for Near-Earth Object) Surveyor is progressing towards an early 2026 launch. NEO Surveyor will peer ahead of and behind Earth's path around the Sun, spotting asteroids not yet known, especially ones that will come close to Earth. The mission will use an infrared camera that reveals heat signatures, ideal for asteroids that absorb light from the Sun and release it back into space. Detecting and studying NEOs while they are still far away will improve our ability to predict which ones may threaten Earth, and inform preparation for future deflection missions if required.

Other highlights of 2021 include completion of the Deep Space Atomic Clock (DSAC) mission, which demonstrated timekeeping two orders of magnitude better than the rubidium atomic clocks used today by global positioning systems. Future space clocks modeled on DSAC will offer essential accuracy to any mission reliant on long-term, autonomous operations. The SunRISE mission to study solar particle storms passed its critical design review, and the Voyager twins, humanity's farthest explorers, continued their journeys through interstellar space.



JPL will provide the instrument that will enable nonprofit organization Carbon Mapper to pinpoint and measure methane and carbon dioxide (CO2) point-sources from space. Image Credit: NASA/JPL-Caltech

The year 2021 may come to represent a turning point for the **Earth Science and Technology** directorate. With the challenges of climate change growing more urgent by the season, the directorate and NASA redoubled efforts to integrate research and policy. JPL hosted a climate science roundtable discussion that included NASA Administrator Bill Nelson, Caltech President Thomas Rosenbaum, State Reps. Judy

Chu, Pete Aguilar, Julia Brownley, and Ted Lieu, California Natural Resources Sec. Wade Crowfoot, Environmental Protection Sec. Jared Blumenfeld, and JPL Director for Earth Science Jim Graf.

“In truth, this discussion is about saving our planet,” Nelson said. “NASA is the point of the spear on climate change.”

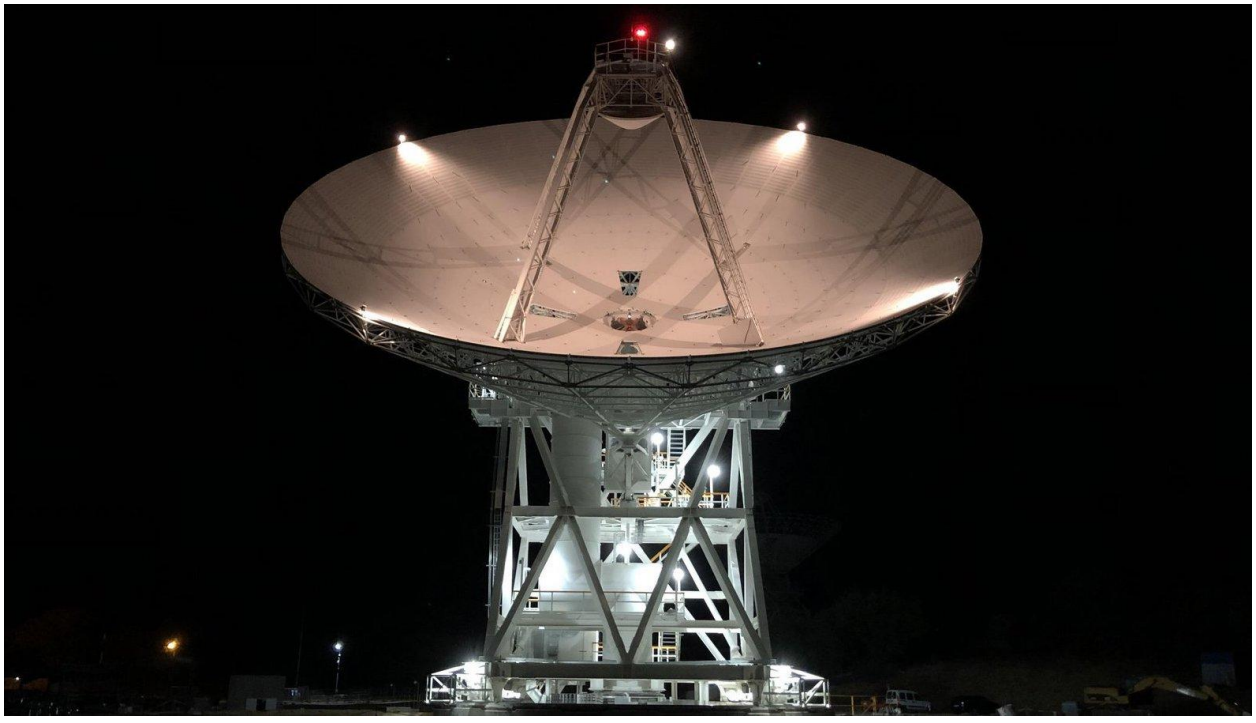
The directorate took another innovative turn by partnering with the new nonprofit organization Carbon Mapper to help detect, track, and ultimately reduce emissions of methane and carbon dioxide from industry and agriculture. Other partners include the State of California, the University of Arizona, and Arizona State University (ASU).

JPL will deliver the hyperspectral imaging spectrometer payload for the first Carbon Mapper satellite and will provide technical assistance on development of the payload for additional satellites. JPL’s spectrometers offer state-of-the-art sensitivity, resolution, and versatility.

2021 also was a year of beginnings and endings. Sentinel-6 Michael Freilich, launched late in 2020, is poised to extend a long dataset of sea level measurements by JPL satellites. A new $177 million proposal developed with Colorado State University, Investigation of Convective Updrafts (INCUS), won funding from NASA’s Earth Venture Program and is expected to launch in 2027. The NASA India Synthetic Aperture Radar mission (NISAR) leaped forward with the integration of the India-provided radar into the JPL payload hardware.

The hugely influential Oceans Melting Greenland airborne campaign, which explored the impacts of climate change on the most massive ice sheets outside of Antarctica, ended on schedule in 2021 after a five-year run, as did Delta-X, which studied how and why land is lost, or gained, around river deltas.

JPL’s focus on the water cycle and climate system will continue with the upcoming Surface Water and Ocean Topography (SWOT) mission, expected to launch Nov. 2022. This summer, JPL delivered the advanced SWOT radar payload to the French Space Agency (CNES).



DSS-56 is a powerful 34-meter-wide (112-foot-wide) antenna that was added to the Deep Space Network's Madrid Deep Space Communications Complex in Spain in early 2021. Image Credit: NASA/JPL-Caltech

The **Interplanetary Network** directorate opened the year by placing in service on Jan. 21 a new 34-meter Beam Waveguide antenna, DSS-56, followed in less than a month by the return online, after an 11-month

overhaul, of the 70-meter dish that links Earth to Voyager 2 in interstellar space. The 21-meter dish operated by Morehead State University has been upgraded to be compatible with the Deep Space Network and has begun operating in conjunction with the DSN. It will support communications with spacefaring CubeSats, including several to be launched with Artemis I.

The directorate and JPL were awarded a new radio science sub-node for the Planetary Data System. The sub-node will serve the planetary science community by collating and curating data that were previously dispersed over several nodes dedicated to other disciplines. Radio science allows precise orbit determinations and other solar system-scale measurements through transmissions between spacecraft and the DSN.

Already a low-cost operations and data processing service for more than 50 missions, the directorate's Advanced Multi-Mission Operations System, or AMMOS, worked with an external vendor to offer the first publicly available cloud-based NASA Ground Data System for SmallSat missions.

The directorate introduced a Three Links per Operator protocol at all Deep Space Network sites in June, allowing each operator to communicate with more spacecraft. In another leap in communications bandwidth and efficiency, the laser-based Deep Space Optical Communications (DSOC) system, which passed a critical design review in 2020, will fly for the first time next year on Psyche.

In late March of 2021, a main component of NASA's Psyche spacecraft was delivered to JPL. Image Credit: NASA/JPL-Caltech

The **Planetary Science** directorate carried a high note through 2021 — from the pitch perfect landing of Perseverance and Ingenuity on Feb. 18, through the helicopter's first flight on April 19, to the extraction and containment of a core of Martian rock on Sept. 1.

Ingenuity demonstrated the feasibility of powered controlled flight on other planets, carrying for emphasis a tiny patch of fabric from the Wright brothers' first airplane. Another technology demonstration showed that future explorers will be able to make oxygen from the Martian air. And a smart terrain navigation system guided Perseverance to a safe landing.

With launches in the latter half of this decade, Mars Sample Return will collect Mars 2020's samples of alien rock, bringing the first scientifically selected samples from another planet to Earth. NASA will partner with the European Space Agency and several U.S. government organizations to design systems that protect Martian samples from contamination throughout their journey to Earth.

In the fall of 2021, NASA approved Europa Clipper's plans for its instrument suite and for assembly and testing. With a planned 2024 launch, Clipper will orbit Jupiter and conduct multiple close flybys of the moon Europa to study its atmosphere, surface, and the ice-covered ocean that may be capable of supporting life.

Psyche is nearly complete and will launch in 2022 towards an asteroid of the same name between Mars and Jupiter. The mission's namesake consists of a significant fraction of iron and nickel, and could be the core of an early, rocky planet. Psyche's observations are expected to help reveal how Earth and other planets formed.

As will the first observations of Venus in 40 years, approved by NASA in June through the selection of JPL's VERITAS and Goddard's Davinci+ missions. Later this past summer, ESA selected the EnVision mission, including the JPL VenSAR instrument, to join the reconnaissance of Earth's sister planet.

The selection of VERITAS notched another first for JPL: under the severe constraints of the pandemic, the traditional site visit by NASA's review committee took place virtually – but no less successfully.

JPL interns (from left to right) Joalda Morancy, Justin Vellanoweth, and Rebecca Gustine.

The JPL Interns Protecting Earth's Future

By Celeste Hoang

Go behind the scenes with three interns working on NASA's Earth System Observatory, and find out why they want to devote their future careers to putting our planet first.

Leave it to the interns to school JPLers. Case in point: Earth System Observatory (ESO) Intern Joalda Morancy knows exactly how to explain—in bite-sized, plain English—NASA's latest multi-missioned initiative to study our home planet.

"The ESO aims to tackle one of the biggest issues we're facing today—climate change," she says. "We need to have multiple missions that look at the Earth system as a whole in order to tackle the issue of climate change in the next couple of decades."

The observatory will be made up of an array of satellites, instruments, and missions to form a well-rounded collection of observations meant to offer crucial and precise measurements about our environment. As NASA puts it: "Taken together, as a single observatory, we will have a holistic, 3-dimensional understanding of our Earth's systems—how they work together, how one change can influence another."

While the ESO is in its nascent stages right now, it's also a crucial time for interns to be involved, as their generation will most likely be facing the most pressing challenges of climate change's future. Below, we spoke to three Education Office Year-Round Internship Program students working behind the scenes and why, to them, Earth is the most important planet to protect right now.

Joalda Morancy (398P)

As a Gen Z astrophysics major at the University of Chicago, is it any surprise that Morancy first became fascinated by space exploration in high school thanks to a YouTube video on how to make a peanut butter and honey sandwich in space?

"I love telling that story," Morancy says with a laugh. "It was so random and I was so intrigued. I watched the entire video and thought, 'This is amazing.' I did a lot more research about what NASA does and that was my gateway to space."

Flash forward a few years and in college, Morancy discovered there was one planet in particular that really caught their eye: Earth.

"I was initially interested in space exploration, and while studying astrophysics, I took a class on what makes a planet habitable," they recall. "It taught me everything about basic Earth Sciences and how that ties into Earth and the big picture of how a habitable environment operates."

They found it so interesting and—combined with the growing alarm of climate change—wanted a hand in studying how to preserve our precious planet. So Morancy took more classes in geophysics and geophysical sciences, including courses on atmosphere, glaciology, and physical geology.

"I wanted to give myself the foundational knowledge," Morancy says. "And right after that, I started at JPL."

They had originally searched JPL's careers site for internships with Mars 2020, but noticed an opening with the Earth Sciences team.

“I didn’t know JPL did Earth Sciences; I thought it was mostly Mars and robotic exploration,” they say. “When I saw that opening, I knew it was the perfect opportunity for me to learn more about Earth.”

For the past year-and-a-half, Morancy has worked on ECOSTRESS and is currently interning for the Surface Biology and Geology mission.

“I help with a lot of project management since SBG is in its early, pre-Phase A stage,” they say. “A lot of things are starting to cook up, and a lot of engineers and scientists are being onboarded to the team. "I’m working with the team to help onboard, and I’m also helping with the instruments for SBG—drafting requirements and assisting in the design of SBG Constellation Pathfinder.”

The magnitude of being part of the Earth Systems Observatory team (ESO) in its early stages is not lost on Morancy.

“I really believe it will have a long lasting impact on how we look at climate change and how we target those specific issues to fix,” they say. “It'll be a major driver for future researchers and scientists.”

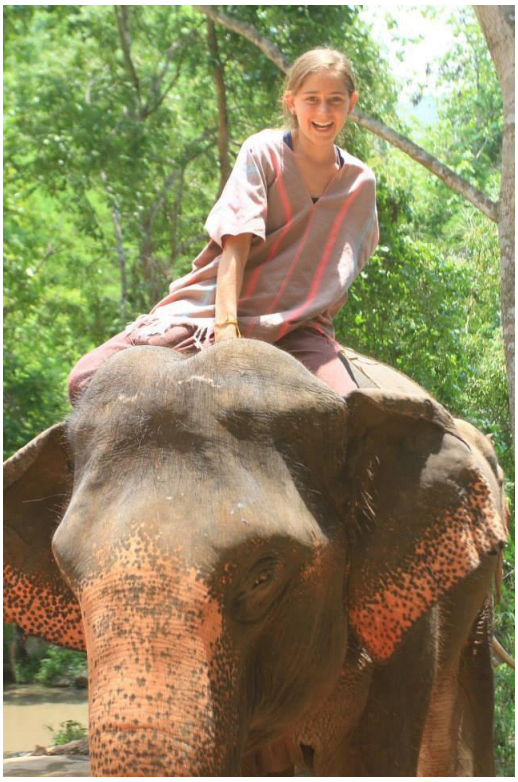
While Morancy hopes to combine Earth sciences alongside space exploration for their future career, they’re invested in the long-run in studying our blue planet.

“I think Earth science is incredibly important because this is our only home,” they say. “Even though people are looking to settle on Mars and other celestial bodies...I think it’s important to take care of this rock we’ve been given to live on. It’s crucial to make sure we take care of it for future generations.”

Rebecca Gustine (329G)

When Rebecca Gustine studied abroad in Thailand during her junior year of college, she didn’t realize it would alter the course of her studies and her future career path.

“I had a lightbulb moment realizing how human development and access to water go hand in hand,” she says.



Gustine went on to Washington State University, where she is now a PhD student studying civil engineering with a focus on water resources engineering.

“A lot of my undergraduate research had to do with water,” she explains. “It was from a global health perspective and had to do with access to clean water, hygiene, and gender dynamics in developing countries. I also really like math and physics, so combining global health with water resources engineering was very interesting.”

Gustine was so fascinated by water research, she knew she wanted to find an internship that would let her focus on just that. When she saw an open call for internships at JPL, she submitted her resume and was contacted by Gregory Halverson and Christine Lee, JPL scientists focused on applications of remote sensing to water quality, water resources, and ecosystems management.

Gustine started at JPL as an intern for the Earth Sciences Division in August 2020, supporting the science team by looking at how ECOSTRESS data could be used to preserve habitats in the California Bay Delta system, where the Sacramento and the San Joaquin Rivers meet. For the past year, she has focused on

processing remote sensing data, engaging with stakeholders, and working with the team to write a peer-reviewed paper.

“My work is basically using pictures from the sky that tell us information about the Earth, and then making decisions about how to manage water resources and protect critical habitats,” she says.

Gustine is also well aware that her research comes at a pivotal time in the global conversation around Earth’s future.

“Given that climate change is having a profound impact on human and natural systems, we have to understand those changes and protect critical habitats and resources for the well-being of humans everywhere,” she says. “Changes in one component of a system can have cascading consequences for other parts of the system.”

Moreover, while Gustine might not be exploring an unknown world in the galaxy, she is particularly proud to be part of pioneering research that could alter the future of the human race.

“Observing Earth is still space exploration, just from a different vantage point,” she says. “Given that NASA is the major proprietor of space, to look back at Earth using the same technology we use to go farther into space is important.”

Jonathan Vellanoweth (329F)

What will be the future, long-term impacts of power plants on our environment? Jonathan Vellanoweth is spending his time as an affiliate JPL intern working with a team to try to help answer that very question.

The student at Cal State University, Los Angeles—where he’s earning his master’s degree in environmental science with an emphasis in geospatial science—is part of the Surface Biology and Geology team using data and satellite imagery from ECOSTRESS and Landsat to detect thermal plumes emitted by power plants.

Vellanoweth’s work currently focuses on the Diablo Canyon Power Plant in San Luis Obispo, California.

“We’re looking at power plants that intake coastal waters to cool their reactors, then discharge it at a higher temperature back into the same water body,” he explains. “I’m using satellite imagery to detect that thermal change and outline the area of what is classified as a plume, or anywhere thermal discharge is heating up the ocean or the coast. We can see where this plume is moving over the year or several seasons, and other studies can use this data to see what the actual effects are on coastal communities.”

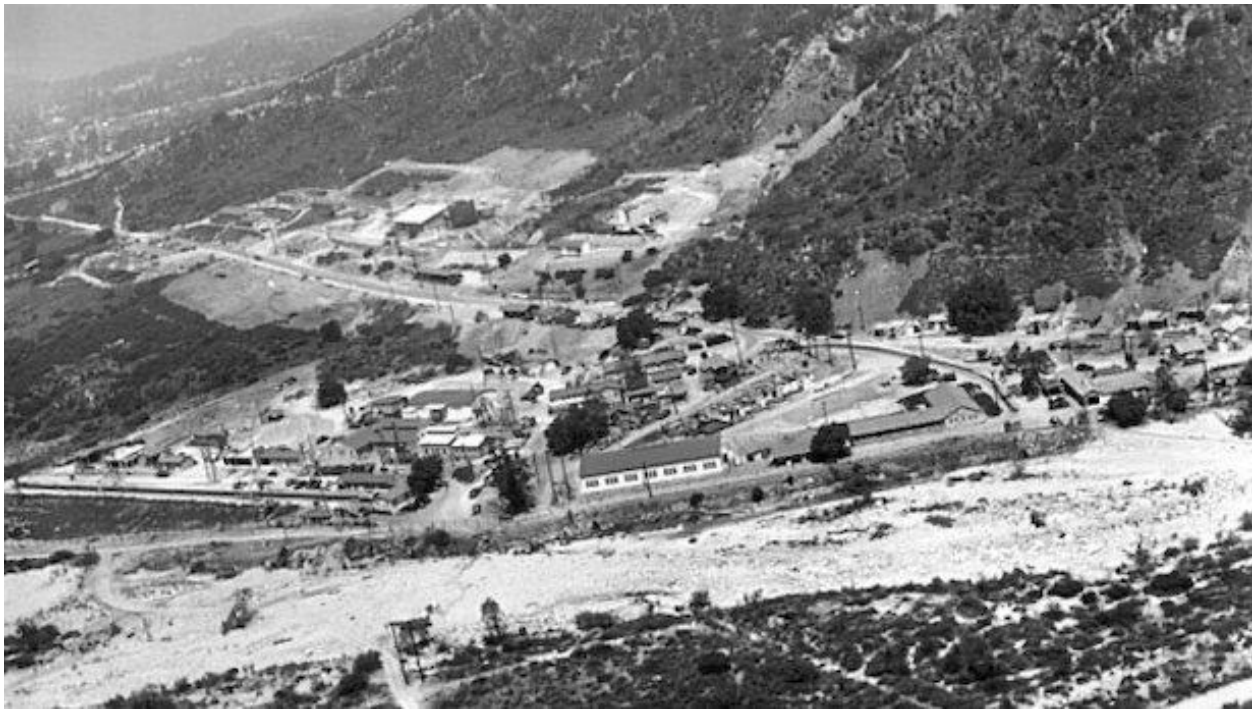
Vellanoweth has been fascinated by Earth science since as early as 7th grade, when he took his first environmental science class, learning all about the scientific method and later getting to go out into nature to collect soil samples and study them.

As a JPL intern, Vellanoweth has been particularly grateful for the variety of knowledge his colleagues provide him.

"The amount of support that you have from all these great scientists that work here is really what attracted me," he says. "You can intern for a lot of places, but at JPL you have all these colleagues you can meet with who have a lot of feedback they can give you. There are people on your team studying similar and dissimilar things as you, so they can provide you with something you might not have thought about and help expand your research."

Most importantly, Vellanoweth is looking forward to the information everyone will have access to in the future from the Earth Science Observatory.

"I'm excited about getting things out there and making them accessible to the public. I'm really big on that because there are a lot of people who want to do this kind of research, but a lot of times, it can be hard to find the data or algorithm you need, and it's a lot of trial and error," he says. "SBG and ESO bring all of these things together and make it available for everyone. It's easy to show someone your work, but I enjoy being able to actually get them involved and not have it be a scavenger hunt."



JPL viewed from the east in July 1947. The building in the center is Building 103, which is still standing. Image Credit: Caltech Archives

JPL in 1947: A Post-war Snapshot

By Erik Conway

JPL Historian Erik Conway looks at life on the Lab after the last of the founders had departed. Here is Part I of JPL's Post-war Missile Era.

When Louis Dunn became JPL director late in 1946, the Lab was still a relatively small research organization with an uncertain future. There were a lot of unknowns about whether federal support for research and development would continue. Research was not yet an accepted function of the federal government, and the armed services did not have a track record of supporting it outside of wartime. What cemented the modern federal research establishment—including JPL—was the 'one-two punch' of the first

Soviet atomic bomb test at the end of August 1949, followed by the Korean War, which began in June 1950.

JPL was no longer the only rocket research organization in the U.S., or even in the U.S. Army. The Army had orchestrated the migration of about 120 of Wernher von Braun's rocketeers from Peenemünde in Germany to White Sands Proving Ground in New Mexico.

In 1950, they would move to the Army's Redstone Arsenal in Huntsville, Alabama, where they would become the core of the Army Ballistic Missile Agency, and more than a decade later, of Marshall Space Flight Center. The Army had also contracted with General Electric to re-assemble and launch the hundred or so captured V-2s that had also been brought back from Germany, giving General Electric and its subcontractors valuable experience, an effort known as Project Hermes.

At the very least, JPL had competition for leadership of American rocketry.

Dunn's own style was far different than his predecessor Frank Malina's had been. Malina's secretary, Dorothy Lewis, recalled Malina had run the young JPL as a family. It was quite freewheeling, with a volleyball league and a newsletter, the GALCIT Ear, which covered the Lab's social life—weddings, births, games, and events, with a rather mocking tone. Unfortunately, it ceased publication in 1945; its replacement, the Lab-Oratory, dates to 1951.

Dunn was from the Transvaal in South Africa and had come to Caltech as an undergraduate. He completed his Ph.D. in aeronautics in 1940. [P-293] Lewis reflected that, "Dr. Dunn was [an] entirely different personality. A fine, brilliant man but hardly said a word. . . very reserved." Al Hibbs, who would become JPL's 'voice' in the 1970s, commented that Dunn was very shy, "rather cold, had difficulty meeting and getting along with people, a good technologist, determined to do it right." He would avoid his own secretaries, sneaking in the back door of his office in building 111. "He didn't want to indulge in small talk," Hibbs remembered. JPL became more formal and structured during Dunn's tenure, though it kept the sports clubs, too.

JPL had about 500 employees in 1947. At least 70 were women, though possibly only one, a chemist named Lois Lackman hired in 1946, counted among the professional staff. (She retired from JPL in 1984.) The staff members were organized into four technical directorates—Rockets and Materials, Thermal Jet Propulsion, Instrumentation and Hydrodynamics, and Engineering, and an Administrative directorate. While Dunn did not have a deputy, he had a laboratory administrator working for him, Val Larsen, who oversaw the myriad support and administrative functions.

The Laboratory's major project was the Corporal E, a guided, short-range, research missile, which first flew in May 1947 at White Sands Proving Ground. The Laboratory also had research tasks in ramjet propulsion, in solid and liquid propellants, in combustion and high temperature materials, and with the new supersonic wind tunnel, high speed aerodynamics. JPL's chemistry division evaluated more than 50 propellants in these years, trying to improve on the performance of the acid-aniline propellant combination that had been the basis of Martin Summerfield's liquid JATO motor of 1942 and was still the basis of the WAC Corporal and the Corporal E missile.

Corporal E Round 31 on its launch stand at White Sands Proving Ground, May 22, 1947. Image Credit: Caltech Archives.

Electronics was another key research area. The WAC Corporal had possessed no electronics other than a radiosonde package that had never worked. The Corporal was supposed to achieve an accuracy possible only through active guidance. The German V-2 had used an onboard gyroscope-based automatic pilot for this purpose, though without success. It had been a terribly inaccurate weapon. The Corporal E's guidance system used gyroscopes too, and it had a telemetry system to send data back to the ground. But the missile was controlled from the ground via radio links. Ground-based radar operators tracked the missile, while other operators issued steering commands. One important research question in this era was

whether this sort of command guidance was feasible for a ballistic missile. It had been experimentally used in the final year of World War II to guide bombs, but was not yet a well-understood technique.

A third significant effort involved JPL with von Braun's engineers at White Sands. Malina and Summerfield had performed an analysis of a multi-stage rocket as an orbital launch vehicle late in 1945, and Malina had presented it to the Army in February 1946 to not much initial interest. That effort caused Summerfield to imagine putting the V-2 and a WAC Corporal together as an experiment towards that end—it wouldn't reach orbital velocity, but it would reach much greater altitude than either vehicle alone. Malina published the idea in Army Ordnance's in-house magazine later that year. Army Ordnance's Gen. Holger Toftoy supported and promoted the idea, too, and it became the Bumper WAC program. The first Bumper WAC would fly in 1948.

About 80 buildings had been built in the Arroyo Seco to support and house all this activity. The Laboratory also operated a large liquid propulsion test complex out at Muroc Dry Lake, now part of Edwards Air Force Base. In 1946, the Lab's asset value had been estimated at $3 million, the equivalent of about $46 million in 2021. Its budget was $2 million.

The Laboratory in 1947 was a far different operation than Malina's little graduate research program of 1936, reflecting the dramatic changes in technology and funding priorities that World War II had brought into being.

In the next column, I'll take a closer look at the Corporal E design and flight test program.

During the Lab's Giving Campaign, JPLers took part in UnitedWalkLA at SoFi Stadium.

JPL Generosity Raises Nearly Half a Million Dollars for Giving Campaign

For the second pandemic year in a row, JPLers stepped up, showed their generosity, and supported our Annual Giving Campaign with donations to the United Way Greater Los Angeles (UWGLA) and other charities.

This year's campaign, which ran from Nov. 4 through Dec. 3, brought in nearly half a million dollars--specifically, $495,696.91 in contributions. That included $484,841.58 for the Giving Campaign, including private donations, and $10,855.33 from UnitedWalkLA.

Over 1,137 JPLers opened their wallets for the campaign. Contributions included one-time, recurring, UnitedWalkLA, and other external donations.

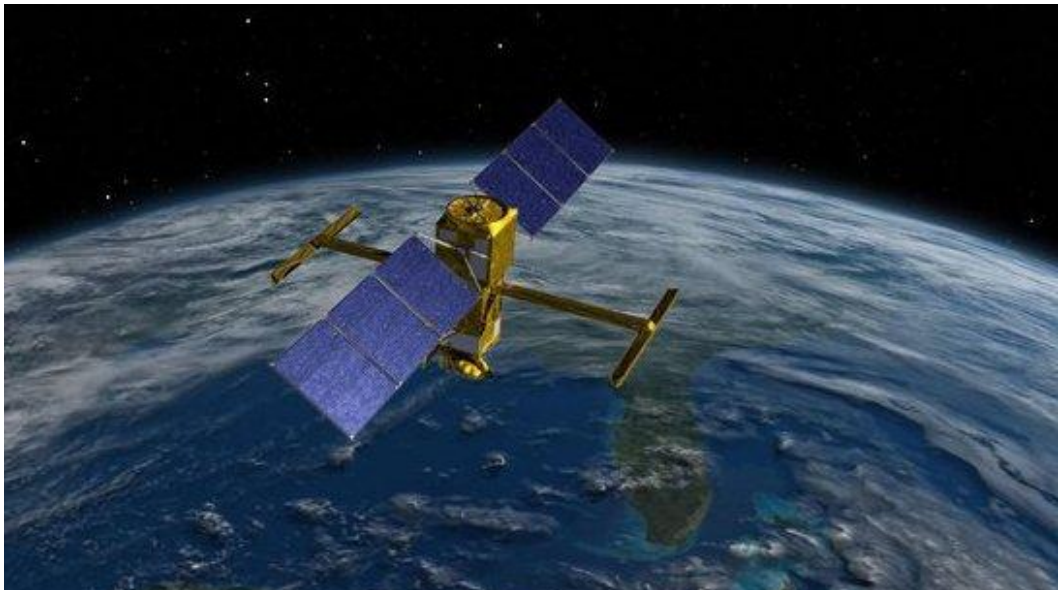
"Because of you, many of our neighbors will greet the new year with hope," said JPL Interim Director Larry James, who sits on the UWGLA Board of Directors and sees firsthand the way these contributions can change lives.

This year's contributions go toward United Way's mission to break the cycle of poverty in L.A. County through housing, education, and economic mobility. Some donors chose the option of directing their contribution to a specific charity they designated.

It's not too late to be part of the Lab's giving efforts. You can still donate at JPL's external site for credit/debit card donations, or by emailing uwgive@jpl.nasa.gov.

While in-person volunteer opportunities are still limited during the pandemic, watch JPL Space for announcements on upcoming events for the first half of 2022.

Events



Von Karman Lecture Series - SWOT: Looking at the Earth's Water

Join Dr. Cedric David for a talk about the Surface Water Ocean Topography (SWOT) mission on Jan. 20 at 7 p.m.

Webcast: YouTube link
Von Karman Lecture Series - SWOT: Looking at the Earth's Water

Earth is our home. SWOT will give us a better understanding of the world's oceans and its terrestrial surface waters while showing why these resources are so important.

- **Speaker:**
  Dr. Cedric David, Supervisor of JPL's Water & Ecosystems Group, NASA/JPL
- **Host:**
  Brian White, Public Services Office, NASA/JPL
- **Co-Host:**
  Jocelyn Argueta, Public Outreach Specialist, NASA/JPL

JPL Family News

Retirees

The following JPL employees recently announced their retirements:

30+ Years:

Bradford L. Swenson, Section 355S, 39 years

James L. Lamb, Section 3890, 38 years

David M. Soules, Section 353E, 33 years

20+ Years:

Ted Brunzie, 337C, 28 years

Mark C. Koehler, 3570, 28 years

Passings

Passings must be submitted through Human Resources, which coordinates with the family of the deceased.

Robert F. Howick, whose work at JPL included serving in Section 662, died on Dec. 9, 2021, at the age of 78. He worked at JPL for more than 40 years, then was an outsourced contractor for five years, for Jacobs Engineering and Allstar. Howick worked as an Electrician Leadman, Journeyman, Electrical Group Coordinator, and First-Line Supervisor. His career included providing support for the Hubble Space Telescope and Voyager.

Howick is survived by his wife, Julia; daughter Tina and her husband Chris; daughter Dana; son Johnathon and his wife, Terry; and two grandchildren, Skyler and Tyler.

A service is scheduled for Jan. 11, 2022 at noon at Forest Lawn Hollywood HIlls, Old North Church at 6300 Forest Lawn Drive.

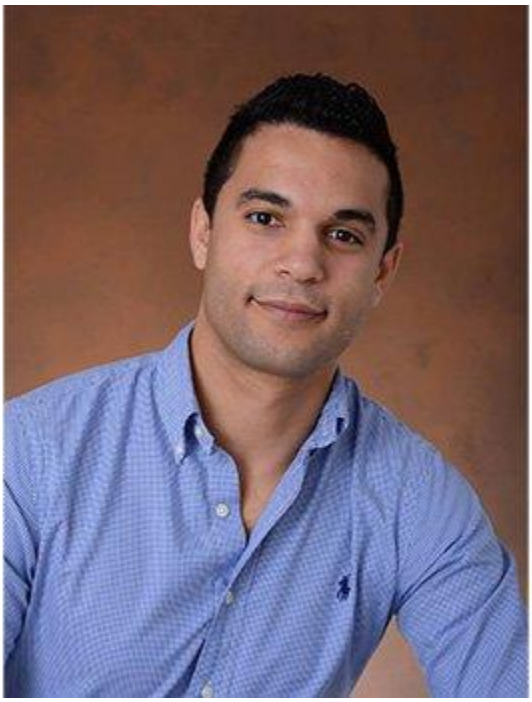
Michael L. Young died on Dec. 9, 2021, at the age of 62. Young was a technician at JPL for 27 years. He is survived by his wife, Benita, and his son, Wesley.

Letters

I would like to thank my JPL colleagues for their support and understanding following the passing of my mother. Your expressions of sympathy during this difficult time were greatly appreciated. I also want to thank the JPL Hospitality Group for the beautiful plant. – *Cynthia Kahn*

Awards

Nacer Chahat Inducted as IEEE Fellow



SWOT Payload System Engineer Dr. Nacer Chahat is rounding out the year with a pair of professional honors.

The Institute of Electrical and Electronics Engineers (IEEE) has inducted Chahat as a Fellow for contributions to “CubeSat and Spacecraft antennas for inter-planetary missions." Selection as IEEE Fellow is one of the most prestigious honors of the organization, bestowed upon a very limited number of senior members who have contributed significantly to the advancement or application of engineering, science, and technology. He is the youngest IEEE Fellow in recent years.

In addition, The Institution of Electronics and Telecommunication Engineers (IETE) has presented Chahat with its 2021 Dr. Sudhakar Rao Award, honoring him “For demonstrating exceptional innovation and leadership in the development and engineering of novel spacecraft antenna technologies that enable a variety of current and future deep space and Earth science missions.”

Chahat says he wears two hats at JPL. As an antenna engineer, he delivers flight hardware and develops innovative technology aimed at enabling new types of missions for Earth Science and deep space exploration. And as a payload system engineer for the SWOT mission, he is currently defining tests to fully qualify all interfaces between the payload (delivered by JPL) and the spacecraft bus (delivered by French partners – Thales Alenia Space and CNES), and he helps resolve any anomaly that might occur.

“These awards are the results of very successful cross-disciplinary collaborations across multiple sections, divisions, and directorates, so I would like to thank my co-workers and look forward to innovating more with them,” Chahat said.

More information about IEEE Fellows is here.

More information about IETE honors is here.