

## Featured Stories



### Laurie Leshin Gets Real

By Carl Marziali

Laurie Leshin became JPL's director a year ago tomorrow. Here, she reflects on her first 12 months and looks ahead to the next three years — the focus of strategic imperatives to be released shortly — in a recent interview with JPL Space.

#### **It's been a year. What moments stand out when you look back?**

It has been a year! So many memorable moments. From the minute I walked in and saw the welcoming banners with my name on them and that first day of so many people coming out to greet me, the Lab has been incredibly welcoming — so far beyond what I could have ever dreamed of. That goes all the way back to when I was announced. I feel the support from the community here, and that has been so essential because there have definitely been challenges, too. The next memorable thing is, four weeks in, Psyche raising their hand to say, 'We're not going to make our launch date.' And so in many ways, this first

year is bookended by the Psyche challenges on the front end, and our response to the IRB, and having Psyche now be on track for a launch this October.

One more big moment — Engage JPL: about 2,500 JPLers, over 13 sessions. I loved every minute of that and want to do more. And getting out and visiting our labs, meeting with our incredible business and technical teams, seeing our Europa Clipper and CGI, and NISAR before it shipped — these great teams, and learning about the technology and science that goes along with them.

**It must have been especially validating for you to start from the depths of Psyche and get to a glowing report at the end.**

That was a good day. Both days, actually, where the IRB gave preliminary report-outs both of Psyche's response as a team and a mission, and then of our institutional response, which of course I was more deeply involved in. I'm just so proud of all of us for not saying, 'This isn't right or this doesn't really impact us.' But instead really leaning into the response and to actually saying, 'You know what, there's truth here that we need to learn from and we need to improve.' It makes me believe we can really solve any problem that we put our minds to.

**It's one thing to work with JPL, it's another to live it. What surprised you the most in your first year as director?**

I don't know that anything has surprised me incredibly. I already knew how dedicated everybody was here, because I have worked here with friends and colleagues over the years. I guess there is a little bit of how information travels across the Lab so quickly, like how everybody knows everything that's going on. It's part of what's cool about it — it's like a small town, everybody knows everybody's business, and I like that!

**What was the hardest thing you did this past year, and if different, what was the one of which you are most proud?**

Honestly, the hardest thing...the Psyche response was hard overall, but specifically within that, standing up and asking people to come back to the Lab as part of updating our hybrid work policy. One, we worked really hard in a short period of time to actually settle on what was a reasonable approach that we think is aligned with what the Lab needs and still enables flexibility for folks. But then rolling it out, I was not quite six months in when that happened, and I really felt like, 'OK, this is it, the honeymoon's over!' I worked really hard on the presentation and I was really nervous about it. And I have to say, JPLers responded like the professionals that they are. People are back and it's just so exciting.

And in terms of what I'm most proud of, I'm actually really proud of a lot of our DEIA work over the last year, specifically around positioning Neela Rajendra as our chief inclusion officer and a member of the EC, taking on some concrete issues like paid parental leave and bringing an ombuds to JPL, and rolling out the DEIA plan. Hopefully people feel like I'm listening and that we're going to continue to take action.

**Our North Star includes creating a safe, inclusive, and exciting workplace where everyone can thrive. That's on all of us, but three positions that are going to have an outsize influence are our chief inclusion officer, the future ombuds, and the future director for human resources. How do you envision those three working together to help achieve our goal?**

All three have important roles to play that are complementary to one another. The ombuds in many ways is the most focused of the three: they are about providing a front door for people who want to understand what resources are there for them if they're having issues at the Lab, and we just want to make that as low a barrier to entry as we can. I'm really excited with the person we've hired and can't wait until she starts, which I think is soon.

And then Neela, our chief inclusion officer — for her, the job is so much about, ‘We built the DEIA plan, now we’ve got to go execute.’ I really love the research orientation of that plan, that we’re going to try things, we’re going to learn from them, and then we’re going to take what’s working and keep pressing.

And then the new director for HR — it’s a huge opportunity. This is a real chance to position HR as a team of people on Lab that are really working to make our employee experience amazing, and to make sure our employees are well supported, and to bring great talent to the Lab. We’re in the middle of the search process. I’m personally doing an early screening of candidates and there are some great folks, and of course what I’m most thrilled about is how many really qualified people are saying, ‘Hey, I’d love to consider JPL!’ It just speaks to the quality of our brand and what we have to offer, and the team that the director for is going to get to lead. I’m excited to bring that person in and have them become a part of this ecosystem focused on making it an inclusive environment where everyone can thrive.

### **How do you stay focused and energized every single day?**

It is kind of a crazy schedule, but it’s interacting with people at the Lab and getting to tell our story to people beyond our walls — both of those things are super energizing for me. Whenever I get to just walk across the Lab and talk to people, or go visit one of our research labs or technology labs, or one of the mission or business teams and just appreciate their work, that’s very energizing for me.

And lately, I have been giving a lot of talks outside of JPL. I’m really getting to tell the story of what we do here every day. People are blown away, and it’s incredibly energizing to get to share our success with so many others. And when we struggle, to share that, too — how we’re dealing with it, and how we’re leading across the aerospace community in some cases.

### **Now that you’ve got a year of perspective behind you, what do you feel is the difference between where JPL is going and where it needs to go?**

I hope there isn’t too much difference in where we are going and where we need to go. I’m excited that we have put together and are just putting the finishing touches on our strategic imperatives for the future. If walking in and having the Psyche challenge taught me anything, it was that we had some near-term work to do on getting our house in order post-Covid and getting ourselves ready for the future. This plan is a three-year plan to help us work that. In some ways, it’s a pretty near-term time horizon. It’ll take us up to our 90th birthday in October of 2026, with some concrete actions that are aligned with what we heard from people out of Engage JPL, aligned in many ways with how we responded to the Psyche IRB. But what folks will see is that last strategic imperative in the plan is about taking this beyond the next three years. How do we, in the 10 years that come after that, position JPL for a second century, which is where we will be in 2036 — embarking on our second century. And to me, that’s the exciting work that frankly I haven’t spent as much time doing as I would like. We’re all really practical and want to work on today and tomorrow’s work, but there’s also real yearning to think longer term, and I really look forward to engaging across the Lab on that longer-term leadership conversation.

### **You were a university president and you were also head of science at Goddard. What’s different about leading JPL?**

First of all, I’m so incredibly happy to be back on the West Coast, in spite of the New England-like winter that we had. There is just something about the creativity I think that we have at JPL, and in California, that is very inspiring and very exciting. And there’s something about the Dare Mighty Things Together, the boldness of JPL, there’s sort of an audacity here that can at times trend toward arrogance, and that’s not always great, but the audacity in its purest form is like rocket fuel. You have the sense that you can go sit in the cafeteria here and throw out a crazy idea and by the end of the day you’ll have three people say, ‘Oh yeah, we thought that through, that’s an engineering problem, and we are excited to go figure it out.’ You’re

constantly opening possibility here. That to me is distinctive about JPL, and something that's very energizing.

**Is there any one thing that you wish JPLers knew about you that they don't already?**

I hope they know how much I already feel a part of the family here, and that's because of them. I'm loving this. I intend to stay as long as they'll have me (laughs).

**What excites you about the coming year?**

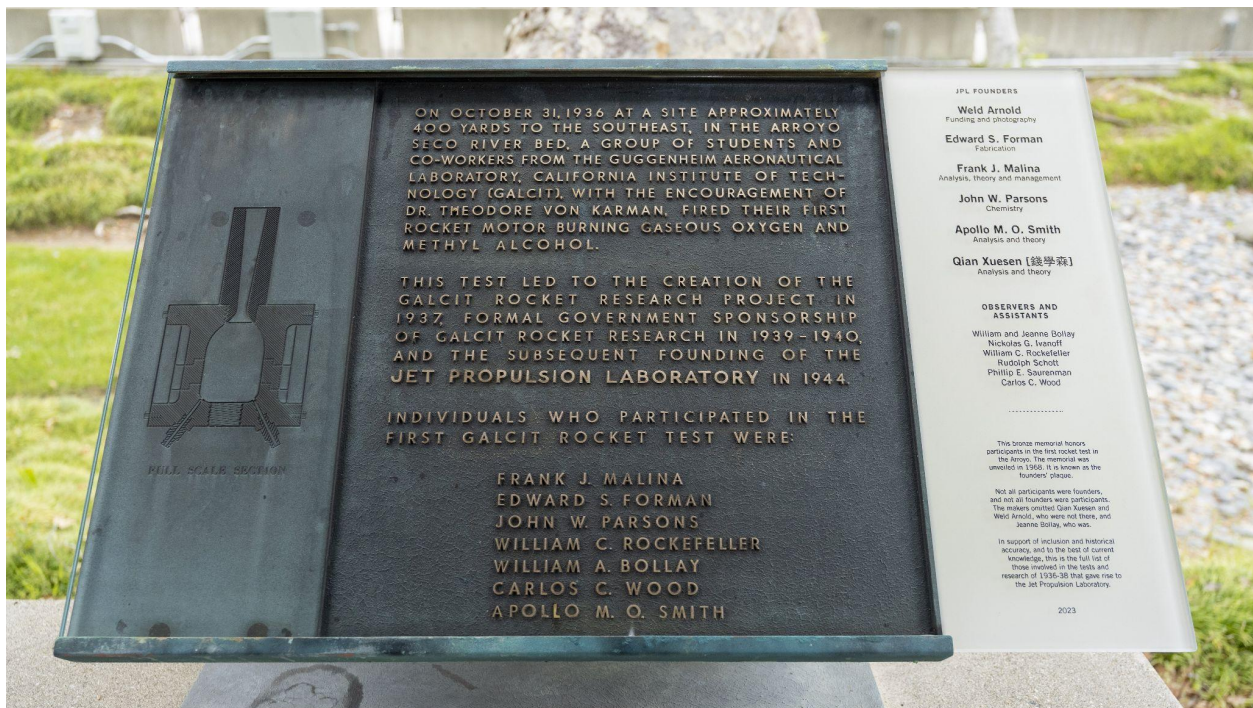
I'm excited about the strategic imperatives. The plan coming out will give us focus and structure in our conversations about where we really want to prioritize. I'm really excited about Psyche's launch, I'm really excited Clipper will ship about a year from now, I'm excited about MSR confirmation, I'm excited about SWOT being operational, and getting NISAR launched. And CGI is going to deliver, I think, in about a year. I mean, the list is so long!

Part of our focus now needs to be on the things that are coming after that – NEO Surveyor is emerging, and astrophysics probes and Habitable Worlds Observatory; there are some great Earth science explorer opportunities coming up, and New Frontiers, and Earth System Observatory missions – so really focusing on the future. I'm excited about that, too.

**There's a special pressure, and responsibility to those who come after, to be the first in anything. Is that something you think about?**

It is. It definitely is. A quick story, I was on the Hill last week in Washington D.C., getting to share the excitement of what we're doing, and helping support NASA's budget request. I ran into Gabby Giffords, former Arizona congresswoman, right under the dome of the Capitol. We talked and I gave her my business card. On my business cards, I have different pictures on the back because every time you give a business card, I think it's a chance to tell a story about JPL. We've got some MIRI images, and Perseverance, and ice sheets melting, and things like this, and I have one image of the women computers at JPL. I gave her that one, and talked about how these are the women whose shoulders I stand on as the first woman to lead JPL. She hugged me and she said thank you, and was just so incredibly proud and supportive. I very much understand that there is a big responsibility that comes with this role and with being a first. I take that very seriously and am so grateful for the opportunity. Although there is definitely pressure, I love my job and I hope that comes through.

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## Founders' Plaque Made Whole

By Taylor Hill

Director Laurie Leshin, Deputy Director Larry James, Chief Inclusion Officer Neela Rajendra and the Asian American Council unveiled a transparent update to the 1968 memorial known as the founders' plaque in a ceremony on the Mall on May 23, 2023.

The glass overlay features the complete list of founders: Weld Arnold, Edward S. Forman, Frank J. Malina, John W. Parsons, Apollo M. Smith, and Qian Xuesen. The traditional Chinese characters for Xuesen's name also appear on the overlay. Observers of the first rocket test are also listed.

An explanation accompanies the new list:

"This bronze memorial honors participants in the first rocket test in the Arroyo... Not all participants were founders, and not all founders were participants. The makers omitted Qian Xuesen and Weld Arnold, who were not there, and Jeanne Bollay, who was. In support of inclusion and historical accuracy, and to the best of current knowledge, this is the full list of those involved in the tests and research of 1936-38 that gave rise to the Jet Propulsion Laboratory."

During the unveiling ceremony, Director Laurie Leshin spoke about the importance of updating a piece of the Lab's history.

"We have learned over and over again, especially with our inclusion lens on, that the history we learn is not necessarily the history that is real," Leshin said. "And just like with our missions, when we learn something new, and we deeply understand something, it's our job to get that information out there, to celebrate it, acknowledge it, embrace it. This is embracing our history and doing it in a way that is real and trusted."

The project began with research by JPL Historian Erik Conway, who documented inaccuracies in the plaque in a JPL Space post, "JPL's 'Founders Plaque' Isn't Quite What It Seems."

"We discovered that Frank Malina, who with Theodore von Karman was the 'brains behind the outfit,' so to speak, had thought the plaque was wrong," Conway said. "What we did to correct the record was to keep

what's on the original plaque—it's still there, after all. But we've added a few names that had been left out, and we've described what each person's role was."

In her comments, Rajendra noted the design of the update, specifically the use of a glass overlay with the new text engraved on an overhang, leaving the original text legible.

"It was incredibly intentional that the addition is glass, signifying the necessity for transparency," Rajendra said. "Without transparency, we can't have inclusion, and we can't have trust."

Rajendra also spoke to the significance of the updated plaque for the JPL community as a whole.

"It's going to have an impact on the kind of timescale that rivals our missions," Rajendra said. "It is a testament in a very permanent way that we are a place of learning, we are a place of growth, and we are a place of inclusion."



*Deputy Director Larry James, AAC Chair Shayena Khandkher, Director Laurie Leshin, and AAC Vice Chair Christine Chen with the updated founders' plaque. **Image Credit: PhotoLab***

Electrical engineer Shayena Khandker said she inherited the effort to update the plaque when she became chairwoman for the Asian American Council. She learned about the efforts of previous AAC chairs to update the plaque and have Xuesen's contributions acknowledged. After Conway's history column and Rajendra's appointment as chief inclusion officer, both in 2021, the effort gained critical support.

"The responsibility of the AAC as an employee resource group for Asian and Asian American employees at JPL was passed down to me from generations of chairpeople before me," Khandker said during the unveiling. "We are here to correct history and preserve the name Qian Xuesen, one of JPL's founders and strongest contributors. We acknowledge that for many years, JPL's heritage was not accurately represented. But today, I am excited to announce that has changed with the unveiling of the founders' and contributors' plaque."

For Technologist Yutao He (349C), seeing Xuesen's name on the plaque is a point of pride and a connection to his own path to JPL. Before coming to the United States, He attended university in Beijing and learned of Xuesen's accomplishments.

“He was always a role model for me,” He said. “When I had the privilege of coming to work for JPL in 2004, I learned about his role as a founder of JPL as well.”

Over the years, He would show archival photos of the original Suicide Squad to his visitors, but he could only tell them about Xuesen’s contributions.

“Now with this, I can very proudly point him out, you can see it here,” He said. “For the Asian American community, it’s amazing to have his contribution included, this part of history recovered, and the truth restored.”

The Office of Inclusion funded the update to the founders’ plaque. The Asian American Council supported and championed the project through several generations of AAC chairs. The Lab Engagement section of the Communications and Education Directorate researched, proposed and executed the update.

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Contributors to the 2023 founders’ plaque update:

- Historical research: Erik Conway
  - Additional research and videography: Leslie Mullen
  - Writing: Erik Conway, Carl Marziali, Katherine Park
  - Editing and conceptual design: Carl Marziali
  - Additional design and production: Dan Goods, Katherine Park
  - Project leadership: Carl Marziali and Neela Rajendra
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Members of the Voyager team sit alongside documentarian Billy Miozzi (far right) for a question-and-answer session following the screening of Miozzi's film, "It's Quieter in the Twilight."

## New Voyager Documentary Highlights the People, Then the Mission

By Taylor Hill

For a 45-year-old mission, JPL's pair of Voyager spacecraft have a knack for staying in the news.

The past few years have seen the spacecraft endure an [anomaly](#) during a scheduled calibration maneuver in early 2020, an 11-month silence between the Deep Space Network and Voyager 2 during Canberra's [70-meter antenna repairs](#), and a [power strategy update](#) that should keep the spacecraft from having to shut down any of its science instruments for two more years.

As the record-setting duo's uncertain future and resilience continue to captivate the public, documentarian Billy Miozzi's fascination with Voyager emerged from a different angle.

"Around the 40th anniversary of the mission, there was an article on the Voyager team working in this nondescript office building — a very ordinary-looking place where this incredible feat of exploration was taking place," Miozzi said. "This tiny, dedicated team that's been working for decades on this mission, in an office next to McDonald's ... the dichotomy was just fascinating to me."

That fascination became the impetus for Miozzi's film "[It's Quieter in the Twilight](#)," which brings to the big screen the 12-person Voyager team toiling away to keep the dream of interstellar exploration alive.

The documentary intersperses the mission's myriad discoveries during its Grand Tour of the outer gas giants, and the revelatory findings throughout its decades-long journey to reach interstellar space. Yet its true aim hits much closer to home, spotlighting the handful of engineers who remain at the helm of an aging mission that once boasted a team of 1,200 individuals.

"This is a shy group," said Suzanne Dodd, Voyager project manager. "I get interviewed a lot, and Ed Stone [longtime and recently retired Voyager project scientist] gets interviewed a lot, but most of this team doesn't. What makes this movie different is that it really focuses on the people even more than the

accomplishments of the spacecraft. It shows how the people have dedicated their lives to it. It's a big part of the Voyager story, and a big part of Voyager's success."





*Members of the Voyager team meet at their Woodbury office location in 2019.*

The film crew embedded with the team inside JPL's Woodbury complex, interviewing members, listening in on conference calls, and generally hanging around through the sometimes-tedious, occasionally harrowing tasks associated with commanding two spacecraft 14 billion miles away.

"This was a three-year process," Miossi said, who began filming the team in 2019. "In the beginning, I could tell everyone was hesitant, kind of avoiding us at first. But I would just talk with them, try and build trust with them. It was a challenge to get that openness, but thankfully they were all so generous sharing their lives — their inspiring lives."

### **Longtime Team Members Learning New Lessons**

The film sheds light on each person on the project, including Fernando Peralta, an operations systems engineer on Voyager since 2008, who emigrated to the U.S. in 1981 from Bogata, Colombia. After watching a screening of the film at Caltech's Beckman Auditorium on May 15, Peralta said he was touched by the inclusion of his personal story and background in the film, and those of his team members.

"Seeing different images of me at different stages of my life being told along with what was going on with the Voyager's is something that makes me feel in a way that I don't find words to express myself," Peralta said. "Seeing colleagues being presented in the same way was very touching. It also makes me think how little we know of the personal lives of our colleagues."



Looking back at the filming experience, Peralta said the timing was serendipitous, as the documentary crew was rolling during a rare anomaly with the spacecraft going offline during a typically routine maneuver — "It's always pristine, but of course when the camera is rolling, it was not," said Peralta — and continued filming through the pandemic.

“Nobody saw that coming, but they were there through it, and the film really captures those moments when we really didn’t know what was going to happen,” Peralta said. “As time passes by, I guess we will look back on it with different eyes.”

### **No Regrets, Just Gratitude**

Fault Protection and Flight Software System Engineer Sun Kang Matsumoto’s path to Voyager started in a rural village in South Korea, emigrating to the U.S. in 1977, where she joined the Army. During her senior year at the University of Texas, JPL recruited her, and she joined the Voyager team for the upcoming Uranus Encounter in 1986.

“I was new and didn’t really know what was going on, but seeing all those people around me getting so excited about the encounter was exciting and infectious. I felt their passion and wanted to join them,” Matsumoto said. “That initial excitement and passion probably are the reasons why I always came back to Voyager after working on other projects.”

After watching the screening, Matsumoto took issue with the portrayal that she and her fellow remaining Voyager team members were making sacrifices to stay on board – both professionally and in their personal lives.

“Most of us were doing what we liked to do and enjoyed working in a family-like environment,” Matsumoto said. “I don’t have any regrets for staying on this project for so long.”



She recalls when her younger son was born, she was able to leave a hectic and pressure-filled mission and came back to Voyager to work part-time.

“On Voyager, I was respected for my experience and knowledge, and I was familiar working with other engineers. Voyager let me work part time until my younger son started high school. I volunteered at their classrooms, chaperoned school trips, and organized and participated in activities outside of school and play dates. I felt I had the best of both worlds, making a meaningful contribution to the work I love doing, and yet not missing anything important in my sons’ lives.”

Overall, Matsumoto said the experience of being a part of the documentary was both honoring and humbling.

“Being such a small team, we are like a family,” Matsumoto said. “Yet there were some things I learned about them because of the film. It made me appreciate the journey they have taken to be where we are today, all in one place at the same time in our lives. Since filming started, some people have experienced additional challenges in their health or personal lives. It reminds me of how fragile human lives are, and what I have heard many times – that we are merely stardust.”

In a question-and-answer segment following the screening, Project Manager Suzanne Dodd talked about the mission’s upcoming goals now that the team has made it through the DSN antenna upgrade, numerous anomalies, and a global pandemic.

“We just finished the senior review proposal, and we hope to continue with these spacecraft to the 2030s, with a stretch goal to take us out to 2035 when Voyager 1 will reach 200 AU from us,” Dodd said. “That’s our new goal.”

"When we were filming, you weren't sure if you'd get to 2027," Miozzi said.

"Yeah, I think we've got a good shot with the new power strategy to reach that 50th anniversary goal, so we've set our sights out even farther.... once again," Dodd quipped.

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## LabGrown, Part 2: The Hunt for the Oldest Tree on Lab

By Vincent Robbins

*In the second of a four-part series exploring the Lab's flora, JPL Space writer Vincent Robbins goes on a lengthy investigative journey to identify the oldest tree on Lab. Next up: native plants of JPL; and last but not least, our shrubs and flowers.*

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In 2019, Chief Engineer Rob Manning and his twin brother, Microdevices Lab Engineering Technical Specialist Chuck Manning, did some nostalgic sleuthing. Having worked at JPL for more than three decades each, they shared fond memories of the Lab they remembered from the 1980s, and curiosity led them to look deeper into JPL's past. They scrutinized old photos, matching them to the current state of the Lab. They located the site of [the gulch](#) and the old outdoor lunch counter from the '40s. They wandered around the site of the original east bridge and found remnants of it.

But something else stood out in their investigation: the trees.

"At least for the east side of JPL, the trees are a quiet reminder that this place has a history that predates even the early rocketeers," said Rob Manning. "Those few remaining trees have seen it all."

Weeks ago, I began work on a series about the trees of JPL and decided for the second installment of the series to do some sleuthing of my own: attempt to identify the oldest surviving tree on Lab. What follows here is my investigative journey into the roots and branches of JPL's arboreal history — an adventure in which I pored over archival photos; scrutinized aerial surveys of the Arroyo; analyzed 80-year-old facilities maps; canvassed Lab on foot; and spoke with historians, scientists, tree experts, and, yes, the Manning brothers.



Well, fine — I wasn't going to slice open old oak trees on Explorer Road to count rings, anyway.

A more scientifically advanced way to date trees — or any organic material — is carbon-14 dating, a method that measures the degradation of radiocarbon over time to determine its age.

However, in the case of trees, Sessions told me that carbon-14 dating has its limitations. Carbon 14 has a half-life of a little over 5,500 years with a plus-or-minus margin of error on the order of several decades. This can create problems for tree samples that are relatively young — a few hundred, not a few thousand years old.

“When you're dating something that's 5,000 years old, plus or minus [decades] is not as big of a deal,” said Sessions. “The problem with 100 years is that you haven't lost very much [radiocarbon] to decay.”

Sessions also pointed out that nuclear weapons testing in the 1950s added noise to the signal of carbon in the atmosphere.

“This phenomenon is called the bomb spike,” explained Sessions. “Atmospheric weapons testing increased the radiocarbon content in the atmosphere by about twofold.”

And while the bomb spike could theoretically be helpful in a century-old sample — one could pattern match the rise of carbon to a certain point in the tree rings — Sessions said these two challenges make the prospects of accurately aging a century-or-two-old tree a difficult task.

Also, fine — I didn't have a WAM for sending pieces of trees to a carbon-14 dating lab, anyway.

So, what are we left with? My last hope was an old-fashioned, educated guess — using a little bit of tree knowledge, my eyeballs, and some old facilities photographs.

### **Archive Dive**

JPL Archivist Kylie Neal was my first stop. Neal showed me where to comb through hundreds of JPL facilities photos from the 1940s and '50s in the hopes of identifying buildings and trees that might remain standing. The early history of the Lab flashed before my eyes: aerial photos of a hardly-developed Arroyo; clusters of cottage-like wooden buildings that used to populate the eastern edge of Lab; the old outdoor lunch counter under a majestic oak tree that is, unfortunately, no longer there; and the gulch — a shantytown row of rocket test pits and storage buildings that housed explosives.



*JPL Archivist Kylie Neal examines photo albums in the archives vault.*

After Neal pulled high-resolution versions of several photos that looked promising, I enlisted more help to make sense of them: JPL Historian Erik Conway. Conway put each image into historical context, helping me identify the buildings, their functions, whether they were still standing, and how old aerial photos align with the current layout of the Lab.

In these images – amidst the buildings and construction sites and parked Studebakers – Conway and I could also make out several big trees. We agreed that, within the confines of the modern-day Lab, the only trees that were bigger than shrub-sized were within a small radius around what is now the East Gate.

We were zeroing in on our target.

### **Boots on the Ground, Eyes in the Sky**

Armed with a subset of historic photos and my understanding of the early history of the Lab, I set out to compare the views of the past with those of today.

The approach was three-pronged: First, I used Google Maps satellite view to compare present-day aerial photography to aerial survey photos from the 1940s. By recreating the angle of the aerial photograph angle with the 3D tilt feature of Google Maps, it's easy to see that several of the same trees still stand today.



*Side-by-side aerial views of the east side of the Lab in 1947 and 2023.*

Next, I walked the area around the East Gate with the old photos from that part of Lab in hand. I used landmarks – buildings, mountains, and roads – to match my line of sight to the old photographs. I snapped photos, pulled them into Photoshop, and lined them up side by side.

Lastly, I roped several tree enthusiasts into taking a walk with me: Roger Klemm and Leslie Mullen of the JPL Green Club; Arborist Liz Velarde and Supervisor Marvin Garcia from landscaping company Brightview; and three arborists from the city of Pasadena: Garrett Crawford, Michael King, and Jason Vega.

Slowly, the likeliest candidates for the oldest surviving tree at JPL began to take shape.

### **The Finalists**

Well fine, you stuck with me this long – I think you deserve some answers.

Below, I outline what appear to be the several oldest surviving trees on Lab. They are all coast live oaks, except for a California sycamore – both, not surprisingly, native species. Their local origins, as well as their relatively mature appearance in early photos of JPL, indicate that they likely pre-dated the Lab.

“The amazing thing is that they protected them,” Conway told me, explaining that given the amount of construction and growth on Lab, the preservation of old trees had to have been intentional – a testament to JPL’s long-standing collective appreciation for our natural environment.

“Someone cared enough to work around those trees. They had to have been protected.”



## 1. Building 11 Coast Live Oak



Nestled between Building 103 and Building 11 – the oldest extant building on Lab – stands a coast live oak that would have had a great view of the earliest JPL rocket tests. In fact, it doesn't just look at the Arroyo – with root systems that can be three to four times the size of the canopy, this oak almost certainly reaches under and across the road to draw life from the watershed.

"The Arroyo is right there, the water table is within reach," said Klemm. "I can see that it probably doesn't have any surface roots. Especially if it's native to the site, the root system has to be in the Arroyo or it wouldn't have survived."

## 2. Building 121 Coast Live Oak



Early in the Lab's history, a grand coast live oak served as a shady respite next to the old outdoor lunch counter, and even as a backdrop for group photos. Unfortunately, that oak was removed in 1953 when its dead stump was all that remained. The cause of failure remains unknown.

"[Coast live oaks can live] hundreds of years, in the right conditions," said Garrett Crawford, a superintendent for the City of Pasadena Parks, Recreation, and Community Services department who oversees all of the natural areas in the Arroyo. "But there are all kinds of site conditions, drought conditions, sudden oak death, polyphagous shot hole borer — there are all kinds of things that are bad for the species."



*THE OLD OAK IN MAY, 1943 serves as a back-ground for a large group of Project employees as they met to celebrate the A-20-A Airplane Flight Test. At that time, approximately 70 employees were on the payroll. The oak tree which was over 100 years old, was an early*



*THE SAME OLD OAK TREE IN FEBRUARY, 1953, just before the final remains of the dead stump was removed in the interests of safety. At the left, Jack Lawless Plant Protection Supervisor, watches the progress of tree men as they excavate the roots. The tree was located*

Shortly thereafter, Building 121 was constructed as a new lunch facility. Nestled up against the eastern edge of the Lab's property, it also had a coast live oak neighbor with a shady canopy that still stands today.

### 3. Building 11 California Sycamore



In the foreground right side of this photo, a California sycamore stretches out over what has seemingly always been a parking lot. (I trust that the vehicles on both the right and the left have visible hang tags of the appropriate color.)

California Sycamores can have a very long life span, with some documented as being nearly 400 years old. Sycamores were particularly venerated by the Indigenous Tongva people of the area. [A sacred Sycamore](#) in the Los Angeles basin near the Tongva village of Yaanga was an important landmark for centuries, serving as a meeting place and providing a well-known point for figuring distances.

#### 4. Building 103 Coast Live Oak



Behind Building 103, there's yet another coast live oak that appears quite mature in this 1951 photo. This oak appears to be multi-trunked, which is not uncommon for coast live oaks.

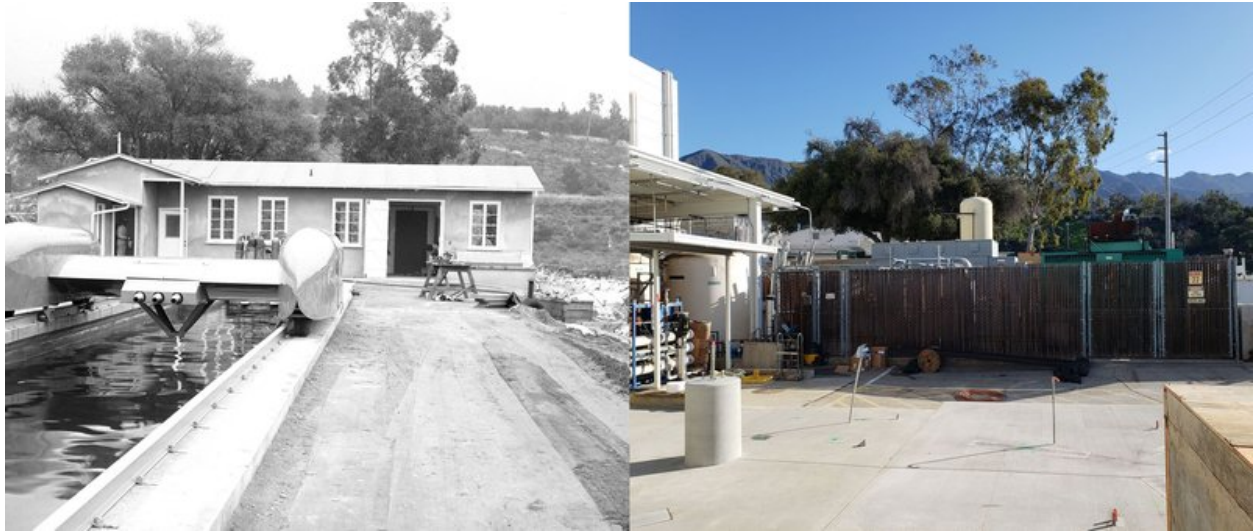
"In Southern California where we have lots of fires, you will often have a coast live oak that will have grown, and then if a fire comes through and kills the top, then it'll sprout up from the base and you'll have multiple trunks," said Klemm. "Sometimes other things can happen, a trunk maybe falls over in the wind, but the roots are still alive and it'll just sprout from the roots."

This tree is no doubt one of the most resilient to the disturbances of construction, as it remains standing tall, sandwiched between several buildings.



"It's kind of amazing, it reminds me of a dandelion coming up out of a concrete sidewalk," mused Media Producer Leslie Mullen.

## 5. Building 302 Coast Live Oak



During World War II, JPL was contracted by the U.S. Army to develop underwater rocket torpedoes. After the war, the tow channel went unused for many years, then covered and used for the storage of toxic materials. Behind the tow channel is Building 44, which, along with the tow channel, was removed to make space for the Earth and Space Science Laboratory (Building 300) and the Microdevices Laboratory (Building 302).

Still standing, however, is the large coast live oak behind Building 44 that is surrounded by a stone wall — a clear sign of preservation as the space immediately surrounding the tree became a parking lot. This oak also appears to have multiple trunks, like its close neighbor behind Building 103.



(The tree to the right of the oak in the above side-by-side appears to be a red herring. Both the location and the type of tree — the current tree is a eucalyptus — do not quite match up, based on my amateur analysis of old photos.)

## Honorable Mention: Explorer Road Oaks



These three coast live oaks on Explorer Road are visible in the early aerial photos, but I didn't spot them in any ground-level photos during my archival digging. No doubt these oaks are in competition with their neighbors, but due to less visual evidence they have been relegated to an honorable mention.

### So, How Old Are They?

Although it is impossible to say which of our finalists is the oldest of all, I still wanted to get a sense of just how old they might be. Because the oldest photos above were taken in 1947, we know that our oldest trees are at least 76 years old. But it's impossible to say exactly how old they were when the photos were taken.

With the final candidates identified, I reached out to Brightview arborist Liz Velarde to ask how old she thought these specific trees might be. Turns out there is one more noninvasive way of estimating tree ages that I hadn't discovered before.

By measuring the circumference of a tree four or five feet up from the ground and dividing by pi (3.14) one can determine what's called a diameter breast height. Then, by multiplying the DBH by the "growth factor" for the species you arrive at an estimated age of the tree. It's important to note that growth factors can vary significantly depending on the environment — the growth rate of JPL's trees may be impacted by construction, resource availability, and pruning.

After inspecting the oak tree next to Building 11 (candidate No. 1 above), Velarde made an educated guess.

"This tree has a diameter of 28 inches. Since it's classified under the Red Oak subgenera, it has a growth factor of 4.0. Therefore, the age is approximately 112 years old," Velarde told me. "Of course, there are other factors that we're not considering, such as water and site condition, but this is probably the best we can do short of cutting down the tree and counting its rings."

At last! An answer.

112 years old – there you have it. 1911 was an eventful year: [Roald Amundsen became the first person to reach the South Pole](#), the [Mona Lisa was stolen](#) from the Louvre, and these young oak saplings sprang

into existence, destined to provide shade for lunch tables full of engineers and scientists a few decades hence.

But I wasn't quite satisfied.

Look at those coast live oaks – inky black with lush foliage in those 76-year-old images. Maybe they were already a hundred years old in those photos. Why not 200? It's possible that members of the Hahamog'na band of Indigenous peoples used these very same trees for shade long before JPLers did. We simply don't know.

But we do know that these trees have been here longer than JPL itself – iconic reminders of the homelands of the Indigenous peoples of the region. We know that since the 1930s, they've seen rocket tests and tow channel experiments, Lab-wide group photos and lunch table conversations. We know that they require care and consideration in order to continue to thrive.

We know that they are worth preserving to serve as reminders of the Lab's past for generations of JPLers to come.

"JPL has been around since the late '30s and I have been around for about half of that time," Rob Manning told me. "So much has changed but there is still a lot that hasn't. When I walk around JPL, I still see the ghosts of those who taught me so much and I see the echoes of a JPL from long ago."





## Cooperative Autonomous Distributed Robotic Exploration

Wednesday, June 14

Noon to 1 p.m.

[RSVP to receive the Zoom link.](#)

### Abstract:

Cooperative Autonomous Distributed Robotic Exploration (CADRE) is a technology demonstration on its way to the moon via the Commercial Lunar Payload Service (CLPS) program in 2024. It will be a first-of-its-kind demonstration of multi-agent autonomous rovers, featuring three fully autonomous, shoebox-sized rovers, performing a distributed measurement of the lunar surface and sub-surface with stereo cameras and ground-penetrating radar. In this talk, the speakers Jean-Pierre de la Croix and Subha Comandur will provide an overview of the technology demonstration and a closer look at how the rovers will work autonomously together to plan and execute a distributed measurement.

### Speaker Bios:

Jean-Pierre de la Croix is a robotics systems engineer in the Maritime and Multi-Agent Autonomy group at JPL and is currently CADRE's principal investigator and autonomy lead. His research focuses on the application of multi-agent autonomy systems and algorithms to space exploration.

Subha Comandur is CADRE's project manager at JPL. Comandur has over twenty years of engineering and leadership experience at JPL and industry on various spacecraft missions including Mars Curiosity Rover, JUNO, and Soil Moisture Active Passive (SMAP).

*This event is part of an official partnership between JPL and AIAA San Gabriel Valley Section.*



## Screening of 'JPL and the Space Age: The Hunt for Space Rocks'

Thursday, June 15

4 to 6 p.m.

[Watch on YouTube](#)

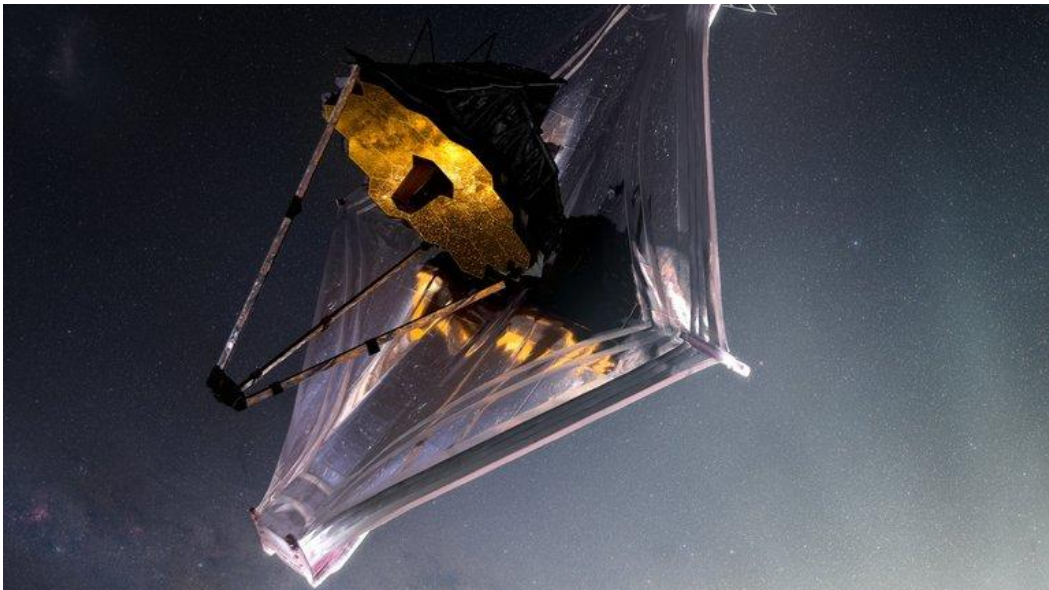
Asteroids and comets are among the oldest objects in our solar system. They mostly reside at safe distances from Earth, but some find their way into our planetary backyard.

Every day, the Earth receives visitors from outer space: tons of space debris that mostly goes unnoticed. Some of these “shooting stars,” however, do survive the fiery descent through the atmosphere. That’s what happened to the dinosaurs 65 million years ago when a massive asteroid – or comet – struck Earth. But as the saying goes: “The dinosaurs didn’t have a space agency. Fortunately, we do.”

“The Hunt for Space Rocks” chronicles JPL’s pioneering work to understand asteroids and comets as part of NASA’s larger effort to protect our planet from cosmic marauders. From JPL’s effort to mount a mission to study the most famous comet of all – Halley’s comet – to the Lab’s current role in planetary defense with its Center for Near Earth Object Studies (CNEOS), the documentary drives home a clear message: We need to find the asteroids and comets before they find us.

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## Von Karman Lecture: The Universe of Very Cold – The James Webb Space Telescope, MIRI, and the Cryocooler

Thursday, June 22  
7 to 8 p.m.

[Watch on YouTube](#)

The James Webb Space Telescope (JWST) takes incredible images using infrared light. The optics and science instruments must be incredibly cold, especially JWST's Mid-Infrared Instrument (MIRI), which needs to be at a temperature of less than 7 kelvins, or -447 Fahrenheit. This is not possible without the Cryocooler, which keeps MIRI's detectors cool.

**Speaker:** Konstantin Penanen, JWST/MIRI Cryocooler Lead

**Host:** Nikki Wyrick, Office of Communications and Education

**Co-host:** Kaitlyn Soares, Universe Public Engagement Lead

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# JPL Family News

## Retirees

The following JPL employees recently announced their retirements:

### 40+ Years:

**Robert Gershman**, Section 312I, 45 years

### 30+ Years:

**Victor Zlotnicki**, Section 3290, 38 years

**Herman Wagner Jr.**, Section 2692, 38 years

**Cinzia Zuffada**, Section 1200, 31 years

### 20+ Years:

**Christopher Lim**, Section 947D, 25 years

**Claire Marie-Peterson**, Section 1844, 23 years

## Passings

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

**Andrew David Morrison** died on May 17, 2023, at the age of 84. Morrison worked at JPL for 30 years and eight months. He was in the engineering job family and retired as a systems engineer III.

Morrison worked on mapping Venus and on the Mars mission. He received a NASA Honors and group achievement award for MER 3rd and 4th extended mission team in 2008.

He is pre-deceased by three weeks by his wife, Jill; survived by his children, Jennifer and Jay, Robert, Maura, and Julie; grandkids, Emily, Max, Key, Jacqueline, Jessica, and Woody.