Featured Stories

JPL Director Michael Watkins to Return to Academia

By Matthew Segal

After having served five years as director of JPL, Michael Watkins will move to the Caltech campus as professor of aerospace and geophysics. Larry D. James becomes interim director of JPL.

JPL Director Michael Watkins announced Monday he will step down from his position as the director of the Jet Propulsion Laboratory to resume his academic and research career at Caltech as professor of aerospace and geophysics. His last day as JPL director will be Aug. 20. JPL is a federally funded research and development center managed by Caltech for NASA.

“There is no place in the world like JPL. It has truly been the great joy of my life to dedicate almost three decades to JPL, and to spend the last five years leading the Lab is the highest honor,” Watkins said in his announcement Monday to JPL’s 6,000 employees. “I treasure above all my interactions with the incredible people who make JPL what it is and who dedicate lifetimes to mission success after mission success.”

Caltech President Thomas F. Rosenbaum joined in the announcement and thanked Watkins for his leadership as director. “Since 2015, Mike has led JPL with consummate skill and determined dedication,

working closely with NASA to ensure continuation of JPL's tradition of setting new scientific and engineering milestones and captivating the world with pathbreaking missions," Rosenbaum wrote to faculty and staff. "Mike has helped to shepherd a new age of exploration that has deepened understanding of the universe and our place within it."

Under Watkins' tenure as director, JPL has launched and operated several new missions for NASA, including Earth missions ECOSTRESS, Orbiting Carbon Observatory 3, GRACE Follow-On, and Sentinel 6 Michael Freilich. Planetary missions include the ongoing operations of Juno at Jupiter, as well as the launches and landings of the InSight mission and Perseverance rover on Mars. Watkins has also guided futures missions in development, including the Europa Clipper mission to Jupiter's icy moon Europa, the Mars Sample Return campaign, and the VERITAS mission to Venus.

Watkins, an engineer and scientist, worked at JPL for 22 years before becoming its director. He has served as chief scientist for the Laboratory's Engineering and Science Directorate, manager of JPL's Science Division, and manager of its Navigation and Mission Design Section. He was mission manager from development through landed operations for the Mars Science Laboratory mission, which sent the Curiosity rover to Mars. He also originated the concept for the GRACE and GRACE Follow-On missions, which use a pair of Earth-orbiting satellites to make detailed measurements of Earth's gravity field.

Larry D. James, JPL's deputy director since 2013, will serve as interim JPL director and also vice president at Caltech until a successor for Watkins is selected. As deputy director, James has acted as the Laboratory's chief operating officer leading the day-to-day management of JPL's resources and activities. Prior to his appointment as deputy director, Lt. Gen. James had a 35-year career in the U.S. Air Force, where he held multiple roles, including commander of the 14th Air Force at Vandenberg AFB and Air Force Deputy Chief of Staff for Intelligence, Surveillance and Reconnaissance at the Pentagon.

Caltech President Thomas F. Rosenbaum has formed a search committee to find the next director of JPL.

Mars Rover Planner by Day, Musician by Night

By Celeste Hoang

What's a person to do when their wildest career dreams come true before they're even old enough to rent a car?

From the time Brendan Chamberlain-Simon was five years old, he knew he wanted to work for NASA. He was so focused on the goal that in middle school, he was meticulously planning his classes to make sure he would be taking multivariable calculus and AP physics by the time he was a senior in high school (spoiler alert: he did.). He later made his way to the Ivy League, majoring in mechanical engineering at Columbia University, before landing at JPL in 2015 at 22—and then finding himself behind the controls of Curiosity as a rover planner at 23.

"I hadn't anticipated making it to NASA until well into my career, and suddenly I was there," recalls Chamberlain-Simon, who is a robotics technologist with three concurrent roles: rover planner for Mars Science Laboratory, helicopter integration engineer for Ingenuity, and mechanical engineer for Europa Lander.

While he was elated to be where he was in his career at that point in his young life, he also felt suddenly lost and rudderless.

"I just always wanted that job and I genuinely and naively thought that if I got that job, I would be happy all the time and never sad again. That's not how it works, apparently," he says with a laugh. "The biggest thing that changed for me, much to my chagrin, was that since I achieved it, I didn't have a goal anymore. I had the same goal for 18 years and I had no practice making new goals. I was the most successful I had ever been and yet I had never felt less of a sense of direction."

During that time, Chamberlain-Simon describes himself as someone who was "driving myself crazy thinking too hard" and who was "in the throes of frantically grabbing for a foothold." As an outlet for those gnawing thoughts, at the end of each workday at JPL, he would go home and immerse himself in his second love: creating music.

“It never felt like I was leaving work and doing more work,” he says of writing songs. “It was always, ‘I’m leaving work and I'm doing what I feel like I need to do.’ It was cathartic.”

Music became the foothold he was searching for, and Chamberlain-Simon began channeling fresh inspiration from his work at JPL, his love of space exploration, and his pursuit for an invigorated sense of purpose.

“My latest project is about the first person to go to Mars, but the kicker is they spend most of their time looking back at Earth,” he says. “Really what it is is an allegory of my own experience [of being hired early on at JPL]. That was a really scary and intimidating thing for me to feel because I was really starting to worry that I would never again have the opportunity to click with the feeling of pursuing a goal.”

“I love my job and I’m so happy to be here, but I initially had trouble with the fulfillment side of it because I didn't realize how fulfillment works,” he says. “You have to actively participate in the making of fulfillment.”

Below, we sat down virtually with Chamberlain-Simon to discuss his career trajectory, how JPL inspires his music, his lyric-writing process, and more.

Chamberlain-Simon and his colleagues celebrate Ingenuity's first flight on Mars on April 3, 2021.

You knew early on that you wanted to work for NASA. What drew you to space exploration?

I remember I would look at the stars a lot. I was a big time skywatcher, and I remember at five years old really wanting to pursue the truth. I was really obsessed with that idea: thinking about the extent of what we knew about our place in the universe and realizing how fuzzy it felt and how unsettling that was. I wanted to make a career out of ambitiously tackling that problem. The thing that drives me now is that we are working on these endeavors that are symbolic and human and meaningful, and yet the way that we engage with them is with absolute technical expertise and rational means. That, to me, is incredibly unique. You don’t really get that working anywhere else.

On witnessing Ingenuity's first flight on another planet:

It was supremely cool. I was the helicopter integration engineer staffed for the actual first flight. It was a big honor and certainly a thrill. The coolest thing about it was that first image I saw. It had been such an intense process leading up to that moment that I don't think I ever thought about what the actual first image would look like. We flew right at solar noon with the shadow of the helicopter superimposed on the deployment site of the helicopter. So I looked at this shadow and all of the rocks we had meticulously analyzed to determine this is where we should fly. It was an unbelievably gratifying image where everything was in frame. It was such a tremendous moment of satisfaction, and there were so many brilliant people working together. I was very honored to be a part of it.

On going to Columbia to pursue left-brained and right-brained interests:

It seemed like this rare opportunity to get a genuinely good engineering education but also have many, many opportunities to engage with all of the other things I was interested in. As I was growing up, I was a big fan of music, and at one point in time was considering being a poetry major. I had thought about English, philosophy, and all kinds of right-brained stuff because I cared about it and always would.

On his love of music:

It has been a part of my life for a really long time. I think it was a parallel thread that started as early as my interest in working for NASA. It's funny because I had the drive to work for NASA when I was a kid, but the dream of writing and recording music seemed impossible. I don't know why, that's how it broke down. I started playing any instrument I could get my hands on. I was playing pretty much everything by the time I graduated high school. But it wasn't until college that I even considered the idea that I could write and record.

Why did you take on the artist name Proud Father and what's the meaning behind the name?

I wish I had a better answer—the real story is that back in college I was occasionally described by friends as a "dad with no kids." Something about that felt true to my approach to music, so I've been Proud Father ever since.

On music as a version of therapy:

I was writing not about me but about the first person to go to Mars. That story felt more undeniable in its magnitude [than my own] and it was a sandbox for me to process my own emotions. I think what ends up getting on tape is very autobiographical because it's me working through things in real time. The traits that make the character feel real are mine. Even though the story is a little bit dark, the character is not content with feelings of aimlessness or existential dread. There's still a quest for a rediscovery of beauty and ambition—a throughline of optimism and hopefulness despite being a bit of a darker story.

What's your lyric-writing process like?

I was almost a poetry major at Columbia, and I've been writing poetry for a long time now and always loved it. I feel like I have good muscle memory for tapping into this particular headspace where the writing that I'm doing is a little bit transcendent of the words themselves and more of a direct through-line of my emotional state.

On chasing inspiration:

It's a feeling that's hard to describe but I know it when I feel it. When I recognize it, I'm going to drop everything and live in it and put pen to paper and see what comes out. But most of the work of making music is done when I'm not in the zone. For every inspired hour, there are probably 10 that are uninspired.

So an important part of my process is doing the particular work I need to do while I'm in the zone so that I can access those musical ideas when I'm no longer in the zone.

Why did you want to create music in the first place?

It felt urgent. It was more of an act of self-exploration than self-expression, but I knew I had something to say. It was about being able to swim into this space and grab onto ideas and ride them as far as they would take me and see how it felt to be there. It was just a cool, safe space to just try ideas to size and see how they felt.

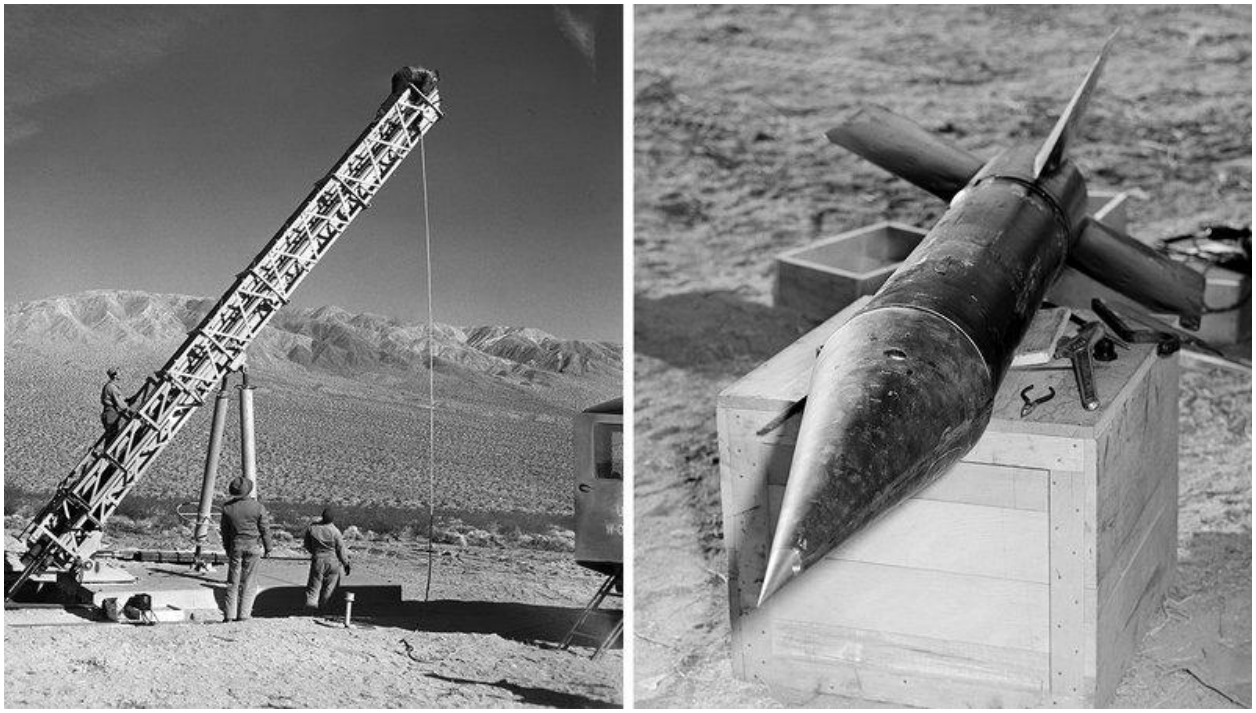
Do you have a favorite verse from one of your songs?

I have this song about Victoria Crater, which was a stop for Opportunity on the way to Endeavour Crater, and that's the song that hits the idea most neatly about how I felt during [my time of feeling lost]. The chorus is, "How long can I run victory laps before I'm just running?" And the verse that keys up that line is, "What's eluding me is relief, I'm here and I know that I can breathe, but all I've ever known is keeping pace with parts of me that run away. In the moments that I feel pride, I keep my head held toward the sky, don't know where to look anymore now that my goals are on the floor."

Where do you find inspiration?

All over the place. Work is a big source of inspiration. I love my job and I'm so happy to be here. I just think I initially had trouble with the fulfillment side of it because I didn't realize how fulfillment works. It requires active participation. I also find inspiration in my peers—I have a lot of love and admiration for people in my life. And I'm an inspired person in general. I'm happy to be doing the things I'm doing. I'm a happy person. I have a lot to be grateful for. When I'm in a perpetual state of gratitude, inspiration comes easily and often.

Answers have been edited for length and clarity.



Left: The 32-foot launch tower for the Private missile. Right: The assembled Private missile, weighing in at 500 pounds.

The Private: JPL's First Missile

By Erik Conway

In my last column, we looked at two of the new JPL's contracts that contributed expertise and personnel to the growing wartime laboratory but never became its main line of business--the hydrobomb and ramjet programs. The lion's share of JPL's efforts went to the Army Ordnance contract (ORDCIT) to develop missile technology.

The proposal that Theodore Von Kármán, Qian Xuesen, and Frank Malina had put together in late 1943, JPL-1, had started with a solid fuel research missile based on existing equipment. Its purpose was not to become a weapon, but to demonstrate the aerodynamic performance of high-speed missiles and to give the JPL team experience in conducting field testing. This almost-off-the-shelf missile became the Private (so-named for the Army's lowest enlisted soldier rank). The Private missile was nothing more than an Aerojet-made JATO motor with fins, a nose cone, and a set of guide rings designed to allow it to run smoothly through a launch tower.

The Aerojet motor (Model 30AS-1) had 192 pounds (87 kilograms) of GALCIT 61-C propellant, developed about 1,000 pounds of thrust (4.4 kilonewtons) and burned for 30 seconds. The missile had no guidance system other than its fins, and most would have no payload other than a black powder explosive charge so that observers would be able to see where it hit the ground. The assembled Private weighed about 500 pounds (227 kilograms).

It was already well established by 1944 that a rocket with only fixed tail fins could be stable if it gained enough velocity before leaving its launcher. Theoretical analysis was done within Qian Xuesen's Research Analysis section at JPL, mostly by Qian Weichang (formerly Chien Wei-Zang, a PhD graduate of the University of Toronto) and Homer Stewart. That analysis had shown that the Private would need help to reach a stable velocity, even with the 32-foot (9.8-meter) launch tower that they planned. So the Private had a booster added, composed of four artillery rockets. These provided 22,000 pounds of thrust (97.8 kilonewtons) for .18 seconds.

Mark Mills, who headed JPL's solid propellant section at the time, had some concern the 33-g (324 m/s2)—33 times the force of gravity—acceleration imposed on the Private by the booster stage might damage the propellant charge, so during the field tests, the Private's motor was ignited before the booster was. Mills counted on the Private motor's own internal pressure to provide protection from the acceleration. A spring assembly would hold the rocket assembly in place for the short time between the Private motor's ignition and the booster's firing. The booster and the Private were not connected, so when the Private left the launch rail, the booster simply fell to the ground a few hundred meters, or yards, away.

The Private A booster.

Qian Weichang's analysis suggested that a launcher angle of 75 degrees would provide a maximum theoretical range for the Private of 19,200 yards (17.6 kilometers).

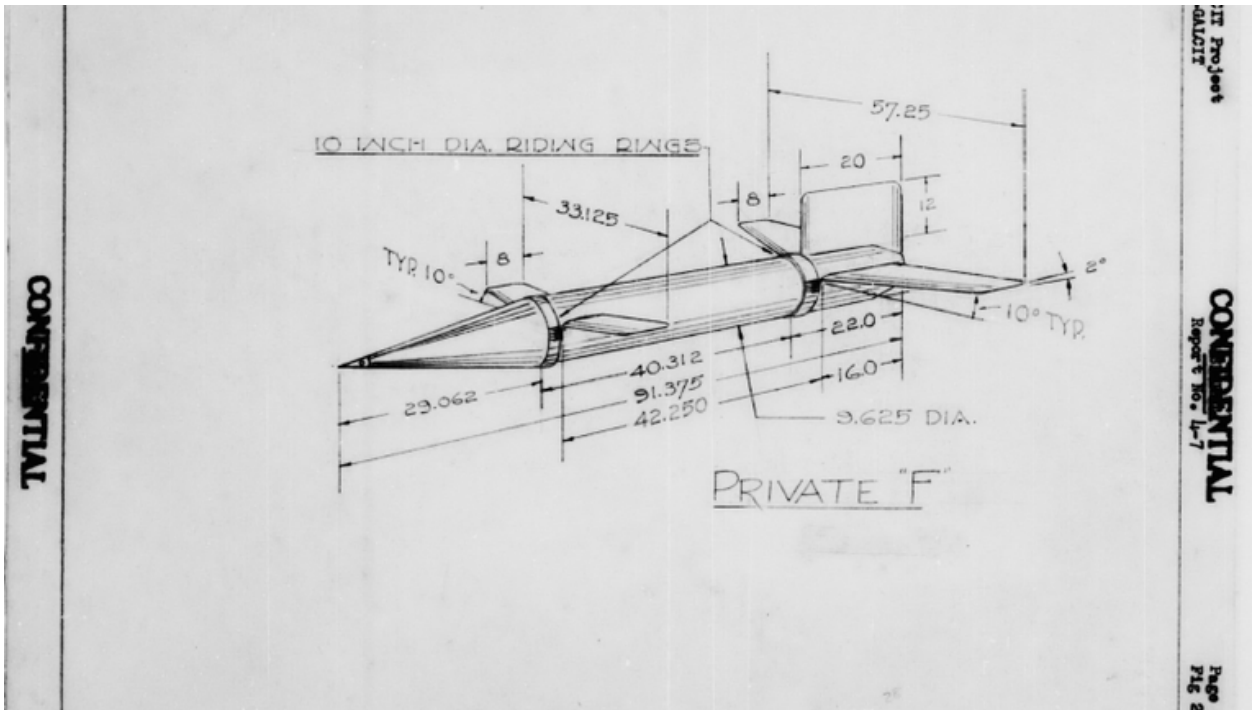
The first set of Private flight tests was held at Leach Springs, California, which was part of the Army's Camp Irwin complex. The 69th Anti-Aircraft Battalion set up a small tent city in November 1944 to support the December tests. Normally, the area was used for anti-aircraft gunnery training, and it already had observation posts that the JPL rocketeers could use to track the Privates.

The test program was held between Dec. 1 and Dec. 16, 1944. The JPL team started out by firing two Privates that had been filled with concrete instead of propellant to ensure that their launcher and booster arrangement worked properly. The third test employed a Private with a one-third fuel load and revealed a flaw in the launch arrangement. When the Private fired, their launcher allowed enough of a gap (less than an inch) to open between the booster and the Private so that when the booster fired, it hit the Private and essentially welded itself onto it. So the two flew the mission together (going 3,510 yards, or 3.2 kilometers). This happened again with the first fully fueled Private, Round 6. They redesigned the launcher mechanism and after Round 8 had no further problems.

The average range of the fully fueled flights was 18,000 yards (16.5 kilometers), and they achieved one flight beyond 20,000 yards (18.3 kilometers). Two Privates were also equipped with cinema cameras in their nose cones to determine if they spun. In both cases the cameras were destroyed (one was "extruded" from the nose cone on impact), and the films were broken into short strips of three to five frames. That was enough to calculate spin rates of 75 and 60 rpm in those two flights.

The spin of these missiles was induced by imperfections in the missile surfaces—especially in the fins--and they expected it. Spin actually contributes to accuracy, just as spinning up an artillery shell (or rifle bullet) does. But it also foreshadowed what happened to the second version of the Private, the Private F, which added wings in the hope of extending the missile's range.

Theoretical work by Homer Stewart and Qian Weichang suggested that just as fins on a rocket provided a restoring force to keep the rocket oriented vertically (as long as it was moving fast enough), wings could be designed so that gravity would provide the restoring force in the horizontal plane. Designers had to provide a "dihedral" in the wings, which meant that they would be bent upwards relative to the ground. Even then, the missile wouldn't fly straight—like a toy glider, it would fly in a circle. But even a circular flight could still prove the concept of increased range available with winged missiles.



A Private F missile drawing with added wings.

The Private F test program took place during April 1945, but not at Camp Irwin. The Army had decided to consolidate its missile testing around Fort Bliss, Texas, and the Private F was tested at Fort Bliss' Hueco Range. It wasn't far from where the launch facilities for JPL's next missile, the WAC Corporal, were already being erected at the soon-to-be named White Sands Proving Ground. The test setup for Private F was essentially the same as in the Private A tests, although the launcher itself had to be redesigned so the tower wouldn't interfere with the wings.

The Private F test program was, to use Chief Engineer Frank Malina's word, a "fiasco." The best range they achieved with the Private F was 5,075 yards (4.6 kilometers), about a quarter of the best Private A flight. Not a single Private F flew properly, and while they tried to fix the problem onsite by altering the sizes and angles of the various fins and wings, they didn't achieve anything like a stable flight. All the Private F flights corkscrewed into the ground.

The team ultimately blamed "asymmetries in the wing and tail construction" of the missiles for these results. They weren't able to manufacture the wings and fins to high-enough tolerances to avoid the aerodynamic instabilities created by imperfect surfaces. Airplanes needed either human pilots or gyroscope-controlled autopilots to maintain stable flight in the face of the instabilities produced by these imperfections—not to mention by the unstable flows of the atmosphere itself--and JPL proved to itself in the Private program that winged missiles did, too.

The Private F launcher tower, redesigned to accommodate the missile's wings.

Decades later, in an unpublished memoir, Frank Malina provided a different interpretation of the Private F fiasco. In 1944, he'd visited British researchers who had far fewer resources with which to experiment, and instead required more analysis and review before spending on hardware. His young JPL had rushed into experimentation without this component of deliberation. It was a difference in research cultures.

Six months after the Private F fiasco, the war would be over in both Europe and the Pacific, and the liquid-fueled WAC Corporal would reach the highest altitude yet achieved by anyone, using any means. More on that in the next column.

Montage of some current interns at JPL.

JPL's Inclusive Intern Program Ramps Up

By Taylor Hill

Flight Systems Engineer Brandon Ethridge has had a year to remember. The 24-year-old got engaged, became a father (his son, Kaiden is now 10 months old), and is celebrating the one-year anniversary of starting full time at JPL—his self-described dream job.

"Definitely the most eventful year of my life," Ethridge said.

While he's been gaining experience on end-to-end effects of fault protection for flight systems, Ethridge has spent minimal time on site due to the pandemic. But the North Carolina native already had plenty of on-Lab knowledge thanks to his summer 2019 internship—an opportunity that presented itself at a JPL informational session that spring at his alma mater, North Carolina A&T State University.

"That allowed me the chance to speak one-on-one with Jenny Tieu and Roslyn Soto [JPL Education project managers]," Ethridge said. "They were incredibly generous with their time and provided resume critiques, feedback, and general advice about how to get an opportunity at JPL."

Since 2017, Tieu has been leading JPL's Historically Black Colleges and Universities (HBCU)/ Underrepresented Minorities (URM) Initiative—an effort to increase and foster a more diverse workforce in technical roles on Lab. It's one of many programs facilitating the more than 550 internship opportunities offered at JPL this year.

Now in its fifth year, the program has seen rapid growth; from seven interns in its first year, to 24 interns in 2020. This year, JPL is welcoming 48 remote students operating virtually from institutions including Howard, North Carolina A&T, Tuskegee, and Prairie View A&M universities, along with URM students from universities including UCLA, USC, UC Riverside, Duke, Cal Poly Pomona, and more.

Growing and Learning

The program started as a NASA-funded pilot program. In 2019, JPL began using the Lab's own investment funds, overseen by Associate Director for Strategic Integration Dave Gallagher, to ensure a student cohort from HBCUs would continue to have a pipeline to JPL internships.

"Since the majority of HBCUs are located in the southeast region of the country, there's a geographic disadvantage for the students attending to make their way across the country to Pasadena for an internship," Tieu said. "The funding allows us to even the playing field by providing housing and travel allowances to these students."

But the program's support doesn't end when a student gets an internship. The initiative includes funding and support to include faculty from the schools to participate in research efforts with the students, building in a cohort model that facilitates sustainable interactions with the JPL hosts.

"We're intentional about addressing the culture shock that some of these students may experience," Tieu said. "With the cohort model, the faculty members can provide guidance to the students while they are navigating new relationships, connections, and a new city."

Additionally, HBCU/URM interns are invited to participate in roundtable discussions in groups where they can share concerns and openly discuss their experiences at JPL. Tieu has also set up virtual meet-ups where students can meet JPLers from outside their groups, along with holding talks from members of JPL's Black Excellence Strategic Team and past HBCU alumni.

For Ethridge, being in a position to give back to the program was something he prioritized.

"I wanted to repay some of the many kindnesses that were afforded to me," Ethridge said. "I also feel that I am in a unique position because I just recently went through the process."

Brandon Ethridge giving a tour of JPL's High Bay to a B.E.S.T. intern and their family.

He says the most important piece of advice he can give to any intern is to be an active advocate for themselves and to explicitly make their intentions known.

"When I started my internship, it was the first job I had ever worked that truly excited me," Ethridge said. "So, I made it a point to reach out to and meet with as many people as I could during my breaks in work. And with every meeting that I had, I would ask questions about the individual's personal experience and I always made a point to explicitly express that this was the place I wanted to stay. That ended up working out for me."

A Pipeline to Diverse Talent

For Howard University junior Kyndall Jones, the draw to JPL came following a fellow student's acceptance into the program.

"I was so amazed that he had an internship with NASA and it really sparked my interest," Jones said. "After doing my research on the program, I submitted my resume and heard back after a few months, landed an interview, and now here I am [virtually]!"

Despite the telework nature of this summer's internship, Jones said that even from her home in Dayton, Ohio, she has been able to foster connections with JPLers and gain valuable experience in her role working on the MAIA (Multi-Angler Imager for Aerosols) instrument operations team, gaining experience on the different software tools that will help NASA answer questions about pollutants that can harm human health globally.

And thanks to Operations Systems Engineer Janelle Wellons' invitation, Jones was able to get the type of hands-on NASA experience that's been hard to come by since the pandemic.

"My mentor Janelle suggested that I come visit Los Angeles for a few days this summer, and I was finally able to visit and explore the city for the first time," Jones said. "I am also super grateful for her setting up a tour at the NASA Armstrong Flight Research Center where we were able to view, tour, and learn lots of interesting facts about NASA's historical aircraft."

Kyndall Jones at the NASA Armstrong Flight Research Center.

Wellons—who is working on instruments aboard earth-observing missions Sentinel-6, Surface Water and Ocean Topography (SWOT) and Multi-Angle Imager for Aerosols (MAIA)—had been involved in previous years' roundtable discussions to mentor HBCU interns, but this year, she had the opportunity to hire her own interns through the program.

“Those roundtable talks are key, because It allows the students a chance to speak with and get familiar with potential mentors, and it’s where I discovered we could hire HBCU students through this education effort,” Wellons said. “The fact that there’s funding for this type of program is huge, and it’s allowing students like Kyndall to get experience and exposure to globally important missions like MAIA.”

Being from the East Coast herself, Wellons remembers having little awareness of JPL as a potential career landing spot while studying at Massachusetts Institute of Technology.

“Getting visibility and actually partnering with these schools to make these internships happen is so important,” Wellons said. “Actively interacting with HBCUs is only going to do good for people we would otherwise potentially never get an application from, and benefit the Lab by broadening the talent pool and diversity of our workforce.”

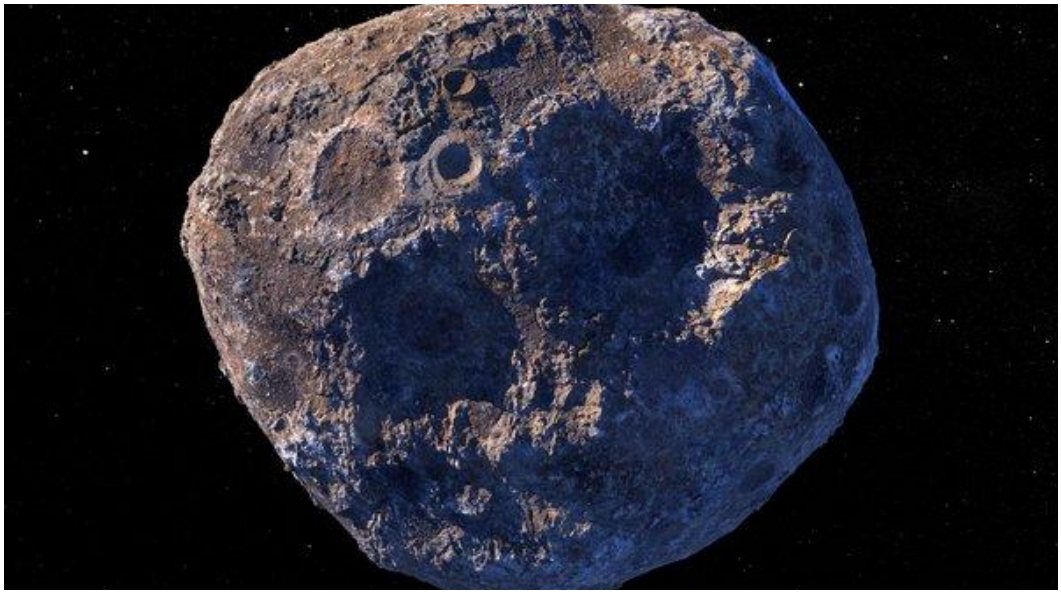
As for the future, Jones sees the HBCU/URM Initiative as one step of many for her and fellow interns toward careers in engineering and science.

“I know a lot of Howard students that are interning or have interned with JPL, and the love from our College of Engineering and Architecture is especially high.” Jones said. “The info sessions, resume workshops, and networking workshops that JPL has been able to put on have been great, and the more they can do, the better for students.”

For Tieu, the HBCU/URM Initiative’s progress is the result of inter-office collaboration across Lab.

“The support from Dave Gallagher and JPL’s Strategic Planning Management Council has truly enabled the growth of the initiative, and there’s so much more we would like to accomplish in the years ahead,” Tieu said.

Events



Von Karman Lecture Series - Psyche: Mission to a Metal World

Thursday, Aug. 19
7 to 8 p.m.
YouTube link (streaming content to begin at the time of the event)

Deep within the terrestrial planets, including Earth, scientists infer the presence of metallic cores, but these lie far below the planets' rocky mantles and crusts. The asteroid Psyche offers a unique window into these building blocks of planet formation and the opportunity to investigate a previously unexplored type of world.

Speaker: Dr. Lindy Elkins-Tanton, Principal Investigator, NASA Psyche Mission, Arizona State University

Host: Marc Razze, Public Services Office, NASA/JPL

Co-Host: Lindsay McLaurin, Public Outreach Specialist, NASA/JPL

JPL Family News

Retirees

The following JPL employees recently announced their retirements:

40+ Years:

Garry M. Burdick, Section 4040, 43 years

30+ Years:

Valerie M. Stanton, Section 349F, 35 years

Courtney B. Duncan, Section 3370, 34 years

Robert J. Haw, Section 392A, 34 years

20+ Years:

Tammy J. Fujii, Section 394G, 24 years

Kenneth E. Van Amringe, Section 3560, 21 years

Thomas A. Brown, Section 5143, 20 years

10+ Years:

Ronald C. Kruid, Section 355A, 19 years

Passings

David Thiessen died on July 7, 2021, at the age of 69. He worked at JPL for 40 years and was an optics specialist, most recently in Section 383. Thiessen worked on Voyager, Cassini, Spitzer, SIM, all OCO projects, including all of the Mars rover missions; Galileo cameras, WFPCI and WFPC II for Hubble Space Telescope, SHERLOC for the Perseverance Mars Rover, and many other projects. He is survived by his spouse Patty Thiessen; son Timothy Thiessen; daughter Erika Thiessen; grandson Marcus Barnett; sisters Betty Pringle and Bert Cronk; several nieces and nephews; and a Golden-Doodle named Jackson.

Services will be held at Cabot and Sons, 27 Chestnut Street, Pasadena California, on Wednesday, Aug. 11 at 10:30 a.m.

William (Bill) C. Frey died on July 22, 2021 at the age of 86. He worked at JPL for 40 years, most recently in European Command and Control System (EUCOM). Frey was an electrical engineer who participated in the incorporation of data processing hardware and software in the Deep Space Network (DSN). He served as manager of the DSN Data Systems Section of Division 33. He transferred to non-NASA projects in 1983 to manage software implementation for the U.S. Military All Source Analysis System (ASAS), a large-scale intelligence data processing system in support of military operations. Frey also served as project/program manager of the U.S. Military European Command and Control System (EUCOM), U. S. Army Command and Control in the Pentagon, and the Corps Battle Simulation Project. He received the NASA Exceptional Service Medal for software implementation in the Deep Space Network in 1982.

Frey is survived by his wife Melissa; three stepchildren Kris Hudson of Ocean Springs, Mississippi; Ashley Berry of Ojai, California; Andrea Berry of Broomfield, Colorado; and one grandson, Hunter, of Broomfield, Colorado. Private services will be held at Pierce Brothers Westwood Village.

Robert Curt Clauss was born on Oct. 6, 1934 in Los Angeles to Walter and Marie Clauss. He attended Eagle Rock High School, where he played basketball, received math and science awards in his senior year, and graduated in 1952. He later joined the Marines and served for four years from 1955 to 1959. He married Audrey Patricia Anderson in 1955 and had four children - Elizabeth, Curt, Kenneth, and Martin. Robert was employed by JPL, where he worked for over 45 years. During his time there, he worked on cryogenic masers for the Deep Space Tracking Network that tracked spacecraft including the Mariner, Viking, and Voyager missions that explored our solar system. He was passionate about his work and enjoyed JPL, even after retirement.

Robert coached YMCA baseball in La Crescenta, and his sons played as part of his teams. In 1973, Robert married his current wife, Shirley, who had two sons, Ray and Ken, who joined his family. In the 1980s, Robert became a member of the Winchester Pheasant Club in southern California and loved hunting, field trials, and dog training with his German retriever, Pepper. Robert was also a proficient ping-pong player and won several tournaments at JPL. Some of his grandchildren's favorite memories include losing to Grandpa in ping-pong games and watching him beat everyone who challenged him! They also remember playing croquet and badminton in the yard, and flying kites along the coast whenever they visited.

Robert enjoyed the great outdoors. One of his favorite vacation spots was Mammoth Lakes, California, where he and his family loved spending the summer weeks fishing and hiking. This tradition is something that his children and grandchildren continue to this day, by renting cabins on Lake George during the summer.

In 1991, Robert and Shirley moved to Fort Bragg, California. They built their house on a picturesque property along the Mendocino Coast with a beach view, where they have lived for the past 30 years. Robert especially looked forward to the town's Abalone Festivals, World's Largest Salmon Barbecue, and other annual events in the area.

Robert passed away on June 30, 2021 in Fort Bragg. Robert is preceded in death by his parents, Walter and Marie, and his son Curt. Robert is survived by his wife, Shirley, daughter Beth (Dennis), sons Kenneth (Linda), Martin (Rhonda), Ray, and Ken (Kelly). He has 10 grandchildren (Christine, Jennifer, Andrew, Kathryn, Valerie, Erich, Stephen, Melody, Nichole, Carley, Trevor, and Joey) and eight great-grandchildren (Chase, Paige, Rylie, Juliette, Mackenzie, Taylor, Evelyn, and Elsie).

Robert will join his son Curt at the Rose Memorial Cemetery, and his life will be celebrated with a small, private family service.

Awards

JPL Receives Diversity Award from International Astronautical Federation

The International Astronautical Federation has selected JPL for a 3G Diversity Award, for its "exceptional engagement towards diversity."

The organization's diversity award subcommittee said they were impressed by JPL's accomplishments within the diversity area and wanted to recognize contributions to the 3G (Geography, Generation, Gender) diversity initiative within the space sector.

The award is given out annually, when the federation receives nominations it considers to have exceptional merit.

An excerpt from JPL's statement submitted for the award says: "As one of the premiere research and space exploration organizations in the world, we value the full contributions of all employees and we are stronger because of our diversity. We have taken actions on many fronts to broaden our diversity and deepen our inclusion -- from internships through retirement -- while creating opportunities for everyone to reach their highest potential along the way."

The award, which includes a statue and certificate, will be presented at a diversity luncheon during the International Astronautical Congress event in Dubai.

The International Astronautical Federation is a non-profit, non-governmental organization set up in 1951 under French law.

More information on the award is here and here.

Aviation Week: The Winner is...the Ingenuity Helicopter

The "little helicopter that could" has garnered attention, fans, and numerous accolades, with the latest coming from Aviation Week in the form of a 2021 Laureate Award.

The Laureate Awards honor "extraordinary achievements in aerospace." The Aviation Week online list of winners cites Ingenuity's first flight and those that followed:

"On April 19, 2021, NASA and its Jet Propulsion Laboratory proved that powered flight on another planet is possible with the 39.1-sec. flight of the 4-lb. Ingenuity helicopter on Mars. And the little rotorcraft kept going—beyond the planned five flights—to begin scouting missions for the flagship rover mission, Perseverance."

Ingenuity was designed as a technology demonstration, and it carries no science payloads on board. Its one and only mission was to prove that humanity can fly powered vehicles on Mars. It hitched a ride to the Red Planet on Perseverance, and soon after landing on Mars and being released from the rover, it completed the first "Wright brothers" flight on another planet.

Ingenuity has chalked up 10 flights, with a total distance of just over one mile, reaching an altitude record of 40 feet (12 meters) in its latest sortie. After Ingenuity achieved its tech demo goals, it entered a new mission phase called the ops demo. In this phase, it focuses on testing its abilities as an aerial explorer, quickly imaging and scouting areas of Mars. This ability has proven useful to Perseverance operators and scientists. During its most recent flights, Ingenuity has surveyed a particular area of possible interest for Perseverance to explore in its hunt for signs of ancient life.

The helicopter is paving the way for possible future missions to include or be solely based on rotorcraft, which would help explore new frontiers on Mars and other worlds. The implications are significant, paving the way for such missions to potentially include an aerial vehicle to scout, explore, and even carry science payloads. As an Earthly comparison, imagine taking a road trip and having your own personal helicopter fly ahead to spot points of interest and warn you about treacherous routes.

The Laureate award will be presented at a ceremony in October in McLean, Virginia. Full list of 2021 Laureate Award winners.

JPL Former Director Charles Elachi Receives Caltech's Highest Honor

Caltech has selected JPL's former director Charles Elachi to receive its 2021 Distinguished Alumni Award. This is the Institute's highest honor, presented each year since 1966 to a few alumni to recognize "personal and professional accomplishments that have made a noteworthy impact in a field, community, or society more broadly."

Elachi's award is "for his distinguished leadership in space exploration and planetary science as the longtime director of the Jet Propulsion Laboratory, where he was instrumental to realizing missions across the solar system including our own planet Earth, and for his many contributions helping to map out NASA's long-term scientific future."

He spent 45 years at JPL, including his role as director from 2001 to 2016. During his time at the Lab, he established the field of spaceborne imaging radar as a significant field of endeavor. Elachi's 15 years as director were highlighted by numerous launches and mission milestones, including Mars Reconnaissance Orbiter, the Spirit, Opportunity, and Curiosity Mars rovers, Phoenix Mars lander, Deep Impact's intentional comet collision, the Spitzer Space Telescope, GRACE, and Cassini.

The hub of much of JPL's mission activity in Building 230 was renamed the Charles Elachi Mission Control Center in 2017.

Elachi received his master of science degree from Caltech in 1969 and his PhD in 1971. He is currently a Caltech professor emeritus of electrical engineering and planetary science.

His previous honors include election to the National Academy of Engineering in 1989, the Chevalier de la Légion d'Honneur from the French Republic, the International von Kármán Wings Award, the Lebanon

National Order of Cedar (twice), two Collier Trophies--awarded for the greatest achievement in aeronautics or astronautics in America, and the National Air and Space Museum Lifetime Achievement Award Michael Collins Trophy.

Elachi has served as a principal investigator on numerous NASA-sponsored projects and has authored more than 230 publications about space and planetary exploration.

The other 2021 Distinguished Alumni Award recipients are Robert (Bob) Behnken, Barbara Burger, and Laurie Leshin.

"Caltech's influence on the world is expressed powerfully through its graduates," says Caltech president Thomas F. Rosenbaum. "Their achievements impact a broad spectrum of disciplines and occupations."

Full Caltech awards news release:
https://www.caltech.edu/about/news/caltech-names-its-2021-distinguished-alumni-award-recipients

JPL news release about Elachi's retirement and accomplishments.
https://www.jpl.nasa.gov/news/charles-elachi-to-retire-as-jpl-director

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JPL Receives Best Place to Work in IT Honors

JPL was named a 2021 Best Place to Work in IT and ranked #38 among large companies by IDG's Insider Pro and Computerworld on July 12. The selection marks JPL's ninth consecutive appearance on the Best Places to Work in IT list, ranking the top 100 organizations that challenged and inspired their IT departments to excel while providing great benefits and compensation.

In its 28th year, the annual list is compiled based on a comprehensive questionnaire regarding company offerings in categories such as benefits, career development, training, and retention. There is also an extensive survey of IT workers, and their responses heavily influence the rankings.

CIO Randi Levin was excited about the honor: “I am thrilled for the IT team to receive this recognition, as I truly believe here at JPL, we do have one of the Best Places to Work in IT. Whether it’s supporting the Lab

in remote work, doing our part to ensure mission success, or innovating to promote the safety and productivity of our people and our projects, our diverse teams strive to meet every challenge with ingenuity and perseverance, and create a culture of inclusion and continuous improvement."

Read the full story.