Featured Stories

Coronavirus Can’t Keep Mars 2020 Down

By Taylor Hill

Michael Ilharreguy woke promptly at 6 a.m. on Thursday morning.

In the dark, just before sunrise, he fixed himself a coffee and stepped onto the beach in front of the rental property he’d been living in for the past seven months as JPL’s group lead for the ATLO flight technicians team at Kennedy Space Center.

Phone in hand and feet in sand, he strolled the empty shoreline savoring NASA’s pre-launch live coverage on his iPhone. The peace of the early morning soothed the anxiety of the night just past, where he had slept “on and off” from excitement and worry that he might oversleep or wake up to launch-scrubbing weather.

“Once I was up and the sun started coming out, I realized we were clear,” he says. “I saw two minutes before launch that our spacecraft was perfectly healthy. In the four launches I've been part of, this was the cleanest launch I've ever seen.”

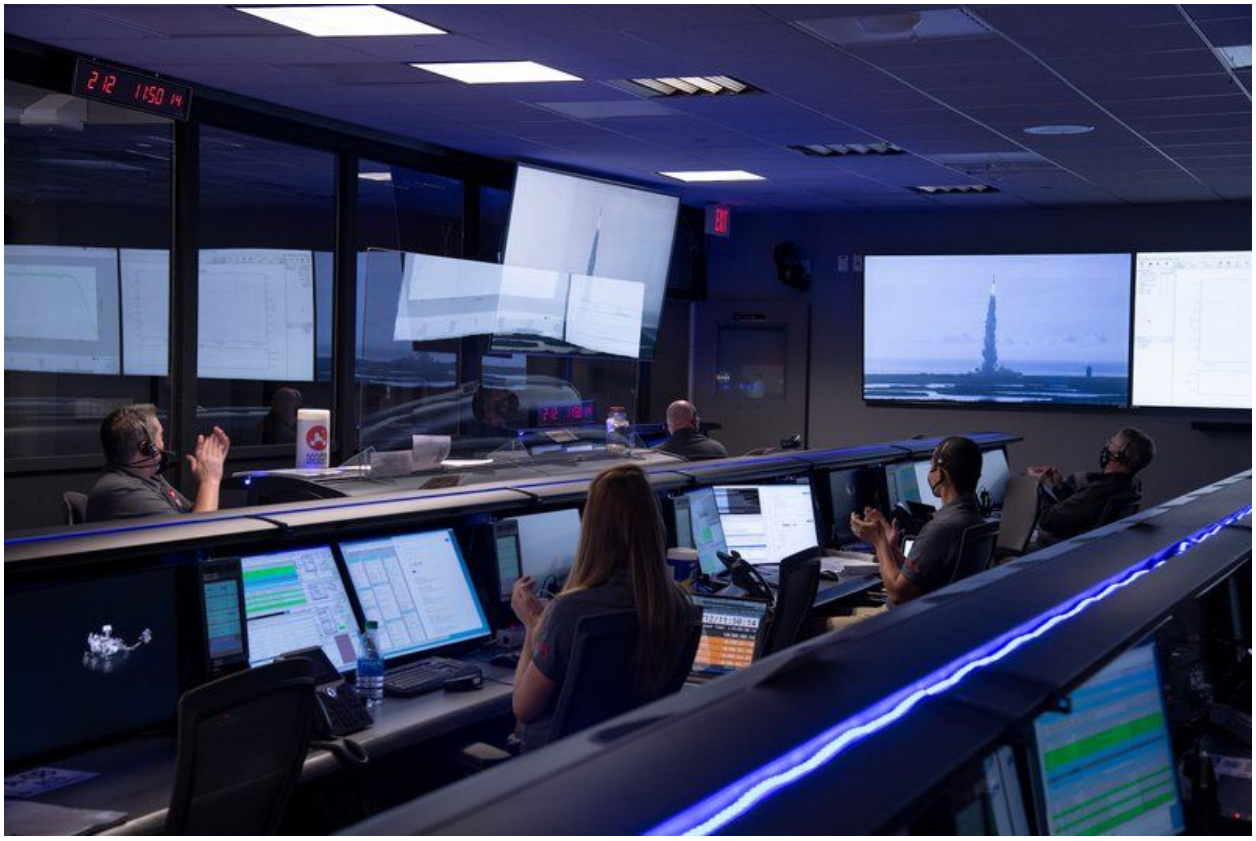
The Atlas V rocket cleared the tower in five seconds, reached Max Q (when the vehicle met the most aerodynamic stress) in 47 seconds, completed two burns of its Centaur upper stage rocket within the first hour, and released the Mars 2020 spacecraft, Perseverance Rover, and Ingenuity Helicopter on a perfect trajectory toward Mars and a rendezvous with Jezero Crater on February 18, 2021.

As the rocket lifted, so did Ilharreguy's worries: "The feeling you get is, 'I did my job. My stuff's alright.'"

In Southern California, where JPLers worked the launch while social distancing in Building 230, and thousands more watched from home, happiness and relief replaced months of unprecedented challenges, uncertainty, and unease.

When the pandemic forced the Lab to go into mandatory telework March 17, the Mars 2020 team pushed ahead. Either the mission stayed on track, or its name would change to Mars 2022. The team's quick adjustment to personal protective equipment, work-from-home schedules, and countless Webex meetings allowed for Thursday's launch to go as scheduled.

"We are deeply grateful for the dedication of the Mars 2020 team and all JPLers who have supported our shared goals during this unprecedented time," Director Mike Watkins said in his post-launch Lab-wide message. "In the best of times, preparing a Mars mission for launch is monumental. The global crisis made this work heroic."



A look inside the Mission Support Area in Building 230 during Mars 2020 launch. Image Credit: PhotoLab/Ryan Lannom

Mission Control at a Distance

In the close quarters of JPL's launch hub, the sparsely staffed Mission Support Area symbolized the pandemic's inescapable presence.

“For launches, we’ve typically got 30 or 40 engineers and around 10 to 12 managers and JPL leadership in that room,” said Jim McClure, long time operations manager of JPL’s Space Flight Operations Facility. “But we had to make sure we had the team safe.”

The team went with individual "lucky" peanut packages for this launch. Image Credit: PhotoLab

McClure had to add a new title this summer as he became the COVID-19 facility coordinator for Building 230, making sure engineers were keeping their distance and following all safety protocols.

Office space upstairs became a kind of MSA-2 where additional team members could support launch operations at a safe distance.

At the crucial moment where the team confirmed Acquisition of Signal (AOS), subdued claps and arm waving replaced the typical high fives, hugs, and loud cheers. Even the lucky peanuts jar was deemed unlucky for health, and replaced with individual packets.

“We knew we had to protect this flight project, and it took a lot of people coming together to figure out how to safely stay apart,” McClure said, praising the work done by the Occupational Safety Program Office, Protective Services Division, and Information and Technology Services Division. “We’ve all had to rely on each other to get the job done, and for our safety.”

For the Deep Space Network team in Mission Control, the Mars 2020 launch was different for two reasons—coronavirus concerns pushed much of the team to an off-site location in Monrovia, and JPL contractor Peraton set up a second ROC in case of overlap with the United Arab Emirates’ Hope Probe mission launch.

“We didn’t end up having to use the backup ROC, as the UAE mission launched a couple weeks prior, but we now have the ability to operate the DSN fully remotely from JPL, in case a situation arises,” said Suzanne Dodd, JPL's director for the Interplanetary Network Directorate.

Nagin Cox prepares for the Mars 2020 launch from her home office.

A Staylebration

Most JPLers watched the launch from their homes—absent the typical hustle and bustle of media, VIP guests, events, and more that accompany a flagship mission launch at JPL.

Nagin Cox, deputy team lead for the Engineering Operations team, was planning on spending her day watching the launch from home on a Webex with her team when she was asked to do a media spot on Lab post-launch.

Since media aren't allowed on Lab due to Coronavirus concerns, Cox did the interview from JPL's traffic circle. It was just one more obvious difference from the typical Lab fanfare during launch day.

"It was 100 percent not the same," Cox said. "We felt the loss of not being on Lab, not clapping and cheering with each other. But there is little point in dwelling on that. You can say it was a loss, and it was, but the important thing is that it launched. And for that, I feel happy. We are in flight, and we are on our way to Mars."

Ny Sou Okon, a flight system systems engineer for the Remote Sensing Mast and High Gain Antenna on the Perseverance Rover, had intended to take her family to watch the launch at Cape Canaveral, but decided to play it safe and watch the launch from home, joining in on the Mars 2020 team's Webex viewing party.

"The Webex party made it more special to share the moment with our teammates," Ny Sou said. "Watching the launch was a joyous and exciting day for me and my family. Mars rovers have been part of our family conversations for the past 15 years (as my husband worked on Curiosity starting in 2005) so it felt awesome to be part of that legacy."

Ny Sou Okon poses with the Mars Perseverance Rover at JPL in December 2019.

Back at the Cape, but Not for Long

With Mars 2020 now well on its way, Ilharreguy and more than a dozen other flight technicians are preparing to wrap up their more than six-month deployment at the Cape. They've been configuring and putting the finishing touches on the rover since January to get it to the launchpad. The veteran ATLO lead has overseen MER, MSL, and Cassini, but had never prepared for what amounted to a half-year quarantine.

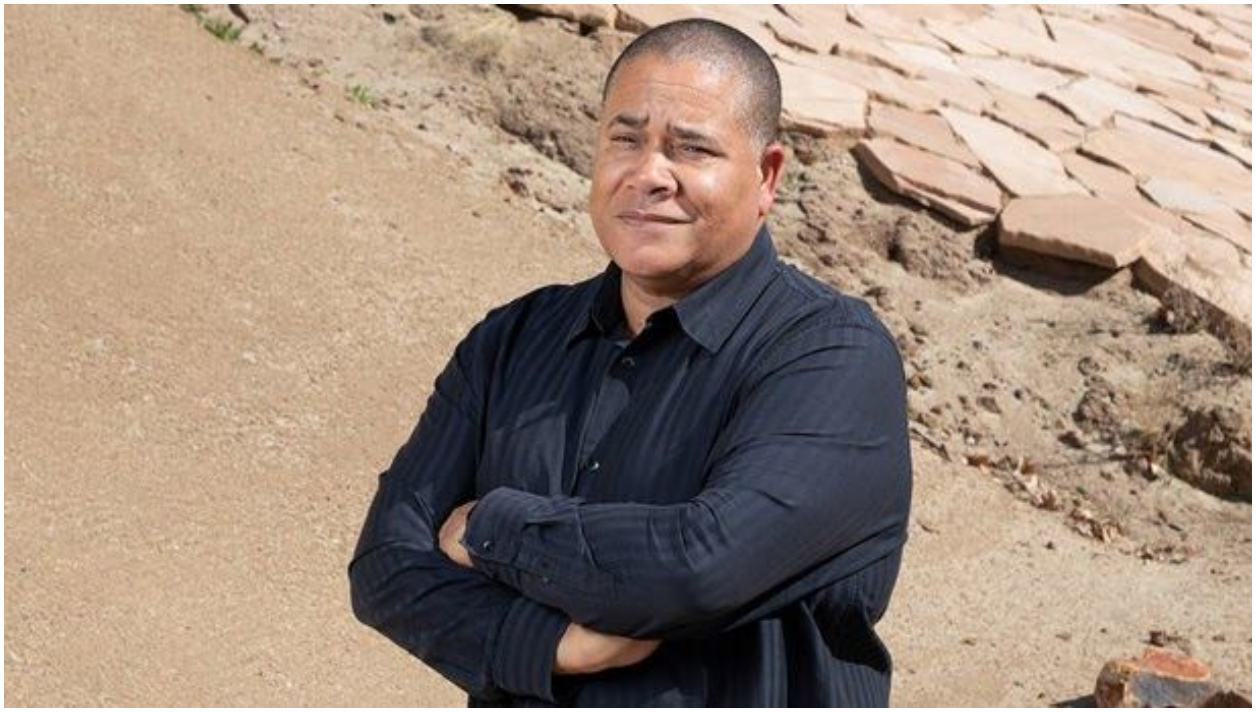
"I think my wife is even more happy that it's launched," Ilharreguy says. "I'm just looking forward to going home and getting my life back in order."

As for the rest of the ATLO crew, Ilharreguy is relieved his hardworking team now get to return home and take some time to savor their accomplishments.

"[The launch is] a giant weight off their shoulders," he says. "Everyone's thinking about the part they did or the system they built and there's always that stress of what can go wrong. But as soon as that rocket leaves, that all rolls away."

Watch a recording of the launch here.

Additional reporting on Kennedy Space Center by Celeste Hoang.



From JPL's Mailroom to Mars and Beyond

By Celeste Hoang

Don’t tell Bill Allen he can’t take risks.

Allen was just 17 years old when he first stepped foot on Lab to join the mailroom in the summer of 1981.

Weeks prior, he had walked across the stage of his high school graduation—but instead of being thrust into what so many young people are told is the frightening “real world,” he felt as though he had walked into a dream at JPL: Voyager had recently encountered Saturn, and the Lab was crawling with members of the media.

“It was like walking into a football stadium in the middle of the touchdown. It was electric,” he says. “This is something that doesn’t go on anywhere else in the world and to be immersed in it with your first footsteps was crazy. That alone was awe-inspiring.”

Cut to 2020, and the veteran mechanical engineer has been with JPL for more than 35 years, working as the mechanical systems design lead for the past three rovers: the Mars Exploration rovers, Spirit and Opportunity (MER), Mars Science Laboratory/Curiosity (MSL), and the soon-to-launch Mars Perseverance rover. Decades of experience have made him a trusted engineer on Lab, one who’s often tapped to be part of “tiger teams” for various projects, and who thrives on risk-reward challenges when a design problem surfaces.

While his initiation at JPL may have been dizzying, Allen’s early years were hardly a foreshadowing of the success to come. As a high schooler, he had zero interest in space and science and didn’t give much thought to what he would do after graduation.

What was high on his list of priorities at the time?

“Sports and girls,” he says with a chuckle.

Bill Allen was a big fan of BMX in his teens and graduated to Motocrossing in the '90s. "I would take apart an entire bike just to know how it worked," he says.

Mechanical Mindset

Allen grew up in West Los Angeles, the middle child and oldest boy of five siblings. His mother was a child development specialist, and his father owned and operated a landscaping business.

While the distant stars and planets didn't interest him "at all" in his youth, Allen recalls, he loved anything he could get his hands on, literally.

"I was always tinkering with things," he says, describing a fascination with the mechanics of objects from as early as age 7. "I would take apart anything and everything. Whatever my parents gave me, such as bikes, I demolished. I would take it apart, modify it, make it better. I was into BMX as a teen and I would take apart an entire bike just to know how it worked."

Allen later moved onto cars, transforming his Volkswagen Bug into the "California Look," a customized design popularized in the 1960s.

For most of high school, however, Allen was preoccupied by everything other than his future.

"The first two years of high school, I was never in the mindset of what I wanted to do," he says. "It did hit me at the end of my junior year that I better start thinking along those lines."

Those lines led him to a straightforward path: Allen knew he enjoyed anything with "mechanical involvement," so he chose to study engineering.

"I had to play catch-up because I was not ready to head down that direction," he says. "Most students had already decided. They had taken much more advanced math and were further along than me, so I took summer classes to catch up."

The summer before college, however, Allen's life took a serendipitous turn while he was looking for a seasonal gig. His uncle, who worked at JPL in electronic packaging, saw a job listing for the Lab's mailroom and suggested his nephew apply as a way to earn extra money. Allen did—with no clue what would be in store for him.

"I didn't even know what JPL was," he says.

Challenges Accepted

Allen was a quick learner in the mailroom and soon had a routine. Early in the mornings, he would sort the mail, put it into the appropriate bins and piles, then jump into the mailroom's Jeep and drive it around to various locations for delivery throughout the day.

"There was no email then, so there was a lot of mail," Allen says. "There was a crew of us who split up and went around Lab. I really got to know the Lab logistically. That wouldn't have happened with any other job, and that part was quite amazing, just picking up all the different parts of the Lab."

Allen knew right away that JPL was a place he wanted to stay, so he made sure to solidify future plans early on.

"I had already decided I wanted to do engineering as a living," he says. "When I saw what was going on here that first summer, I wanted to come back. I laced up my sneakers. I didn't wait for anything."

That fall, Allen enrolled at Oregon State University as an engineering physics major. During his time as a mailroom employee, he had made it a point to set up contacts and eventually landed a spot in a new program JPL had initiated at the time: a six-month co-op—similar to today's internship program—starting the following spring with 20 other students.

"It's one of the best programs I've seen JPL put together," he says. "It was quite frankly amazing. We were treated like assets."

The co-op included weekly field trips, such as visits to Edwards Air Force Base to watch shuttle landings, booster tests, and experimental crash landings. It wasn't unusual for an astronaut or lead scientist to drop in for a talk with the students.

Because the co-op was six months, as opposed to a summer internship, the students were assigned tasks that were hands-on and integral to the flight hardware.

"They would give us challenges they maybe didn't have time to solve in a normal summer program," Allen says. "[We were able to offer] fresh thinking and creative solutions."

One challenge that Allen rose up for was helping to redesign the star scanner mounting for Galileo. The mission had changed, and the scanner had to be re-pointed in a different direction, so he helped build an adapter bracket and was later one of the original JPLers to introduce Computer-Aided Design (CAD) to JPL.

Back then, design and engineering was "a paper task," Allen recalls. "It was an art. I actually became very good at drafting. It was just part of your skillset to get your job done. That drafting eventually turned into computer-aided design, and us new guys were like, 'Heck yeah!' We really ushered that way of life onto the Lab."

After his six-month co-op ended, Allen didn't stop contributing to JPL. He went back to school but returned to Lab to spend all of his school holidays—from winter break to spring break and summers—co-oping.

When Allen graduated in the spring of 1986, he had an offer waiting for him: a full-time position at JPL as a mechanical design engineer.

Bill Allen with the Mars Exploration Rovers in JPL's Mars Yard in the early 2000s.

Making History, Breaking Records

The co-oping opportunities paved the way for Allen's seamless transition into full-time work at JPL, where he was able to dive headfirst into major tasks. "I started day one doing the things I wanted to do," he says.

In his early years at JPL, Allen worked on the development of the 70-meter Deep Space Network antenna and 34-meter waveguide beam designs, as well as mission support for Galileo. As he cut his teeth on more tasks, he was committed to larger projects, including Cassini, which Allen worked on for 10 years, seeing it through the design cycle from start to finish.

"It was very fulfilling to work on a dedicated project," he says, calling Cassini "the last of the old-school projects," where the design of a major mission could take 10 or more years.

Allen soon saw himself with the near-impossible job of designing a transforming rover that would tightly fit inside the Mars Pathfinder lander and then unfold itself on Mars—and it needed to be done in record time: three years for the Mars Exploration Rovers. It was the late '90s, and a challenging time for Mars projects in the wake of the Mars Polar Lander and Mars Climate Orbiter failures.

Allen was assigned to a team that would propose the next Mars rover mission.

To build a new rover within three years, the team pitched re-using the architecture of Mars Pathfinder, which had successfully landed and deployed the first Mars rover, Sojourner, in July 1997, to build a new rover within three years. Allen remembers being floored by the response to their pitch: Not only did NASA end up selecting their proposal, but Headquarters requested two rovers—marking the origins of Spirit and Opportunity.

"There are not many times when you're given what you've asked," he recalls. "In this case, it was, 'Oh, you want two of them? OK, here we go.'"

Over the next three years, a team of managers, engineers, and technicians pushed through high stress levels and around-the-clock work schedules to complete the Mars Exploration rovers, an experience Allen describes as one of the most challenging—and rewarding—endeavors he's taken on at JPL.

"It was an extraordinary experience that I wouldn't trade for anything. It's the type of thing I live for," he says. "I believe in the risk-reward challenge and trade. And we were able to do more risky, more challenging, more technically capable designs as a result. It was a golden time period."

Allen also took away some of his career's most important learned lessons.

"It was worth the sacrifice and the investment. The rewards and returns far outweighed any stress level or extra effort put in. And probably more than anything else, it validated JPL's secret recipe for whatever we succeed at, which is to lock the talent we have here at JPL in a room and produce amazing things. It was amazing to be a part of that recipe and see it come to fruition."

When Spirit and Opportunity landed successfully, it felt like an out-of-body experience for Allen.

"Those rovers had my blood, tears, soul and DNA," Allen says. "To have them touch down on another planet was as surreal as it gets."

Quantum Leaps and Tiger Teams

While those twin MER rovers tested the limits of JPL's ability to produce a rover in a short time period, Mars Science Laboratory (MSL) came strapped with its own set of challenges, including a new way to land a rover.

"Going from MER to MSL was a quantum leap," Allen says. "MER was re-cooked from Pathfinder, but MSL was as close to a clean slate as you can get. We knew how to design rovers but this one was going to be much bigger and do much more."

The team started fresh with the design, but a clean slate meant a whole new slate of problems. Well after the design implementation, the team learned that there was an issue with an unexpected plume effect from putting the thrusters in close proximity to be used as pairs.

One step toward resolving the issue involved setting up a "tiger team," or a group of experts tasked with helping to resolve a high-level mission problem, which Allen was asked to join.

Over the next year and a half, the tiger team met "anywhere and everywhere" to work on the problem, spending months to first understand the problem; another several to trade concepts to solve the problem; and then yet another several months to validate the concepts.

When MSL finally landed on Mars in 2014, Allen remembers the visceral feeling of shock and awe that it all worked out.

"We looked at everything we had done and thought, 'This is the craziest thing we've done so far.' It was super challenging, all the things that had to come together to make this work."

Allen watched the landing from Beckman Auditorium at Caltech.

"There were a lot of tears," he says of witnessing the landing. "I was with the people I spent time in the trenches with to take in the landing, and you could tell everybody had the same reactions—it was deeper than words can provide."

Bill Allen posing with the full-scale model of Curiosity.

A Final Perseverance

After being part of JPL's most historic Mars explorers, Allen felt ready to hang up his cape on the rover front and—true to his nature—look for something even more difficult to work on.

"I originally didn't want to work on 2020," Allen says, "but when I found out what they wanted me to do, I saw the challenge."

It was a formidable one: The Mars 2020 team was asked to preserve the architecture of MSL but create a new design for the 2020 rover.

Never one to resist a good engineering riddle, Allen felt a renewed sense of purpose and agreed to join the Mars 2020 tiger team.

"All of my memorable challenges are based on problem solving," he says. "All the missions I've worked on, problem solving has come up—some during the design process, the build and testing, some post-launch. When a problem arises on a mission, they put together a team of highly focused individuals; it's cross-talent. Those are always the ones I enjoy the most."

On paper, the idea sounded good, but the reality for the team turned out to be far more difficult. They had to "grow the rover," Allen says—a whole new suite of instruments required more support, more space, and more room to accommodate the new payload.

At the same time, the team had to re-tool the data management system that could handle the level of computer-aided designs that needed to be tracked and configured, and which were changing on a daily basis.

“We took the most complicated mission we’ve ever done while we’re changing our infrastructure,” Allen says. “This is like fixing your car while you’re driving it.”

For those on the mission, the work could often feel as terrifying as it was exhilarating.

“A problem can pop up anytime,” Allen says. “Someone wakes up at 3 a.m. with a nightmare they didn’t consider and boom, we go look at it.”

And for many of those who know Allen well, he’s the person they want on the team because even in the face of seemingly insurmountable tasks, he never loses sight of the joy behind the work.

“Bill is a glass-is-always-half-full kind of guy, even if it’s got two drops of water in it,” says Randy Lindemann, who has worked with Allen for more than 23 years. “He’s got the most positive, upbeat attitude of anybody I’ve ever worked with at JPL. He always looks on the bright side of a project, and he’s just very technically deep and competent.”

Adds Tenny Lim, who has worked with Allen for 35 years since they were both in the co-op program: “He’s very giving of himself, very helpful, and always good-natured. He’s very open to teaching people anything that he knows. He’ll sit down with you and take the time to help you understand something. I see him do that with a lot of people.”

Now, as Perseverance prepares to launch from Florida in the middle of summer—and in the middle of a pandemic—Allen will be enjoying the fruits of his labor from home, where he’s been closing out Mars 2020 design tasks and documentation, as well as supporting the Assembly, Testing and Launch Operations team virtually with verifications.

“I will be watching from home since the crew working launch operations should be protected from all risk and should be in contact with as few people as possible,” Allen says.

For someone who cares so deeply about the colleagues he works with, it will be a very different experience to share the launch without them by his side. Still, it won’t take away from Allen’s sentiments about his decades on Lab:

“If I could summarize the best thing that’s happened to me from being at JPL, it’s working with such brilliant minds,” he says. “When you consider we do what no one else is doing on the planet, the problems are unique and sometimes the solutions are as well. To be in the mix of those minds to solve some of these problems—it’s been extraordinary.”

And, of course, he’s already accepted his next challenge: helping design the Mars Sample Retrieval Lander.

Planetary Science Summer School students and mentors at a Team X meeting at JPL.

The Summer School for Mission Mavericks

By Celeste Hoang

When Jennifer Scully was a planetary geology grad student at UCLA in 2013, she happened upon an email that called for students to apply to something called the Planetary Science Summer School, or PSSS.

“I asked around and everybody only had positive things to say,” she says, “so I applied and I got in.”

She found herself in an immersive, 11-week program that teaches students all over the country how to formulate, design, and pitch a mission concept to a review board of NASA experts – essentially, how to bring a space mission to life from beginning to end.

“It was fabulous,” Scully says of her time in the program. “I come from a science background, and I had worked on an active planetary mission, but I didn’t have much experience with engineering. The summer school gave me my first exposure to mission-concept development and proposals. It was really illuminating.”

Seven years later, Scully is now a geologist at NASA's Jet Propulsion Laboratory in Southern California, researching the asteroid Vesta and dwarf planet Ceres. She also plays a role in planning and designing missions to explore Jupiter's moon Europa. She’s still part of the PSSS program – but, now, as one of the mentors to this year’s cohort of 36 students looking at missions to Venus and Saturn's moon Enceladus.

The first 10 weeks of the program focus on formulation and always happen remotely via webinar. The final week usually culminates with an intensive in-person experience at JPL, during which participants write their mission proposal. Participants receive mentorship from scientists and engineers with the laboratory's Team X, a group that has been helping design and evaluate mission concepts since 1985. Even though the pandemic means their “culminating week” won’t take place physically at the laboratory this year, the students are still descending virtually on the JPL community between July 20 and Aug. 7 to learn the complex dance of what does and doesn’t work when it comes to dreaming up a NASA mission.

“We do this for the broader planetary science mission community,” says PSSS manager Leslie Lowes, who’s been leading the program since 2010. “It’s about NASA training the next generation of scientists and engineers to do this type of work. Over 650 alumni use this model of mission design, and they’re in all kinds of leadership positions across NASA, including at JPL.”

The first of two summer 2020 cohorts to virtually arrive at JPL for their culminating week in the PSSS program. While these one-week sessions are traditionally held in person, this year's group is meeting remotely via Webex.

Developed in 1989, the summer school started as a lecture series on how space missions could address the latest science discoveries and gradually shifted to a more hands-on format in 1999. Instead of hearing about the process, why not let students experience it?

“The first thing we do [when participants arrive at JPL] is help them evaluate potential architectures for their mission. Is it an orbiter or a lander? Is it a flyby?” says Alfred Nash, a mentor for the summer school and a lead engineer for Team X. “Does the science work? Do the engineering and cost work? The problem is not ‘can you make the thing,’ but ‘can you make the thing within the boundaries you have?’”

For Team X, it’s all about an integrated approach, which is one of the principal differences between how missions were developed in earlier days of exploration versus more recently. “Team X itself, its superpower is its ability to work in parallel and concurrently,” Nash says, stressing the importance of how the science should work in parallel with the engineering, the storytelling, the cost, and the project management.

“What is the big thing I’m trying to do? How do all the pieces work together? What is the foundational heart of this in terms of how we’re going to change humanity’s understanding? What are the pieces we need so that happens, and what does it take to do that?” are common questions Nash says Team X asks of all its mission proposals – including the concepts developed in PSSS.

One key lesson Nash tries to impart during the culminating week: “Win [the proposal] and don't regret it when you do,” he says. “The last thing you want to do is design a mission that no one can manage.”

If the students’ answers can pass the rigorous initial hurdles and meet the requirements for a NASA proposal, then they transition to design work. At that point, each student is paired with a mentor who has expertise in a range of engineering capabilities, from mission design to the science tools that will go on a spacecraft.

While this would normally mean working together at JPL, the program has gone virtual this year.

Team X had some practice setting up a virtual experience for the summer’s incoming students, as most JPL employees have been on mandatory telework since mid-March. Currently, the students are in a “waterfall of [web meeting] rooms,” as Nash describes it, where there’s one central meeting room and then individual “stations” in separate rooms, where students and mentors can interface while moving from room to room as needed. A typical day kicks off at 8 a.m. with a daily briefing. Then, students spend half the day with Team X and half the day on their own, preparing for the next day’s tasks. Their day ends at 5 p.m. with a briefing to review what was completed, what worked well, what didn’t, and what needs to change for the next day.

Astronaut Jessica Watkins, an alumna of the program, attending her PSSS session in 2016 with mentor Bill Smythe.

“Everyone knows science, if they’re a scientist, and engineering, if they’re an engineer,” says PSSS alumna Scully. “But now, they’re really trying to understand what mission development is about. This foundation will enable them to work with NASA much more effectively.”

The cohorts that arrive every year are formidable, and this summer's group is no different: Among the students are 26 Ph.D. candidates and eight postdoctoral researchers.

For Elizabeth Spiers – a Ph.D. candidate studying the habitability of other planets at the Georgia Institute of Technology, and one of this summer's students examining Enceladus' ocean – PSSS has provided her with invaluable experience in real-time mission concept problem-solving.

"The project moves quickly and some of our decisions must be made equally as fast," Spiers says. "Oftentimes, no person on our team knows the answers, and we need to figure out what we don't know or understand about the problem so that we can ask the correct questions swiftly."

In addition to critical thinking, the summer school also gives its students the chance to work with a diverse group of students and mentors.

"It's really exhilarating to see all of those disparate backgrounds and expertise come together into one cohesive project," Spiers says. "I have learned so much about not only our project and the science and engineering related to it, but also about my teammates and their individual passions."

Over the years, the program has taught students lessons they can carry with them throughout their careers. PSSS alumna Jessica Watkins went on to become a NASA astronaut and, at JPL, two summer school alumni led development of science instruments on the Perseverance Mars rover – PIXL and SHERLOC. And this year, there's a new star in the program, literally: The summer school is piloting a second experience called the Heliophysics Mission Design School to help strengthen hypotheses-driven science investigations when designing missions to the Sun.

Perhaps one lesson students will take away from PSSS is not only knowing what they want, but also recognizing the limits of space exploration.

"The most rewarding thing is seeing them make good decisions," says Nash. "When they avoid trying to do something too expensive just because it's cool. When they find a more fruitful way forward. What you want has nothing to do with it; it's about what the world will let you do and how clever you are at navigating those boundaries."

To learn more about Planetary Science Summer School and how to apply, visit: https://www.jpl.nasa.gov/edu/intern/apply/nasa-science-mission-design-schools/

Events

Von Karman Lecture—Venus: Earth's Evil Twin or Just Misunderstood?

Thursday, Aug. 20
7 to 8 p.m.

Watch live on YouTube
Watch live on Ustream

Venus is becoming more attractive to scientists as technology improves for sending spacecraft to survive orbit and even descend to the surface.

From orbiters to balloons, host Brian White will moderate a discussion with Rocky Planet Geoscientist Sue Smrekar about the great science that can be done, how we can do it, and what we hope to learn.

JPL Family News

Retirees

The following JPLers have announced their retirement:

30+ Years:

Linda Scott, Section 252A, 39 years

Daniel G. Graham, Section 2500, 36 years

Audrey Doran, 34 years

20+ Years:

Leonard E. Day, Section 348C, 25 years

Gary Straley, Section 2833, 25 years

Scott Cozy, Section 5135, 23 years

Stanley Jankowski, 20 years

10+ Years:

Tom Soderstrom, Section 1700, 14 years

Passings

Michael Freilich.

In Memoriam: Remembering Michael Freilich, Key Figure in NASA/JPL Earth Science

A major leader in Earth Science, Mike Freilich, died Aug. 5 at his home in Kensington, Maryland, of complications from pancreatic cancer. He was surrounded by his wife, Shoshannah, his adult children, Sarah and Daniel, and his granddaughter Rosie.

Freilich headed NASA's Earth Science Division for more than 10 years, from 2006 and until his retirement in February 2019.

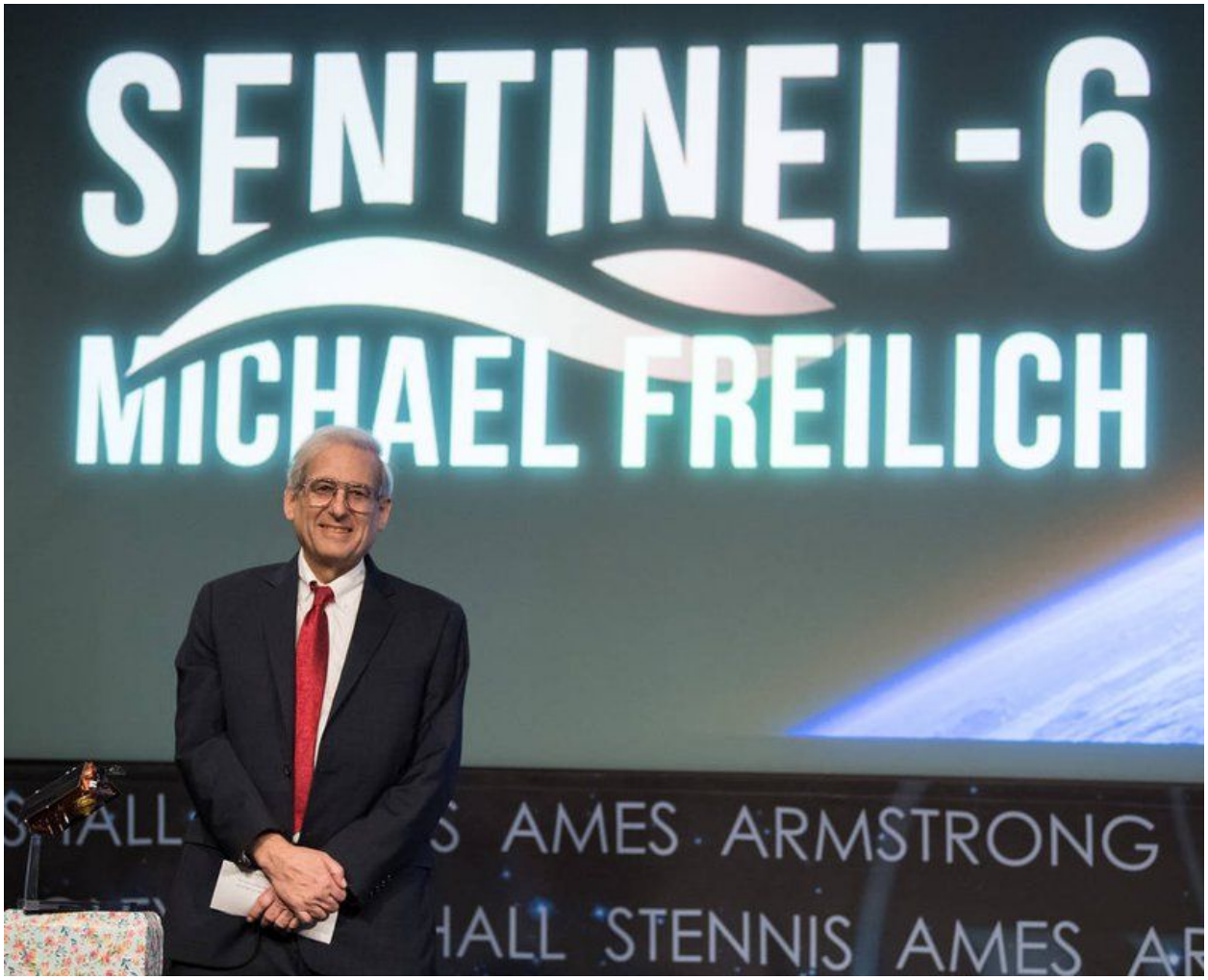
In a message to the JPL Earth Science community, Jim Graf, Director of the Earth Science and Technology Directorate, said Freilich "revitalized the program through his creative vision, his powerful intellect and tireless commitment to excellence."

NASA Administrator Jim Bridenstine said, "Our planet has lost a true champion with the passing of Mike Freilich." He added that Freilich's "deep expertise and innate love of science helped our agency to innovate and expand the ways it observes our home planet."

Freilich earned numerous awards during his career, including NASA's Distinguished Service Medal, Distinguished Achievement Award and Public Service Medal, the Distinguished Presidential Rank Award, and the JPL Director’s Research Achievement Award, to name a few.

Recently, NASA, NOAA, the European Space Agency, and the European Organisation for the Exploitation of Meteorological Satellites honored him by naming an upcoming Earth Science mission the Sentinel-6

Michael Freilich mission. The satellite, scheduled to launch Nov. 10, will carry out work that was a passion for Freilich, gathering critical information about the oceans.



On Jan. 28, 2020, at NASA Headquarters in Washington, NASA and its European partners renamed the Sentinel-6A/Jason-CS satellite Michael Freilich, in honor of Mike Freilich, former director of NASA's Earth Science Division. Image Credit: Credits: NASA/Aubrey Gemignani

Bridenstine recalled how Freilich wept openly as he signed the launch vehicle for IceSat2, his last launch as Earth Science director. Bridenstine described it as "a testament to how much being able to work on missions that helped us to better understand our planet and improve life across it meant to him."

Freilich leaves a long and impressive legacy with NASA and JPL. He worked at JPL from 1983 to 1991 and was project scientist for NASA Scatterometer and principal investigator for SeaWinds Scatterometer. He was one of the pioneers of building the model function to convert radar measurements into accurate, all-weather winds at the surface of the ocean. Freilich's efforts led to scatterometer measurements being routinely incorporated into models to improve weather forecasts and hurricane tracking and prediction.

Graf noted that Earth Science funding increased dramatically under Freilich's tenure, and that such directed missions as NISAR, SWOT, S6MF, OCO 2, OCO3, Jason 3 and SMAP, and completed missions like ECOSTRESS, MAIA, EMIT, and PREFIRE, were conceived and implemented under his guidance. He described Freilich as "an eloquent and effective spokesman and advocate for the Earth science program, both to Congress and the public."

Freilich had a lifelong interest in Earth Science. In a ScienceatNASA video, he said that starting in 10th grade, he knew he wanted to be a near-shore oceanographer, and that "what has driven me is understanding how nature works."

Michael Freilich, signs a star on the United Launch Alliance Delta II with the NASA Ice, Cloud and land Elevation Satellite-2 (ICESat-2) onboard. Image Credit: NASA/Bill Ingalls

He earned bachelor's degrees in physics and chemistry from Haverford College in 1975, and a Ph.D. in oceanography from Scripps Institution of Oceanography in 1982.

Bridenstine said, "His presence will continue to be felt across the agency and our planet, in space and in our hearts."