

# Celebrating 20 Years of USC Viterbi Astronautical Engineering

Posts by [Matilda Bathurst](#) | February 21, 2025

*The academic program and its record-breaking student-run USC Rocket Propulsion Lab are celebrating 20 years of advancing space exploration through stellar research and teaching.*



BUILDERS OF ASTRONAUTICAL ENGINEERING AT USC VITERBI; L-R: PROFESSOR DAN ERWIN, EMERITUS PROFESSOR JOSEPH KUNC, DEPARTMENT BUSINESS MANAGER DELL CUASON AND PROFESSOR MIKE GRUNTMAN. PHOTO BY CHA CHA STUDIO.

Given the leading role historically played by the United States in the global space enterprise, you might expect that departments dedicated to astronautical engineering would be the norm at institutes of higher education throughout the nation.

Think again.

When the USC Viterbi School of Engineering's academic division in astronautical engineering was established in 2004 (later becoming the USC Department of Astronautical Engineering, ASTE, in 2009), USC was one of the first universities in the nation to have a department dedicated purely to engineering for space.

## USC Viterbi in Space: Celebrating the 20th Anniversary of ASTE and RPL

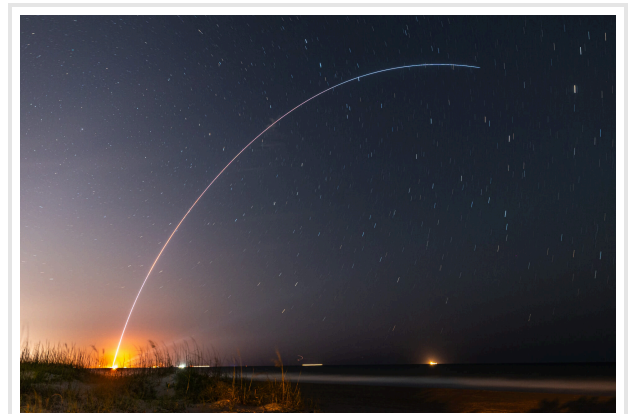


Twenty years on, ASTE has become something of a neutron star in the academic galaxy – think super-high energy, compact and with an impact that far outweighs its relatively small size. Just look at the [alumni startups](#) that were propelled by the program – [Relativity Space](#), [Ursa Major](#), [Kayhan Space](#), [Violet Labs](#) and [ExoSpace](#), to name just a few.

On Feb. 18, 2025, faculty, students, industry leaders and distinguished alumni gathered at Town & Gown ballroom on the USC campus to celebrate the long legacy in space of USC Engineering and its last twenty years of pioneering research and teaching in astronautical engineering.

In his opening remarks, Dean Yannis Yortsos reflected on the Apollo 11 moon landing that opened new areas in space exploration.

“Late that night of July 20, 1969, in my native Greek Island of Rhodes, we looked up in the sky with awe, imagining [Neil Armstrong](#)’s descent on the moon’s surface. Indeed, the Greek word for human is *ανθρωπος*, which literally means ‘looking up.’ Space and its exploration are essential to our humanity. The Apollo 11 mission opened a new dimension in our ‘looking up’ as it also helped us understand the preciousness of our world. It demonstrated the extraordinary power of technology and innovation.”



ON MARCH 22, 2023, TERRAN 1 BECAME THE FIRST 3D-PRINTED ROCKET TO REACH SPACE. RELATIVITY SPACE, WHICH DESIGNED AND LAUNCHED THE ROCKET, WAS FOUNDED BY USC VITERBI ALUMS TIM ELLIS AND JORDAN NOONE. PHOTO BY ELLIOTT DAVI

As it happens, the following year, in 1970, Neil Armstrong earned a master's degree in aerospace engineering at USC. If the program had been available, we can imagine he might have enrolled in a master's in astronautical engineering. However, academic convention is hard to break, and it took then Dean C.L. Max Nikias and a group of forward-thinking professors – current ASTE Chair [Dan Erwin](#), the first chair of the department Professor [Mike Gruntman](#), and now Emeritus Professor [Joseph Kunc](#) – to form an independent program in space engineering.

Dell Cuason, now department business manager, also played a central role in administrating the formation of the department. “If it was a lot of work for the faculty of three, it was an enormous job for our staff of one,” said Erwin. “Dell Cuason did the real heavy lifting: finances, student affairs, office operations, getting us listed in all the databases. Now we are happy to have six staff members but Dell has been the face of the department for twenty years.”

Today, ASTE is one of just a handful of university departments to offer bachelor's, master's and Ph.D. degrees in astronautical engineering – a distinguishing factor that has a lot to do with USC's location at the center of the Southern California space industry. As a result, the department's master's program – with more than 1,000 master's degrees awarded to date – has become something of a go-to for recruiters from the nation's top space engineering companies and research institutions, such as SpaceX, Boeing, Northrop Grumman and Aerospace Corporation, as well as the NASA Jet Propulsion Lab (JPL).

“In 2004 the idea of creating a new space-only department was a big leap of faith,” said Erwin. “To make it happen required a courageous decision by Max Nikias who was Dean at the time. The following year, he approved the new USC Rocket Propulsion Lab and gave it generous initial support from the Lord Foundation.”

Erwin, along with his fellow co-founders, set out to design a unique curriculum – looking beyond the traditional topics addressed by astronautical programs and towards emerging challenges central to the “New Space” movement, the shift away from primarily government-led space activities toward a more innovative, commercial, and entrepreneurial approach. The national reputation of the department is also built on significant research contributions to the understanding of the fundamentals of space science.



DEAN YANNIS YORTSOS AND JORDAN NOONE, CO-FOUNDER OF RELATIVITY SPACE. PHOTO BY CHA CHA STUDIO.



Alongside Professor [Joseph Wang](#) and other faculty members, Professor Gruntman has been central to this endeavor. He is also director of the [DEN@Viterbi](#) online learning initiative, which has enabled space professionals in more than 30 states across the country to take the ASTE master's program.

“We have made a difference, opening a path for numerous students to join the space enterprise and advance their professional careers,” said Gruntman. “We persevered and succeeded despite numerous challenges and headwinds.”

The commitment to keep in step with industry is demonstrated by the [USC Space Engineering Research Center \(SERC\)](#) – a joint effort of ASTE and the [USC Information Science Institute \(ISI\)](#), led by research professor David Barnhart. At SERC, faculty and researcher-led work leverages students within R&D teams to develop innovative space systems, focusing on hands-on build, test and flight demonstrations of spacecraft and nanosatellites. To date, SERC has launched three satellites into orbit and has a fully operational ground control station located on campus to communicate with them. In 2024, SERC's [CLINGERS](#) docking system was USC's first experimental research prototype to be tested on board the International Space Station.



KENNETH LUI, PROGRAM CHAIR AT AIAA LOS ANGELES SECTION, PRESENTS USCRPL'S RYAN KRAEMER AND JAYNA RYBNER WITH AWARD FOR THE MILESTONE LAUNCH OF AFTERSHOCK II. PHOTO BY CHA CHA STUDIO.

“SERC was established to grow ASTE's research activities into a national level center,” said Professor [David Barnhart](#), director of SERC. “A significant turning point in the center's activities came in 2014, when we directed much of our efforts toward the new research area of space servicing – maintenance and updates to space platforms, satellites and spacecraft after they are launched into space.”

## First Student Rocket to reach Space (339,800 ft, Mach 5.1) | Traveler IV Launch



The faculty speeches were followed by a video celebrating the achievements of ASTE and the student-run USC Rocket Propulsion Lab (USCRPL) over the last two decades. The achievements of USCRPL are notable alongside those of the USC Liquid Propulsion Laboratory (celebrating its 10th anniversary this year) in designing, building and testing sophisticated 3-D printed regeneratively-cooled liquid rocket engines using storable and cryogenic propellant components.

In 2019, USCRPL became the first student-led group to design, build, and successfully launch a rocket (Traveler IV) past the Kármán line — the recognized boundary of space at 100 km above Earth. Most recently, in October 2024, USCRPL's broke its second world record. Aftershock II is believed to be the world's first civilian-built rocket to reach an altitude of 470,000 feet.

“The USC Rocket Propulsion Lab was founded with the goal of launching to space, but we will not stop there,” said Ryan Kraemer, executive engineer of USCRPL and an undergraduate student majoring in mechanical engineering. “Our members have worked passionately over the years to develop unique technologies, and the club is certain to continue breaking barriers for student rocketry.”

USCRPL's achievements were further underlined by a speech presented by alumnus Jordan Noone B.S. '14, former member of USCRPL and co-founder, with fellow USC Viterbi alumnus, Tim Ellis B.S. '12, MS '13, of Relativity Space, the world's first 3D-printed rocket company.

## USC Student Rocket Group Shatters Amateur International Space Record



Relativity Space grew rapidly as it developed a fast-moving, cost-effective additive manufacturing model. This groundbreaking strategy represents the radical change upending space industry as it rapidly prototypes new solutions to further the use of space resources.

For Andrea Belz, vice dean of transformative initiatives at USC Viterbi, academia can match industrial developments with world-class technologies. As founding director of the USC Center for Research in Space Technologies (CREST), Belz has been a leading advocate of cross-disciplinary work to accelerate civil and commercial uses of space resources.

“CREST not only brings together our research community developing exciting solutions, but also represents an important application of USC’s contributions to human-centered systems,” said Belz. “Our synergistic approach gives us the ability to see around corners so we can predict the space industry’s path in the next five years. We lead with our cutting-edge research and our approach to training students as leaders in the national space enterprise.”

At CREST, faculty members throughout Viterbi – including ASTE, ECE, ISI, ICT – have joined with colleagues in spatial sciences and public policy. This knowledge consortium serves as an important resource for governmental organizations, large corporations, and nimble startups that together drive the future of space exploration.

The USC space community has grown dramatically from the seed planted by ASTE and USCRPL two decades ago. The coming years should bring even more innovation and impact throughout Viterbi, USC, and across the country.

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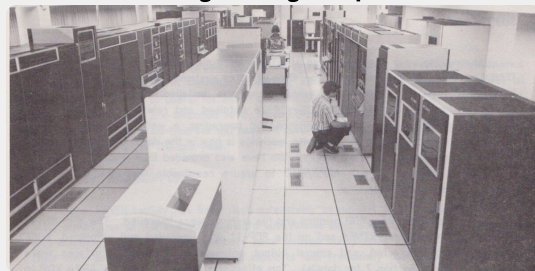
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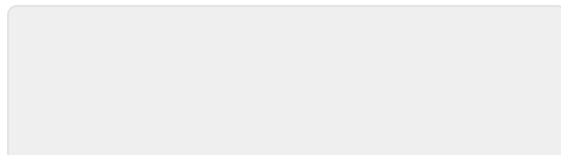
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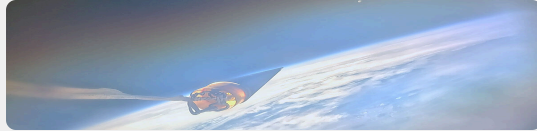


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