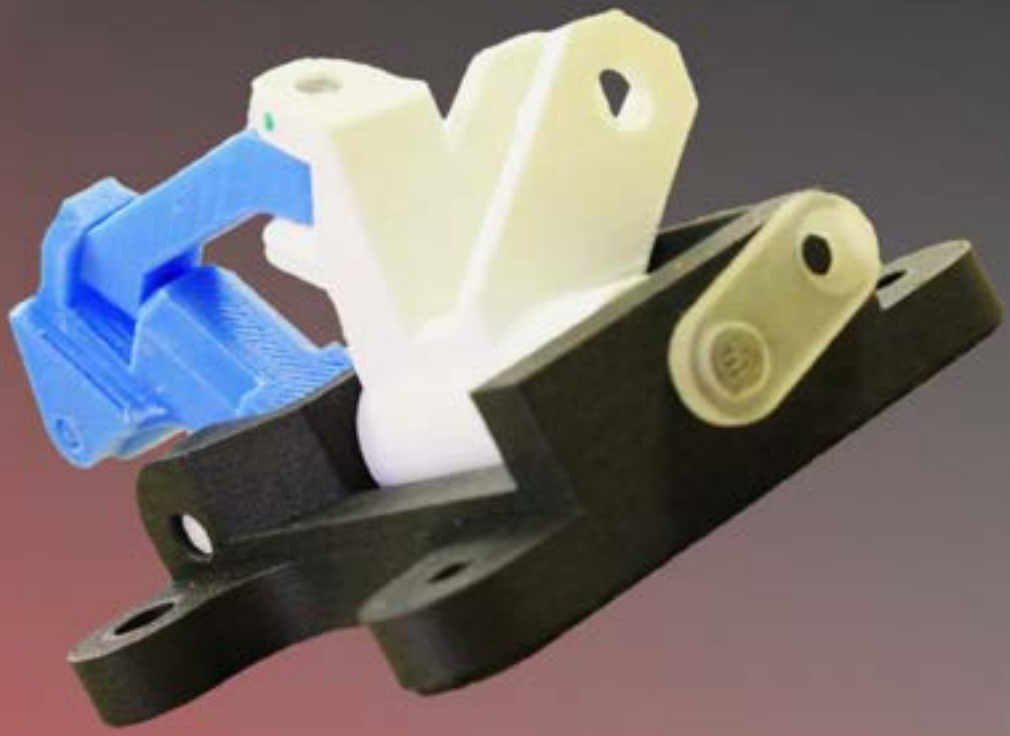
Navajo Technical University
STEM & Skills Program

Project Egress

Dual Credit College Program



"It works if you work it cause it's worth it..."

~Darrick Lee~

ENGINEERING

Project Egress

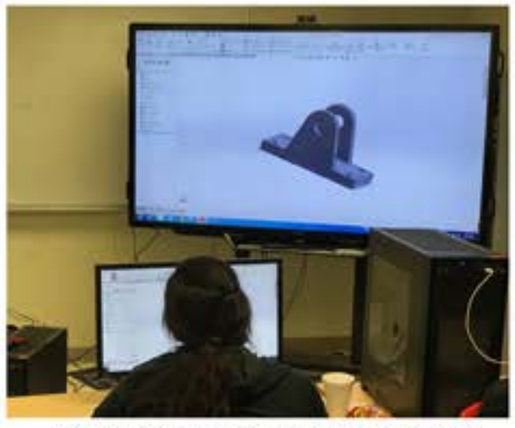
Project EGRESS was a great opportunity for students in our 2019 Summer STEM & SKILLS Dual Credit Program to apply what they learned during the summer. High school students from Many Farms, Arizona and Wingate, NM were able to participate in this once in a lifetime experience tobe a part of history to commemorate the 50th anniversary of the Apollo 11 space mission.

Conrad Begay instructing a class

The students were excited to be working with Savage Industries alongside, Mr. Adam Savage. This was not only hands on experience inworking with 3D CAD, but also a lesson in the history of the Apollo space missions.

Darrick Lee feeding 3D printing machine

The high school students were able to earn College credits by participating in our ENGR-130 Engineering Graphics course. Students learned how to design parts in 3D CADand how to print them on various 3D Printers.



Highschool student watches instructor display a piece of the module of crew hatch.

In the final two weeks of class, the students earned their final grades by concentrating on preparation for and printing the final working 3D model for the unified crew hatch. Using three different models of 3D printers, they were able to relate their own knowledge of how to use 3D CAD to build these 3D sketches and transfer them into printable STL files.

They were able to learn each step in downloading the STL files, transferring to each software for the different 3D printers, and load them into the 3D printers for print.

In the end, this was great for the students because it brought them closer together by building fundamental team working skills and working with an interdisciplinary team. This was truly a great and exciting experience for these students.

The Project EGRESS team wishes to acknowledge the support we received from the Navajo Tech Advanced Manufacturing Center, the Navajo Tech Innovation Center, and Project KARMA

Sincerely,

Darrick Lee, NTU BSEE May 2019

Engineering Graphics Instructor &

Project EGRESS Lead

Darrick Lee filing down and fitting parts.

By: Felicia Chischilly

National Science Foundation Project Egress

On, July 17th, 2019, the Navajo Technical University Summer STEM and SKILL Program staff traveled to Washington, D.C. for the 50th Anniversary Smithsonian National Air and Space Museum Project Egress. There, they witnessed Mr. Adam Savage of the former TV series, MythBusters, build a full-scale model of the Apollo 11 Command Module Hatch in honor of the Apollo 11 Moon Mission. The NTU attendees, included, Darrick Lee, NTU Summer Program Engineering instructor, April Chischilly, Business Assistant Professor, Felicia Chischilly, STEM & Skills Media Intern, and Christine Reidhead, Business Assistant Professor.

Before attending Project Egress, the NTU team got a chance to meet with Jody Chase, Ph.D. Program Director for Tribal Colleges and Universities Program with the National Science Foundation (NSF), and Gina Sievert, Secondary Education Director, Salish Kootenai College.

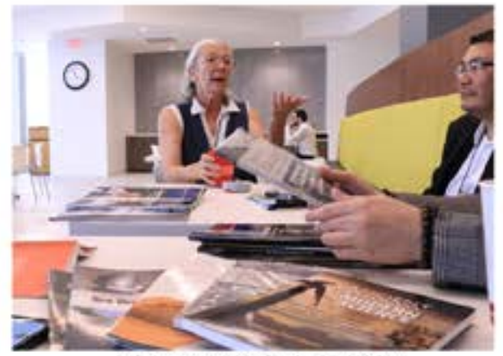
Left to right: Gina Sievert, Jody Chase, Christine Reidehead

Left to right: Christine Reid head, Darrick Lee, Felicia Chischilly, April Chischilly

Jody informed the team of a few projects the NSF grant could fund. One in particular, that was funded, was a video, starring, Gina Sievert, in "A Best Kept Secret: STEM Research at Tribal Colleges and Universities".

The short film gives awareness to the Indigenous research done by Native American students enrolled at universities and colleges and the effect on their tribal community. Gina Sievertstates, "Indigenous research allows the community to choose the research question, type of methodologies that will be usedand the type of evidence that would be accepted in a tribal community and to use the resultsto make important changes to the community".

Left to right: Gina Sievert, April Chischilly, Jody Chase



Left to right: Jody Chase, Darrick Lee

Jody and Gina also mentioned the NSF Graduate Research Fellowship Program (GRFP), and how it helps ensure the vitality of the human resource base of science and engineering in the United States and reinforces its diversity.

The program recognizes and supports outstanding graduate students in NSF-supported science, technology engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees at accredited United States institutions. The GRFP Fellows share in the prestige and opportunities that become available when they are selected. Fellows benefit from a three-year annual stipend of $34,000 along with a $12,000 cost of education allowance for tuition and fees (paid to the institution), opportunities for international research and professional development, and the freedom to conduct their own research at any accredited U.S. institution of graduate education they choose.

At the conclusion of their meeting, both Darrick and Felicia, were encouraged by Jody and Gina, to continue their education by pursuing a graduate degree funded by the NSF grant. Both, Jody and Gina, acknowledged the number of Native Americans who have received the scholarship, which was approximately 10 students, according to their track record. The National Science Foundation Tribal College and Universities Program and TCUP support advancement in STEM education researchand Outreach to American Indian Alaskan native and NativeHawaiian undergraduate students. TCUP is an integral part of NSF's mission to support and fund diversity within STEM Education and Research. The National Science Foundation has been the most importantagency of throughout the federal government and in providing targeted capacity-building money to allow us to build our stem programs major natural.

Left to right: April Chischilly, Christine Reidhead, Darrick Lee, Jody Chase, Gina Sievert Felicia Chischilly

Headquarters of National Science Foundation located in Alexandria Virginia

To apply for this scholarship, you would have to be within the last year as an undergrad and first year of grad school. For details on GRFP, visit their website at https://www.nsfgrfp.org/general_resources/about.

Project Egress

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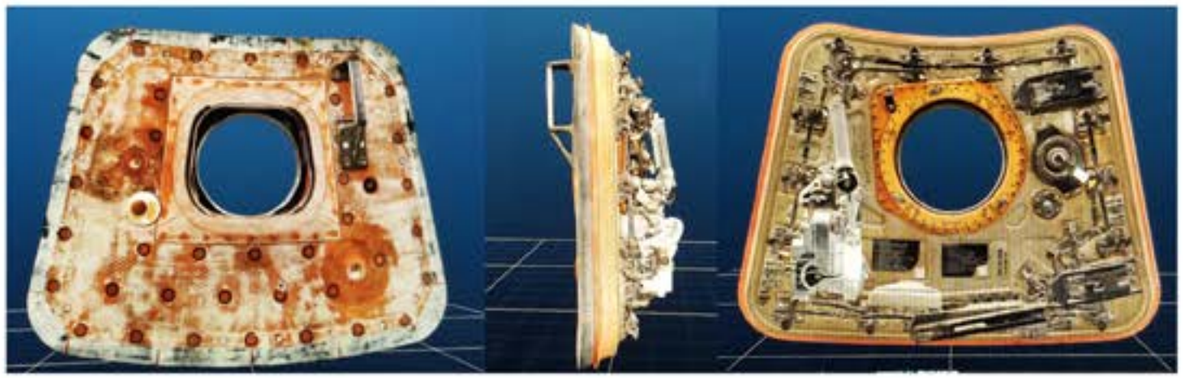
After meeting with Jody Chase and Gina Sievert, the NTU team made their way to the Smithsonian National Air and Space Museum. The crowd had already arrived.

There was excitement in the room for the assembly of the module hatch. The hatch is the door the astronauts used to enter and exit the spacecraft after visiting the moon. There were people from all over the United States who participated in making parts for the Apollo 11 Command Module Hatch. The design and format of the 3D parts demanded preciseness, with every small detail, therefore, participants used 3D scans of the Apollo 11 Command Module "Columbia" captured by the Smithsonian's Digitization Program Office, and original engineering drawings from the museum's archives.



The 3D designed parts were made by 44 different artists and fabrication shops. Each using different techniques and mediums. Navajo Technical University STEM & Skill Program was honored to be a part of both of these creations.

The students involved in making the right hand latch assembly for Project Egress, were enrolled in the NTU Summer STEM & Skill Dual Credit Program.The students were from Many Farms and Fort Wingate High Schools. Instructors were Darrick Lee, a recent graduate from the Engineering program and Conrad Begay, a graduate of the Electrical

Shipped packages containing parts from engineering departments from all over the country.

Engineers locate and view parts buit to build module hatch

Darrick catches a glimpse of Adam filiming the opening of the packages

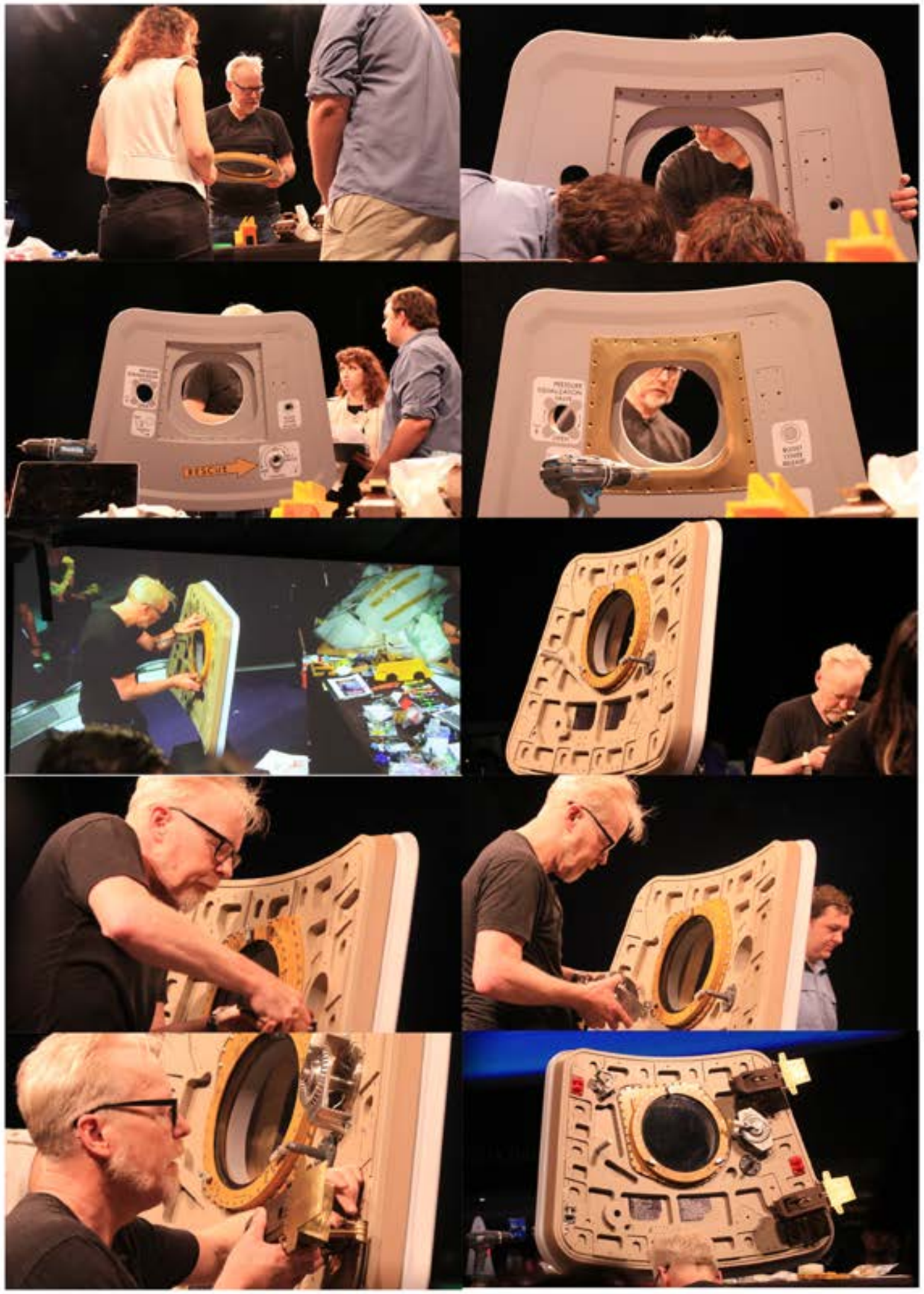
Engineering and Computer Science Bachelor's program at NTU. "We are very excited to be a part of Project Egress and showcase our work. The students worked very hard this summer to get the finished product," Darrick Lee said in an interview with STEM & Skill Program. "The students far exceeded the expectations that were required of them. They were enthusiastic about being involved in a once ina lifetime opportunity working with other schools and professionals around the U.S."

Though, they finished building the assigned piece in time for shipping, Darrick and Conrad, encountered minor problems. "One of the problems we encountered was working witha 3D printer we had just purchased. We had just purchased. We had

Adam Savage unpacking parts

Darrick views the blue print of the module hatch.

to do a number of test prints before it started to perform well enough to do what we needed.



Probably, most importantly, was getting the correct dimensions that were required of each part due to shrinking. One of the requirements was not to alter any of the dimensions of the parts, so we were able to adjust our 3D printer to take in these factors" said, Darrick.

Darrick watches as Adam puts together module hatch

It was the enthusiasm to see their part being used in Project Egress that made all complications worthwhile "It was a challenging and worthwhile experience to be a part of this project. It certainly prepared me for working on a team of less experience, but hard working and willing team," Darrick said. "It was an exciting time because we knew that our piece would be among the many who would also be a part of this project. Many who are professionals in the industry. It's an honor to know that our university, as small as we are, can depend on our students to rise above and take a hold of this opportunity to make a name for our institution."

NTU's developed piece was one of many important parts of the assembly of the hatch, along with the 44 other artists, to complete themodule hatch that day. "It was amazing to see Adam Savage put together the hatch. If only the students, who actually developed the part, could have made the trip, and witnessed their module hatch part be put into place, they would have been blown away.

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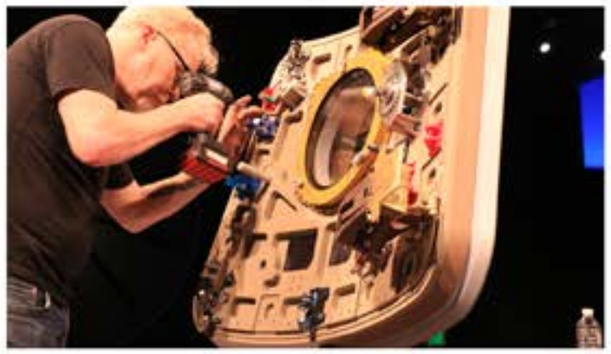

The amount of hard work and design of their piece,would have been admired by other professionals in the same industry. And, maybe, this experience would have made up their minds to continue doing 3D printing and design work, for the rest of their lives," said Felicia Chischilly STEM & Skills Media Intern. "The NTU STEM & Skills program, National Science Foundation, and Project Egress has me wanting to spread the word to inspire the young children and teenagers on the Navajo reservation and inform them that great things you see on television and in the media, can be accomplished by them, if they make education a priority."

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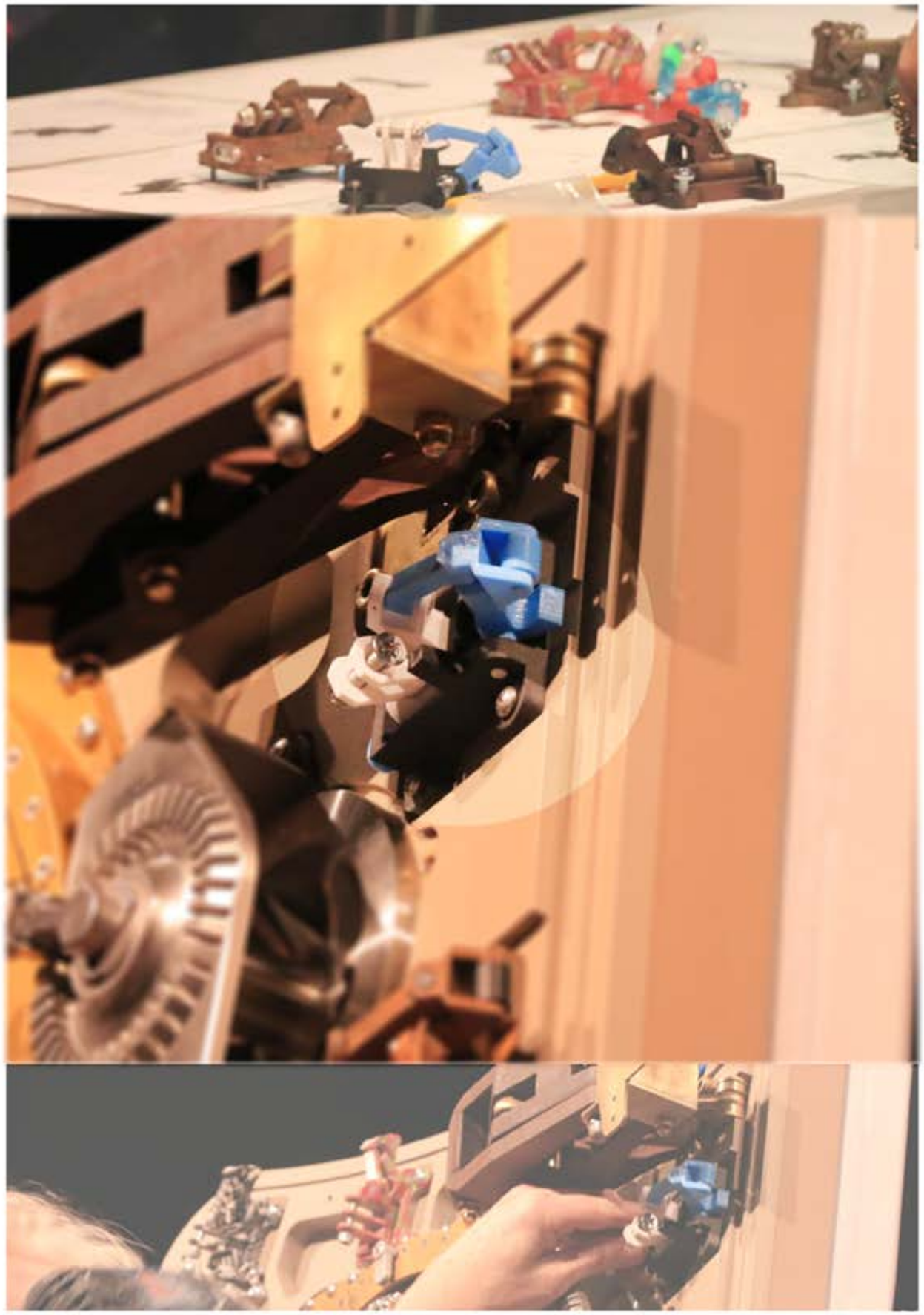
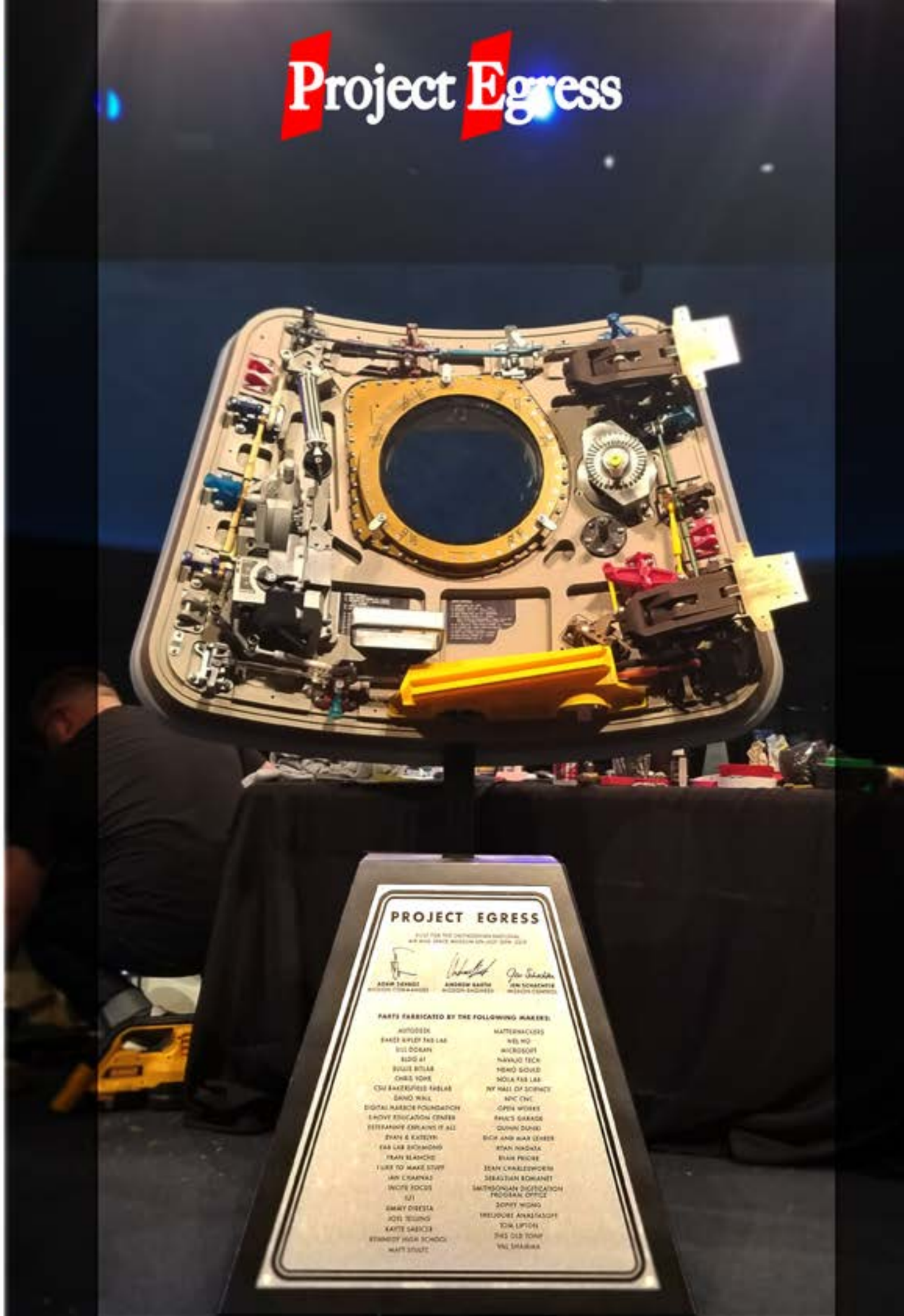


After 8 long hours (standing room only), Adam Savage and his team completed the building of the module hatch. All engineers and those who took part in Project Egress signed the hatch. The hatch is staged at the Smithsonian National Air and Space Museum's Moving Beyond Earth gallery.



For more information contact
Peter Romine promine@navajotech.edu
or
Christine Reidhead creidhead@navajotech.edu