

A close-up photograph of an astronaut in a white space suit with a large, reflective helmet visor. The astronaut is positioned on the left side of the frame, against a background of a dark blue and orange gradient representing space. The helmet visor shows a reflection of the astronaut's face.

# Audience with Aerospace: Astronaut Training and Space Exploration

Virtual Visit with The Aerospace Corporation

***Astronaut Training and Space Exploration  
Virtual Visit***  
*The Aerospace Corporation*

**2025**



# Audience with Aerospace: Astronaut Training and Space Exploration

Virtual Visit with The Aerospace Corporation



***Dr. Larry DeLucas***

***Technical Staff***

***The Aerospace Corporation***



A close-up photograph of an astronaut in a white space suit with a large, reflective helmet visor. The astronaut is positioned on the left side of the frame, against a background of a dark blue and orange gradient, suggesting a space environment. The helmet visor shows a reflection of the astronaut's face.

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***How It All Started***

***Being Selected to Launch an Experiment***



# Audience with Aerospace: Astronaut Training and Space Exploration

*Attended the University of Alabama at Birmingham received 5 college degrees*

- Bachelor of Science degree majoring in Chemistry

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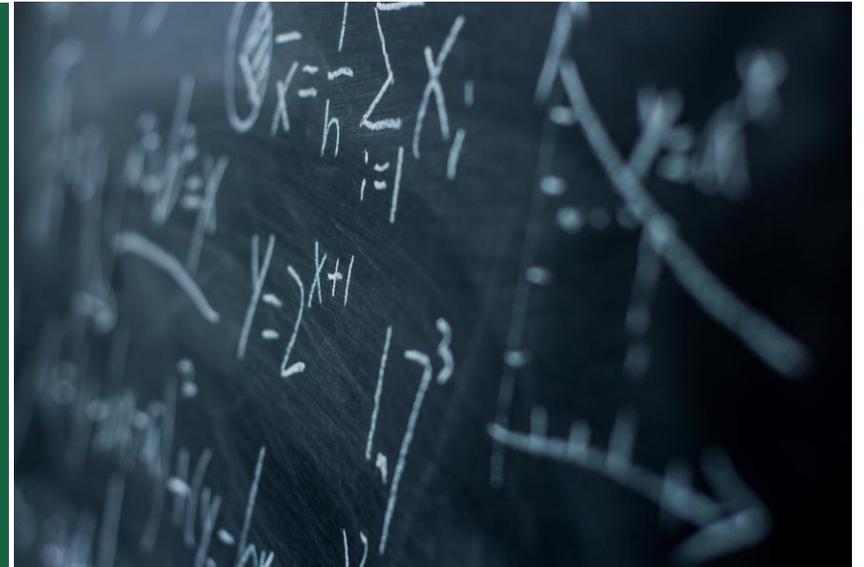
- Master of Science degree majoring in Chemistry

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- Specializing in X-ray crystallography of small molecules

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- Sigma Xi graduate school competition



Adobe Stock



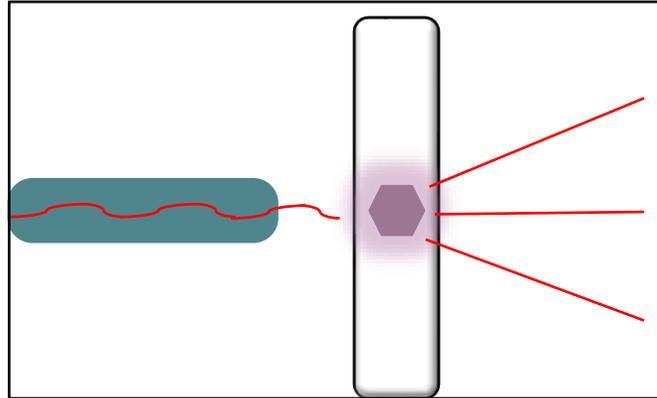
Adobe Stock

# Audience with Aerospace: Astronaut Training and Space Exploration

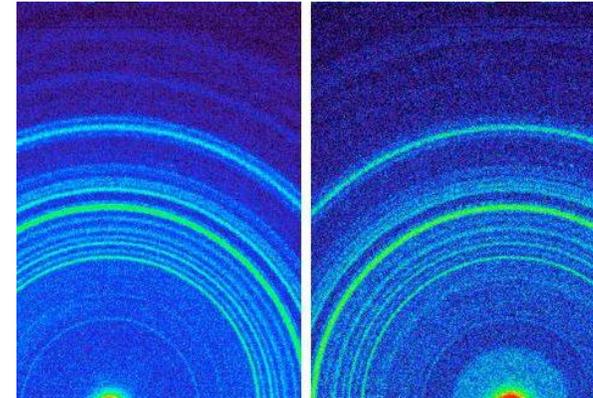
## *Protein Crystallography*



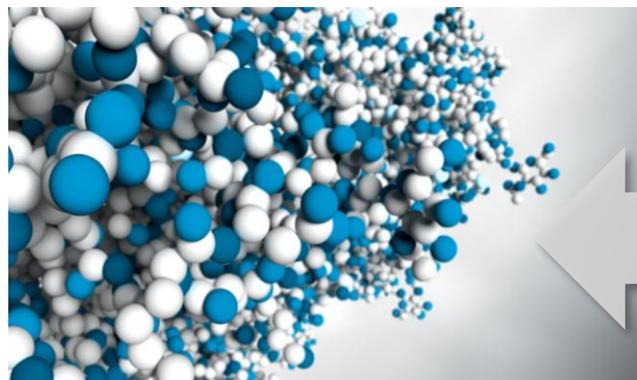
CYSTALS



X-RAYS



DIFFRACTION PATTERN



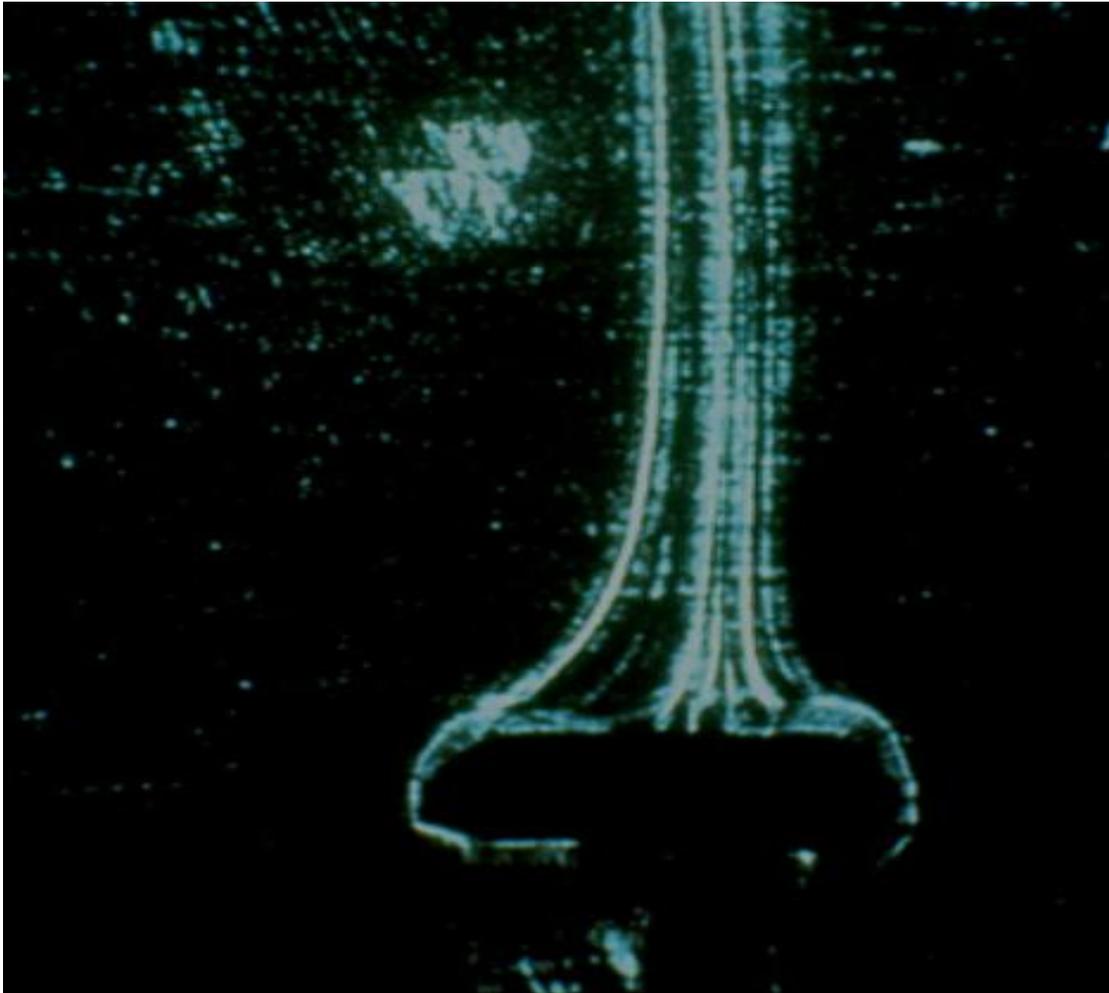
PROTEIN STRUCTURE



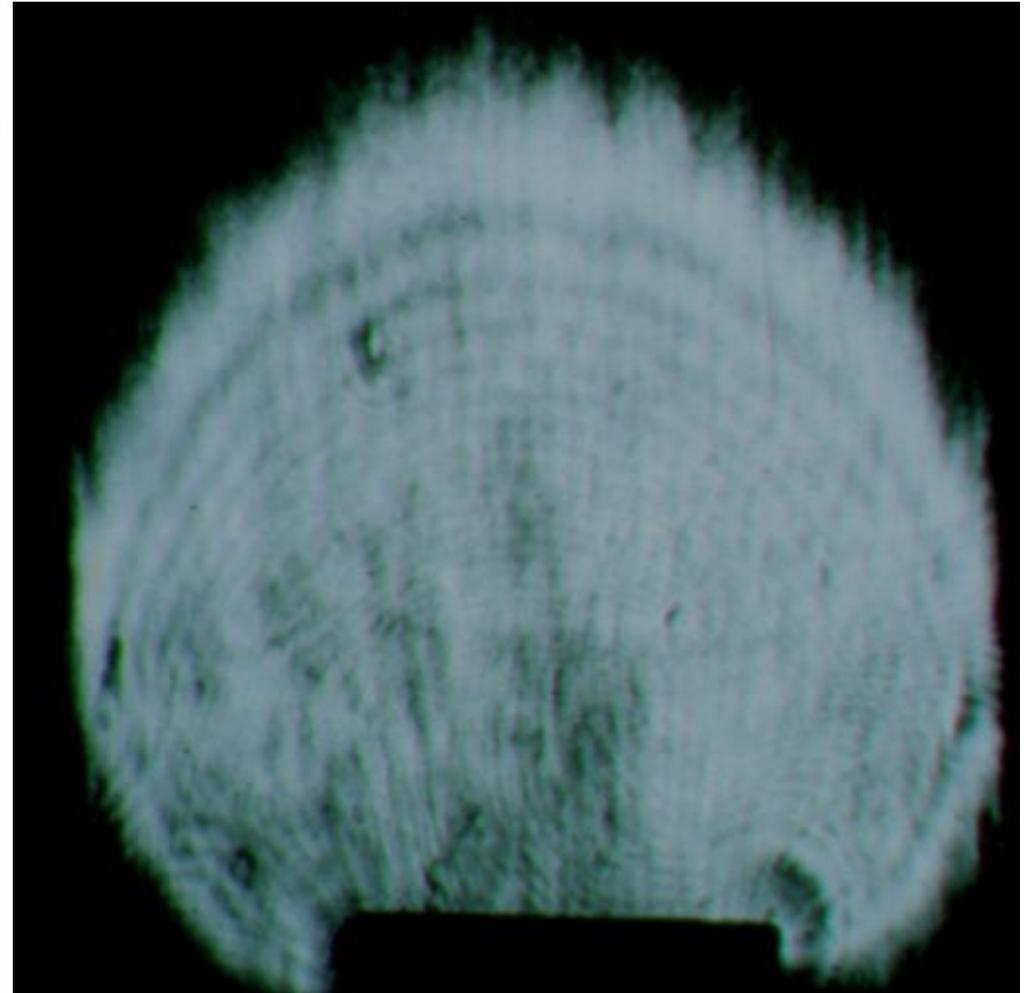
ELECTRON DENSITY MAP

# Audience with Aerospace: Astronaut Training and Space Exploration

## *NASA Connection*



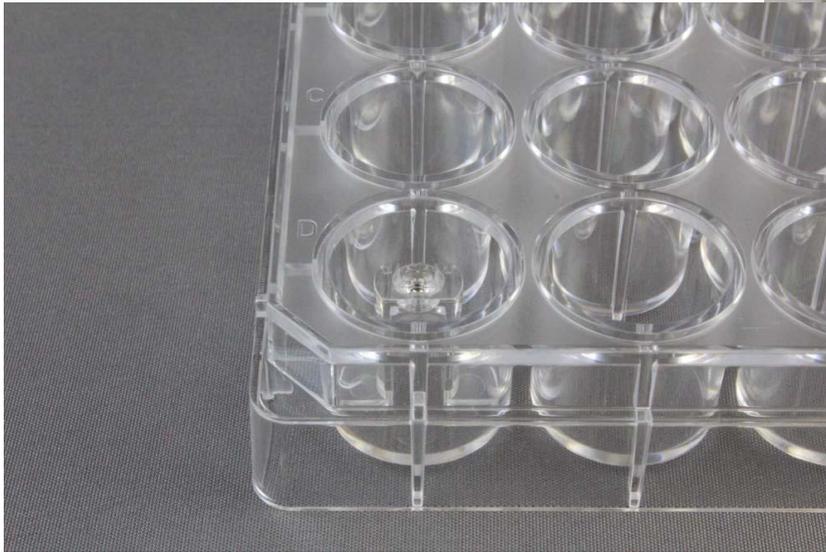
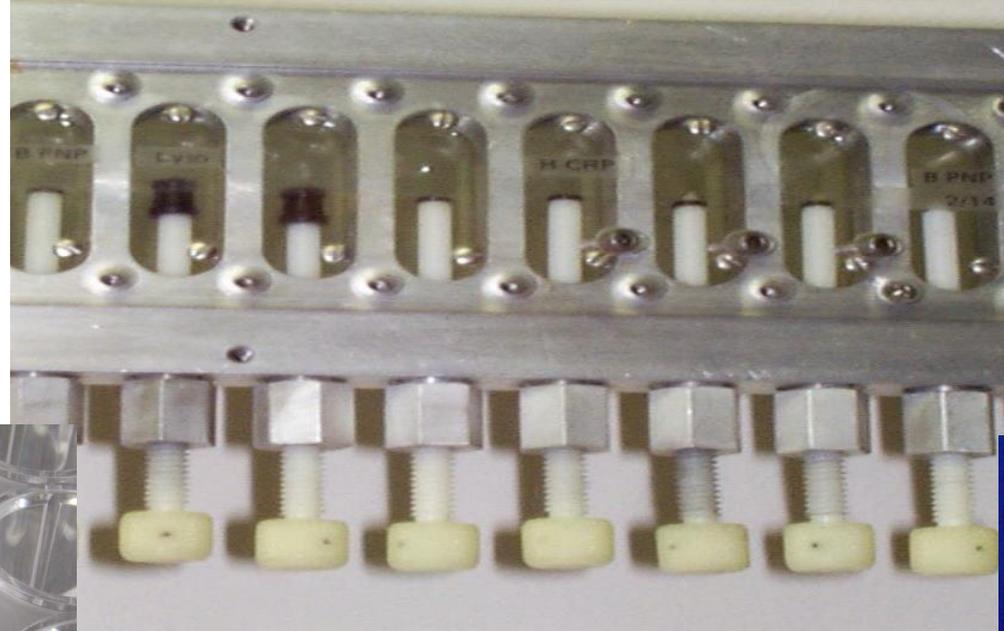
Credit: NASA



Credit: NASA

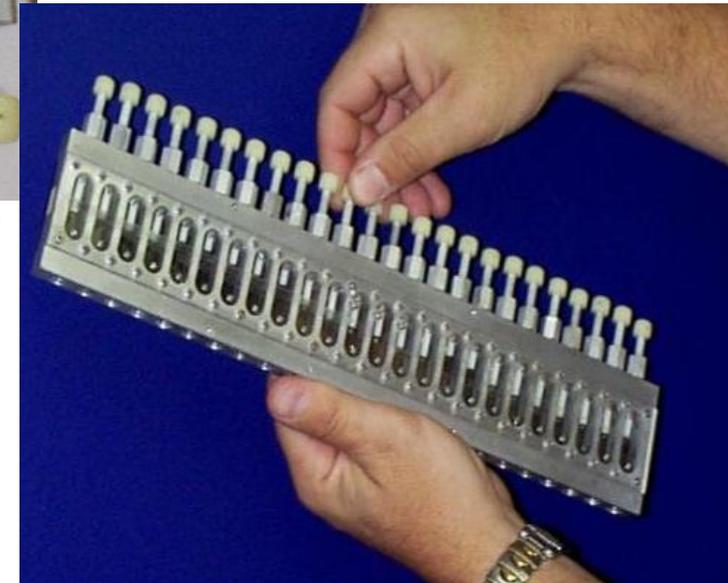
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## *Initial Flight Hardware*



Credit: Hampton Research

Credit: Dr. Lawrence DeLucas



Credit: Dr. Lawrence DeLucas and McPherson

# Audience with Aerospace: Astronaut Training and Space Exploration

## *Training and Selection – Year 1*

### 31 DIFFERENT EXPERIMENTS

- Combustion
- Fluid dynamics
- Crystal growth (proteins, zeolites, semiconductors)
- Medical (LBNP, eye)
- Ant farm

### SELECTION PROCESS

- 3-day physical
- Travel to each university and NASA centers
- Oral exam

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## *Year-2 Training*

- Move family to Houston
- Classes where we learn about the space shuttle
  - Main frame computers
  - Orbital
  - Repelling
  - Medication tolerance
  - Fire safety
- Practice on-orbit science at Marshall Space Flight Center



Credit: NASA



Credit: NASA

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## *Emergency Procedures on Launch Pad*



Credit: NASA

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## *Centrifuge Training*



Credit: NASA



Credit: NASA

# Audience with Aerospace: Astronaut Training and Space Exploration



Credit: NASA



Credit: NASA

# Audience with Aerospace: Astronaut Training and Space Exploration



# Audience with Aerospace: Astronaut Training and Space Exploration



Credit: NASA

# Audience with Aerospace: Astronaut Training and Space Exploration

## *Unique Environment of Space*

- Surface tension dominates
- Absence of buoyancy-induced convection
- Bubbles do not coalesce



Credit: Dr. Lawrence DeLucas



Credit: Dr. Lawrence DeLucas

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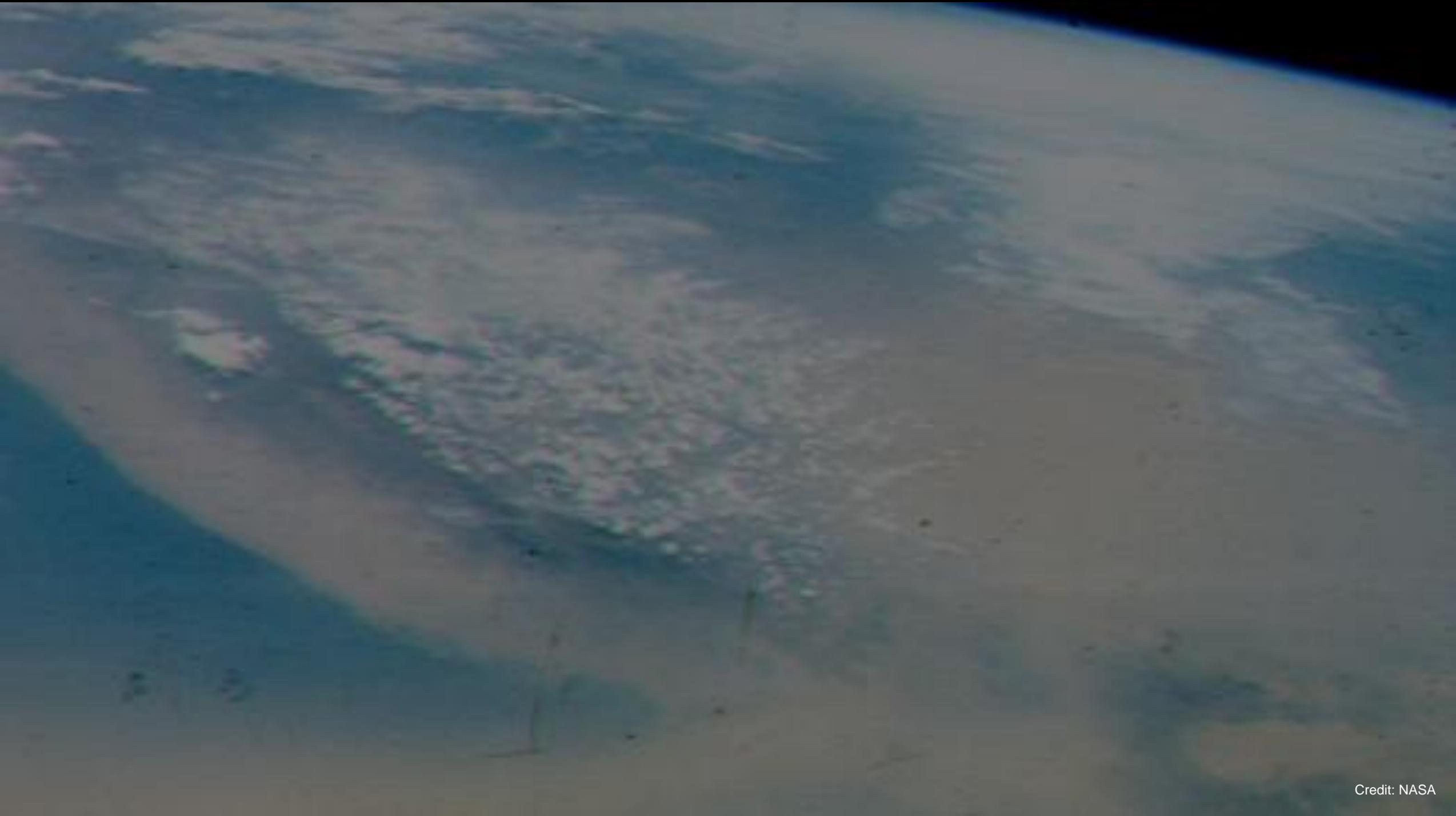
Credit: NASA



Credit: NASA













A close-up view of an astronaut's helmet and upper torso in a white space suit, set against a dark blue and orange gradient background. The helmet's visor is dark and reflective. A small white speaker icon is visible in the bottom left corner of the image area.

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Virtual Visit with The Aerospace Corporation

***Thank You For Attending***

*Look For More STEM Events At  
[Aerospace.org](https://www.aerospace.org)*





## References

**Slide 08:** <https://hamptonresearch.com/product-Greiner-ComboPlate-and-CrystalBridge-451.html#gallery-7> – Hampton Research

**Slide 30-32:** Don Pettit Drinks coffee in space

<http://www.collectspace.com/news/news-050815a-space-coffee-cup-kickstarter.html>

Cup designed by Mark Weislogel - <https://www.pdx.edu/insidepsu/psu-coffee-cup-goes-into-orbit>

NASA / Many were taken by Dr. DeLucas himself