

Keynote Talk: Enabling an Inclusive and Professional Future in the Era of Commercialized Spaceflight

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In the height of Cold War tensions, Space brought out the best of the US and of the Soviet Union through both competition and collaboration. And today, even in a country as politically divided as the United States, astronauts are as embraced by Republicans as they are by Democrats.

Astronauts have historically been civil servants bearing special talent, both innate and learned. Chuck Yeager was the son of farmers, Yuri Gagarin was the son of a carpenter on a collective farm, Neil Armstrong was the son of a state auditor, Alexei Leonov was a son of a miner that had been sentenced to labor in Siberia. But the sense of humility and infectious charisma shared by Gagarin and Armstrong became the face of their respective nations, and astronauts continue to inspire us because they show us the best version of ourselves.

The Professional:

The role of a professional in any endeavor should not be confused with participants. The professional astronaut is a scientific explorer - the product of a lifetime of learning, of skill acquisition, teambuilding, and of learning to adapt to unusual, unpredictable, or extreme environments as much as to different people and cultures.

There are fiduciary duties that astronauts have traditionally provided to the citizens of the nations from which they come. They inspire the next generation. They serve as ambassadors to science, technology, engineering, and mathematics (STEM), they succeed on the value of their merit and not through their economic or influential means, they are often regarded as global citizens and are diplomatic with regards to international affairs, and they embrace a sense of service much greater than the self. These are attributes that reflect the best of a nation.

Today, we are at a pivotal time. Space is becoming more accessible to all. New technologies, reduced costs, and changing legal frameworks will enable more suborbital and orbital Private Astronaut Missions. Consequently, more nations will see the long-term value of investing in the training of their own national astronauts, not only for the benefits that investment in primary science might bring to the country but also for the benefits that

university outreach would bring, as with the ability to inspire a future generation of STEM professionals.

However, only 0.02% of the US population today could afford orbital space flight. Such a subset of the population would inevitably be very homogenous. If young people do not see themselves represented, they might never fully benefit from all that our previous generations of astronauts have provided to us all. They may never fully appreciate the value of an education. They may never fully appreciate the value of studying science. They may question whether their hard work in school will be fairly rewarded in life. They may see Space as something that divides us based on social status, rather than unites us.

Breaking Barriers of Access:

The potential to exponentially increase our presence in space could lead towards a more science-literate and science-participatory culture as humanity learns to adapt to new challenges and appreciate new discoveries. Space literally touches every field of scientific knowledge, but economic barriers exist in terms of access to education, including access to facilities and mentors that drive participation in science. Further, lack of representation in STEM is perpetuated: women make up only 28% of the STEM workforce¹, LGBTQ people are 17–21% less represented in STEM fields than statistically expected²; and all but 43 countries spend less than 1% of their GDP on research and development³.

With students from over 52 different countries, the International Institute for Astronautical Sciences (IIAS) has leveraged the inspiring power of human space flight and provided avenues for broad and diverse populations to mature the skills needed to be professionals in space through high-value professional courses that provide access to immersive campaigns that enable student-led, publishable scientific investigations. IIAS also actively sponsors and maintains three outreach programs serving under-represented populations: The PoSSUM13, Out Astronaut, and Space for all Nations.

References:

1. <https://www.aauw.org/resources/research/the-stem-gap/>
2. <https://www.science.org/doi/10.1126/science.abn1103>
3. <https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm>

