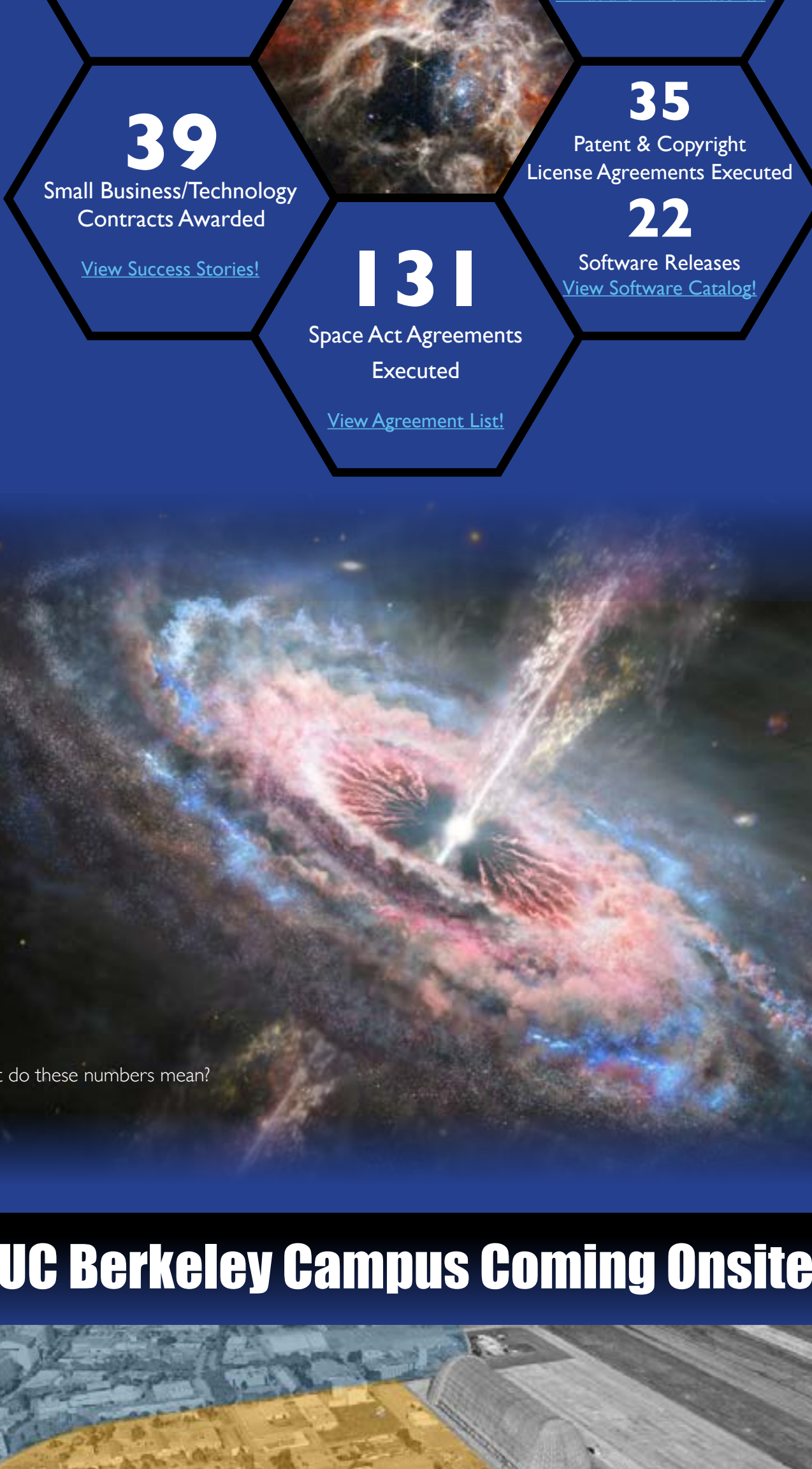


Ames Partnerships Office Annual Report 2022

NASA in Silicon Valley inspires the world through discovery and innovation while leading worldwide partnerships and growing new commercial markets to serve NASA for the benefit of humanity.



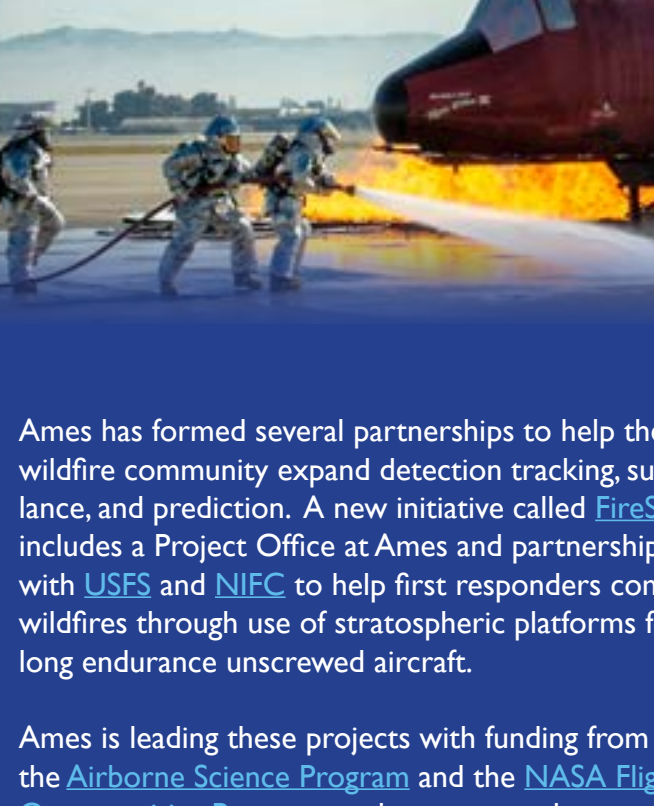
What do these numbers mean?

UC Berkeley Campus Coming Onsite!



UC Berkeley has signed a 99 year agreement with NASA in Silicon Valley to lease 36 acres of land to develop a new campus focused on aerospace engineering. The new campus will include up to 1.4 million square feet of space for classroom instruction, research laboratories, and student housing. The UC Office of the President envisions this as a hub for collaborative research involving UC Berkeley as well as other UC campuses, NASA and other government agencies, and private partners. While it will take approximately 6 years to build the new campus (in phases), NASA Ames and UC Berkeley have started to develop more joint research projects as both institutions recognize there are immediate benefits that can be gained when the two organization work together. Read more about the satellite university campus [here!](#)

Chabot Space & Science Center



The NASA Experience exhibit at Chabot Space & Science Center in Oakland, California serves as a new visitor center for NASA's Ames Research Center and provides a dynamic and interactive space for the public to learn more about local contributions to space exploration across the years. From models of spacecraft and genuine spacesuits from early missions to artifacts related to NASA's recent Artemis mission.

Ames' expertise in wind tunnel testing, rover design and testing, space robotics, supercomputing, and more is on display. It also highlights the people of Ames, with interactive ways of learning about the stories that brought scientists, engineers, artists, and more from across the world to work for NASA in Silicon Valley.

Fire Sense

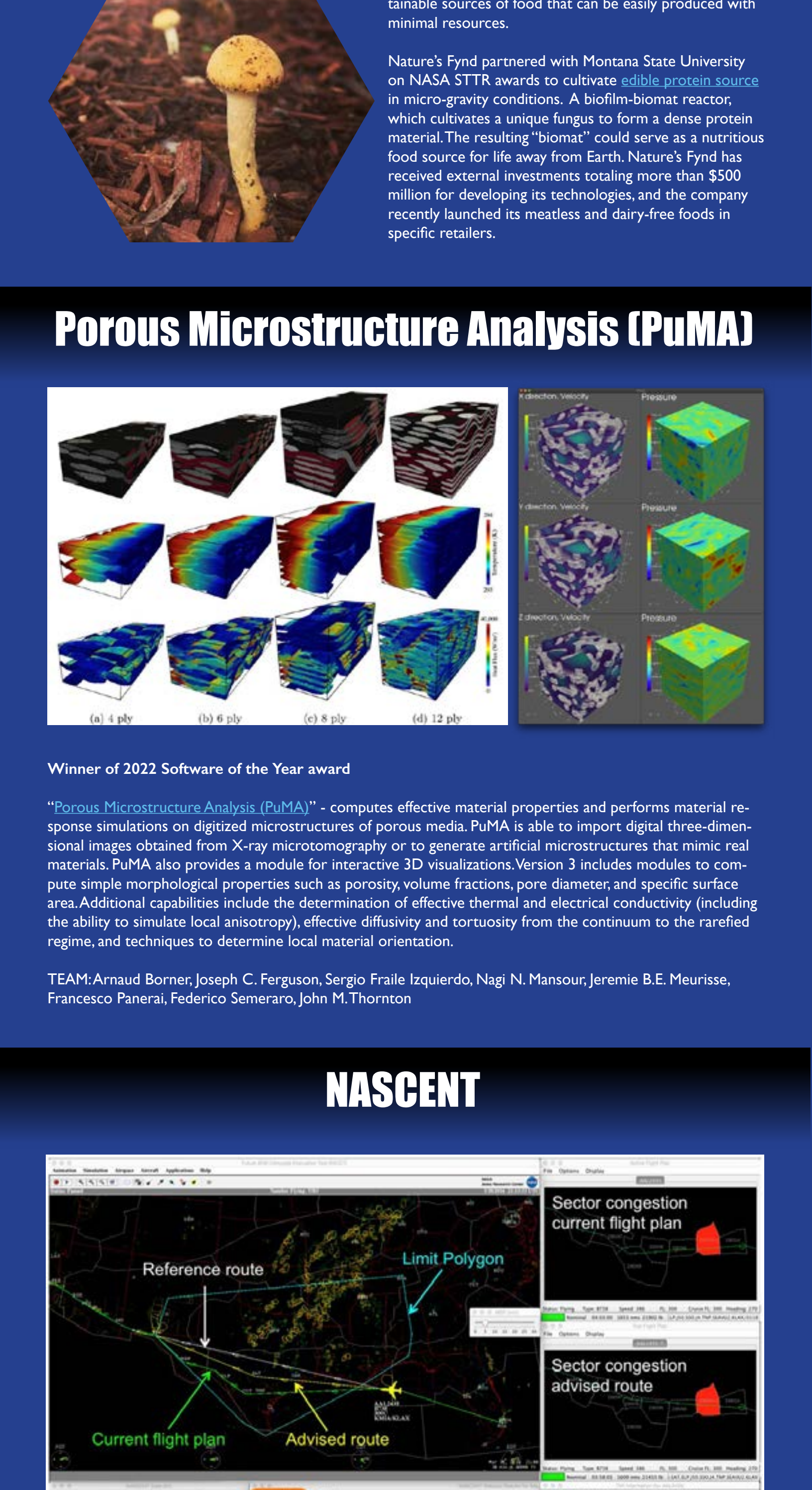


Ames has formed several partnerships to help the wildfire community expand detection tracking, surveillance, and prediction. A new initiative called FireSense includes a Project Office at Ames and partnerships with USFS and NIEIC, to help first responders combat wildfires through use of stratospheric platforms for long endurance uncrewed aircraft.

Ames is leading these projects with funding from the Airborne Science Program and the NASA Flight Opportunities Program to demonstrate the use of station-keeping high altitude balloons for providing imagery and communications over fires. These are part of the Agencies new initiative called the NASA Wildfire Initiative (WFI).



Fluidic Telescope Experiment (FLUTE)



Can we make a Telescope out of Liquid?

This question fueled the Fluidic Telescope Experiment (FLUTE) program which was designed to investigate using liquids to construct telescope lenses. Ed Balaban from NASA Ames initiated this concept through a Center Innovation Fund Award, and now serves as the lead PI with our international Partners at Technion and the Israel Space Agency.

FLUTE may one day revolutionize the materials we use to build larger, more powerful space telescopes that peer far into the universe's origins. The larger the telescope the more astronomers can peer farther into space and see distant objects in greater detail.

A Sustainable Plastic Alternative

Recycling and reducing waste are two important operational goals for NASA—both in space and on Earth. Mango Materials partnered with the Colorado School of Mines on NASA STTR awards to adapt an end-to-end bioreactor system that produces biopolymer (bioplastic) from methane gas for low-gravity environments.

In space, methane from carbon dioxide conversion systems and waste treatment can be used to 3D print objects and produce polymers for construction and moon dust binding. On Earth, the system can convert methane—a greenhouse gas—into environmentally conscious bioplastic. Mango Materials received \$6 million through NASA CCRPP including funds from fashion investors seeking alternatives to plastic-based textiles. Read more about our current [climate change research](#).



Fungi Food



As we continue to expand humanity's potential for habitation away from Earth, NASA seeks innovative and sustainable sources of food that can be easily produced with minimal resources.

Nature's Fynd partnered with Montana State University on NASA STTR awards to cultivate [edible protein source](#) in micro-gravity conditions. A biofilm-biomat reactor, which cultivates a unique fungus to form a dense protein material. The resulting "biomat" could serve as a nutritious food source for life away from Earth. Nature's Fynd has received external investments totaling more than \$500 million for developing its technologies and the company recently launched its meatless and dairy-free foods in specific retailers.

Porous Microstructure Analysis (PuMA)

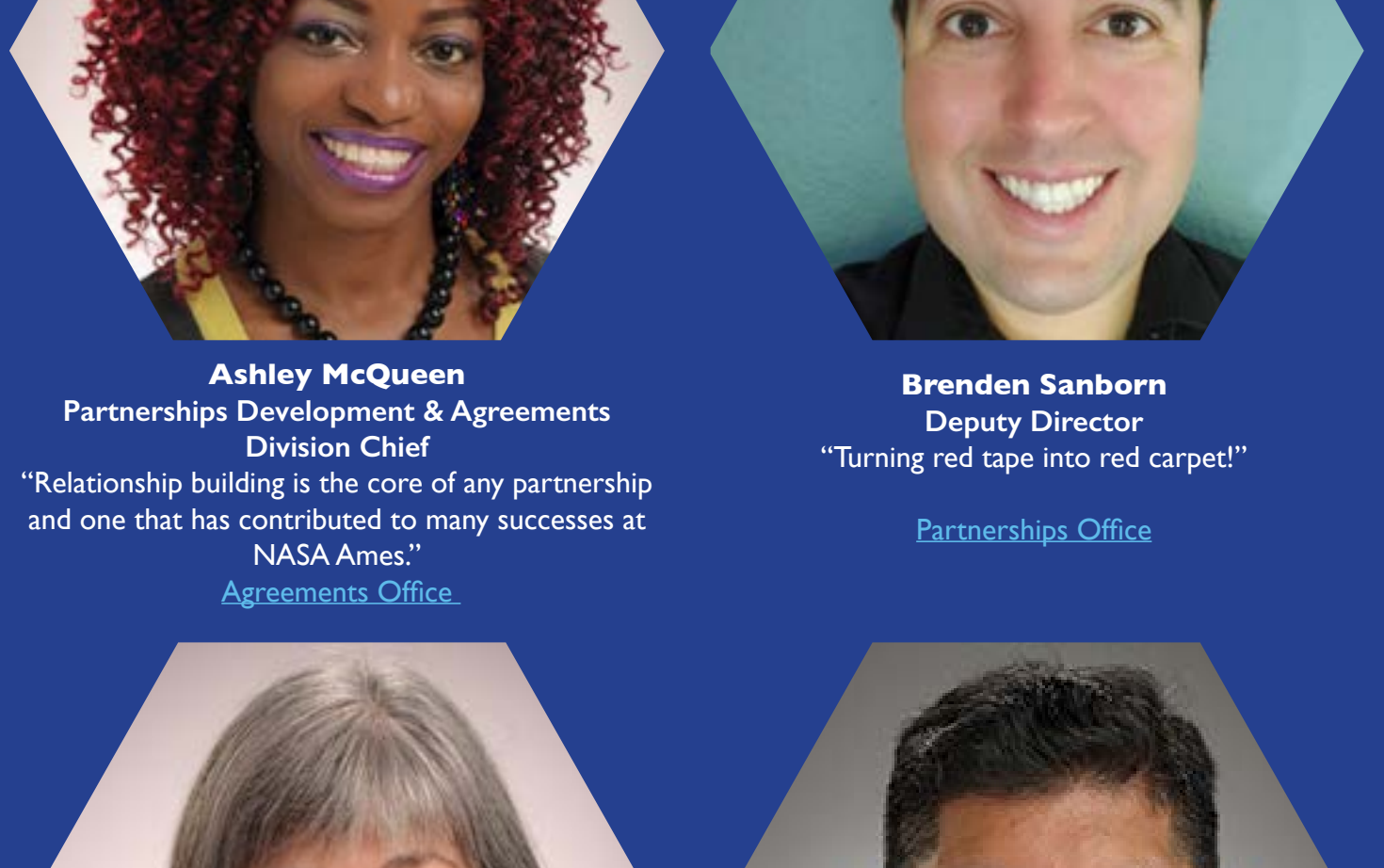


Winner of 2022 Software of the Year award

"Porous Microstructure Analysis (PuMA)" - computes effective material properties and performs material response simulations on digitized microstructures of porous media. PuMA is able to import digital three-dimensional images obtained from X-ray microtomography or to generate artificial microstructures that mimic real materials. PuMA also provides a module for interactive 3D visualizations. Version 3 includes modules to compute simple morphological properties such as porosity, volume fractions, pore diameter, and specific surface area. Additional capabilities include the determination of effective thermal and electrical conductivity (including the ability to simulate local anisotropy), effective diffusivity and tortuosity from the continuum to the rarefied regime, and techniques to determine local material orientation.

TEAM: Arnaud Borne, Joseph C. Ferguson, Sergio Fraile Izquierdo, Nagi N. Mansour, Jeremie B.E. Meurisse, Francesco Panerai, Federico Semeraro, John M. Thornton

NASCENT



Winner of 2021 FLC Far-West Region "Outstanding Technology Development" Award

National Airspace System Constraint Analysis and Notification (NASCENT), or (NASCENT) is a near constraint avoidance system that automatically analyzes routes of aircraft flying, or to be flown, in or near constraint regions and provides an evaluation of more time and fuel efficient reroutes around current and predicted constraints. NASCENT provides a find more time and fuel efficient reroutes around current and predicted constraints. NASCENT provides an evaluation of avoidance routes that save more than a user-specified number of minutes of wind-corrected flying time savings, for all the 20 Air Route Traffic Control Centers (ARTCCs or Centers) in the National Airspace System (NAS) simultaneously. The dynamic constraint avoidance route system continuously analyzes all flights and provides reroute advisories that are dynamically updated in real time. This system includes a graphical user interface that allows users to visualize, evaluate, modify if necessary, and implement proposed reroutes.

TEAM: Karl Bilimora, Paul Borchers, Alexis Clymer, Kaj Edholm, Heinz Erberger, Sebastian Gutierrez-Nolasco, Jennifer Lock, Dave McNally, Alexander Morando, Scott Sahlman, Kapil Sheth, Fu-Tai Shih

NASA Technology Transfer System

Winner of 2022 Government Invention of the Year award, NASA Technology Transfer System (NTTS)

The NASA Technology Transfer System (NTTS) is an enterprise software tool developed in-house for STMD's Technology Transfer Program, which aims to find the widest possible applications for NASA technology through partnerships and licensing agreements with industry, academia, and other U.S. government agencies.

NTTS contains over 60,000 technologies supporting all ten NASA field centers and Headquarters. The tool provides a comprehensive suite of data systems, web-enabled applications, and infrastructure for both NASA personnel and external users from private companies, academia, and other federal, state, and local government agencies to request technology licensing from NASA. It facilitates and streamlines the commercializing transfer process, including the reporting of new technologies, protecting intellectual property, and commercializing technologies through various technology licenses, software releases, spinoffs, partnerships, and success stories.

NTTS is the 2022 Invention of the Year winner in the government category. NTTS has enabled NASA to execute more technology license agreements than ever before, breaking the agency's annual record with 211 licenses executed in 2021. More licenses mean more opportunities for commercial products or services to be created in the forms of spinoffs that help protect the planet, create jobs, boost the economy, and even save lives. NTTS has been transferred via software usage agreements to 11 U.S. federal agencies.

TEAM: Jairon Moh-hashim Camarillo, Ronald Instrella, Takeshi Okimura, Peter B. Tran, Vu Hoang Tran, Anh Ngoc Trinh

International Agreements

Over the past year we have initiated partnerships with the following international partners:

Technion Israel Institute of Technology
NASA and Technion university are collaborating on fundamental research under a joint project titled "Fluidic Telescope Experiment (FLUTE)." FLUTE aims to revolutionize space-based astronomy by developing a new method for fabricating high-quality optical components in space using fluidic shaping and taking advantage of the microgravity environment. The method may eventually lead to space telescopes with lenses or mirrors measuring in tens or even hundreds of meters in diameter, allowing, for instance, direct, high-resolution observations of planets around other stars (the primary mirror of the most advanced current space telescope, the James Webb Space Telescope, is only 6.5 meters in diameter). Such observations would, in turn, help answer questions about the composition and climate of such planets and — likely of most interest — whether life currently exists on them or may have existed in the past.

Von Karman Institute for Fluid Dynamics Research (VKI)
NASA and VKI have a mutual interest in conducting joint research to advance their respective Entry Systems Modeling (ESM) capabilities. Under this Agreement, the NASA and VKI are advancing fundamental research related to four ESM research topics: material response, aerothermodynamics, radiation, and magnetohydrodynamics. The Parties intend to conduct this joint research through a series of joint discussions, tutorials, training, and data and software model exchanges, resulting in joint ESM related technical publications.

German Aerospace Center (DLR)
DLR and NASA in Silicon Valley are collaborating to advance their respective computing quantum computing capabilities. The focus is on developing quantum computing tools for assessing the potential of quantum computing for space exploration applications. Specifically, both groups expect to jointly develop a software library to be used for space exploration applications. The library consists of a collection of software tools for the implementation of quantum algorithms.

Tohoku University
NASA in Silicon Valley's Rotor Optimization for the Advancement of Mars Exploration (ROAMX) team are collaborating with Tohoku University for the testing of new airfoils specifically designed and optimized for mars rotorcrafts. This agreement enables NASA to test these new airfoils in a variety of conditions in Tohoku's unique Mars wind tunnel. The resulting data will benefit NASA and Tohoku by helping to validate the computational results of the optimized blades and explore how to simultaneously achieve increase in predicted performance of vehicle design while maintaining structural integrity.

Incorporating DEIA

Currently NASA in Silicon Valley is preparing to submit their Diversity, Equity, Inclusion & Accessibility (DEIA) Implementation Plan in accordance with the Racial Equity Executive Order and NASA's DEIA Strategic Plan. Here are the following actions that were specifically assigned to our office:

- Establish strategic partnerships and cultivate current ones with MSIs, minority-owned businesses, non-profit organizations, and other small businesses.
- Identify contacts and develop partnerships to ensure solicitation notifications are sent to Black owned companies, HBCUs, and Black organizations
- Increase engagement and collaborations with Native American and Indigenous Communities, including Ohlone Tribe and other local tribes.

Source: Dream to Reality Comic

Areas of Growth in 2023

As we adjust to the new normal in aftermath of the global pandemic, it is evident that NASA can do so much more with its partners than on our own. From small businesses and large technology companies to international governments and local Bay Area municipalities, NASA is joining with its partners to explore the secrets of the universe for the benefit of all.

In the coming year, we are specifically looking to grow our partnerships in several technology sectors:

- Emerging aeronautics (X-Planes, UTM/ATM Integration, Autonomy for Aviation) with an emphasis on advanced air mobility and sustainable aviation.
- Disaster mitigation and climate resilience, including wildfire research with integration of airborne Earth Science capabilities.
- Astrobiology, life detection, and biosciences, including development of new science instruments for spaceflight missions.
- Building the lunar and space economy to strengthen science and exploration.

Office Director for Strategic Partnerships,
Matthew C. Boffington

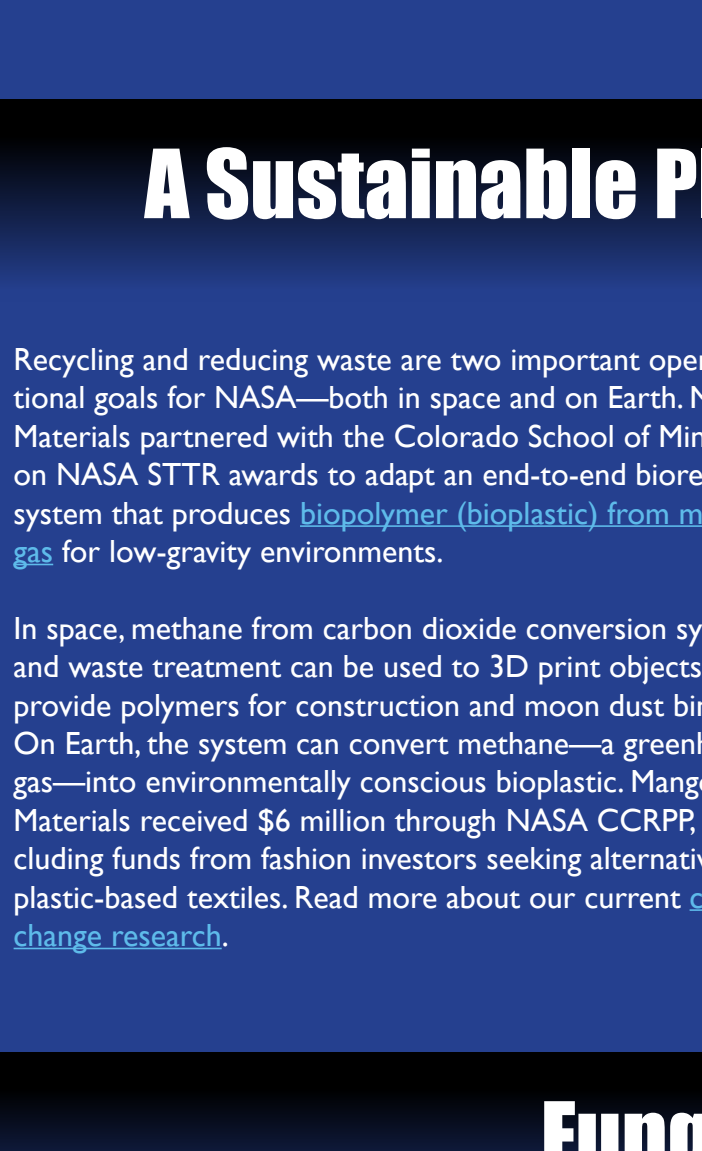
Ames Partnerships Team!



Ashley McQueen
Partnerships Development & Agreements Division Chief
"Relationship building is the core of any partnership and one that has contributed to many successes at NASA Ames."
[Agreements Office](#)



Brenden Sanborn
Deputy Director
"Turning red tape into red carpet!"
[Partnerships Office](#)



Kimberly Hines
Technology Transfer Office Chief
"Technology Transfer is truly a partnership with Ames per capita of scientists and engineers. Ames leads the agency in issuing licenses for NASA technologies."
[Technology Transfer Office](#)



Carlos Torrez
SBIR/STTR Program Manager
"Whether your destination is the Marketplace, the Moon, or Mars—let us help you get there."
[SBIR/STTR Office](#)

Contact the NASA in Silicon Valley Partnerships Office