



2019 NIAC Symposium



September 24-26, 2019 – Huntsville, AL

Tuesday, September 24

- 8:30 **Welcome & Overview** *Jason Derleth, NIAC Program Executive
David Burns, MSFC Science and Technology Office*
- 9:00 **Keynote Address** *Scott Livingston, CEO – Livingston Securities LLC &
General Partner, Starbridge Venture Capital*
- 10:00 Break**
- 10:20 *2019 Phase I Fellow Javid Bayandor, BREEZE- Bioinspired Ray for Extreme Environments and
Zonal Exploration, University at Buffalo - The State University of New York*
- 10:45 *2019 Phase I Fellow Erik Brandon, Power Beaming for Long Life Venus Surface Missions, NASA Jet
Propulsion Laboratory*
- 11:10 *2019 Phase I Fellow Ana Diaz Artiles, SmartSuit: A Hybrid, Intelligent, and Highly Mobile EVA
Spacesuit for Next Generation Exploration Missions, Texas A&M Engineering Experiment Station*
- 11:35 *2019 Phase I Fellow Tom Ditto, Dual Use Exoplanet Telescope (DUET), 3DeWitt LLC*
- 12:00 Lunch**
- 1:30 *POSTER SESSION*
- 2:30 *2018 Phase II Fellow Robert Adams, Pulsed Fission-Fusion (PuFF) Propulsion Concept, NASA
Marshall Space Flight Center*
- 2:55 *2018 Phase II Fellow John Brophy, A Breakthrough Propulsion Architecture for Interstellar
Precursor Missions, NASA Jet Propulsion Laboratory*
- 3:20 *2018 Phase II Fellow Devon Crowe, Kilometer Space Telescope (KST), Raytheon*
- 3:45 Break**
- 4:05 *2019 Phase II Fellow Tom Ditto, The High Étendue Multiple Object Spectrographic Telescope (THE
MOST), 3DeWitt LLC*
- 4:30 *2019 Phase II Fellow John Kendra, Rotary-Motion-Extended Array Synthesis (R-MXAS), Leidos, Inc.*
- 4:55 **Adjourn**
- 6:00 **Fellows' Reception, an external event located in the Davidson Center for Space Exploration at
the U.S. Space & Rocket Center (see flyer; doors open at 5:30PM)**



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Wednesday, September 25

- 8:30 **NIAC Plans and Announcements** *Ronald Turner, NIAC Senior Science Advisor*
- 9:00 **Keynote Address** *Mae Jemison, Principal, 100YSS, Physician, former NASA Astronaut*
- 10:00 Break**
- 10:20 *2019 Phase I Fellow Yu Gu, Micro-Probes Propelled and Powered by Planetary Atmospheric Electricity (MP4AE), West Virginia University*
- 10:45 *2019 Phase I Fellow Troy Howe, SPEAR Probe - An Ultra Lightweight Nuclear Electric Propulsion Probe for Deep Space Exploration, Howe Industries LLC*
- 11:10 *2019 Phase I Fellow Noam Izenberg, RIPS: Ripcord Innovative Power System, Johns Hopkins University*
- 11:35 *2019 Phase I Fellow Geoffrey Landis, Power for Interstellar Fly-by, NASA Glenn Research Center*
- 12:00 Lunch**
- 1:30 *POSTER SESSION*
- 2:30 *2018 Phase II Fellow Jay McMahon, Dismantling Rubble Pile Asteroids with AoES (Area-of-Effect Soft-bots), University of Colorado, Boulder*
- 2:55 *2018 Phase II Fellow Steven Oleson, Triton Hopper: Exploring Neptune's Captured Kuiper Belt Object, NASA Glenn Research Center*
- 3:20 *2018 Phase II Fellow John Slough, Spacecraft Scale Magnetospheric Protection from Galactic Cosmic Radiation, MSNW, LLC*
- 3:45 Break**
- 4:05 *2019 Phase II Fellow Chris Limbach, Self-Guided Beamed Propulsion for Breakthrough Interstellar Missions, Texas A&M Engineering Experiment Station*
- 4:30 *2019 Phase II Fellow Nickolas Solomey, Astrophysics and Technical Lab Studies of a Solar Neutrino Spacecraft Detector, Wichita State University*
- 4:55 Adjourn**
- Fellows' Free Evening:** *Fellows are free to collaborate informally to make broader connections and a Women of Science informal event will be held on site at 7:00PM*



2019 NIAC Symposium



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Thursday, September 26

- 8:30 **Welcome/NIAC Q&A** NIAC Staff
- 9:00 **Keynote Address** Marvin Weinberger, Inventor, Entrepreneur, Philadelphia Makers
- 10:00 Break**
- 10:20 2019 Phase I Fellow Joel Sercel, Lunar-Polar Propellant Mining Outpost (LPMO): Affordable Exploration and Industrialization, TransAstra Corporation
- 10:45 2019 Phase I Fellow John Slough, Crosscutting High Apogee Refueling Orbital Navigator (CHARON) for Active Debris Removal, MSNW LLC
- 11:10 2019 Phase I Fellow George Sowers, Thermal Mining of Ices on Cold Solar System Bodies, Colorado School of Mines
- 11:35 2019 Phase I Fellow Robert Staehle, Low-Cost SmallSats to Explore to Our Solar System's Boundaries, NASA Jet Propulsion Laboratory
- 12:00 Lunch**
- 1:30 2019 Ph III Fellow William Whittaker, Robotic Technologies Enabling the Exploration of Lunar Pits, Carnegie Mellon University
- 1:55 2019 Ph III Fellow Joel Sercel, Mini Bee Prototype to Demonstrate the Apis Mission Architecture and Optical Mining Technology, TransAstra Corporation
- 2:20 2018 Phase II Fellow Slava Turyshev, Direct Multipixel Imaging and Spectroscopy of an Exoplanet with a Solar Gravity Lens Mission, NASA Jet Propulsion Laboratory
- 2:45 2018 Phase II Fellow Michael VanWoerkom, NIMPH: Nano Icy Moons Propellant Harvester, ExoTerra Resource
- 3:10 Break**
- 3:30 2018 Phase II Fellow James Woodward, Mach Effect for In Space Propulsion: Interstellar Mission, Space Studies Institute, Inc.
- 3:55 2019 Phase II Fellow Grover Swartzlander, Diffractive Lightsails, Rochester Institute of Technology
- 4:20 2019 Phase II Fellow Doug Willard, Solar Surfing, NASA Kennedy Space Center
- 4:45 Adjourn**



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ABOUT NIAC:

The NASA Innovative Advanced Concepts (NIAC) Program supports early studies of visionary concepts that could one day “change the possible” in space and aeronautics. NIAC studies develop and assess revolutionary, yet credible, aerospace architecture, mission, and system concepts. They aim to enable far-term capabilities, and spawn exciting innovations to radically improve aerospace exploration, science, and operations.

NIAC also contributes to the Nation's leadership in key research and technology areas, and fosters outreach, education, and economic benefits. Part of the Space Technology Mission Directorate, NIAC is the most open-ended and far-reaching program in NASA.

2019 NIAC SYMPOSIUM SPEAKERS:

Welcome: Day 1



David Burns
Manager, MSFC Science & Technology Office

David Burns manages NASA Marshall Space Flight Center’s Science and Technology Office. He joined Marshall in April 2016 after eight years with the U.S. Department of Defense Missile Defense Agency, where he served as the director of Science and Technology. He holds a doctorate in electrical engineering from the Air Force Institute of Technology, a master’s degree in electrical engineering from the University of Dayton, Ohio, and a bachelor’s degree in electrical engineering from the Air Force Academy.

Keynote Address: Day 1



Scott Livingston
CEO – Livingston Securities LLC & General Partner, Starbridge Venture Capital

Mr. Livingston has been working on emerging technologies at Wall Street firms for 25 years and has specialized in nanotechnologies since 2002. Mr. Livingston has been called "sharp and highly connected" by the Forbes Wolfe Nanotechnology Report (July 1, 2005) and has been a keynote speaker on advanced technology investment trends in more than 30 states across America, including at MIT, the National Renewable Energy Lab (NREL), Brookhaven National Labs, Rice University Center for Nanotechnology, the Lawrence Berkeley Labs, Albany Nanotech, the President's National Economic Council, numerous US congressional committees. In addition, the "Livingston Nanotechnology Conference," is Wall Street's largest and longest running annual nanotechnology investor conference, now in its 10th year.

Mr. Livingston has often been called "the King of Nanotechnology on Wall Street" and Livingston Securities was founded to change the way that innovation is financed on Wall Street and to connect people with their local innovation economy.

From 2005 to 2009 Mr. Livingston was a Managing Director at Axiom Capital Management, Inc, and head of the Livingston Group, a division within Axiom focused on nanotechnology. From 2000 to 2005 Mr. Livingston was a Director in the Private Investment Management Division at Lehman Brothers. While at Lehman in 2002, Mr. Livingston began his focus on nanotechnology and started to cover the field for institutional and individual investors. From 1996 to 2000, Mr. Livingston served as a Director in the Private Client Group at Cowen & Co (later renamed SG Cowen Securities), where he was a member of the Chairman's Club from 1998 to 2000 the firm's highest honor for private client management. While at Cowen, Mr. Livingston focused on emerging technology trends, including genomics, Y2K preparedness and defense technologies. From 1993 to 1996 Mr. Livingston was a Senior Vice President in the Private Client Group at Smith Barney Inc. Mr. Livingston was named a Senior Vice President in 1993, at the age of 24, one of the youngest appointees for the firm at that time. While at Smith Barney Mr. Livingston focused on emerging technology trends, including biotechnology, data networking and telecommunications services. From 1992 to 1993 Mr. Livingston was a Vice President at Shearson Lehman Hutton, Inc. Smith Barney Inc. acquired Shearson Lehman Hutton in March of 1993. From 1989 to 1992 Mr. Livingston was an investment representative with Citigroup Global Markets.

Mr. Livingston graduated from the State University of New York at Albany with a B.A. in Political Science with a concentration in International Economic Relations. Mr. Livingston is a Board Member of the Nanobusiness Alliance and a founding Board Member of the New York Nanobusiness Alliance.

Keynote Address: Day 2



Mae Jemison

Principal, 100 Year Starship (100YSS), Physician, former NASA Astronaut, NIAC External Council Member

Mae Jemison is an American engineer, physician and former NASA astronaut.

She became the first black woman to travel in space when she served as a mission specialist aboard the Space Shuttle Endeavour. Jemison joined NASA's astronaut corps in 1987 and was selected to serve for the STS-47 mission, during which she orbited the Earth for nearly eight days on September 12–20, 1992.

Before joining NASA, Jemison graduated from Stanford University with degrees in chemical engineering as well as African and African-American studies. She then earned a medical degree from Cornell University and briefly worked as general practitioner before serving on the medical staff of the Peace Corps from 1983 until 1985.

Following her spaceflight, Jemison resigned from NASA in 1993 and founded a technology research company. She later formed a non-profit educational foundation and through the foundation is the principal of the 100 Year Starship project funded by DARPA. Jemison has also wrote several books for children and appeared on television several times, including in an episode of Star Trek: The Next Generation. She holds several honorary doctorates and has been inducted into the National Women's Hall of Fame and the International Space Hall of Fame.

Keynote Address: Day 3



Marvin Weinberger
Philadelphia Makers

Marvin Weinberger is an inventor who holds several patents, lawyer, serial entrepreneur, violinist, and proud maker of American products. He was involved with numerous early online businesses which are legend in Philadelphia's investment and entrepreneurial communities, including Infonautics, Telebase Systems and CD Now. In recent years, he works through his hand tool company, Innovation Factory, and has created a number of highly regarded tools, including the USA made Trucker's Friend (multipurpose tool) and the recently launched Off-Grid Survival Axe (crowdfunded under the name Lil Trucker).

He is the organizer of the Philly Maker Meetup, a large community catalyzing innovation and collaboration among hard-product entrepreneurs. Marvin is also the author/editor of numerous books, including "The PAC Directory" (the first-of-its-kind guide to Political Action Committees and their expenditures) and "Databasics."

A trained violinist, Marvin was one of the founders of the Klezmer Conservatory Band. As a member of this Yiddish music group, he participated in recordings and appeared on "A Prairie Home Companion." These days, he performs primarily at local hospitals as a volunteer with Musicians on Call.

Marvin graduated Phi Beta Kappa from the University of Michigan and subsequently received his law degree from Boston University.

In sum, Marvin is a lawyer by training, violinist by avocation and an inventor/ entrepreneur/ community builder by passion.

POSTER SESSION SCHEDULE

Poster Session I, Tuesday, September 24, 2019

2019 Phase I Fellows

Javid Bayandor	BREEZE- Bioinspired Ray for Extreme Environments and Zonal Exploration
Erik Brandon	Power Beaming for Long Life Venus Surface Missions
Ana Diaz Artilles	SmartSuit: A Hybrid, Intelligent, and Highly Mobile EVA Spacesuit for Next Generation Exploration Missions
Tom Ditto	Dual Use Exoplanet Telescope (DUET)
Yu Gu	Micro-Probes Propelled and Powered by Planetary Atmospheric Electricity (MP4AE)
Troy Howe	SPEAR Probe - An Ultra Lightweight Nuclear Electric Propulsion Probe for Deep Space Exploration

2018 Phase II Fellows

James Woodward	Mach Effect for in space propulsion: Interstellar mission
John Brophy	A Breakthrough Propulsion Architecture for Interstellar Precursor Missions
Robert Adams	Pulsed Fission-Fusion (PuFF) Propulsion Concept
Jay McMahan	Dismantling Rubble Pile Asteroids with AoES (Area-of-Effect Soft-bots) Phase II
Michael VanWoerkom	NIMPH: Nano Icy Moons Propellant Harvester

2019 Phase II Fellows

Tom Ditto	The High Étendue Multiple Object Spectrographic Telescope (THE MOST)
John Kendra	Rotary-Motion-Extended Array Synthesis (R-MXAS)
Chris Limbach	Self-Guided Beamed Propulsion for Breakthrough Interstellar Missions

2019 Phase III Fellow

Joel Sercel	Mini Bee Prototype to Demonstrate the Apis Mission Architecture and Optical Mining Technology
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Poster Session II, Wednesday, September 25, 2019

2019 Phase I Fellows

Noam Izenberg	RIPS: Ripcord Innovative Power System
Geoffrey Landis	Power for Interstellar Fly-by
Joel Sercel	Lunar-Polar Propellant Mining Outpost (LPMO): Affordable Exploration and Industrialization
John Slough	Crosscutting High Apogee Refueling Orbital Navigator (CHARON) for Active Debris Removal
George Sowers	Thermal Mining of Ices on Cold Solar System Bodies
Robert Staehle	Low-Cost SmallSats to Explore to Our Solar System's Boundaries

2018 Phase II Fellows

Steven Oleson	Triton Hopper: Exploring Neptune's Captured Kuiper Belt Object
Devon Crowe	Kilometer Space Telescope (KST)
John Slough	Spacecraft Scale Magnetospheric Protection from Galactic Cosmic Radiation
Slava Turyshev	Direct Multipixel Imaging and Spectroscopy of an Exoplanet with a Solar Gravity Lens Mission

2019 Phase II Fellows

Nickolas Solomey	Astrophysics and Technical Lab Studies of a Solar Neutrino Spacecraft Detector
Grover Swartzlander	Diffractional Lightsails
Doug Willard	Solar Surfing

2019 Phase III Fellow

Red Whittaker	Robotic Technologies Enabling the Exploration of Lunar Pits
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