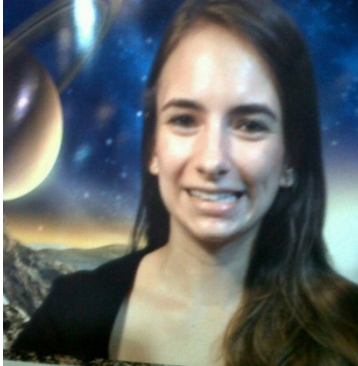


63rd International Astronautical Congress

Naples, Italy
October 1–5, 2012
Sponsored Student Researcher



Natalya Brikner

Massachusetts Institute of Technology
nbrikner@mit.edu

Presentation:

Date: October 2–5, 2012
Time: 10:00.–17:00
Room: Poster Venue

Research Title:

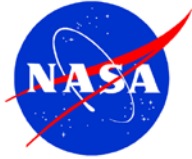
Electrodeposition Techniques for Improving
Electrochemical Resistance of Silicon and Nickel
MEMS Electro spray Thrusters

Biographical Sketch

Natalya Brikner is a Ph.D. student in the Aeronautics and Astronautics Department at MIT. Her work focuses on improving the lifetime of high-specific impulse ion electro spray thrusters used for on-orbit maneuvers of small spacecraft. She received her B.S. from San Diego State University in 2008 and her M.S. from Duke University in 2010, where she designed a microscale chemical rocket engine. When she graduates, Natalya hopes to continue research in academia or start her own space propulsion company. In her free time, she enjoys running, cooking, and reading fiction novels.

Research and Education Activities

- Research associate, multiple (2009–Present). Chemical and electric propulsion, MEMS fabrication, metrology, decomposition, and combustion analyses.
- Visiting scientist, Aurora Flight Sciences (June–September 2012). Mass/power/performance trade studies, proposal writing, radiation analyses, orbital decay simulations.
- Mentor, Science Club for Girls High School Rocket Team (2011–Present).
- Fellow, National Science Foundation (2011–Present).
- Graduate Council Representative, MIT (2011–2012).



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Daniel Buckland

Harvard Medical School/Massachusetts Institute of Technology

buckland@mit.edu

Presentation:

Date: October 2–5, 2012

Time: 10:00 – 17:00

Room: Poster Venue

Research Title:

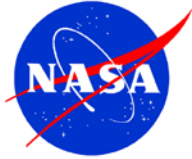
Ultrasound Images of Spinal Changes in Spaceflight

Biographical Sketch

Daniel Buckland received his Ph.D. in aeronautics and astronautics from the Massachusetts Institute of Technology and is a medical student at Harvard Medical School in the Division of Health Science and Technology as part of the National Space Biomedical Research Institute Bioastronautics Program. He has previously worked as a summer graduate intern at NASA Johnson Space Center on spacesuit injuries and was an undergraduate participant in the NASA Reduced Gravity Flight Opportunities Program. He is currently doing work on musculoskeletal ultrasound imaging at the University of Basel Hospital in Orthopedics in Basel, Switzerland.

Research and Education Activities

- Whitaker International Postdoctoral Fellowship
- NIH National Research Service Awards Individual Predoctoral M.D./Ph.D. Fellowship
- Associate Member of the Center for Space Medicine at Baylor Medical College



63rd International Astronautical Congress

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Ashley Chandler
Stanford University
Achandlr@stanford.edu

Presentation:

Date: October 2, 2012
Time: 10:15
Room: TS14

Research Title:

Visualization of the Liquid Layer Combustion of Paraffin Fuel at Elevated Pressures

Biographical Sketch

Ashley Chandler is a fifth-year Ph.D. student at Stanford University. Her research is focused on high-regression-rate fuels for hybrid rocket propulsion. She has held internships at both NASA Ames Research Center and the Jet Propulsion Laboratory (JPL). She will begin working at JPL full time upon the completion of her Ph.D. this year. Ashley received her B.A. from the University of California–Berkeley, majoring in astrophysics, physics, and political science, and her M.S. from Stanford University, in aeronautics and astronautics.

Research and Education Activities

- “Visualization of the Liquid Layer Combustion of Paraffin-Based Hybrid Fuels.” Designed, fabricated, constructed, and ran an experiment to observe the mechanism responsible for the high-burning rate of paraffin-based hybrid fuels with gaseous oxygen.
- “Hybrid Rockets for Solar System Exploration.” Evaluating hybrid rockets as alternatives to solid and liquid options for a variety of in-space applications.
- “Hybrid Propulsion for a Mars Sample Return Mission.” Worked with Professors Brian Cantwell and Scott Hubbard to design a two-stage hybrid Mars Ascent Vehicle (MAV) to deliver a sample of Martian rock to an awaiting spacecraft orbiting Mars. Presented a mission design for a technology demonstration version of the MAV to raise the TRL.
- “Advanced Rocket Propulsion Design Lab.” AA 284 B, C. Course Assistant. (2010).



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Stephen Indyk

Rutgers University
sindyk1@gmail.com

Presentation:

Date: October 2, 2012
Time: 15:15
Room: TS13

Research Title:

Structural Members Produced from Unrefined Lunar Regolith, A Structural Assessment

Biographical Sketch

Stephen is currently pursuing an M.S. from Rutgers University in mechanical engineering, concentrating in solids. Previously, he earned a B.S. in mechanical engineering from Rutgers in 2010. Through NASA Space Grant support, he interned with Honeybee Robotics during the summer of 2011 and has had the privilege of interning at NASA twice, most recently, during the summer of 2009 with the NASA Lunar and Planetary Science Academy for a robotics project entitled “Proximity Operations in Microgravity.” Then, during the fall of 2007, he was part of the Undergraduate Student Research Program at Goddard Space Flight Center for the Tetrahedral Robotics project there. Currently, he serves as a NASA Student Ambassador.

Research and Education Activities

- Teaching assistant at Rutgers University, Mechanical and Aerospace Engineering Department, 2010–2012.
- Research assistant with Dr. Haym Benaroya, 3D printing methods for lunar structures and means of site preparation.
- Participant in NASA Revolutionary Aerospace Systems Concepts Academic Linkage Competition, 2010.
- Design team leader for Rutgers chapter of the American Institute of Aeronautics and Astronautics, AUVSI UAS competition.



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Katherine McBryan

University of Maryland
kmcbryan@ssl.umd.edu

Presentation:

Date: October 2, 2012
Time: 10:15
Room: TS06 (Hall 3)

Research Title:

Mission Overview of a Dynamic Manipulator Flight Experiment: A Nanosatellite Testbed To Study the Coupled Dynamics Between a Robotic Arm and an Equivalently Sized Small Host Vehicle in the Space Environment

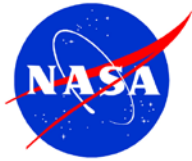
Biographical Sketch

Katherine McBryan is a graduate research assistant in the Space Systems Lab at the University of Maryland, under the advisement of Dr. David L Akin. She is currently working on her Ph.D. in aerospace engineering, focusing on space systems. At the University of Maryland, her research includes being systems engineer and structures lead on nanosatellites. In addition to nanosatellites, she has also done research into computer vision, specifically for an autonomous underwater sampling mission. She received her M.S. in aerospace engineering from the University of Maryland in 2010 and her B.S.E. in mechanical and aerospace engineering from Arizona State University in 2007.

Research and Education Activities

NASA Goddard Space Flight Center (part time)
May 2011–August 2011

- Assisted in I&T for a zero-g flight program
- Designed, machined, and assembled flight components



63rd International Astronautical Congress

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October 1–5, 2012
Sponsored Student Researcher



Derek M. Nusbaum, M.D.
Baylor College of Medicine
nusbaum@bcm.edu

Presentation:

Date: October 5, 2012
Time: 15:15
Room: TS12

Research Title:

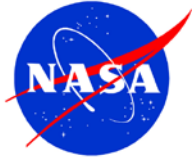
Changes in Intracranial Pressure and Optic Nerve Sheath Diameter with Increasing Cephalad Fluid Shifts in a Porcine Model

Biographical Sketch

Derek Nusbaum received his bachelor of arts in biological sciences with a concentration in neurobiology from Northwestern University and his medical degree from Michigan State University. He is currently in an internal medicine residency and neuroscience Ph.D. program at the Baylor College of Medicine. His interests include neurobiology, wilderness medicine, space medicine, remote medicine, tropical/travel medicine, telemedicine, and medical-care quality improvement. He has done both clinical work and research in these areas in the United States as well as abroad in various parts of Central America and Sub-Saharan Africa.

Research and Education Activities

Dr. Nusbaum is currently working on a Ph.D. in neuroscience as part of a Career Development Award he received from the Baylor College of Medicine Center for Space Medicine. His research interests include evaluating various risk factors for the development of elevated intracranial pressure, venous engorgement, and visual changes during long-duration space flight; evaluating structural changes to the retina with changes in intracranial pressure or venous flow; and evaluating the utility of various noninvasive modalities for estimating intracranial pressure during space flight. Dr. Nusbaum works under the mentorship of R. Blaine Easley, M.D., and Jonathan Clark, M.D. Dr. Easley is an associate professor of pediatrics and anesthesiology at the Texas Children's Hospital and an expert in porcine modeling of intracranial pressure changes and cerebrovascular physiology. Dr. Clark is an associate professor of neurology at the Baylor College of Medicine, a former NASA flight surgeon, and a current space medicine adviser for the National Space Biomedical Research Institute. He has expertise in space physiology.



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Tracie Prater

Vanderbilt University

tracie.j.prater@gmail.com

Presentation:

Date: October 3, 2012

Time: 10:15

Room: TS08

Research Title:

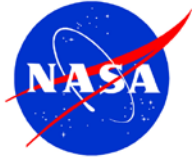
Friction Stir Welding of Metal Matrix Composites for Use in Aerospace Structures

Biographical Sketch

Tracie Prater received a B.S. in physics from Eastern Kentucky University in 2006 and a master's degree in mechanical engineering from Vanderbilt University in 2008. She will complete her doctorate in mechanical engineering, also from Vanderbilt, in August 2012. She is currently a materials and processes engineer at United Launch Alliance.

Research and Education Activities

Tracie Prater was a NASA Academy intern at NASA Marshall Space Flight Center (MSFC) in summer 2007, where she worked in the Environmental Control and Life Support Systems (ECLSS) Division on sorbent-based atmospheric revitalization in support of the International Space Station (ISS). In fall 2008, she was awarded a NASA Graduate Student Research Program (GSRP) fellowship to support her dissertation research on joining advanced materials for aerospace applications. As part of this fellowship, she completed three summer research assignments in materials and processes at MSFC. She was also the recipient of a National Defense Industries Association (NDIA) Fellowship. Tracie recently completed her doctoral research at the Vanderbilt University Welding Automation Laboratory (VUWAL). To date, she has authored or coauthored five peer-reviewed publications and presented at five national conferences. Tracie is a member of the American Society of Mechanical Engineers (ASME), the Society of Women Engineers (SWE), Sigma Xi, and the American Society of Materials (ASM).



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Jordan Matthew Spatz

Harvard-MIT Health Sciences and Technology (HST)

jspatz@mit.edu

Presentation:

Date: October 5, 2012

Time: 10:15

Room: TS12

Research Title:

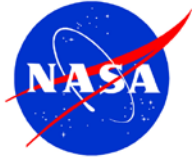
Novel Osteocytic Cell Lines To Study RANKL and SOST for an International Space Station (ISS) Flight Experiment

Biographical Sketch

Jordan received his bachelor and master of science degrees in aerospace engineering sciences from the University of Colorado at Boulder. He is a Northrop Grumman Ph.D. Fellow attending the Harvard-MIT Health Sciences and Technology Bioastronautics Program.

Research and Education Activities

His bioastronautics research interest involves studying the role of osteocytes in microgravity-induced bone loss. He was a National Space Biomedical Research Institute (NSBRI) graduate summer researcher at NASA Johnson Space Center (JSC) and participated in the STS-135 flight experiment investigating the murine sclerostin antibody for the treatment of microgravity-induced bone loss. Further, his aerospace engineering interests include advanced space vehicle systems engineering and development for NASA, the National Oceanic and Atmospheric Administration (NOAA), and the Department of Defense (DOD) aeronautics and satellite programs, including NASA human spacecraft design. Outside of lab work, in 2009, he led the design and construction of a three-room preschool for a village of Burmese ethnic hill tribe refugees in Ban Nor Lae, Northern Thailand, as a member of Engineers Without Borders.



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Timothy Szwarc

Stanford University Department of Aeronautics and
Astronautics

tjs53@stanford.edu

Presentation:

Date: October 3, 2012

Time: 10:15

Room: TS15

Research Title:

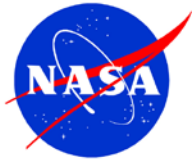
Thermal Modeling and Experimentation on Mars Rock
Analogues To Plan Rover Sampling Operations

Biographical Sketch

Timothy Szwarc received his bachelor of science degree in mechanical engineering from Cornell University in 2008 and his master of science degree in aeronautics and astronautics from Stanford University in 2009. Timothy worked on the design and testing of the powder-acquiring drill system on board the Mars Science Laboratory during three co-op work terms at JPL. In addition, he has worked at Honeybee Robotics in Pasadena, California, testing and improving equipment for a Mars sample return and novel excavation technologies for the Moon and Mars.

Research and Education Activities

Timothy's dissertation research is being conducted under Professor Scott Hubbard of Stanford University, studying the thermal environment of rocks and soil during coring and drilling operations on Mars and other solar system bodies. His work uses models and experimental testing to provide algorithms for the acquisition of geologic samples while minimizing their alteration due to heating, protecting the sampling equipment from becoming stuck due to refreezing of ice, and providing a thermal history of the samples as a context for scientific analysis.



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Sponsored Student Researcher



Innocent Udom

University of South Florida
iudom@mail.usf.edu

Presentation:

Date: October 4, 2012
Time: 15:15
Room: TS04

Research Title:

Harvesting *Chlorella spp.* for Green Aerospace Fuels Production Using Flocculants

Biographical Sketch

Innocent Udom is a doctoral student at the University of South Florida. He received his B.S. in chemical engineering from Rossijskij Himiko-Tehnologiceskij Universitet im. D.I. Mendeleeva, in Moscow, Russia. Innocent also has an M.S. degree from the University of South Florida in Tampa, Florida. His research experience includes assessment of a localized bisphosphonate therapy for Perthes disease using multifunctional gold nanoparticle areas and supercritical distillation of crude oil using organic additives. His current research includes sustainable algal-aerospace-biofuel production from wastewater nutrients and photocatalyst application for water purification. Currently, he is a mentor and tutor to several undergraduate students.

Research and Education Activities

Innocent is a recipient of a NASA-JPFP summer internship award. Presently, he is an intern with Dr. Aloysius Hepp, a senior chemist at the Bio Sciences and Technology Branch (REB0), Space Processes and Experiments Division, at NASA's Glenn Research Center in Ohio. His current research investigates the photocatalytic processing of organic wastes for green space exploration. Further, his interests include examining the current technologies available for enhanced microalgal CO₂ fixation, specifically exploring the possibility of coupling wastewater treatment with microalgal growth for the eventual production of aerospace biofuels and/or added-value products, with an emphasis on productivity.