

**ASCE Earth and Space Conference
April 10-12, 2018**

**Technical Schedule (as of 3/12/18)
(* designates presentation only)**

Tuesday, April 10, 2018

**Symposium 1: Granular Materials in Space Exploration
Room 1**

10:30 am - 12:00 pm

Extraterrestrial Simulants

Session Chair: Andreas Becker (Technical University Kaiserslautern, Germany)

111* - UCF/DSI Asteroid Regolith Simulants

Daniel Britt, Cody Schultz (University of Central Florida, USA); Stephen Covey (Deep Space Industries, USA)

112 - Assessment of Lunar Soil Simulants Based on Multivariate Statistics

Paweł K. Zarzycki, Jacek Katzer (Koszalin University of Technology, Poland)

113* - Phobos Simulants for MMX Mission

Daniel Britt (University of Central Florida, USA), Kevin Cannon (University of Central Florida, USA), Philip Metzger (University of Central Florida, USA)

114 - Developing Carbonaceous Chondrite Asteroid Simulants

S.D.Covey, J.S.Lewis (Deep Space Industries, Inc., USA); P.T.Metzger, D.T.Britt (University of Central Florida, USA)

1:30 pm - 3:00 pm

Granular Flows

Session Chair: Philip Metzger (University of Central Florida, USA)

121 - Granular Flow and Heat Transfer Modeling for the Helium Extraction and Acquisition Testbed

A.D.S. Olson, G.L. Kulcinski, J.F. Santarius (University of Wisconsin-Madison, USA); J.G. Mantovani (NASA Kennedy Space Center, USA)

122 - Discrete Element Modeling of Martian Regolith Simulants Accounting for Realistic Particle Shapes and Particle Size Distributions

Z. Lai, Q. Chen (Clemson University, USA)

123 - Gas-Granular Simulation Framework for Spacecraft Landing Plume-Surface Interaction and Debris Transport Analysis

Peter A. Liever, Manuel P. Gale, Ranjan S. Mehta (CFD Research Corporation, USA); Jeffrey S. West (NASA Marshall Space Flight Center, USA)

124 - Microgravity Granular Material Research Facility for ISS

J. Sercel, A. Longman (Trans Astronautica Corporation, USA); C. Dreyer, H. Williams (Colorado School of Mines, USA); O. Walton (Grainflow Dynamics, Inc., USA); S. Love (NASA Johnson Space Center, USA)

3:30 pm - 5:30 pm

Geotechnical Properties and Measurements

Session Chair: Juan Agui (NASA Glenn Research Center, USA); Purushotham Tukkaraja (South Dakota School of Mines and Technology, USA)

131 - Influence of Ice on Velocity of Waves in Regolith

Xiangwu Zeng, Xu Yang (Case Western Reserve University, USA)

132 - Combined Seismic and Penetration Tests on the Planetary Analogue Site Mount Etna
S.Papamichael, A. Becker, C. Vrettos (Technical University Kaiserslautern, Germany)

133 - Experiments Indicate Regolith is Looser in the Lunar Polar Regions than at the Lunar Landing Sites

P. T. Metzger, S. Anderson (University of Central Florida, USA); A. Colaprete (NASA Ames Research Center, USA)

134* - Cohesion Strength and Bearing Capacity of Regolith in Microgravity

Anton V. Kulchitsky, Jerome B Johnson (University of Alaska Fairbanks, USA); Dmytro Cherepakha (Coupi, Inc., USA); David Reeves (NASA Langley Research Center, USA)

135 - The Stinger: A Geotechnical Sensing Package for Robotic Scouting on a Small Planetary Rover

K. Zacny, M. Hedlund, Z. Mank, J. Atkinson, C. Hyman (Honeybee Robotics, USA); A. Rogg, M. Bualat, T. Fong (NASA Ames Research Center, USA)

136 - High Impact Wave Propagation Studies in Lunar Granular Systems

J. H. Agui, C. M. Creager (NASA Glenn Research Center, USA)

Tuesday, April 10, 2018

Symposium 2: Exploration and Utilization of Extra-Terrestrial Bodies

Room 2

10:30 am - 12:00 pm

Robotic Mobility in Extreme Terrain

Session Chairs: Colin Creager and Kyle Johnson (NASA Glenn Research Center, USA)

211* - Optimization of the Non-pneumatic Spring Tire for Traction in Soft Soil

Colin Creager, Kyle Johnson, Darrell Gaydosh, Santo Padula (NASA Glenn Research Center, USA)

212 - Cryogenic Vacuum Testing of Lunar Rover Drivetrain

Perry Edmundson, Peter Visscher, Josh Newman (Canadensys Aerospace Corporation, Canada); Joseph O'Connell (NASA Langley Research Center, USA); Martin Picard (Canadian Space Agency, Canada)

213 - Traversing Tight Tunnels – Implementing an Adaptive Concertina Gait in a Biomimetic Snake Robot

Henry C. Astley (University of Akron, USA)

214* - NASA 8th Annual Robotic Mining Competition for Universities: Lessons Learned, Robot Configurations and Results

Rob Mueller, Jason Schuler, Andrew Nick, Jonathan Smith (NASA Kennedy Space Center, USA); Philip T. Metzger (University of Central Florida, USA)

1:30 pm - 3:00 pm

Space Engineering and Construction: Habitats

Session Chairs: Ramesh B. Malla (University of Connecticut, USA); Melissa Sampson (United Launch Alliance, USA)

221 - Multiobjective Optimization for Structural Design of Lunar Habitats

Valentina Sumini, Sam Wald, Caitlin Mueller, Olivier L. de Weck (Massachusetts Institute of Technology, USA); Claudio Chesi (Politecnico di Milano, Italy)

222 - Mars Surface and Transit Habitat Commonality: Design Considerations

Olga Bannova, Jorge D. Camba (University of Houston, USA)

223 - Additive Construction with Mobile Emplacement (ACME) / Automated Construction of Expeditionary Structures (ACES) Materials Delivery System (MDS)

R. P. Mueller, I. I. Townsend, G. J. Tamasy, C. J. Evers, L. J. Sibille (NASA Kennedy Space Center, USA); J. E. Edmunson, M. R. Fiske, J. C. Fikes (NASA Marshall Space Flight Center, USA); M. P. Case (USACE Construction Engineering Research Laboratory, USA)

224* - Additive Manufacturing with Regolith and Solar Radiation

Matthias Sperl (Institut for Material Physik in Waltraum, Germany)

225 - Developing a Request for Proposal (RFP) for Moon Base Alpha

P. Carrato, A. Ellis (Ellis Global LLC, USA); R. P. Mueller (NASA Kennedy Space Center, USA); C. Miller (NexGen Space LLC, USA)

3:30 pm - 5:30 pm

Space Engineering and Construction-General

Session Chairs: Olga Bannova (University of Houston, USA); Christopher Dreyer (Colorado School of Mines, USA)

231 - Zero Launch Mass Three Dimensional Print Head

Robert P. Mueller, Nathan J. Gelino, Jonathan D. Smith, Brad C. Buckles, Thomas Lippitt, Jason M. Schuler, Andrew J. Nick, Matt W. Nugent, Ivan I. Townsend (NASA Kennedy Space Center, USA)

232 - The Critical and Necessary Role Of Near Solar System Development in Rapidly Modernizing U. S. Physical Infrastructure and Productive Capacity

John C. Smith, Jr. (Naval Facilities Engineering Command, Europe, Africa and Southwest Asia)

233 - Lunar Tunnel Boring Machines

Jamal Rostami, Chris Dreyer (Colorado School of Mines, USA); Brad Blair (Planetary Resource Engineering LLC, USA)

234 - Affordable Design for Space-Based Biological Laboratories for Alternative Gravity Levels

Thomas L. Matula (Sul Ross State University, USA); Kevin Greene (Private Practice, USA)

235 - Case for a Long Term Logistical Support Base on Phobos

Timothy. K. Bishop, Victor. A. Kitmayen, Thomas. J. R. Lagarde, Zachary. A. Taylor (University of Houston, USA)

236 - The Need for Remote Artificial Intelligence Control of Space-Based Construction Projects: Multi-Agent-Based Task Planners, Local Centralized Controllers, and Hybrid Solutions to Decision-Making

Alireza Shojaei, Hashem Izadi Moud, Ian Flood (University of Florida, USA)

Tuesday, April 10, 2018

Symposium 3: Advanced Materials and Designs for Aerospace Structures and Terrestrial Structures under Extreme Environments

Room 3

10:30 am - 12:00 pm

Advanced and Alternative Cementous Materials I

Session Chair: Christopher Ferraro (University of Florida, USA)

321 - Extruded Clay-Based Regoliths for Construction on Mars, Phobos, and NEAs
S.D. Covey (Deep Space Industries, Inc., USA); P.T. Metzger (University of Central Florida, USA)

322 - Multiscale Modeling and Testing of Protein-bound Regolith and Soils
I. Rosa, M. D. Lepech (Stanford University, USA); D. J. Loftus (NASA Ames Research Center, USA)

323 - Biocementation of Martian Regolith Simulant with In-Situ Resources
J. Gleaton, R. Xiao, Z. Lai, N. McDaniel, C.A. Johnstone, B. Burden, Q. Chen, Y. Zheng (Clemson University, USA)

324 - Thermal and Mechanical Properties of Cementitious Composites for Additive Construction of Energy-saving Habitats
Hongyu Zhou, Adam L. Brooks, Dominic Hanna, Babak Salarieh (University of Alabama in Huntsville, USA)

1:30 pm - 3:00 pm

Advanced and Alternative Cementitious Materials II

Session Chair: Christopher Ferraro (University of Florida, USA)

325 - Scaling Impact Crater Dimensions to Predict Micrometeorite Damage of Biopolymer-Stabilized Regolith
Maria I. Allende, Michael D. Lepech (Stanford University, USA); David J. Loftus (NASA Ames Research Center, USA)

326 - Creation and Characterization of Regolith-Based Functional Blocks with Simulated In-Situ Martian Materials
S. Shukla, S. Agnihotri (Clemson University, USA & Indian Institute of Technology (B.H.U.), India); Z. Lai, A.B. Kousaalya, S. Pilla, Q. Chen (Clemson University, USA)

327 - Performance of a magnesia silica cement for Martian construction
Allan Scott, Matthew W. Hughes, Scott Bevin, Callum Wisbey (University of Canterbury, New Zealand); Christopher Oze (Occidental College, USA)

3:30 pm - 5:30 pm

Ballistic Impact and Crashworthiness of Aerospace Structures I

Session Chair: Justin D. Littell (NASA Langley Research Center, USA)

331 - Stability Analysis of Pinned-Fixed Wide Plate Subjected to Uniaxial Compression

Hayder Rasheed, Rund Al-Masri (Kansas State University, USA)

332 - Numerical and Experimental Study on Deformation and Failure of Trees under High-Velocity Impact Loads

Wenbo Huang, Yu Zhang, Wenzhi Wang, Chao Zhang (Northwestern Polytechnical University, China); Wieslaw Binienda (The University of Akron, USA)

333 - Mesomechanical Simulation of Rate-Dependent Mechanical Behavior for Triaxially Braided Composites

Jun Xing (Northwestern Polytechnical University, China & Civil Aviation Administration of China, China); Zhenqiang Zhao, Chao Zhang, Yulong Li (Northwestern Polytechnical University, China); Xin He (Civil Aviation Administration of China, China)

334 - Multiscale Hybrid Element Modeling of Triaxial Braided Composite

Mingkun Sun, Wieslaw K. Binienda (The University of Akron, USA)

335 - Simulations of Trajectory of Separated Objects after Impact

Menglong Ding, Wieslaw Binienda (The University of Akron, USA)

336 - Development and Verification of an Orthotropic Three-Dimensional Model with Tabulated Input Suitable for Use in Composite Impact Problems

Robert K. Goldberg (NASA Glenn Research Center, USA); Kelly S. Carney, Paul DuBois (George Mason University, USA); Canio Hoffarth, Bilal Khaled, Loukham Shyamsunder, Subramaniam Rajan (Arizona State University, USA); Gunther Blankenhorn (Livermore Software Technology Corporation, USA)

Tuesday, April 10, 2018

Symposium 4: Structures in Challenging Environments: Dynamics, Controls, Smart Structures, Health Monitoring, and Sensors

Room 4

10:30 am - 12:00 pm

Tensegrity-Concept and Applications I

Session Chairs: Ramesh B. Malla (University of Connecticut, USA); Landolf Rhode-Barbarigos (University of Miami, USA)

411 - Dynamics of Class 1 Tensegrity Systems Including Cable Mass
Raman Goyal, Robert E. Skelton (Texas A&M University, USA)

412 - Symmetric Reduction of Tensegrity Rover Dynamics for Efficient Data-Driven Control
David Surovik, Kostas Bekris (Rutgers University, USA)

413 - Design of Lightweight Deployable Antennas using the Tensegrity Principle
Sudarshan Krishnan, Bingyan Li (University of Illinois at Urbana-Champaign, USA)

414 - Towards a Form-Finding Process for Damage-Tolerant Tensegrity Structures
O. Aloui, L. Rhode-Barbarigos (University of Miami, USA)

1:30 pm - 3:00 pm

Recent Advances in Dynamics and Control

Session Chair(s): Gangbing Song (University of Houston, USA); John Koppelman (Boeing (retired), USA)

421 - Aerodynamic Modeling Process using Reverse Engineering and Computational Fluid Dynamics
A. Olejnik, L. Kiszewski (Military University of Technology, Poland); A. Dziubiński (Institute of Aviation, Poland)

423 - Multi-Rate Data Fusion Based Kalman Filtering with Unknown Input for On-line Estimation of Dynamic Displacements
Ying Lei, Sujuan Luo, Han Su (Xiamen University, China)

424 - Intelligent Traffic Light Control System at Two Intersections using Adaptive Neuro-Fuzzy Inference System (ANFIS) Method
Rizky Aryo Bayu Utomo, Diaz Angga Permana, Pranoto Hidayat Rusmin (Institut Teknologi Bandung, Indonesia)

450 - Dispersion Characteristics of Piezoelectric Guided Waves in Concrete Filled Steel Tubular Columns

S. Yan, B. W. Zhang, J. Y. Lin (Shenyang Jianzhu University, China)

3:30 pm - 5:30 pm

Structures Under Wind/Wave Hazards: Theory and Applications

Session Chairs: Wei Zhang (University of Connecticut, USA); Min Liu (Harbin Institute of Technology, China)

431 - Assessment of Wave Energy Dissipation and Stability of Breakwater with Varied Geometries Subjected to Strong Waves

Xuan Li, Wei Zhang, Di Wu (University of Connecticut, USA)

432 - Vehicle-Bridge Coupled Vibration of Sea-Crossing Bridges Under Extreme Wind and Wave Conditions

Kai Wei, Chen Fang, Chunming Liang, Yongle Li (Southwest Jiaotong University, China)

433 - Evaluation of Vehicle Performance on Slender Coastal Bridges Considering Wind and Wave Actions

J. Zhu, W. Zhang (University of Connecticut, USA); M.X Wu (Southwest Petroleum University, China); Bin Wang (Southwest Jiaotong University, China)

434 - Response of Short Span Continuous Girder Bridge Under Spatially Varying Multi-point Earthquake Waves Excitation

Shuli Fan, Yi Shi, Chunguang Liu, Jianyun Chen (Dalian University of Technology, China)

435 - Vibration Control of High-Rise Building Installed with Viscoelastic-wall Damper Subjected to Wind Excitation

M. Liu, Y. Wang (Harbin Institute of Technology, China); H.X. Liu (Henan Shenhua Construction and Installation Engineering Limited Company, China)

Tuesday, April 10, 2018

Symposium 3: Advanced Materials and Designs for Aerospace Structures and Terrestrial Structures under Extreme Environments

Room 5

10:30 am - 12:00 pm

General (Composites)

Session Chair: Steve Murphy (Boeing, USA)

311* - Advanced Composites in the Aerospace Industry
Steve Murphy (The Boeing Company, USA)

312 - Multiscale Modeling of PEEK using Reactive Molecular Dynamics and Micromechanics
W.A. Pisani, M. Radue, S. Chinkanjanarot, J.A. King, G.M. Odegard (Michigan Technological University, USA); B.A. Bednarczyk, E.J. Pineda (NASA Glenn Research Center, USA)

313 - Predicting the Effective Mechanical Properties of Graphene Nanoplatelet-Carbon Fiber-Epoxy Hybrid Composites Using ReaxFF: A Multiscale Modeling
H. Al Mahmud, M.S. Radue, S. Chinkanjanarot, W.A. Pisani, S. Gowtham, G.M. Odegard (Michigan Technological University, USA)

Wednesday, April 11, 2018

8:00 am - 10:00 am

Plenary Session

Student Competition Finalists

144 - Framework to Holistically Predict the Behaviors of Cohesive Granular Materials
Yuan Guo, Xiong (Bill) Yu (Case Western Reserve University, USA)

253 - Development of a Heuristic Thermal Control System for the Ultrasonic Planetary Core Drill
Ryan Timoney, Kevin Worrall, David Firstbrook, Patrick Harkness (University of Glasgow, UK)

352 - Structural Analysis of Curved Folded Deployables
Steven R. Woodruff, Evgueni T. Filipov (University of Michigan, USA)

422 - Periodic Material-Based Passive Control Systems for Engineering Structures
Witarto Witarto, Y. L. Mo (University of Houston, USA); Shiang-Jung Wang, Cho-Yen Yang, Kuo-Chun Chang (National Center for Research on Earthquake Engineering, Taiwan); Xin Nie (Tsinghua University, China); Yu Tang (Argonne National Laboratory, USA); Robert P. Kassawara (Electric Power Research Institute, USA)

Wednesday, April 11, 2018

Symposium 1: Granular Materials in Space Exploration

Room 1

10:30 am - 12:00 pm

Mechanic Strength of Space Materials

Session Chair: Jim Mantovani (NASA Kennedy Space Center, USA)

141 - Mechanical Properties of Icy Lunar Regolith: Application to ISRU on the Moon and Mars
J. Atkinson, K. Zacny (Honeybee Robotics, USA)

142 - Thermal Cycling and the Strength of Primitive Asteroids
Daniel T. Britt, Cody Schultz, Philip T. Metzger (University of Central Florida, USA)

143 - Measurements of Adhesion in CM2 Meteorites and Associated Minerals for Applications to Small C-type Asteroids
Z. Zeszut, R. Harvey, P. Shoher (Case Western Reserve University, USA); J. Gaier, J. Kleinhenz, D. Waters (NASA Glenn Research Center, USA)

Wednesday, April 11, 2018

Symposium 2: Exploration and Utilization of Extra-Terrestrial Bodies

Room 1

2:00 pm - 3:30 pm

ISRU-Volatile Extraction

Session Chairs: Julie Kleinhenz (NASA Glenn Research Center, USA); Philip Metzger (University of Central Florida, USA)

271 - Volatiles Loss from water bearing regolith simulant at Lunar Environments
J. Kleinhenz (NASA Glenn Research Center, USA); J. Smith (NASA Kennedy Space Center, USA); T. Roush, A. Colaprete (NASA Ames Research Center, USA); K. Zacny, G. Paulsen, A. Wang (Honeybee Robotics Spacecraft Mechanisms Corporation, USA); A. Paz (NASA Johnson Space Center, USA)

272 - Testing of the Planetary Volatiles Extractor (PVEx)
V. Vendiola, K. Zacny, P. Morrison, A. Wang, B. Yaggi, A. Hattori (Honeybee Robotics, USA); A. Paz (NASA Johnson Space Center, Houston, USA)

273 - Modeling the Thermal Extraction of Water Ice from Regolith
P. T. Metzger (University of Central Florida, USA)

274 - Extraction of Water from Martian Regolith Simulant via Open Reactor Concept
Andrew J. Trunek, Diane L. Linne, Julie E. Kleinhenz, Steven W. Bauman (NASA Glenn Research Center, USA)

4:00 pm - 5:30 pm

In-Situ Resource Utilization (ISRU) I

Session Chairs: Laurent Sibille (Ascentech Enterprises, USA); Paul van Susante (Michigan Technological University, USA)

265 - Computational Modeling of Heat Transport and Volatile Extraction from Asteroid Materials

Joel C. Sercel, Mark Crawford (TransAstra Corporation, USA); Christopher Dreyer (Colorado School of Mines, USA); Egboche Unobe, Leslie Gertsch (Missouri University of Science and Technology, USA); Robert Jedicke (University of Hawaii, USA); Stanley Love (NASA Johnson Space Center, USA)

266 - Reduced Gravity Excavation Cutting Forces Considering Soil Accumulation
K. Skonieczny (Concordia University, Canada)

267 - Sensor Testing for Telerobotic Perception During Asteroid and Mars Regolith Operations
Robert P. Mueller, John E. Lane, Nathan J. Gelino, Andrew J. Nick, Larry Batterson (NASA Kennedy Space Center, USA); Eric A. Reiners (Caterpillar, Inc., USA)

268 - The Application of Gravimeters for Subsurface Fluid Tables
William Akin (Civil Consultants, Inc., USA)

Wednesday, April 11, 2018

Symposium 2: Exploration and Utilization of Extra-Terrestrial Bodies

Room 2

10:30 am - 12:00 pm

Space Engineering and Construction-Landing Pads

Session Chairs: Gerald Sanders (NASA Johnson Space Center, USA); Karol Seweryn (Space Research Center, Polish Academy of Science, Poland)

241 - Robotic Mars and Lunar Landing Pad Construction Using In-Situ Rocks

Paul J. van Susante (Michigan Technological University, USA); Kris Zacny, Magnus Hedlund, Jared Atkinson (Honeybee Robotics, USA); Nathan Gelino, Robert Mueller (NASA Kennedy Space Center, USA)

242 - Combustion Joining of Regolith Tiles for In-Situ Fabrication of Launch/Landing Pads on the Moon and Mars

Robert E. Ferguson, Evgeny Shafirovich (The University of Texas at El Paso, USA); James G. Mantovani (NASA Kennedy Space Center, USA)

243 - Using LROC NAC Boulder Distributions at Spacecraft Landing Sites to Determine Landing Site Hazards

Ryan N. Watkins (Planetary Science Institute, USA); Bradley L. Jolliff (Washington University in St. Louis, USA); Samuel J. Lawrence (NASA Johnson Space Center, USA)

244 - Planetary Lego: Designing a construction block from a regolith derived feedstock for In-Situ Robotic Manufacturing

Rodrigo Romo, Christian Andersen, Kyla Defore (Pacific International Space Center for Exploration Systems, USA); Kris Zacny (Honeybee Robotics, USA); Madhu Thangavelu (University of Southern California, USA); Thomas Lippitt (NASA Kennedy Space Center, USA)

2:00 pm - 3:30 pm

Extraterrestrial Drilling I

Session Chair: Brian Glass (NASA Ames Research Center, USA); Arwen Dave (NASA Ames Research Center, USA)

251 - UPCD: Field Trial Results and Further Work

K.J. Worrall, R. Timoney, X. Li, P. Harkness, M. Lucas (University of Glasgow, United Kingdom)

252 - Auto-Gopher-2 – An Autonomous Wireline Rotary Piezo-percussive Deep Drilling mechanism

Yoseph Bar-Cohen, Mircea Badescu, Hyeong Jae Lee, Stewart Sherrit, Xiaoqi Bao, Shannon Jackson, Brandon Metz, Alan Simonini (NASA Jet Propulsion Laboratory, USA); Kris Zacny, Bolek Mellerowicz, Daniel Kim, Gale Paulsen (Honeybee Robotics Spacecraft Mechanisms Corporation, USA)

254 - Preliminary Experiments on Soil Flow Characteristics of Flexible Tube Coring for Lunar Exploration

Junyue Tang (Harbin Institute of Technology, China & Northwestern University, USA); Qiquan Quan, Shengyuan Jiang, He Li, Zongquan Deng (Harbin Institute of Technology, China)

257 - Ultrasonically Assisted Hammer-Action Penetrators in Planetary Regolith

David Firstbrook, Kevin Worrall, Ryan Timoney, Patrick Harkness (University of Glasgow, UK)

4:00 pm - 5:30 pm

Extraterrestrial Drilling II

Session Chairs: Kris Zacny (Honeybee Robotics, USA); Ryan Timoney (University of Glasgow, United Kingdom)

255 - Atacama Rover Astrobiology Drilling Studies Project: Second Year

B. Glass, A. Davila, R. Quinn, T. Fong, D. Bergman, T. Stucky, S. Seitz, C. McKay, C. Stoker (NASA Ames Research Center, USA); V. Parro (Centro de Astrobiologia (INTA-CSIC), Spain); P. Willis (NASA Jet Propulsion Laboratory, USA); W. Brinckherhoff (NASA Goddard Space Flight Center, USA); K. Zacny, G. Paulsen (Honeybee Robotics, USA); J. DiRuggiero (Johns Hopkins University, USA); M. Williams (NASA Ames Research Center, USA & Georgia Institute Of Technology, USA)

256 - Autonomous Regolith Extraction using Real-Time Diagnostics and Dynamic Plan Execution for 1 Meter Class Interplanetary Rotary-Percussive Drills

Thomas R. Stucky (SETI Institute, USA); Dean Bergman, Arwen Davé (Millennium Engineering and Integration Company, USA); Brian Glass (NASA Ames Research Center, USA)

258 - What the Atacama Can Tell Us About Subsurface Mars

A. Davé, M. Wilhelm, T. Stucky, M.P. Furlong, K Bywaters, B. Glass, D. Bergman, J. Rask (NASA Ames Research Center, USA)

Wednesday, April 11, 2018

Symposium 3: Advanced Materials and Designs for Aerospace Structures and Terrestrial Structures under Extreme Environments

Room 3

10:30 am - 12:00 pm

Ballistic Impact and Crashworthiness of Aerospace Structures II

Session Chair: Justin D. Littell (NASA Langley Research Center, USA)

337 - Vertical Drop Test and Simulation of a Fokker F-28 Fuselage Section

K. E. Jackson, J. D. Littell, M. S. Annett (NASA Langley Research Center, USA); I. M. Haskin (NASA Glenn Research Center, USA)

338 - Full-Scale Drop Test of a Fokker F28 Wingbox Fuselage Section

J. D. Littell (NASA Langley Research Center, USA)

339 - Crashworthiness by Analysis: Verifying FEA modeling capabilities by Accident Reconstruction

Chandresh Zinzuwadia, Gerardo Olivares, Hoa Ly, Luis Gomez (Wichita State University, USA)

340 - Modeling and Simulation for Occupant Safety in Aerospace Applications

Joseph A. Pellettiere (Federal Aviation Administration, USA)

2:00 pm - 3:30 pm

Ballistic Impact and Crashworthiness of Aerospace Structures III

Session Chair: Justin D. Littell (NASA Langley Research Center, USA)

341 - Experimental Techniques for Material Characterization of Composites for Modeling Impact Analysis

Bilal Khaled, Loukham Shyamsunder, Canio Hoffarth, Subramaniam Rajan (Arizona State University, USA); Robert Goldberg (NASA-Glenn Research Center, USA); Kelly S. Carney, Paul DuBois (George Mason University, USA); Gunther Blankenhorn (LSTC, USA)

342 - Comparison of Impact Damage from Spin Pit and Flat Panel Gas Gun Testing

Andy VanderKlok, James Dorer, Ryan Dutour, Andy Stamm, Xinran Xiao (Michigan State University, USA); Eryi Hu (China University of Mining & Technology, China); J. Mike Pereira, Gary D. Roberts, Robert K. Goldberg (NASA Glenn Research Center, USA)

343 - Evaluation of Low Temperature Effects on Impact and Bending Properties of Composite Sandwich Structures

M.H. Khan, K.T. Tan (The University of Akron, USA)

344 - Effects of Adiabatic Heating on the High Strain Rate Deformation Response of Triaxially Braided Polymer Matrix Composites

Christopher Sorini, Aditi Chattopadhyay (Arizona State University, USA); Robert K. Goldberg (NASA Glenn Research Center, USA)

4:00 pm - 5:30 pm

General

Session Chairs: Hongyu Zhou (University of Alabama in Huntsville, USA); An Chen (Iowa State University, USA)

361 - Development of Elastoplastic Design Strategies for Reinforced Structures at Elevated Temperatures

I. Soner Cinoglu, Ali Charbal, Natasha Vermaak (Lehigh University, USA)

362 - Development of an Analytical Model for a Tuned Liquid Multi-Column Damper

Hao Wu, Liang Cao, An Chen, Simon Laflamme (Iowa State University, USA)

363 - Experimental Analysis of the Pseudoelasticity of Nitinol Shape Memory Alloy Helical Springs

Bin Huang, Yang Song, Yixing Wu, Yuemin Lao (Wuhan University of Technology, China); Gangbing Song (University of Houston, USA)

364 - Comparison and Discussion of Influential Finite Element Model Updating Methods

Hao Zhang, Dongsheng Li, Hongnan Li, Suyan Wang (Dalian University of Technology, China); Gangbing Song (University of Houston, USA)

Wednesday, April 11, 2018

Symposium 4: Structures in Challenging Environments: Dynamics, Controls, Smart Structures, Health Monitoring, and Sensors

Room 4

10:30 am - 12:00 pm

Specialized Sensors-based Structural Damage Detection and Health Monitoring I

Session Chairs: Sudarshan Krishnan (University of Illinois-Urbana/Champaign (USA)); Baoxin Qi (Shenyang Jianzhu University, China)

441 - Determination of Natural Frequencies of a Steel Railroad Bridge Using Onboard Sensors

Suvash Dhakal, Ramesh B. Malla (University of Connecticut, USA)

442 - Stress Monitoring of the Spatial Truss of the Huanghe Center Stadium During Construction
L. Ren, T. H. Yi, S. Y. Wang (Dalian University of Technology, China); H. N. Li (Dalian University of Technology, China & Shenyang Jianzhu University, China)

443 - Seismic Health Monitoring of a Space RC Frame Structure Using Piezoceramic-Based Sensors

Wen-I Liao (National Taipei University of Technology, Taiwan); Chien-Kuo Chiu (National Taiwan University of Science and Technology, Taiwan)

444 - Detection of High-strength Bolts Looseness Using Lead Zirconate Titanate due to Wavelet Packet Analysis

Tianyong Jiang (Changsha University of Science and Technology, China); Yi Li (China Communications Construction Company Railway Consulting (Wuhan) Co. Ltd, China); Gangbing Song (University of Houston, USA)

2:00 pm - 3:30 pm

Specialized Sensors-based Structural Damage Detection and Health Monitoring II

Session Chairs: Xion (Bill) Yu (Case Western Reserve University (USA)); Shi Yan (Shenyang Jianzhu University (China))

445 - Damage Detection for Plate-Like Structures Using Generalized Curvature Mode Shape Method

Mijia Yang, Hai Zhong (North Dakota State University, USA)

446 - Damage Characteristics of High Temperature Treated PVA-ECC Beam under Impact Loading Using Smart Aggregates

B. X. Qi, S. Yan (Shenyang Jianzhu University, China); Q. Z. Kong, G. Song (University of Houston, USA); W.J. Li (Harbin Institute of Technology, China); M. Li (University of California, USA)

447 - Detection of Impact Damage on PVA-ECC Beam Using Infrared Thermography

J. C. Wu (Institute of Seismology, China Earthquake Administration, China & University of Houston, USA); C. H. Xu (China University of Petroleum, China); B.X. Qi (Shenyang Jianzhu University, China); G. Song (University of Houston, USA)

448 - Piezoceramic Smart Washer Enabled Bolt Pre-load Monitoring Using Impedance Method

Dongdong Chen, Linsheng Huo (State Key Laboratory of Coastal and Offshore Engineering, China); Gangbing Song (University of Houston, USA)

4:00 pm - 5:30 pm

Specialized Sensors-based Structural Damage Detection and Health Monitoring III

Session Chair: Juan H. Agui (NASA Glenn Research Center, USA); Wei Zhang (University of Connecticut, USA)

449 - Feasibility Research on Interface Debonding Detection in Concrete Filled Steel Tubular Columns Using PZT-based Guided Waves

S. Yan, J. Y. Lin, B. W. Zhang (Shenyang Jianzhu University, China)

451 - Feasibility of SA-based Compactness Monitoring of DCL Compound Concrete

Shuang Hou, Bo Wu, Heying Zheng, Lu Liu (South China University of Technology, China)

452 - Local Bond-slip Monitoring in a Steel-plate Ultra-High Performance Concrete (S-UHPC) Beam using Smart Aggregates

Qingzhao Kong, Jamshaid Sawad, Y. L. Mo (University of Houston, USA); Xin Nie (Tsinghua University, China)

453 - Optimization Design of Contact Stress Sensor in Cold Strip Rolling

Si Li, Yihui Xia, Zhigang Wang, Changming Liu (Wuhan University of Science and Technology, China)

Wednesday, April 11, 2018

Symposium 4: Structures in Challenging Environments: Dynamics, Controls, Smart Structures, Health Monitoring, and Sensors

Room 5

2:00 pm - 3:30 pm

Tensegrity-Concept and Applications II

Session Chairs: Landolf Rhode-Barbarigos (University of Miami, USA); David Surovik (Rutgers University, USA)

415 - New Approaches to Mechanizing Tensegrity Structures

Thomas E. Flemons (Intension Designs Ltd., Canada); Dorothea Blostein (Queen's University, Canada)

416 - Tensegrity-Inspired Wheel with Force-Based Motion

I. Henry P. Goodell, Robert Dennis, Sharon Joines (North Carolina State University, USA)

417 - Semi-active Control of a Tensegrity Bridge

Mohamed Hechmi El-Ouni, Nabil Ben Kahla (King Khaled University, Saudi Arabia); Nizar Bel Hadj Ali (Ecole Polytechnique de Tunisie, University of Carthage, Tunisia)

418 - An Interdisciplinary Undergraduate Research Studio on Tensegrity Systems for Shape Control and Locomotion through Simulation and Physical Rapid Prototyping
L. Rhode-Barbarigos, J. Flores (University of Miami, USA); J. Park (Pohang University of Science and Technology, Korea)

4:00 pm - 5:30 pm

Planetary Environment Impact on AIT Requirements for Space Systems

Session Chairs: Alexander M. Jablonski (Canadian Space Agency, Canada); Kin F. Man (NASA Jet Propulsion Laboratory (JPL), USA)

461 - Environmental Requirements and Verification for NASA's Planned Europa Clipper Mission
Kin F. Man (California Institute of Technology, USA)

462 - An Introduction to Assembly Integration and Test (AIT) Requirements for Martian Systems
Alexander M. Jablonski, Daniel Showalter (Canadian Space Agency, Canada); Jay Weng (University of Waterloo, Canada)

463 - Dusty Thermal Vacuum (DTVAC) Facility Integration
Roman V. Kruzelecky, Jonathan Lavoie, Piotr Murzionak, Jacob Heapy, Martin Mena, Elad Wallach, Ian Sinclair, Gregory W. Schinn (MPB Communications Inc., Canada); Edward Cloutis (University of Winnipeg, Canada); Nadeem Ghafoor, Josh Newman (CanadenSys Aerospace Corporation, Canada)

Thursday, April 12, 2018

Symposium 2: Exploration and Utilization of Extra-Terrestrial Bodies

Room 1

10:30 am - 12:00 noon

Ocean Worlds

Session Chair: Christopher Yahnker (NASA Jet Propulsion Laboratory (JPL), USA); William Brinckerhoff (NASA Goddard Space Flight Center, USA)

281 - Introduction to Tools and Techniques for Surface Sampling on Europa
Christopher R. Yahnker, Alexander Brinkman, Morgan L. Hendry, Jay D. Jasper, Lori R. Shiraishi, Amy E. Hofmann, Katherine J. Siegel, Erica L. Tevere (NASA Jet Propulsion Laboratory, USA)

282 - LiRS Combined LIBS and DUV Raman Spectrometer for Astrobiology
Vincent Latendresse, Roman V. Kruzelecky, Piotr Murzionak, Jonathan Lavoie, Elad Wallach, Martin Mena, Ian Sinclair, Greg Schinn (MPB Communications Inc., Canada); Michaela Skulinova (CINTECH, Canada); Edward Cloutis (University of Winnipeg, Canada)

283 - EMILI: European Molecular Indicators of Life Investigation

W. B. Brinckerhoff, S. A. Getty, J. Eigenbrode, M. Casey (NASA Goddard Space Flight Center, USA); A. Grubisic, R. D. Arevalo Jr., X. Li, M. Castillo (University of Maryland,); R. M. Danell (Danell Consulting, USA); F. van Amerom (MiniMass Consulting, USA)

284 - Feasibility of an In-situ Nitrogen Ballast System for the Saturn Titan Submarine

Peter Meyerhofer, Jason Hartwig (Case Western Reserve University, USA)

Symposium 2: Exploration and Utilization of Extra-Terrestrial Bodies

Room 2

10:30 am - 12:00 noon

In-Situ Resource Utilization (ISRU) II

Session Chair: Robert Mueller (NASA Kennedy Space Center, USA); Joel Sercel (Trans Astronautica, USA)

261 - Lunar In-Situ Resource Utilisation – the Key to Human Salvation on Earth

A.A. Ellery (Carleton University, Canada)

262 - Minerals from Space: Terrestrial and Extra-terrestrial Perspectives

P. J. van Susante (Michigan Technological University, USA); Leslie Gertsch (Missouri University of Science and Technology, USA)

263* - Modeling Tool for Off-Earth Mining Optimization and Resource Processing Based on Geological Contexts

Laurent Sibille (Ascentech Enterprises, USA)

264 - Lunar Mining and Processing for In-Situ Resource Utilization

P. Tukkaraja, W. Cross, S. Sreekumar Ajitha, B. Jasthi (South Dakota School of Mines and Technology, USA)

Symposium 3: Advanced Materials and Designs for Aerospace Structures and Terrestrial Structures under Extreme Environments

Room 3

10:30 am - 12:00 noon

General (Structures)

Session Chair: Wieslaw Binienda (University of Akron, USA)

351 - Additive Construction with Mobile Emplacement: Multifaceted Planetary Construction Materials Development

J. Edmunson, M. R. Fiske, H. C. Morris (Jacobs Technology Inc., USA); R. P. Mueller (NASA Kennedy Space Center, USA); H. S. Alkhateb (University of Mississippi, USA); A. K. Akhnoukh (East Carolina University, USA); I. I. Townsend (Craig Technologies Inc., USA); J.C. Fikes, M.M. Johnston (NASA Marshall Space Flight Center, USA)

353 - Soil Mechanics in Vacuum Chamber

G. H. Go, J. Lee, H. S. Shin, B. H. Rhu (Korea Institute of Civil Engineering and Building Technology, Korea) H. W. Jin (Korea University of Science and Technology, Korea)

354 - Stabilization of Pure Salty Formations of the GOTVAND Dam Lake and another Salty Drought Desert Regions through Invention of Turk Salty Mortar

Afshin. Turk (KWPA, Iran); presented by Xiong (Bill) Yu (Case Western Reserve University, USA)

Symposium 4: Structures in Challenging Environments: Dynamics, Controls, Smart Structures, Health Monitoring, and Sensors

Room 4

10:30 am - 12:00 noon

Renewable Energy Harvesting Systems and Structures

Session Chairs: Benjie Balsler (Ion Power Group, LLC, USA); Lukasz Kiskowskiak (Military University of Technology, Poland)

471 - Fabrication of Flexible Thermoelectric Energy Harvesting System

Guangxi Wu, Ferrin Neff, Xiong (Bill) Yu (Case Western Reserve University, USA)

472 - Low-Head In-stream Hydroelectric Power System

Sebastian Uppapalli, Clint McCowen (Ion Power Group, USA)

473 - Performance of Solar Cells Integrated with Rigid and Flexible Substrates under Compression

Ahmed Alateeq, An Chen (Iowa State University, USA)

474* - Responsive Building Envelope Achieved Through Mechanical Metamaterials

Hongyu Zhou, Zhenglai Shen (University of Alabama in Huntsville, USA)