... on March 23-24 we go to Loews!

POLY031
Polymers and Advanced Materials for Humanity's Next Giant Leap

GME NASA Symposium @ Loews Philadelphia Hotel

Symposium Updates & Registration: CME-STEM.org


Keynote James Green, Lecturers Robert Grubbs and Cherie Kagan

Fourth NASA Chemistry Symposium
POLY: Polymers and Advanced Materials for Humanity’s Next Giant Leap

March 24 • 1 – 4 PM

James Green
Chief Scientist
NASA

Duane Dickson
Vice Chairman
Deloitte

Norton Tucker
Innovation Director
DuPont

CME Lectures

Robert H. Grubbs
Caltech Professor
Nobel Laureate

Cherie R. Kagan
UPenn Nanotech
Principal Investigator

Symposium Registration: CME-STEM.org
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March 23 AM • NASA Day

Michael Meador
POLY Chair
Session Presider

Jonathan Rall
NASA HQ Associate Chief Scientist for Programs

Michael New
NASA HQ Research Deputy Admin.

Mark Neveu
NASA Goddard Space Flight Assistant Research Scientist

Jennifer Stern
NASA Goddard Planetary Environment Space Scientist

John Vickers
NASA Marshall-Huntsville Principal Technologist

Zhiyong Liang
Florida State University Professor & Director of HPMI

Stephanie Vivod
NASA Glenn Research Chemical Engineer

Symposium Registration: CME-STEM.org
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March 23 PM • NASA Day

Ksenia Takhirsova
CME Co-Chair
Session Presider

John Vickers
NASA Marshall-Huntsville
Principal Technologist

Eugene Boland
Techshot
Chief Science Officer

Jessica Koehne
NASA Ames
Nanotechnology Scientist

Mark Blenner
Clemson University
Protein Eng. A. Professor

Casey Wade
Ohio State University
Inorganic Ch. A. Professor

Matthew Green
Arizona State University
Engineering A. Professor

Shawn Domagal-Goldman
NASA Goddard
Astrobiology Research

Tara Ruttley
NASA HQ Associate Chief
Scientist Microgravity

Symposium Registration: CME-STEM.org
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March 24 • Industry & Academia Day

Ksenia Takhistova
CME Co-Chair
Session Presider

Jon Arenberg
Northrop Grumman Chief Engineer Space Science

Ken Savin
Int’l Space Station US National Lab Scientist

George Rodriguez
CME Past Chair
Session Chair

Matthew Truppo
Johnson & Johnson
Vice President Biologics

Ru Xie
ExxonMobil Chemical
Senior Engineer

Erika Wagner
Blue Origin
Director

Anne Shim
BASF
Director New Market

Tara Ruttley
NASA HQ Associate Chief Scientist Microgravity

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March 23-24, 2020 • Loews Hotel Philadelphia

Bringing Together Industry, Academia, Government and the Public to Enlarge and Enhance the STEM Talent Pool

Cutting-edge developments in chemical sciences to advance human space travel and translate them into new knowledge to improve the lives of people and make their dreams a reality. Two days packed with inspirational research, industry, jobs.

Day 1 – NASA Day
AM, PM – Speakers from NASA (HQ, Glenn, Goddard, Huntsville), Caltech, Clemson, FSU, ASU, Techshot

Day 2 – Industry & Academia Day
AM – Panels with speakers from industry: J&J, ExxonMobil, Northrop Grumman, Blue Origin, BASF, ISS US Nat'l Lab, Blue Origin.

Organizers: POLY Chair Mike Meador, CME Co-Chair Ksenia Takhistova, CME Past Chair George Rodriguez; James Green, NASA’s Chief Scientist and Tara Ruttley, NASA’s Associate Chief Scientist for Microgravity Research.

Primary Sponsor: Polymer Chemistry Division (POLY).


Symposium Registration: Symposium and reception are free for national meeting registrants. So CME can send you symposium program updates, register at CME-STEM.org.
### POLY031A Ladders of Life / Structural Materials
#### Mon 3/23 - Morning Session (8:30 AM - 12:00 PM) - Regency Ballroom Section A

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Institution/Position</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>8:30 AM</td>
<td>Jonathan Rall, NASA</td>
<td>Michael Meador, Former NASA Manager</td>
<td>Opening Remarks</td>
</tr>
<tr>
<td>8:45 AM</td>
<td>Michael New, NASA HQ</td>
<td>Marc Neveu, NASA Goddard, Space Flight Center</td>
<td>Ladder of Life Detection</td>
</tr>
<tr>
<td>9:15 AM</td>
<td>Marc Neveu, NASA Goddard</td>
<td>Marc Neveu, NASA Goddard, Space Flight Center</td>
<td>Searching for Life on Ocean Worlds</td>
</tr>
<tr>
<td>9:45 AM</td>
<td>Jennifer Stern</td>
<td>NASA Goddard, Planetary Environment</td>
<td>Nitrogen on Mars: Insights from Curiosity</td>
</tr>
<tr>
<td>10:15 AM</td>
<td></td>
<td></td>
<td>Intermission</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>John Vickers</td>
<td>NASA Huntsville</td>
<td>NASA Composites Technology - A Chronicle</td>
</tr>
<tr>
<td>11:00 AM</td>
<td>Zhiyong Liang</td>
<td>Florida State University, Tallahassee</td>
<td>Fundamental understanding and optimization of long-range orders in CNT assemblages for high-performance structural composite applications</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Stephanie Vivod</td>
<td>NASA Glenn, Materials</td>
<td>Polymer aerogels: Looking toward the future</td>
</tr>
<tr>
<td>12:00 PM</td>
<td>Jonathan Rall</td>
<td></td>
<td>Closing Remarks</td>
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### POLY031B Additive Manufacturing / NASA Presidential and Early Career Fellows
#### Mon 3/23 - Afternoon Session (1:00 PM - 4:30 PM) - Regency Ballroom Section A

<table>
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<th>Topic</th>
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<tbody>
<tr>
<td>1:00 PM</td>
<td>John Vickers</td>
<td>NASA Huntsville</td>
<td>Overview of Additive Manufacturing and In-Space Manufacturing at NASA</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>Gene Boland</td>
<td>Techshot, Greenville, IN</td>
<td>Designing Bioinks to Bioprint on the International Space Station</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>Jessica Koehne</td>
<td>NASA Center for Nanotechnology</td>
<td>In-Space Manufacturing of Point-of-Care Diagnostic Devices</td>
</tr>
<tr>
<td>2:30 PM</td>
<td></td>
<td></td>
<td>Intermission</td>
</tr>
<tr>
<td>2:45 PM</td>
<td>Mark Blenner</td>
<td>Chemical Biomolecular Eng, Clemson University</td>
<td>Using Synthetic Biology to Enable the Production of Advanced Materials for Long-Term Space Exploration</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Casey Wade</td>
<td>Chemistry Biochemistry, Ohio State University</td>
<td>Trace CO2 capture with metal-organic frameworks containing nucleophilic M-OH functional groups</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>Matthew Goldman</td>
<td>Chemical Engineering, Arizona State University</td>
<td>Charged poly(arylene ether sulfone)s as a life support systems platform</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>Shawn Domagal-Goldman</td>
<td>NASA Goddard, Astrobiology Institute</td>
<td>Exoplanets: Finding Complexity and Biosignatures via Remote Detection of Small Molecules</td>
</tr>
<tr>
<td>4:30 PM</td>
<td>Tara Ruttley</td>
<td>NASA Associate Chief Scientist Microgravity</td>
<td>Closing Remarks</td>
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</table>
# Fourth NASA Chemistry Symposium

**POLY: Polymers and Advanced Materials for Humanity’s Next Giant Leap**

March 24, 2020 • Industry, Government & Academia

## POLY031C Industry Panels / Advanced Manufacturing

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<tr>
<td>8:30 AM</td>
<td>Ksenia Takhistova, CME Co-Chair</td>
<td>Industry Panel on Applications for Advanced Materials, Energy and Systems. Co-moderator Tara Ruttley, NASA Associate Chief Scientist</td>
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<tr>
<td></td>
<td>Jon Arenberg</td>
<td>Northrop Grumman Chief Engineer, SSM</td>
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<td></td>
<td>Ken Savin</td>
<td>Dir. Scientific Partnering International Space Station US National Lab - Research Opportunities</td>
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<tr>
<td></td>
<td>Erika Wagner</td>
<td>Blue Origin Director Research &amp; Development in Space</td>
</tr>
<tr>
<td>10:00 AM</td>
<td>George Rodriguez, Co-Author</td>
<td>Industry Panel on Rapid Manufacturing Applications in Advanced Materials and Life Sciences.</td>
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<tr>
<td></td>
<td>Matthew Truppo</td>
<td>J&amp;J Vice President and Head, Biologics Discovery</td>
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<td></td>
<td>Anne Shim</td>
<td>BASF Director New Market &amp; Product Dev.</td>
</tr>
<tr>
<td></td>
<td>James Hedrick</td>
<td>Azul 3D CEO Breakthrough Rapid Manufacturing</td>
</tr>
<tr>
<td>11:15 AM</td>
<td>Ru Xie</td>
<td>ExxonMobil Chemical Researcher 3D Printing of New Polymers</td>
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<td>11:45 AM</td>
<td>Tara Ruttley</td>
<td>NASA Associate Chief Scientist Microgravity</td>
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## POLY031D Distinguished Lecturers & CME Leadership Awards

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<tr>
<td>1:00 PM</td>
<td>James Green</td>
<td>NASA Chief Scientist What is next at NASA</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>Tucker Norton</td>
<td>DuPont Innovation &amp; Strategy Director Fast-track Your Discoveries by Leveraging Innovation Engine Architectures</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>Duane Dickson</td>
<td>Deloitte Vice Chairman, Oil, Gas &amp; Chemicals Enabling Sustainability Through Transformational Change</td>
</tr>
<tr>
<td>2:30 PM</td>
<td>George Rodriguez, President</td>
<td>CME Lectures and Awards</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Cherie Kagan</td>
<td>UPenn Principal Investigator Ch ESE MSE The Design of Colloidal Nanocrystal Materials and Their Unconventional Devices</td>
</tr>
<tr>
<td>3:40 PM</td>
<td>Robert Grubbs</td>
<td>Caltech Professor, Nobel Laureate Exploring advances in polymer synthesis and catalysis in organic synthesis</td>
</tr>
<tr>
<td>3:40 PM</td>
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for Humanity’s Next Giant Leap

March 24, 2020 • PM Session Abstracts

What is Next at NASA?
Keynote: James Green, NASA Chief Scientist
Abstract: NASA’s future plan is to go to the Moon to stay and then onto Mars. For human exploration, going to the Moon provides an opportunity to live and work on a planetary surface. Scientists want to follow up on the recent stunning advances in Mars and lunar science but cutting-edge development in chemical science will be necessary to make this future vision a reality.

Fast-track your discoveries by leveraging innovation engine architectures
Speaker: Tucker Norton, DuPont Innovation & Strategy Director
Abstract: In this talk you will learn about what is needed to propel your discoveries in the world of polymers and advanced materials into real commercial successes. Understanding innovation processes and metrics are essential in meeting company-wide innovation portfolio reviews across dimensions of risk, time, and reward. And you will also learn to contribute in the building of the key tenets of innovation messaging for employee and investor audiences to demonstrate a return on innovation investment.

Enabling sustainability through transformational change
Speaker: Duane Dickson, Deloitte Vice Chairman, Energy & Chemicals
Abstract: Sustainability is a global societal and business challenge facing all industries. As the global population nears nine billion people, Earth’s resources will continue to be strained, and global waste will increase. Finding innovative solutions and policies to solve for the many dimensions of sustainability will take an ecosystem of partners, with the chemical industry uniquely positioned to lead the efforts.

The Design of Colloidal Nanocrystal Materials and Their Unconventional Devices
Abstract: Colloidal nanocrystals are known for their size, shape, and composition-dependent physical properties and their solution-based synthesis, assembly, and device fabrication. In this talk, I will describe the properties of metal, semiconductor, and magnetic nanocrystal building blocks, their assembly to create multi-functional materials, and their integration to realize unconventional devices.

Exploring advances in polymer synthesis and catalysis in organic synthesis
Lecturer: Robert H. Grubbs, Caltech Professor, Nobel Laureate
Abstract: This talk will help you gain a new perspective on some of the most impactful chemistries in the modern world, including packaging, industrial processes and consumer goods. For example, the total world polyolefins annual capacity exceeds 120 million tons or 0.12 quadrillion grams. I will discuss the latest advances in mechanisms of metal catalyzed reactions, polymers synthesis, and catalysis in organic synthesis.