CME
NASA STEM
SYMPOSIUM

ACS Fall 2023: POLY Three Days 8/14-16 CME NASA

Advancing Materials for Human Space Exploration

8/14-15 · CME NASA Symposium

8/14 AM · NASA Day PM · CME PMSE Student Awards

8/15 · Industry Day-CME Lectures & Awards

8/16 AM · Space Chemistry Roundtable

8/16 PM · CME NASA Sustainability & Reception

Day 1 · 8/14 CME NASA Symposium
PMSE CME Student & Mentor Awards

Advancing Materials for Human Space Exploration

8/14 AM - POLY023A - NASA Day One - SF Marriott Marquis Salon 7 (go to cme-stem.org for bios, abstracts and updates)			
8:00 AM	Steve Barnett	CME Co-Chair	Opening Remarks
8:01 AM	Boyu Yang	Capital Medical University, Beijing	Mechanism of Porous Se@SiO2 Nanospheres inducing cuproptosis in CRPC
8:20 AM	Tane Boghozian	NASA HQ	Development of Additive Manufacturing Technologies for 3D Printing of Spacecraft Heat Shields
8:45 AM	Cameroun Sherrard	NASA Marshall Space Flight Center	NASA's SIBatt-3D: In-Space and On-Surface 3D Printing Sodium-Ion Batteries from ISRU Materials
9:10 AM	Ciera Cipriani	Texas A&M University	3D Printing Polyimide Aerogels for Hierarchical Porosity
9:35 AM	Steve Barnett	CME Co-Chair	Intermission
9:55 AM	Kirk Schanze	U of Texas at San Antonio	Luminescent Coatings for Aerodynamic Applications
10:20 AM	Burcu Gurcan	Case Western Reserve U	Sorbents for CO2 Capture from Air
10:45 AM	Mahmooda Sultana	NASA Goddard Space Flight Center	Parts-per-Billion Detection of Gases and Volatiles with Hybrid Multifunctional Nanosensor Platform
11:10 AM	Steven Snyder	NASA Langley Research Center	AeroFusion: Data Fusion and Uncertainty Quantification for Entry Vehicles
11:35 AM	Keith Parrish	NASA Goddard Space Flight Center	Cryogenic Materials Development for the James Webb Space Telescope's Large Deployable Sunshield
12:00 AM	Steve Barnett	CME Co-Chair	Session Adjourns
8/14 PM - POLY023B - Pluripotent Polymers, CME PMSE Students & Mentor Awards - SF Marriott Marquis Salon 7			
2:00 PM			Introductory Remarks
2:01 PM	Stuart Rowan	University of Chicago	Dynamic Networks as a Route to Access Pluripotent Materials
2:30 PM	Cheol Park	NASA	Multifunctional Structural Materials for Sustainable Human Exploration in Extreme Space Environments
3:00 PM	Steve Barnett	CME Co-Chair	Intermission
3:10 PM	George Rodriguez	CME Programming	CME PMSE Student & Mentor Award Presentation
3:25 PM	Alexandra Easley	Cornell University	Design of Macromolecular Radicals for Next Generation Energy Storage
3:55 PM	Jodie Lutkenhaus	Texas A&M University	Toward Sustainable Organic Polymer Batteries
4:25 PM	Timur Ashirov	University of Freibourg	Fast Light-Switchable Polymeric Carbon Nitride and Adsorptive Membranes for Tunable Gas Separation
4:55 PM	Ali Coskun	University of Freibourg	Supramolecular Sython Approach for High Capacity Electrodes in Lithium-ion Batteries
5:25 PM			Closing Remarks

Day 2 · 8/15 CME NASA Symposium
CME Lectures: Industry Academia Government

Advancing Materials for Human Space Exploration

8/15 AM - POLY023C - Industry Panel and CME Nobel Lecture - SF Marriott Marquis Salon 7 (go to cme-stem.org for bios, abstracts, updates)			
8:00 AM			Introductory Remarks
8:00 AM	Anna Douglas	SkyNano	Sustainable Approach to Carbon Management to Enable Our Energy and Economic Transition
8:25 AM	Tony Go	ExxonMobil	Advanced Recycling - Meeting the Needs of Plastic Recycling Today and Tomorrow
8:50 AM	Jonathan Arenberg	Northrop Grumman	Polymers and Their Roles in Space Astronomy
9:15 AM	Benjamin Knudsen	BASF	Harnessing the Power of Data through QURIOSITY
9:40 AM	Shah Karim	CME Officer	Panel on Advanced Technologies
10:05 AM			Intermission
10:20 AM	K Barry Sharpless	Scripps Research	Click Chemistry: New Directions
10:50 AM	George Rodriguez	CME Program Chair	CME STEM Leadership Awards Presentation
11:00 AM	Kim Budil	Lawrence Livermore National Laboratory	Accelerated Development of Advanced Materials for Diverse Mission Needs at Lawrence Livermore National Laboratory
11:30 AM	Chyree Batton	Axiom Space	Chemistry Beyond Gravity: Unlocking the Potential of Space Chemistry for Exploration and Industry
8/15 PM - POLY023D - Day 2 - Sustainability: Industry, Government, Academia - SF Marriott Marquis Salon 7			
2:00 PM			Introductory Remarks
2:01 PM	Zhenan Bao	Stanford University	Bioelectronics Applications of Skin-Inspired Electronics
2:25 PM	Kamil Godula	UCSD	Hidden in Plain Slime: Finding Inspiration in Mucus for Building Synthetic Biological Interfaces.
2:50 PM	Rampi Ramprasad	Georgia Institute of Technology	Informatics-Driven Design of Polymers for Extreme Conditions
3:15 PM	Joseph Moebus	ExxonMobil	Polymer Structure Property with Machine Learning Models
3:40 PM			Intermission
3:50 PM	Paul Anastas	Yale University	Greenchem Innovation: What is Next?
4:15 PM	Jennifer Gustetic	NASA	Nurturing Innovation in Sustainability through Early-Stage Partnership Development at NASA
4:40 PM	Karen McDonald	UC Davis	Plant Molecular Farming to Support Human Life on the Moon, Mars, and Beyond
5:05 PM	Elizabeth Barrios	NASA	Using Lessons Learned to Create a Safer, More Sustainable Future in Space
5:30 PM	Ksenia Takhistova	CME Co-Chair	Panel Discussion on Sustainability
5:55 PM			Closing Remarks

8/16 CME NASA Sustainability Earth & Space

San Francisco Marriott Marquis Golden Gate B | Registration: CME-STEM.org

Sustainable Living: Earth and Space			
Keynote - Host: George Rodriguez, ACS Fellow, CME Programs			
12:30 PM	Paul Anastas	Yale Chair of Chemistry for the Environment	Accelerating the Sustainable Space Age
The Next Phase in Life Sciences Evolution			
1:00 PM	Chris Love	MIT Koch Institute Professor of Chemical Engineering	Global Discovery and Manufacturing of Biologic Medicines
1:05 PM	Valerie Patrick*	Fulcrum Connection President	Sustainable Innovation Leadership in Life Sciences
1:10 PM	Panel Discussion	Moderator: Ksenia Takhistova, CME Co-Chair	
Industry Sustainability and Resiliency			
2:00 PM	Benjamin Knudsen	BASF Vice President of Research, NA	Net Zero 2050, White Biotechnology and Super Computers
2:10 PM	Tony Go	ExxonMobil Chief Engineer, Novel Processes	Energy Transition Challenges and Opportunities
2:20 PM	Panel Discussion	Moderator: Shah Karim, SafeRock CEO, CME Officer	
3:00 PM	Intermission		
Shaping Disruptive Technologies			
3:20 PM	Jon Arenberg	Northrop Grumman Chief Mission Architect, Science and Robotic Exploration	Space Living: The Next Big Leap in Sustainability
3:25 PM	Brooke Stokes	McKinsey Partner Aerospace & Defence	Creating Thriving Ecosystems for Novel Technologies
3:30 PM	Bruce Pittman	NASA Ames Portal Member	Leveraging Disruptive Technologies for Space Exploration
3:35 PM	Panel Discussion	Moderators: George Rodriguez, CME Programs, and Jana Stoudemire, Axiom Space Director	
Creating a Sustainable Future in Space			
4:15 PM	Elizabeth Barrios	NASA Avionics Materials Engineer	Engineering Safety and Sustainability in Space Materials
4:20 PM	Luis Zea	Sierra Space, Sr. BD Mgr, In-Space R&D	Boundless In-Space Research
4:25 PM	Jana Stoudemire	Axiom Space Director, In-Scpace Manufacturing	Advancing the Low-Earth Orbit (LEO) Economy
4:30 PM	Panel Discussion	Moderators: Steve Barnett, CME Co-Chair, and Jana Stoudemire, Axiom Space Director	
5:30 PM	Steve Barnett	ConnellFoley EHS Partner, CME Co-Chair	Closing Remarks

*Invited

POLY

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NASA STEM SYMPOSIUM

PRES

Day 1 and 2 of Sustainable Innovation

Advancing Materials for Human Space Exploration

AGFD ENVR
AGRO FLUO
ANYL GEOC
BIOL HIST
BIOT I&EC
BMGT INOR
CARB MEDI
CATL NUCL
CELL ORGN
CHAS PHYS
CHED PMSE
CINF POLY
COLL PROF
COMP SCHB
ENFL TOXI

8/14 PMSE CME
Student & Mentor Awards

8/15 CME Lectures
Leadership Awards

AIR PRODUCTS

DOW

BLAVATNIK FAMILY FOUNDATION

MERCK

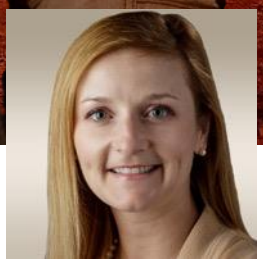
BASF
We create chemistry

Speakers

Kimberly Budil
LLNL

Barry Sharpless
Scripps

Paul Anastas
Yale



Jennifer Gustetic
NASA

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Registration: www.CME-STEM.org

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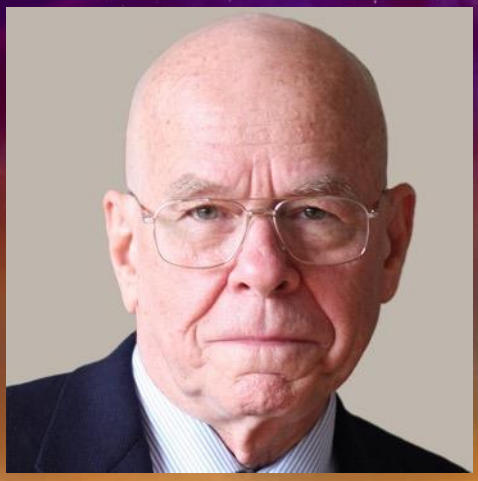
Advancing Materials for Human Space Exploration

8/15 CME Nobel Lecture



Barry Sharpless

The Scripps Research Institute Professor
One of the Exceptional Two-Nobel-Prize Laureates
Curie · Pauling · Bardeen · Sanger · Sharpless

Click Chemistry: New Directions

Abstract Click chemistry was defined by Kolb, Finn, and Sharpless in a 2001 Angewandte Chemie article. It has evolved substantially since then, to the point of having applications in most all fields of pure and applied chemistry. Today I highlight the properties of some SuFEx polysulfate polymers which have emerged in a collaboration between Scripps and the Molecular Foundry Lab at Berkeley. The phenomenon mediated by these polymers is to shield electric capacitors from the destructive effects of both high temperatures and high electric fields, more effectively than the existing materials for this purpose. The question is, how can a thin film of polymer, a condensed chemical phase, shield against the electromagnetic field force of physics. Our latest results and thoughts are presented.

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Advancing Materials for Human Space Exploration

8/15 CME Lecture

Kimberly Budil

13th Director, Lawrence Livermore National Laboratory

Accelerated development of advanced materials for diverse mission needs at Lawrence Livermore National Laboratory

Abstract The convergence of machine learning and high-performance computing, advanced manufacturing, and automation promises to accelerate the development of advanced materials from concept to demonstration. LLNL has developed an ecosystem of facilities and capabilities in these areas that can work in a holistic manner to accelerate materials development and scale up. In this presentation, we detail how this ecosystem has been used on materials systems for a diverse set of applications ranging from national security to clean energy and beyond.

Day 2 · CME Lectures

For the Annals of Civilization

Kimberly Budil

Lawrence Livermore Nat'l Lab

13th Director

Barry Sharpless

Scripps Research Institute

2001 and 2022 Nobel Prize in Chemistry

Paul Anastas

Yale University

Director of the Center for Green Chemistry and Green Engineering

Recommended by

Angela Wilson

American Chemical Society

2022 President

Judy Giordan

American Chemical Society

2023 President

Mary Carroll

American Chemical Society

2023 President-Elect

Day 1 · CME PMSE Student & Mentor Awards

ACS Global Outstanding Students & Mentors in Polymer Science & Engineering

Alexa Easley

Texas A&M University

USA Graduate Student

Timur Ashirov

University of Fribourg

International Graduate Student

Mentors

Jodie Lutkenhaus

Texas A&M University

Mentor

Ali Coskun

University of Fribourg

Mentor

Day 2 · Speakers

Partial List of Distinguished Thought Leaders

Benjamin Knudsen
BASF

Vice President of Research North America

Jennifer Gustetic
NASA

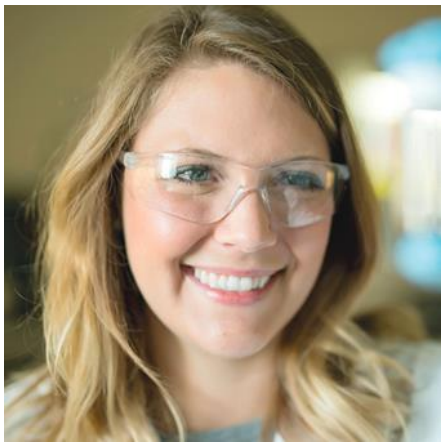
Director, Early-Stage Innovations and Partnerships

Jon Arenberg
Northrop Grumman

Chief Mission Architect, Science and Robotic Missions

Tony Go
ExxonMobil

Chief of New Feeds & Processes



Anna Douglas
SkyNano

Co-Founder and Chief Executive Officer

Rampi Ramprasad
Georgia Tech

Professor, Chair Georgia Research Alliance

CME NASA STEM SYMPOSIUM

2017-2023 CME Nobel Lectures

Partial List of Featured Eminent Thought Leaders

Sir Fraser Stoddart

Northwestern University

2016 Nobel Prize in Chemistry

Barry Sharpless

Scripps Research Institute

2001 and 2022 Nobel Prize in Chemistry

Frances Arnold

Caltech

2018 Nobel Prize in Chemistry

Ben Feringa

University of Groningen

2016 Nobel Prize in Chemistry

Robert Grubbs

Caltech

2005 Nobel Prize in Chemistry

Eric Betzig

University of California Berkeley

2014 Nobel Prize in Chemistry

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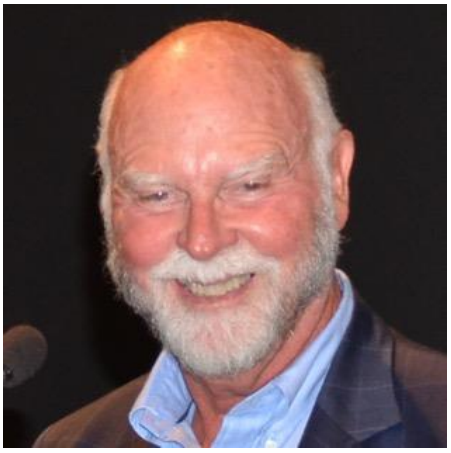
2017-2023 Speakers

Partial list of distinguished thought leaders

Janet Kavandi

NASA Glenn Research Center

Director (Former Astronaut)



Craig Venter

Human Genome Project

Visionary Industry Scientist

Robert Langer

MIT

Koch Institute Professor; most cited engineer, 1400 patents

Rich Tillyer

Johnson & Johnson, Janssen

Global Head of Discovery

Peter Eckes

BASF Bioscience Research

President

James Green

NASA

Former Chief Scientist

CME NASA STEM SYMPOSIUM

2023 Event Organizers

Creating STEM Events for the Space Age

Steve Barnett
CME Co-Chair

Partner at Connell Foley LLP
Aeronautical Eng., PE, JD

Jennifer Gustetic
NASA

Director, Early-Stage Innovations and Partnerships

George Rodriguez
CME Programming

Chemical Engineer, American 2020 Chemical Society Fellow

Shah Karim
CME Program Chair

SafeRock CEO
PME Advisory Board Member

Ksenia Takhistova
CME Co-Chair

Technology IP Attorney;
Mechanical & Chemical Engineer

Michael Meador
NASA Glenn

Former Game Changing Manager

POLY

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NASA STEM
SUSTAINABILITY

SFMM

8/16 · Earth and Space Sustainability Summit

AIR PRODUCTS

DOW

BLAVATNIK FAMILY FOUNDATION

MERCK

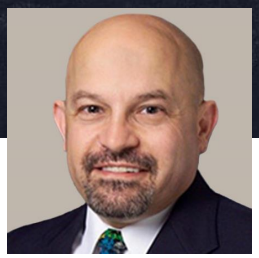
BASF
We create chemistry

Industry Sustainability and Resiliency

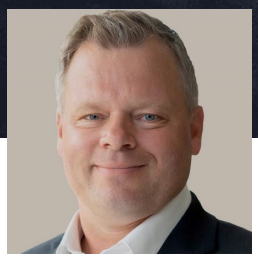
The Next Phase in Life Sciences

Creating a Sustainable Future in Space

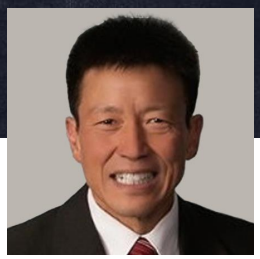
Speakers



Jon Arenberg
Northrop Grumman



Benjamin Knudsen
BASF



Tony Go
ExxonMobil

8/16/2023 | 12:30 – 5:30 pm | SF Marriott Marquis | www.CME-STEM.org

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SUSTAINABILITY

SFMM

Earth & Space Sustainability

Partial List of Leaders Propelling Diverse STEM Talent for Sustainable Innovation

Chris Love
MIT Koch Institute

Professor of Chemical Engineering

Jana Stoudemire
Axiom Space

Director, In-Space manufacturing)

Paul Anastas
Yale University

Chair of Chemistry for the Environment

Tony Go
ExxonMobil

Chief Engineer of Novel Processes

Jon Arenberg
Northrop Grumman

Chief Mission Architect for Science and Robotic Exploration

Benjamin Knudsen
BASF

Vice President of Research in North America

Sustainability & Reception

Partial List of Leaders Propelling Diverse STEM Talent for Sustainable Innovation

Elizabeth Barrios
NASA

Avionics Materials Engineer

Bruce Pittman
NASA

Ames Research Space Portal

Brooke Stokes
McKinsey

Partner, Aerospace & Defense

POLY

CME

NASA STEM SUSTAINABILITY

SF Marriott Marquis

8/16 AM · Space Chemistry Roadmap

(By invitation only)

AIR PRODUCTS

DOW

BLAVATNIK FAMILY FOUNDATION

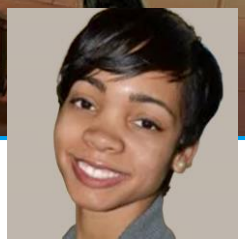
MERCK

BASF We create chemistry

Keynote

Speakers

Brad Carpenter
NASA



Chyree Bartton
Axiom Space

Ferenc Darvas
InnoStudios

Ken Savin
Redwire

8/16/2023 8:00-11:30 AM | Space Chemistry Roundtable | By invitation only

Award-Winning Space Age STEM Programs

Advancing Diversity and Environmental Social Governance

CME STEM Symposiums with NASA

CME STEM Leadership Awards

CME STEM Talks by Thought Leaders

CME STEM Festivals