



# ACS Fall 2024

8/19–21 · POLY 006

## CME NASA Program



Elevating Polymer Chemistry for Human Space Exploration:  
Polymers for Future Space Missions

8/19 · NASA Day, CME PMSE Student & Mentor Awards

8/20 AM · Industry & Academia, CME Nobel Lectures

8/20 PM · CME NASA Sustainability: Earth & Space

8/21 AM · Space Chemistry Roundtable





POLY

# NASA STEM SYMPOSIUM

PRES

# Fall 2024: Elevating Polymer Chemistry to New Heights

Polymers for Future Space Missions

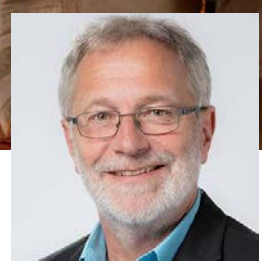


- AGFD ENVR
- AGRO FLUO
- ANYL GEOC
- BIOL HIST
- BIOT I&EC
- BMGT INOR
- CARB MEDI
- CATL NUCL
- CELL ORGN
- CHAS PHYS
- CHED PMSE
- CINF POLY
- COLL PROF
- COMP SCHB
- ENFL TOXI

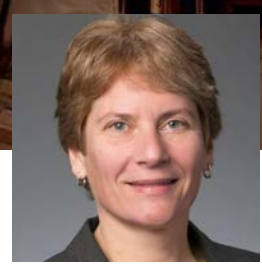
8/19 PMSE CME Student & Mentor Awards

8/20 CME Lectures Leadership Awards

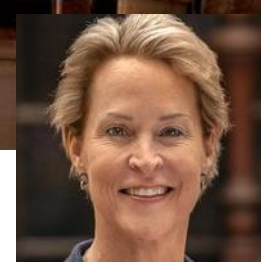
### Speakers



Martin Keller  
NREL



Carolyn Bertozzi  
Stanford



Frances Arnold  
Caltech



Mamta Nagaraja  
NASA



# 8/19 · NASA, Academia, Student & Mentor

Day 1 PM · PMSE CME Student & Mentor Awards

## Elevating Polymer Chemistry for Human Space Exploration: Polymers for Future Space Missions

Day 1: Monday 8/19 AM - POLY006A: Academia, NASA (go to [cme-stem.org](http://cme-stem.org) for bios, abstracts and updates)

8:45 AM	Shah Karim	CME	Welcome and introduction
8:50 AM	Chris Bates	UC Santa Barbara	Accelerated discovery of block copolymers using automated chromatography
9:20 AM	Austin Evans	University of Florida	Accessing next-generation polyolefins by electrochemical postsynthetic modification
9:50 AM			Intermission
10:00 AM	David Ginger	University of Washington	Conjugated polymers as mixed ionic electronic conductors: From neuromorphic transistors to energy storage
10:30 AM	Seth Marder	University of Colorado Boulder	From neuromorphic transistors to energy storage
11:00 AM	Jihye Park	University of Colorado Boulder	Tuning properties of 2D conductive metal-organic frameworks from molecular approaches
11:30 AM	Stuart Rowan	University of Chicago	Accessing pluripotent materials through tempering of dynamic covalent polymer networks
12:00 AM	Shah Karim	CME	Closing remarks

Day 2: Monday 8/19 PM - POLY006B: NASA, CME PMSE Student & Mentor Awards

2:00 PM	Ksenia Takhistova	CME	Introduction
2:01 PM	Jessica Koehne	NASA Ames	In-space manufacturing for sustained human exploration
2:30 PM	Mia Siochi	NASA Langley	Polymers and composites for aerospace applications
3:00 PM	Stephanie Vivod	NASA Glenn	Polymer aerogels for lunar applications and beyond
3:30 PM			Intermission
3:40 PM	Pamela Cai	University of Chicago	Polymer physics driven design and understanding of biological materials
4:05 PM	Andrew Spakowicz	Stanford University	Active DNA olympic hydrogels modulated by topoisomerase activity
4:30 PM	George Rodriguez	CME	CME and PMSE present the ACS Outstanding Global Student & Mentor Awards
4:40 PM	Laura Rijns	Stanford University	Design rules for supramolecular hydrogel-cell interactions: From growing tissue towards bio-electronic applications
5:05 PM	Patricia Dankers	Eindhoven University of Technology	Complex tissue-inspired materials based on supramolecular polymers
5:30 PM	Ksenia Takhistova	CME	Closing remarks

# 8/20 · CME Lectures & Leadership Awards

Day 2 AM · CME NASA Earth & Space Sustainability Summit

## Elevating Polymer Chemistry for Human Space Exploration: Polymers for Future Space Missions

Day 2: Tuesday 8/20 AM - POLY006C: CME Lectures & STEM Leadership Awards (go to [cme-stem.org](http://cme-stem.org) for bios, abstracts and updates)

8:20 AM	Shah Karim	CME	Introduction
8:25 AM	James Hedrick	Azul 3D	Transforming thermosets into UV curable resins for additive production
8:50 AM	Joey Luther	NREL	Developing and testing perovskite solar cells as space energy source
9:15 AM	Teresa Barnes	NREL	Photovoltaic module materials: Lessons from Earth
9:40 AM			Intermission
9:50 AM	Balaji Narasimhan	Iowa State University	Room temperature-stable nanovaccines: A breakthrough in healthcare
10:20 AM	Frances Arnold	Caltech	Innovation by evolution: Bringing new chemistry to life
10:50 AM	Martin Keller	NREL	Innovative chemistry for a clean energy future.
11:20 AM	George Rodriguez	CME	CME STEM Leadership Award presentation to Carolyn Bertozzi and Martin Keller
11:30 AM	Carolyn Bertozzi	Stanford University	Therapeutic targeting of mucin glycoproteins
12:00 PM	George Rodriguez	CME	Closing remarks



CME  
STEM Leadership  
AWARDS

Inspiring Women  
in Science

Carolyn Bertozzi  
2022 Nobel Laureate

Excellence in  
Sustainability

Martin Keller  
NREL 9<sup>th</sup> Director

# 8/20-21 · Sustainability & Space Chemistry

Day 2 PM & 3 AM · CME NASA Earth & Space Sustainability Summit

## CME NASA Earth & Space Sustainability

Day 2: Tuesday 8/20 PM - POLY006D: CME NASA Earth & Space Sustainability Summit

2:00 PM	Ksenia Takhistova	CME	Introduction
2:01 PM	Chad Mirkin	Northwestern University	Changing the pace of materials discovery through nanomaterial megalibraries
2:25 PM	Michael Roberts	ISS National Laboratory	International Space Station National Laboratory: Elevating chemistry to new heights
2:45 PM	Mamta Nagaraja	NASA HQ - Microgravity	NASA science for human exploration
3:00 PM	Sharmila Bhattacharya	NASA HQ - Space Biology	How space biology enables exploration
3:15 PM	Kristin Fabre	NASA HQ - Human Health	Enabling astronaut health & performance for space exploration missions
3:30 PM	Mamta Nagaraja	NASA HQ - Microgravity	Panel on space sustainability: Academia, NASA and ISS National Lab
4:00 PM			Intermission
4:10 PM	Shah Karim	CME	Introduction
4:11 PM	Katrina Knauer	NREL	Exploring material circularity in space: A paradigm shift in sustainable space exploration
4:30 PM	Robert Kumpf	Deloitte	Strength in numbers: Reducing Scope 3 emissions in the chemical industry
4:50 PM	Kevin Fogash	Celanese	Sustainability at scale: Practical innovation at Celanese
5:10 PM	Jon Arenberg	Northrop Grumman	Polymers and space astronomy: Past, present and future
5:30 PM	Deb Ryan	S&P Global	Panel on large-scale Earth & space sustainability: NREL, Celanese, Northrop Grumman, and Deloitte
6:00 PM	Shah Karim	CME	Closing remarks

## Space Chemistry Roundtable

Day 3: Wednesday 8/21 AM - POLY006E: Space Chemistry Roundtable (go to [cme-stem.org](http://cme-stem.org) for bios, abstracts and updates)

8:00 AM	Ksenia Takhistova	CME	Introduction
8:05 AM	Chyree Batton	Axiom Space	Advancing the Low-Earth Orbit (LEO) Economy
8:30 AM	Jana Stoudemire	Axiom Space	Panel Discussion on the Fast-Growing Space Age Economy
10:00 AM			Intermission
10:10 AM	Ken Savin	Redwire	Panel Discussion on Roadmap Action Items
11:30 AM	Ksenia Takhistova	CME	Closing remarks

## CME Lectures

For the Annals of Civilization



**Martin Keller**  
National Renewable Energy  
Laboratory (NREL)

9<sup>th</sup> Director



**Carolyn Bertozzi**  
Stanford University

2022 Nobel Prize in Chemistry



**Frances Arnold**  
Caltech

2018 Nobel Prize in Chemistry

Recommended by



**Judy Giordan**  
American Chemical Society

2023 President



**Mary Carroll**  
American Chemical Society

2024 President



**Dorothy Phillips**  
American Chemical Society

2024 President-Elect





PRES

## 2024 CME PMSE Student & Mentor Awards

ACS Global Outstanding Student & in Polymer Science & Engineering



**Pamela Cai**  
Stanford University  
USA Graduate Student



**Laura Rijns**  
Eindhoven University of Tech.  
International Graduate Student

2024.08.19 3:30 – 5:30 PM Denver

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**Andrew Spakowitz**  
Stanford University  
USA Mentor



**Patricia Dankers**  
Eindhoven University of Tech.  
International Mentor



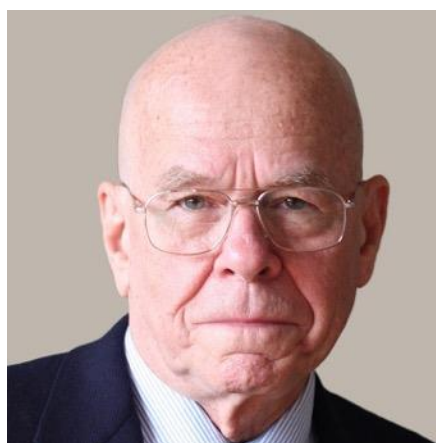
August 19, 2024 · 3:30 to 5:30 pm  
ACS Fall 2024, Denver

## 2017-2023 CME Nobel Lectures

Partial List of 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



CME

POLY

NASA STEM  
SUSTAINABILITY

PRES

# Earth & Space Sustainability

AIR  
PRODUCTS

DOW

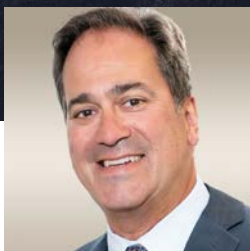
MERCK

ExxonMobil

BASF

We create chemistry

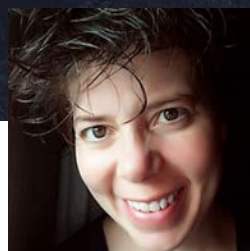
## Speakers



Chad Mirkin  
Northwestern



Michael Roberts  
ISS National Lab



Kristin Fabre  
NASA



Mamta Nagaraja  
NASA

2024.08.20 | Registration: [www.CME-STEM.org](http://www.CME-STEM.org)



POLY

CME

NASA STEM  
SUSTAINABILITY

PRES

$$U = \frac{W_{\infty}}{m} = -\frac{1}{m} \int_{\infty}^r \mathbf{F} \cdot d\mathbf{r} = -\int_{\infty}^r \mathbf{g} \cdot d\mathbf{r}$$

# 8/21 · Space Chemistry Roadmap

$$\frac{1}{M} \sum_i m_i |g(r_i)|$$

$$\frac{1}{M} \sum_i r_i m_i |g(r_i)|$$

AIR PRODUCTS

DOW

MERCK

ExxonMobil

BASF  
We create chemistry

## Speakers



Michael Roberts  
ISS National Lab



Chyree Batton  
Axiom Space



Kenneth Savin  
Redwire



Ferenc Darvas  
InnoStudios

CME  
NASA STEM  
SYMPOSIUM

8/19-21

POLY 006

# Program Speakers



Elevating Polymer Chemistry to New Heights

Listed in Chronological Order





## 8/19 AM · Academia Speakers

Partial List of Distinguished Thought Leaders



**Chris Bates**  
UC Santa Barbara  
Associate Professor



**Austin Evans**  
University of Florida  
Assistant Prof., CME Director



**David Ginger**  
University of Washington  
Professor



**Seth Marder**  
University of Colorado Boulder  
Prof., NREL Sr. Research Fellow



**Jihye Park**  
University of Colorado Boulder  
Assistant Professor



**Stuart Rowan**  
University of Chicago  
Barry L. MacLean Professor

## 8/19 PM · NASA Speakers

Partial List of Distinguished Thought Leaders



Jessica Koehne  
NASA Ames  
Scientist



Mia Siochi  
NASA Langley  
Research Materials Engineer



Stephanie Vivod  
NASA Glen  
Chemical Engineer

## 8/19 PM · Student & Mentor Awardees

CME PMSE · ACS Global Outstanding Student & in Polymer Science & Engineering



**Pamela Cai**  
Stanford University  
USA Graduate Student



**Laura Rijns**  
Eindhoven University of Tech.  
International Graduate Student

2024.08.19 3:30 – 5:30 PM Denver



**Andrew Spakowitz**  
Stanford University  
USA Mentor

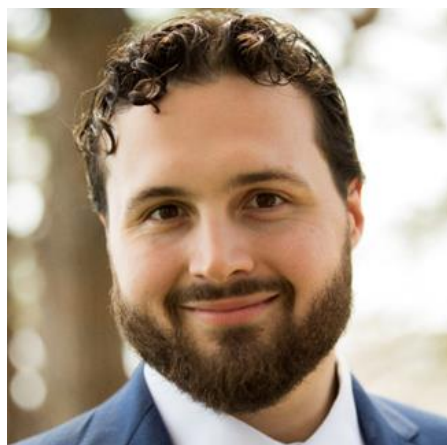


**Patricia Dankers**  
Eindhoven University of Tech.  
International Mentor



# 8/20 AM · Industry & Academia Speakers

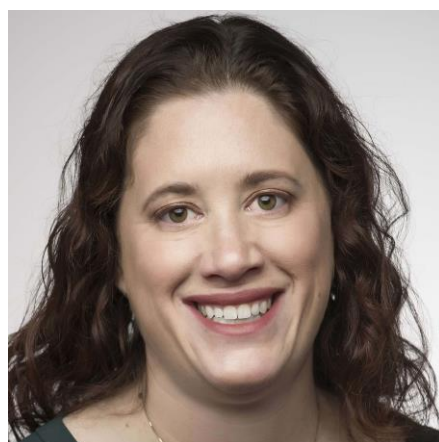
Partial List of Distinguished Thought Leaders



**James Hedrick**  
Azul 3D  
CTO and Founder



**Joseph Luther**  
NREL  
Senior Research Fellow



**Teresa Barnes**  
NREL  
Principal Scientist

## 8/20 AM · CME Lectures

Partial List of Distinguished Thought Leaders



**Balaji Narasimhan**  
Iowa State University  
Nanovaccine Institute Director



**Frances Arnold**  
Caltech  
2018 Nobel Prize in Chemistry



**Martin Keller**  
NREL  
9<sup>th</sup> Director



**Carolyn Bertozzi**  
Stanford University  
2022 Nobel Prize in Chemistry

## 8/20 PM · Speakers

Partial List of Distinguished Thought Leaders



**Chad Mirkin**  
Northwestern University  
Sr International Nanotechnology  
Institute Director



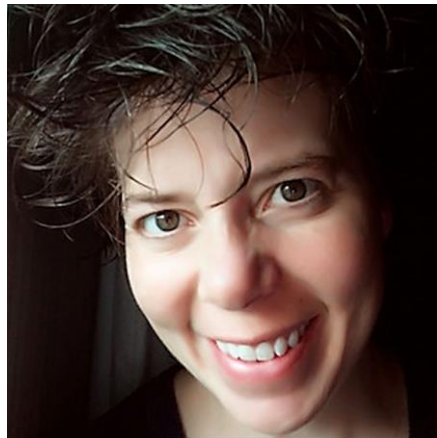
**Michael Roberts**  
ISS US National Laboratory  
Chief Scientific Officer



**Mamta Nagaraja**  
NASA HQ  
Associate Chief Scientist for  
Exploration & Applied Research



**Sharmila**  
NASA HQ  
Space Biology Program Scientist



**Kristin Fabre**  
NASA HQ  
Deputy Chief Scientist



## 8/20 PM · Speakers

Partial List of Distinguished Thought Leaders



**Katrina Knauer**

NREL

Researcher and CTO of BOTTLE



**Robert Kumpf**

Deloitte Consulting

Managing Director



**Kevin Fogash**

Celanese

Sr. Director Process Technology  
and Product Stewardship



**Jonathan Arenberg**

Northrop Grumman

Chief Mission Architect, Science  
and Robotic Missions



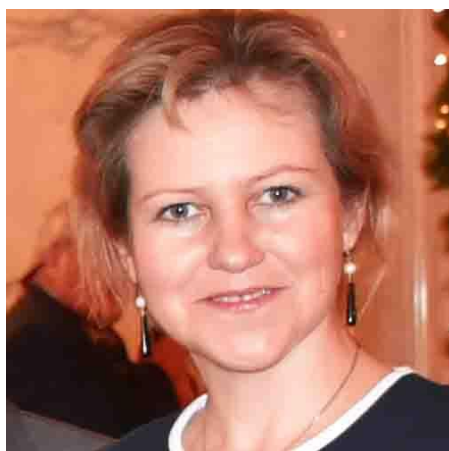
**Deborah Ryan**

S&P Global

Head of Emissions Insight

## 2024 Event Collaborators

Creating STEM Events for the Space Age



**Ksenia Takhistova**  
CME Co-Chair, General Counsel

Technology IP Attorney;  
Mechanical & Chemical Engineer



**Mamta Nagaraja**  
NASA

Associate Chief Scientist for  
Exploration & Applied Research



**George Rodriguez**  
CME Programming

Chemical Engineer, American  
2020 Chemical Society Fellow



**Shah Karim**  
CME Program Chair

SafeRock CEO  
PME Advisory Board Member



**Steve Barnett**  
CME Co-Chair

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



**Michael Meador**  
NASA Glenn

Former Game Changing Manager



# 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

