



Evolution of Nanomachines In Geospheres and Microbial Ancestors



## Rutgers Annual ENIGMA Astrobiology Symposium

Virtual

[WebEx link for Day 1 – June 16](https://rutgers.webex.com/rutgers/j.php?MTID=m927527c3812fe5c6cee1cc16dd9be88e)

<https://rutgers.webex.com/rutgers/j.php?MTID=m927527c3812fe5c6cee1cc16dd9be88e>

[WebEx link for Day 2 – June 17](https://rutgers.webex.com/rutgers/j.php?MTID=m7b03fa5efaae9c1299e5518ff5e4931f)

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***How did proteins evolve to become the predominant catalysts of life on Earth?***

**Tuesday, June 16th from 12:00PM – 16:15PM EST**

- Noon-12:15 [Welcome and Introductory Comments](#) - Paul Falkowski
- 12:15-12:45 [Overview of Theme 1: Synthesis and Function of Nanomachines in the Origin of Life](#)  
Vik Nanda - Plenary
- 12:45-13:15 Daniel Segrè, Boston University – *Traces of Early Life in the Architecture of Metabolic Networks*
- 13:15-13:45 [Overview of Theme 2: Increasing Complexity of Nanomachines in Microbial Ancestors](#)  
Yana Bromberg - Plenary
- 13:45-14:15 Cara Magnabosco, ETH Zurich – *Biogeodynamic Models for Deep Time*
- 14:15-14:45 [Overview of Theme 3: Co-Evolution of Nanomachines and the Geosphere](#)  
Nathan Yee - Plenary
- 14:45-15:15 Vamsi Mootha, Harvard Medical School – *Mitochondria and Oxygen: from Evolutionary Origins to Human Disease*
- 15:15-15:45 [Review and Discussion of Education and Outreach](#)  
Janice McDonnell - Plenary
- 15:45-16:15 Open discussion of the day's presentations

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**Wednesday, June 17th from 12:00PM – 16:15PM EST**

- Noon-12:30 Yi Lu, University of Illinois – *Designing Redox-active Metalloenzymes Involved in Electron Transfer Processes*
- 12:30-13:30 Plenary Presentations: Theme 1 (3)
- Presentations by Saroj Poudel, Bhanu Jagilinki, Kenneth McGuinness
- 13:30-14:30 Plenary Presentations: Theme 2 (3)
- Presentations by Adrienne Hoarfrost, Ariel Aptekmann, Julian Esselborn
- 14:30-15:30 Plenary Presentations: Theme 3 (3)
- Presentations by Bob Hazen, Joy Buongiorno, Jihua Hao
- 15:30-16:15 Final Discussions: Review research priorities for Year 3
- 16:15 Adjourn



The ENIGMA research team is part of the [Astrobiology at NASA program](#)