

THE ROLE OF SYNTHETIC BIOLOGY IN ATMOSPHERIC GREENHOUSE GAS REDUCTION: PROSPECTS AND CHALLENGES

Tuesday, Dec 3rd 2019

8:35 AM Welcome and Introductions Charles DeLisi
8:40 AM Welcome, Dean of Engineering Kenneth Lutchen

Session 1 Synthetic and Systems Biology

Chair: Ahmad Khalil

9:10 - 9:40 AM Building Self-fertilizing Plants Chris Voigt
9:40 - 10:10 AM Harnessing Arctic & Pelagic Photosynthesis George Church
10:10 - 10:40 AM Building Microbial Chemical Factories Kristala Jones Prather
10:40 - 11:00 AM Break
11:00 - 11:30 AM Engineering nature and society:
Art and synthetic biology for a changing climate Christina Agapakis
11:30 - 12:00 PM Towards a framework for Identification and manipulation
of key bio-environmental processes to engineer outcomes Adam Arkin
12:30 - 1:30 PM Lunch *ELSI Discussion* with Robert Cook-Deegan
1:30 - 2:00 PM Synthetic Biology Approaches to Methane Mitigation Mary Lidstrom
2:00 - 2:30 PM Conversion of E. coli to Generate all Biomass Carbon from CO₂ Ron Milo
2:30 - 3:00 PM Photosynthetic Desalination: Green Plants that Purify Salt
Water and Secrete Fresh Water June Medford
3:00 - 3:30 PM Harnessing Plant Genomics for CO₂ Capture and
Storage in Soils Stan Wullschlegel
3:30 - 4:30 PM *Open Discussion* Moderator: Elizabeth Strychalski

Session 2 Terrestrial - Atmosphere- Ocean System

Chair: Mike MacCracken

4:30 - 5:00 PM Terrestrial Systems and the Potential Role of SSB at the
Ecosystem Scale Steven Hamburg
5:00 - 5:30 PM Agroecosystem Controls and Synthetic Biology Interventions
to Increase CO₂ Drawdown Keith Paustian
5:30 - 6:00 PM *Open Discussion and Wrap-up* Charles DeLisi

Wednesday, Dec 4th 2019

Session 2 Terrestrial - Atmosphere - Ocean System

Chair: Mike MacCracken

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| 9:00 - 9:30 AM | Global Change and its Effects on Carbon and Nutrient Cycles in Land Ecosystems | Jerry Melillo |
| 9:30 - 10:00 AM | Carbon Dioxide Trends and Climate System Responses: The Importance of the Long-term | Susan Solomon |

Session 3 Policy Panel

Chair: John Reilly

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| 10:00 - 9:15 AM | Opening Remarks and Framing | John Reilly |
| 10:15 - 10:45 AM | The Current Emissions Pathway and the Expectation of Conventional Climate Policies | Henry Jacoby |
| 10:45 - 11:00 AM | Break | |
| 11:00 - 11:30 AM | Potential and Constraints of Natural Climate Solutions | Dominic Woolf |
| 11:30 - 12:00 PM | Archipelago Consulting | Kent Redford |
| 12:00 - 1:00 PM | <i>Open Discussion & Lunch</i> | Moderator: John Reilly |

Session 4 Ethical Legal and Social Issues

Moderator: Sir Richard Roberts

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| 1:00 - 3:00 PM | <i>Panel Discussion</i> | Pilar Ossorio, George Annas
David Resnik and Todd Kuiken |
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The Risks and unintended consequences of genomic mediated CDR. Does a biotechnological approach to CDR face challenges that other CDR strategies do not? What are the governance issues? What are the potential solutions?

Climate change and social justice. The severity of the impact is greatest on those at the lowest rung of the economic ladder. Have proposals been made to rectify this? How viable are they? What else can be done?

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| 3:00 - 4:00 PM | <i>Open Discussion & Wrap-Up</i> | Moderator: Ari Patrinos |
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