Hello, and thank you for participation in our workshop to assess the Environmental Impact of Synthetic Biology. Located at the Lincoln Laboratory Forbes Facility (3 Forbes Road, Lexington, MA 02420-9108; <http://www.ll.mit.edu/about/mapForbesRoad.html>), the workshop consists of 2 ½ days of presentations, discussions and networking. Our goal is to seek and understand the needs in developing synthetic biology products and the barriers that can be reduced by the Army, USACE, ERDC and others in regards to environmental impacts assessment. This workshop acts as a starting point for advancing the understanding of how synthetic biology can solve today’s most pressing problems as well as identify potential risks entailed by utilizing these strategies. Above all, we want to ensure that research and development efforts progress in a safe and transparent manner for the benefit of all mankind.

For most up to date information, check out the website: <https://synbio.erdc.dren.mil/>

**Participants** include a diverse list of professionals from Academia, Government, Industry, Regulatory Bodies and NGO’s. Current participants:

|  |  |  |
| --- | --- | --- |
| Brinda Dass | Keith Hayes | Renee Wegrzyn |
| Clem Fortman | Mark Segal | Stephanie James |
| Sarah Carter | Melissa Rhoads | Megan Palmer |
| Zachary Sun | Kevin Esvelt | Nicholas Guido |
| Jason Delborne | Royden Saah | James Comolli |
| Kate Buckley | Robert Bastian | Chris Sund |
| Rick Lance | Patrick Boyle | Cpt. Derese Getnet |
| Fiona Crocker | Zach Smith | Camilla Beech |
| Jay Reichman | Heather Meeks | Jeantine Lunshof |
| Steven Bradbury | Bryn Adams | Justin Gallivan |
| Dave Martin | Jessica Cussins | Karen Tountas |
| Matthew Magnuson | JC Gutierrez | Pamela Peralta-Yahaya |
| Todd Kuiken | Lola Olabode | Scott Walper |
| Jed Eberly | James Diggans | Jessica Coleman |
| Chris Warner | Ed Perkins | Dave Walsh |
| Stefani McGregor | Christy Foran | Peter Carr |
| Blake Bextine | Taylor Rycroft | Jessica Terrell |
| Peter Emanuel | Travis King | Rob Saunders |
| Srivatsan Raman | Richard Murray | Katyee Pokrzywinski |
| Megan Frisk | Charles Cooke | Rebecca Phillips |

**Workshop Purpose:**

Significant questions surround the potential risks and impacts of synthetic biology in the environment. These unknowns include experimental approaches for quantifying risk, likely ecological interactions, regulatory requirements, and social and ethical implications. The goal of this workshop is to identify specific knowledge gaps related to these questions surrounding the environmental risks of synthetic biology and to develop a roadmap for addressing these gaps. To achieve this goal we anticipate developing a position paper that reviews current progress in this area and lays out a path forward based on input from key opinion leaders in this area. We anticipate that this work will build on past work by providing tangible goals and metrics for addressing specific questions related to environmental risk.

## Specific Objectives

The objectives for this workshop are to:

1. Identify a cross-disciplinary and prioritized list of challenges, including key knowledge/R&D gaps that need to be filled so that we understand potential environmental impacts of SynBio.
2. For each challenge, document notional objectives, and, where appropriate, quantitative technical requirements.
3. For each challenge, assess and document the opportunity for transformative basic and applied research.
4. Identify key stakeholders and their respective roles for each challenge.

## Workshop Structure

The workshop will open with plenary sessions to emphasize the many stakeholder positions in SynBio development. With these thoughts in mind, the group will then break into four separate discussion workgroups (Listed in appendix A), each designated with a specific case study (gene drives for invasive species management, microbial engineering for performance enhancement, cell-free technologies for advanced chemical production, and viral systems for waste water management). Participants will be divided into breakout groups who have mixed backgrounds and interest in regulatory science, basic science, applied science, or policy for a balanced discussion.

Upon completion of breakout activities, the group will reconvene; discuss the products of each group; identify divergent, conflicting, and/or redundant input; and, if possible, reach consensus regarding the cross-disciplinary prioritization of key technical challenges and enabling basic research areas. One of the goals is to converge on points across all categories and identify overarching themes for SynBio development and stakeholder relationships to these responsibilities.

# Location

# 3 Forbes Road, Lexington, MA 02420-9108; <http://www.ll.mit.edu/about/mapForbesRoad.html> for visitor information, check out https://www.ll.mit.edu/about/visitorinfo.html

# Schedule of Events

**Day 1: Wednesday, May 17th 2017**

|  |  |  |
| --- | --- | --- |
| Time | Agenda: Wednesday, May 17th 2017 | Who’s Responsible |
| 8:00 | Welcome and Workshop Overview, goals and purpose | Ed Perkins (ERDC) |
| 8:40 | Facility and logistics overview | Catherine Cabrera (LL) |
| 9:00 | Opportunities in Synthetic Biology | Richard Murray (Cal-Tech) |
| 9:30 | Industrial Synthetic Biology | Ginkgo Bioworks |
| 10:00 | *Break Snacks and Coffee provided by LL* |  |
| 10:15 | DoD Perspective on SynBio | Peter Emanuel (ECBC) |
| 10:45 | International Perspective on SynBio | Keith Hayes (CISRO) |
| 11:15 | Breakout participant Introductions |  |
| 12:00 | *Lunch provided by LL* |  |
| 1:15 | Breakout session charge: Description of task and roles/responsibilities | Chris Warner (ERDC) |
| 1:30 | Breakout Session 1: Horizon scanning of current and near future technologies | All |
| 4:00 | Present Day 1 Breakout Session Findings (5 min each group plus discussion) | 4 Group leaders |
| 4:30 | Day 1 Debrief | Chris Warner (ERDC) |
| Evening | Activities TBD or on your own |  |

**Day 2: Thursday, May 18th 2017**

|  |  |  |
| --- | --- | --- |
| Time | Agenda: May 18th 2017 | Who’s Responsible |
| 8:00 | Arrival and check in |  |
| 8:15 | Introduce today’s activities and recap yesterday | Chris Warner (ERDC) and Catherine Cabrera (LL) |
| 8:30 | EPA's Approach to SynBio | Mark Segal (EPA) |
| 9:00 | Charge Session 2: Environmental Impacts | Fiona Crocker (ERDC) |
| 9:15 | *Break* |  |
| 9:30 | Breakout Session 2: Environmental Impacts | All |
| 11:30 | Present Breakout Session 2 Findings |  |
| 12:00 | *Lunch* |  |
| 1:00 | Charge Session 3: Safety and regulation | Richard Lance (ERDC) |
| 1:15 | Breakout Session 3: Safety and regulation | All |
| 4:15 | Present Breakout Session 3 Findings |  |
| 4:40 | End of day recap | Richard Lance (ERDC) |
| Evening | Activities TBD or on your own |  |

**Day 3 Friday May 19th, 2017**

|  |  |  |
| --- | --- | --- |
| **Time** | **Agenda: May** 18th 2017 | **Who’s Responsible** |
| 8:00 | Arrival and check in |  |
| 8:15 | Introduce today’s activities and recap yesterday. Charge Session 4: Social License | David Martin (ERDC) |
| 8:30 | Breakout group 4: Social License | All |
| 10:15 | Present Breakout Session 4 Findings |  |
| 10:30 | *Break* |  |
| 10:45 | Charge Session 5: Define challenges & capabilities | Fiona Crocker (ERDC) |
| 10:50 | Breakout Session 5: Construct Road map for the path forward | All |
| 11:45 | Present Breakout Session 5 Findings |  |
| 12:30 | Debrief |  |

**Electronics Policy:**

Unfortunately, the conference room will not allow for electronics. There will be bins to place phones, laptops and tablets. Common areas and break out room will allow for phone access.

**Dress Code:**

Business Casual

Restaurants near Lincoln labs:

**Waxy O'Connor's**

Casual, cozy pub known for Irish-American eats, table beer

94 Hartwell Ave, Lexington, MA 02421

**Via Lago Restaurant & Catering**

Roomy white-tablecloth staple offers diverse bistro fare & a counter-serve deli in a warm interior.

1845 Massachusetts Ave, Lexington, MA 02420 Located in: Giroux Building

**Artistry on the Green at The Inn at Hastings Park**

Innovative New England fare is served in a handsome dining room with a fireplace & flag tapestries.

2027 Massachusetts Ave, Lexington, MA 02421

**Formosa Taipei**

No-nonsense establishment featuring a menu of Taiwanese specialties for takeout or delivery.

315 Marrett Rd, Lexington, MA 02421