Tuesday, August 2

7:30 – 8:30  Registration and Continental Breakfast

8:30 – 8:45  Welcome; Introductory Remarks; Meeting Logistics – Jeff Rolf, President and CEO, OAI / Therese Griebel, Director of Strategy, NASA GRC

**Biomimicry: A NASA Perspective (Chair: Sandra Reehorst – NASA GRC)**

8:45 – 9:05  NASA Mission and Applications of Biomimicry – Craig E. Kundrot, NASA HQ

9:05 – 9:25  ARMD overview and interest in biomimicry – Barb Esker, NASA HQ

9:25 – 9:45  NASA GRC Innovation and Biomimicry – John Sankovic, NASA GRC

9:45 – 10:15  Aerospace biomimicry and other cool things – Vik Shyam, NASA GRC

10:15 – 10:30  BREAK

**Biomimicry: An Evolving Discipline (Chair: Peter Niewiarowski, University of Akron)**

10:30 – 11:00  Cognitive challenges of biologically inspired design – Ashok Goel, Georgia Institute of Technology

11:00 – 11:30  Sweet are the uses of adversity: Insights into adaptation and speciation using experimental evolution – Frank Rosenzweig, Georgia Institute of Technology

11:30 – 12:00  Planetary exploration using bio-inspired technologies – Yoseph Bar-Cohen, JPL

12:00 – 12:30  Synthetic biology as an enabling technology for space exploration – Lynn Rothschild, NASA ARC

12:30 – 1:45  LUNCH (Speaker - Thomas Tyrrell, Great Lakes Biomimicry)

**Life in Hostile Environments (Chair: Lynn Rothschild, NASA ARC)**

1:45-2:15  Physiomimetics, adaptation and persistence of life in novel environments – Scott Turner, SUNY College of Environmental Science & Forestry

2:15 – 2:45  From geochemistry to biogeochemistry: The origins of life – Nita Sahai, University of Akron

2:45 – 3:15  Responses of microbial communities in ‘non-extreme’ settings to imposition of physicochemically ‘extreme’ conditions – John Senko, University of Akron

3:15 – 3:30  BREAK

**Robotics (Chair: Yoseph Bar-Cohen – JPL)**

3:30 – 4:00  Biomimetic robot inspired by _cyanea capillata_ for underwater surveillance – Shashank Priya, Virginia Polytechnic Institute & State University

4:00 – 4:30  Material-integrated intelligence for robot autonomy – Nikolaus Correll, University of Colorado Boulder

4:30 – 5:00  Animals as models for robot mobility and autonomy: Crawling, walking, running, climbing, and flying – Roger Quinn, Case Western Reserve University

5:00 – 5:15  Logistics for Evening Session

**Evening Session – Reception and Presentation at the Cleveland Metroparks Zoo**

6:15 – 8:30  Biomimicry in our backyard – Rebecca Eagle-Malone, University of Akron
## Agenda

**Wednesday, August 3**

### Registration and Continental Breakfast

7:30 – 8:30

### Artificial Intelligence and Swarms (Chair: Herbert Schilling – GRC)

8:30 – 9:00  
Evolutionary computation for real-world optimization problems – Amir Gandomi, Michigan State University

9:00 – 9:30  
Swarm intelligence and extended analog computing – Russell C. Eberhart, Consultant (Indiana University, Purdue University, Indianapolis, retired)

9:30 – 10:00  
Mimicking biomimicry: What can we learn from a swarm of humans? – Marc Kirschenbaum and Daniel Palmer, John Carroll University

10:00 – 10:15  
BREAK

### Materials and Structures I (Chair: Aloysius Hepp – NASA GRC)

10:15-10:45  
Materials alchemy – Kenneth Sandhage, Purdue University

10:45-11:15  
Creating functional biomimetic materials – Rajesh Naik, Air Force Research Laboratory, Wright-Patterson Air Force Base

11:15-11:45  
Biomorphic ceramics from lignocellulosic template – Mrityunjay Singh, Ohio Aerospace Institute

11:45 – 12:15  
Multifunctional structures and materials: The ultimate biomimicry – Paul Kladitis, University of Dayton Research Institute

12:15 – 1:30  
LUNCH (Speaker – Harvey Webster, Cleveland Museum of Natural History)

### Aeronautics and Propulsion (Chair: Isaiah Blankson – NASA GRC)

1:30-2:00  
Aerodynamic role and low dimensional analysis of wing surface morphology in bio-inspired flapping flight – Haibo Dong, University of Virginia

2:00-2:30  
Airplane de-icing: Lessons learned from cacti, kale, aphids, and poison dart frogs – Konrad Rykaczewski, Arizona State University

2:30-3:00  
How seal whiskers suppress vortex structures: Effects of phase shift angle – Wei Zhang, Cleveland State University

3:00 – 3:15  
BREAK

### Architecture, Art, and Design (Chair: Thomas Tyrell – Great Lakes Biomimicry)

3:15 – 3:45  
Biomimetic principles utilized in product design – John Nottingham, Nottingham Spirk

3:45 – 4:15  
Collaboration, biomimicry and success stories – Bill Sullivan, FLEXcon

4:15 – 4:45  
Biomimicry: A multidisciplinary design process – Doug Paige, Cleveland Institute of Art

4:45 – 5:15  
A biomimetic approach to architecture and design – Petra Gruber, University of Akron

5:15 – 5:30  
Logistics for Evening Session

### Evening Session – Reception and Presentation at the Cleveland Museum of Natural History

6:30 – 8:30  
Fossil doesn’t equal failure – Stephen Howe, University of Akron
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<th>Time</th>
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<tr>
<td>7:30 – 8:30</td>
<td>Registration and Continental Breakfast</td>
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<td>8:30 – 9:00</td>
<td>Bio-inspired radiofrequency steganography via linear chirp radar signals – Zhiqiang Wu, Wright State University</td>
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<td>9:00 – 9:30</td>
<td>An artificial brain mechanism to develop a learning paradigm for robots – Rashmi Jha, University of Cincinnati</td>
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<td>A stochastic, swarm-based control law for emergent-system-level area coverage by robots – Bryan Trease, University of Toledo</td>
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<td>Wet and Dry Biological Adhesives in Complex Environments: Learning from Ants and Geckos – Alyssa Stark, University of Louisville</td>
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<td>BREAK</td>
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<td>Light-trapping in polymer solar cells by processing with nanostructured diatomaceous earth – Lyndsey McMillon-Brown, Yale University/NASA GRC</td>
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<td>11:15 – 11:45</td>
<td>Green Harbors Program and biomimicry - Anamarija Frankić, Director Green Harbors Project, UNIZD &amp; Biomimicry New England</td>
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<td>11:45 – 12:15</td>
<td>Zygote Quarterly: An open-source bio-inspired design journal – Marjan Eggermont, University of Calgary</td>
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<td>Geckos adhesion: An exploration of bibliometric pattern and biomimetic process – Peter Niewiarowski, University of Akron</td>
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<td>12:45 – 2:00</td>
<td>LUNCH (Speaker – Mark Avsec, Benesch, Friedlander, Coplan &amp; Aronoff, LLP)</td>
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<td>2:00 – 5:00</td>
<td>NASA facilitated follow-on activities related to biomimicry vision</td>
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<td>- INCOSE (George Studor NASA/JSC) and EPSCoR (Jeppie Compton/NASA KSC)</td>
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<td>- Intro to NASA facilities and collaboration mechanisms</td>
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<td>- NASA Creativity &amp; Innovation team facilitated breakout sessions to identify</td>
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<td>o Frameworks for follow-on interaction to achieve research objectives</td>
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<td>- GLBIO biomimicry methods and tools for problem solving</td>
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<td>5:00 – 5:30</td>
<td>Closing Remarks &amp; Logistics for Evening Session</td>
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<td>6:00 – 8:30</td>
<td>at the 100th Bomb Group Restaurant, 20920 Brookpark Road, Cleveland</td>
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