Biocene 2018

	Event Organizers:	OAI Ohio Aerospace Institute	GREAT LAKES BIOMIMICRY	NASA		
	Event Sponsors:	OWENS CORNING	GOJO	The University of Akron	Cleveland Institute of Art	na2ure studio

Program	Summary	Location	Speakers	Start Time	End Time	Track
Opportunity						
Summit Objectives: Blockchain, Bionics and the Biocene			Dr. Vikram Shyam, NASA GRC	8/14/2018 9:00am	8/14/2018 9:15am	All
EPSCoR SME "1 on 1's"	Batteries, AI, Quantum biology, Photovoltaics, Sensors, Biomaterials	Ohio Aerospace Institute		8/14/2018 9:15am	8/14/2018 12:30pm	Technical
Tour 1 of NASA Glenn Research Center	Glenn tours are a unique blend of education and entertainment. Visitors can explore America's research facilities and see where scientists and engineers develop propulsion, power and communication technologies for NASA'S aeronautics and space programs. Space limited to 50 participants; US citizens and green card holders only. The tours are free.	NASA Glenn Research Center		8/14/2018 1:00pm	8/14/2018 3:00pm	Education
Early Bird Registration/ Volunteer Orientation		OAI Auditorium		8/14/2018 1:00pm	8/14/2018 1:30pm	All
Biocene 2018 Cafe	Poster set up and viewing, Bio-inspired Art Competition Begins: Nature-inspired interstellar travel; Earth 2150, Ultimate artificial intelligence.	Discovery Space Exhibit Area		8/14/2018 1:30pm	8/14/2018 3:15pm	All
Bio-inspired Art Competition	3 Topics: -Nature-inspired interstellar travel -Earth 2150 -Ultimate AI Poster set up and viewing, Bio-inspired Art Competition Begins: Nature-inspired interstellar travel; Earth 2150, Ultimate artificial intelligence.	OAI Atrium		8/14/2018 1:30pm	8/14/2018 3:15pm	All
Tour 2 of NASA Glenn Research Center	Glenn tours are a unique blend of education and entertainment. Visitors can explore America's research facilities and see where scientists and engineers develop propulsion, power and communication technologies for NASA'S aeronautics and space programs. Space limited to 50 participants; US citizens and green card holders only. The tours are free.	NASA Glenn Research Center		8/14/2018 3:00pm	8/14/2018 5:00pm	Education
Continental Breakfast				8/15/2018 8:00am	8/15/2018 8:45am	
Welcome: Day 1	Introduction and Welcome by Howard Thompson (Ohio Aerospace Institute)	OAI Auditorium	Dr. Vikram Shyam, NASA Glenn Research Center Jeff Rolf(President, OAI), Tom Tyrrell (Founder, GLBio). Dr. Ajay Misra (Deputy Director for Research, NASA Glenn Research Center)	8/15/2018 8:45am	8/15/2018 9:15am	All
Keynote 1: Healthy Buildings for Everyone: Tapping Into Biology to Grow the Next Generation of Buildings	In 2016, the XPRIZE Foundation set out to establish a “moonshot” for construction by creating the XPRIZE for Healthy Buildings. In this talk, you’ll learn how the team approached this unique opportunity to develop a way to (literally) grow buildings by fusing synthetic biology, genomics, parametric modeling and 3D printing to create a disruption and paradigm shift that could switch us from a PETRO-chemical world to a BIO-chemical one.	OAI Auditorium	Eric Corey Freed (Principal, organicARCHITECT)	8/15/2018 9:15am	8/15/2018 10:15am	Keynote
Biomimicry: What's in your R&D?	Biomimicry thinking is a powerful tool for bringing unique potential solutions to the table in ways traditional innovation processes do not. The ROI for organizations is real and is something every organization needs to consider.	Ohio Aerospace Institute Auditorium	Dr. Peter Niewiarowski (Department of Biology, University of Akron)	8/15/2018 10:15am	8/15/2018 10:45am	Business
Break				8/15/2018 10:45am	8/15/2018 11:00am	All
Design of Soft Machines	Evolutionary optimization techniques are utilized for the rational design of soft artificial creatures, characterized by different scales and operating across environments. Applications range from slithering and swimming biolocomotion strategies to artificial muscles and bio-hybrid systems	Ohio Aerospace Institute Auditorium	Dr. Mattia Gazzola (Blue Waters Professor at National Center for Supercomputing Applicaitons, University of Illinois Urbana Champaign)	8/15/2018 11:00am	8/15/2018 11:30am	Technical
Meet Animal Ambassadors	Meet Biological Ambassadors (live biological interactions)		Harvey Webster (Cleveland Museum of Natural History)	8/15/2018 11:30am	8/15/2018 12:00pm	All
Lunch & Announcements	'-Biocene Lunch + Poster Review + Lightening Round Sign-ups -Discovery Space (Exhibit Area) -Poster Presentations			8/15/2018 12:00pm	8/15/2018 1:30pm	All
Animal Engineering	Whether in accessing scarce water resources, providing energy-free HVAC or utilizing adaptive building materials, animals have evolved strategies to address problems that we share. Examples of active research from the lab and from termite architecture, nesting birds and desert insects will be reviewed in the context of the potential application. *Break-out session: please choose 1 event to attend during this time*		Dr. Hunter King (University of Akron)	8/15/2018 1:30pm	8/15/2018 2:00pm	Business
The Ultimate Physiomimetic Machine- A Leap Towards a Self-Replicating Machine for Planetary Colonisation	Physiomimetic approaches yield a potential solution to bypass high launch costs by exploiting local in-situ resources and leveraging those resources to create self-replicating machines which proceed to replicate exponentially. Indeed, it might be argued that a self-replicating machine encapsulates the most biological of life functions that differentiate the biological from the non-biological. If this can be achieved, entire infrastructures can be constructed robotically with only a modest injection of hardware into space onto the Moon, Mars, asteroids, etc.		Professor Alex Ellery (Carleton University)	8/15/2018 1:30pm	8/15/2018 2:00pm	Technical
Biomimicry & Business Panel : Moderated by Steve Percy	This panel discussion will explore the on-the-ground experiences of three companies who have employed biomimicry to enhance their innovation. Steve Percy, former Chairman and CEO of BP America and one of the co-coordinating lead authors of the UN's Millennium Ecosystem Assessment, will lead a conversation with Owens Corning, Lubrizol, and GOJO Industries to uncover and explain the discoveries, challenges and perspective-changing results of looking to nature for inspiration.		Steve Percy, moderator: (retired Chairman and CEO of BP America) Tom Marting (panelist, Facilities, and Resource Management Director, GOJO) Teresa Wagner (panelist, Director, Roofing Science & Technology, Owens Corning) Jeff Finefrock (panelist, Corporate Technology Portfolio Manager, Lubrizol)	8/15/2018 2:00pm	8/15/2018 2:45pm	Business
Intentional Networking Activity		Ohio Aerospace Institute Lobby	Led by Great Lakes Biomimicry	8/15/2018 2:45pm	8/15/2018 3:00pm	Business
Break				8/15/2018 3:00pm	8/15/2018 3:15pm	All
Pattern Alphabet	In 2016, na2ure jointly released the Pattern Alphabet at RISD Design Science and MIT Sandbox Summit to great acclaim as a powerfully simple and versatile tool to aid learning and creativity. The goal of this pattern set, fashioned after the most essential building blocks in nature, is to create a universal, non-verbal language to visualize math in a way that humans can understand by non-verbal reasoning, including at pre-verbal ages.		Alex Wolf (na2ure) Dr. Vijal Parikh (na2ure)	8/15/2018 3:15pm	8/15/2018 3:45pm	Technical

Biomimicry Explorer	Inventions and discoveries triggered by biomimicry are usually highly creative and efficient. However they happen due to serendipity: knowledge transfer between biology and engineering is not straightforward since biology and engineering are generally studied in isolation of each other. There are no systematic ways to incorporate ideas from nature/biology into the design process of engineering solutions. A knowledge base of biology goals and mechanisms and an "intelligent" tool to navigate them and map them to engineering problems would take serendipity out of the loop and provide a systematic way of connecting engineering challenges to biology inspiration.		Ioana Baldini (IBM Artificial Intelligence)	8/15/2018 3:45pm	8/15/2018 4:15pm	Technical
Lightening Round Presentations	Participants self select to give a 3-5 minutes presentation about a big idea, an interesting fact, a burning questions or anything they want to present to advance learning and the perspective of biomimicry.		Moderated by Calvin Robinson	8/15/2018 4:15pm	8/15/2018 5:15pm	Business
Wrap up of the Day				8/15/2018 5:15pm	8/15/2018 5:30pm	All
Reception & Networking, Cleveland Museum of Natural History	When you visit the Cleveland Museum of Natural History, you become a part of a tradition of science and exploration nearly 100 years in the making. Known as a great place for everyone curious about science, the Museum is also a center for world-class scientific research. We will learn what the Museum is doing in biomimicry, visit exhibits and join a scavenger hunt for biomimetic ideas from their collections.	Cleveland Museum of Natural History		8/15/2018 6:30pm	8/15/2018 8:30pm	All
Continental Breakfast				8/16/2018 8:00am	8/16/2018 8:45am	All
Welcome: Day 2	Introduction and Welcome by Howard Thompson (Ohio Aerospace Institute) Theme: AI, UAVs, Education, Nature, and Business *Plenary Sessions 8:45 am - 11am*	OAI Auditorium	Curt Mcnamara (INCOSE/Minneapolis College of Art and Design)	8/16/2018 8:45am	8/16/2018 9:00am	All
Keynote 2: Responsibly Imagined Future and Quantum Biology	The biomimetics task going forward is to elicit from nature how the quantum processes that are present and operable in bioprocesses are enabled, and to determine ideal potential applications of these quantum bio approaches to quantum technology practice.	OAI Auditorium	Dennis Bushnell, (NASA Langley Research Center)	8/16/2018 9:15am	8/16/2018 10:00am	Keynote
Workshop: Growing V.I.N.E. (Virtual Interchange for Nature-Inspired Exploration), Introduction to Clusters		Ohio Aerospace Institute Auditorium	Facilitated by Colleen Unsworth (Biomimicry Fellow, U Akron/NASA)	8/16/2018 10:00am	8/16/2018 10:30am	Workshop
Drone Demonstrations		OAI Atrium/ outdoor		8/16/2018 10:30am	8/16/2018 11:00am	All
Biomimicry As an Innovation Tool to Reach Sustainability Goals			Dr. Emily Kennedy (University of Akron)	8/16/2018 11:00am	8/16/2018 11:30am	Business
Current Limitations of Biomimicry in Artificial Intelligence Research	Deep learning is biomimicry inspired by the mechanisms of neural systems, however neural networks can be fooled in ways that humans cannot. There are defenses, but they've been shown to be ineffective for white-box attacks -- this is largely an unsolved problem. The risks and limitations of a biomimetic approach to AI will be discussed.		Jason Mancuso (OpenMined)	8/16/2018 11:00am	8/16/2018 11:30am	Technical
Systems Mapping and Modeling for Biomimetic Education			Curt McNamara (Minneapolis College of Art and Design)	8/16/2018 11:00am	8/16/2018 11:30am	Education
Break				8/16/2018 11:30am	8/16/2018 11:40am	All
Designing Into and For the Future through Biomimicry	An essential key to good design is to get the question right. This requires understanding the scope and scale of the environment in which you are trying to innovate. Biomimicry thinking is an effective tool for designing in a different, more effective way.		Doug Paige (Cleveland Institute of Art)	8/16/2018 11:40am	8/16/2018 12:10pm	Business
Evolving Rule-based, Explainable Artificial Intelligence (XAI) for Decision Support System of Unmanned Air Vehicles	An effective XAI should be able to deliver explanation with a high level of accuracy, handle uncertainty, and learn from experience. To address these points and provide meticulous explanation this research utilizes a hybrid learning technique that combines explanation ability of Fuzzy logic that incorporates uncertainty with learning abilities of nature-inspired artificial Neural Networks.		Dr. Devinder Kaur (University of Toledo)	8/16/2018 11:40am	8/16/2018 12:10pm	Technical
Resources and Techniques for K-12 Biomimicry Education			Moderator DeLeon, Ballou, Wilson	8/16/2018 11:40am	8/16/2018 12:10pm	Education
Lunch & Presentation: Nature-inspired Artificial Intelligence	'- (Close art competition, voting begins) -12:00 - 12:30 Lunch Keynote - Nature-inspired AI	Ohio Aerospace Institute Sun Room	Dr. Doug Riecken (Program Officer, Science, Information, Learning & Fusion, Air Force Office of Scientific Research)	8/16/2018 12:10pm	8/16/2018 1:30pm	Keynote
Introducing Biomimicry to Lockheed Martin			Michael Haro	8/16/2018 1:30pm	8/16/2018 2:00pm	Business
Evolutionary Data Mining in Aerospace	Evolutionary Computation (EC) techniques are a subset of artificial intelligence, but they are slightly different from the classical methods in the sense that the intelligence of EC comes from biological systems or nature in general. The efficiency of EC is due to their significant ability to imitate the best features of nature which have evolved by natural selection over millions of years.		Dr. Amir Gandomi (Stevens Institute of Technology)	8/16/2018 1:30pm	8/16/2018 2:00pm	Technical
Best Practices in Informal Biomimicry Education	Moderator DeLeon, Ballou, Wilson		Great Lakes Biomimicry & Akron Zoo	8/16/2018 1:30pm	8/16/2018 2:00pm	Education
Break (vote on artwork)				8/16/2018 2:00pm	8/16/2018 2:15pm	All
Featured Speaker Dr. Sofi Bin-Salamon, Program Officer, AFSOR, Biophysics at Air Force Office of Scientific Research	Biophysics at Air Force Office of Scientific Research		Dr. Sofi Bin-Salamon, Program Officer, AFOSR	8/16/2018 2:15pm	8/16/2018 2:45pm	Keynote
Workshop: Democratizing Science (Citizen Scientists, K-12, Technology, Business)	3 Tracks : -Citizen science for K-12 -Technology, -Business and IP		Calvin Robinson (NASA, MIT Media Lab)	8/16/2018 2:45pm	8/16/2018 3:40pm	Workshop
Break				8/16/2018 3:40pm	8/16/2018 3:45pm	All
Flourishing Organizations			Sally Parker(TimeZero Enterprises) Argerie Vasilakes (TimeZero Enterprises)	8/16/2018 3:45pm	8/16/2018 4:15pm	Business
Artificial Intelligence Led Discovery of Sense and Avoid Taxonomy and Strategy for sUAS The Business of Drones			Zen Ahmed (QUID)	8/16/2018 3:45pm	8/16/2018 4:15pm	Technical
Education: Art Approaches to Bio-Inspired Design			Markus Vogl(University of Akron Myers School of Art)	8/16/2018 3:45pm	8/16/2018 4:15pm	Education
Envisioning Human-Centered Tools for Systematic Biologically Inspired Design that Solve Real Needs and Bring People Joy	In this presentation, Ethan Smith, Director of the Biomimicry Institute's AskNature program, reveals key audience insights gleaned from a decade's worth of surveys, interviews, and analytics. Ethan highlights best practices for human-centered design and user research, and envisions how some of today's most promising concepts might materialize via an array of tangible and relatable interface mockups. How might today's open source projects toward systematic biologically inspired design collaborate to best leverage these kinds of information and techniques?		Ethan Smith (The Biomimicry Institute)	8/16/2018 4:15pm	8/16/2018 4:45pm	Business
Neuromorphic Target Tracking and Control for Insect-Scale Aerial Vehicles	Insect-scale aerial vehicles have a wide variety of potential applications in areas such as search and rescue and surveillance in narrow or confined spaces, thanks to their small size. These insect-scale vehicles, however, are challenging to control because their response is characterized by dominant time scales on the order of only a few hundred milliseconds. Neuromorphic sensors and control techniques can potentially provide a biologically-inspired solution to this problem.		Taylor Clawson (Laboratory for Intelligent Systems and Controls, Cornell University)	8/16/2018 4:15pm	8/16/2018 4:45pm	Technical
Bio-inspired Augmented Reality for Astronaut Extra Vehicular Activity	Extra Vehicular Activities (EVAs) are a complex sequence of tasks that must be executed with precision in an uncertain and risky environment. In the current state, the Astronaut is supported during an EVA by audio communications with the flight crew and ground crew. While this approach has worked effectively for several decades, emerging augmented reality technologies offer new opportunities to improve the safety, reliability, and effectiveness of EVAs.		Dr. Shivakumar Sastry (Director, Data Science, University of Akron)	8/16/2018 4:15pm	8/16/2018 4:45pm	Education
V.I.N.E. Cluster Breakouts - How to Bring Business, Education and Technology to Build PeTaL (Periodic Table of Life)				8/16/2018 4:45pm	8/16/2018 5:30pm	Technical

Picnic in Cleveland Metroparks/ Rocky River Reservation	Picnic in the Park. Hike with a Naturalist. Be part of a swarm. This casual event in the Cleveland Metroparks at Willow Bend will feature a grilled dinner, a nature walk to discover the "genius of place" and an opportunity to be part of a swarm. Or just kick back and enjoy a relaxing summer evening in a beautiful park that's part of a nationally-awarded Metro Parks system.	Cleveland Metro Parks / Rocky River Reservation		8/16/2018 5:00pm	8/16/2018 7:00pm	All
Continental Breakfast				8/17/2018 8:00am	8/17/2018 8:45am	All
Welcome: Day 3	Welcome by Howard Thompson (Ohio Aerospace Institute) *Plenary Sessions 8:45 am - 11am*	OAI Auditorium	Chris Maurer (Principle Architect, redhouse Studio, LLC.)	8/17/2018 8:45am	8/17/2018 9:00am	All
Meet Zoo animal ambassadors	Meet a biological ambassador, Cleveland Metroparks Zoo			8/17/2018 9:00am	8/17/2018 9:15am	All
The Structural Form	The structural form seen in bones and tree branches defines their function and design. The natural meaning of structural form can be adopted in architectural structures and industrial design objects that might represent an alternative and more attractive vision.	OAI Auditorium	Dr. Luca Frattari (Director of Business Development, Altair)	8/17/2018 9:15am	8/17/2018 10:15am	Keynote
Break				8/17/2018 10:15am	8/17/2018 10:30am	All
Wind-Resilient Buildings and Structures: What Can We Learn from Nature?	The presented paper takes the biomimicry perspective on wind hazard mitigation by identifying the most vulnerable aspects of buildings and other civil structure in strong winds on one side, and the wind-resilient examples of biology systems on the other side, in order to link problem areas with potential biomimicry solution proposals.		Dr. Petra Gruber (Integrated Biosciences, University of Akron)	8/17/2018 10:30am	8/17/2018 11:00am	Technical
V.I.N.E. Clusters Report out - Including Communication Strategy, Targeted Solicitations, PeTaL Collaboration/ Application				8/17/2018 11:00am	8/17/2018 11:30am	Technical
City 2100			Phillip Vandermey (Spectacle-Bureau and University of Calgary)	8/17/2018 11:30am	8/17/2018 12:00pm	Technical
Lunch & Awards	Tom Tyrrell Award Al Hepp Award ART COMPETITION AWARDS Radiodurans Award (people's choice) Tardigrade Award (critics choice)	Ohio Aerospace Sunroom	Facilitator - H. Thompson (OAI)	8/17/2018 12:00pm	8/17/2018 1:30pm	All