

## Bioinspiration, Biomimetics, and Bioreplication IX

Monday - Tuesday 4 - 5 March 2019

### Conference Sessions At A Glance

SHOW | HIDE

Monday Plenary Session  
**1:** Robotics I  
**2:** Robotics II  
**3:** Environmental Biomimetics  
**4:** Biomimetic Optics  
 Tuesday Plenary Session  
**5:** Biomimetic Materials and Structures I  
**6:** Biomimetic Materials and Structures II  
**7:** Biomimetic Actuators  
**8:** Sensors  
 Poster Session

### Important Dates

SHOW | HIDE

Abstract Due:  
22 August 2018

Author Notification:  
29 October 2018

Manuscript Due Date:  
6 February 2019

### Conference Cosponsors



Sponsored by:

### Conference Committee

SHOW | HIDE

#### Conference Chair

Raúl J. Martín-Palma, Univ. Autónoma de Madrid (Spain)

#### Conference Co-Chairs

Mato Knez, CIC nanoGUNE Consolider (Spain)  
Akhlesh Lakhtakia, The Pennsylvania State Univ. (United States)

#### Program Committee

Javaan S. Chahl, Univ. of South Australia (Australia)  
Vincenzo Fiumara, Univ. degli Studi della Basilicata (Italy)  
Laurent A. Francis, Univ. Catholique de Louvain (Belgium)  
Olaf Karthaus, Chitose Institute of Science and Technology (Japan)

Program Committee continued...

Kwang Jin Kim, Univ. of Nevada, Las Vegas (United States)  
Mathias Kolle, Massachusetts Institute of Technology (United States)  
Bert Müller, Univ. Basel (Switzerland)  
Maurizio Porfiri, NYU Tandon School of Engineering (United States)  
Akira Saito, Osaka Univ. (Japan)  
Cordt Zollfrank, Technische Univ. München (Germany)

MONDAY 4 MARCH

[Show All Abstracts](#)

### Session Plen: Monday Plenary Session

Monday 4 March 2019  
 8:20 AM - 10:00 AM

Session Chairs: **Tribikram Kundu**, The Univ. of Arizona (USA) and **Gregory W. Reich**, Air Force Research Lab. (USA)

8:20 to 8:30am:

- 2019 NDE Lifetime Achievement Award presented to **Laurence J. Jacobs**, Georgia Institute of Technology (USA)
- 2019 SSM Lifetime Achievement Award presented to **Diann E. Brei**, Univ. of Michigan (Country)

#### Artificial intelligence-based structural health monitoring (Plenary Presentation)

Paper 10972-501

Author(s): Hui Li, Harbin Institute of Technology (China)

[Add To My Schedule](#)


#### The emerging technologies for future space missions (Plenary Presentation)

Paper 10965-500

Author(s): Fred Y. Hadaegh, Jet Propulsion Lab. (United States)

[Add To My Schedule](#)

---

## Session 1: Robotics I

---

Monday 4 March 2019  
10:30 AM - 12:10 PM


Session Chair: [Raúl J. J. Martín-Palma](#), Univ. Autónoma de Madrid (Spain)

---

### Design and modeling of biomimetic soft jellyfish robots with IPMC actuators

Paper 10965-1


Author(s): Zakai Olsen, Kwang Jin Kim, Univ. of Nevada, Las Vegas (United States)

[Add To My Schedule](#) 

### Autonomous robotic jellyfish actuated with shape memory alloy springs

Paper 10965-2


Author(s): Mohammad Ali Kazemi Lari, John A. Shaw, Univ. of Michigan (United States)

[Add To My Schedule](#) 

### Study on proper behavior of home robot supporting multiple residents

Paper 10965-3


Author(s): Takumi Kimura, Akira Mita, Keio Univ. (Japan)

[Add To My Schedule](#) 

### Variable stiffness soft robotics using pennate muscle architecture

Paper 10965-4


Author(s): Tyler E. Jenkins, Matthew Bryant, North Carolina State Univ. (United States)

[Add To My Schedule](#) 

### An information-theoretic approach to study hydrodynamic interactions in schooling fish

Paper 10965-5

Author(s): Peng Zhang, Elizabeth Krasner, NYU Tandon School of Engineering (United States); Sean Peterson, Univ. of Waterloo (Canada), NYU Tandon School of Engineering (United States); Maurizio Porfiri, NYU Tandon School of Engineering (United States)

[Add To My Schedule](#) 

---

**Lunch Break 12:10 PM - 1:10 PM**

---

## Session 2: Robotics II

---

Monday 4 March 2019  
1:10 PM - 2:10 PM


Session Chair: [Yoseph Bar-Cohen](#), Jet Propulsion Lab. (United States)

---

### Humanlike robots: the state of the art and the challenges (Keynote Presentation)

Paper 10965-6


Author(s): Yoseph Bar-Cohen, Jet Propulsion Lab. (United States)

[Add To My Schedule](#) 

### A pipe-crawling robot using bio-inspired peristaltic locomotion and modular actuated non-destructive evaluation mechanism

Paper 10965-7

Author(s): Hadi Fekrmandi, John Hillard, Phillip Hillard, South Dakota School of Mines and Technology (United States)

[Add To My Schedule](#) 

---

## Session 3: Environmental Biomimetics

---

Monday 4 March 2019  
2:10 PM - 3:20 PM


Session Chair: [Akhlesh Lakhtakia](#), The Pennsylvania State Univ. (United States)

---

### Evomimetics: the biomimetic design thinking 2.0 (Invited Paper)

Paper 10965-8

Author(s): Dominique Adriaens, Univ. Gent (Belgium)


[Add To My Schedule](#) 



### Biomimicry of school of fish for community windstorm design


Paper 10965-9

Author(s): Brandon Enbody, Amanda Melendez, Mariantonieta Gutierrez Soto, Univ. of Kentucky (United States)

[Add To My Schedule](#) **Can robotic fish help zebrafish learn to open doors?**

Paper 10965-10

Author(s): Yanpeng Yang, Tianjin Univ. (China), NYU Tandon School of Engineering (United States); Brandon LeMay, Rana El Khoury, Romain J. G. Clément, NYU Tandon School of Engineering (United States); Stefano Ghirlanda, Brooklyn College (United States), The Graduate Ctr., CUNY (United States), Stockholm Univ. (Sweden); Maurizio Porfiri, NYU Tandon School of Engineering (United States)

[Add To My Schedule](#) 

## Session 4: Biomimetic Optics

Monday 4 March 2019

3:50 PM - 5:30 PM

Session Chair: [Mato Knez](#), CIC nanoGUNE (Spain)**Optical changes in coleopteran wings induced by liquids and vapors** *(Invited Paper)*


Paper 10965-11

Author(s): Sébastien R. Mouchet, Univ. of Exeter (United Kingdom), Univ. de Namur (Belgium); Pete Vukusic, Univ. of Exeter (United Kingdom); Olivier Deparis, Univ. de Namur (Belgium)

[Add To My Schedule](#) **On the multi-functionality of colored insect scales** *(Invited Paper)*


Paper 10965-12

Author(s): Hendrik Hölscher, Karlsruher Institut für Technologie (Germany)

[Add To My Schedule](#) **Towards biomimetic red solar cells**


Paper 10965-13

Author(s): Torben A. Lenau, Technical Univ. of Denmark (Denmark); Akhlesh Lakhtakia, The Pennsylvania State Univ. (United States), Indian Institute of Technology (BHU), Varanasi (India); Faiz Ahmad, The Pennsylvania State Univ. (United States)

[Add To My Schedule](#) **Underwater solar navigation using the in-water light field**

Paper 10965-14

Author(s): Samuel B. Powell, N. Justin Marshall, The Univ. of Queensland (Australia)

[Add To My Schedule](#) **TUESDAY 5 MARCH**[Show All Abstracts](#)

## Session Plen: Tuesday Plenary Session


Tuesday 5 March 2019

8:30 AM - 10:00 AM

Session Chairs: **Tribikram Kundu**, The Univ. of Arizona (USA) and **Gregory W. Reich**, Air Force Research Lab. (USA)**Piezoelectric films for MEMS applications** *(Plenary Presentation)*


Paper 10967-500

Author(s): Susan Trolier-McKinstry, The Pennsylvania State Univ. (United States)

[Add To My Schedule](#) **Structural health monitoring: a view of the entrepreneur** *(Plenary Presentation)*

Paper 10972-500

Author(s): Tadeusz Uhl, AGH Univ. of Science and Technology (Poland)

[Add To My Schedule](#) 

## Session 5: Biomimetic Materials and Structures I


Tuesday 5 March 2019

10:30 AM - 12:00 PM

Session Chair: [Maurizio Porfiri](#), NYU Tandon School of Engineering (United States) **Bone-inspired solutions for novel strong and tough composites** *(Invited Paper)*

Paper 10965-15


Author(s): Flavia Libonati, Politecnico di Milano (Italy)

[Add To My Schedule](#) 

**Development of a conceptual demonstrator of an SMA-based rotorcraft blade twist system**


Paper 10965-16

Author(s): Salvatore Ameduri, Antonio Concilio, Ctr. Italiano Ricerche Aerospaziali (Italy)

[Add To My Schedule](#) **Biomimetic nanostructures on various polymer surfaces by plasma nanotexturing**


Paper 10965-17

Author(s): Y.P. Li, X.Y. Li, M.K. Lei, Dalian Univ. of Technology (China); Akhlesh Lakhtakia, The Pennsylvania State Univ. (United States)

[Add To My Schedule](#) **Adaptive and compliant wing tip devices enabled by additive manufacturing and multi-stable structures**

Paper 10965-18

Author(s): Kimberly Gustafson, Luis Urrutia, Univ. of Illinois (United States); Alexander Pankonien, Gregory Reich, Air Force Research Lab. (United States); Aimy Wissa, Univ. of Illinois (United States)

[Add To My Schedule](#) 

---

**Lunch Break 12:00 PM - 1:30 PM**

---

---

**Session 6:  
Biomimetic Materials and Structures II**

---

Tuesday 5 March 2019

1:30 PM - 2:30 PM


Session Chair: Flavia Libonati, Politecnico di Milano (Italy)

---

**Hybrid materials by mimicking mineralization from the vapor phase**


Paper 10965-19

Author(s): Mato Knez, CIC nanoGUNE (Spain)

[Add To My Schedule](#) **Morphogenesis of compliant thin shells mechanisms: bioinspiration and transformation of geometric surfaces**


Paper 10965-20

Author(s): Victor Charpentier, Sigrid Adriaenssens, Princeton Univ. (United States)

[Add To My Schedule](#) **Time-lapse imaging of bactericidal effect of nanostructural surface**

Paper 10965-21

Author(s): Takeshi Ito, Kansai Univ. (Japan)

[Add To My Schedule](#) 

---

**Session 7:  
Biomimetic Actuators**

---

Tuesday 5 March 2019

2:30 PM - 3:30 PM


Session Chair: [Torben A. Lenau](#), Technical Univ. of Denmark (Denmark)

---

**Actuation simplification for grippers based on bioinspired spring origami**


Paper 10965-22

Author(s): Salvador Rojas, David M. Boston, Andres F. Arrieta, Purdue Univ. (United States)

[Add To My Schedule](#) **Bio-inspired orderly recruitment valve for fluidic artificial muscles**


Paper 10965-23

Author(s): Dheeraj Vemula, Matthew Bryant, North Carolina State Univ. (United States)

[Add To My Schedule](#) **Flow- and temperature-induced structural changes of liposomes**

Paper 10965-24

Author(s): Bert Müller, Marzia Buscema, Sofiya Matvykiv, Hans Deyhle, Univ. Basel (Switzerland)

[Add To My Schedule](#) 

---

**Session 8:  
Sensors**

---



Tuesday 5 March 2019

4:00 PM - 5:40 PM


Session Chair: Hendrik Hölscher, Karlsruher Institut für Technologie (Germany)

---

**Digitization of biomimetic vision sensor based on the common housefly**

Paper 10965-25


Author(s): Sakshi Agrawal, Brian Dean, Oakland Univ (United States)

[Add To My Schedule](#) 

**Finite element analysis of structural implications of Basilar membrane measurements**

Paper 10965-26


Author(s): Mohammad Sadegh Saadatzi, Vahid Tavaf, Sourav Banerjee, Univ. of South Carolina (United States)

[Add To My Schedule](#) 

**Liquid metal-based bio-inspired capacitive flow sensor**

Paper 10965-27


Author(s): James P. Wissman, Kaushik Sampath, Charles A. Rohde, U.S. Naval Research Lab. (United States)

[Add To My Schedule](#) 

**Behavior prediction for several seconds using human body model and non-contact sensor**

Paper 10965-28


Author(s): Yosuke Kimura, Keio Univ. (Japan)

[Add To My Schedule](#) 

**The structural colors of the blue butterflies: from sexual signaling to chemically selective vapor sensing**

Paper 10965-29

Author(s): Gábor Piszter, Krisztián Kertész, Hungarian Academy of Sciences Ctr. for Energy Research (Hungary); Zsolt Bálint, Hungarian Natural History Museum (Hungary); László P. Biró, Hungarian Academy of Sciences Ctr. for Energy Research (Hungary)

[Add To My Schedule](#) 

---

## Session PTue: Poster Session

---

Tuesday 5 March 2019

6:00 PM - 7:30 PM


Conference attendees are invited to attend the joint poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster authors must set up their poster between 10 am and 4 pm on Tuesday 5 March. [View poster presentation guidelines.](#)

---

**Prolonging lifetime of pneumatic artificial muscle using strain-induced crystallization**

Paper 10965-30


Author(s): Akihiro Kojima, Manabu Okui, Yasuyuki Yamada, Taro Nakamura, Chuo Univ. (Japan)

[Add To My Schedule](#) 

**Lighting control using natural gestures of resident**

Paper 10965-31


Author(s): Toshiki Minagawa, Akira Mita, Keio Univ. (Japan)

[Add To My Schedule](#) 

**Repel high-speed waterdrops for polyethylene nanowire bundles by plasma nanotexturing**

Paper 10965-32

Author(s): X.Y. Li, Y.P. Li, I. Muzammil, X. Liu, M.K. Lei, Dalian Univ. of Technology (China); Akhlesh Lakhtakia, The Pennsylvania State Univ. (United States)

[Add To My Schedule](#) 

**Fabrication of bioinspired micro/nanotextured surfaces by femtosecond laser processing**

Paper 10965-33

Author(s): Miguel Martínez-Calderon, Ainara Rodríguez, CEIT-IK4 (Spain), Univ. de Navarra (Spain); Vicente Torres-Costa, Miguel Manso-Silván, Univ. Autónoma de Madrid (Spain); Santiago M. Olaizola, CEIT-IK4 (Spain), Univ. de Navarra (Spain); Raúl J. J. Martín-Palma, Univ. Autónoma de Madrid (Spain)

[Add To My Schedule](#) 