ONR Jellyfish Review - Presentation Outline "Jellyfish Autonomous Node and Colonies"

Program Overview - Shashank Priya (20 minute) (8:30 - 8:50)

I. Continuing from September 2009, Propulsion Analysis of Biomimetic Vehicle (90 minute) (8:50 - 10:20 AM)

- Biomimetics - Development of *Aurelia Aurita* species and *Cyanea* and analysis of platform
    - Design Challenges (Alex Villanueva) (5 minute)
    - Fabrication (Colin Smith) (10 minute)
    - Testing at Wood's Hole (Alex Villanueva and Colin Smith) (10 minute)
- BISMAC actuator optimization and control (Alex Villanueva) (10 minute)
- Vehicle modeling (Keyur Joshi) (15 minute)
- MFC actuators based propulsion (Dan Inman) (10 minute)
- Conducting Polymer Jellyfish and JetSum (Colin Smith) (10 minute)
- Progress in Conducting Polymer Muscles based on Pt/PPy (Yonas Tadesse) (10 minute)
- IPMC Actuators - Current Status and Future (Don Leo) (10 minute)

Break (10 minutes)

II. Biological Understanding and Inspiration (45 minute) (10:30 - 11:15 AM)

- Jack Costello
- Sean Colin
- John Dabiri

III. Biological Sensory Organs, Communication Features, and Energy Generation (65 minute) (11:15 - 12:20 PM)

- Lipid Bilayer (Andy Sarles) (30 minute)
    - Bio-luminescence
    - Sensing
    - Bio-energy harvesting

- Communication Protocols with comparative analysis (35 minute) (Zainul Charbiwala, Jonathan Friedman)
    - Electrostatic, Acoustic and optical modalities

Lunch (60 minutes) [12:20 - 1:20 PM]

IV. Bio-Inspired Navigation Schemes (40 minute) (1:20 - 2:00 PM)

- Thermoacoustic projectors (15 minute) (A. Aliev)
- Undersea GPS system using magnetic guidance from earth (25 minutes) (Junqi Gao, Shen Liangguo)

V. Salinity Sensing and Organic Electronics (30 minute) (2:00 - 2:30 PM)

- Breakthroughs in organic electronics and current power handling capability (Wei Xiong)
- Progress in salinity sensor development (Anatoliy Sokolov)
- Challenges in organic electronic powered salinity sensor (Anatoliy Sokolov)

VI. Current Important Questions (60 minute) (2:30 - 3:30 PM)

- How are we going to achieve energy autonomy? - Solar and Fuel Power
    - Limitations with Solar Energy Harvesting (Keyur Joshi) (10 minute)
- Hydrogen powered Vehicles
    - Fuel Powered SMA's (David Novitski / Carter Haines) (15 minute)
    - Torsional Actuators and CNT-based supercapacitors for energy storage (David Novitski / Carter Haines) (15 minute)
- Experimental Progress made on Fuel Powered Aurelia Aurita (Yonas Tadesse) (15 minute)
- Summary (Shashank Priya) (5 minutes)

DISCUSSION AND COMMENTS FROM DR. BRIZZOLARA