NPS Defense Energy Program Presents:

Defense Energy Seminar

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A Technical and Operational Perspective on the DOE Energy Innovation Hub in Fuels from Sunlight, the Joint Center for Artificial Photosynthesis

01 November 2013 – ME Auditorium 1300

With Guest Lecturer Professor Nathan. S. Lewis

California Institute of Technology,
Division of Chemistry and Chemical Engineering,
Beckman Institute and Kavli Nanoscience Institute

Professor Nathan. S. Lewis

The design of highly efficient, non-biological, molecular-level energy conversion "machines" that generate fuels directly from sunlight, water, and carbon dioxide is both a formidable challenge and an opportunity that, if realized, could have a revolutionary impact on our energy system. Basic research has already provided enormous advances in our understanding of the subtle and complex photochemistry behind the natural photosynthetic system, and in the use of inorganic photo-catalytic methods to split water or reduce carbon dioxide–key steps in photosynthesis. Yet we still lack sufficient knowledge to design solar fuel generation systems with the required efficiency, scalability, and sustainability to be economically viable.

Topics will include:

- Feasible and functional prototype and blueprint for an artificial photosynthetic system
- Both the operational and technical scope of the JCAP Hub
- Technical results towards this goal that have recently been developed at Caltech

Abridged Biography:

Dr. Nathan Lewis, the George L. Argyros Professor of Chemistry, has been on the faculty at the California Institute of Technology since 1988 and has served as Professor since 1991. He is the Scientific Director of the Joint Center for Artificial Photosynthesis, the Energy Innovation Hub in Fuels from Sunlight, and has also served as the Principal Investigator of the Beckman Institute Molecular Materials Resource Center at Caltech since 1992. He is currently the Editor-in-Chief of the Royal Society of Chemistry journal, Energy & Environmental Science. He has published over 300 papers and has supervised over 60 graduate students and postdoctoral associates.

His research interests include artificial photosynthesis and electronic noses. Technical details of these research topics focus on light-induced electron transfer reactions, both at surfaces and in transition metal complexes, surface chemistry and photochemistry of semiconductor/liquid interfaces, novel uses of conducting organic polymers and polymer/conductor composites, and development of sensor arrays that use pattern recognition algorithms to identify odorants, mimicking the mammalian olfaction process.

Naval Postgraduate School