



SAINT-GOBAIN MATERIALS SCIENCE LECTURE

LIGHT AS FUEL

HARRY ATWATER

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Howard Hughes Professor of Applied Physics and Materials Science
California Institute of Technology

With a brief introductory talk by
Julia DiCorleto
Director of Saint-Gobain Research North America
Saint-Gobain

Photonics Center, Room 906
May 7, 2019 at 4PM
Wine reception to follow

Host: Professor Lawrence Ziegler, Chemistry Chair and MSE Associate Head

DIVISION OF MATERIALS SCIENCE & ENGINEERING

BU.EDU/MSE



special guest speaker

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Howard Hughes Professor of Applied Physics and Materials Science
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LIGHT AS FUEL

Research in nanophotonics is opening conceptually new paths to address the grand challenge of using light as a chemical fuel. This is the challenge of direct synthesis of energy-dense chemical fuels from solar energy, including hydrogen and products from reduction of carbon dioxide. I will discuss recent advances in nanophotonics to enable efficient and selective photocatalysis and light-driven photoelectrocatalysis.

A second grand challenge for nanophotonics is the use of light as a rocket fuel. This is the challenge of designing light-propelled spacecraft capable of reaching the stars beyond our solar system, since light itself is the only fuel capable of propelling spacecraft to the relativistic speeds needed to achieve interstellar travel. Recently, the Breakthrough Starshot initiative has captured scientific imagination and motivated thinking about conceptual prototypes for light-driven spacecraft that could reach nearby stars within a human lifetime. I will describe how this audacious concept may be closer than we imagine, if advances in materials and nanophotonics can enable key concepts for spacecraft propulsion, instrumentation and communications.

BIO Harry Atwater is currently Howard Hughes Professor and Professor of Applied Physics and Materials Science at the California Institute of Technology. Professor Atwater currently serves as Director of the DOE Joint Center for Artificial Photosynthesis. His research interests center around two interwoven research themes: photovoltaics and solar energy, and nanophotonics and plasmonics. He is an early pioneer in surface plasmon photonics; he gave the name to the field of plasmonics in 2001. He has also created new light management principles for solar cells and high efficiency solar cell designs. He is the co-founder of the company Alta Devices, which holds the current world records for solar module efficiency and single junction cell efficiency at one Sun illumination, and which is currently taking high efficiency photovoltaics to manufacturing. His work in the solar and plasmonics field has been featured in Scientific American and in research papers in Science, Nature Materials, Nature Photonics and Advanced Materials. He also serves as Editor in Chief for the journal ACS Photonics, and is Associate Editor for the IEEE Journal of Photovoltaics, and in 2006 he founded the Gordon Research Conference on Plasmonics. He is a Fellow of the SPIE, Materials Research Society, American Physical Society and a member of the US National Academy of Engineering.



introductory speaker

JULIA DICORLETO

Director of Saint-Gobain Research North America
Saint-Gobain

SAINT-GOBAIN: MATERIALS THAT POWER LIFE

Saint-Gobain Research (SGR) North America is a multi-disciplinary research and development center located in the Greater Boston area. SGR North America develops and interfaces with other R&D centers around the world to help accelerate Saint-Gobain's business growth by developing materials and solutions which are key ingredients in the wellbeing of each of us and the future of all. Teams at SGR North America work with businesses and customers to solve problems in challenging industrial markets. Combining expertise in materials science, process technologies, and markets, our scientists and engineers use their technical mastery to deliver ceramic, abrasive and high-performance polymer solutions as well as building materials and technical fabrics.

BIO Julia DiCorleto is the Director of Saint-Gobain's R&D Center in Northboro, MA. Dr. DiCorleto previously held the position of General Manager of the Tape Solutions Business, a world leader in specialty tapes for bonding, protection and insulation. She began her career in Saint-Gobain in Research & Development. Over the years, she held various positions of increasing responsibility in R&D and business activities.

Dr. DiCorleto holds a B.S. in chemical engineering & materials science from the University of Connecticut (Storrs, CT) and a PhD in polymer science/chemical engineering from the Massachusetts Institute of Technology (Cambridge, MA). Prior to her industrial career Dr. DiCorleto spent two years at the JJ Thomson Physical Laboratory at the University of Reading (Reading, England).

AGENDA

3:45PM	Coffee
4:00PM WELCOME	Professor David Bishop MSE Division Head
INTRODUCTION	Professor Lawrence Ziegler Chemistry Chair and MSE Associate Head
INTRODUCTORY SPEAKER	Dr. Julia DiCorleto Director of Saint-Gobain Research North America
SPECIAL GUEST SPEAKER	Professor Harry Atwater Howard Hughes Professor of Applied Physics & Materials Science
RECEPTION	Wine & cheese reception 7 th floor atrium

SPONSORS

Saint-Gobain
Division of Materials Science and Engineering
Boston University

HOST

Professor Lawrence Ziegler
Chemistry Chair and MSE Associate Head

PROFESSOR ZIEGLER WARMLY ACKNOWLEDGES

Division of Materials Science and Engineering Head David Bishop,
Ruth Mason, Elizabeth Flagg and Gabriella McNevin

Additional thanks to BU Associate Vice President,
Industry Engagement Marc Scatamacchia

