



Woodrow Wilson
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Tomorrow's Green Nanofactories *New podcast explores how viruses produce eco-friendly batteries*

WASHINGTON, DC—Viruses are notorious villains. They cause serious human diseases like AIDS, polio, and influenza, and can lead to system crashes and data loss in computers.

A new podcast explores how nanotechnology researcher Angela Belcher, from Massachusetts Institute of Technology (MIT), is working with viruses to make them do good things. By exploiting a virus's ability to replicate rapidly and combine with semiconductor and electronic materials, she is coaxing them to grow and self-assemble nanomaterials into a functional electronic device. Through this marriage of nanotechnology with green chemistry, Belcher and her team are working toward building faster, better, cheaper and environmentally-friendly transistors, batteries, solar cells, diagnostic materials for detecting cancer, and semiconductors for use in modern electrical devices—everything from computers to cell phones.

Unlike traditional semiconductor or battery manufacturing which requires expensive and toxic chemicals, Belcher's nanofactories generate little waste, grow at room temperature, and promise to be inexpensive and largely biodegradable.

Does all this sound too good to be true? Judge for yourself. Listen to an interview with Dr. Belcher, a 2004 winner of a MacArthur Foundation "Genius Award." It is second in an exciting new series of podcasts called ***Trips to the NanoFrontier***. These podcasts are available online at www.penmedia.org/podcast, or directly from Apple's iTunes music store.

These podcasts and a recent publication, ***NanoFrontiers: Visions for the Future*** (www.nanotechproject.org/114), are written by freelance science writer Karen F. Schmidt. Both focus on nanotechnology's ability to address the energy crisis, the need for better medical treatments, and the demand for clean water. They are based on a two-day NanoFrontiers forecasting workshop held in February 2006, sponsored by the National Science Foundation (NSF), National Institutes of Health (NIH), and the Project on Emerging Nanotechnologies, which is an initiative of the Woodrow Wilson International Center for Scholars and The Pew Charitable Trusts.

"Nanotechnology is the future. In 2006 alone, governments, corporations, and venture capitalists spent \$12 billion on nanotechnology research and development worldwide. Nanotechnology promises to change just about everything—our medical care, energy sources, communications and food. It is leading us to what many in government and industry are calling 'The Next Industrial Revolution.' Society needs to prepare *now* for how to exploit and harness its potential, especially to ensure that nanotechnology makes possible a greener, more sustainable tomorrow," said David Rejeski, director of the Project on Emerging Nanotechnologies at the Wilson Center.

"Dr. Belcher's research with viruses, proteins and yeast offers hope for new, ground-breaking solutions to the world's energy problems. It holds out the prospect of using nanotechnology in a variety of ways, ranging from improving the efficiency of production, storage, and transmission of

energy to overcoming many of the obstacles to a hydrogen-based transportation system based on fuel-cell powered cars and trucks,” according to Rejeski.

About Nanotechnology

Nanotechnology entails the measurement, prediction and construction of materials on the scale of atoms and molecules. A nanometer is one-billionth of a meter, and nanotechnology typically deals with particles and structures larger than 1 nanometer, but smaller than 100 nanometers. To put this into perspective, the width of a human hair is approximately 80,000 nanometers. In 2014, Lux Research estimates that \$2.6 trillion in manufactured goods will incorporate nanotech, or about 15 percent of total global output.

The **Project on Emerging Nanotechnologies** is an initiative launched by the **Woodrow Wilson International Center for Scholars** and **The Pew Charitable Trusts** in 2005. It is dedicated to helping business, government and the public anticipate and manage possible health and environmental implications of nanotechnology. For more information about the project, log on to www.nanotechproject.org.

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