

North Penn High School Engineering Academy Students Present at Philly Materials Day

North Penn High School Engineering Academy, The Future is N.E.A.R. (Nanotechnology Education and Research)

Philadelphia, Pennsylvania—February 7, 2015— Six NPHS engineering academy seniors, Joe DiFeo, Alex Noce, Connor Sloan, Alex Pham, Brandon Berlin and Rahul Pendurthi presented the nanotechnology research they have been performing so far this year at the 5th annual [Philly Materials Day](#) event held at [Drexel University](#) in Philadelphia, Pennsylvania.

“Philly Materials Day raises public awareness of the importance of materials science and engineering. Nearly everything in the world around us is made of something—stuff. Materials science and engineering is the study of that stuff—materials—and how we use the stuff to create useful things for everyday life. The event allows people of all ages a chance to explore some of the stuff the world is made of and to learn about how materials impact us every day. Now entering its fifth year, the 2015 Philly Materials Day will organize activities around five key themes: communication, earth, energy, health, and sports.”

[<http://drexel.edu/engineering/news/archive/2014/December/FifthAnnualPhillyMaterialsDay/>]

The North Penn High School student’s research endeavors, which focus upon two themes: Electronic Textiles and Solar Energy Harvesting, have been made possible by grants from the [North Penn Educational Foundation](#) and [The Dow Chemical Corporation](#).

The students presented their research and the science behind their work from 10am to 4pm alongside students from Drexel University, The University of Pennsylvania and many local businesses. During their presentations, visitors of all ages viewed their demonstrations, asked questions and opened a dialog about their research. Ideas were exchanged with many visitors which spawned further ideas for their research.

There are three other teams this year performing research in the EDD course at North Penn High School. BCC Biotechnologies: their work focuses upon Antibacterial and bio-absorbable nanofabrics, DeltaTech: their work focuses upon another way of producing nanofibers and nanoscale structures known as Melt-Electrospinning and BCS Technologies is researching and developing High Temperature Superconductive Nanofibers. The students will be utilizing professional research quality characterization equipment and a scanning electron microscope on loan from [Angstrom Scientific](#) to analyze their work in the coming weeks. The teams will be offering a presentation to the community on June 3, 2015 at 7pm in the audion at North Penn High School.

The Future is N.E.A.R. (Nanotechnology Education and Research) program parallels the senior capstone course, Engineering Design and Development (EDD), of the North Penn High School Engineering Academy. The program offers its students an opportunity to gain 21st century skills that will prepare them to become successful leaders in a technological global society. The program introduces the fundamentals of nanotechnology, engineering research and a rigorous application of their knowledge and skills to high school students while cultivating their interest in engineering, problem solving and life-long learning. Students seek opportunities to research & develop solutions to global issues by capitalizing from fundamentals of nanotechnology and engineering research utilizing the latest published research available.

If you are interested in learning more about their research, the Engineering Academy or the Technology and Engineering Education Department, please visit their websites: www.northpennengineering.org or www.thefutureisnear.org.

Team Research Statements:

Research Team: Valence (Brandon Berlin, Rahul Pendurthi and Alex Pham)

A solar cell is a photovoltaic that converts light energy into usable electrical energy through the photovoltaic effect. Certain materials exhibit this property. As the atoms absorb photons, the electrons from the valence shell are energized and are elevated to the conduction band. As electrons go into an excited state, they generate a potential difference or electromotive force, which drives the electron through the external circuit.

Current endeavors to make a commercially viable and efficient solar cells have led to advancements in dye sensitized solar cell (DSSC) research. By altering dye, semi-conducting material, and electrolytes, we intend to look for a more efficient DSSC using multiple semi-

conducting materials for multijunction cells, instead of having only TiO₂. We will also research on other novel solar regeneration methods such as photocatalysis and plasmoelectricity.

Research Team: Electrifier (Joe DiFeo, Alex Noce and Connor Sloan)

Electronic textiles, or e-textiles, are fabrics that have either electronics woven into them or are made of a conductive material. They possess the characteristics of metals and other electrically conductive materials while still maintaining the flexibility and versatility of a fabric. Our goal is to create conductive polymer fibers through a simplified wet spinning process. In wet spinning, a material that is in solution is extruded into a bath in which the material coagulates into a fibrous strand. A simplified process can fuel the growing e-textile industry by minimizing materials and cost. This process is used to create Kevlar and Spandex.



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(From L to R) Joe DiFeo, Alex Noce, Connor Sloan, Alex Pham, Brandon Berlin and Rahul Pendurthi



More Images are available: http://www.thefutureisnear.org/news/PressReleases/02-07-15_Philly_Materials_Day/