Greetings!
The Engineering New Frontiers Program is an excellent opportunity for us to provide you with a taste of engineering education and to introduce you to The Catholic University of America and Washington, D.C. Our staff and faculty have worked diligently to create a program that will not only expose you to the theoretical and practical aspects of engineering, but also will broaden your horizons by enabling you to experience college life firsthand. I strongly encourage you to participate in this program and come experience engineering in our nation’s capital with us.

Charles Cuong Nguyen, D.Sc.
Dean, School of Engineering

Explore the wide variety of engineering opportunities this summer at CUA
Engineering New Frontiers (ENF) is a weeklong, residential summer camp for rising high-school juniors and seniors held on the campus of The Catholic University of America from July 22 to 28, 2012. At ENF, students will work closely with CUA engineering faculty members to explore the wide variety of engineering opportunities in our society. Through classes, demonstrations, and hands-on experiments, students will experience how college engineering majors and professional engineers do. Living on campus, students also get a “taste” of college and exposure to the best of Washington, D.C.—including special museum tours, sporting events, and various other safe recreational activities.

Tuition Costs
The cost for the camp, room, board, and outside activities is $650 per person.

For more information and application materials contact Mary Kate Zabroske, Program Director
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http://engineering.cua.edu/ENF.cfm

Camp Curriculum
Students enrolled in the camp work in teams for the week. They will be introduced to the following engineering concentrations:

Biomedical Engineering: Biomaterials and Tissue Engineering: The world of biomedical engineering is moving in exciting directions. In this section students get a broad overview of biomedical engineering and learn how different biomaterials are used in various areas of medicine and health. The focus will be on how biomedical engineers are working to grow tissues and organs, such as bones and heart muscle—tissue engineering—that help people with bone and cardiac problems.

Civil Engineering: Water and Wastewater Treatment: Water runoff from streets, parking lots, yards, and farms affects the ecosystem, fish, and human health. In this section, students focus on the importance of water and wastewater treatment (to remove pollutants/microbes) and the impact of discharges of untreated wastewater into water bodies. They also examine the processes—settling, filtration, disinfection, coagulation, and flotation—used to purify water for drinking and treatment of sewages.

Electrical Engineering: Solar Concentrator Project: From the sun to electricity: how does it happen? In this section, students learn the general properties of electrical circuits, including descriptions and explanations of voltage, current, power, resistance, and other electrical properties. Using that knowledge, students build solar concentrators and measure solar cell output to quantify voltage, current, power, and resistance. This project highlights the importance of alternative and renewable energy.

Computer Science: Robotics: The life of a robot isn’t simple. In this section, students focus on the complexity of robotic systems. Robots are expected to explore unknown, dynamic, or possibly hazardous environments, and must be equipped to respond to unanticipated changes in their environments. Robots work in a variety of places: in space and underwater, in manufacturing plants, in households, as toys, in medicine and health care surgical systems and pharmaceutical dispensaries, and for navigation as vehicle control.

Mechanical Engineering: Glider Design: Gliding on air currents seems carefree, but requires astute engineering. In this section students focus on flight, learning about glider design, then designing, building, and launching gliders. In the process students gain an appreciation for the sometimes conflicting objectives of having the gliders fly the longest distance and having them stay aloft the longest time.

Faculty
Each section will be led by CUA faculty experts who are also professionals in their fields.

Otto Wilson Jr., Ph.D., biomedical engineering, received a National Science Foundation CAREER award in 2007 for his work involving bone inspiration in research and education. In addition to those topics, he studies nanomaterials, chemistry and biological liquid crystals.

Arash Massoudieh, Ph.D., civil engineering, studies water, especially the effects of contaminants from storm water and contaminated sediments on ecological systems, fish populations, streams, and wetlands, as well as how bacteria transfer genes in porous media.

Scott Mathews, Ph.D., electrical engineering, recently established the Alternative and Renewable Energy track at CUA. He also conducts research in the areas of electromagnetic materials, lasers, and high explosives detection.

Erion Plaku, Ph.D., computer science, focuses his research on motion planning and enhancing automation in human-machine cooperative tasks in complex domains, such as robotic-assisted surgery, mobile robotics, manipulation robotics, and hybrid systems.

Rene Gabbai, Ph.D., mechanical engineering, has focused on the characterization of the structural response of marine risers and conductors covering a full range of configurations used in the search and extraction of hydrocarbons. He also studies tall building response to wind loading and making dynamically sensitive structures reliable.

In addition to the faculty, who will lead each section, deliver lectures, and prepare and supervise experiments, among other related activities. Catholic University engineering undergraduates will be on hand as counselors and lab assistants to help guide students through the program. Resident Assistants will supervise the students’ residence hall stays.