

Students at NJIT
Karisa Solt

Karisa Solt is an undergraduate student in the Biomedical Engineering Program at NJIT. She has earned a GPA of 3.99+. She is a member of the NJIT Women’s Soccer Team.

Based upon her record and her status as a Biomedical Engineering student at NJIT, she is one of the few students from across the country



who has been accepted into a summer internship program “Research Experience for Undergraduates (REU) Neuroscience Program.” This Research Experience for Undergraduates (REU) at Johns Hopkins University is a ten-week program consisting of research, seminars, and field trips. In addition to her research, she will participate in lectures on medical procedures, ethics in engineering research, and computer-integrated surgery, and will complete a report and presentation on her area of research. She will be a part of a laboratory conducting research related to understanding the role of the physiological environment and vascularization on tumor progression, invasion, and metastasis.

We look forward to Karisa’s return in the Fall when she will report her experiences to us.

Saint Barnabas Medical Center

Each summer several NJIT BME students participate in the NJIT/SBMC Surgical Observership Program where they attend operations, make rounds with surgeons and attend medical lectures. Students make recommendations for improving some aspect of hospital procedures.

Peter Marchetto

“The Development of a Portable Tonometer”

Peter Marchetto is a high school student from Bergen Academy who has been working for the past several months with Professors Gordon Thomas [Biomedical Engineering and Physics], Richard Greene [Biomedical Engineering] and Tara Alvarez [Biomedical Engineering] at NJIT.



Most patients with glaucoma exhibit elevated intra-ocular pressure (IOP). A cost effective device that allows the patient to measure his- or her own IOP at regular intervals may reduce vision loss. The research that Peter is doing has involved testing the Bausch & Lomb Proview™ self-tonometer against a calibrated force meter. It further compared the Proview™ tonometer with results from the clinical gold standard, the Goldmann Tonometer. Results obtained by Peter show that the Proview™ Tonometer has inaccuracies in calibration and uncertainties in clinical applications. Our laboratory is currently developing a self-tonometer (which a patient could use on him- or herself) and which will provide better accuracy and precision, and which will be cost-effective and easy to use compared to commercially available devices.

UMDNJ – NJ Medical / NJ Dental Schools

NJIT BME students have the opportunity to work on research projects during the academic year or the summer at the University of Medicine and Dentistry of New Jersey, just a short walk from the NJIT campus.

Biomedical Engineering at



The New Jersey Institute of Technology

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NJIT offers
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Biomedical Engineering Staff

David Kristol, Chairman
(973) 596-3584; Kristol@njit.edu

Clare Naporano, Assistant to the Chair
(973) 596-5476; naporano@njit.edu

“Neuromuscular Modeling of Spasticity in Cerebral Palsy”

Professor Richard Foulds

Data from the pendulum knee test has been used to develop two active models that use external torques to closely match the experimental knee trajectories of subjects with spasticity due to cerebral palsy. These data were collected from three subjects who are identical triplets; two of whom have clinically measurable spasticity. A passive model that accurately describes the knee trajectory of the non-spastic subject serves as the passive plant for two active models. One of these models allows direct application of external torques, and the second provides additional torque as the result of velocity feedback. Both active models and the passive model use separate parameters of stiffness and damping for the agonist and antagonist muscles.

Cerebral Palsy is defined as a set of disabling conditions resulting from an insult to the brain usually suffered before, during, or immediately following birth. These conditions are non-progressive in nature and include discoordination, spasticity, athetosis, and ataxia. The incidence of cerebral palsy is between two and six in every 1,000 live births. It is agreed that spasticity is the most common disabling condition seen in cerebral palsy. Among those with spasticity, the majority have spasticity in both lower limbs. Spasticity is known to be a hypersensitive, velocity-dependent response to a passive muscle stretch. Data from our Pendulum Test can be used to quantify the movement about the knee joint. The viscoelastic properties of the connective tissue of the knee allow us to evaluate the parameters of stiffness and damping.

“The Effects of Vision Therapy for Patients with Convergence Insufficiency”

Professor Tara Alvarez

Convergence Insufficiency [CI] is present in 7% of the population (20 million people in the U.S., mainly young adults and children) and severely affects the amount of near-term work a person can perform, limiting a person's productivity and quality. Based on several studies, vision therapy had a 72% cure rate for CI. However, it remains unknown precisely how this therapy modifies oculomotor control. Our research, comparing responses from normal to convergence insufficient populations is providing critical insights into the neural strategy the brain utilizes to process binocular disparity and blur visual information. This insight will lead to better therapies, so that additional patients can receive more effective and efficient treatment resulting in health care cost reduction. The methodology includes 1) recording dynamic vergence eye movements of the normal and convergence insufficient populations, 2) quantifying and comparing the responses by modeling and digital signal processing, 3) performing vision therapy on the convergence insufficient population with periodic monitoring of progress, and 4) quantifying results after a time period of six months to determine how the vergence neural mechanism and control have changed. This work is being done collaboratively among three investigators, including Kenneth Ciuffreda and Michael Lacker, as well as Professor Alvarez.

Northeast Bioengineering Conference

We are proud to announce that two of our students won prizes at the Northeast Bioengineering Conference that was held on April 20-21.

Biren Bhatt won First Prize for his presentation of “A Functional Clotting Assay to Monitor Low Molecular Weight Heparin”

Kiran Patel won Third Prize for her presentation “Integrating Biomedical Engineering into the Undergraduate Curriculum”

Get a head start on your Biomedical Engineering career – come to NJIT



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