

NYU-poly

POLYTECHNIC INSTITUTE OF NYU

Applying Mechatronics to Promote Science (AMPS)

PIs: Vikram Kapila, Magued Iskander, & Noel Kriftcher

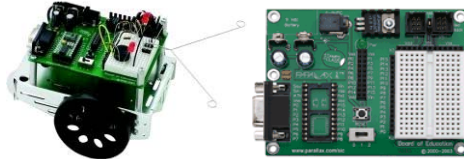
Senior Personnel: Dariusz Czarkowski, Rastislav Levicky, & Maurizio Porfiri

Fellows: Nicole Abaid, Peter James Baker, Jennifer Haghpanah, Michael Hernandez, Damion Irving, Pavel Khazron, Alexander Kozak & Keeshan Williams

GK-12 Fellows Grant DGE-0741714

Integration of Robotics & Mechatronics

- Enrich STEM learning
- Enhance technology proficiency
- Afford opportunities to students to develop, apply, and enhance their STEM skills

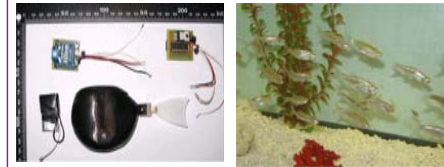
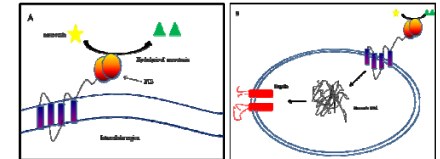


- Integrate mechatronics in physics labs to teach concepts such as force and pressure
- Introduce binary numbers by programming and testing a Morse code generator
- Springboard to teach programming languages such as PBasic and Matlab



Integration of Robotic Fish & Robotic Bacteria

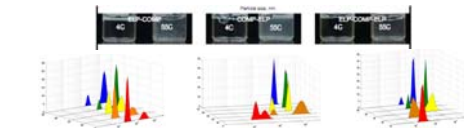
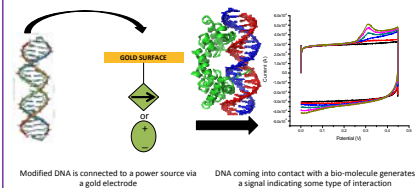
- Development of a marine biology and underwater robotics based fun-science exhibit at New York Aquarium
- Investigate physiological sensors of fish to assist students in understanding sensors



- Draw analogies between biological systems (nervous system, micro-organism, etc.) and electrical circuitry
- Implant current news stories about stem cells to demonstrate the importance of science in global community

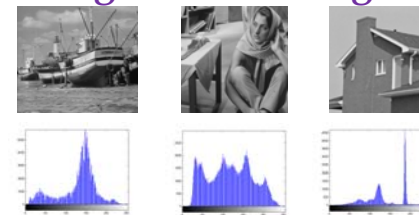
Integration of Biosensors & Biopolymers

- Biosensor technology
- Characterizing interaction of DNA with other biomolecules
 - Classroom integration: Lab safety, measurements, cause-effect, scientific inquiry, etc.



- Influence of environmental stimuli to trigger biological responses
 - Classroom integration: animal survival in its environment
- Novel robotic illustration to mimic the functions of protein and DNA
 - Classroom integration: biologically-inspired engineering design

Integration of Image Processing & Cryptography



- How real-world images are acquired, stored, and processed on a computer
- How to improve video which has been corrupted by noise
 - Classroom integration: computer programming

- Use hash algorithms and encryption to explain cryptography
- Explain importance of cyber security and ethics in engineering

