Reverse Engineering the Basic Sciences Deans Working Together: The Rowan Educational Perspective

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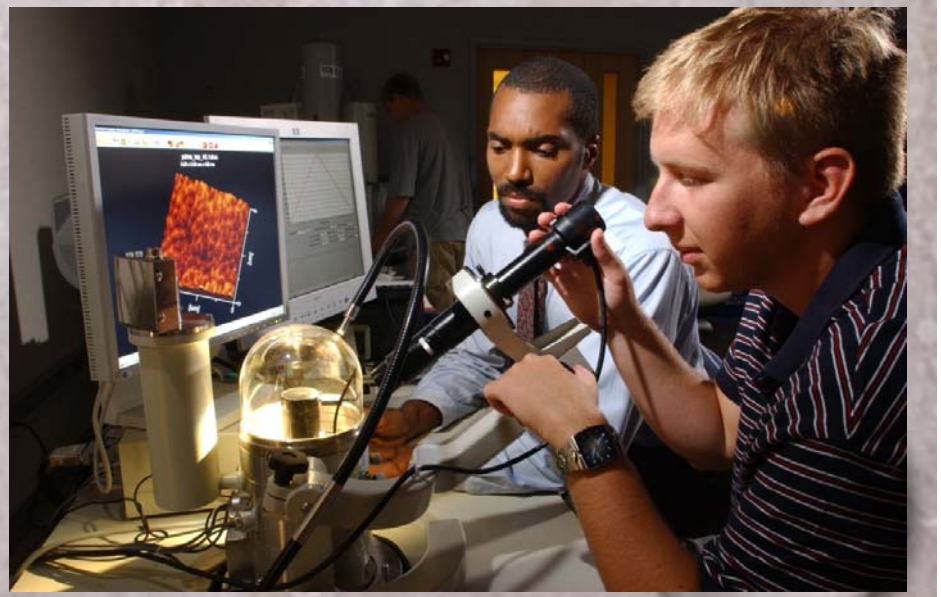
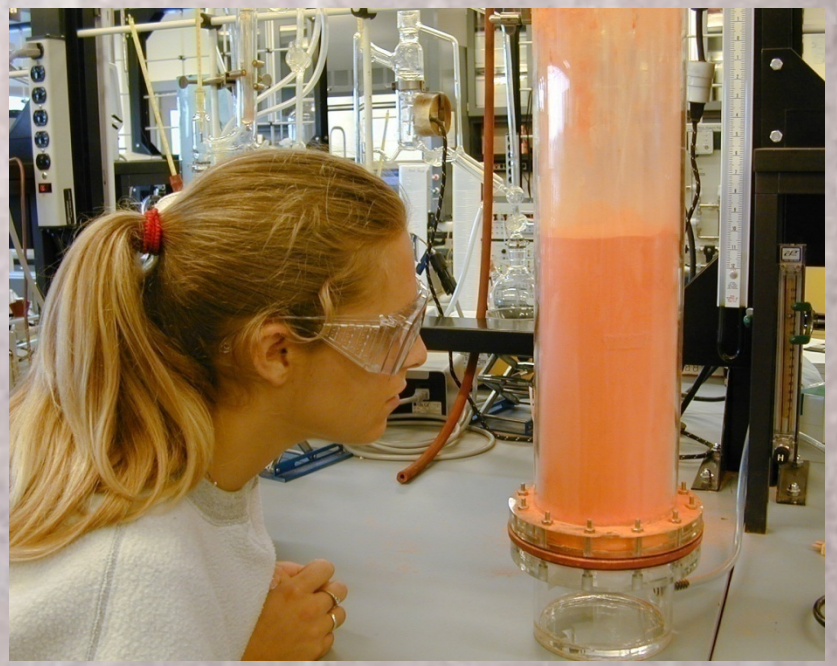
Key Features

- Interdisciplinary undergraduate education
- Undergraduate research
- Collaborative laboratory and coursework
- State of the art technologies
- Global competencies
- Real world-situations
- Project-based
- Teamwork



Integration Though the Curriculum

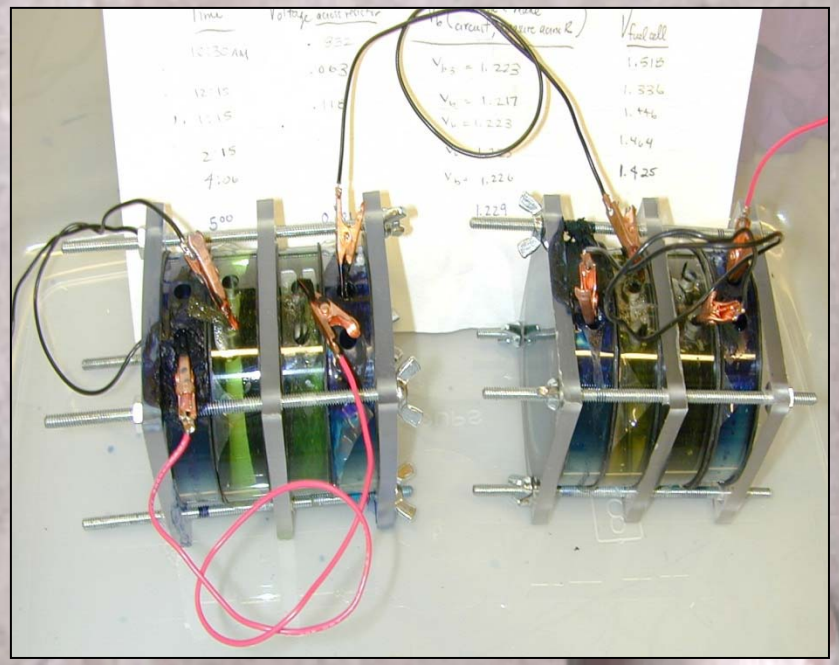
- Freshman/Sophomore: learning modules
- Junior/Senior: Interdisciplinary research teams of science and engineer students



Learning Module

Microbial Fuel Cell

- Design and construct battery powered Lego® Mindstorms robot
- Use concepts of metabolic pathways, growth curves and doubling time



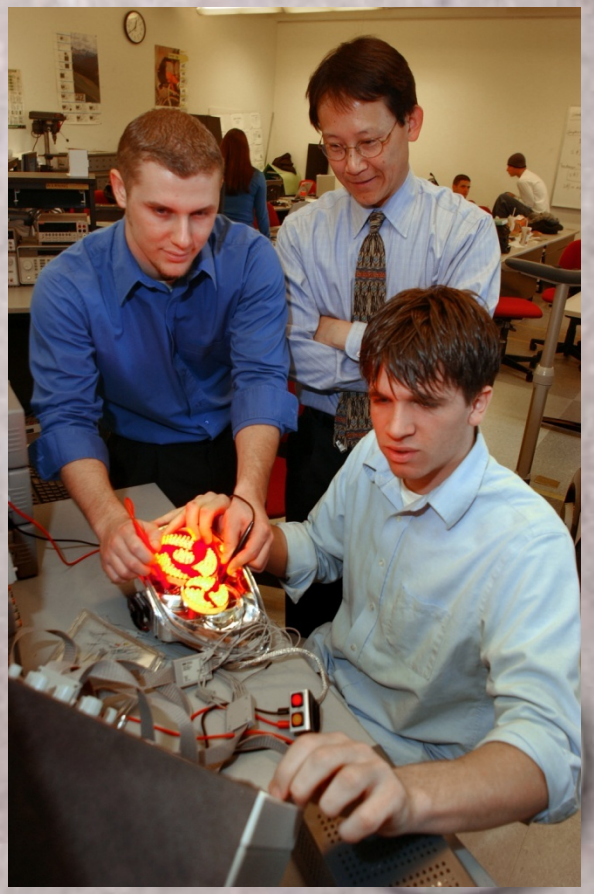
Learning Module

Flight Conflict Analysis –Visualization

- Graphical display of raw air traffic data
- Algorithms
  - Better prediction of airplane trajectories
  - Traffic control improvement

Integration Through Research

- Funded by industry, research grants, venture capital, or government agencies
- Basic or applied research
- Interdisciplinary
- Entrepreneurial
- Community-oriented



IMAPS

- Problem: real-time detection of pollution plumes
- Project:
  - Design and build a robotic surveillance device
  - Communicate in real-time
  - Test water bodies remotely
  - Monitor pollution
- Patent pending

Funded by NSF

Bug Power

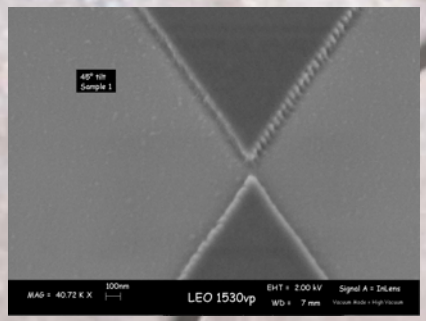
- Problem: process creates organic compounds toxic to fermenting organisms
- Project:
  - Identify ethanologenic mutants resistant to toxins
  - Quantify strains' resistance using toxicological analysis
  - Demonstrate efficiency of new strains

Funded by NSF

Heavy Metal Contamination

- Problem: release of toxic elements from glass beads used in roads
- Project:
  - Quantitative analysis of toxicants
  - Possible toxic reductions

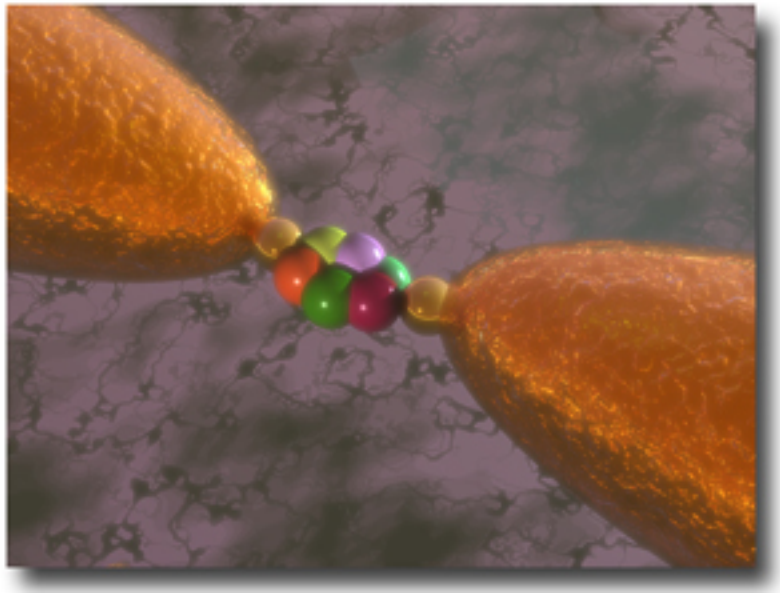
Funded by NJDoT



X-Ray Fluorescence Spectrometry

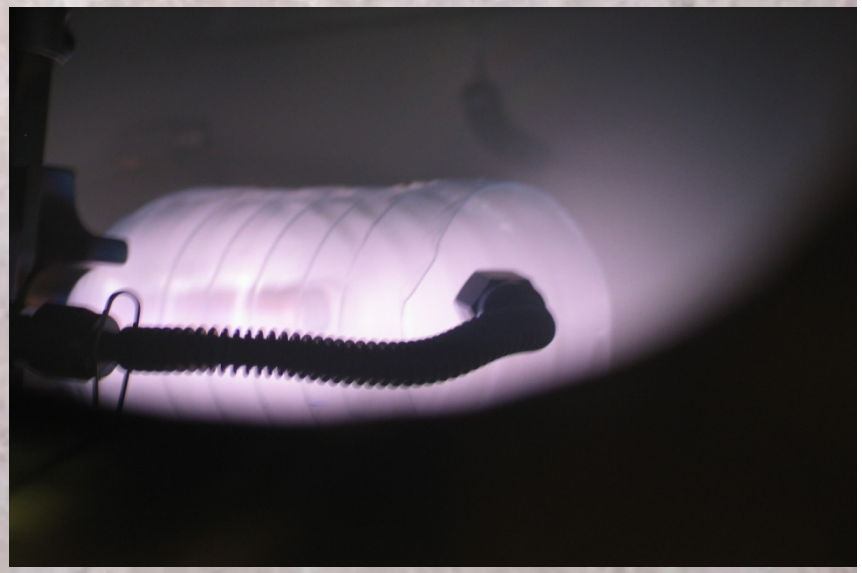
- Projects
  - Material understanding for forensic research
  - Build system to grow single-walled carbon nanotubes
  - Synthesis of thin film
  - Frictionless coatings for nanoindentation
  - Polymer degradation analysis

Funded by NSF



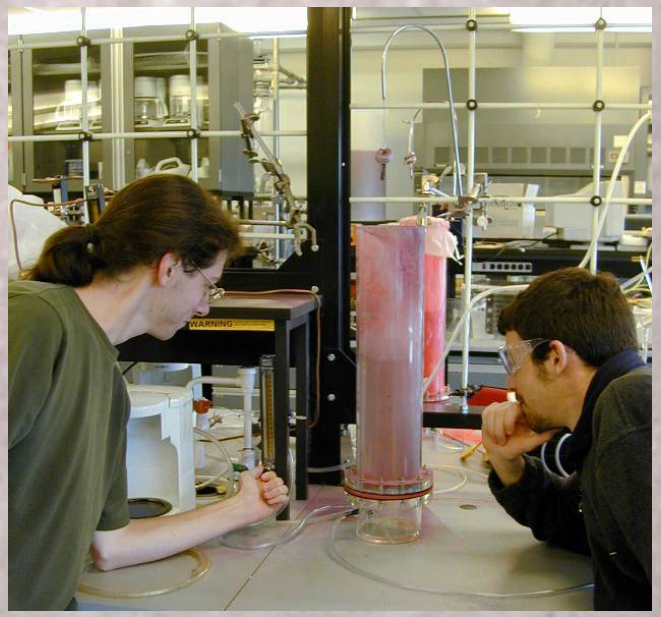
Plastic Containers

- Problem: increased concerns about plastic storage containers
- Project:
  - Create barrier coating polymers
  - Thin film synthesis of low density plastics
  - Increase surface hardness and reduce friction



Funded by Wheaton Industry

Student Outcomes



- Develop critical analysis and experimental methods
- Develop design experience
- Understand global concepts
- Provide interdisciplinary experiences
- Develop value-added education

Benefits

- Undergraduate research
- Prepare for graduate studies/careers
- Promote collaboration
- Industrial partnerships
- Entrepreneurship
- Improve retention

In Conclusion, We Offer

- Innovative engineering and science interaction
- Multidisciplinary approach
- Experiential learning
- Value-added education

Q & A

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