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INTERPROFESSIONAL PROJECTS PROGRAM

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IPRO 318: Fuel Cells for the Future

Business or Bust?

ILLINOIS INSTITUTE OF TECHNOLOGY

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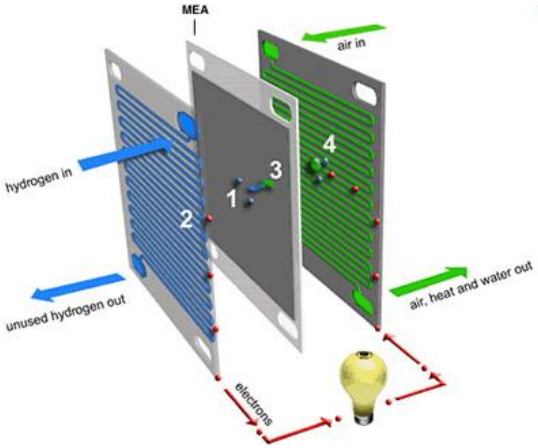
- Evaluate the feasibility of PEM fuel cells in commercial application
- Investigate industrial and commercial technicalities of PEM fuel cells
- Select an application and create a design incorporating a PEM fuel cell system into the chosen application.
- Perform a cost and benefit analysis using engineering design principles.



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- Statement of Problem
- Organization of Team
- Goals of Project
- Progress toward Goals
- Major Obstacles and Resolutions
- Anticipated Challenges
- Questions

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ILLINOIS INSTITUTE OF TECHNOLOGY

- Evaluate current PEM fuel cell technology
- Compare the performance and cost of fuel cell to internal combustion engines.
- Assess PBI fuels cell for use in UAV and UUV applications.
- Design a fuel cell system to power a UAV.
- Evaluate different fuels
- Compare the newly designed fuel cell system to existing propulsion systems.

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- PEM fuel cell not cost efficient for automobiles
  - Will concentrate on military applications.
- Analyzed cost and performance of internal combustion engine
- Fuel cell has the potential to be a replacement for battery power in both UUV's and UAV's
  - Decided to concentrate on UAVs due to airplanes' ready access to oxygen
- JP-5 and JP-8 fuels are the most worthy fuel candidates
- Researching types of UAVs

- IPRO
  - Broad objective
  - Wide spectrum of fuel cell designs available
  - Emerging technology without mass market appeal
- Fuel Cells
  - Slow, inefficient start-up
  - Limited operating temperatures
  - Impurities reduce efficiency and lifetime
- Resolutions
  - Selected to design for unmanned aircraft
  - Chose PBI instead of Nafion based PEM fuel cell

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- Selecting viable aircraft
- Optimizing in design:
  - Operating temperature
  - Size
  - Weight
- Resolving storage and delivery of fuel
- Making result economically competitive

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We welcome input from the IIT community regarding fuel cells and their possible applications.