



# 2010 Student Scholars Expo

## Engineering IPC Presentations

### Frey 110 - Friday, April 30, 2010

#### **9:00 – 9:15 a.m. Welcome and Introductory Remarks**

*W. Ray Norman, Dean of the School of Mathematics, Engineering and Business*

#### **9:20 – 9:40 a.m. Grace Mission to Haiti Photovoltaic Project (Energy)**

*Presenters: Quay Hoffman, Gabriel Jolin, Stephen Karanja*

This project involves the design and construction of a photovoltaic electrical system to be implemented at a recently constructed conference center in Port Au Prince, Haiti.

#### **9:45 – 10:05 a.m. Light Sport Aircraft Tail Assembly and Control Systems (Transportation)**

*Presenters: Matthew Halburd, Joel Siegrist, Eric Spring*

We have integrated the tail assembly into the fuselage of the Light Sport Aircraft. This includes attaching the control surfaces, connecting to the fuselage, and building control systems in both the tail and fuselage.

#### **10:10 – 10:30 a.m. Electric Motorcycle Battery Pack (Transportation)**

*Presenters: Peter Shenk, John Wolgemuth, Josh Zimmerman*

Efficient transportation is in high demand. The electric motorcycle project is prototyping a more efficient bike using Li-ion batteries and a brushless DC motor. Come see how this could ease the energy crisis.

#### **10:35 – 10:55 a.m. Wireless Enabled Remote Co-presence (Communications)**

*Presenters: Ade Osunsakin, Jason Shortall*

WERC seeks to develop an adaptive coaching solution for individuals with autism in today's workplace. Using wireless technology and live video streaming, WERC is able to virtually place a coach at the employee's side.

#### **11:00 – 11:20 a.m. Light Sport Aircraft Engine Team (Transportation)**

*Presenters: Nathaniel Cross, Benjamin Horst*

In 2009 when the Light Sport Aircraft engine was grounded, the engine team was formed to find a suitable replacement. Our work has resulted in a new engine and the development of a mounting system for the new engine.

#### **11:25 – 11:40 a.m. Modeling Blood Flow in a Cannula (Biomedical)**

*Presenter: Emily Howell*

Ventricular assist devices (VAD) keep patients healthy until a heart becomes available for transplant. We analyzed blood flow in the cannula of a pediatric VAD in order understand how the device affects the health of the patient.

#### **11:45 – 12:00 a.m. Tricycle Welded Axle Redesign Assessment (Disability Resources)**

*Presenter: Logan Putnam*

The redesigned tricycle frame of 2009 has the wheel axle supported on only one side. This project involved developing a manufacturing method to consistently produce these axles as well as analyzing and testing the longevity of the axle.

#### **12:00 – 1:00 a.m. Lunch – Lottie Nelson Dining Hall, Union Café, or Falcon Express**



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#### **1:00 – 1:05 p.m. Introduction to Collaboratory Sessions**

#### **1:10 – 1:25 p.m. Mali Water and Disabilities Study Project (Disability Resources)**

*Presenters: Sarah Finney, Sarah Jarnecki, Stephanie Knepper*

In partnership with World Vision, the Mali Water and Disabilities Study project team works to improve access to community water facilities and to assess the needs of disabled people in Mali.

#### **1:30 – 1:45 p.m. Solar Scholars Project (Energy)**

*Presenters: Lance Martin, Jonathan Yoder*

The Clifford L. Jones Solar Scholars Pavilion provides a working solar power demonstration and training facility on the Messiah College campus, educating current students and college visitors about solar electricity production.

#### **1:50 – 2:05 p.m. Solar Scholars (Energy)**

*Presenter: Andrew Spotts*

The Solar Scholars project is a multi-year project with an overall goal to implement a photovoltaic (solar power) system on Messiah's campus to promote alternative energy use and awareness as well as to use the system as an educational tool for future projects.

#### **2:10 – 2:30 p.m. Light Sport Aircraft: Wing Folding Design (Transportation)**

*Presenters: Jeffrey Smeiles, David Smith*

The LSA wing folding design is a step toward developing a cost-effective, versatile missionary aircraft. Our solution offers a compact wing configuration and effective storage capabilities while remaining simple to operate.

#### **2:35 – 2:55 p.m. Small Scale Methanol Recovery (Energy)**

*Presenters: Stephen Bray, Benjamin Studer*

The project focused on the process of methanol recovery and the variables that affect the output quality of methanol. This year's work focused on a small scale high quality system and incorporated a monitoring system.

#### **3:00 – 3:15 p.m. Flight Tracking and Messaging Solutions - (FTMS) (Communications)**

*Presenter: Steve Heindel*

FTMS aims to provide low-cost, high-quality solutions for the tracking and messaging needs of missionary pilots.

#### **3:20 – 3:40 p.m. Electric Tricycle Motor and Battery Optimization (Disability Resources)**

*Presenters: Dave Bedillion, Stephen Ritter*

Optimizing the motor and battery of the electric tricycle would significantly reduce the cost and weight. Our team developed performance characteristics for motor and battery combinations to assist this optimization.



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#### **3:45 – 4:00 p.m. Multi-Modal Teacher - (hand-held device) (Communications)**

*Presenter: Evan Liem*

The project focuses on educating the deaf people of the Burkina Faso. The device consists of a remote control that loads and displays text messages previously loaded into the microchip. An example is multiple choice questions in mathematics.

#### **4:05 – 4:25 p.m. Thermosyphon Design Project (Energy)**

*Presenters: Trevor Book, Reid Hoffman*

Our project's goal is to explore options in cost-effective solar technologies and use that knowledge to provide hot water for the students of the Theological College of Zimbabwe.

#### **4:30 – 4:45 p.m. Modeling the India Mark II Pump (Disability Resources)**

*Presenter: Kendall Leaman*

We built attachments that will make an India Mark II pump more accessible to persons with disabilities. We analyzed a model of the pump plus attachments to determine if the attachments would lead to wear and failure of the pump mechanism.

#### **4:50 – 5:10 p.m. Electric Tricycle Steering Stability (Disability Resources)**

*Presenters: Mason Rhine, Alex Waardenburg*

Using SolidWorks and physical testing, our team has developed specifications to modify the current tricycle front end so that steering instabilities are reduced while keeping the user's needs in mind.

#### **5:15 – 5:30 p.m. Biodiesel Quality Testing (Energy)**

*Presenters: Andy Derr, Trent Zempel*

Using the newly equipped biodiesel testing lab, this project focused determining the effect of catalyst concentration and water washing on biodiesel quality in accordance with five ASTM standards.

#### **5:35 – 5:50 p.m. Water Group Project: Village Water Ozonization System - (VWOS) (Water)**

*Presenters: Timothy Bitzer, Grant Kruppenbacher, Ryan Nicholas*

The VWOS Project uses filtration technology and the disinfectant ozone to develop and implement an economically, environmentally, and culturally sustainable water purification system to meet the needs of partnering Honduran communities.