



## ZEM Team Members

### 2005-2006

Sharbana Kodwavi  
 Lu Van Tran  
 Saveed Ahmad Andeshmand  
 Rene Lucero Limos  
 Elijah Josh Marasigan  
 Ricardo Adan Uro  
 Jackeline Carpio  
 George C. Transmonte  
 Tony M. Syluangkhot  
 Michael Fernandez  
 Peter Ng  
 Brian Bantista

### 2006-2007

Scott Lee Cassell  
 Javier Manriquez Jr.  
 Jose Manuel Origel Pacheco  
 Carson M. Lee  
 Andrew H. Chau  
 Larry Trinh Nguyen  
 Ricardo Flores, Jr.  
 Duy Huu Tran  
 Richard Lee Henry  
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 Pak Yen Wilson Lam  
 Hlwan Moe Aung  
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 Nhon Phuoc Vo  
 Nathan W. Kong  
 Tim Tian Bo Wang  
 Ryan Hansen  
 Sergio de Ornelas

### 2007-2008

David Malvestuto  
 Christopher M. Fillice  
 Thang Tran Bui  
 Phillip Gutierrez De Castro  
 Phillip Thai Ho  
 Alex Kasim  
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 Willy Setianegara Sucipto  
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## Human-Hybrid Powered Vehicle (HHPV)

SJSU'S Solution to Gas-Free,  
Emissions-Free Urban Transportation



San José State University  
Charles W. Davidson College of Engineering

## Zero Emissions Vehicle (ZEM)

The ZEM vehicle is SJSU's solution to gas-free, emissions-free urban transportation. The design and construction of the ZEM vehicle evolved from a senior design course in the Davidson College of Engineering at San José State University. It combines the latest technologies in electric vehicle design, solar power conversions, and ergonomic human-powered vehicles into one affordable and environmentally sustainable vehicle for urban transportation.

The vehicle is powered by human pedaling and an electric motor. The motor is driven by batteries that can be charged by 110-volt sources and by solar energy harnessed from the collection panels that are integrated into the exterior surface of the vehicle. The vehicle can be driven at low speeds by human pedaling in inner city streets with congested traffic. The electric motor can power the vehicle to run at higher speeds. Solar energy provides a continuous charge of the batteries during the operation of the vehicle and also when it is idle. The ZEM vehicle is suitable for urban commuting, small business deliveries and shuttle services.

### National Competition

The student team consisting of Scott Cassell and Tim Wang of 2006-2007 won first prize with a \$15,000 cash award at the National Idea-to-Product Competition for EPICS and Social Entrepreneurship on March 27, 2007, at Princeton University.

### Faculty Supervisors:

**Professor Tai-Ran Hsu**  
Department of Mechanical  
and Aerospace Engineering  
**Professor Raymond K. Yee**  
Department of Mechanical  
and Aerospace Engineering  
**Professor Thuy Le**  
Department of  
Electrical Engineering

### Student Mentors on Entrepreneurship:

**Professor Malu Roldan**  
Management Information Systems,  
College of Business,  
San José State University  
**Charles Erickson**  
Assistant Director  
Environmental Business Cluster  
**Richard Okumoto**  
Principal, ANR Ventures, Inc.  
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