



University of  
Massachusetts  
Lowell

A stylized logo consisting of a green swoosh that curves upwards and then downwards, ending in a grey swoosh that curves upwards.

# Go Juice

Lessons Learned from CWC 2014  
University of Massachusetts Lowell

U.S. DEPARTMENT OF ENERGY (DOE)  
COLLEGIATE WIND COMPETITION

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Assistant Professor, Mechanical Engineering

- **Quick Description of UML Entry**
- Academic support & strategy
- Setting up “the team”
- Timeline & major milestones
- Reflections on the competition

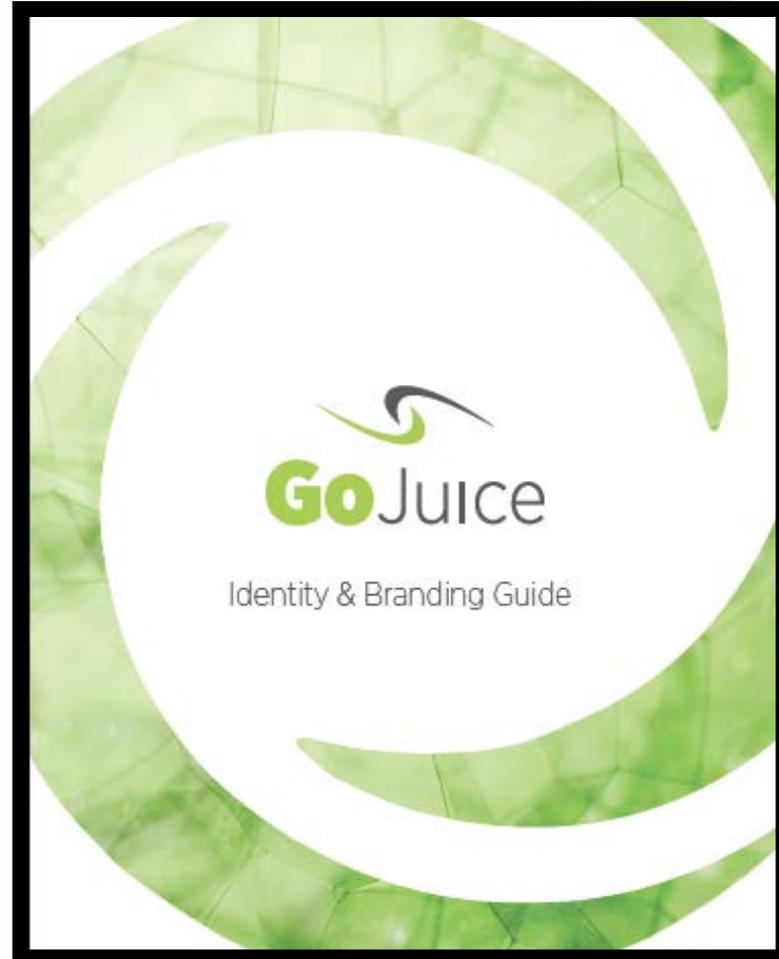
# System Overview



# *Phone Case Development Design Overview*

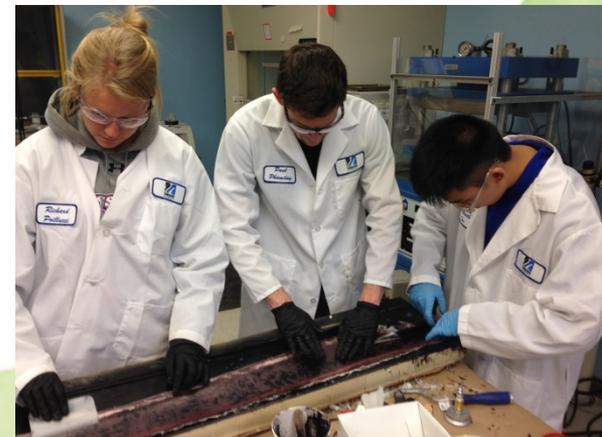
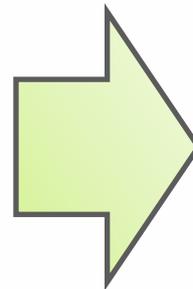
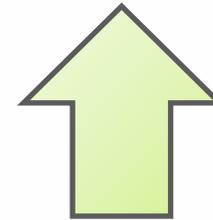
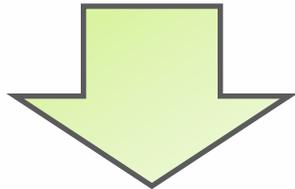
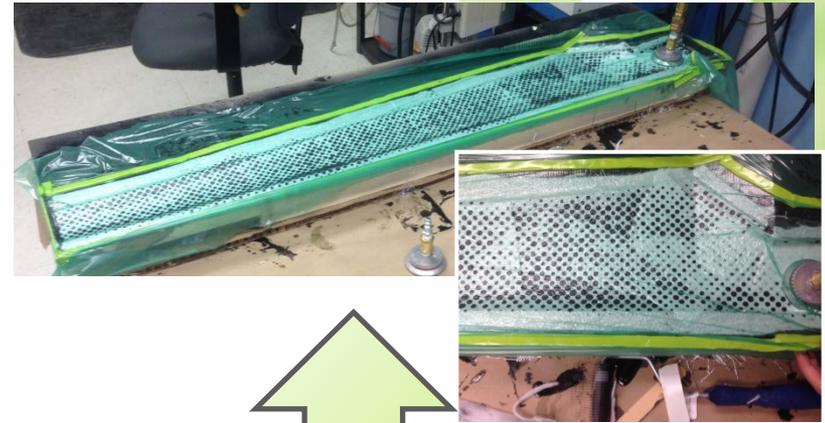


# Kiosk Prototype w/ Branding



# Wind Turbine Development

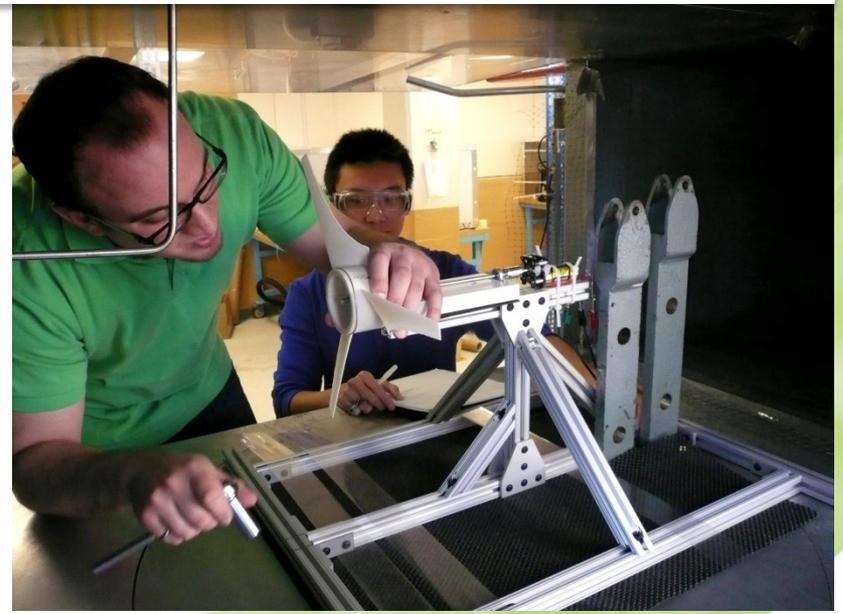
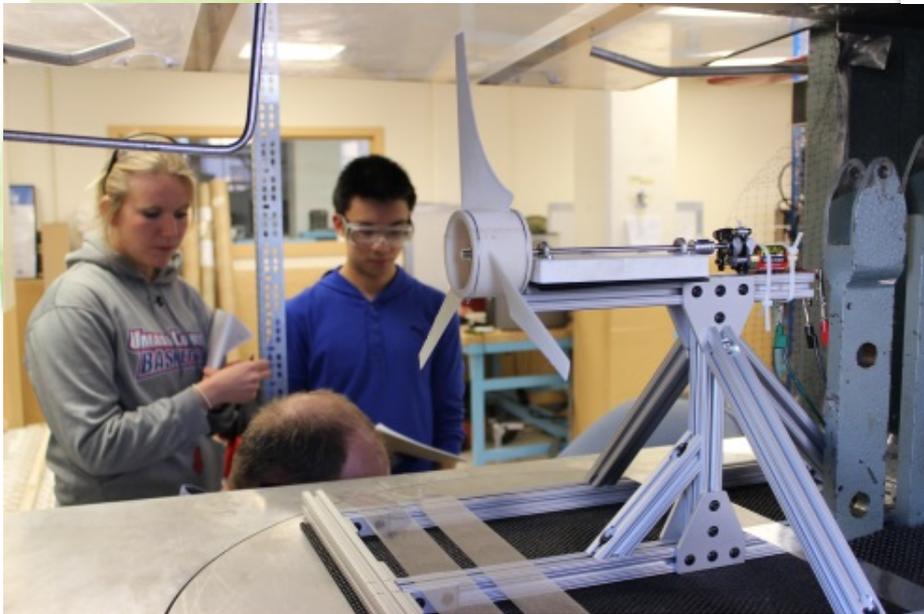
## Blade Manufacturing Process



# Wind Turbine Development Full Scale Test



# Scale Model for Tunnel Testing



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- **Mechanical Engineering**
  - 3 Faculty (2 very active junior faculty)
- **Plastics Engineering**
  - 1 very active junior faculty
- **Electrical Engineering**
  - 1 Faculty member
- **Business, Management and Entrepreneurship**
  - 2 faculty members

- **Redesigned Aero/Wind engineering course:**
  - 3 groups of students
    - CWC 2014, wind for the developing world, AIAA-DBF
  - Hands-on, **design thinking<sup>1</sup>** approach.
    - **Empathize** with the user (brainstorm)
    - **Define** user needs (interviews)
    - **Ideate/Develop** solutions (presentations, interviews)
    - **Prototype** (cardboard, paper, 3D printing)
    - **Test** (initially simple tests, progressing to more complex)
  - Course “overload” for Willis/Johnston

# Academic Support: *Spring Semester*

- ***Senior Capstone Design Course (ME & PE):***
  - Broken into system components w/ advisors
    - **Willis:** Large & Small turbine aero design, Electrical
    - **Hansen:** Charging kiosk and composites manufacturing
    - **Johnston:** Phone case and turbine tower
- **No formal structure for EE/Entrepreneurship.**

# *Outline*

- Academic support & strategy
- **Setting up “the team”**
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# Setting up the team

- Solicited student members in mid-summer/early fall.
  - **Mechanical Engineering** (7 students + 3 faculty)
  - **Plastics Engineering** (6 students + 3 faculty):
    - Required a short paragraph describing interests in wind.
    - Looked for higher GPA students
      - Some of higher achievers were lower GPA!!
  - **Electrical Engineering** (4 students + 1 faculty)
    - Recruited students from EE classes
    - Less effective without capstone/course credit
  - **Business/Entrepreneurship** (1 + 2 students)
    - Branding portfolio worked wonders for team morale



# Team Org. Chart



## Electrical Team

- Albert Andino**  
EE, Generator Testing, Turbine Circuitry
- Isaac Grullon**  
EE, Generator Testing, Turbine Circuitry
- Jigar Patel**  
EE, Generator Testing, Turbine Circuitry
- Alexandre Sampaio**  
EE, Generator Testing, Turbine Circuitry

## Turbine Team

- Erika Sjoberg**  
ME, Blade Design, Testing, Manufacturing
- Michael Dube**  
ME, Testing, Manufacturing, Gearbox
- Dean Kennedy**  
ME, Team Leader Blade Design
- Chris Daly**  
PL, Manufacturing

## Wind Lens Team

- Mike Schaefer**  
PL, Design, Testing, Manufacturing
- Donna DiBaptista**  
PL, Design, Testing, Manufacturing
- Chris Daly**  
PL, Testing, Manufacturing

## Kiosk Team

- Maggie Riley**  
PL, Design, Manufacturing
- Peter Jones**  
PL, Kiosk Interface, System Design
- Parth Patel**  
PL, Team leader, External Structure Design

## Business Team

- Dean Kennedy**  
ME, Business Report
- Bobby LeBoeuf**  
BA, Preliminary Business Model
- Gregory Lennartz**  
BA, Preliminary Business Model

## Branding

- Kristin Morrissey**  
Entrepreneurship, Branding & Logo Design
- Peter Jones**  
PL, Website Content & Design

## Case Team

- Patrick Logan**  
ME, Electronic Controls
- David Phung**  
ME, Full-Scale Generator Specification and Tower
- Jeff Chung**  
ME, Tower Design and Analysis

## Faculty Advisors

- Prof. David Willis**  
ME, Advising on Turbine, Co-electrical
- Prof. Christopher Hansen**  
ME, Advising on Kiosk Team, Blade Molding
- Prof. Stephen Johnson**  
PL, Advising of Phone Case Team
- Prof. Christopher Niezrecki**  
ME, WERG, Co-advisor
- Prof. Ziyad Salameh**  
EE, Electrical Co-advisor
- Prof. Jack Wilson**  
BA, Business Co-advisor
- Prof. Yi Yang**  
Business Co-advisor



# The UML-CWC Team

Turbine Team:

**Advisor: Willis**

E. Anderson, C. Daly, D. DiBattista, M. Dube, E. Sjoberg, and M. Schaefer

Electrical Team:

**Advisor: Willis/Salameh**

A. Sampaio, A. Andino, I. Grulon, J. Patel



Kiosk Team:

**Advisor: Hansen**

P. Jones, P. Patel, and M. Riley

Case Team:

**Advisor: Johnston**

J. Chung, D. Phung, and P. Logan

Business Team:

**Advisor: Hansen/Willis**

R. LeBoeuf, G. Lenna, D. Kennedy, and K. Morrissey



*For the financial support as well as the opportunity to be a part of the Collegiate Wind Competition.*

# Outline

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# *Key Dates/Timeline*

- **August:** Start forming the student team
- **September:** User group empathy/studies
- **Mid/late-October:** Down-select concepts
- **November:** First design cycle (feasibility)
- **End of December:** First portfolio due
- **January-March:** Second design cycle & build/test prototypes
- **Mid-April:** Develop final portfolio (ouch!)
- **Late-April:** Prep, shipping, presentations (ouch!)
- **Early May:** Competition

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# CWC 2014

- Awesome event! Exceptionally delivered!
  - Awesome to:
    - To see all the teams again (great!)
    - To bring students to AWEA Windpower (huge!)
    - To use the NREL wind tunnels and event setup (WOW!)
    - To test the turbines (fingers crossed!)
    - To present and defend the concept (lots of nerves!)
    - To go to Las Vegas, NV and do well (priceless!)

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