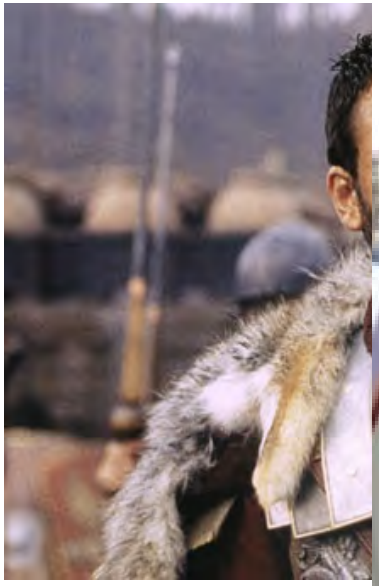
Welcome CAP Executive Board

October 1, 2009

Students Driving Innovation

Welcome Danny Brown!



- B.S. in Science & Ph.D. in Physics from University of New England in Australia
- Assoc. Dir. Centre for Lasers and Applications at Macquarie Univ, Sydney, Australia
- Accomplished photographer

- Surfer 2009 UCSD Luau and Longboard Invitational sponsored by Cymer.
- Photo by Danny Brown will be displayed at both the San Diego and San Jose International Airports!

Welcome Anton Monk!

- B.S. and Ph.D. in Electrical Engineering from the UCSD and a M.S. in Electrical Engineering from the California Institute of Technology
- Co-founder of Entropic Communications

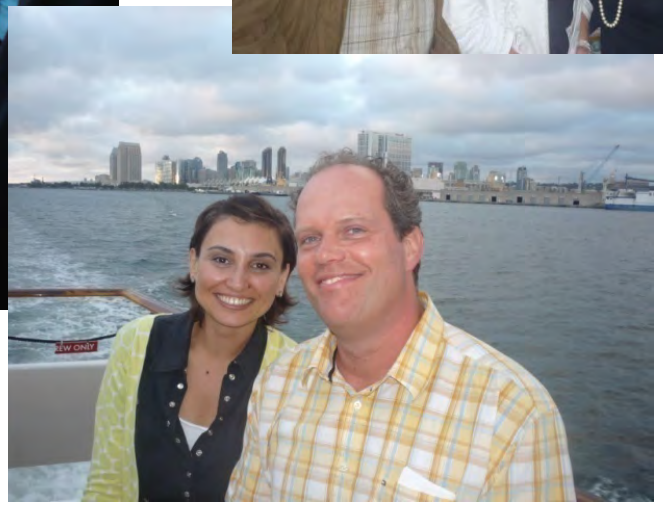
CAP Leadership 2009 - 2010

CAP Chairman:
Danny Brown, Ph.D.
VP Technology Development,
Cymer

CAP Vice Chairman:
Anton Monk, Ph.D. UCSD '94
VP Engineering,
Entropic Communications

Solar Turbines
A Caterpillar Company

Thank you Dave Esbeck and Solar Turbines for '*Spirit of Solar*' cruise Monday, September 14th



Welcome Distinguished Students

Jacobs School Scholars and Fellows

TESC President: Stephan Kemper, CSE ’10

NSBE President: Weini Mehari, SE ’10

SHPE President: Hared Ochoa, ME ‘10

SWE President: Annie Ho, ChE/Nano ‘10

2009 Summer Intern Program (TIP) participants

Engineering Student Leader

Stephan Kemper CSE, ‘10

President, Triton Engineering Student Council (TESC)

Interested in…

Leadership?

volunteering?

Intramural Sports?

RÉSUMÉS?

PROFESSIONAL DEVELOPMENT?

ENGINEERING OLYMPICS?

Career Fairs?

BROOM BALL?

Pizza?

junkyard derby?

High School Outreach?

UCSD Jacobs | TESC Triton Engineering Student Council

We do that.

TESC News

- Added three new student orgs
  - TIES Ambassador Corps
  - Triangle
  - Engineering World Health
- Expanding Rapidly!
  - 200 students @ Engineers on the Green
  - First GBM was Wednesday
  - Goal: Be forced to move!

Coming Soon

Engineering Explorations

?

Rebranding

New Website

And of course…

UCSD Jacobs | TESC Triton Engineering Student Council

DECaF
Disciplines of Engineering Career Fair

- 2009

- 9:30 – 2:00
- 71 companies
- 1400 students

- 2010

- 9:30 – **3:00**
- **100** companies, **2** rooms
- **1600** students

Registration starts today @ tesc.ucsd.edu/decaf

NSBE, SHPE, & SWE First Annual

Professional Evening with Industry

To provide our members with great networking by building a closer relationship with Industry

Thursday, November 12

6-9 pm

Price Center Ballroom A&B

Company Registration ends October 20

For sponsorship opportunities please contact:

SWE:
Annie Ho, (805)312-4439 annie.ho114@gmail.com

NSBE :
Weini Mehari, (650)284-9018 wmehari@ucsd.edu

SHPE:
Hared Ochoa, (323)387-9896 hochoaga@ucsd.edu

Welcome New CAP Members

UCSD Jacobs | Corporate Affiliates Program

connecting you to talent and technology…

Team Internship Program (TIP) Growth

Bringing innovative student teams to corporate partners

Team Internship Program	2003	2004	2005	2006	2007	2008	2009
Students	3	18	35	50	61	72	93
Teams	1	5	9	18	20	29	37
Companies	1	5	8	14	15	14	16
New sponsors	1	4	5	8	4	3	6
Returning sponsors	3	1	3	6	11	11	10
Multiple teams			1	3	3	8	7
International teams				1	2	8	0

UCSD Jacobs | Team Internship Program

Energy Storage to Manage Variable Renewables

Dylan Botham, MAE, MS ‘09
Christopher Doran, ECE, BS, ‘10
Bhavita Mehta, Rady MBA, ‘10
Ted Sanders, ECE, BS ‘10

Project Sponsor

SDGE
A Sempra Energy utility®






A Sempra Energy® utility

Controlled Renewable Energy Output System

CREOS

Dylan Botham

Christopher Doran

Bhavita Mehta

Ted Sanders

Supervisor: Chris Chen

UCSD Jacobs School of Engineering
Team Internship Program

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Our Objectives

- Research problems to the grid arising from high penetration of intermittent renewables
- Investigate suitable energy storage technologies to help solve these problems
- Design a residential battery management system
- Evaluate the battery management system's financial viability and potential market

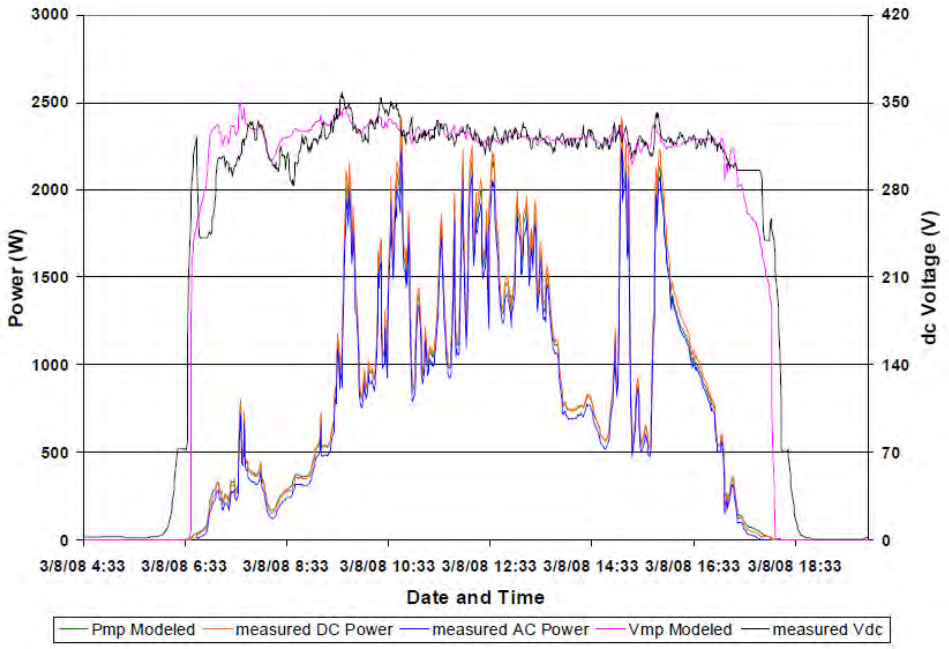
UCSD

SDGE
A Sempra Energy utility

Intermittency Issues

- Unpredictable output
- Power backflow
- Voltage Regulation
- Morning Power Surplus
- Fault Currents
- Inverter Tripping

Fluctuating Solar Cell Output



Source: Sandia National Laboratories

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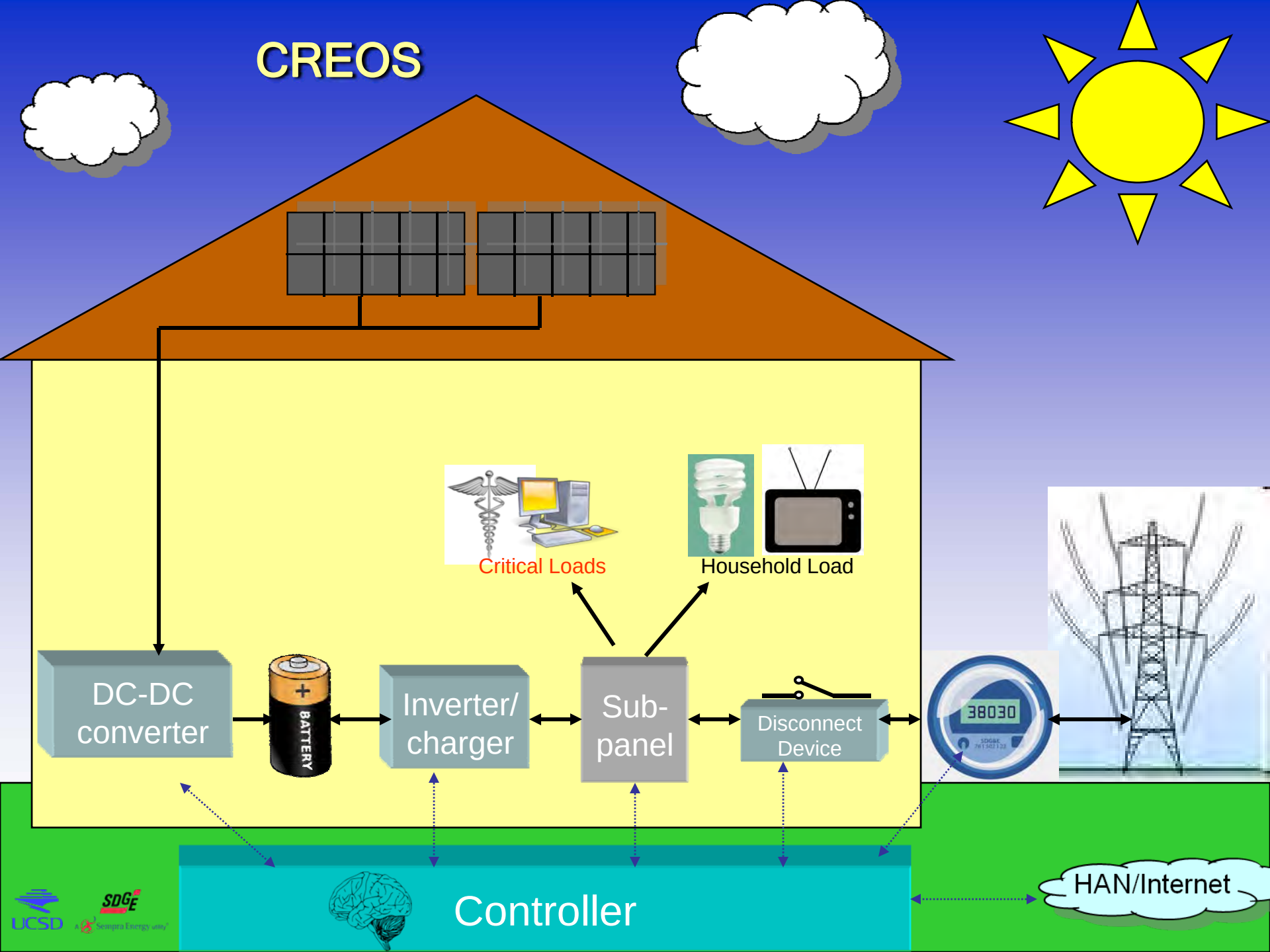
SDGE
A Sempra Energy utility


CREOS
Critical Loads
Household Load
DC-DC converter
BATTERY
Inverter/ charger
Sub-panel
Disconnect Device
38030
Controller
HAN/Internet
UCSD
SDGE

Smart Controller Algorithm

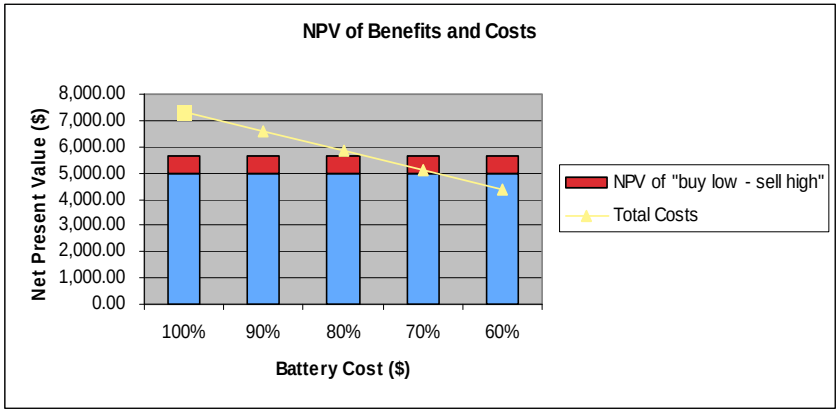
- Iteratively optimizes system resources for voltage regulation and energy arbitrage
- Communicates directly with utility
- Accounts for costs to battery lifetime
- SDG&E is currently pursuing IP protection for algorithm

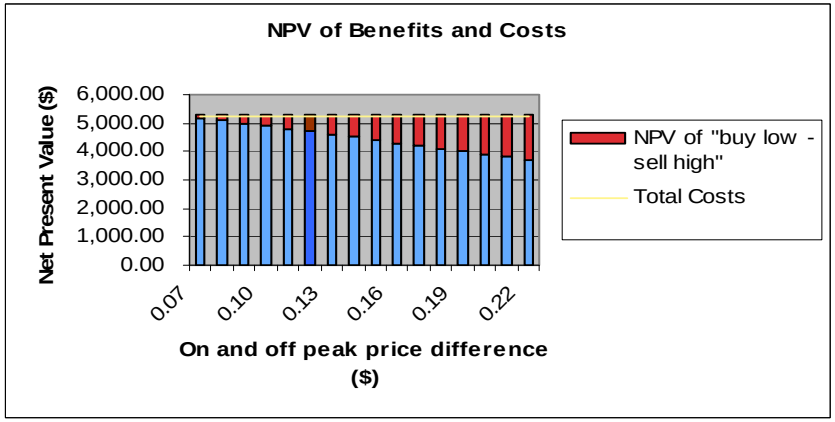
UCSD

SDGE
A Sempra Energy utility

Energy Storage Benefits

- Peak shaving
- Energy arbitrage
- Transmission & distribution deferral
- Regulation or other ancillary services
- Supply or sink reactive power (VArs)
- Power quality and reliability





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SDGE
A Sempra Energy utility

Conclusions

- Problems resulting from variability in renewable sources are a way off, but issues can emerge in localized areas soon
- Price arbitrage not enough for batteries to be cost effective
- Combined peak shaving, ancillary services, and backup may be cost effective in the future

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A Sempra Energy utility

Thank you

Questions?

UCSD

SDGE

A Sempra Energy utility

UCSD Jacobs | Team Internship Program

Universal Wireless Charging Applications and Interface to Surface Computing

Leo Ham, Cognitive Science, BS ‘09

Julie Kuang, Visual Arts, BS ‘09

David Vanoni, CSE, BS ‘10

Project Sponsor QUALCOMM

Team Internship Program
Summer 2009

Leo Ham
Cognitive Science ‘09

Julie Kuang
Visual Arts ‘09

David Vanoni
Computer Science ‘10

UCSD Jacobs | School of Engineering

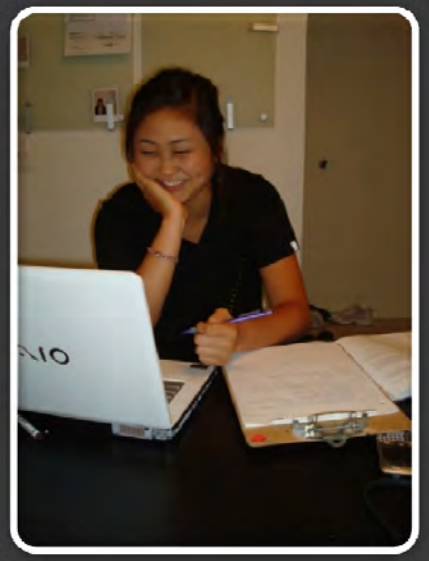
PROJECT OVERVIEW

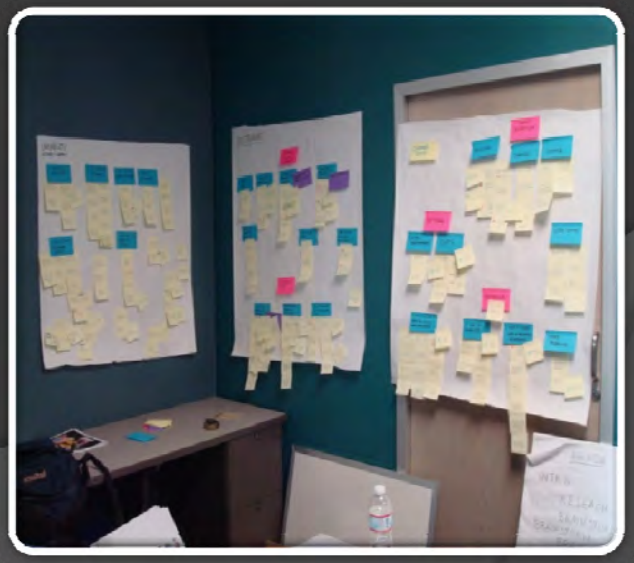
- The Technology
  - Qualcomm's eZone technology allows devices to be wirelessly charged
- The Objective
  - Create future user experience scenarios where eZone technology can fit seamlessly
- The Process

USER RESEARCH and CONCEPT TESTING → VISUAL and INTERACTION DESIGN → SOFTWARE IMPLEMENTATION

USER RESEARCH AND TESTING

- Go out into the wild and gather data
  - Observation
  - Contextual Inquiries
  - Paper prototype testing
- Extract workflow, opportunities, and design ideas
- Recommend interface and principles according to found affinities





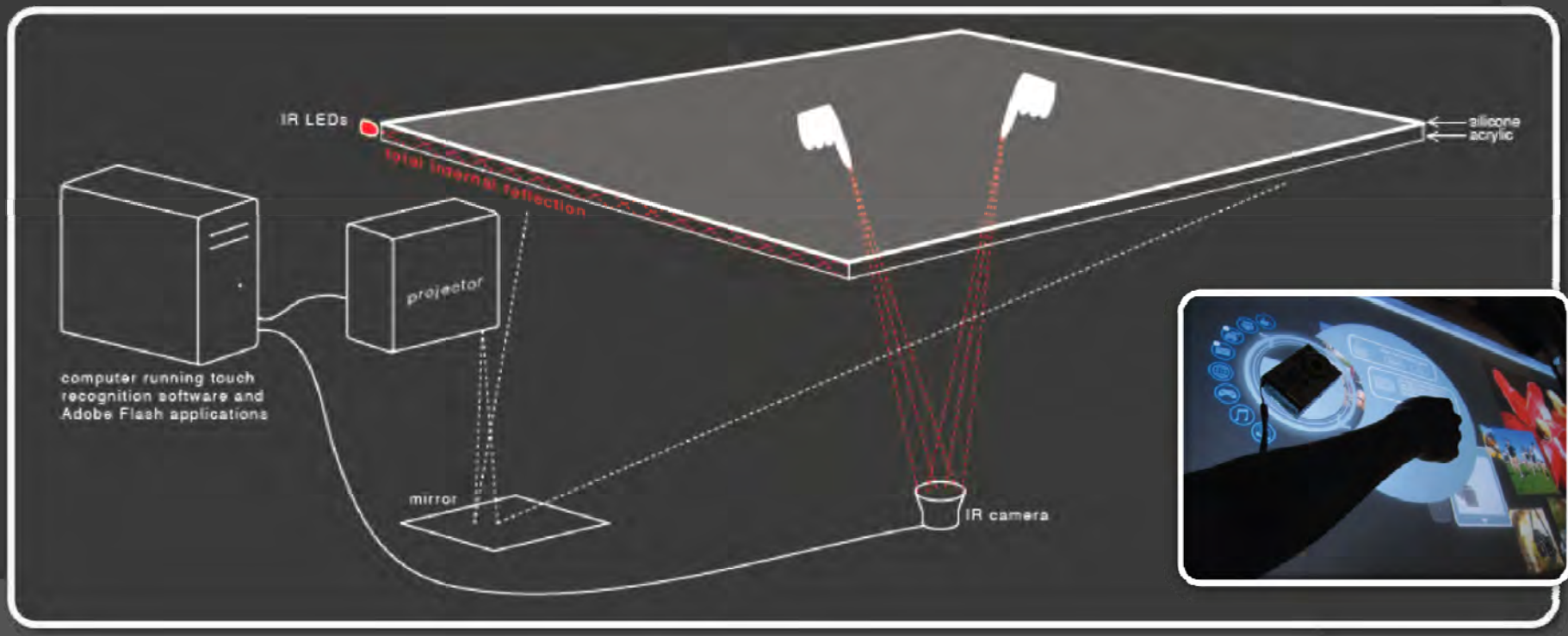
VISUAL/INTERACTION DESIGN

- Take observations and research to create graphical user interface
- Bridge the divide between user-centered research and actual implementation
- Main concerns in design:
  - Usability, aesthetic value, feasibility of implementation

- Visual Design Process
  - Create story boards based on user needs
  - Take user research and design graphics for each individual use case
  - Combine icons to create usable interface
  - Provide guidance for prototype implementation

SOFTWARE IMPLEMENTATION

- Integrate graphics into an interactive application for full implementation on a multi-touch table used for prototype testing
- Interactive table allows for the ability to demonstrate multiple unique scenarios using one platform
- Worked with our supporting team in Calit2 to develop a touch interface framework for use with Adobe Flash



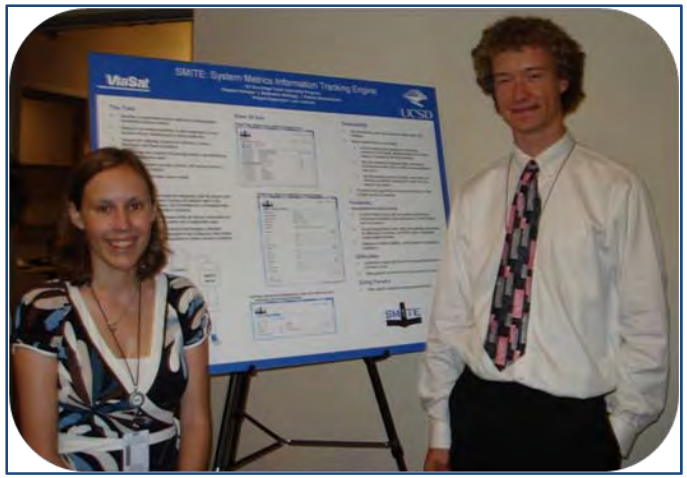
INTERN TEAM: BIG TAKEAWAYS

- Three interns from three different disciplinary backgrounds where each of us focuses on what we know how to do best
- We work well together because we respect each others' expertise and are open to each others' ideas, making our collaboration very successful
- We are free to learn and develop our own ideas without being forced to do something a specific way
- Great manager and mentors who spent time with us and incorporated us into the company culture

COFFEE SHOP DEMO VIDEO

UCSD Jacobs | Team Internship Program

Automated Metrics Collection



Stephan Kemper, CSE, BS ‘10
Stephanie Mattingly, CSE-CompEng, BS ‘10
Patrick Stammerjohn, CSE, BS ‘10

Project Sponsor ViaSat®

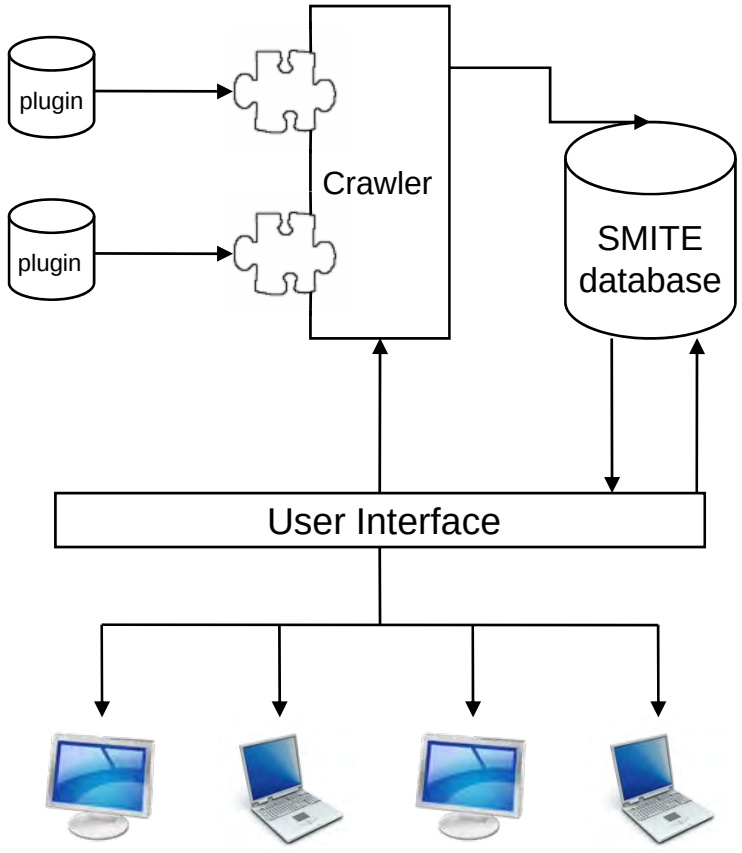
SMITE

System Metrics Information Tracking Engine

Stephan Kemper, Stephanie Mattingly, Patrick Stammerjohn

SMITE

- **Central repository for metrics information**
- **Main components**
  - Crawler
  - User Interface
  - Database
- **Extensible design**



Crawler

- **Central control component**
- **Runs on a schedule**
- **Plugins to collect metrics information**
  - Jar file, .sql file and .xml file
- **Core technologies**
  - Java, MySQL
  - Interface with external applications

User Interface

- **Web application that facilitates common tasks**
- **Project-based access controls**
- **Core technologies**
  - GWT, PHP, MySQL, LDAP (Active Directory)

Database

- **Extensible design**
- **Access through stored procedures**
- **Core technologies**
  - MySQL, phpMyAdmin

Team Experience

- **Three heads are better than one**
  - Different levels of experience
  - Different technical backgrounds
  - Different point of view
- **Social benefits**
  - Great starting point
  - Groupmates are less scary
  - The more the merrier

UCSD Jacobs | Team Internship Program

Component Design and Analysis for Molecular Diagnostic Instrumentation

Lisa Fong, BENG, MS ‘10

Robert Holmes, BENG, BS ‘10

Kelsey Jacquard, MAE, BS ‘10

Project Sponsor

GEN-PROBE

GEN-PROBE

UCSD Jacobs School of Engineering
Team Internship Program

UCSD Jacobs School Team Internship Program 2009

Lisa Fong – UCSD Bioengineering, MS

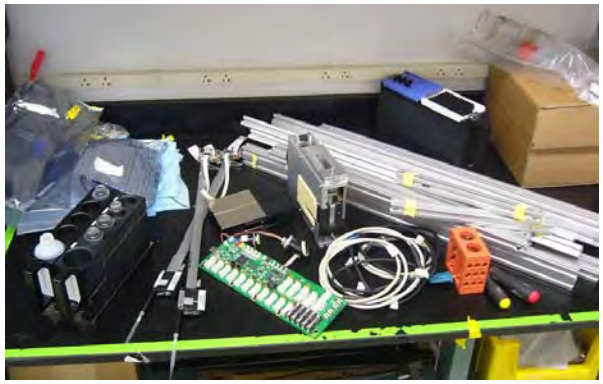
Robert Holmes – UCSD Bioengineering, BS

Kelsey Jacquard – UCSD Mechanical Engineering, BS

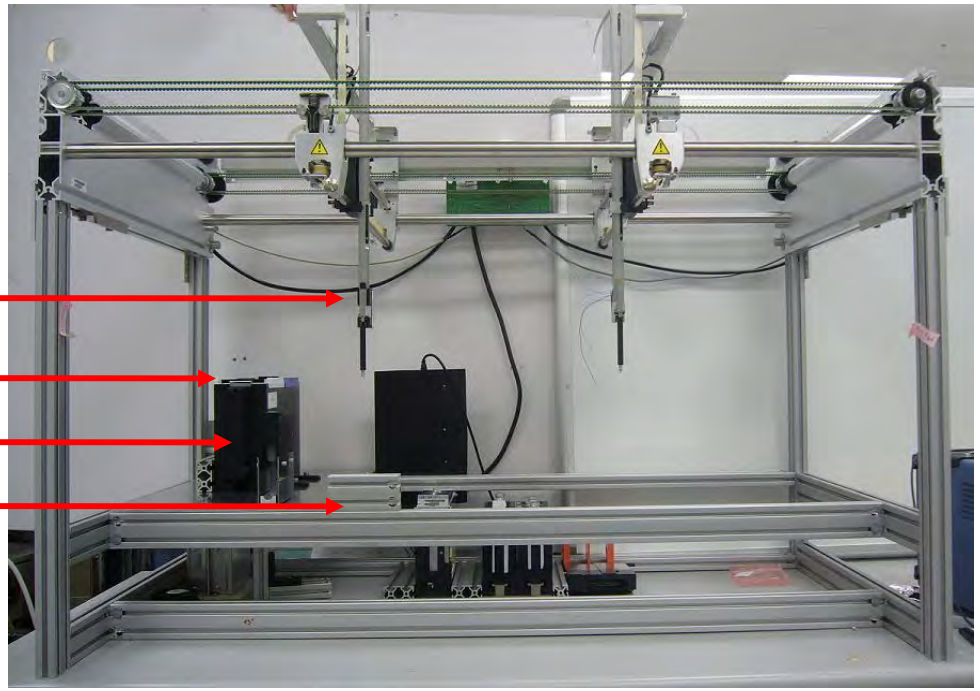
Company Profile

- Gen-Probe is a leader in the development of nucleic acid tests used to diagnose human diseases and screen donated human blood.
- Gen-Probe produces fully automated, high throughput systems for diagnostics and blood screening

Testing Platform



Before



Pipettor is controlled by PC

After

GEN-PROBE

Optimizing Capacitive Liquid Level Detection (CLLD)

Objective

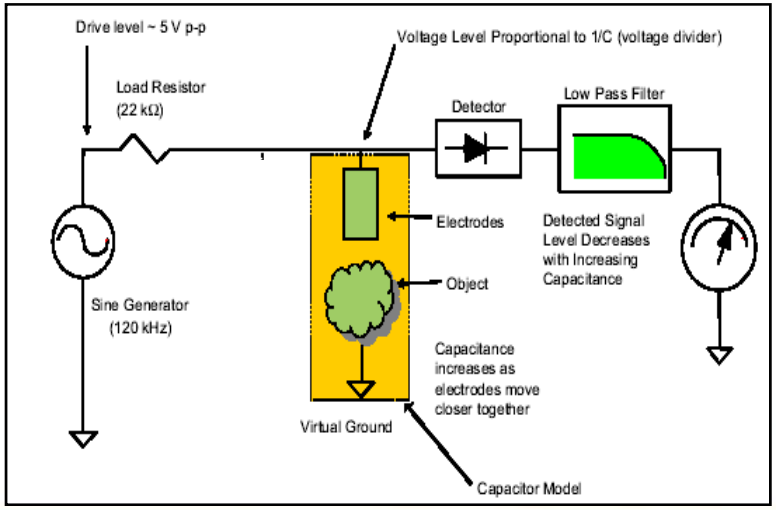
1. Determine component designs that produce the highest CLLD sensitivity
2. Prevent any false detection of liquid

Background

CLLD verifies that the correct amount of fluid has been dispensed and is therefore an important process control

Cone and Tip (Electrode)

Fluid and Load Station (Ground)



GEN-PROBE

CLLD Testing

- A component prototype was attached to the testing platform.
- A script was developed to communicate to the pipettor
- The pipettor was set to perform a specific number of cycles to collect CLLD data.
- This was repeated for multiple design iterations of various components.

1. Fluid placed in load station

2. Pipettor picks up a tip

3. Pipettor moves to touch fluid

GEN-PROBE

Conclusion

- The designs that produced the highest CLLD sensitivity were found.
- False liquid detections were reduced
- Signal drift and noise were reduced
- The most efficient yet cost effective designs were implemented into the actual product.

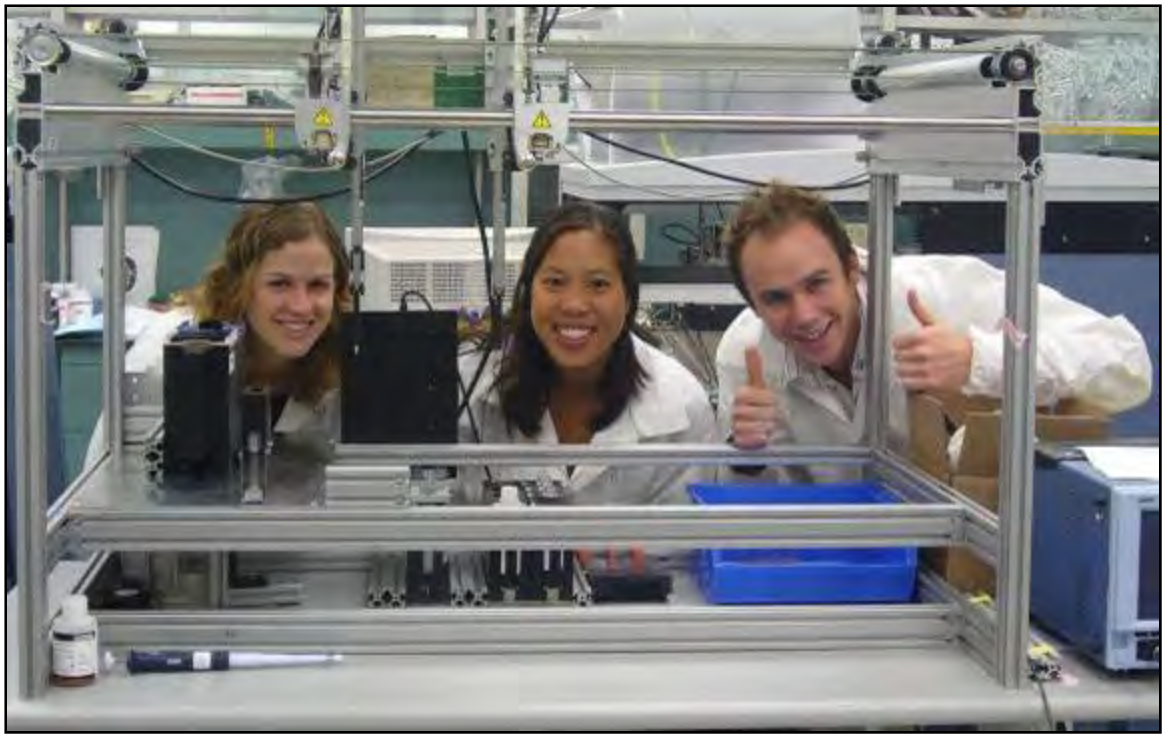
GEN-PROBE

Accomplishments

- Conducted experiments that resulted in instrument design changes
- Developed teamwork skills in a project-oriented environment
- Improved technical communication skills
- Learned how to apply theory to application in industry
- Gained a better understanding of what a career in engineering entails
- Developed professional relationships that will last a lifetime!

GEN-PROBE

Thank you Gen-Probe and UCSD Jacobs School of Engineering!



Special Thanks to:

- Wilbur Braulio
- Joe Ellis
- Norbert Hagen
- Byron Knight
- Sean La Motte
- Ben Liang
- Kevin Livers
- Melody Murphy
- David Opalsky
- Brian Schroeter
- Todd Tuggle
- George Walker

GEN-PROBE

Faculty Presentation

“Educating and Managing the NextGen Engineer”

Beth Simon, Ph.D.

Professor, Computer Science Engineering

UCSD MS ‘98, PhD ‘02

CAP Business

Anne O’Donnell

Director, Corporate Affiliates Program

UCSD Jacobs | School of Engineering

IGNITING INNOVATION

RESEARCH EXPO

THURSDAY • APRIL 15, 2010 • 12:30 PM – 8:30 PM

12:30 p.m.	Poster Judging Begins
1:00-3:00 p.m.	Graduate Student Poster Exhibit
3:00-4:30 p.m.	Breakout Sessions Featuring Faculty Talks for each Dept.
4:30-5:30 p.m.	Keynote speaker: Lawrence Papay, Ph.D. NAE “Renewables and America’s Energy Future” Poster awards
5:30-6:30 p.m.	Research Expo Reception
6:30-8:30 p.m.	NAE Dinner – ***CAP Members have one seat!***

Jim Rohr, Ph.D. UCSD ’85

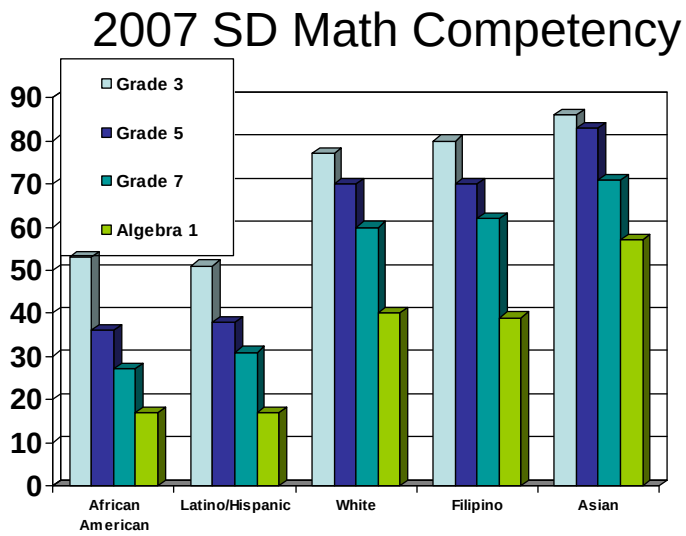
K-12 Outreach

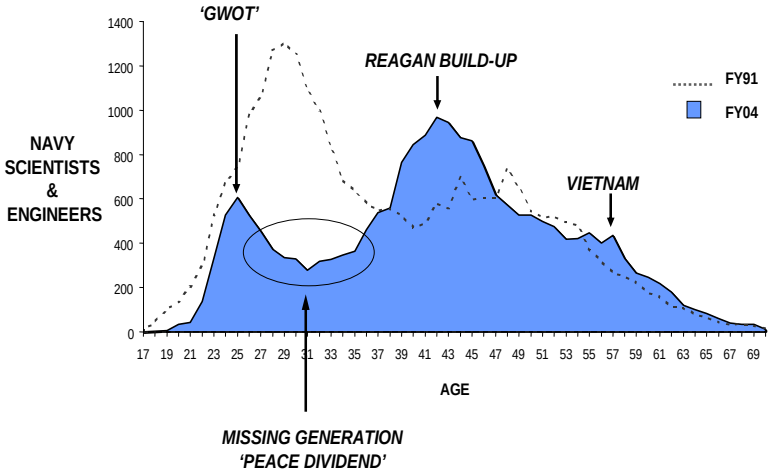
SPAWAR Systems Center – Pacific

“Go visit your kid’s class!”

K-12 Outreach

- **Why do we care:**
  - Pipeline Needs
  - Reservoir Low
  - Leaks





	1985	1995	2005
US - BS Eng. Degrees	70,000	64,000	66,000
US -Total Enrollment	12.3 M	15.6 M	17.3 M


turn
upside
down


Girl's Day Out


Navy VetLab

NATIONAL ENGINEERING WEEK

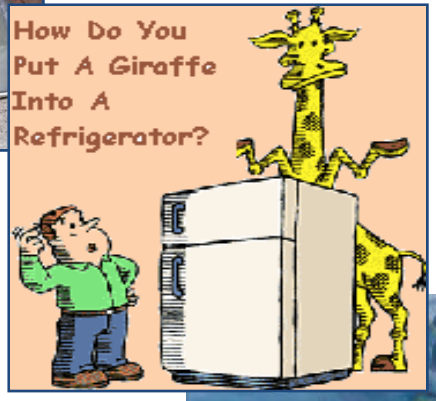
(Feb. 14-20)

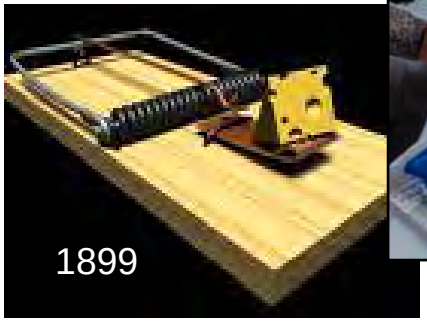
who are the engineers

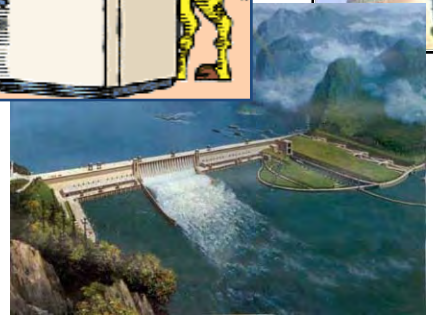
NDEP
NATIONAL DEFENSE EDUCATION PROGRAM
BUILDING AMERICAN STRENGTH IN SCIENCE AND ENGINEERING

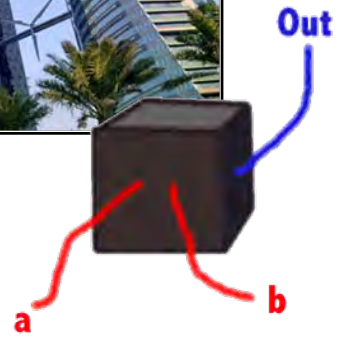
"wild for adventure, keen for achievement, eager, ardent, bronze-faced, and keen-eyed" … someone who "had been seized by the spirit of some great thing to be."

--- Zane Grey In The U. P. Trail









"So I want to persuade you to spend time in the classroom, talking – and showing – young people what it is that your work can mean, and what it means to you …
Think about new and creative ways to engage young people in science and engineering, like science festivals, robotics competitions, and fairs that encourage young people to create, build, and invent – to be makers of things."

President Barack Obama
to the National Academies
April 27, 2009

CAP Business:

Anne O'Donnell, Director

Dates to Remember:

October 13, 2009	Gordon Leadership Awards Ceremony
November 12, 2009	Professional Evening with Industry NSBE, SWE, & SHPE
February 4, 2010	CAP Executive Board Meeting
February 19, 2010	Disciplines of Engineering Career Fair (DECaF)
April 15, 2010	Research Expo
April 15, 2010	National Academy of Engineering Conference
June 3, 2010	CAP Executive Board Meeting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