### **BYU** | CIVIL & ENVIRONMENTAL ENGINEERING

IRA A. FULTON COLLEGE



## 2017-2018 CEEn Capstone Committee

### Department Participants

Rollin Hotchkiss, Ph.D., P.E.

Wayne Lee, Ph.D., P.E. (AZ/WA)

Jim Nelson, Ph.D.

Brett Borup, Ph.D., P.E.

**Department Chair** 

**Program Director \*\*** 

**Committee Chair, Faculty** 

**Committee Member, Faculty** 

## Professional Advisory Committee \*\*

Dan Avila, P.E.

Norm Beagley, P.E.

Mark Christensen, P.E.

Roy McDaniel, P.E.

Spencer Stephenson, P.E.

Paul Thorley, S.E.

Stephen Sowby, P.E. – Technical Project Advisor

**Utah Dept. of Transportation** 

**City of Santaquin** 

**J-U-B Engineers** 

LDS Church

**Horrocks Engineers** 

**Acute Engineering Inc.** 

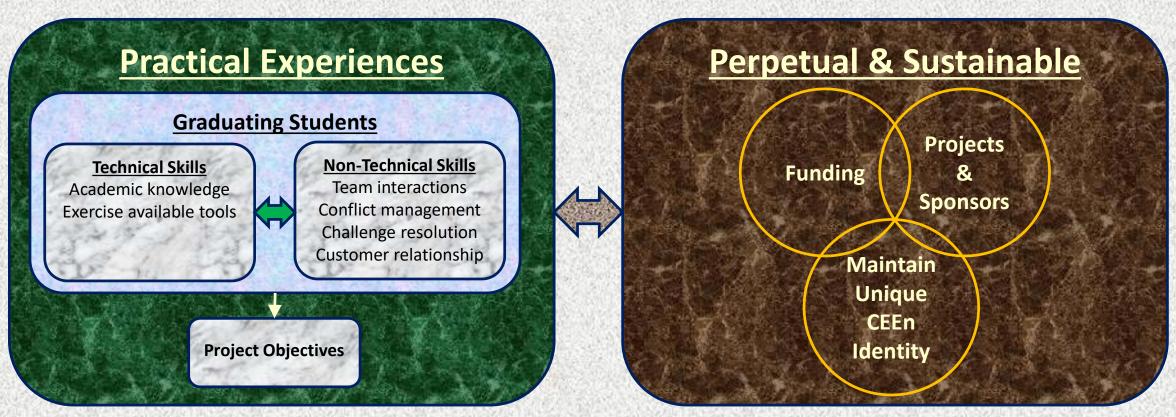
Alan Bollinger – Engineering Management CH2M-Hill

\*\* Volunteers



# **Capstone Program Objectives**

- Self-sustaining world-class program (Inspiring Learning via win-win practical project experiences)
- Maintain true Civil Engineering identity with government/municipal, commercial and humanitarian projects
- Expand both domestic and international collaborative projects → Way of the future
- Provide meaningful benefits (win-win-win) to all involved with the program: ⇔ Students, sponsors and faculty advisors





## **Enhanced Capstone Project Perspective**

- Improve project support environment/perspective
  - Addition to everything in Traditional Capstone (Nothing taken away)

#### **Traditional Capstone Perspective**

- Main Sponsors
  - Mostly municipals, humanitarian, small businesses
- Objective
  - Provide students practical experience in project management & execution prior to graduation
- Projects (Limited)
  - Introduce students to practical experience
    - Sometimes projects have known results/answers
    - Taxing on faculty and sponsors
- Sponsors' Benefits
  - Preview of potential new hires
  - Charitable contributions toward preparing students
- Students' Benefits
  - Practical project experiences
- Faculty's /School's Benefits
  - Satisfaction on helping students succeed

### **Enhanced Capstone Perspective (In Addition to Traditional)**

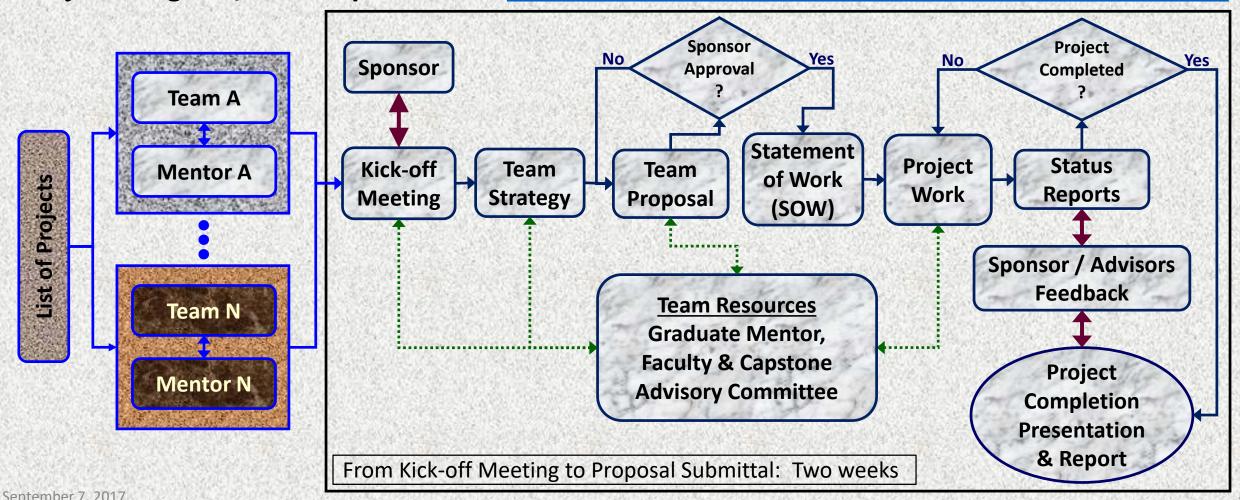
- Main Sponsors
  - Research institutions, construction, manufacturing, corporations and government agencies
- Objective
  - Foster academic-industry collaborative environment → Mechanisms for Win-Win-Win
- Projects (Limitless)
  - Proof-of-concepts demonstrations, process/quality improvements, maintenance reduction
- Sponsors' Benefits
  - Provide investment justifications with sound business-case
    - Pennies on the dollar investments with win-win-win results
  - Improve competitiveness and financial bottom-line
    - Cost reduction, quality improvement, increase reliability, higher profitability etc.
  - Greater customer satisfaction via deliverables with higher quality/reliability & lower costs
- Students' Benefits
  - Enhanced practical project experiences through innovations (inspiring learning)
  - Encourage innovative solutions to challenges (i.e. think outside the box)
  - Publish / showcase practical project work
- Faculty's / School's Benefits
  - Increase research and innovative project opportunities
  - Publications of leading edge results → Expand academic credentials
  - Additional external funding potentials





## **Projects Execution Process**

Project Progress/Results posted on: <a href="http://cecapstone.groups.et.byu.net/content/projects">http://cecapstone.groups.et.byu.net/content/projects</a>





# Sample Capstone Collaborative Project Environment \*

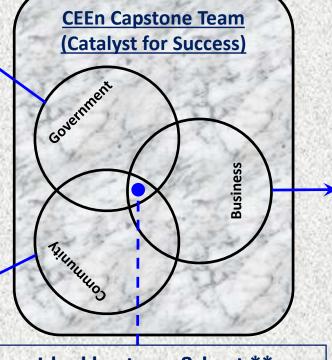
#### **Zoning, Planning & Regulations**

- Environmental
- Code & ordinance compliance
- Historical significance
- Business growth potentials tax revenues
- Traffic & infrastructures
- Compatibility to local development plan

### **Community Involvement**

- Environmental
- Jobs
- Community growth
- Traffic
- Neighborhood compatibility, impact & benefits
- Convenience

### **Potential Students Involvement for Mutually Beneficial Solutions**



Ideal best use & best \*\*
practices win-win-win scenario

#### **Business Case**

- Business significance vs. costs, feasibility & risks
  - Environmental Potential lead/asbestos removal
  - Code compliance Structural/electrical/mechanical
  - Water resources Well/septic vs. city water/sewer
  - Storm drain/run off Low Impact Development (LID)
  - Geotechnical Soil/foundation assessment
- Short & long term investment costs vs. benefits
  - Liability
  - Profitability
  - Traffic improvements
  - Site plan & construction
  - Tenant occupancy rate
  - Maintenance & operation
  - Risks assessment

September 7, 2017

<sup>¥</sup> Actual process to be applied in a 2017-2018 Capstone Project
\*\* Best acceptable compromises under conflicting requirements & interests