



NORTHERN ARIZONA  
UNIVERSITY



*Spirit*

# 2014 NAU ASCE Concrete Canoe Team

Design Team:

Brent Allman

Ariel Suarez

Hannah Adele Williams

Shuo Zhang

**NAU**

Northern Arizona University

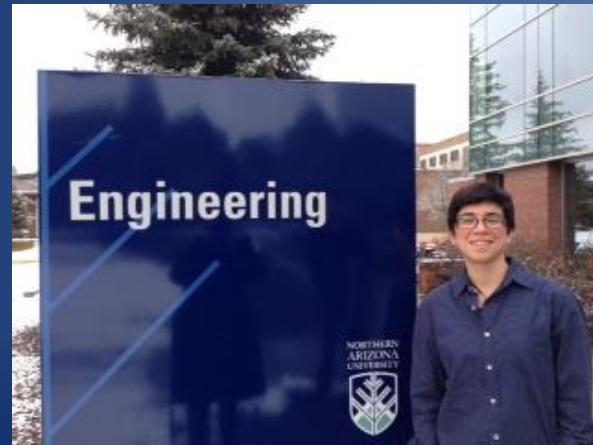
**ASCE**<sup>®</sup>

*American Society of Civil Engineers*

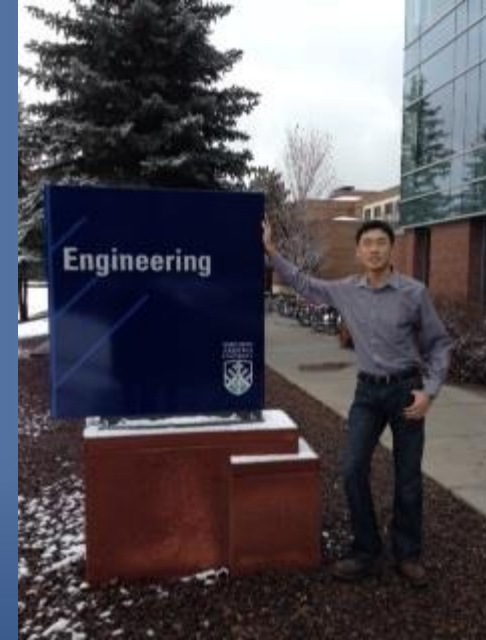
# Project Management



Hannah Adele Williams  
*Project Manager,  
Reinforcement Lead*



Ariel Suarez  
*Hull Design Lead*



Shuo Zhang  
*Structural Analysis Lead*



Brent Allman  
*Concrete Lead*

# Project Management *continued*

Technical Advisor  
*Thomas Nelson*  
Project Engineer  
*Hubbard and Merrel*



Client  
*Mark Iamer, PE, MEng.,*  
Instructor  
*NAU*



# Presentation Overview

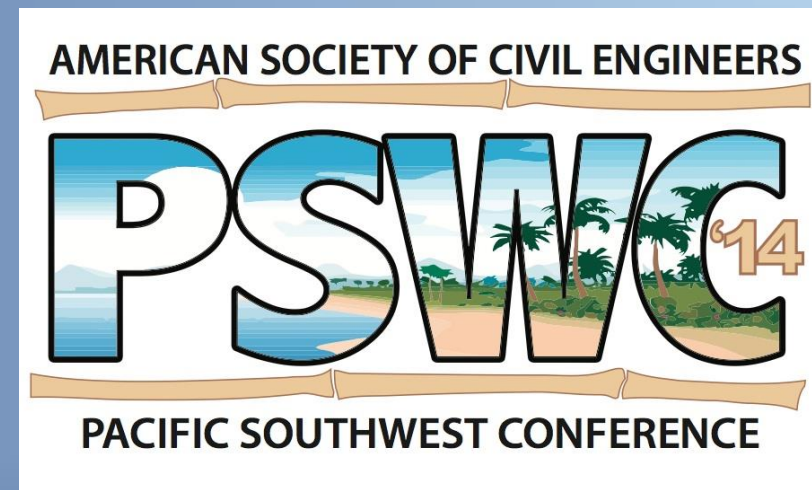
- Project Understanding
- Scope of Services
- Schedule
- Cost of Engineering Services

# Project Understanding

- Background on Concrete Canoe
- Stakeholders
- Project Description
- Goals and Technical Aspects

# Background

- Annual ASCE competition
- NAU ASCE student chapter depends on completed product
- *Night Fury*
- Must comply with 2014 rules and regulations



# Stakeholders

- NAU CE Department
- NAU ASCE Student Chapter



# Project Description

- Construct a thin shelled, lightweight concrete canoe
- 2014 ASCE National rules and regulations
- Participate in ASCE PSWC
- Canoe will be judged on a number of different levels
- National Competition





# Goals and Technical Aspects

- Build off of *Night Fury's* morale boost
- Use *Night Fury* as a stepping stone
- Place in top 5
- Relate engineering knowledge



# Scope of Services

## **PHASE I: Research**

Task 1.0 *Begin*

Task 2.0 *Concrete Mix Design*

Task 3.0 *Hull Design*

## **PHASE II: Design**

Task 4.0 *Structural Analysis*

Task 5.0 *Reinforcement Design*

## **PHASE III: Construction**

Task 6.0 *Canoe Construction*

Task 7.0 *Display Construction*

## **PHASE IV: Conference**

Task 8.0 *Design Report*

Task 9.0 *Paddling*

Task 10.0 *Oral Presentation*

Task 11.0 *Conference*

## **PHASE V: Capstone**

Task 12.0 *Deliverables*

# Exclusions

Tasks to be excluded from this project:

- Design strong back
- Build mold
- Drawing canoe in AutoCAD Civil 3D
- Structural analysis on mode of transportation



# Impacts

## Economical

Building canoe every year



## Environmental

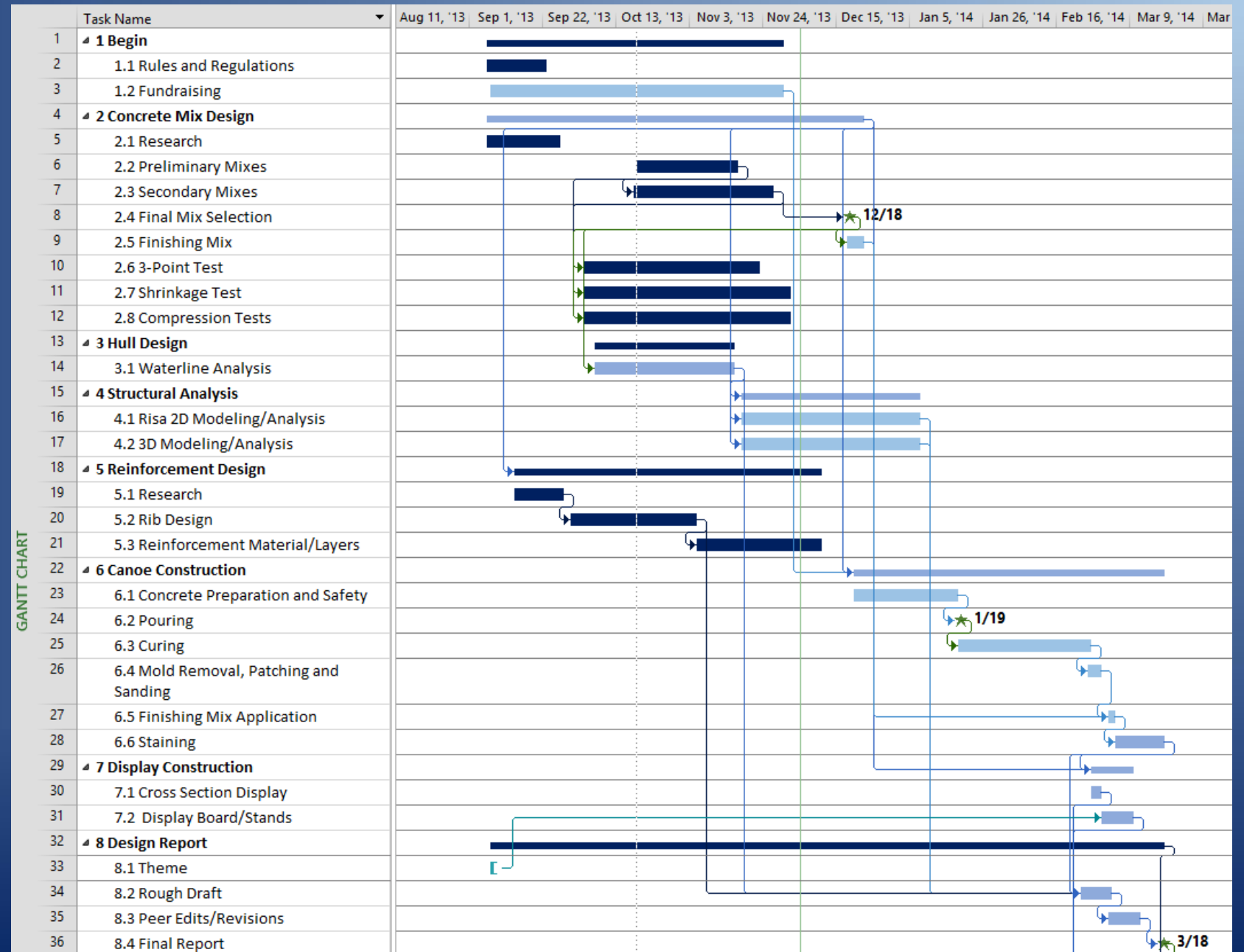
Material waste



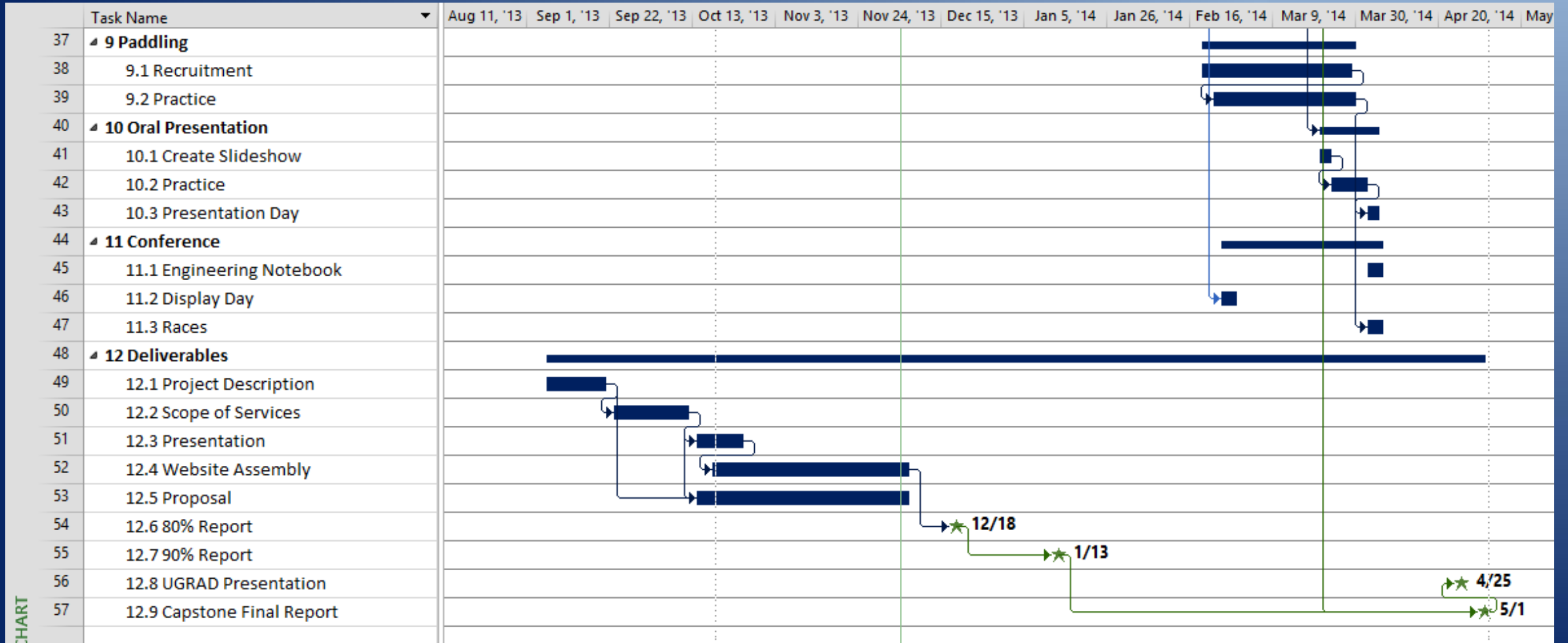
## Educational

Mentorship Program  
Real-world application

# Schedule



# Schedule *continued*



# Cost Estimate of Engineering Services

1.0 Personnel	Person	Hours	Rate, \$/hr	Cost, \$
	Project Manager	150	40	6,000
	Hull Designer	150	30	4,500
	Structural Analyst/Reinforcement Designer	150	20	3,000
	Concrete Designer/Lab Technician	150	10	1,500
	Total personnel			15,000
2.0 Travel	Local meetings			
3.0 Overhead				1,200
4.0 TOTAL				16,200

# Project Summary

- Optimize last year's design
- Build a thinshelled, light weight concrete canoe
- Attend and participate in the ASCE PSWC





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