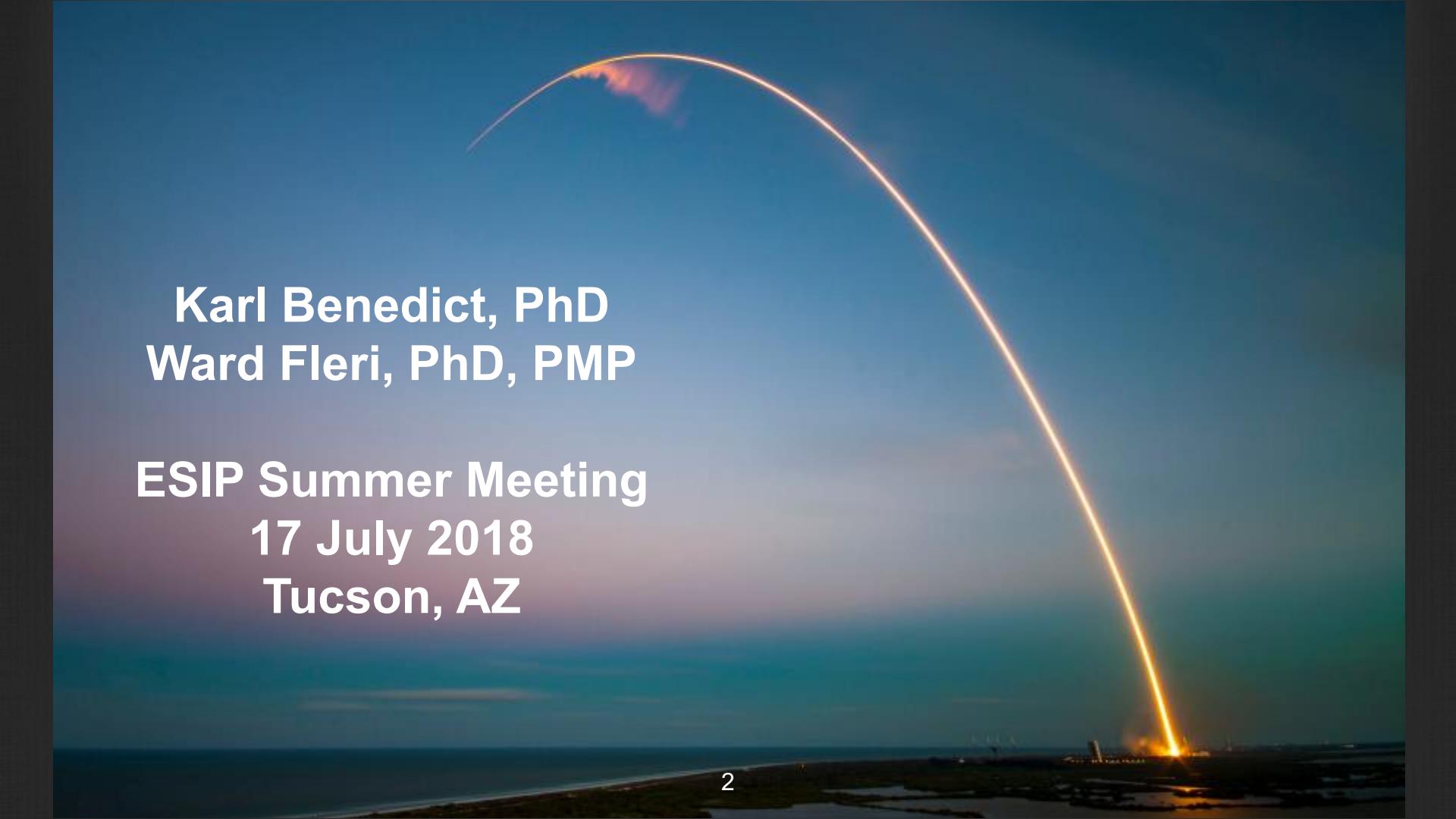


Research Project Management Principles & Tools (Juggling 101)





**Karl Benedict, PhD
Ward Fleri, PhD, PMP**

**ESIP Summer Meeting
17 July 2018
Tucson, AZ**

Overview

Session 1

- Why us?
- Why project management?
- What is a project?
- Requirements & scope
- Intro to TaskJuggler
- The triple constraint
- Task breakdown
- Estimating effort

Session 2

- Assigning resources
- Budgeting
- Project execution
- Communication
- Analysis & visualization
- Project close-out
- Career implications

Who are we and why are we talking about this?

Ward Fleri

- PhD in Applied Math from Brown University
- Photon Research Associates – Scientist, PM, Software Engineering Group Leader
- Protein Data Bank at UCSD/SDSC – PM
- Immune Epitope Database at LJ Institute – PM
- Project Management Professional since 2003
- Certified Scrum Master since 2016

Who are we and why are we talking about this?

Karl Benedict

- PhD in Anthropology from the University of New Mexico
- Director of Research Data Services, UNM Libraries
- Former Director and Research Scientist, Earth Data Analysis Center, UNM
- Cyberinfrastructure Lead/ Co-I for multiple large-scale, multi-year NSF and NASA funded projects



Why
Knowing
Project
Management
Makes Sense
No Matter
What Career
You Choose

Importance of Project Management

- You are already involved in projects
- Writing proposals
- Organizing awards
- Communicating among team members, subcontractors, your boss
- Achieving results on time and within budget
- Developing leadership skills



Top 10 Skills Employers Seek in 20-Something Employees

Ability to:

- Work in a Team
- Make Decisions & Solve Problems
- Plan, Organize & Prioritize Work
- Communicate Verbally
- Obtain & Process Information

- **Analyze Quantitative Data**
- **Technical Knowledge**
- in Job
- **Proficiency with Computer Software**
- **Create/Edit Written Reports**
- **Sell & Influence Others**



Forbes
October 2013

The Top 12 Skills Employers Seek



The Balance
Dec 2017

1. Positive Attitude
2. Strong Work Ethic
3. Excellent Communication
4. Problem-Solving
5. Time Management
6. Flexibility

7. Work in Team Environment

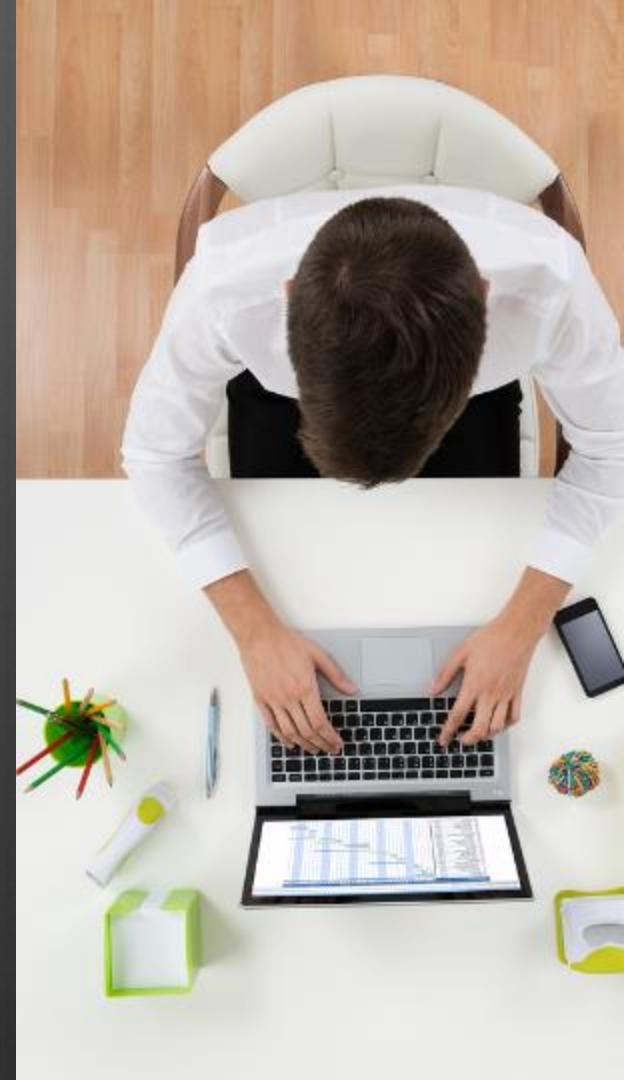
8. Computer/Technology

9. Project Management

10. Self Confidence

11. Accept Constructive Criticism

12. Strong Research Skills



What should you know?





Individuals going about the daily routine of their job will need to know how to prioritize and plan each activity to be able to get the best job done in the least amount of time.

What is a project?

A **temporary effort** with a beginning and an end.
It creates a **unique** product, service, or result.



Some basic project management concepts

Requirements & Scope

Know Where You're Going

Goals, aims, objectives

Pick a Road

Approaches, constraints,
assumptions



Out of Scope

Related
Aims

In Scope

Aim 1
Aim 2
Aim 3

Related
Goals

Feature 1
Feature 2
Feature 3
Feature 4

Additional New Features

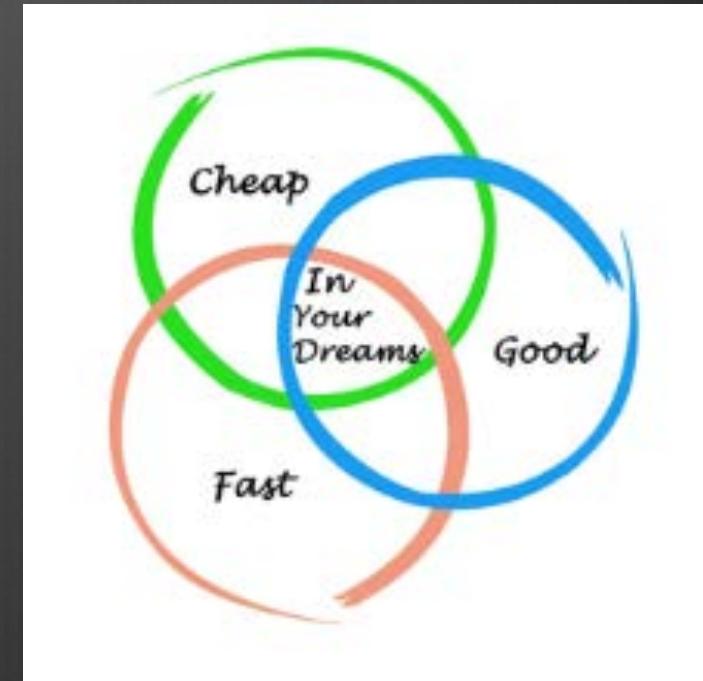
Beware of Scope Creep!



Introduction to TaskJuggler

- Overview
- Project skeleton

The Triple Constraint (Iron Triangle)



Constraint Prioritization → Communicate with Stakeholders



Planning

Break down
the overall
effort into
manageable
tasks.



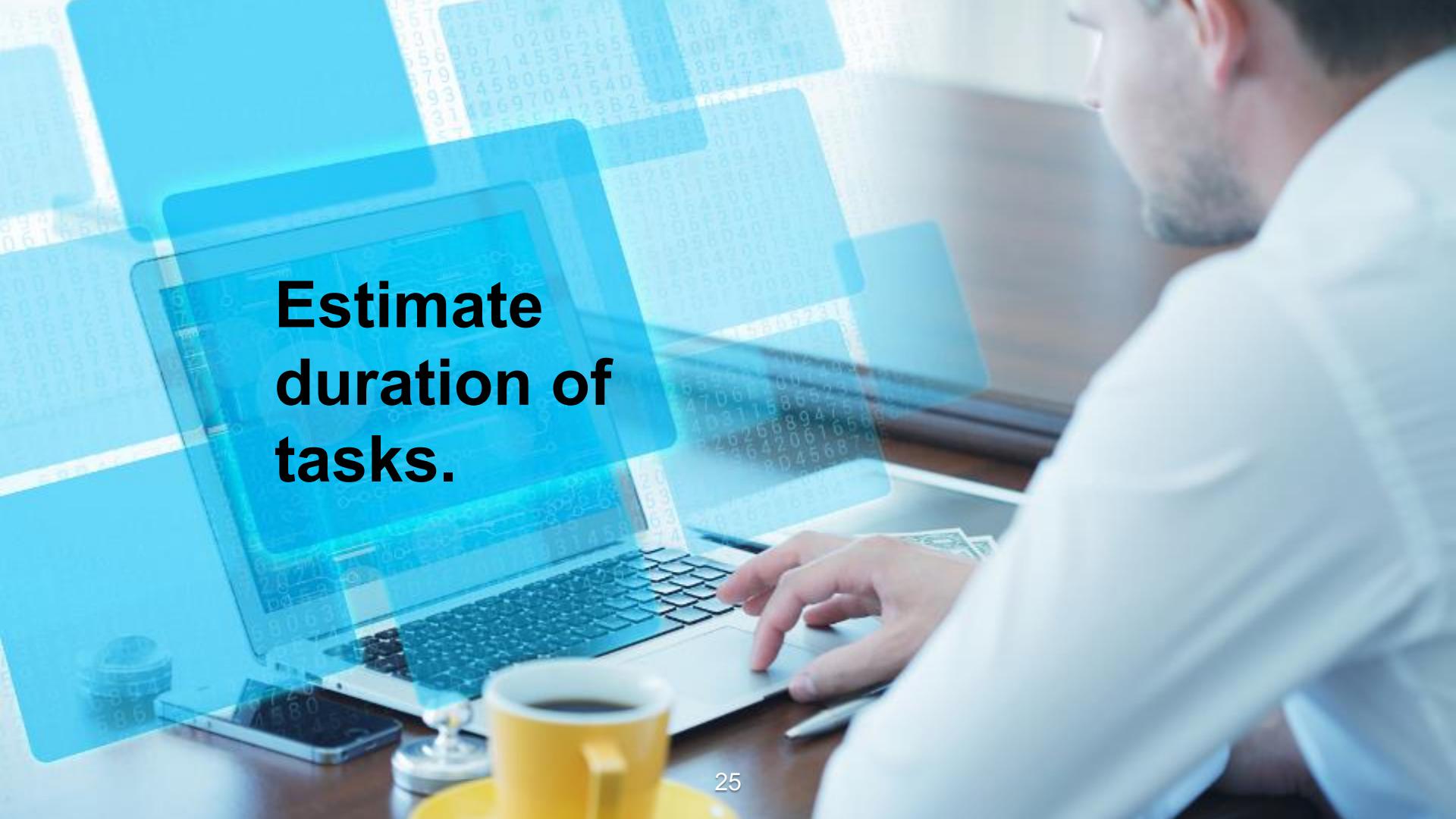
TaskJuggler

- Project outline



A collage of hands and a chalkboard diagram illustrating project management concepts. The background features a chalkboard with a lightbulb containing a dollar sign, a Venn diagram, and a flowchart with arrows. Several hands are shown writing on paper or pointing at the chalkboard.

Identify
dependencies
among tasks.



**Estimate
duration of
tasks.**

TaskJuggler

- Progressive elaboration

Session 2



Assign Resources (People & Equipment)

Make a Budget



TaskJuggler

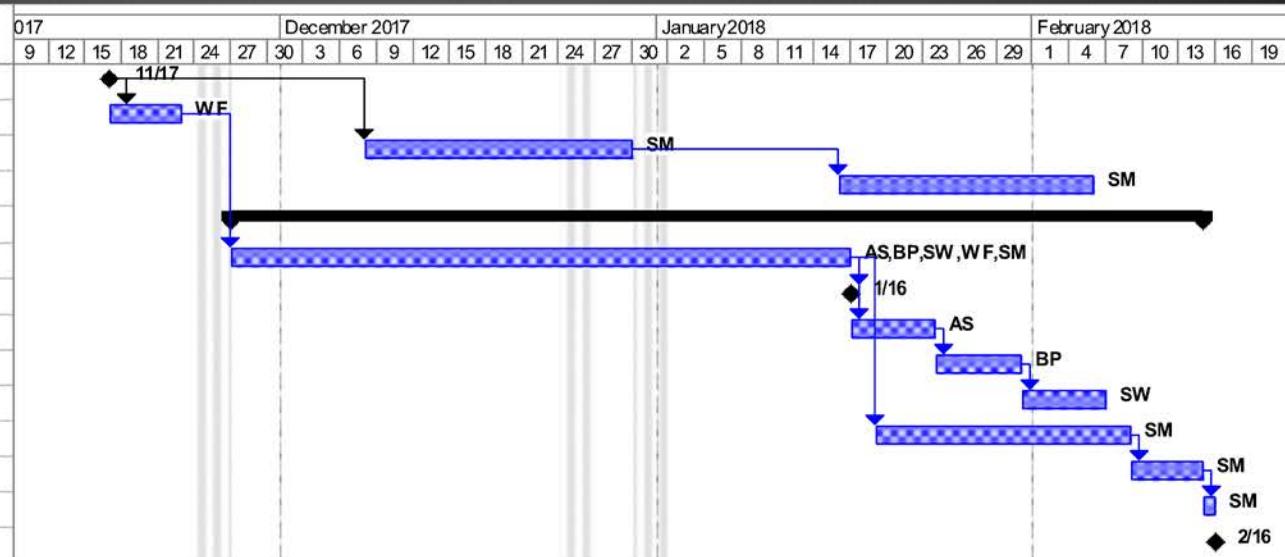
- Assigning resources
- Cost estimation



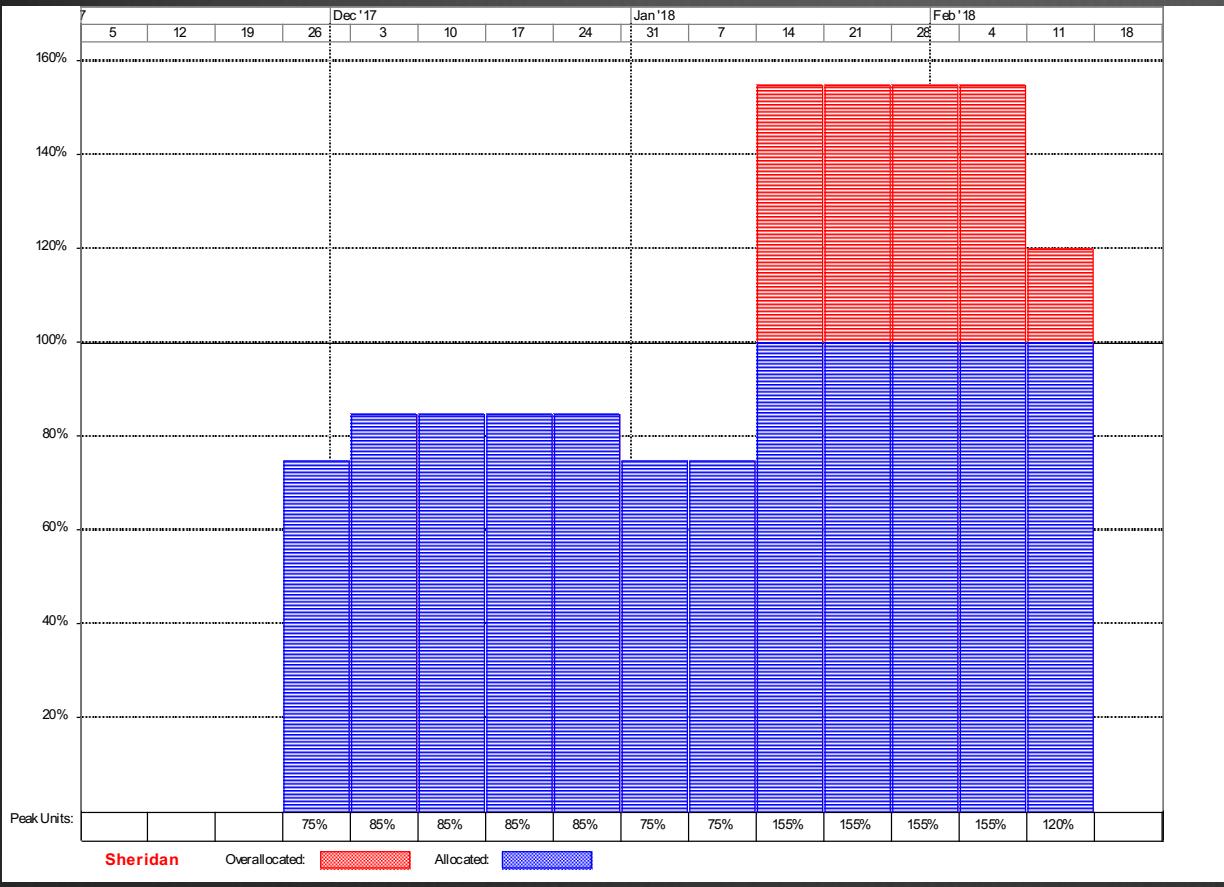
**Expect
Changes**

Plan with a Gantt Chart

ID		Task Name
1		RFP Released
2		Review RFP
3		Gather biosketches
4		Gather letters of collaboration
5		TECHNICAL PLAN/APPROACH
6		1st draft
7		1st draft complete
8		Review by PI #1
9		Review by co-PI #1
10		Review by co-PI #2
11		Revise proposal
12		Finalize proposal
13		Send proposal electronically
14		Proposal due at NIAID



Microsoft Project (\$600)
TaskJuggler (Free)



Some
Programs
Offer
Resource
Profiling

Project Execution



- Identify risks
- Expect variations from the plan
- Correct course as needed
- Provide leadership to the team

TaskJuggler

- Project tracking

A professional man with glasses and a beard, wearing a dark suit, is standing in an office and speaking to two other people whose backs are to the camera. He is gesturing with his hands while talking. In the background, there are white tiled walls with several yellow sticky notes pinned to them.

**Surprises are
usually not good**

Communication

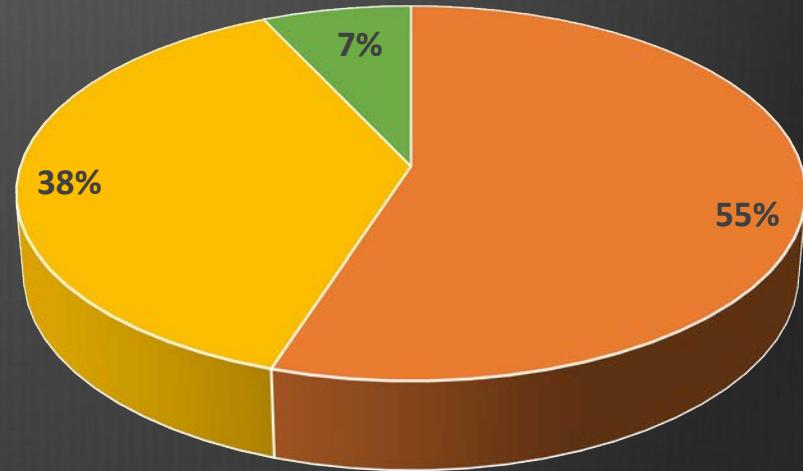
Did you know?

The majority of communication is nonverbal.



**Good
communication
is critical.**

3 V's of communication





Choose the most effective means for the situation

Email
Phone
Face-to-Face
Formal Reports

Communication Channels Expand Quickly

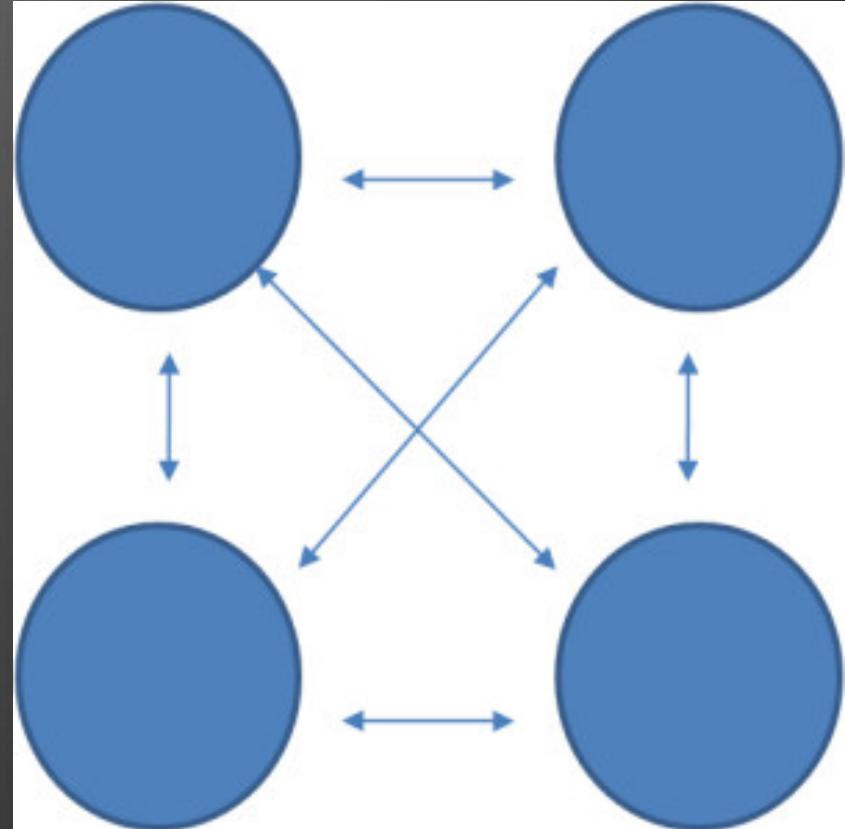
$N(N-1)/2$

$N = \# \text{ of}$
Stakeholders



4 Stakeholders?

$$4 (4-1) /2 = 6$$



10
Stakeholders?

$$10 (10-1) /2 = 45$$



TaskJuggler

- Visualization
- Reporting



Project Closeout

- Make final contractual deliverables (e.g. code, reports)
- Finalize financials (vendors, subcontractors, invoices)
- Archive all artifacts
- Meet with team for “Lessons Learned”



Learn from Your Successes and Failures

If you want to
succeed, double your
failure rate.

Thomas Watson

A close-up photograph of a woman's profile. She has dark hair pulled back and is wearing a light green button-down shirt under a grey blazer. Her right hand is resting against her chin, with her fingers tucked under her cheek, suggesting a thoughtful or listening pose. The background is blurred.

Career Implications

- More effective use of time & resources
- Opportunity to develop leadership & management skills
- Critical skills to have as a PI

- 
- Alternative career path to traditional PI research trajectory
 - Sought-after skills in science, engineering, and software organizations
 - Expanded domain flexibility

