Using Project Management in Your MS or PhD

Elizabeth Salm, PhD
Director, Graduate and Postdoctoral Training & Development
Biomedical Graduate Education
Georgetown University

BIOMEDICAL GRADUATE EDUCATION
GEORGETOWN UNIVERSITY

Learning Objectives

By the end of this talk, you will be able to:

- Define project scope and develop work breakdown structures
- Breakdown and prioritize tasks
- Use software to manage project progress

What words come to mind when you think of project management?

What is project management?

Project management is a series of flexible and iterative steps through which you identify where you want to go and a reasonable way to get there, with specifics of who will do what and when.

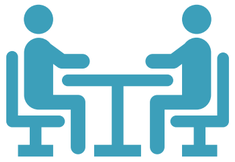
Making the Right Moves: A Practical Guide to Scientific Management, 2006. Burroughs Wellcome Fund and Howard Hughes Medical Institute

Why use project management in research?

Manage your time more effectively

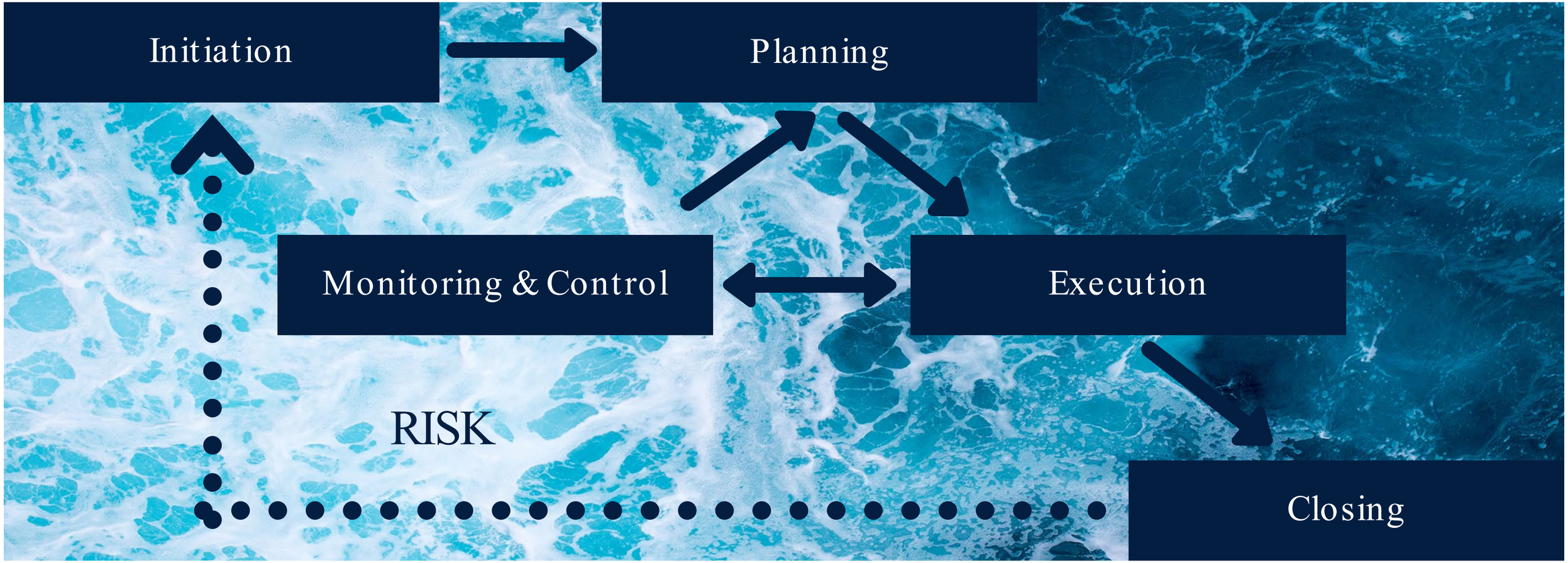
Improve the quality of your work

Prevent and/or reduce the effect of issues that arise



Communicate better and manage expectations

Project Management Lifecycle



Starting a Project

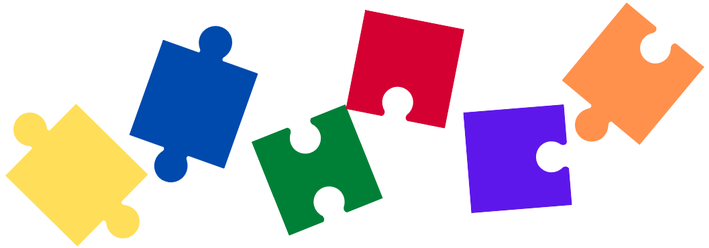
What is your main goal?

Project Goal

Graduate with your degree

What outputs or results are required to reach that goal?

Deliverables



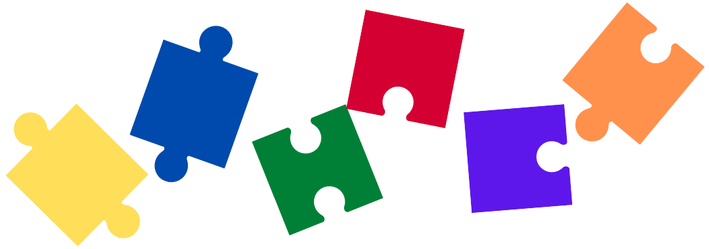
Research hypothesis, completed courses, thesis, etc.

Starting a Project

Define your project scope

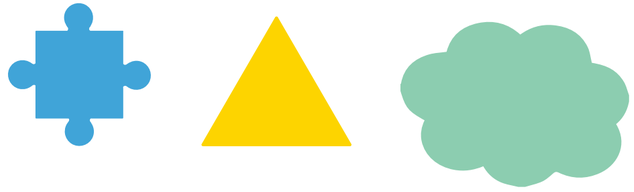
- Guardrails around what it takes to produce the deliverables
- What is fine to work on and what to avoid given the constraints (resources, bandwidth, requisite skills, etc) or expectations that you may have

In Scope



Written thesis, research project, final grades, etc.

Out of Scope



Published book, post-graduation job, etc.

Starting a Project

Involve your team and stakeholders

- Depending on the project, these decisions can require input from others:
  - In your group, you may need to consult with your advisor and others working on the project (i.e. coworkers, collaborators, thesis committee, etc).
  - Outside of your group, your stakeholders can include your funding, companies, government agencies, nonprofits, and more.
- Input from stakeholders can involve focus groups, brainstorming, or reviewing material.

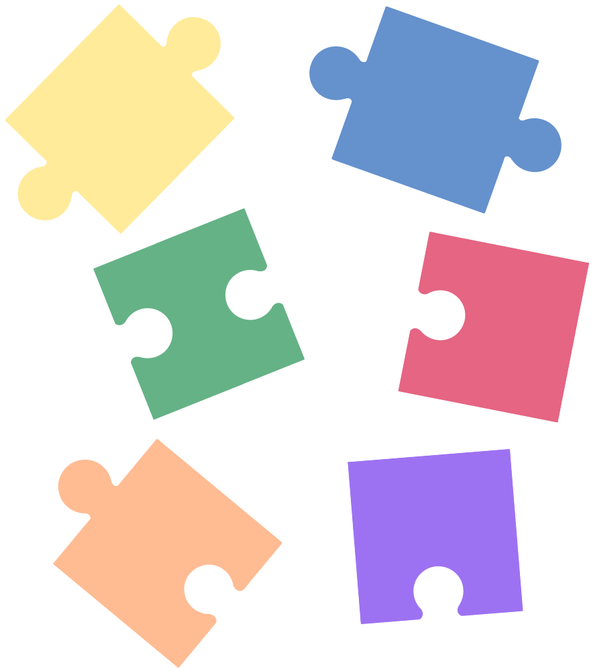
Activity: Let's plan to present at a conference!

Scope Description: Present our research at a scientific conference in the spring

Deliverables:

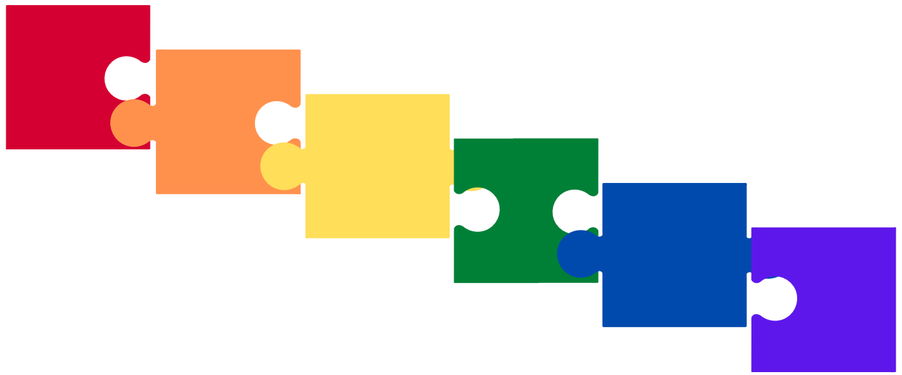
Planning a project

Deliverables

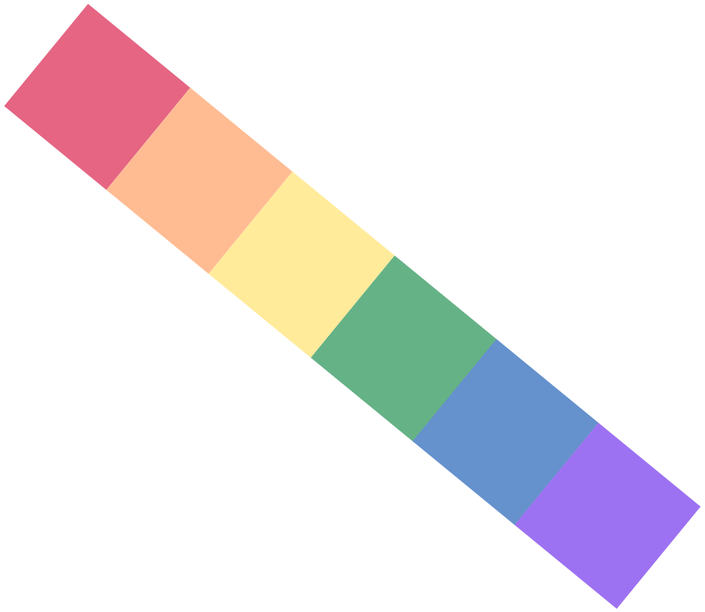


Assemble

into



Project Goal



Work Breakdown Structure

Planning a project

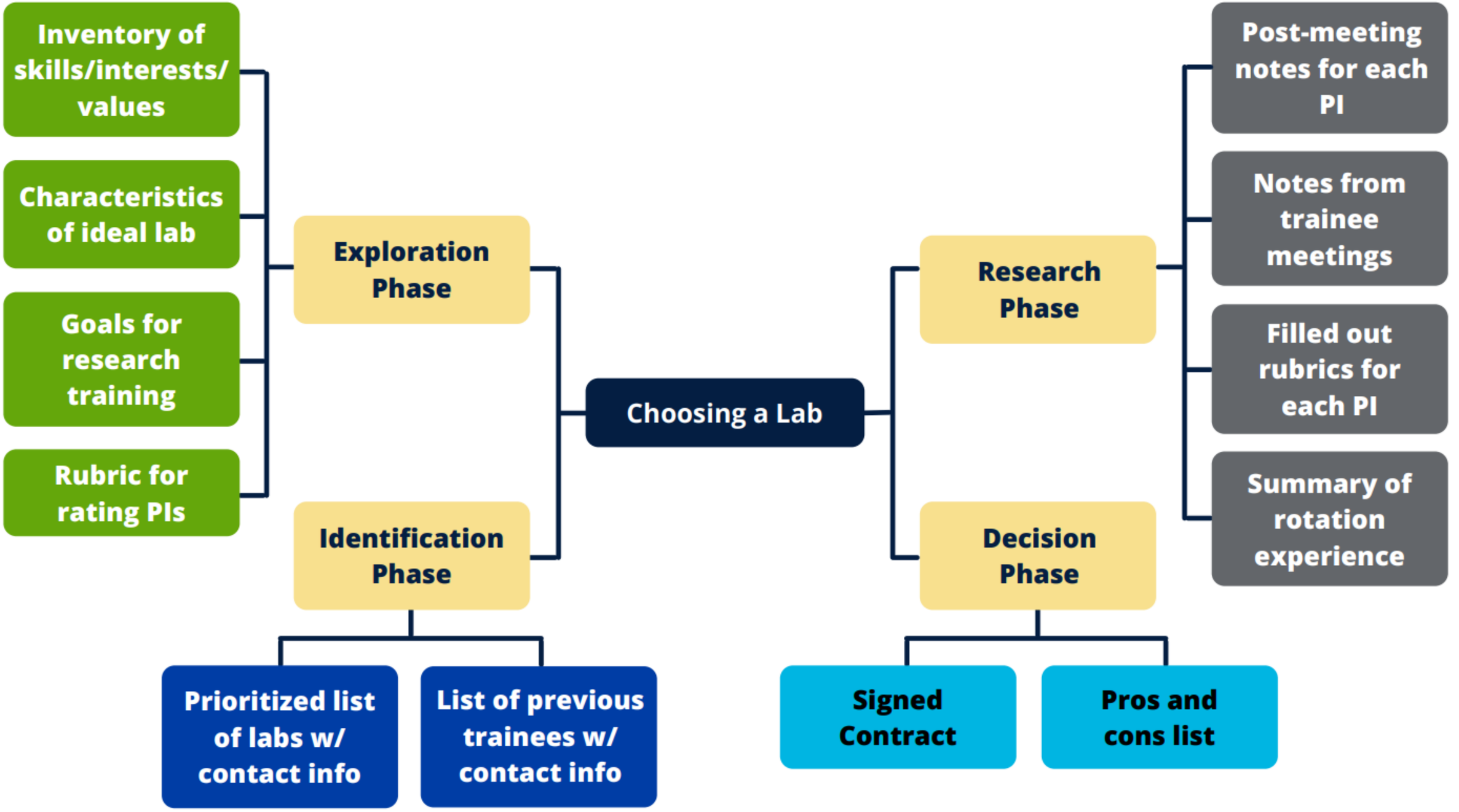
Work Breakdown Structures (WBS)

A WBS structures your deliverables based on what needs to be done first, through the creation of project phases or categories.

It also breaks down deliverables into smaller components and the tasks or work required to accomplish them.

Example WBS

PROJECT	Applying for a Research Grant
PHASE	Literature Review & Idea Generation Research Project Design Writing Application Submission
DELIVERABLES	Summary of lab's past research Summary of relevant literature List of potential research questions Research project outline Preliminary data goals Experiment protocols & reagents Preliminary data figures Specific aims Abstract Research Plan Bibliography Facilities & Resources CV Budget Final version of application materials Submitted application


Inventory of skills/interests/ values
Characteristics of ideal lab
Goals for research training
Rubric for rating PIs
Exploration Phase
Identification Phase
Prioritized list of labs w/ contact info
List of previous trainees w/ contact info
Choosing a Lab
Research Phase
Decision Phase
Post-meeting notes for each PI
Notes from trainee meetings
Filled out rubrics for each PI
Summary of rotation experience
Signed Contract
Pros and cons list

Activity: Let's plan to present at a conference!

What phases of work go into planning to present at a conference, then what are some deliverables for each category

Phase				
Deliverable				

Where to go from deliverables?

To determining what tasks are required to complete a deliverable!!

Then organizing tasks based on priority.

Adapted Eisenhower Matrix

Rate your tasks on their effort and importance

IMPORTANCE

1 | Easy to do, let's do it *Characteristics:* Low effort, clear expectations, straight forward execution *Examples:* Emails, short reports, lab meeting update, reading a paper	**2 | Tough ask, let's plan it** *Characteristics:* High effort, complex expectations, tough execution, require planning *Examples:* Building complex analysis codes, writing an IRB protocol, grading 30 essays
3 | Someone else can do this *Characteristics:* Low effort, simple execution, not very important *Examples:* Report formatting, buffer preparation, routine analysis, organizing references in online library	**4 | Probably shouldn't do this** *Characteristics:* High effort, unclear expectations, complex execution, low return *Examples:* Tasks out of scope, creating two different poster drafts, undefined tasks, planning your whole PhD in detail in your 1st year

EFFORT

https://www.proofhub.com/articles/how-president-eisenhowers-advice-will-help-you-ace-your-project

Activity: Let's plan to present at a conference!

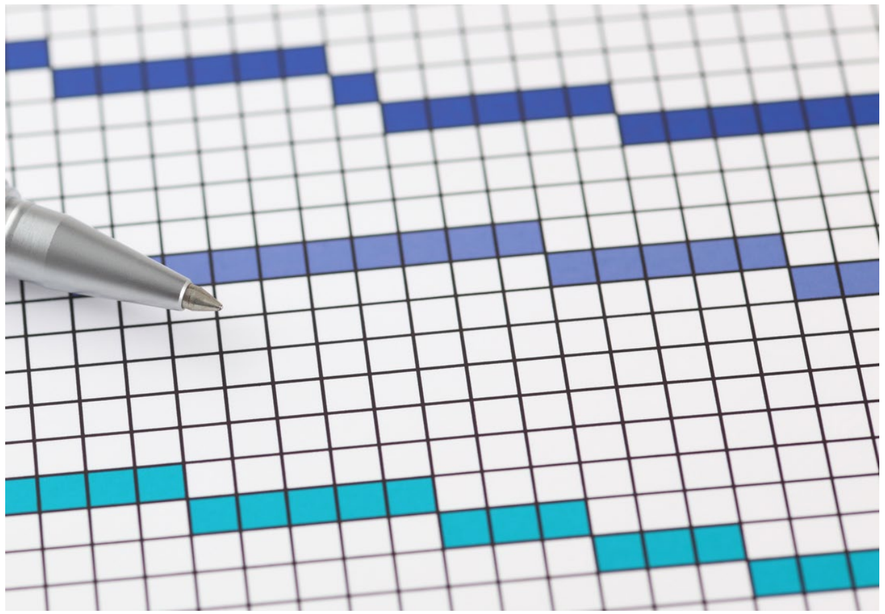
What are tasks for individual deliverables, then what is the priority of the tasks based on the adapted Eisenhower matrix (1-4).

Deliverable			
Tasks			

Scheduling a Project

Creating a project schedule requires:

- Estimating how long a task will take
- Determining which tasks are dependent on other tasks
- Creating milestones to track progress



Scheduling a Project

Estimating how long a task will take

Ask yourself:

- Have you done this or a similar task before?
- Has someone you know done this task before?
- What's the fastest this task could get done? What's the slowest? What is most likely?

Try:

- Comparing tasks to each other: which one is "bigger" meaning it requires more effort
- Add buffer time to your estimates

Scheduling a Project

Determining which tasks are dependent on other tasks

Some tasks require other tasks to be completed first, so need to be scheduled after them.

Examples:

- An experiment must be completed before a results figure can be made.
- You need to collect survey results before you can analyze them.
- You need to take this fall course before you can enroll in the advanced spring course.

Scheduling a Project

Creating milestones to track progress

An opportunity to reassess the timeline and feasibility of the project:

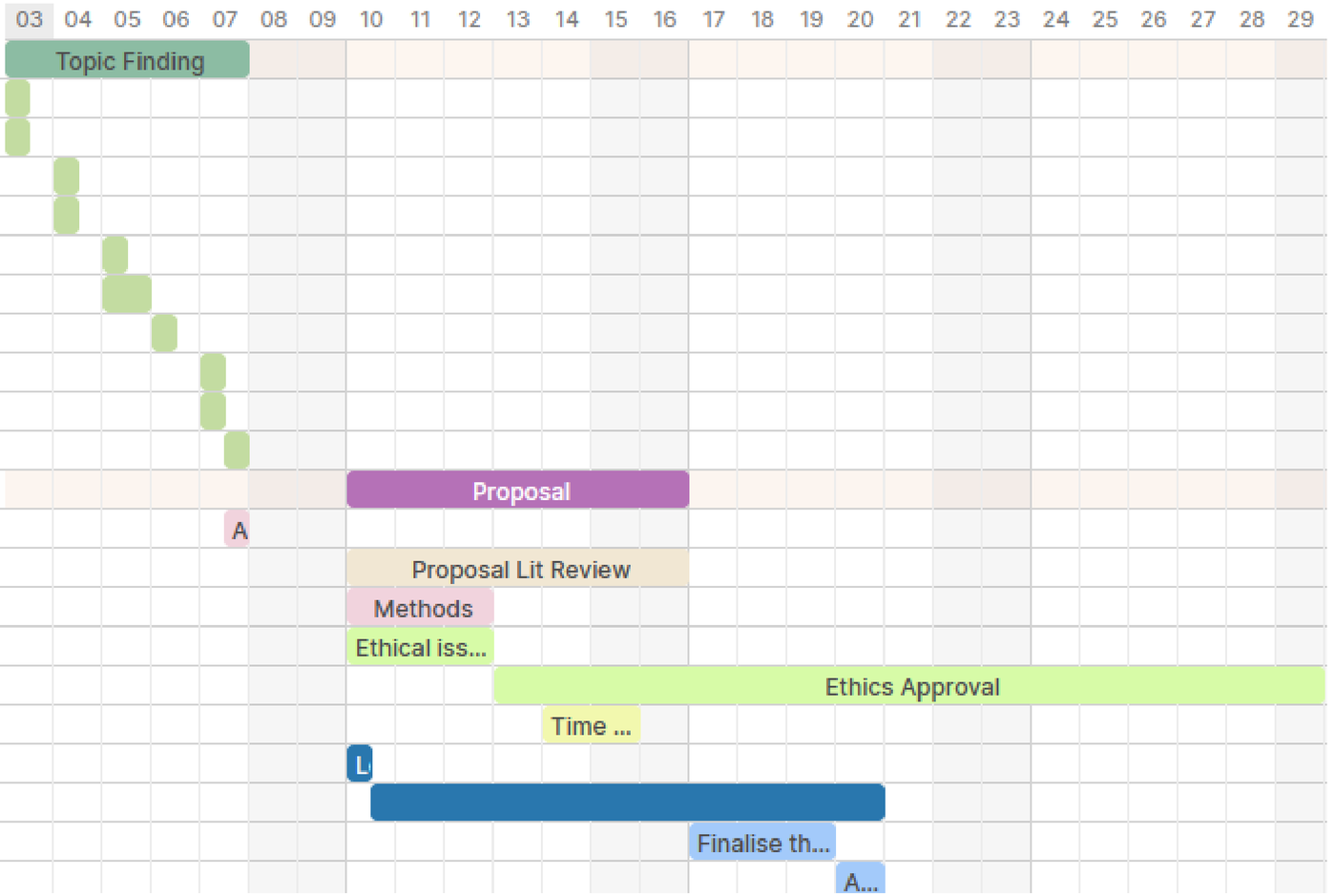
- Did you accomplish what you planned to? Why or why not?
- Are some tasks taking longer or going faster than expected? Why?
- Have you spent a lot of time and resources on a project but aren't seeing any results by the expected time?

Examples

- Submit conference abstract by deadline
- Presentation draft complete

Example Dissertation Project Schedule

No	Task	Who	What'...	Status	% co...
1.0	**Topic finding**	**Me**	**Net**	**Started**	**100**
1.1	Read about strategies f...	Me	Book	Started	100
1.2	Research possible topics	Me	Net/Lib	Started	100
1.3	Check out the topic area	Me	Net/lib	Started	100
1.4	Brain Storm precise res...	Me+1	Study ...	Started	100
1.5	Meet with supervisor to ...	Me+Sup	Office	Started	100
1.6	Plan resources	Me	Net/lib	Started	100
1.7	Finalise Research Qs	Me	NA	Started	100
1.8	Plan the next stages	Me+Sup	Office	Started	100
1.9	Audit my use of time	Me	Com	Started	100
1.10	Communicate research ...	Me	com	Started	100
2.0	**Dissertation Proposal**	**Me**	**Net/Lib**	**Started**	**100**
2.1	Agree the research Qs a...	Me	Net/Lib	Started	100
2.2	Proposal Lit Review	Me	Net/Lib	Started	100
2.3	Read around methods	Me	Net/Lib	Started	100
2.4	Address ethical issues a...	Me	Net/Lib	Started	100
2.5	Ethical approval	Ethics ...	Uni	Started	100
2.6	Detailed planning of sta...	Me	Tom's Pl	Started	100
2.7	Learn how to use the ref...	Me	Net/Lib	Started	100
2.8	Enter Refs and Bib data	Me	Home	Started	100
2.9	Finalise the proposal	Me	Net/Lib	Started	100
2.10	Agree Prosposal with tu...	Me/Tut	Uni	Started	100



https://plan.tomsplanner.com/?template=dissertation

Task Management Strategy: Kanban Board

Backlog (Optional)	To Do	In Progress	Done
			

What parts of managing a project do you find easy to do?

Where do you struggle when managing a project?

Project Management Software for You!

Project Management Apps Share Many Features

- Tasks and subtasks
- Due dates
- Labels
- Boards vs lists
- Ability to collaborate
- Linking to other apps
- Templates

Think about where you need help in managing a project and find a tool that can help you do it!

No need to get something complicated when all you need is a task list

What do you need from your project management software?

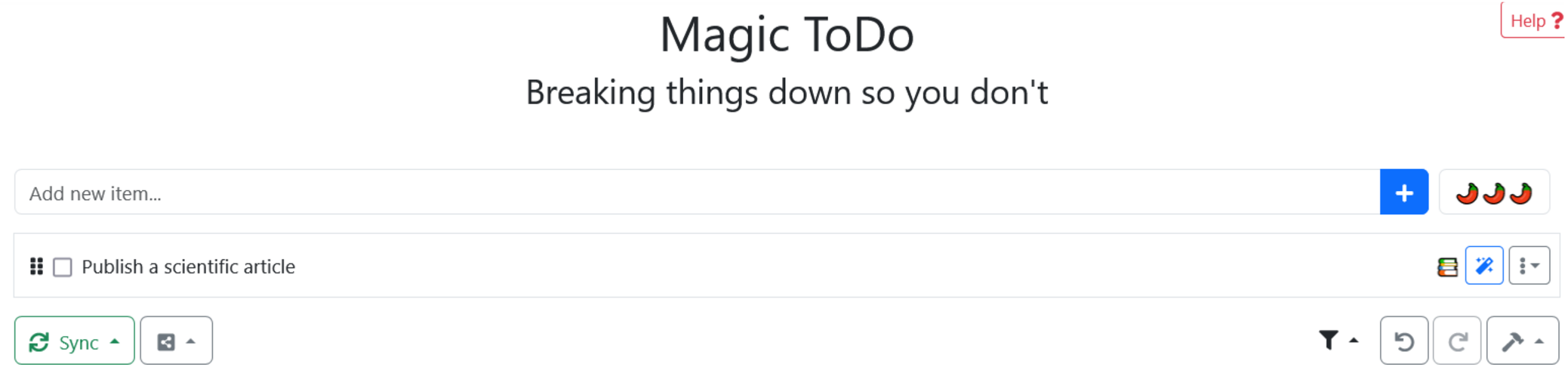
- To-do list
- Kanban board
- Project schedule
- Collaboration management
- Integration with other software
- Long-term planning
- Detailed project planning
- Note-taking
- Task breakdown
- Time tracking

Project Management Software Complexity

What if you are only looking for help with a smaller part of project management like breaking down a task?

goblin.tools

Breaking Down Tasks



goblin.tools

Add new item...

- [ ] Publish a scientific article
  - [ ] Choose a relevant topic or research question
  - [ ] Conduct a literature review to gather existing research
  - [ ] Develop a hypothesis or research objective
  - [ ] Design the study or experiment
  - [ ] Collect data or conduct experiments
  - [ ] Analyze the data and interpret the results
  - [ ] Draft the article, including sections like introduction, methods, results, and discussion
  - [ ] Cite all references correctly
  - [ ] Revise the draft based on feedback from peers or mentors
  - [ ] Select an appropriate journal for submission
  - [ ] Format the article according to the journal's guidelines
  - [ ] Submit the article for review
  - [ ] Respond to reviewers' comments and make necessary revisions
  - [ ] Resubmit the revised article if required
  - [ ] Promote the published article through academic networks and social media

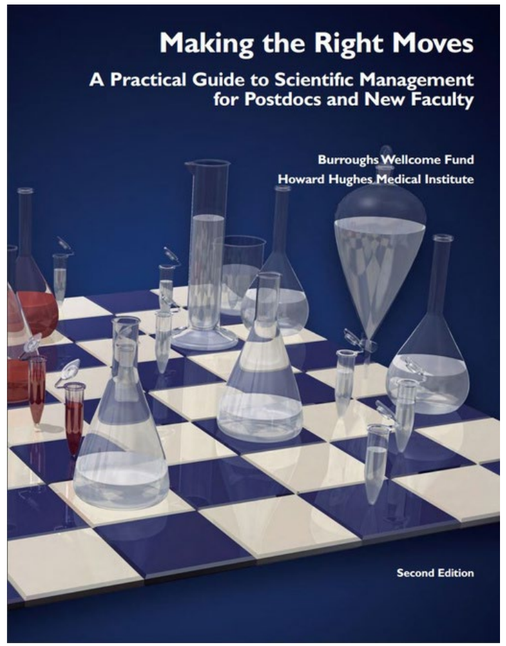
Questions

Additional Resources

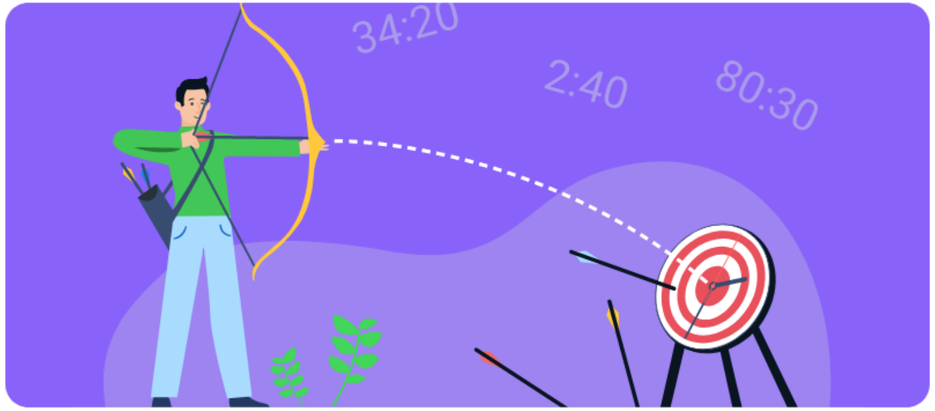
Research Project Plan

Writing and planning a research project such as a dissertation paper, especially for a first-timer can be a real pain in the neck to get started with. So many things to consider, read and write that you just can't see the end of it all. Our advice? Keep calm (as they would say on 9gag) and think of the whole thing as a series of tasks, like in any other project. And this is where we come in. With Tom's Planner you can schedule your dissertation project with just a few clicks, giving you a clear overview of what needs to be done (and when) in smaller, more manageable steps. Not so scary anymore, is it?

EXAMPLE TEMPLATE



6 Project Estimation Techniques: Pros + Cons



Managing the Research Project (From Research Methods for Business and Management)

Project Management Software

Overview

Project management tools for researchers 2023 – scientifyRESEARCH

21 Best Project Management Tools For Research In 2022 2024

Software

Manage Your Team’s Projects From Anywhere | Trello

Online Gantt Chart Software | Gantt Chart Maker | Tom's Planner

Manage your team’s work, projects, & tasks online • Asana • Asana

monday.com | Your go-to work platform

ClickUp™ | One app to replace them all

Your connected workspace for wiki, docs & projects | Notion

Magic ToDo - GoblinTools

Addressing Pain Points

Prioritizing

How to prioritize tasks: 10 task prioritization techniques | Zapier

How to Prioritize Tasks in 4 Steps to Get Work Done [2024] • Asana

Literature Review

Rayyan – Intelligent Systematic Review – Rayyan

Connected Papers | Find and explore academic papers

ResearchRabbit

Semantic Scholar | AI-Powered Research Tool

Elicit: The AI Research Assistant

Addressing Pain Points Con.

Managing uncertainty and risk

How do you deal with the uncertainty and complexity of research outcomes and impacts?

What strategies can you use to manage risk in research innovation and creativity?

Agile Project Management – Iterative Planning Based on Shorter Work Period

Adapting the scrum framework for agile project management in science: case study of a distributed research initiative - PMC

Agile in science: managing research projects with lessons from product development