

Capstone Project

Life after Year One for the Modern Human Anatomist

What is a Capstone Project?

A Mentored Research Project

What Research?

We kept the definition of what Research you should do purposefully vague:

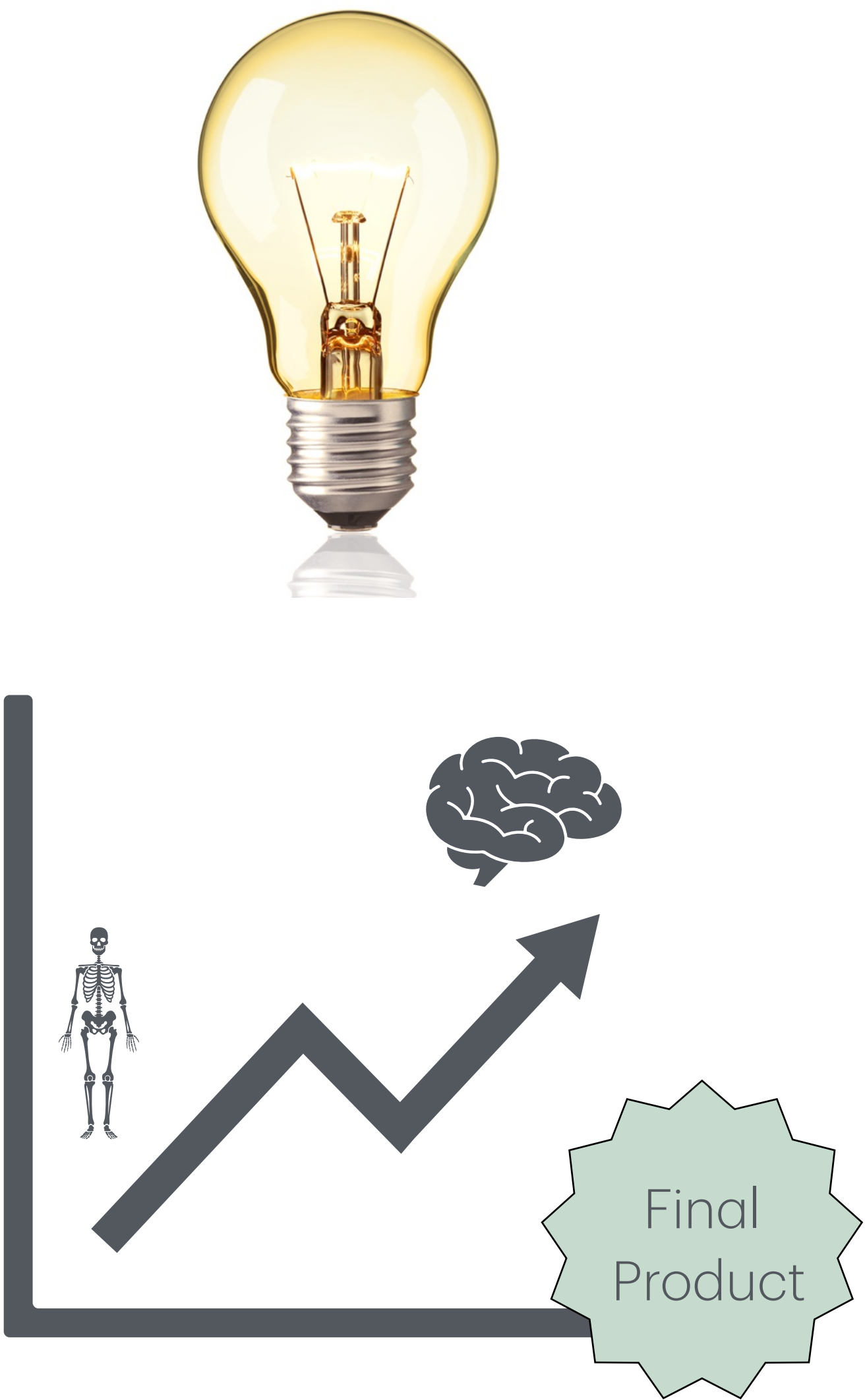
- We want you to take advantages of all the opportunities that are available in Denver
 - The Anschutz Medical Campus
 - UC Denver Downtown campus and Boulder Campus
 - Denver Museum of Nature and Science
- But with oversight from the MHA program



Why a Capstone Project?

Learn by Doing

Project Management Skills	<ul style="list-style-type: none">• Brainstorming• Planning• Requesting Funds (up to \$1K)• Implementing
Research Skills	<ul style="list-style-type: none">• How do you ask and answer questions?• Integrate and apply knowledge• Communicate what you've learned
Your Agenda	<ul style="list-style-type: none">• Personalized Learning• What you are passionate about



Angelique Dueñas, PhD

Assistant Professor, Northwestern Medicine

Bolstering embryology education

Focusing on educating future students in an area she has become passionate about but that has shown signs of declining interest, Angelique Dueñas, a master's student in [Modern Human Anatomy](#), presented a project weighing the value of 3-D virtual embryos in learning.

"I found it fascinating to see how we develop and why things are the way they are in our bodies," Dueñas said, explaining her passion for embryology. After seeing a number of literature reviews on the medical curricula's decreasing emphasis on embryology, she joined colleagues in their efforts to boost interest.

"It's super important that medical students understand embryology," Dueñas said. But the field has unique learning challenges. "It's a three-dimensional subject," she said of a fetus. "Then you add in time of a developing embryo, and it can be really challenging, especially when the classic presentation is 2-dimensional," she said of textbook visuals.

So, her team designed 3-D printed models and virtual models and assessed their value. "You can use your mouse and look at all sides of the different organs," Dueñas said, illustrating with a brightly colored eight-week embryo model on a computer screen. "You can click, and it will tell you what structure you are looking at," she said, adding that the application used does have virtual-reality capabilities.

After recruiting 162 first-year medical, dental and graduate students, the researchers gave each volunteer a pre-quiz. They then assigned groups to a static pamphlet representation, a 3-D printed version and a 3-D virtual version. Then volunteers completed a post-quiz and survey.

"Students who interacted with the virtual model and the 3-D printed model seemed to increase their pre-test performance statistically significantly," she said. "The pamphlet group did not." Nearly 90 percent of students surveyed



Angelique Dueñas stands next to her poster presentation on the educational value of 3-D embryos. Dueñas won first-place recognition for another presentation on Mapping the Body: Poetry and Anatomical Art New Student Exhibit Merges Humanities and Sciences in Higher Education Collaboration.

Requirements

A Capstone Project should...

Entail Work	You need to do <i>something</i>	Not just write a review paper or help write a grant
Create Something	Add or contribute to an existing body of a knowledge	Create a Deliverable
Involve Learning	New Scholarship and Creativity	Knowledge is power
Expertise	Unlock new achievement	
Involve Anatomy	Characterize a Structure: from molecular to gross level	This is MHA, after all
Involve Imaging	2D images, 3D images, animations, OR 3D models	any imaging is fine, but imaging is required



Examples

What is a deliverable?

Learning Module	Self-guided teaching tool
3D model	anatomical model with Annotations, distributed digitally or 3D Printed
A new protocol	With the results showing the protocol works
Original Research	<ul style="list-style-type: none">• Structure-Based (e.g. IHC)• NOT Test-Tube biochem reactions.• Figure(s) for a research paper.



Assignments

Major Milestones

Authorization Packet	To get started, you fill out this collection of Forms and Scope of Work
Capstone Proposal	Like a Grant Proposal, with a stated hypothesis and specific aims.
Capstone Report	A final, written report of your accomplishments
Capstone Presentation	A Poster or Slide Talk in a Public Forum



Capstone Committee

Your Advisement Team (and Graders)

Mentor	<ul style="list-style-type: none">• Your main Project Partner• You and Your Mentor design the project together
Advisor	<ul style="list-style-type: none">• Your MHA Overseer• Makes sure the project meets MHA guidelines• Also advises on the project• Can be different from 1st Year
Third Member	A third pair of eyes to give you advice on the project



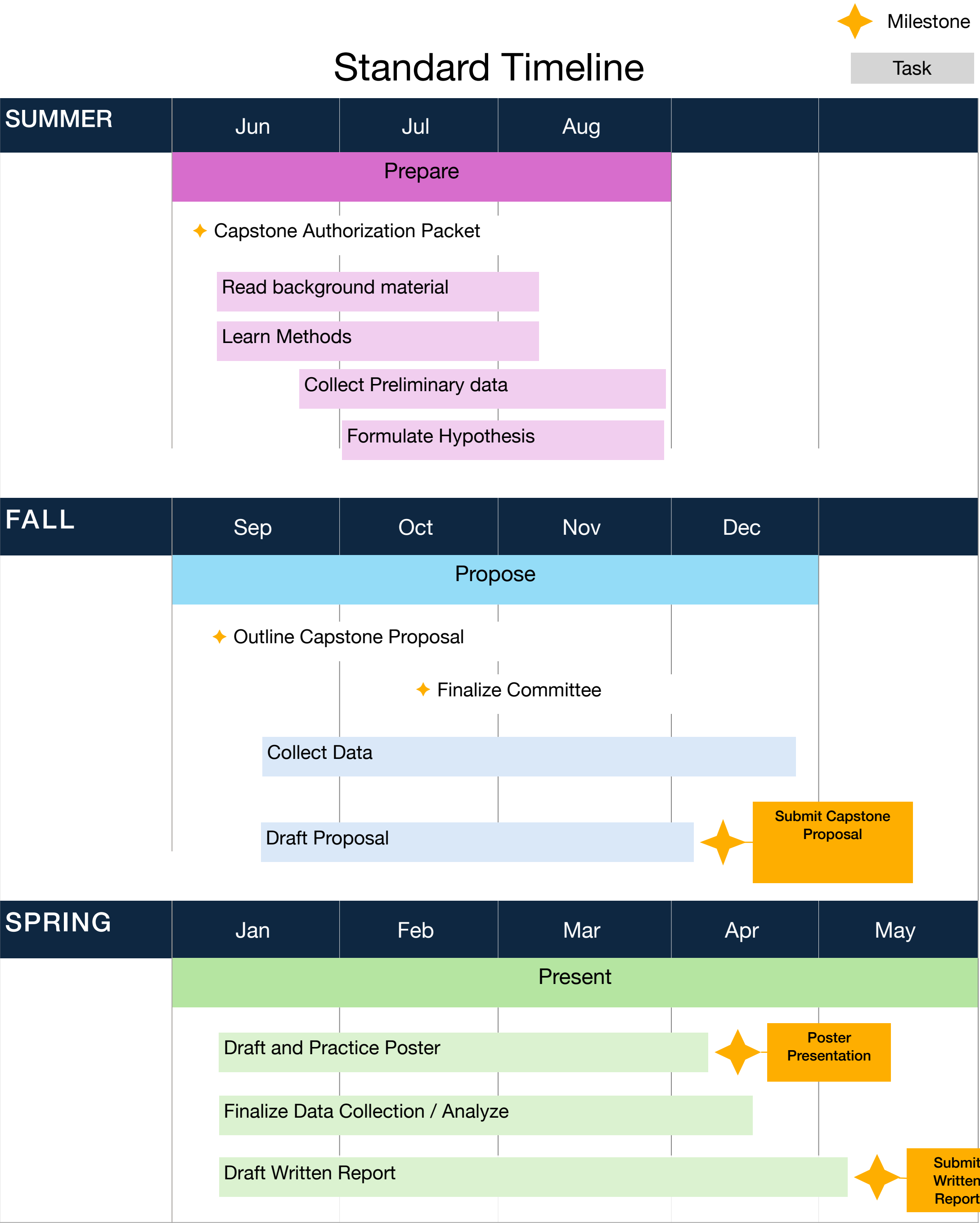
Timeline

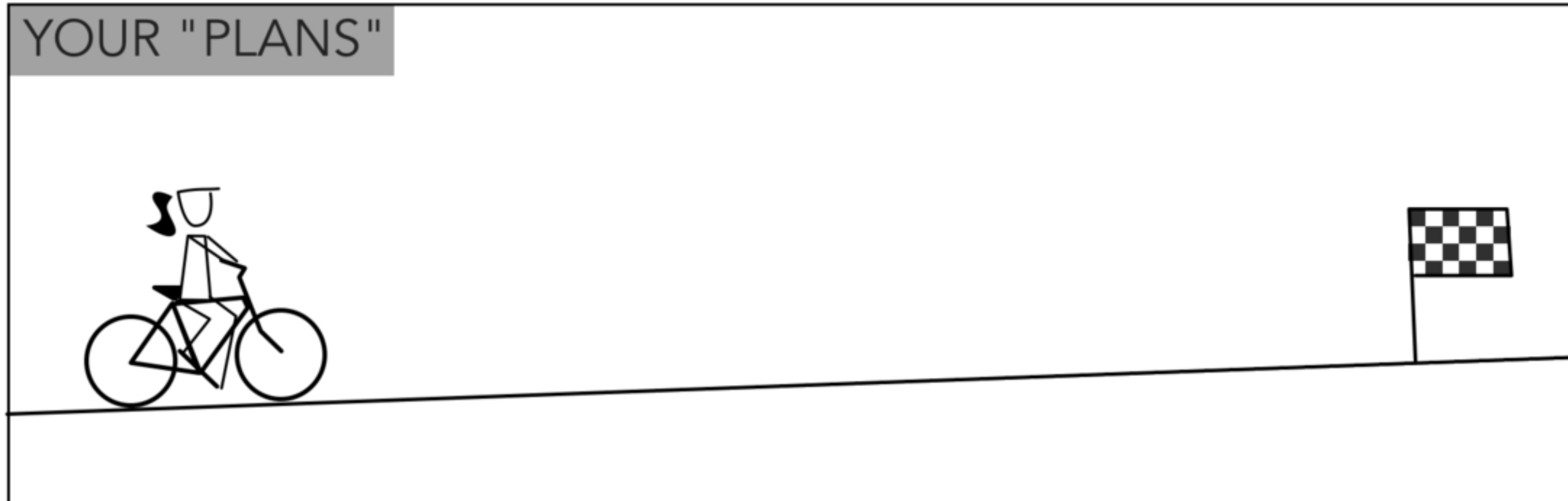
Project Management

Three Major Phases:

- Prepare
- Propose
- Present

Standard	<ul style="list-style-type: none">• Most Students on this Track• Plan to Graduate in Spring of Second Year• Standard Track Canvas site
Alternate	<ul style="list-style-type: none">• Different Timeline• Set Deadlines with your committee• Alternate Track Canvas site





Evaluation

Your final grade

Category	Points	Description
Capstone Report	60	final written report
Presentation	25	Poster/Talk Presentation
Capstone Workshop	5	Participation in Workshop Timely Completion of all Assignments, especially the Proposal
Chair Evaluation	5	Communication and Professionalism, Project Management Skills, Academic Mastery and Effort
Mentor Evaluation	5	Independence and Time Management, Communication and Professionalism, Engagement & Collaboration, Responsiveness to feedback, Quality of Work
total	100	

Capstone Project Documentation Site

The Capstone Project User Manual

- All Instructions for the Capstone Project can be found on this site
- A link to the Site is Found on the MHA Capstone Page (Under the Curriculum Menu)
- <https://medschool.cuanschutz.edu/ms-modern-human-anatomy/curriculum/capstone>

