

FINAL PROJECT

Project checklist:

- Think about a project which interests you, some ideas are given below.
- By Monday 7/7 you should have a project outline which consists of a i) topic, ii) goals, and iii) work plan. This doesn't need to be fancy, just a few sentences and a good idea.
- You can submit a project outline before Monday. You are especially encouraged to do this if your project is more involved (for example, a computer programming project).
- Please consult me (by email, after class, office hours, or any other time) about your proposal.
- Over the final week plan to work roughly an hour each day on your project.
- During Friday's class of the final week give a 5-10 minute presentation on what you have done. Please do not put a lot of effort into preparing the presentation – it is meant to be an opportunity to share what you have learned and hopefully spur some questions and discussion.

A suitable project can be anything which relates to the topics of the class and may contain significant math or no math at all. Here are some examples:

- Solving a challenging problem which requires significant math.
 - Depends on your math and physics background. Please let me know soon to decide on a suitable problem.
- Biography of a major developer of relativity.
 - Albert Einstein
 - Arthur Eddington
 - Hendrik Lorentz
 - Henrietta Swan Leavitt
 - Albert Michelson
 - Stephen Hawking
 - Yvonne Choquet-Bruhat
 - Ed Witten
 - Ernst Mach
 - Mileva Maric
 - Theodor Kaluza
 - Kip Thorne
 - Larry Smarr
 - Joseph Weber
 - John Wheeler
- Biography of a major developer of “classical” physics.
 - Isaac Newton
 - Johannes Kepler
 - James Clerk Maxwell
 - Galileo Galilei
- Historical development of geometry (Euclidean and/or non-Euclidean)
 - Euclid and/or his book
 - Riemannian geometry

- Philosophy
 - Ideas of space and time. How this has changed throughout history.
 - Time travel (paradoxes)
- Interesting topics
 - Black holes
 - Stars (birth, death, black holes, Boson stars, etc)
 - String theory
 - Galactic rotation curves
 - Modified Newtonian dynamics
 - Penrose process and Aliens
 - Tensors (or other useful math concepts)
- Report on current experiments.
 - LIGO, gravitational wave astronomy
 - LISA, gravitational wave astronomy
 - CERN, creating mini blackholes
 - BICEP2, primordial gravitational wave
 - Planck spacecraft
 - Gravitational lensing
 - Gravity probe B
 - Dark matter or energy
 - faster than light neutrinos
 - GRACE (Gravity Recovery and Climate Experiment)
- If you have some (even if very limited) computer programming experience, computationally solve a difficult physics problem
 - Write code to “solve” the twin paradox
 - Compute the orbits of stars around supermassive blackholes
 - Many many more
- Something not on this list