



Diary of WIMP(y) Researcher

I don't work on WIMP's but the title seemed clever?



Announcements

Undergraduate Seminar - Pablo
Castano

375 Physics North, 6:30 pm Thursday (10/14)

USPT Team Matching

2 pm October 16 RSVP on newsletter!

Destress with SPS - Art!

5 pm October 16 Physics 375

1

What is research?

What are you getting yourself into?



Types of Research

Three broad (interwoven) categories:

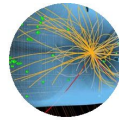
- **Experimental** - Organization and interpretation of experiments
 - **Lab work** and **measurements**
 - Trained on the job or through 111A
- **Computational** - Data analysis and simulation
 - Requires **coding** background
 - Physics 77, 188, Python DeCal, CS 61A, Data 8
- **Theoretical** - Construction of theoretical frameworks
 - **Very rare** for undergrads, requires large course background
 - Even when you get it, its often mainly computational



Physics Landscape



Astrophysics



High-energy



AMO physics



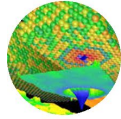
Nuclear physics



Biophysics



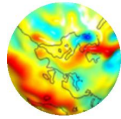
Plasma physics



Condensed matter



Quantum information



Geophysics



Life Before **Research**

- You should be aware...
 - Research takes a lot of time (Read: Learn how to time manage)
 - Research is hard (Read: Be confident in your abilities even when things aren't going well)
 - Research is unpredictable (Read: In the end, learn to just work with what you can get)

You will never feel ready for research until you try!



How to get **Research?**

- Email!
- Office Hours
- Undergraduate Research Apprenticeship Program (URAP)
- Faculty-Student Lunches
- SPS Barbecues
- REUs/Research internships/summer programs

I have research! **Now what...?**

If you are reading this, have a great day!



Question: What is the Goal?

- What is **not** the goal?
 - Prove that you are smart to your PI
 - Don't be afraid to ask questions
 - Don't pretend to understand something when you don't
 - Doing everything on your own
 - Science is a collaborative effort



Question: What is the Goal?

- What **is** the goal?
 - Learning a lot about an interesting subject
 - Figuring out what you are interested in and what type of work you like to do
 - Being productive and contributing to the broad scientific effort
 - Mastering the basic skills that you need as a scientist



Your First Steps

- Before starting, you'll want to meet with the professor to discuss potential projects that may fit you
- You will get a graduate student/postdoctoral mentor
- Lab tour
- Reading introductory papers
- Diving into the deep end

You will probably not know what's going on, and that's okay.



*The Golden Rule

Research is not
homework.



Undergraduate's First **Project?**

- What is a project?
 - Think of it like an interesting problem that YOU want to solve!
- Your grad student/postdoc and you
- Zeno's productivity
- Transition from gruntwork to a stable project

Becoming a **Scientist**

- Running to the frontier
- Exploring new domains
- Contextualizing results within the broader field
- Always question

*Gain valuable skills for grad school or industry,
and have fun doing it!*



A Shared Experience

- Imposter syndrome
- Feeling like what you're doing is worthwhile
- Work hard, but expect respect
- If you want to move on to the next step in research, just ask!
 - Your professor can actually help you in that stage
- Know when to leave

Summer/Post-Bac

- Pros: you can actually do it full-time
 - For a post-bac, you actually know a lot more material
- Main ways of getting summer and post-bac research include REUs/internships/fellowships
 - Though emailing and talking to professors works too, especially if you already know you want to work with a particular professor
- These programs are more structured and often require a deliverable at the end



Some **SPS Members** w/ Research

Siddhant

Condensed matter,
Joel Moore (email)

AMO, *Mueller group* (email)

Shantanu

Biophysics, Environmental
Econ, Electrical Engineering,
micro-fluids, particle physics
and more!

Vivian

AMO, *N. Yao* (Email)

investigating the property of Boron
Vacancy Center (defect) (It's a really
new field, so we are still in the
exploring stage)

Pablo

Mystery ???

Ruoyi

Astrophysics (Email), Lu Group

Star clusters, binary star candidates

Condensed Matter Physics
(Email), Leone Group

*Non-linear Light-matter interactions,
quasiparticle dynamics*

Others in the crowd

That's it!

Go Bears! Feedback? Member announcements?

