Graduate Physics Programs Admissions Overview

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September 11, 2021

Are you a junior transfer student?

Consider applying to Cal-Bridge: www.cpp.edu/calbridge.
Deadline is **September 17!**

Admissions Process: Timeline

Junior Year:

- keep your grades up
- get some research experience
- summer research: start arranging it in *January*
- take physics GRE in April?
- spring: begin drafting statement of purpose

Summer Before Senior Year:

- impress your summer mentor with your productivity
- draft statement of purpose/personal statement
- *get peer feedback on statements*
- study for physics GRE
- start shopping for programs

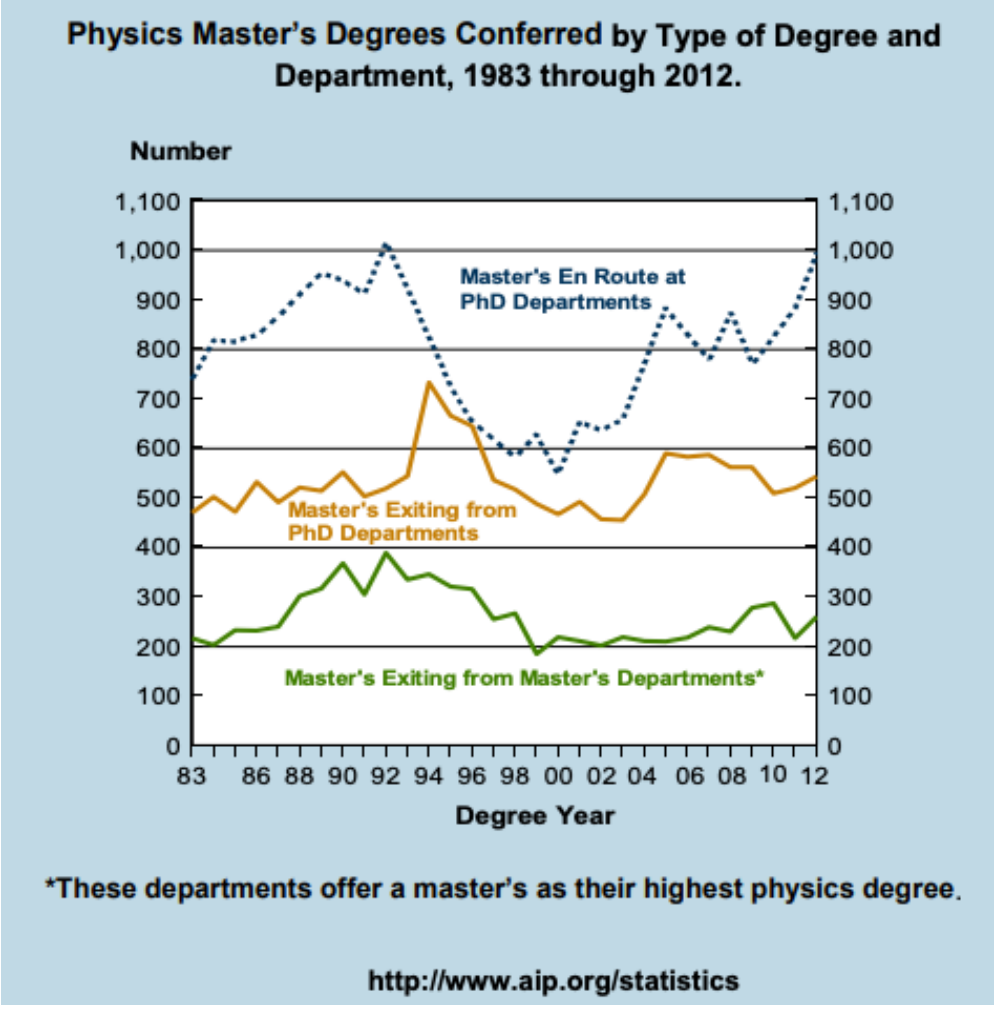
Timeline ct'd

Senior year

- keep studying for GRE
- get mentor feedback on statements and target schools
- **September /October** Physics GRE dates
- don't forget general GRE!
- **End of October** NSF GRFP deadline
- **November** finalize list of programs to apply to; check deadlines
- **December-January** most PhD application deadlines (MS deadlines are later)

MS or PhD?

- MS = 2 years to obtain a credential
- PhD = 6-year research apprenticeship
- big differences in funding as well
- terminal MS programs in California: CSULA, CSULB, SDSU, SFSU, SJSU, Fresno, Fullerton, Northridge, Stanford, USC
- MS can be a gateway to career or (less often) to a PhD
- context: about 8000 physics BS degrees awarded in US annually; about 900 of those go on to earn a PhD and 300 an MS from an MS department. (Half of 1800 PhDs annually in US are to international students.)



PHYSICS STUDENTS RESEARCH RESOURCES CONNECT

ADVISING

UNDERGRADUATE PROGRAMS

GRADUATE PROGRAMS

SPECIAL PROGRAMS

STUDENT RESOURCES

https://www.csulb.edu/physics-astronomy/graduate-programs

CSULB Home ➤ Physics ➤ Physics Home ➤ Graduate Programs

GRADUATE PROGRAMS

Four graduate degrees are offered by the Physics and Astronomy Department:

- Physics, M.S.
- Physics, Applied Physics Option M.S.
- Physics, Computational Physics Option M.S. *(catalog link unavailable)*
- Professional Physics, M.S.

Graduate Advisor

Dr. Prashanth Jaikumar
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Email:
Prashanth.Jaikumar@csulb.edu

BEACH SCHOLARSHIPS

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Academic Programs

Colleges

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- Graduate College of Education
- College of Ethnic Studies
- College of Extended Learning

Physics and Astronomy

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Masters

- Master of Science in Physics
- Master of Science in Physics: Concentration in Astronomy

APS Bridge Program

APS BRIDGE PROGRAM physics

ENHANCING DIVERSITY IN PHYSICS GRADUATE EDUCATION

About the Bridge Program
- Diversity in Graduate Education
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Institutions
- Bridge Sites
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Conferences & Workshops
- 2019 IGEN National Meeting

Publications & Presentations

APS Bridge has sites all over the United States. Find one near you!

Information For...
- **Students**
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Announcements

Meet the Bridge Students!
Hear what Bridge Students have to say about the program. Learn more.

APS Bridge Graduate Student Induction Manual is now available.
The APS Bridge Program has developed a guide of best practices for inducting new graduate students

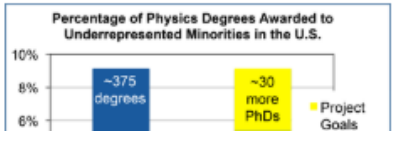
Get Involved!

Become a Partnership Institution
The APS-BP is developing a national network of doctoral granting institutions where bridge and other students, if admitted, will receive mentoring and assistance in making the transition into a doctoral program.

Join the Bridge Program as a

Program Goals

About the Program Goals
The program aims to increase the number of physics Ph.D.'s awarded to underrepresented minority students.



Post-baccalaureate Programs

These are designed to boost your research experience and provide some professional development (writing skills and specific practice on writing statements of purpose, GRE prep, etc) without necessarily being tied to the requirements of an MS program. In many cases, you get paid to do the program because most of your time is spent working in a lab. Programs vary from 1–2 years and some of them give you fast-track admission to that institution's PhD program if you do well.

- An article on postbac programs.
- A list of postbac programs (note that some of them *do* grant MS degrees)

PhD student timeline (at UC Davis)

- **Year 1:** core courses, teaching (w/few exceptions)
- **Start of Year 2:** written preliminary exam
- **Year 2:** specialty courses, teaching (usually), start research
- **Year 3:** research, maybe teaching on the side
- **End of Year 3:** qualifying exam
- **Years 4+:** research, maybe teaching on the side

Why this analogy?

- PhD program is a series of *different* challenges: coursework, research skills, creative problem-solving, writing, creative question-asking, etc
- you will naturally be better at some obstacles than others. Don't get overconfident when it seems easy, nor discouraged when it seems hard.
- at some point you will run into a wall.
- admissions committees are looking for a *combination* of skills and talents

Admissions Committee Process (one example)

- $\sim$ 500 applications each year
- each packet is read holistically by two independent faculty graders and scored 1–10
- top scores always get offers but rarely enroll: we are their backup school
- very good scores get offers and may enroll
- "merely" good scores require more discussion, taking into account:
  - balance across subject areas and theory/experiment (needs vary from year to year)
  - expected yield: overall 1/3 of our offers are accepted, but this is a function of subject area, domestic vs international, and how far down the list we are
- every committee is unique and functions differently!

Choosing Where to Apply (Assuming PhD)

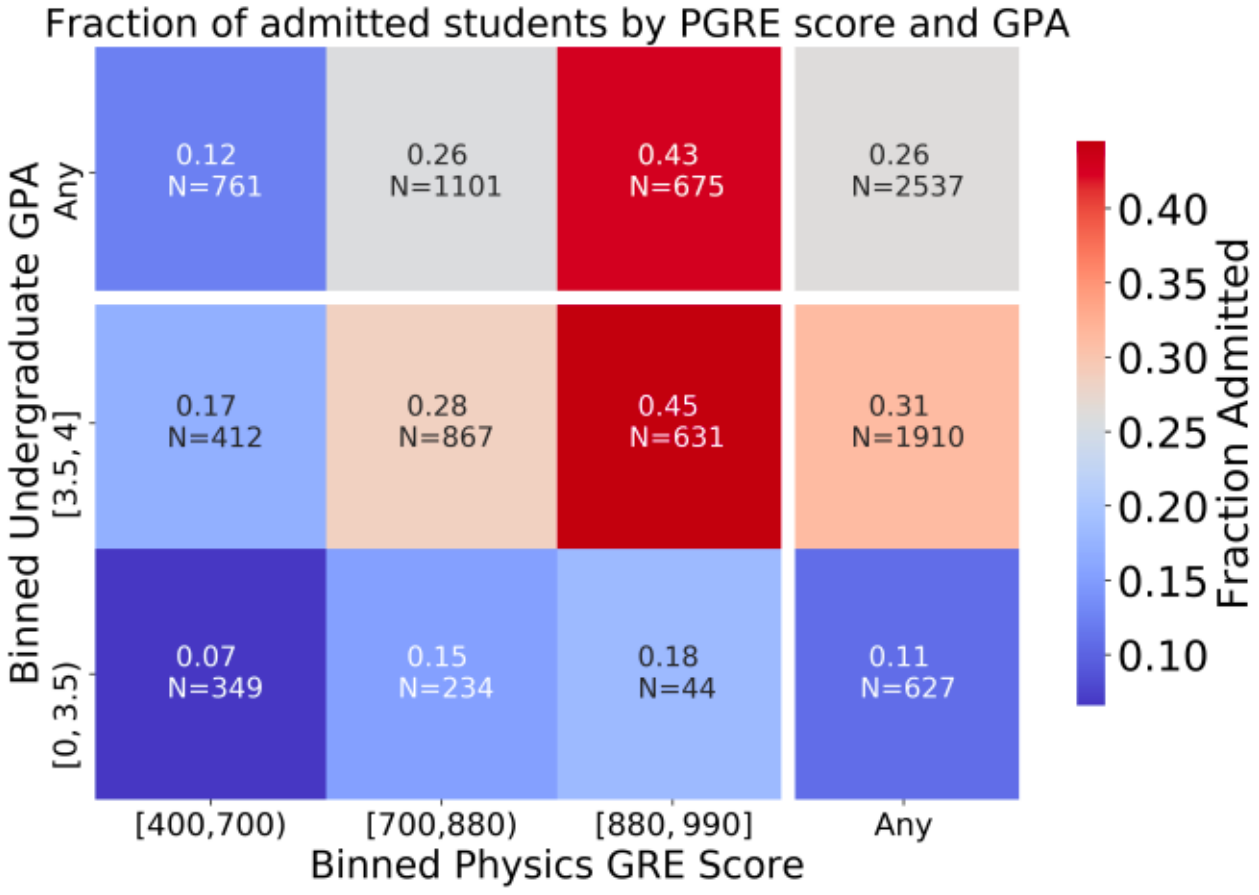
- Goal is *not* to get into the highest ranked department on some national listing. **It is finding a good fit.**
- Choose a program with more than one faculty/topic you are interested in doing research.
- Contact those faculty. [Conversation starter: ask if they are taking new students next year, or what their research focus will be over the next 5 years...websites are usually out of date!]
- Your interests/research topic choice is not a commitment, and $\sim$50% of the time students work on different topics than initial interests. **But you must have a Plan A.**
- Get advice from your local mentors!

How Many Places to Apply?

- some target schools, some "stretch" schools, some less selective schools
- process is stochastic $\Longrightarrow$ apply to 4-5 target schools, plus 2-3 less selective and 2-3 stretches for a total of 10
- GradSchoolShopper.com (run by AIP) is a convenient place to get a quick look at programs—a starting point for choosing school/faculty websites to visit in more detail
- take advantage of any fee waivers!

How Do I Calibrate Target/Stretch/Less Selective?

Competition is fierce: *there's no such thing as a safety school*.



Source: https://arxiv.org/pdf/2008.10712.pdf (has lots more tables if you're interested, eg broken down by size and selectivity of undergrad school)

OK, How Do I Calibrate Target/Stretch/Less Selective?

- reference point: UCD is ranked 28th (USNWR); median student entering UCD PhD program has GPA $\approx$ 3.6, PGRE $\approx$ 55th percentile, quantitative $\approx$ 90th, verbal $\approx$ 80th, writing $\approx$ 60th (but with a lot of scatter in some of these quantities!)
- schools often post *minimums*, not typical values, on their websites
- *don't* rely on acceptance rate on GradSchoolShopper—there is a huge selection bias
- look widely and rely on your mentors!

COVID and GRE

Caveat: this is a fast-moving target! Always check a school's website for its current policy.

- convenient summary for US/Canada physics/astronomy programs: https://docs.google.com/spreadsheets/d/19UhYToXOPZkZ3CM469ru3Uwk4584CmzZyAVVwQJJcyc/edit (but see above caveat)
- general GRE still required at $\sim\frac{1}{2}$ of institutions
- physics GRE required/recommended $\sim\frac{1}{4}$ of institutions

COVID and GRE: my recommendation

- if you don't take the general GRE, you are shutting yourself out of many opportunities. And there are many opportunities to take it.
- the physics GRE is offered at only a few centers and **only once this fall** (Oct 23, registration deadline **Sep 17**)
- $\Longrightarrow$ take it only if required by one or more schools that you really want to go
- **before Sep 17**, check that list and confirm each school's policy

Application Components

- Undergraduate academic record
- GRE
- **Three letters of recommendation**
  - at least one *must speak to your research potential*, and the more the better
  - juniors: plan to do multiple research projects. Independent study is ok as a backup plan: it gets a faculty member to see your potential beyond the classroom.
- Statement of purpose/personal statement [later today]

Writing Your Statement(s)

Types of Statement

- **Statement of purpose:** why you want a PhD (including what you plan to do with it afterward) and why you are a good fit to *this* program. Include personal information only as it relates to your scientific approach and how you will enrich the scientific world.

  Example prompt: *Highlight your academic preparation and motivation; interests, specializations and career goals; and fit for pursuing graduate study at UC Davis.*

- **Personal statement:** your personal history and how you will enrich the community you are wanting to join (including contributing to diversity). See prompt on next slide.
- NSF GRFP applications will present a *third* writing challenge: a *project proposal*). See https://docs.google.com/spreadsheets/d/1xoezGhbtcpg3BvNdag2F5dTQM-Xl2EELUgAfG1eUg0s for successful examples.

Example Prompt for Personal Statement

Describe how your personal background informs your decision to pursue a graduate degree. You may include any educational, familial, cultural, economic, or social experiences, challenges, community service, outreach activities, residency and citizenship, first-generation college status, or opportunities relevant to your academic journey; how your life experiences contribute to the social, intellectual, or cultural diversity within a campus community and your chosen field; or how you might serve educationally underrepresented and underserved segments of society with your graduate education.

Types of Statement Redux

- **Always answer the prompts.**
- Some schools ask for one statement with both elements; others ask for separate statements.
- In either scenario: convince faculty that you are aimed for success—*in their program*
- **Repeat: always answer the prompts!**

Statement of Purpose Key Elements

- What is the purpose of your graduate study? Focus on your path to achieving your goal as a research scientist, from entering an undergraduate program to now (skip K12 years).
- Any specialized areas of interest? Who did you work with, what did you do: internships, projects, employment, research and publications? [Avoid list format!]
- Do not be afraid to get technical in short order. Include skills such as using equipment, programming, etc, but keep *science* in the forefront. Rule of thumb: one full paragraph per research experience.
- What are your future goals?

(quotes from Cal-Bridge Handbook)

Tailor your statement to each department

- What makes you uniquely suited for this particular department, this specific institution?
- Include faculty with whom you want to work. This shows you have done your homework [and can save you a lot of grief!].
- Read specific faculty's research in the department you are applying to and tie into it.
- Contact faculty before you apply to build a relationship. [Or at least make sure they are taking new students.]

What if I'm Torn Between Two Fields of Study?

- Try to be coherent in your fields of interest. If you express interest in very different fields, it looks like you should learn more about them before applying.
- Having > 1 field of interest is not *necessarily* dangerous if your statement makes them both look *well* motivated...but use caution.
- Generally, it's best to lay out your Plan A fully rather than mention Plan B.
- If you are really divided, consider writing very different applications to very different programs.

(some quotes from Cal-Bridge Handbook)

Tips for Writing

- Start early and revise, revise, revise (w/help of readers)
- Target length: 2 pages (personal statement can be much shorter; *always check the prompt*)
- Final product: a package that reflects your professionalism. (Drafts sent to faculty mentors should already look professional enough.)
- Think of yourself as a scientist: astronomer or physicist (in training). Every paragraph should be related to your research area, interest, experience, and future.
- Include *a small dose* of the adventure that got you to want to do research. What is the wow factor that got you into astronomy or physics? Did a certain book or article inspire you?

(some quotes from Cal-Bridge Handbook)

But...

- Don't go overboard with statements like "I've wondered about the night sky since I was 10 years old..." A human touch here and there is ok, but overall make it specific, scientific, professional, eg "after taking Astronomy 101 I developed a strong interest in exoplanets."
- Do not *tell* us you are passionate and a hard worker ["I love science. I love to study it, to breathe it, to be it. Science is the foundation for all that we are. I have worked long hours pursuing my goal to become a PhD."] *Show* us how you are passionate and what you did because of your passion.
- do not compare your SoP with friends applying to programs in law, medicine etc...same criteria do not necessarily apply across fields.
- it's a fine line between appearing confident ("I've been building to this for years and I know I'm ready") and overconfident ("I'm ready to write down the theory of everything.")

(many quotes from Cal-Bridge Handbook)

Personal Statement

- don't be fooled by the name...it's not all about your life. Read the prompt again!
- *don't* try to fill the full two pages: shorter is fine. [Contrast w/SOP: if you have only a 1-page SOP, there *must* be more details you can add.]
- common mistake: too much navel-gazing and too little thought put into how you will enrich the community you are proposing to join.
- this is where extenuating circumstances, if any, should go if possible

Extenuating Circumstances

- Keep this section brief: such circumstances must be addressed, but a few sentences at most.
- Describe any problems or inconsistencies in your records or scores, such as a bad semester. Explain in a positive manner. Since this is a rebuttal argument, it should be followed by a positive statement of your abilities.
- Point out positive trends in your grades.
- Describe any special conditions that are not revealed elsewhere in the application, such as a significant workload outside of school. This, too, should be followed with a positive statement about yourself and your future.

(quotes from Cal-Bridge Handbook)

Frame the negative as a positive: building experience

- What did you learn from this experience?
- write a strong statement instead of a weak statement about the extenuating circumstances. Avoid "excuse" statements such as: "I had to work two jobs to support my family because my father was injured. My grades suffered." [This doesn't help me see how you will be successful in my program.]
- Better: "I maintained a B+ average while working in Dr. Sprout's botany laboratory despite having to work forty hours a week as a waitress to support my family." [Took ownership of this circumstance...]
- Best: tell the story of the extenuating circumstance and how your perseverance or motivations overcame that.

(slightly modified quotes from Cal-Bridge Handbook)

Let's Critique Some Examples!