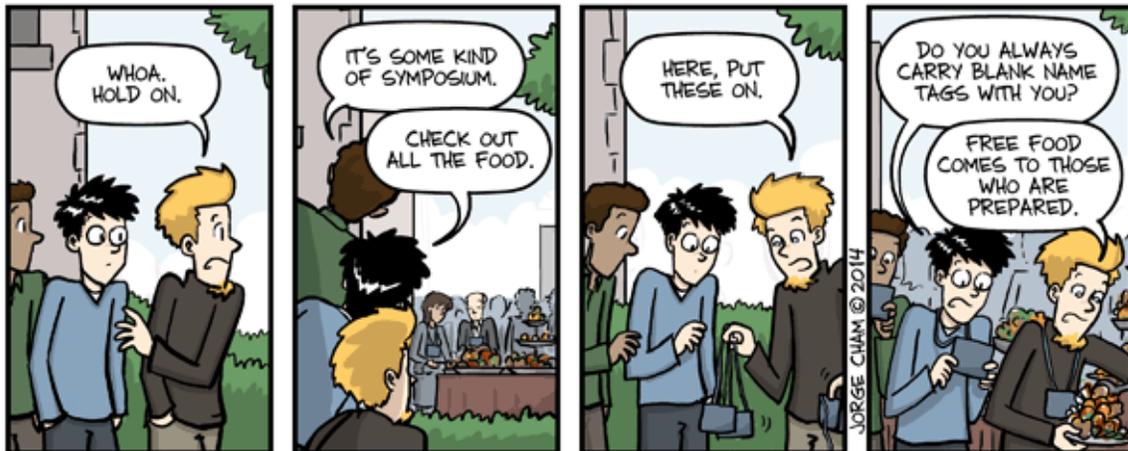


STANFORD PHYSICS

Graduate Student Handbook

2019-2020



Comic courtesy of www.phdcomics.com

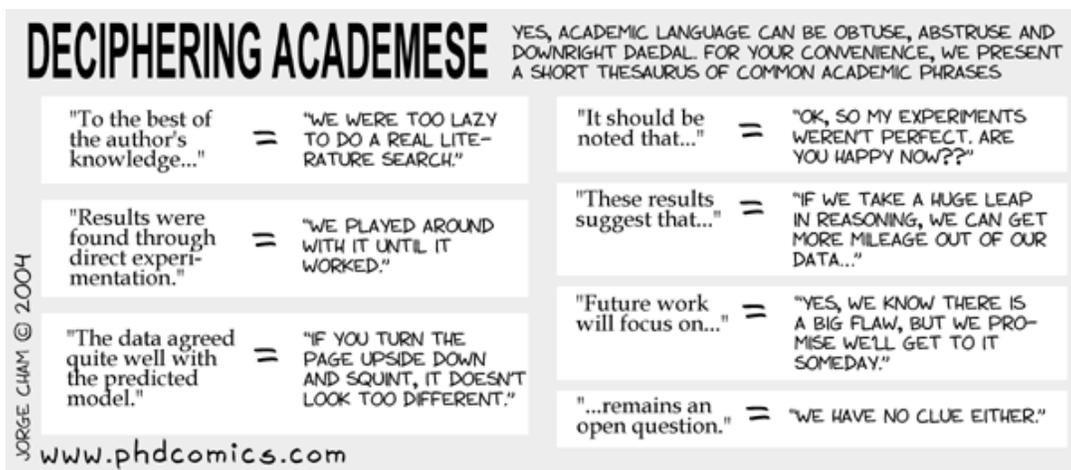
The department reserves the right to make changes at any time without prior notice. It is the student's responsibility to review the Graduate Handbook on an annual basis. This handbook augments the Bulletin and other University publications and contains department-specific policies, procedures, and degree requirements. Further information and resources are available from the Director of Graduate Studies, student services staff, and can be found on our website. It is the responsibility of each student to familiarize himself/herself with this information and to seek clarification as needed.

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Dear Graduate Student,

Welcome to the Stanford Physics Department. This handbook should answer many questions you may have about the department and the program. If you have additional questions please do not hesitate to contact me. I look forward to working with you during your graduate career.

Sincerely,
 Maria Frank
 Student Services Officer

PHYSICS MAIN OFFICE

Hours: 10AM – NOON & 1PM - 4:30PM, Monday through Friday, *Closed for lunch from Noon-1 p.m.*

Below is a list of Physics Department main office staff, contact information, and a short list of areas of responsibility. If you have questions, feel free to ask any staff member.

NAME	TITLE	E-MAIL	PHONE	OFFICE
Rosenna Yau	Academic Operations Manager	rosenna.yau@stanford.edu	3-4345	Varian Main Office, Rm 110
Karen Ajluni	Financial Manager	kajluni@stanford.edu	3-4346	Varian Main Office, Rm 111
Works with faculty to process research grants and contracts and oversee the financial accounts in the department; handles HR issues, processes pay distribution, as well as all temporary student, research assistant, and academic staff research associate appointments.				
Jenifer Conan-Tice	Administrative Associate, Faculty Affairs	tice@stanford.edu	3-4347	Varian Main Office, Rm 105
Students may contact Ms. Conan-Tice in the Physics Main Office to arrange meetings with our Department Chair, for textbook inquiries or for general questions about the department.				
Maria Frank	Student Services Officer	maria.frank@stanford.edu	3-0830	Varian Main Office, Rm 106
Responsible for administration of the Graduate Program; processes RA/TA stipends, tuition, fellowships, graduate student progress, milestones, graduate admissions, etc.				
Elva Carbajal	Undergraduate Program Coordinator	elva@stanford.edu	3-4362	Varian Main Office, Rm 107
Oversees undergraduate program; schedules courses; maintains department bulletin copy; coordinates the recruitment, hiring and placement of graduate students as course teaching assistants (TA's).				
Violet Catindig	Administrative Associate	vcv@stanford.edu	3-4344	Varian Main Office, Rm. 108
Responsible for key distribution, purchasing card, petty cash reimbursement, main office administrative support, and answering student inquiries.				
Julie Hall	Administrative Associate	julie.hall@stanford.edu	3-3349	Varian Main Office, Rm. 108
Provides administrative support for Main Office staff; graduate and undergraduate student services support; Oral Qualifying exam administration; graduate admissions support.				

For additional information on facilities, colloquium listings and other department events/services please see our department website at <http://physics.stanford.edu>

YOUR CONTACT INFORMATION

All students must enter current phone numbers into the AXESS system. The information will be used for the graduate student contact list and you will receive important program information most often via email. Please keep your information in AXESS current, especially emergency phone numbers.

ACADEMICS

Advising

First year students have a program advisor selected by the department to advise on course selection and rotations until settling into a research group. Students typically join a research group during or near the end of the first year. This Dissertation Research advisor will direct the research program for the remainder of the student's graduate career.

Professor Sean Hartnoll is the Chair of the Physics Graduate Study Committee for 2019-20. He is available by appointment to consult with students about any graduate student related matter, including degree progress.

Co-Advisors

Physics graduate students have a wide range of research choices available to them, including working on a Physics-related program in a different department, with a research advisor who is not a member of the Physics Department. Students working with advisors outside Physics/Applied Physics/SLAC* must have a co-advisor who is a faculty member in the Physics Department.

*Students with SLAC PPA faculty advisors DO NOT require a co-advisor.

Students with SLAC Photon Science faculty advisors who have a Ph.D. in Physics DO NOT require a co-advisor.

Students with SLAC Photon Science faculty advisors with a Ph.D. in an area other than Physics DO require a co-advisor.

A co-advisor serves two main roles: (i) acting as an official liaison for the student to the Physics Department and (ii) insuring that the student's dissertation has a physics component that is sufficient to allowing granting of a Ph.D. in Physics. The co-advisor also serves as the student's contact to the department for any academic issues that would be more appropriately dealt with by Physics, rather than a faculty member in another department.

Students should select the co-advisor as soon as he/she is no longer on rotation and has decided on a research program with an advisor in a department other than Physics. In any case, this should be no later than the end of the second year of graduate study. Students should complete the "[Advisor/Co-Advisor](#)" form and submit it to the Physics Student Services Officer, Maria Frank.

During the third year the student submits a dissertation proposal on his/her research, including a description of the physics components, to Maria Frank. The proposal should have been reviewed, approved, and signed by the student's research advisor, co-advisor, and Reading Committee Members (see Milestones).

From then on, the student is required to meet with his/her co-advisor on a yearly basis, although more frequent meetings are encouraged. If, during the annual meeting, the co-advisor determines that the research no longer contains a significant physics component, the student will be counseled that a Ph.D. in Physics may not be merited and he/she may need to transfer to the relevant department.

Minor

A minor in another department must be approved by that department, using the "Application for Ph.D. Minor" form: <https://stanford.app.box.com/v/app-phd-minor>

Your plan must also be approved by the Chair of Graduate Studies. Please see the [Stanford Bulletin](#) for more information.

Master's Degree

The department does not offer a coterminal degree program, or a separate program for the M.S. degree, but this degree may be awarded for a portion of the Ph.D. degree work.

University requirements for the master's degree, discussed in the "[Graduate Degrees](#)" section of the Bulletin, include completion of 45 units of unduplicated course work after the bachelor's degree. Among the department requirements are a grade point average (GPA) of at least 3.0 (B) for the following required courses (or their equivalents):

See the Stanford Bulletin for detailed information on obtaining the [M.S. degree](#) in Physics

TAKE ALL COURSES BELOW		Units
PHYSICS 212	Statistical Mechanics	3
PHYSICS 220	Classical Electrodynamics	3
PLUS one of the following courses:		
PHYSICS 230	Graduate Quantum Mechanics I	3
PHYSICS 231	Graduate Quantum Mechanics II	3
PHYSICS 234	Advanced Topics in Quantum Mechanics	3
PHYSICS 330	Quantum Field Theory I	3
PHYSICS 331	Quantum Field Theory II	3
PHYSICS 332	Quantum Field Theory III	3
PLUS two 3 unit graduate level courses in Physics or Applied Physics.		6

Up to 6 of these required units may be waived on petition if a thesis is submitted.

The [Graduate Program Authorization Petition](#) form (required for those interested in pursuing the M.S. in Physics) must now be submitted electronically through AXESS. From the Academics panel in your Student Center, select "Petitions and Forms" from the drop down menu to submit the Graduate Program Authorization Petition electronically. You also need to submit the [Program Proposal for a Master's Degree](#) to the Physics Student Services Officer.

REQUIREMENTS FOR THE PH.D.**COURSE WORK**

The minimum department requirements for the Ph.D. degree in Physics consist of completing all courses listed in the chart below **AND at least one course from each of two subject areas outside the student's primary area of research (among biophysics, condensed matter, quantum optics and atomic physics, astrophysics and gravitation, and nuclear and particle physics)**. For this requirement students may choose from courses listed [here](#).

The requirements in the list below may be fulfilled by passing the course at Stanford or passing an equivalent course elsewhere. **All required courses, including [breadth requirements](#), must be taken for a LETTER GRADE.**

	Units
PHYSICS 212 Statistical Mechanics	3
PHYSICS 220 Classical Electrodynamics	3
PHYSICS 290 Research Activities at Stanford	1
PHYSICS 294 Teaching of Physics Seminar	1
PLUS <u>one</u> of the following courses:	
PHYSICS 230 Graduate Quantum Mechanics I	3
PHYSICS 231 Graduate Quantum Mechanics II	3
PHYSICS 234 Advanced Topics in Quantum Mechanics	3
PHYSICS 330 Quantum Field Theory I	3
PHYSICS 331 Quantum Field Theory II	3
PHYSICS 332 Quantum Field Theory III	3

A grade point average (GPA) of at least 3.0 (B) is required for courses taken toward the degree.

All Ph.D. candidates must have math proficiency equivalent to the following Stanford MATH courses:

	Units
MATH 106 Functions of a Complex Variable	3
MATH 113 Linear Algebra and Matrix Theory	3
MATH 116 Complex Analysis	3
PHYSICS 111 Partial Differential Equations of Mathematical Physics	4
PHYSICS 112 Mathematical Methods for Physics	4

COURSE WAIVERS

Students who can demonstrate that they have taken the equivalent course elsewhere with the necessary grade may request to waive that course by submitting the following form: [Petition to Waive/Substitute Courses](#) . Follow the instructions, complete and then submit the

form with all supporting documentation to the Graduate Student Services Officer, Maria Frank. Note you may submit petitions to waive core courses only. **The [breadth requirement](#) must be fulfilled by courses you have taken at Stanford University.**

Students are strongly encouraged to complete or waive course requirements as soon as is practical in their graduate careers, but no later than the end of your second year. This reduces the possibility of delays in the granting of a degree or in transferring to TGR status with its lower tuition rate. Note that most physics courses, including the core courses, are only offered once in each academic year and the more advanced courses may only be offered less frequently. Advanced planning is to your benefit.

TEACHING

The department believes that a demonstrated ability to teach is an important part of a graduate-level education in Physics. Consequently, three quarters of teaching are a requirement for the Ph.D. in physics. Teaching duties vary from course to course but can include leading discussion sections, laboratory sections, meeting with students informally through office hours, and grading homework and exams. Beginning Autumn 2018/19 it is possible to petition to receive teaching requirement credit by working as a course assistant (CA) for a maximum of two quarters. See detailed instructions [here](#).

All TAs in the Physics Department are required to take [PHYSICS 294](#) (Teaching of Physics at Stanford). It is preferred that PHYSICS 294 is taken prior to the first quarter of working as a TA, however it may be taken concurrently with your first Physics TA assignment.

A TA application form must be completed before any quarter in which a student wishes to teach. The form is made available online a few weeks prior to the end of the preceding quarter on the Physics Department website <https://physics.stanford.edu/academics/graduate-students/student-assistantships/teaching-assistant>. The Undergraduate Program Coordinator is responsible for TA assignments and will notify students of application availability and deadlines.

First year graduate students are given first priority for TA positions, however first year Physics students do NOT teach in their first quarter at Stanford.

Note that all students are required to complete the three-quarter TA requirement PRIOR to committing to completing any long-term research at a location a significant distance from the Stanford University campus. Examples include CERN in Geneva, KITP at UC Santa Barbara and the Soudan Mine in Minnesota.

ENGLISH PROFICIENCY FOR TEACHING ASSISTANTS (International Students Only)

The University requires that International graduate students who wish to be appointed as TAs must first be screened by proficiency in the English language. The screening is conducted by the English for Foreign Students Program in the Stanford Language Center. The Language Center also offers courses in English as a second language (ESL) to international graduate students. More information on the screening exam can be found at <https://language.stanford.edu/programs/efs/languages/english-foreign-students/screening-international-teaching-assistants>. We strongly recommend students get screened at least one quarter prior to the quarter in which they wish to TA.

GRADING

Occasionally the department needs graders for courses. Grading positions provide an hourly wage, do not pay any tuition allowance and cannot be used to fulfill the teaching requirement. Graders may work a maximum of 8 hours per week, but international students may not work as graders during the academic year if they have a 50% RA or a combined RA/TA appointment. Rules are slightly different for Summer quarter. See Maria Frank or Elva Carbajal if you have further questions about grading positions.

QUALIFYING ORAL EXAMINATION

The Qualifying Exam consists of an oral exam taken in the second year, typically in the Fall or Winter quarter. The student will make a presentation about a recent development or paper in an area of research interest to the student to a faculty exam committee. Exhibiting command of the material by answering questions from the committee about the relevant physics will be required. For more detailed information, see the [FAQ](#) page and the relevant page below.

<https://physics.stanford.edu/academics/graduate-students/graduate-resources/qualifying-exam>

UNIVERSITY REQUIREMENTS

Continuous Registration

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-3/subchapter-1/page-3-1-1>

Students must be registered for **10** units of coursework and/or research (PH 490) every quarter during the academic year (Autumn, Winter and Spring quarters). Registration procedures may vary slightly during

quarter, but you will receive instructions at the end of Spring quarter on how many units to register for during the summer, depending upon the percentage of summer RA or TA appointment and/or the number of units funded by your fellowship if you have one. If you plan to be away from campus for an extended period of time you need to fill out a leave of absence form officially approved by your advisor, the Physics Department, and the Degree Progress Office during the quarter before the requested leave. Note that fieldwork directly related to your thesis does not require you to take a leave of absence and that a leave of absence is not required for Summer quarter.

Residency Requirement for the Ph.D.

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-3/subchapter-2/page-3-2-1>

The University requires students studying for the Ph.D. to complete 135 units of study. Students who have completed 135 units must then apply for Terminal Graduate Registration (TGR) status, which usually happens in the fourth or fifth year of study and is discussed further on page 12. Note that your 135 units **must include** all courses required for the Physics Ph.D. unless you have specifically waived them.

Registration Procedures

In Autumn, Winter, and Spring quarters, students register for 10 units via AXESS. Units taken are usually a combination of course units and research units (Physics 490, under your research advisor) as appropriate. 50% support TA and RA appointments include a tuition allowance for the

10 unit tuition rate. Some outside fellowships include full tuition (18 units); refer to your fellowship award letter or contact Maria Frank if you have questions.

In Summer quarter ONLY, students in year 2 and above can receive up to 75% RA support and in year 3 and above, up to 90% if approved by the advisor. **Students in year 1 are only eligible to earn 50% RA or RA/TA support in Summer quarter.**

Registration unit levels for Summer quarter are slightly different than in Autumn, Winter and Spring. The amount of tuition allowance you receive depends upon the percentage of your appointment. For example, if you work as a 75% research assistant, you receive 5 units of tuition support and should only register for 5 units. Detailed information regarding summer registration is sent to students via e-mail at the end of Spring quarter.

TGR students register for Physics **802** (TGR Dissertation) for 0 units under their research advisor.

Advancing to Candidacy

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-6/page-4-6-1>

Advancing to candidacy is a very important step, with both departmental and university requirements. Departmental requirements include (i) passing the Physics Qualifying Oral Exam and (ii) completing all required core courses with the exception of PHYSICS 294. PHYSICS 294 (Teaching of Physics at Stanford) should be taken prior to or concurrently with the first quarter you work as a TA, which, for some graduate students may not happen until later in their graduate career. Note that financial support may be delayed if you do not advance to candidacy by your pre-candidacy period expiration date. The *Application for Candidacy for Doctoral Degree* can be found here: <https://stanford.app.box.com/v/appcanddoct>

Extension of Candidacy

Ph.D. candidate status is good for **five years** after your pre-candidacy period has ended. You may see your candidacy expiration date in AXESS by viewing your unofficial transcript. If your candidacy end date is approaching or has expired, the following Candidacy Extension form should be completed, signed by your research advisor and submitted to the Physics Student Services Officer ASAP for review and processing: <https://stanford.app.box.com/v/appcandextens>

Leave of Absence

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-3/page-5-3-1>

Stanford requires graduate students to maintain continuous enrollment for all quarters of the academic year (excluding Summer quarter) from admission through conferral of the degree. However, the university also recognizes that circumstances may arise where this may not be possible. In such circumstances, a student may request a leave of absence for up to one year, or four quarters, or be placed on a mandatory leave of absence. During the period of an approved leave, the student will not be registered. See more detailed information about Leaves of Absence by clicking on the link above. Leave of absence petitions can be obtained here:

<https://stanford.app.box.com/v/leaveofabsence>

Length of Leave

All leaves of absences are granted for a fixed period of time, normally one year or less. Students who have completed all residency requirements (including advancement to candidacy) may request an additional year of leave if special circumstances exist. If no approved extension is on file, a hold is automatically placed on future registration. A student who wishes to return at a later

date must file for reinstatement and an extension of candidacy. This applies whether it is the same major and degree program or a different one.

Status While on Leave

Students on approved leave retain their current degree program status but are not considered officially registered. No official departmental or University requirement, e.g., University Oral Examination, may be met while a student is on leave. However, an incomplete course grade may be submitted when a student is not registered. Also, a student may file a request to change major or degree level while on leave.

Returning Early from a Leave of Absence

Graduate students returning early from an approved leave of absence must file the *Returning Graduate Student Request to Register* form before the beginning of the quarter in which they wish to return. The form can be found here: <https://stanford.app.box.com/v/returning-student-request>

Withdrawal from Program

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-4/page-5-4-1>

A student who wishes to terminate study in a program should submit a Request to Permanently Withdraw from Degree Program form <https://stanford.app.box.com/v/permanent-withdraw> to the Student Services Officer, who will forward the information to the University Registrar.

Reinstatement

A student who has withdrawn and later wishes to return to the same degree program must follow the normal procedure for reinstatement. Further information on reinstatement can be found here: <https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-4/page-5-4-1>

Inactive Status/Discontinuation

A student who has not resigned and fails either to maintain registration or to secure a formal leave of absence will be declared inactive. A student whose candidacy is not extended is also considered inactive. If a student wishes to resume study either in Physics or a different field, he/she must apply for reinstatement. Reinstatement is not automatic and must be approved by the Department.

Terminal Graduate Registration (TGR) Tuition Status

The Humanities and & Sciences Dean's office requires students with 135 units to apply for TGR status. This usually occurs in the 4th year of study. TGR tuition rates are much lower than the 10-unit rate so it is important to apply for TGR tuition status as soon as you are eligible. **Be sure to complete all required courses, including breadth requirements, and speaking/writing courses for foreign students, prior to the fourth year of study.** While on TGR tuition status, you need to register for PHYS 802 for "0" units under your research advisor. Note you **must** fulfill all degree course requirements before you can go TGR. Applications for TGR status are available at the following link: <https://stanford.app.box.com/v/tgrreq>

Before applying for TGR status check your transcript and confirm that you have received a grade or mark (Satisfactory or CR, for example) for **every** course you have taken at Stanford.

Graduation Quarter Tuition Status

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-6/subchapter-1/page-6-1-1#anchor-46>

Registration is required for the quarter in which a student submits a dissertation or has a degree conferred. Students who meet the conditions listed below are eligible to file a [Petition for Graduation Quarter](#), and, upon approval, to be assessed a special tuition rate for the quarter in which they are receiving a degree. Only one graduation quarter may be requested. There is a registration fee of \$150 for the graduation quarter. Students must enroll in the appropriate TGR course during their graduation quarter.

Carefully review the eligibility requirements on the [Petition for Graduation Quarter](#) prior to submission. Students who are properly enrolled in a graduation quarter are registered at Stanford and therefore have the rights and privileges of registered students.

Reading Committee

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-8/page-4-8-1>

Submission of an approved doctoral dissertation to the department and the Committee on Graduate Studies is required for the Ph.D., Ed.D., and J.S.D. degrees. The doctoral dissertation is expected to be an original contribution to scholarship or scientific knowledge, to exemplify the highest standards of the discipline, and to be of lasting value to the intellectual community. Every doctoral dissertation is read and approved by members of the Stanford faculty to ensure that standards for departmental and university quality are met. Standards for professional presentation of doctoral work have been established by the Committee on Graduate Studies.

Click on the link above for detailed policy information regarding Doctoral Dissertation Reading Committees. The reading committee, as proposed by the student and agreed to by the prospective members, is endorsed by the Chair of the major department on the [Doctoral Dissertation Reading Committee](#) form.

This form must be submitted before approval of Terminal Graduate Registration (TGR) status or before scheduling a University oral examination that is a defense of the dissertation. The reading committee should be appointed in Year 3 as committee members need to review and sign off on each Ph.D. candidate's Third Year Thesis Proposal (see Milestones).

All subsequent changes in the composition of the reading committee must be approved by the Chair of the Ph.D. major department prior to submission of the dissertation via the [Change of Advisor or Reading Committee Member form](#).

Oral Examination

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-7/page-4-7-1>

The University Oral Examination is a requirement of the Ph.D. degree. The purpose of the examination is to test the candidate's command of the field of study and to confirm fitness for scholarly pursuits. The Ph.D. candidate and his advisor will determine when, after advancement to candidacy, the exam will be given. In the Physics Department the Oral Examination is a defense of the dissertation.

The University Oral Examination committee consists of at least five members: four examiners and an out-of-department committee Chair. The Chair must be a member of the Stanford Academic

Council and may not have a full or joint appointment in the same department as the candidate or her/his advisor. *In most cases, a SLAC faculty member would not be the best choice for Oral Examination Committee Chair because of the close connection to the Physics Department. In the interest of objectivity the examinee should strive to find a faculty member from another department to serve as Chair.* See the Graduate Academic Policies and Procedures Manual for rules in selecting a dissertation defense committee chair and the reasons why the Oral Examination Committee Chair must be from outside the department.

Students must be registered in the quarter in which the University oral examination is taken. Candidacy must also be valid. The [Doctoral Dissertation Reading Committee form](#) must be submitted to and recorded by the department prior to scheduling the examination. An abstract of the dissertation must be provided prior to the defense.

The [University Oral Examination Schedule form](#) is used to officially schedule the examination and includes:

- Date, time, and location of the examination
- Title of dissertation
- Composition of the committee, approved by the department Chair

This form should be submitted by the student to the department Student Services Officer **at least two weeks prior to the examination date.**

Writing and Submitting the Dissertation

Students work with their advisor(s) in planning and preparing the thesis. For detailed instructions see: <https://registrar.stanford.edu/students/dissertation-and-thesis-submission> Contact the Graduate Degree Progress Office with additional questions:

Conferral of Degree

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-7/page-5-7-1>

To be cleared for conferral of the Ph.D. or Master's degree, you must apply to graduate via AXESS by the due date indicated on the Registrar's Office website. Check with the Student Services Officer to make sure all requirements have been met and all grades have been cleared.

Commencement Ceremony <https://commencement.stanford.edu/>

For detailed information about participating in the university wide commencement ceremony, visit the link above.

The Physics Department allows Ph.D. students near completion to "walk through" the departmental ceremony. This means that you may participate if you plan to complete all the requirements for your degree the quarter following the commencement ceremony. To be eligible to walk through you must complete and submit the Commencement Ceremony Participation webform which is sent to graduate students via the Physics Graduate Student email distribution list in March/April.

Grades <https://registrar.stanford.edu/students/definition-grades>

It is your responsibility to check grades in AXESS each quarter to make sure they have been correctly reported for every quarter you have registered at Stanford. See your instructor about grade disputes and missing grades, and see the Student Services Officer about the

procedure for grade changes. Be sure that Incomplete ("I") and Continuing Course ("N") grades are cleared when courses are completed. "I" grades will be changed to Not Passed ("NP") after one year.

Credit for Graduate Work Done Elsewhere (Graduate Residency Credit)

<https://gap.stanford.edu/handbooks/gap-handbook/chapter-3/subchapter-2/page-3-2-1#anchor-178>

After at least one quarter of enrollment, students pursuing a Ph.D. may apply for credit for graduate work done at another institution if that work meets the established eligibility criteria. Note that transfer units cannot be used towards a Master's degree. No more than 45 units of transfer credit may be applied towards a Ph.D.

The eligibility criteria for coursework accepted for transfer credit are specified in the Stanford Bulletin. Students must complete and submit the [Application for Graduate Residency Credit](#) which is reviewed by the department and the University Graduate Degree Progress Office.

Students enrolled at Stanford who plan to study elsewhere during their degree program should obtain prior approval of any anticipated transfer residency credit before their departure.

More Information

See the Stanford University Bulletin, <http://exploreddegrees.stanford.edu/#text> and the Graduate Academic Policies and Procedures Manual <http://gap.stanford.edu> for further information on University requirements, grading policies, course adds, drops, withdrawals, etc.

MILESTONES <https://gap.stanford.edu/handbooks/gap-handbook/chapter-4>

The usual schedule for physics graduate students consists of two years of course work, plus, research training leading to the dissertation and Ph.D. degree. Although there are exceptions, a well-prepared graduate student should complete the dissertation within five years after qualifying for candidacy, i.e., passing the Qualifying Oral Exam, completing all course work and filing the application for candidacy.

The following are the major milestones for the Physics Ph.D. program:

First or

Second year: Pass the Physics Oral Qualifying exam no later than Spring quarter of 2nd year.

Second year: Submit [Application for Candidacy for Doctoral Degree](#) by pre-candidacy period end date of your second year. Candidacy is valid for five years.

Third year: Prepare a tentative [Proposal for Thesis Research](#) by end of Summer quarter of the third year. The Ph.D. candidate must submit a 1-3 page proposal **signed by the student, advisor and co-advisor (if required) and all members of the reading committee.** By this time ALL course requirements should be completed and the Reading Committee form should be submitted. You can find the Doctoral Dissertation Reading Committee form here:

<https://stanford.app.box.com/v/docdiss-reading-committee-form>

Fourth year: Fourth-year students are required to give a 45-minute oral presentation to their Ph.D. reading committees. Generally no other people besides the student, advisor and reading committee members are present at the oral presentation.

All students must complete this requirement in the fourth year of study. Experience has proven this is an extremely reliable tool to help students stay on track to degree completion.

The purpose of the requirement is to increase contact between students and faculty members, to help students organize their thoughts, to give students practice in giving oral presentations, and most importantly to obtain feedback on the development of the thesis, approximate date of thesis completion and future plans.

These are informal meetings, and no grades are given. Students schedule the presentations themselves. By end of Winter quarter of the fourth-year students should have a set date for the oral presentation.

The sessions should consist of a half-hour presentation by the student, 15 minutes of discussion between the student, research advisors and readers, and then a closed door discussion by the committee.

Fourth year oral presentation forms are available online at https://physics.stanford.edu/sites/default/files/revised_fourth_yr_oral.pdf

When 135 units have been completed, apply for Terminal Graduate Registration (TGR) tuition status. TGR forms are available online at: <https://stanford.app.box.com/v/tgrreq>. See earlier section ("Terminal Graduate Registration Status") for more detail.

Fifth year or when appropriate: Take the university [oral exam](#), and file dissertation by quarterly deadline.

FINANCIAL SUPPORT

Financial Aid Information Forms

The financial aid information form is sent out via e-mail every quarter and is available at <https://physics.stanford.edu/academics/graduate-programs/forms>

Students use this form to indicate their intention to work as a TA and/or RA, or indicate that they have fellowship support. There is a strict deadline by which the financial aid form must be submitted to the Graduate Student Services Officer. Late submission of forms may delay stipend payment and/or cause denial of the health insurance subsidy.

During the academic year, students can be paid for a 50% (full support) RA appointment which includes 8, 9 or 10 units of tuition. Since it costs the same for 10 units as it does for 8, students must register for 10 units every quarter in order to more quickly progress to TGR status and thus, a lower tuition rate. In Physics, students often combine smaller TA and RA appointments during

the same quarter, for a total 50% appointment. U.S. citizens can work an additional 8 hours per week as graders. International students cannot work more than 50% during the academic year.

In Summer quarter, students in year 2 can work a total 75% appointment and receive tuition allowance for 5 units, and those in years 3 and above can have 90% appointment and receive tuition allowance for three units, if the appointment is agreed to by their advisor. This is true for both U.S. citizens and international students.

Fellowships

Applying for fellowships is strongly encouraged. In particular, all eligible first year students who are U.S. citizens or permanent resident aliens should apply for the NSF fellowship. See the following web sites for further information on various fellowships:

National Science Foundation (NSF): <https://www.fastlane.nsf.gov/grfp/>

Hertz Foundation: <http://hertzfoundation.org>

Department of Defense: <http://www.asee.org/ndseg/>

Stanford Graduate Fellowship (SGF) *by nomination only*: <http://sgf.stanford.edu>

NASA: <https://science.nasa.gov/researchers/sara/fellowship-programs#gradops>

See the "Web Resources" section of this handbook for more web links to fellowship information.

Teaching Assistantships

<https://physics.stanford.edu/academics/graduate-students/student-assistantships/teaching-assistant>

Graduate students can apply for a position as a teaching assistant before the beginning of each quarter. First year students do not teach in the Autumn quarter of their first year.

The salary for 2019-20 TA appointments can be viewed [here](#). See Elva Carbajal, the Undergraduate Program Coordinator, for questions about teaching assistant assignments and refer to the [Physics TA web pages](#) for further information.

The department provides a teaching orientation ([PHYSICS 294](#), Teaching of Physics Seminar, offered Autumn and Winter quarters) and the Vice Provost for Teaching and Learning (VPTL) has an excellent orientation session in the Fall, and valuable training available at any time. See <https://vptl.stanford.edu/> and <https://vptl.stanford.edu/events/autumn-quarter-ta-orientation> for more information.

Research Assistantships

Research assistant salaries in Physics for the 2019-20 academic year are as follows:

50% RA, 1st year students	\$10,956 per quarter/\$1,826 per pay period
50% RA, 2nd year+ students	\$11,352 per quarter/\$1892 per pay period
25% RA, 1st year students	\$5,478 per quarter/\$913 per pay period
25% RA, 2nd year+ students	\$5,676 per quarter/\$946 per pay period
RA Supplement (for some fellowship students)	Varies depending upon fellowship

Regular graduate (non-TGR) tuition allowances for the 2019-20 academic year are as follows:

50% RA	\$11,370 per quarter
25% RA	\$5,685 per quarter
RA Tuition Supplement (for some fellowship students)	Varies depending upon fellowship

The federal and state governments tax salaries for virtually all current students. Foreign students may wish to consult a tax professional regarding possible tax exemption based on a treaty between the US and their home countries. See the following webpage for helpful information: <https://bechtel.stanford.edu/practical-matters/taxes>. Foreign students receiving taxable scholarships or fellowships may claim any applicable treaty exemption by filing the appropriate forms with the Student Financial Services office.

Rotations and First Year Funding

Students usually settle with a research group towards the end of their first year or the start of their second. Before that, they 'rotate' between different groups. A rotation means that the student spends a quarter working in a given group. Rotations allow students to have contact with research as soon as they arrive at Stanford and gives them the opportunity to try out different research topics, while interacting with different faculty and groups. During the first three quarters rotations are funded by the Physics department (two quarters as a Research Assistant and one quarter as a Teaching Assistant) and therefore the rotation advisor does not need to provide funds, unless the student continues with the group for more than one quarter. Students should contact potential rotation advisors before the quarter starts to express interest and check the availability of positions. All students need to be formally rotating each quarter until they permanently join a group.

Up to a maximum of two quarters of funding equivalent to full RA salary and tuition allowance is provided to first year students not on fellowship (such as NSF, SGF, etc.)

Students on fellowship may be able to receive fellowship supplement support during year one Autumn, Winter or Spring quarters while on rotation IF their fellowship stipend does not meet the minimum quarterly salary level for a first-year grad or if fellowship tuition does not meet the 10-unit graduate rate. See your Student Services Officer, Maria Frank for more information on how to determine if you qualify.

How long do I have to use it?

You must use this department funding in your first year as a rotation student AND it must be used during Autumn, Winter or Spring quarters. **The funding is not available during Summer quarter.**

What's the purpose of this funding?

The support is intended to help first year graduate students secure a rotation with the research group that he/she is most interested in. With this departmental support you can do a rotation without having the advisor pay for your salary or tuition for that quarter.

Health Insurance Subsidy

Stanford subsidizes the Cardinal Care premium for graduate students who are employed in research or teaching assistantships, and for students receiving the equivalent level of fellowship support. Details regarding eligibility and amount can be found here: <http://financialaid.stanford.edu/grad/funding/subsidy.html>.

The following enrolled graduate students (who do not waive Cardinal Care and do not have an outside fellowship source paying the full cost of insurance) will receive the FULL subsidy:

Stanford Physics Department Graduate Student Handbook 2019-20

- those with a Research or Teaching Assistantship appointment of 25% or more
- those with a fellowship paying a non-tuition stipend at or above the minimum salary for a 25% assistantship (CA or RA)

The following enrolled graduate students (who do not waive Cardinal Care and do not have an outside fellowship source paying the full cost of insurance) will receive the PARTIAL subsidy:

- those with a Research or Teaching Assistantship appointment of less than 25%
- those with a fellowship paying a non-tuition stipend at or above the minimum salary for a 10% assistantship (CA or RA)

Students not meeting the above criteria are not eligible for a Cardinal Care subsidy.

The FULL benefit consists of a payment of 50 percent of the Cardinal Care premium*.

The PARTIAL benefit consists of a payment of 25 percent of the Cardinal Care premium*.

* For the purposes of calculating the amount of this subsidy, the Cardinal Care premium is defined as the cost of the 12-month coverage, divided by three academic quarters.

Click here for a Cardinal Care Cost Table: <https://vaden.stanford.edu/insurance/cardinal-care-overview-and-benefits/cost-and-coverage-dates>

How does Cardinal Care subsidy work during the summer?

Students who are enrolled in Cardinal Care during the academic year will automatically be enrolled in Cardinal Care for Summer quarter at no additional cost (whether they are enrolled as a student in the summer or not). Since there is no charge posted for Cardinal Care during Summer quarter, a corresponding Cardinal Care subsidy is not applied.

In those cases, where a student was charged for Cardinal Care during Autumn, Winter or Spring but was not eligible for the subsidy during that quarter, and has subsidy-eligible support (assistantship or fellowship) during the Summer, the subsidy will be given to the student "retroactively" during the summer.

Departmental Travel Reimbursement Support

The Physics Department offers travel fund reimbursement of up to \$300 for domestic travel, or \$500 for international travel, to assist Physics doctoral students traveling to **professional meetings to present their research**. Up to three trips are permitted using these funds during a student's academic career, **but only one trip per student may be funded each academic year**. Students who use this fund should be participating substantively in the meeting (presenting a paper or serving on a panel). Further instructions and reimbursement request forms can be found here: <https://physics.stanford.edu/academics/graduate-programs/forms>

PAYMENT OF FELLOWSHIP STIPENDS AND TA/RA SALARIES

Fellowships

The Financial Aid Office will either directly deposit or mail checks directly to students who receive aid in the form of a University or outside fellowship at the beginning of each quarter.

Salaries

Teaching and research assistants are paid as university employees. Employees are paid on the 7th and the 22nd of the month or on the preceding Friday if one of those dates falls on a weekend or holiday. The first paycheck in Autumn Quarter arrives on 10/22 for the period from 10/1 to 10/15. The 11/7 paycheck covers the period from 10/16 to 10/31. The last paycheck of the academic year comes on 7/7 for the period from 6/16 to 6/30. **Students are strongly encouraged to have paychecks deposited directly to an individual bank account. You can apply for [direct deposit](#) via AXESS. Note that students who are paid by SLAC may be subject to different rules and procedures. Check with the SLAC Human Resources Department if you have any questions.**

If you opt not to sign up for direct deposit, you can pick up your check from the main office receptionist only during regular office hours (10am - Noon and 1pm - 4:30pm, Monday through Friday).

All employees can view their Pay Statement online by logging in to AXESS.

Holders of assistantships may sign up for [Payroll Deduction](#) to conveniently pay housing and other student fees.

REQUIREMENTS FOR EMPLOYMENT AS AN RA OR TA

Full Time Enrollment

In order to receive pay from the university you must be registered as a full-time graduate student.

For Graduate students this means that you must enroll in courses and/or research totaling **8-10** units (10 units preferred) each quarter during the academic year (if not on TGR status) and for the zero-unit TGR course PH 802 if you are on TGR status. Enrollment levels for Summer quarter will vary according to your appointment percentage. Enrollment levels for some fellowship students may vary. Check with the department Student Services Officer if you have questions.

English Proficiency for Teaching Assistants (International Students Only)

The University requires that International graduate students who wish to be appointed as TAs must first be screened by proficiency in the English language. The screening is conducted by the English for Foreign Students Program in the Stanford Language Center. The Language Center also offers courses in English as a second language (ESL) to international graduate students. More information on the screening exam can be found at <https://language.stanford.edu/programs/efs/languages/english-foreign-students/screening-international-teaching-assistants>. We strongly recommend students get screened at least one quarter prior to the quarter in which they wish to TA.

Tax declaration

All students receiving assistantship salary must have submitted a form SU-32/W-4/DE-4 Employee's Tax Data (includes federal and state withholding certificate).

Review the information at the "[Getting Started as an Employee](#)" and "[Teaching Assistantships](#)" pages for other important information/requirements.

Assistantships are "full-quarter packages" (12 weeks of either teaching or research work). Employment is for full quarters with standard start/stop dates. The salary start and stop dates of

an assistantship are coordinated with the standard pay periods for Stanford employees, as follows:

FALL QUARTER: October 1 - December 31

WINTER QUARTER: January 1 - March 31

SPRING QUARTER: April 1 - June 30

SUMMER QUARTER: July 1 - September 30.

Note that these dates are normally different from the start and stop dates of quarters on the university's academic calendar. This timing is intended to deliver continuous salary to students appointed for multiple sequential quarters, i.e., students on assistantships are paid during the periods between quarters. **Arrangements for any variations in work hours, including time off for vacation or illness, should be made individually with the faculty sponsor.** See Administrative Guide Memo 10.2.1 (Graduate Student Assistantships, Section 11) for detailed information: <https://adminguide.stanford.edu/chapter-10/subchapter-2/policy-10-2-1>

HOW TO PAY UNIVERSITY BILLS

For detailed information on the various ways to pay University bills see the University Bill web page: <https://sfs.stanford.edu/student-accounts/pay-your-bill>

COMMUNITY RESPONSIBILITIES

As members of the Physics community, all students are expected to help out occasionally with special events such as our department open house, and to serve on committees.

Typical physics community responsibilities are listed below by year of study:

First Year Students - Assist with open house for new admits

Second Year Students - Assist with qualifying exam preparations

Third Year Students - Assist with graduate student orientation, talk to visitors

Fourth Year and Advanced Grad Students - Assist with various physics community events

In addition, students may volunteer or be asked to participate in:

PHYSICS GRADUATE STUDY COMMITTEE (STUDENT REPRESENTATIVES)

Three graduate students attend graduate study committee meetings and give their input concerning curriculum, teaching, and department policies.

TOWN HALL MEETINGS

These meetings are held in the Autumn and Spring quarters to discuss student related issues and concerns.

LUNCH WITH THE CHAIRS

Each year graduate students have the opportunity to meet and have lunch with the Physics Department and Graduate Studies Committee Chairs. This is your opportunity to speak to the Chairs about how things are going for you. It is also a time for you to discuss the Ph.D. Program and express any concerns or suggestions for improvement that you may have.

COLLOQUIA

Colloquia are held on Tuesdays in the William R. Hewlett Teaching Center, Room 200 or 201 at 4:15pm, unless otherwise indicated.

Refreshments are served at 4:00pm in the Varian Physics Lobby. The general public is cordially invited and all Physics students are encouraged to attend.

Schedule may be subject to change. For up-to-date colloquium information, please check the department website <https://physics.stanford.edu/news-events/applied-physicsphysics-colloquium> and/or look for the notices posted weekly in the lobby of the Varian Physics building. Email notifications will also be sent out on a weekly basis when school is in session.

BEFORE LEAVING STANFORD

- Please return all keys to the receptionist and retrieve your deposit.
- Complete a [GRADUATE EXIT INFORMATION FORM](#)
- Apply for a leave of absence if you have not yet submitted your dissertation.
- File an "Application to Graduate" for the quarter in which you expect to receive a degree. You may do this via AXESS

RECOMMENDED REFERENCE BOOKS AVAILABLE IN THE PHYSICS LIBRARY

[The Ph.D. Process: A Student's Guide to Graduate School in the Sciences](#)

by Dale F. Bloom, Jonathan D. Karp, Nicholas Cohen, Oxford University Press (1999)

[Graduate Research: A Guide for Students in the Sciences](#)

by Robert V. Smith, University of Washington Press (1998)

WEB RESOURCES

DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS

<http://aa.stanford.edu/>

DEPARTMENT OF APPLIED PHYSICS

<http://www.stanford.edu/dept/app-physics/cgi-bin/>

STANFORD ASTRONOMICAL SOCIETY

<http://orion.stanford.edu/>

AXESS - (Requires login with SUNet ID)

<https://axess.stanford.edu/>

BIO-X

<http://biox.stanford.edu/>

BULLETIN/EXPLORE DEGREES

<http://exploreddegrees.stanford.edu/#text>

CANVAS - (Requires login with SUNet ID)

<https://canvas.stanford.edu/>

DIRECTIONS FOR PREPARING DOCTORAL DISSERTATIONS

<http://studentaffairs.stanford.edu/registrar/students/dissertation-thesis>

BECHTEL INTERNATIONAL CENTER

<https://bechtel.stanford.edu/>

DEPARTMENT OF ELECTRICAL ENGINEERING

<http://ee.stanford.edu/>

CAMPUS EATERIES

<http://www.stanford.edu/dept/visitorinfo/activities/dining.html>

ENVIRONMENTAL HEALTH AND SAFETY

<https://ehs.stanford.edu/> and

<https://physics.stanford.edu/resources/safety-training>

EXPLORE COURSES

<https://explorecourses.stanford.edu/>

GATEWAY TO FINANCIAL ACTIVITIES (**FINGATE**)

<http://web.stanford.edu/group/fms/fingate/>

GEBALLE LABORATORY FOR ADVANCED MATERIALS (**GLAM**)

<https://glam.stanford.edu/>

GINZTON LABORATORY

<https://ginzton.stanford.edu/>

GRADUATE STUDENTS OF APPLIED PHYSICS AND PHYSICS (**GSAPP**)

<http://web.stanford.edu/group/gsap/>

HANSEN EXPERIMENTAL PHYSICS LAB (**HEPL**)

<http://hepl.stanford.edu/>

STUDENT HOUSING

<https://rde.stanford.edu/studenthousing/>

COMMUNITY HOUSING SERVICES

<https://rde.stanford.edu/studenthousing/community-housing>

HUME WRITING CENTER RESOURCES FOR GRADUATE STUDENTS

<https://undergrad.stanford.edu/tutoring-support/hume-center/writing/graduate-students>

KAVLI INSTITUTE FOR PARTICLE ASTROPHYSICS AND COSMOLOGY (**KIPAC**)

<https://kipac-web.stanford.edu/>

LINAC COHERENT LIGHT SOURCE (**LCLS**)

https://portal.slac.stanford.edu/sites/lcls_public/Pages/Default.aspx

LIBRARIES

<http://library.stanford.edu/>

PHYSICS MACHINE SHOP

<https://physics.stanford.edu/resources/machine-shop>

MAPS

<http://visit.stanford.edu/plan/index.html>

PARTICLE PHYSICS AND ASTROPHYSICS

<http://www-group.slac.stanford.edu/ppa/>

DEPARTMENT OF PHYSICS

<https://physics.stanford.edu/>

PHYSICS DEPARTMENT EMERGENCY PLAN

https://physics.stanford.edu/sites/default/files/physics_emergency_plan_8-2017.pdf

PULSE INSTITUTE FOR ULTRAFAST ENERGY SCIENCE

<https://ultrafast.stanford.edu/>

REGISTRAR'S OFFICE

<https://registrar.stanford.edu/>

SIMPLE ENROLL

<https://registrar.stanford.edu/resources-and-help/axess-students/how-use-simpleenroll>

STANFORD INSTITUTE FOR MATERIALS AND ENERGY SCIENCE (**SIMES**)

<http://simes.stanford.edu/>

STANFORD INSTITUTE FOR THEORETICAL PHYSICS (**SITP**)

<https://sitp.stanford.edu/>

STUDENT FINANCIAL SERVICES

<https://sfs.stanford.edu/>

SLAC NATIONAL ACCELERATOR LABORATORY

<http://www.slac.stanford.edu/>

STANFORD SYLLABUS

<https://syllabus.stanford.edu/syllabus/#/mainSyllabus>

STANFORD SYNCHROTRON RADIATION LIGHT SOURCE (**SSRL**)

<https://www-ssrl.slac.stanford.edu/>

STANFORDWHO

<https://stanfordwho.stanford.edu/SWApp/lookup>

STANFORDYOU - (Requires login with SUNet ID)

<https://stanfordyou.stanford.edu/main/SYApp>

STANFORD UNIVERSITY GRADUATE ACADEMIC POLICIES & PROCEDURES HANDBOOK (GAP)

<http://gap.stanford.edu/>

VICE PROVOST FOR TEACHING AND LEARNING (VPTL)

<https://vptl.stanford.edu/>

FELLOWSHIPS & SCHOLARSHIPS

AT&T

<https://www.att.jobs/students/#content>

DOE OFFICE OF SCIENCE GRADUATE FELLOWSHIP (DOE SCGF)

<http://science.energy.gov/wdts/scgf/>

HERTZ FOUNDATION

<http://www.hertzfndn.org/>

IBM

<https://www.ibm.com/developerworks/university/phdfellowship/>

NASA GRADUATE STUDENT RESEARCHERS PROGRAM (NASA GSRP)

<https://science.nasa.gov/researchers/sara/fellowship-programs#gradops>

NATIONAL DEFENSE SCIENCE & ENGINEERING GRADUATE FELLOWSHIP (NDSEG)

<http://ndseg.asee.org/>

NATIONAL PHYSICAL SCIENCE CONSORTIUM (NPSC)

<http://www.npsc.org/Applicants/Applicants/fellowshipinfo.html>

NATIONAL SCIENCE FOUNDATION (NSF)

<https://www.fastlane.nsf.gov/grfp/>

STANFORD GRADUATE FELLOWSHIP (SGF)

(BY NOMINATION ONLY)

<http://sgf.stanford.edu/>

STANFORD OFFICE OF THE VICE PROVOST FOR GRADUATE EDUCATION (VPGE) FELLOWSHIPS (ALL BUT DARE AND SIGF ARE BY NOMINATION ONLY)

<https://vpge.stanford.edu/fellowships-funding/all>

PHYSICS DEPARTMENT DIRECTORIES

FACULTY: <https://physics.stanford.edu/people/faculty>

ACADEMIC STAFF: <https://physics.stanford.edu/people/academic-staff>

RESEARCH STAFF: <https://physics.stanford.edu/people/research-staff>

ADMINISTRATIVE STAFF: <https://physics.stanford.edu/people/administrative-staff>

