

# **Group handbook and code of conduct**

Griffies Research Group in the Princeton University AOS Program

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## **Abstract**

This document provides guidance to participants in the Griffies Research Group for the purpose of ensuring clear expectations. This document does not supplant [Princeton University Rights, Rules and Responsibilities](#), nor [Princeton Graduate School requirements](#). Where appropriate, GFDL rules (e.g. for use of computers, NOAA accounts, and conduct within the GFDL building) also apply.

## **The research process and the need to embrace the unknown**

A research scientist probes the limits of understanding while striving to unravel the mysteries of how nature works. The research process involves struggles and frustrations. For those familiar with having answers just around the corner, the uncertainties inherent in research can create deep anxiety. This anxiety is exacerbated when projecting onto others a higher level of certainty and wisdom than warranted. The truth is that every research scientist, including advisers, lives in a state of unknown and confusion. Indeed, it is the unknown that offers the fuel needed to drive the scientific endeavor. Maintaining resilience when confronted with uncertainty requires deep patience and perseverance while remaining peaceful and healthy. Practices that reduce mental viscosity (e.g., religion, meditation, yoga, communing with nature, participating in sports), can ease mental stress in the face of strains induced by deadlines, mistakes, and other obstacles inevitably encountered doing research.

My goal as a mentor is to nurture independent and creative research scientists who excel at the theoretical and computational skills needed to advance understanding of oceanography and climate science. To excel requires time management that supports wide and deep study and the development of numerous theoretical and computational tools offering the means to answer novel scientific questions. Some ideas and tools turn out to be dead ends, thus requiring time to reevaluate and pivot. Indeed, the research path is often nonlinear, with seemingly random walks penetrated by moments of insight that light the way. It is crucial to realize that research advances take longer than expected, even when realizing they take longer than expected!

There are many questions one asks when doing a PhD or postdoc: Will this project lead to a paper? Will I have a productive and healthy relationship with my advisor? Will I get a satisfying job after the PhD or postdoc? Will I be able to balance work with family life? These questions are normal and important. Yet the trick is to avoid letting such questions consume every moment, as doing so can foster an anxious mental state that is contrary to the drive, passion, and creativity needed to succeed as an independent research scientist.

Research is a process not an event. Part of my role as a mentor is to offer intellectual support as you learn this process and move along your path to becoming an independent research scientist. I will share my experiences and advice when in service to your path. But ultimately,

your path is found within. Finding your unique path generally involves deep reflection on what drives your passions; a commitment to doing the tough work needed to meet the many challenges; and the willingness to confront personal transformations that may arise when learning how to embrace the unknown.

### **Work-life balance, mental and physical health**

Science can be a lot of fun and incredibly compelling. But it also requires heaps of work to realize goals. One of the benefits of an academic research environment is that we are not tied to set working hours. Indeed, the creative work required for research does not always follow a schedule. Hence, everyone is encouraged to find the schedule that works best for them, even if that schedule is irregular. However, a downside of flexibility can be implicit pressure to work 24/7. Group members are strongly encouraged to take time to engage in exercise, social activities, hobbies, and sleep. Paying attention to your physical and mental well-being is as important as working on your research.

**Working hours:** Other than attendance at scheduled meetings, group members may choose their working hours, while being aware that others may not keep the same hours. To reasonably accommodate different schedules and responsibilities, try to ensure meetings are only scheduled for Mon-Fri between 10 am-5 pm.

**Working in a Covid-informed world:** With our advanced use of virtual meetings built up during Covid, many of our work activities can be performed remotely. Working from home or any chosen location has reduced concerns over the transmission of illness and reduced stress from commutes. However, there are important advantages to in-person work that warrant a conscious effort to come into GFDL and/or Sayre Hall on a regular schedule. The schedule can consist simply of a few days of the week, so long as the days are timed to overlap with others also coming to work and attending group meetings, seminars, and other gatherings that support education and community building.

Given the increased awareness of infectious illnesses, please refrain from in-person work if feeling any symptoms.

**Vacation:** All group members are entitled to annual vacation, as well as national holidays (e.g. July 4th), and are encouraged to use their vacation allowance, which is four weeks per year. Students should follow the guidelines in the Princeton Graduate Student Guide. All group members should give the adviser advance notice of vacation longer than a few days. The adviser should also give other group members notice of any vacation longer than a few days.

### **Expectations within the Group**

Our group is committed to ensuring a safe, welcoming work environment for all, free from harassment or discrimination. Harassment or discrimination, in any form, will not be tolerated. Group members and visitors are asked to abide by the following code of conduct:

- Be kind and respectful to others, and do not insult or demean other group members or their work.
- Participate in group activities, including discussions, with a constructive approach.
- Allow all voices to be heard - respect others when they are talking, and be willing to hear out the ideas of others.
- Harassment is unwelcome verbal or physical behavior related to race, religion, sex, gender identity or expression, age, national origin, ancestry, physical or mental disability, veteran status, sexual orientation and/or other characteristics protected by law.
- Discrimination is the adverse treatment of an individual based on race, religion, sex, gender identity or expression, age, national origin, ancestry, physical or mental disability, veteran status, sexual orientation and/or other characteristics protected by law, rather than on individual merit.
- Anyone asked to stop harassing or discriminatory behavior should comply immediately, even if the behavior was not intended to be harassing/discriminatory - if the behavior is unwelcome to the recipient, the intent of the perpetrator is not relevant. This applies to all communications, online and in person, imagery, and jokes.
- While political beliefs are not a characteristic protected by law, we want everyone to feel welcome in our group. Political discussions should remain respectful, focus on the ideas, refrain from personal attacks, and not be allowed to interfere with group members' ability to work in a safe environment.

### **Complaints related to discrimination and/or harassment**

For any concerns about discrimination and/or harassment, the Princeton University policies, procedures for making complaints, and resources are all found on [this Princeton University website](#).

Before making any report on discrimination and/or harassment, you may wish to discuss the matter confidentially, in order to obtain advice and support. A list of confidential resources is found at [this Princeton University website](#).

Other avenues for complaints: the AOS director, CIMES director, and GFDL director may be appropriate, depending on the circumstances of the complaint. For students, the graduate school provides staff for addressing grievances. Note that faculty members are mandatory reporters for Title IX, meaning they are required to formally report any incidents which violate Title IX (sexual harassment) regardless of the wishes of the victim.

### **Expectations for the PhD student-adviser relationship**

Many science breakthroughs originate from the work of early career scientists, including PhD students and postdocs. One reason for their success is that early career scientists are not burdened with knowing too much, and so are not prejudiced regarding what one intellectually can and cannot do. Consequently, some early career scientists confront research questions using novel methods that more experienced scientists overlook or do not have the fortitude to pursue.

This perspective motivates my advising style, whereby I deliberately eschew prescriptive management of the PhD and postdoc research decisions, while fully engaging in and actively

advocating for research needs and aspirations. This section provides further details of the expected relations between Griffies (adviser) and PhD students.

**Evolution of the relationship:** Interactions are aimed at optimizing the exchange of knowledge and wisdom needed to foster growth as an independent research scientist. These interactions can take the form of the adviser and student mutually working through concepts from research papers and books that are directly relevant to the research. At other times, the adviser is a consultant or collaborator who offers feedback and suggestions.

Before passing the PhD general exam, the student and adviser closely consult as the PhD student develops a general exam project, targeting a project that interests the student, is scientifically relevant, and expands the student's intellectual frontier and toolset. After the general exam, the student is expected to be increasingly independent so that by the start of year three, the student is identifying and pursuing worthy scientific questions using suitable methods.

**The process of earning a Princeton AOS PhD:** Earning a Princeton AOS PhD requires an extreme level of focused creativity, intense study, hard work, fortitude, and perseverance. Such character traits and qualities are necessary to pursue novel research that is successfully received within the peer-reviewed literature. There can be a steep learning curve from being adept at coursework to being the independent research scientist expected of a Princeton AOS PhD. Although the adviser is available for consultation and guidance, there are no shortcuts to working through the attendant struggles and uncertainties.

A Princeton AOS PhD is owned and earned by the graduate student. As such, there is a line beyond which the adviser cannot cross. Namely, the student must lead in the PhD research, especially after the general exam. This leadership includes the development of the core research agenda and novel research questions, as well as details of the methodology such as numerical modeling and mathematical analysis. Throughout the PhD process, the adviser supports the student's intellectual foundation with suggestions and feedback concerning the student's research agenda, and by offering resources, insights, and lessons where available. But the adviser is guiding neither the generalities nor specifics of the research agenda, nor is the adviser acting as the student's computer programmer, on-demand tutor, or ghostwriter.

**Expectations for peer-reviewed journal publications:** Lead authoring peer-reviewed journal papers constitutes tangible evidence that a PhD student can productively contribute to the scientific community. Hence, during the PhD studies, graduate students are expected to be the lead author on papers that are published in leading scientific journals. These papers can be solo-authored or, more commonly, co-authored with the adviser and other collaborating scientists. The adviser will mentor the student on the needs and styles of a scientific publication, including the process of working with reviewers and editors.

Anecdotally, it has been said that lead authoring of three peer-reviewed publications offers evidence that the student has completed work sufficient for a Princeton AOS PhD. However, this

“three-paper rule” is neither necessary nor sufficient on all occasions. The more general rule is that the PhD dissertation must represent a substantial body of novel research, and the student must successfully publish that research. Determining what qualifies as “substantial” is an ongoing topic of discussion between the student, the adviser, the PhD committee, and the AOS faculty.

**Uncertainties and obstacles:** There will be questions about the student’s research, both general and specific, for which the adviser has no answer nor any useful advice for how to reach an answer. This situation is expected since PhD research pushes the science frontier. Furthermore, the adviser is just one of many resources that the student should avail when deliberating on a research path. In addition, success as a PhD student generally requires skills as an autodidact that are coupled with an energetic resourcefulness to use the wide variety of human and computational resources available through the Princeton/GFDL AOS Program.

A student’s research will inevitably meet obstacles due to having pursued unpromising research paths, making mathematical mistakes or computer code bugs, or being unable to garner needed resources. Obstacles and their associated struggles form a critical part of learning how to maintain the fortitude and perseverance required to pursue science research.

**The five-year clock:** Graduate students working with Griffies have five years to complete their PhD. There is no funding from the Princeton AOS Program for extra time. In contrast to many other PhD programs, a Princeton AOS PhD student is not required to teach or to grade homework as a teaching assistant, though doing so is an option for those interested in building skills as a mentor. Five years generally offers a sufficient amount of time to complete a substantial amount of research, so long as that time is used efficiently and effectively throughout the PhD.

The five-year PhD clock does not pause when obstacles prove difficult or time-consuming to overcome. Although the adviser will do his best to offer guidance, and suggestions, and aim to garner resources, such help can be of limited value for addressing particulars of the student’s research. Furthermore, it is not the adviser’s responsibility to develop the tools or insights needed to blaze a path to overcome these obstacles. Rather, it is for the student to choose the path and to nurture the skills, determination, and energy needed to successfully pursue that path.

### **Expectations for the postdoc-adviser relationship**

Postdocs arrive at Princeton having earned a PhD and, perhaps, having done previous postdoc work. They are expected to drive their research from the start of their time at Princeton, with close collaboration from their adviser and other possible collaborators. The adviser works under the assumption that a postdoc wishes to further a research portfolio to support a career as a research scientist either at a university or research laboratory. Hence, intellectual and computational resources will be provided to support that career path.

Postdocs are expected to develop new expertise and skills; identify novel and exciting research questions; and successfully lead peer-review publications of their research. They are also expected to engage in group activities, including the mentoring of other students and postdocs where intellectually matched, and to present research activities to the group and broader GFDL and AOS community.

If the postdoc decides that the pursuit of a research career is not in their plans, then that information should be communicated to the adviser so that the adviser can adjust expectations and strategies accordingly.

### **Individual and group meetings**

**Individual meetings:** Every early career scientist (ECS; graduate student, postdoc) should expect a weekly or biweekly individual meeting with the adviser (Griffies). The meeting ideally will be in-person, though virtual is suitable on occasion. If either the ECS or adviser is unable to attend due to a schedule conflict or travel, communication should be given in advance so the meeting can be rescheduled. Given enhanced access to virtual meetings, it is anticipated that canceled meetings will be rare.

These one-on-one meetings support ongoing research of the ECS and allow the adviser to measure progress. The ECS is expected to run the meeting by setting the agenda and organizing material (e.g. slides of latest results, discussion points about relevant papers and plans). Meetings should be scheduled for one hour, with longer meetings available as needed.

Students (and optionally postdocs) are expected to document each of the weekly meetings via a Google Doc or Overleaf document that is shared with the adviser. Updates are made to this document within two days of the one-on-one meeting. The document provides a detailed record of the meeting discussions, along with a listing of relevant papers, a summary of model results, documentation of resolved and unresolved questions, and updates to plans and milestones. In so doing, the document offers a thorough record of the ECS's ongoing research and a method for both the ECS and the adviser to measure progress. It is central to an informed and trusting relationship between ECS and the adviser.

**Group meetings:** Group meetings offer an important venue to share ongoing work, practice presentations, discuss literature, and help each other with professional skills. All group members should attend group meetings, with meetings occurring either in-person or virtual. Group meetings are scheduled for two hours in length, with that time allowing for extended discussions and interactions. However, meetings will often be shorter. ECS members should contribute to group meetings by leading and/or joining in the discussion and questions, with the adviser mostly acting to provoke discussion and offer suggestions.

**Ocean and Cryosphere Division meetings:** All group members should plan to attend meetings of this GFDL division, except in case of schedule conflicts.

**Seminars:** Attending seminars is a valuable part of scientific education and communication. All group members are encouraged to attend a selection of the following seminars: the GFDL formal seminar (Thursday 2 pm), the GFDL informal seminar (Wednesday noon), AOS/Geo/CIMES climate seminar. Seminars in other departments can also be useful - see <https://aos.princeton.edu/events> for information on relevant seminars. When a large number of seminars are available (i.e. during the academic semester), group members can be selective; about two seminars per week is a good target.

## Communications

The primary form of asynchronous communication is email - emails may be sent whenever is convenient, but no reply should be expected until the recipient's regular working hours. Group members should strive to reply to emails within 24 hours (except on weekends or other days off).

Slack channels will be used for particular group activities on an as-needed basis - group members should aim to check the relevant Slack channels daily.

## Data and code expectations

All the work we do should be conducted to ensure results are reproducible and data is sharable to the maximum extent possible. For publications (depending on the journal), we need to share as much as possible of the code, input data, and analysis routines used to produce the results in the paper. For example, see the [AGU Data + Software Policy](#), which is used across all AGU journals.

We should keep good records, use version control (e.g. Git), and preserve input and code information and model output, all in a form that can be readily shared with collaborators and readers of the article. Once an article is published, we should share data and software with anyone who asks. For that purpose, the information to replicate our results (i.e. input files and code) should be available through a public repository (e.g. Github and/or Zenodo) and the actual model output should be shared upon request (or if small enough, also included in the public repository).

All work produced using GFDL resources must follow the [GFDL Fair Use Policy for Code and Data](#).

The main (not public) repository for model output at GFDL is /archive. For efficient storage on archive, tar files of an entire model run are created and only the .tar file is stored on /archive. Archive is backed up, and provides long-term storage. Analysis of the model output should be conducted by unpacking the .tar file on /work or other temporary space. However, /work is not backed up, so do not use /work to permanently store the results of analysis or analysis routines. Analysis routines should be stored on /home, and larger results of analysis should be stored on /archive or /net2. While GFDL file-systems /home, /net, and /archive are all backed up,

individuals are responsible for ensuring any important work-related files on personal laptops are backed up regularly. Princeton offers back-up services.

## **Publications**

Publications are the main method for sharing our work with the scientific community, and all group members are encouraged to prepare their work for publication in peer-reviewed journals. The choice of journal should be primarily determined by the audience rather than by the journal impact factor or ease of review. Another important factor is publication charges and the reputation of the publisher. Open-access journals are encouraged, as are journals run by professional societies (rather than for-profits). CIMES will pay the publication costs, including open access fees. Avoid Elsevier journals (e.g. Ocean Modelling) because of their questionable (predatory) practices. There are many suitable journals for our work; a non-exhaustive list of some commonly used ones (with professional society in []) includes:

- Journal of Physical Oceanography [AMS]
- Journal of Climate [AMS]
- Journal of Fluid Mechanics
- Journal of Geophysical Research-Oceans [AGU]
- Journal of Advances in Modeling Earth Systems [AGU]
- Geophysical Research Letters [AGU]
- AGU Advances [AGU]

Depending on the type of manuscript, other journals may be preferred, and discussion of the most suitable journal for each individual piece of work is encouraged.

For every project, we should ideally discuss who will be co-authors near the beginning of the project. Co-authors should have made contributions to the conception or design of the work and/or the acquisition, analysis, or interpretation of data for the work; and the writing and/or editing of the manuscript; and given approval of the final version before submission. If in doubt whether someone has made a contribution sufficient to be an author, it is best to be generous and offer co-authorship. If someone agrees to be a co-author, then they have a responsibility to follow up by reading and editing the manuscript before submission. If someone has made a contribution (e.g. provided some previously published data) but does not wish to be a co-author, they should be named in the acknowledgments section, and their previous work should be cited. All co-authors should be given adequate time to read drafts (recommended two weeks, extendable if anyone requests due to other commitments).

Once all co-authors have agreed that a manuscript is ready for submission, before submitting for review at a journal, it should undergo internal review by two GFDL-based colleagues, if the work has used any GFDL resources, or been funded by CIMES. Use the form at <https://cobweb.gfdl.noaa.gov/admin/manuscript.pdf>. While this internal review is not required for student or postdoc first authors, it is a very good way to get constructive feedback, and to raise awareness of our work at GFDL. Following internal review, we should submit a one-page summary (see <https://cobweb.gfdl.noaa.gov/~jma/cms/1pager.php>) which will help GFDL



publicize our work if appropriate. Follow other instructions on the manuscript form regarding notification etc.

Students and postdocs are encouraged to be the 1st and corresponding author for publications arising from their primary research projects. As such, they will communicate with the journal editor, and with other co-authors, regarding the reviews and revisions. The adviser and other senior authors will be happy to provide advice and assistance if needed.

When a manuscript is accepted for publication, Anna Valerio ([apval@princeton.edu](mailto:apval@princeton.edu)) should be informed for payment of publication charges. For CIMES-funded work, the final submitted version of the manuscript (i.e. prior to journal type-setting) should be provided to Joanne Curcio ([jcurcio@princeton.edu](mailto:jcurcio@princeton.edu)) for submission to the NOAA repository. When a publication date is imminent, Joanne Curcio should be informed - she may make an announcement, or contact Princeton media services, if the manuscript is deemed newsworthy.

## Conferences

All group members are encouraged to share their research results at national and international meetings. The AOS program will provide funding for at least one conference per year per student, and students should consult the AOS graduate student handbook for details of other funding sources. Postdocs should also expect to attend at least one conference per year, and possibly more, depending on funding availability.

A partial list of relevant conferences includes:

- Ocean Sciences Meeting (every two years, next in February 2022)
- AGU fall meeting (annual)
- AMS annual meeting
- AMS Atmospheric and Oceanic Fluid Dynamics conference (every two years)
- American Physical Society Division of Fluid Dynamics annual meeting
- European Geophysical Union annual meeting
- Ocean Mixing Gordon Research Conference (every 2 years, next in 2024)
- Graduate Climate Conference (annual student-run conference)
- Physical Oceanography Dissertation Symposium (every 2 years, next in October 2022)
- International Symposium on Stratified Flows (every 4-5 years, next in summer 2022?)

Many other workshops and conferences might be suitable venues for your work, and all appropriate requests will be considered.

For most conferences, we will need to submit an abstract. Abstract submission charges will be paid by AOS - contact Anna Valerio for details (before making any payments). Follow the conference abstract guidelines, include all co-authors, and give co-authors a few days to read and provide feedback on the abstract before submission. At the conference, work will usually be presented as either an oral presentation or poster. Both are equally valuable methods of communicating work. Presentation material should be prepared well in advance, and drafts shared with co-authors for review and feedback. For talks practice presentations to your peers

as well as to this group are encouraged. For poster-printing at GFDL contact Cathy Raphael at least one month beforehand to find out (a) requirements for background, size, logos, and (b) timeline for editing and printing.

All conference expenses will be paid by AOS (unless covered by an external grant/award, e.g. a travel award administered by the conference). Before making any arrangements for registration or travel, contact Anna Valerio to find out what expenses are allowed (e.g. maximum per diem, allowable airlines) and how payments can be made using the department credit card, saving out-of-pocket expenses, as well as what information will be needed for any reimbursements.

## Professional development

Group members will be supported in their preparation for future careers, whether those careers are in government or nonprofit research, academia, policy, or commercial sectors. Students and postdocs are encouraged to consider what skills they might wish to develop, in addition to research-focused skills, share these plans with their adviser, and together seek out opportunities for professional development.

[The Princeton Writing Program](#) has several useful courses and seminars for graduate students and postdocs, including: [graduate writing courses in science and engineering](#) (writing proposals and articles).

[The McGraw center for teaching and learning](#) offers several [programs suitable for graduate students and postdocs](#), including [pedagogy workshops](#), and the [teaching transcript](#).

[The Center for Career Development](#) offers events [specifically for graduate students](#), including one-on-one advising and specialized advice. [Resources](#) cover resume/CV writing, cover letters, interviews, etc.

[MyIDP](#) is a free resource for developing your own Individual Development Plan.

The [gradFUTURES](#) program focuses on professional development for Princeton graduate students (lots of seminars and links to resources also useful for postdocs).

[Here's an article from Times Higher Ed](#) that looks at some do's and don'ts of preparing a strong and meaningful diversity statement. Even if you're not preparing to apply for jobs in North America or other places where a diversity statements are *de rigueur*, there is benefit in reading the article to self-reflect.

As a companion piece, here is an [assessment rubric and background information from the University of California](#) outlining what they are looking for from candidates who submit diversity statements.

## Outreach and education

Group members may wish to get involved in outreach and other activities aimed at broadening participation in science, as well as teaching and mentoring activities. These activities are encouraged, but not required. Before taking on any new responsibility, group members should discuss the effort involved with their adviser. Also consider concentrating your efforts on underserved communities, rather than already highly-resourced communities.

Some of the activities group members have been involved in are listed below - additional suggestions are welcome.

[Prison Teaching Initiative at Princeton University](#): For postdocs or senior grad students who can teach all or part of a complete course to incarcerated students in New Jersey.

[The Young Women's Conference in STEM](#): An annual 1-day event for middle school girls, on PU campus - role involves engaging participants in hands-on activities.

[New Jersey Ocean Fun Days](#): Annual event for 2 days at the Jersey Shore - role involves engaging children and families in hands-on activities.

[Boys and Girls Clubs of Mercer County](#): STEM activities include an annual youth STEM conference, with hands-on workshop activities.

[Trenton Area Soup Kitchen \(TASK\)](#): Adult education classes include one-on-one tutoring, computer classes.

Group members can co-advise interns in [CIMES](#) (non-Princeton undergrads), [HMEI](#) (Princeton undergrads only), and [NOAA internship programs](#) (especially Hollings, Lapenta, and EPP/MSI programs). The lead adviser may need to be either a Princeton faculty member or GFDL employee (depending on the intern program).

### **Useful essays on being a research scientist**

[The Conversation on how to receive negative feedback](#)