

2264 PHYS 3102 Special Topics: Federal R&D

Professor Patrick Gallagher

Spring Term 2026

Tuesdays and Thursdays 12:30-1:45pm

103 Allen Hall

Summary:

Who “does” research and development? This seemingly straightforward question can be answered in many ways. Scientists, engineers, and other technical experts directly carry out research, but we could equally well answer the question by characterizing the type of institution that employs them or funds their work. Commercial enterprises, national laboratories, universities, governments, and non-profit organizations each have different objectives for the research and development work that they support. The federal government is both a major funder and institutional employer of researchers and plays an outsized role in shaping research and development activity in the United States.

This course will focus on the role of the U.S. federal government in the support and conduct of research and development. The perspective for the course will be from the viewpoint of the government itself: agency leaders, administration officials, and members of Congress. It will look at the public welfare rationale for this activity and explore the variety of mechanisms and “actors” in this federal research enterprise. Topics to be covered include an examination of the various branches of the federal government – executive, legislative and judicial – and explore their roles in R&D. The U.S. system is decentralized, so the course will focus on the various federal agencies that carryout or support research and development, their missions, leadership, culture, staffing, as well as the legal and operational framework for R&D activities that support their mission. The course will also look at the mechanisms used by the President and Administration, as well as Congress, to fund, steer, coordinate and review the federal R&D portfolio. Finally, the course will look at both historical and contemporary issues that are shaping or constraining federal R&D and explore the various mechanisms by which scientists and engineers engage and participate in this public research enterprise. During the course, you will get to participate in several “mock” exercises that simulate government processes for interacting with the Congress, White House and the public.

Goal:

The primary goal of this course is to better understand federal research and development (R&D) *from the perspective of the federal government:*

- Why does the government “do” R&D?
- Who performs R&D related activities within the government?
- How are R&D programs developed, funded, managed and reviewed for results?
- What are the external “drivers” impacting federal R&D priorities and programs? What changes are these likely to cause?
- Who are the stakeholders for federal R&D?

Learning Objectives:

By the end of this course, you should be able to:

1. Use public sources of information to find and summarize relevant information about aspects of federal R&D, including trends in federal R&D, federal R&D agencies, leaders and programs, the administration, Congress, and various stakeholders that play a key role in developing priorities or providing review or oversight of federal programs.
2. Expand your understanding of federal agencies, their missions, their leadership and management, their approaches to R&D, and to discover how they solicit input, and the processes they use to set priorities and execute federal R&D programs and evaluate their effectiveness.
3. Recognize mechanisms used in government for science agencies to interact with each other, with Congress, with other agencies and the White House, and with the public and other key stakeholders.
4. Evaluate some current issues and trends that are likely to impact the federal R&D enterprise in the future and hypothesize how these changes might lead to new opportunities or limits on federal R&D programs.

Approach:

- You will have a unique opportunity to explore various aspects of the federal R&D enterprise through presentations and discussions with guest speakers who are current or former government officials and by other major stakeholders in the federal R&D enterprise. ***This direct interaction with former government officials is a central feature of this course.***
- The course will use short exercises where you will find and use various sources of publicly available, online information to summarize key information about the federal R&D enterprise. Most of these exercises will be short homework assignments, although some examples may be briefly performed together in class.
- The course will include several “mock” sessions where we will simulate government mechanisms to interact with Congress, with other agencies and with the public. These exercises will use hypothetical scenarios with role playing by students in settings such as congressional hearings, interagency meetings, and interactions with the press.
- Remaining sessions will be devoted to lectures and discussion to present relevant background information and to help the class develop a framework for productively interacting with guest speakers.
- Class sessions will generally be in-person (in 103 Allen Hall) but may occasionally be remote (via Zoom) to accommodate a speaker or to meet any other circumstances where that approach is warranted.

Grading:

The grading philosophy for this course is to support the learning objectives, which are based on gaining experience with the federal R&D system (through speakers, exercises and assignments), and on expanding your understanding of how this system works. You will be the one making this evaluation by combining two approaches:

Specification: your experience achievements

Your participation in class activities (speakers, homework assignments and exercises) determines your baseline letter grade according to meeting specifications associated with those grades. Here is how this works:

Achievements: With the exception of classroom lectures (no speakers), your participation in course activities counts towards your baseline grade. Key course activities include attending sessions with an external speaker, completing a homework assignment, or participating in a class “mock” exercise. Each of these types of activities will have a basic requirement associated with it. This will be described when the activity is assigned. For example, for a session with a guest speaker, the basic requirement is attendance. I will not be grading these activities, except to determine if you “met” or “didn’t meet” those basic requirements (in other words, they are either “complete” or “incomplete”). These are your achievements, and you control them.

Tokens: I realize that everybody has occasional conflict that makes 100% participation impossible. Therefore, each student will receive three achievement tokens at the start of the course. These are “free passes” or excused omissions from your specification grade. For example, you could miss a speaker session and a homework assignment, thereby using up two tokens, without affecting your specification grade. These tokens should allow you sufficient flexibility to achieve your grade goals.

Grading bundles: Your base grade (A, B, C, etc.) is determined by your achievements. The specifications are:

Base grade	Specifications for achievements
A	Full participation for all speakers, exercise participation, and homework assignments (i.e. either completed or a token)
B	Missing 1 speaker, or 1 exercise, or 1 homework assignment
C	Missing 2 speaker sessions, or 2 exercises, or 3 homework assignments.
D	Missing 3 speaker sessions, or 3 exercises, or 4 homework assignments.
F	Anything over the criteria for a D

Learning outcomes: self-assessed

Finally, at the end of the course you will be given an opportunity to reflect on how much you meet your learning goals and, based on your self-assessment, you will propose the modifier for your grade (i.e. up, no change or down a half grade). I will review your self-assessment and justification and either accept your proposal or modify it. Either way, I will tell you your final grade and my rationale if I made any changes to your proposed grade. For example, if your specification grade was an A and you assess your learning growth to exceed your learning goals/expectations, you might propose a final grade of A+.

Attendance: special circumstances

The token system is designed to provide sufficient leeway for you to manage an occasional absence consistent with the grade you want. However, if an unexpected issue arises (e.g. illness, family emergency, research travel, etc.) which might adversely impact your ability to participate in classes, and would potentially impact your grade, please contact me as soon as you know, so we can

explore ways to accommodate your needs and minimize the impact on your grade. I cannot do much to help you after the fact, but if you contact me ahead of time, I am committed to working with you to help you achieve your learning goals.

Participation considerations:

I urge you to fully use your time interacting with guest speakers and in actively participating in the 'mock' exercises. In my view, these are the most unique and interesting (and fun!) parts of the course! I invite you to be prepared, be curious, and to ask questions. Not many scientists have this opportunity, so take advantage of it!

Also, as a courtesy to any guests, please try to leave your video on if the class is being held via Zoom. The classroom should be available for use if you prefer to bring your laptop there for the Zoom session. The obvious exception is if we are remote for weather or other circumstances that make the building or room unavailable.

Communication

With me...

There are several ways for you to communicate with me, depending on your needs. My office is in 217 Allen Hall and I have both unscheduled and by-appointment office hours. These are posted on the course Canvas site calendar, which also includes a mechanism for scheduling an appointment. I welcome in-person visits, but you can also schedule a Zoom office appointment if that is better for you.

You may also send me a message via the Canvas messaging tool. You may also use my direct email (pdg@pitt.edu), but because those messages are mixed with many others, there is some risk of delay and I recommend using the Canvas messaging tool.

With you...

I will be using the Canvas Learning Management system for this course. This system has many features including class announcements, messages (an email like feature), resource and course content pages, and access to web resources, assignments and your grades. My intention is to use this system for all communication outside of the classroom. If for any reason this will cause you problems, please contact me so we can make alternative arrangements.

Classes meeting during University or building closures

As articulated in the [University-wide Closure and Class Cancellation Policy](#), it is the policy of the University of Pittsburgh to remain open, but in rare instances, circumstances beyond the University's control may necessitate a closure of the University or of a particular building. Such circumstances may include severe weather, power outages, water main issues, and the like.

If feasible during a campus or building closure, I intend for our class to meet **remotely** at its regularly scheduled time. On a day with an announced delay or closure for the University or for Allen Hall, please check the course Canvas site for the latest information. I will make every effort to send out a timely class announcement with updates containing additional details.

Academic integrity

Students in this course will be expected to comply with the [University of Pittsburgh's Policy on Academic Integrity](#). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity.

To learn more about Academic Integrity, visit the [Academic Integrity Guide](#) for an overview of the topic. For hands-on practice, complete the [Academic Integrity Modules](#).

Disability Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact me and [Disability Resources and Services](#) (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodation for this course.

Use of generative AI

During this class, you may elect to use Generative AI tools such as ChatGPT. This is permitted, but it is not required. To adhere to scholarly practice, if you directly include any AI generated content into a submitted homework assignment, you should cite the source (a simple in-text citation is fine). You, and not the AI, are responsible for both the final content in the assignment, and for ensuring that it meets the criteria for a “satisfactory” submission. As a friendly caution, I will note that the data used by many available Generative-AI systems use to create content do not use the same online data resources that we will be using, so results may be incomplete or skewed accordingly.

Statement on classroom recording

To ensure the free and open discussion of ideas and to meet any needs by our guest speakers, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Protecting your rights and supporting your wellbeing

The most important element in any learning environment is the student, and nothing supports that learning environment more than ensuring that every student is treated fairly and without bias, harassment, or misconduct and to ensure that they have support they need for their health and wellbeing. In support of that goal, the University has many programs and offices to support you. I am always happy to help you find the resources that meet your needs. I have also compiled links to key resources for the University's Civil Rights and Title IX services and protections as well as many services offered by the University, Dietrich School of Arts and Sciences, and the Department of Physics and Astronomy on our course Canvas site on the student resources page. The Dietrich School of Arts and Sciences (DSAS) Office of Ombuds is a resource whose function is to be your advocate to resolve issues, independent of me or the Department.

Under University of Pittsburgh policy, I am required to report incidents of bias, harassment, discrimination or of sexual assault/misconduct to the appropriate office within the University. This

mandatory reporting policy is for your protection, but it also means that I cannot always maintain the confidentiality of some information that you share with me. If you wish to make a report directly, you may do so through the [Pitt Concern Connection](#). This reporting resource works for making any type of report or complaint or for asking a question and can be done anonymously or by identifying your name to the university, or to a neutral third party. Alternatively, you may also directly contact the appropriate office within the University. Contact information for these resources is provided on the course Canvas student resource page.

If you are dealing with an emergency, please call the Pitt Police at 412-624-2121 or call 911.