

# 2251 PHYS 3101 Special Topics: Federal R&D

Professor Patrick Gallagher

Fall Term 2024

Tuesdays and Thursdays 11:00am-12:15pm

321 Allen Hall

## Summary:

Who “does” research and development? This seemingly straightforward question can be answered in many ways. Scientists, engineers, and other technical experts most 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 carry out 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. We will also examine how various agencies “use” the outputs of their research activities and how they assess the effectiveness and performance of their R&D. 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.

## 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?

## 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 particular feature 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. 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:

- 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.
- 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 experience is a central feature of this course.
- We will also use classes without guest speakers for discussions on federal agencies, programs and processes in a lecture & discussion format. The objective of these class sessions is preparatory: to provide you with background information and context so you are prepared for a future guest speaker and so that the discussions with them are as engaging and informative as possible.
- Class sessions will generally be in-person (in 321 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:

This course will be “minimally graded” – sometimes referred to as “specification graded”, which means that there are no quizzes or exams. Instead, your grade will be based on completing certain assignments on time and by attending and participating in class discussions. This “effort-based” approach to grades supports the learning objectives and is consistent with our approach to the course detailed above.

## Assignments:

During the semester you will be assigned approximately 8-10 homework tasks. A typical assignment will ask you to use public information sources (all web based) to find and then

concisely summarize a specific aspects of the federal R&D enterprise. The assignment you turn in should ideally be one page or less, and not exceed 2 pages in length. Being concise is an objective!

I will only be evaluating assignments to determine whether they are complete or incomplete and whether they were submitted on time, late, or are missing.

Complete means they address the objective of the assignment and demonstrate a good faith effort. They are incomplete otherwise.

- A complete assignment turned in before the posted deadline is “on time”.
- A complete assignment turned in after the posted deadline, but before one week after the posted deadline (the late deadline) is “late”.
- Any assignment that is incomplete or turned in after the late deadline is “missing”.
- You may redo and resubmit an assignment marked incomplete as many times as you wish to earn a complete designation. Resubmitted assignments will still be marked as “late” or “missing” according to the above criteria.

*Class participation and attendance:*

Attending and participating in classroom sessions - especially those with guest speakers - is an essential component of this course. This is why it will be considered in your final grade. This reflects the importance of the opportunity to hear and discuss from experts in the federal R&D enterprise. Participation will be considered as attending for all in-person or remote (depending on the schedule) class sessions.

*Determining your course grade:*

Grades are determined by “specification” based on the above rationale. The grade for the class is given by the row which corresponds to values that you have not exceed for missed or late assignments and sessions. In essence, everyone starts with an A, but less participation in homework or class sessions affects your grade. Therefore, you can manage your own final grade by staying within the limits of the criteria for the final grade you seek.

<b>Grade</b>	<b>Missing assignments</b>	<b>Late assignments</b>	<b>Missed classes with speakers</b>	<b>Missed other class sessions</b>
A	0	1	1	2
A-	1	2	1	3
B+	2	3	2	4
B	3	4	3	5
B-	4	5	4	6
C	5	6	5	7
D	6	7	6	8

F is earned for exceeding any of the values in the D row.

Examples: You would earn an A for turning in all of your assignments, but even if one was marked late and you missed no more than one session involving a speaker or 2 class sessions without a speaker. Similarly, you would earn a B+ if you missed 2 or fewer assignments and 3 or fewer late assignments, but missed 2 sessions with external speakers or missed 4 regular class sessions.

## Attendance: special circumstances

Attending class sessions, especially those with guest speakers is an important element of the course. By its very nature, it is also difficult to “make up” should you miss a class. This is why class sessions are considered in your grade. While I encourage you to attend every class session, I do understand that this is not always possible.

The grading specification above does provide sufficient leeway for you to manage an occasional absence consistent with the grade you want. However, there are two special circumstances where I ask you to contact me so we can work together to minimize any adverse impacts to your desired grade:

### *Religious Observances:*

I am committed to providing equivalent educational opportunities to students of all belief systems. To assist me, at the beginning of the semester, you should review the course requirements and your personal calendar to identify foreseeable conflicts with assignments, exams, or other required attendance and contact me within the first two weeks of the term to allow time for us to discuss and make fair and reasonable adjustments to the schedule and/or tasks.

### *Unexpected, long-term conflicts:*

If an unexpected issue arises which would adversely impact your ability to participate in classes, please contact me as soon as you know, so we can explore ways to accommodate your needs and minimize the impact on your grade.

## Participation considerations:

I urge you to fully use your time interacting with guest speakers. In my view, this is both the most important – and most interesting part of the course! The class sessions without speakers help us prepare for productive speaker sessions, which is why attendance for them are also considered in the final grade. I invite you to prepare, be interested, and ask questions. You’ll get the most out of the class this way.

Also, as a courtesy to any guests, if at all possible, 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](mailto: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, group and individual 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](mailto: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 accommodations 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 out 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) also has an "Ombudsperson" whose function is to be your resource and advocate, independent of me or the Department. The contact information for the Ombudsperson for graduate students in the Dietrich School is provided on the student resource page.

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 any such 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, for example at the [Office of Diversity, Equity and Inclusion](#). Contact information for these resources are 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.**