

Shaklee, Toni

Book Part

Chapter 5.7 Research Administration in the United States

Provided in Cooperation with:

ZBW LIC

Reference: In: The Emerald Handbook of Research Management and Administration Around the World (2023). Emerald Publishing Limited, S. 473 - 481.
<https://doi.org/10.1108/978-1-80382-701-820231040>.
doi:10.1108/978-1-80382-701-820231040.

This Version is available at:

<http://hdl.handle.net/11159/670035>

Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/>

Standard-Nutzungsbedingungen:

Dieses Dokument darf zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden. Sie dürfen dieses Dokument nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen. Sofern für das Dokument eine Open-Content-Lizenz verwendet wurde, so gelten abweichend von diesen Nutzungsbedingungen die in der Lizenz gewährten Nutzungsrechte. Alle auf diesem Vorblatt angegebenen Informationen einschließlich der Rechteinformationen (z.B. Nennung einer Creative Commons Lizenz) wurden automatisch generiert und müssen durch Nutzer:innen vor einer Nachnutzung sorgfältig überprüft werden. Die Lizenzangaben stammen aus Publikationsmetadaten und können Fehler oder Ungenauigkeiten enthalten.

Terms of use:

This document may be saved and copied for your personal and scholarly purposes. You are not to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public. If the document is made available under a Creative Commons Licence you may exercise further usage rights as specified in the licence. All information provided on this publication cover sheet, including copyright details (e.g. indication of a Creative Commons license), was automatically generated and must be carefully reviewed by users prior to reuse. The license information is derived from publication metadata and may contain errors or inaccuracies.





<https://savearchive.zbw.eu/terms-of-use>

Chapter 5.7

Research Administration in the United States

Toni Shaklee

 0000-003-4883-8972, *Oklahoma State University, Oklahoma State University, Stillwater, OK, USA*;  *Conceptualisation, Writing—original draft, Writing—review and editing*

Abstract

The existence and growth of research administration in the United States has been largely guided by the requirements imposed on recipients of federal funding and it continues to be influenced by those requirements today. What has changed over the past 80 years is how research administrators learn their craft and share their knowledge, how the profession has moved from mostly male dominated to being largely female, and how their roles expanded. The formation and growth of professional organisations has allowed research administrators to take an active role in development of regulations and policy and to advocate for the profession. The challenges faced by research administrators since the turn of the century have served to show the vital role played by the profession in moving the research enterprise forward.

Keywords: US; research administration; research management; NCURA; SRAI; NORDP; COGR, FDP; RACC

US Research Ecosystem

Research has been funded by the US federal government since nearly the beginning of the republic. The Smithsonian Institution, the Morrill Act, the National Academy of Sciences, and the Hatch Act of 1887 all funded research as early as 1846.

The Emerald Handbook of Research Management and Administration Around the World, 473–481



Copyright © 2024 by Toni Shaklee. Published by Emerald Publishing Limited. These works are published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of these works (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode> doi:[10.1108/978-1-80382-701-820231040](https://doi.org/10.1108/978-1-80382-701-820231040)

The contemporary version of the government’s involvement in funding research came under President Franklin D. Roosevelt when he created the National Defense Research Council in 1940 (reorganised in 1941 as the Office of Science Research and Development) to coordinate research collaborations between federal and civilian laboratories (Beasley, 2006). Data shown in Table 5.7.1 from the 2020 Higher Education Research and Development Report (HERD) Survey reported research and development (R&D) expenditures from more than 900 institutions of higher education, more than one-half of which is supported by the federal government.

Federal funds have historically been, and are likely to remain, the largest source of R&D funds at most institutions. Table 5.7.2 shows the most recently reported federally funded R&D expenditures at institutions of higher education from 1st October 2019 to 30th September 2020.

Historical data for the type of both total and federally financed R&D expenditures at higher education institutions show that since the early 1970s federal R&D expenditures in higher education accounted for about 70% of the basic research expenditures until about 2010 when basic research expenditures dropped to the mid 60% range, although data collected since 2010 includes both science and engineering and non-science and engineering fields and could account for the apparent drop.

Research policy in the United States is broadly set by the Executive Branch. Several groups are involved in the effort. The Office of Science and Technology Policy (OSTP), established by Congress in 1976, advises the President and others in the

Table 5.7.1. US Higher Education R&D Expenditures by Source of Funds Fiscal Year 2020.

Source of Funds						
All R&D Expenditures	Federal Government	State and Local Governments	Institution Funds	Business	Nonprofit Organisations	All Other Sources
\$86,435,054	\$46,220,254	\$4,605,307	\$21,979,735	\$5,189,184	\$5,758,485	\$2,682,089

Source: US National Science Foundation (2021).
Notes: Dollars in thousands.
Institutional funds include institutionally financed research cost share and unrecovered indirect costs.

Table 5.7.2. US Federally Financed Higher Education R&D Expenditures by Agency Fiscal Year 2020.

Department of Defense	\$7,080,958
Department of Energy	\$2,037,915
Department of Health and Human Services	\$25,397,976
National Aeronautics and Space Administration	\$1,758,375
National Science Foundation	\$5,414,611
US Department of Agriculture	\$1,244,633
All other federal agencies	\$3,209,721

Source: US National Science Foundation (2021).
Note: Dollars in thousands.

Executive Office of the President on science, engineering, and technology aspects of the economy, national, and homeland security, foreign relations and the environment. OSTP leads the effort to develop and implement sound science and technology policy (White House Office of Science and Technology Policy, 2022). The National Science and Technology Council (NSTC) was established by Executive Order (EO) 12881 in 1993 and is a cabinet-level council of advisors to the President. Council membership includes the Vice President, Director of OTSP, the Secretaries of the Departments of Commerce, Defense, Energy, Health and Human Services, State, Interior, the administrators of the National Aeronautics and Space Administration and Environmental Protection Agency, National Security Advisor, the Assistants to the President for Economic Policy and Domestic Policy and others the President may designate (Executive Order 12881, 1993). The President's Council of Advisors on Science and Technology (PCAST), founded in 2001, is the latest version of Franklin Roosevelt's Science Advisory Board established in 1933 (Executive Order 12882, 1993). Since then, Presidents have had advisors from outside the federal government who are charged with making science, technology, and innovation policy recommendations to the President.

Since the beginning, the United States has understood the need for and the value of research. As stewards of taxpayer dollars, the government must ensure public trust in their investment, by continual review of research, evaluation of research policies and sharing outcomes.

Evolution of Profession

Although it is difficult to determine when research administration was born in the United States, as early as 1941 journal articles and presentations began to appear that referred to 'research administration' but it wasn't clear what a research administrator actually was. Bush's bibliography on research administration published in 1954 contains more than 1,100 references and grew from a reading list originally prepared for a graduate course in research administration at The American University (Bush, 1954). The references are grouped in areas that today we would view as traditional research administration tasks (budget and finance, organisation and management, personnel administration, external relations, and 'research in action') but often focussed on the role of laboratory heads as opposed to professional research administrators. A large number of the references refer to 'men' which is not surprising given the time frame of the bibliography but seems in stark contrast to the current demographic of research administrators, which is predominantly female (Oliveira et al., 2023, Chapter 2.2; Shambrook & Roberts, 2011). It is also notable there are few references concerned with compliance issues such as radiation safety, protection of humans or animals in research.

An interesting, although not a quantitative measure of the shift in the profession from largely male to female was when the first National Council of Research Administrators (NCURA) annual meeting program not made to fit into a man's suit jacket pocket made its appearance in 1987.

There have been efforts made to professionalise research administration for a number of years and while there hasn't been a seismic shift that has occurred, it is clear that each has been an important step. The certification program of the Research Administrators Certification Council (RACC, 2022a) beginning in the 1990s is an important marker in the path towards professionalisation (RACC, 2022b). This trusted third-party credentialing program sends a signal to those outside the profession of an individual's proficiency in research administration and is increasingly seen as either a required or preferred qualification in position descriptions (Cole, 2013; Roberts & House, 2006).

Research administration has been a profession that most entered with training in some other field such as accounting, business administration, management, procurement, law, or even as trained researchers. Individuals in the field were often mentored and trained by senior research administrators in their own institutions. In the United States, research administrators could also receive instruction from others in the field at annual meetings of the large research administrators' associations or at specialised workshops and seminars presented by those organisations.

In 2007, NCURA's Board of Directors, under President Pam Whitlock, approved a major move towards professionalisation. A working group was formed to develop a Request for Proposals (RFP) for feasibility studies in the development of an online master's degree in research administration. The RFP went out to NCURA's membership and NCURA granted four \$10K grants. Later, NCURA provided two \$40K grants; one to the University of Central Florida and the other to Rush University Medical Center for the development and implementation of online programs. In addition to those institutions funded by NCURA, other institutions including Emmanuel College, Johns Hopkins University, and City University of New York (CUNY) have developed and now provide online degree programs ([Roberts et al., 2016](#)). These programs have not only regular faculty members from the institutions, but often also include professional research administrators as members of their teaching faculty as well.

Early research administrators were focussed primarily in the business/accounting realm, taking funds into the institution, tracking expenses, invoicing funders for reimbursement of allowable expenses and completing accounting closeout procedures at the end of projects. Today's research administrator, while still responsible for sound financial stewardship, is also driven by increasing federal regulation and a greater need for transparency. The representations and certifications that are routine parts of proposals and that become part of the award requirements range from export controls, trafficking in persons, environmental protections, civil rights, affirmative action, delinquent tax liability, disclosure of lobbying activity, responsible and ethical conduct of research, and dual use research of concern, are all likely to fall to research administrators to assure the signing official that the institution is in compliance.

Current Community

Integral to the growth of a profession are the professional organisations that are formed to support individuals working in the field. These organisations provide a community for individuals to share best practices, participate in group problem-solving and to advocate for research administration.

In the United States, two large organisations, NCURA and the Society of Research Administrators International (SRAI), are the 'Big Tent' organisations for research administrators. These two organisations have been active for decades (NCURA was initiated in 1958 and had its first annual meeting in 1959, SRAI since 1967) ([Roberts et al., 2008](#); Society of Research Administrators International, 2022) and have grown in scope to accommodate the changing landscape of research administration. NCURA's membership is at about 7,000 worldwide, SRAI's membership is currently about 4,000 worldwide. Both organisations hold annual, national meetings as well as presenting seminars and specialised conferences throughout the year. Each also has an active web presence and produces journals and other publications for their members.

In addition, there are a number of smaller, more specialised organisations. Among these organisations are the Council on Governmental Relations (COGR) formed in 1948 ([Council on Governmental Relations, 2022](#)), AUTM (first known as the Society

for University Patent Administrators [SUPA] and formerly known as the Association of University Technology Managers) formed in 1974, the National Grant Management Association (NGMA) formed in 1978, the Federal Demonstration Partnership (FDP) formed in 1986 ([Federal Demonstration Partnership, 2022](#)), and the National Organization of Research Development Professionals (NORDP) founded in 2010 ([National Organization of Research Development Professionals, 2022](#)).

A third type of organisation that is important in the research administration community, but fits into neither the ‘Big Tent’ nor the specialised professional groups is RACC. Founded in 1983, RACC awards certifications (Certified Research Administrator [CRA], Certified Pre-Award Research Administrator [CPRA], and Certified Financial Research Administrator [CFRA]) to individuals who sit for and pass certification examinations. Currently, more than 3,000 individuals engaged in research administration hold at least one of RACC’s certifications ([RACC, 2022b](#)).

Demographics

Prior to its second annual meeting in 1968, SRA charged a research committee with the task of establishing a set of professional standards for research administrators. As the committee began its work it was clear there was no data to support what a research administrator even was and so the committee developed and administered a survey with the goal of establishing what constituted a ‘typical’ research administrator ([Vanderford et al., 2019](#)). The results of the committee’s work, published in the first volume of the *Journal of the Society of Research Administrators* (now the *Journal of Research Administration*), determined that the typical research administrator at the time was a male in his early 40s with post-graduate training in business administration, working in an academic setting. His responsibilities included dealing with activities such as budgeting, accounting, salary administration, financial report writing, internal property management, purchasing, maintenance and construction, and employee relations. He administered a budget of less than \$1,000,000 in a unit of less than 50 people ([D’Agostino et al., 1969](#); [Vanderford et al., 2019](#)).

More than 50 years later we are still unable to accurately describe the typical research administrator. The US Department of Labor (DOL) does not currently track the number of jobs which would fall into the category nor are we able to accurately report on the demographics of those working in the field. Work started in 2022 that will enable DOL to have a job category for research administration and to track those jobs in the United States.

Little demographic data exists about research administrators prior to 2006 when a regional study was conducted using members of NCURA’s Region III as study participants ([Roberts & House, 2006](#)). Studies conducted after that have expanded to provide better national data. These later studies have used multiple sources of study participants including NCURA members and subscribers to the RESADM-L listserv. Studies conducted over the past 15 years have provided a fairly consistent picture of a ‘typical’ research administrator, regardless of the affiliation of study participants. Studies continue to report that the profession is largely female, holding university degrees, with an annual income of more than \$50,000 ([Shambrook et al., 2011](#); [Shambrook & Roberts, 2011](#)). The majority of the workforce is Caucasian, more than 40 years of age, have been with their current employer for more than four years (a perhaps surprising 36% reported being with their current employer for more than 10 years) and most report working more than 40 hours per week ([Shambrook et al., 2011](#); [Welch & Brantmeier, 2021](#)). Race and ethnicity questions have not always been part of the surveys so those demographics are the least well characterised.

US generational data presents in a normal curve, with the bulk of membership falling into the Generation X category. As members of the Baby Boomer generation move towards retirement age, it is likely we will see both the Generation X and Millennial/Generation Y categories grow (Smith & Shambrook, 2015). The most current study conducted by Oliveira et al. (2023, Chapter 2.2) shows that the demographic trends reported over the past nearly 20 years are continuing.

Directions/Future

Although the field of research administration in the United States has evolved at a fairly steady pace, there have been some significant events in the 21st century that have impacted the field and that are likely to continue to shape the profession as it moves forward (Minnema, 2011). The profession was born at a time that substantial federal funding was made available in the 1940s. This early funding was largely from the Department of Defense (DOD) and directed primarily towards the war effort. While DOD continues to remain as the largest federal funder of R&D, other federal funders including the National Institutes of Health (NIH) and the National Science Foundation (NSF) are among the most significant sources of R&D funds for institutions of higher education. NSF, for example, reports that it funds about 25% of all federally supported basic research conducted at US colleges and universities (National Science Foundation, 2022a).

Although there had been growth in federal funding throughout the 20th century it was generally at a steady pace, with occasional larger increases at one agency or another. However, significant federal dollars became rapidly available in the aftermath of terrorist attacks on the United States in 2001. At the same time, there was a significant change in homeland security accompanied by a more proactive approach (and accompanying federal regulations) to safeguard research information largely through increased emphasis on export controls, publication restrictions and limits on hiring foreign nationals as graduate students and postdoctoral scholars (Minnema, 2011). Each required additional scrutiny and oversight by awardee institutions, often through research administration offices working in close collaboration with a variety of campus offices including human resources and purchasing. Research administrators either became responsible for or were required to not only understand the applicable regulations but to have a better understanding of research projects far beyond what was required in the past. It was not unusual for research administrators to take full or partial responsibility for an institution's compliance with a variety of export control regulations, a series of regulations which in general universities had previously believed did not apply to their research. Secure research operations, usually involving classified projects, became less unusual at institutions and required a new mindset and compliance with another complicated set of regulations by institutions, researchers, and research administrators.

The recession of 2007–2009 also saw a rapid influx of federal funding via the American Recovery and Reinvestment Act of 2009. The act made nearly \$14 billion available through NSF and NIH alone, but also placed a heavy burden on awardees with greater levels of accountability and transparency. Reporting requirements were significantly increased and deadlines for reporting were shortened. The reporting required greater coordination within institutions as information was required from all levels of institutions from departmental to central accounting offices. These dollars became available in a number of different ways, often with very short deadlines for application, that required research administrators to be aware of how agencies were making their

funding decisions (new proposals, via previously submitted but not yet funded proposals, or supplements to existing awards) and to get that information to investigators.

A series of executive orders and Presidential memorandums that were issued by the Obama White House starting in 2009 set the stage for federal grants management reform and led to the eventual release of 2 CFR Part 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards in 2014. Known as Uniform Guidance, these regulations represented the first substantial review and coordinated revision of a series of Office of Management and Budget (OMB) circulars which governed federal assistance awards made to institutions of higher education, hospitals, other non-profit organisations and to state and local governments and Indian Tribal governments. EO13563 ordered a retrospective analysis of significant rules and coordination across agencies to simplify and reduce redundant, inconsistent or overlapping requirements to reduce costs. A working group made up of representatives from Executive Branch agencies, the Council of Financial Assistance Reform (COFAR) was established to conduct the review and analysis. Research administrators from around the nation played a significant role in the multi-year effort that produced 2 CFR Part 200. As guidance was developed to implement the new regulations, both individual research administrators and their professional organisations continued to play a major role in those efforts.

A fourth significant event was the Coronavirus (COVID-19) pandemic. In March 2020, colleges and universities around the United States began to shut down on-campus activities and a large majority of research administrators began to work from home (WFH).

Although most institutions had catastrophe plans formulated and ready to implement, they were usually for one-time, more localised events (i.e. fires, tornadoes, hurricanes, floods, earthquakes, explosions). The plans had not envisioned a fast-moving global pandemic that would necessitate the move to a virtual work environment practically overnight. Research administrators used the informal relationships they had forged over the years to work through the myriad issues that arose. The notion of sharing practices, brainstorming long-term solutions (or quick, temporary fixes) to problems common across the field was one that was longstanding and trusted within the research administration community. These informal personal networks quickly became an important lifeline for many research administration professionals. The formalised interactions facilitated by professional organisations became even more vital to the profession at large and allowed the community to speak with a unified voice when interacting with funders. Not only did research administrators help develop plans to shut down research operations but they were also instrumental in devising plans necessary to restart when institutions began to transition back to more normal operations.

A study conducted by an NCURA Task Force in late July 2021, surveyed current NCURA members about remote working ([National Council of University Research Administrators, 2021](#)). Responses were collected from 1,618 members. Prior to the shutdown, no one reported working 100% remotely from their local area and a very small percentage reported working remotely from another location. After the shutdown, less than 25% at any staff level would report working 100% remotely from the local area and an even smaller number to working remotely from anywhere. About one-half indicated they would be willing to change jobs or employers for greater flexibility and more than 82% believe telework will positively impact their organisation.

Comments gathered from the initial survey indicated that not all respondents believed remote working was better or even that employees preferred it, but many did

indicate a preference to being able to continue to work at least part of their schedule remotely. It was often the refusal of organisations to even consider the option to allow for remote work that respondents found most disappointing. Some indicated that they had been told institutions (and in some cases states) were beginning to work on policies and procedures that would allow for remote work, but no firm schedules for the policy development had been published. The decision to allow remote work for research administrators is likely to be a hot topic as policies are discussed, developed, and implemented.

Crises such as the global pandemic shine a light on the importance of research. Those who spend their professional lives supporting it – whether in a sponsored programs office or at a remote location – can be proud of all they did and continue to do to ensure research continues without disruption. These 21st century events highlight the changing nature of research administration and point to the need for research administrators to be well-informed and able to make changes necessitated by changing circumstances, regulations, and public expectation.

Summary

As seen in this chapter, research administration in the United States started as an additional responsibility taken on by one or more members of a laboratory group. Since that time, research administrators have become vital and necessary members of university professional staff and have taken on roles that range from generalist to specialist in areas including regulatory compliance, HR, and contracting. Research administration is a critical and evolving component of the research enterprise.

Acknowledgements

The author would like to acknowledge the information and assistance provided by the NCURA office, in particular NCURA Executive Director Kathleen Larmett and Emily Ainsworth, Director of Regional and Membership Services.

References

- Beasley, K. L. (2006). The history of research administration. In E. C. Kulakowski & L. U. Chronister (Eds.), *Research administration and management* (1st ed., pp. 9–29). Jones & Bartlett Learning.
- Bush, G. P. (1954). *Bibliography on research administration annotated*. The University Press of Washington DC.
- Cole, K. W. (2013). University faculty value the CRA – They just don't realize it yet! *Research Management Review*, 19(2), 1–9.
- Council on Governmental Relations. (2022). *History*. <https://www.cogr.edu>
- D'Agostino, R., Lasker, L., Nivin, D. T., Proctor, R., & Stevenson, B. L. (1969). Profile of a research administrator: Report of the Research Committee to the Second National Meeting of the Society of Research Administrators. *Journal of the Society of Research Administrators*, 1(1), 3–22. <https://www.srainternational.org/resources/journal/journal-archives>
- Executive Order 12881. *Establishment of the National Science and Technology Council*. 58 FR 62491.
- Executive Order 12882. *President's Committee on Science and Technology*. 58 FR 62493.
- Federal Demonstration Partnership. (2022). *History*. <http://www.thefdp.org/default/about/history>
- Minnema, L. (2011). From 9/11 to recession: Historically significant events in America and their impact on research administration. *Research Management Review*, 18(1), 31–41.

- National Council of University Research Administrators. (2021). *Research administration remote work survey*. <https://www.ncura.edu/MembershipVolunteering/RemoteWorkSurvey.aspx>
- National Organization of Research Development Professionals. (2022). *NORDP home*. <https://www.nordp.org>
- National Science Foundation. (2021). *Higher education research and development: Fiscal year 2020: Data tables: 3 higher education R&D expenditures, by source of funds, R&D field, and survey population: FY 2020*. <https://nces.nsf.gov/pubs/nsf22311>
- National Science Foundation (NSF). (2022a). *About*. <http://www.nsf.gov/about>
- Oliveira, C. I., Fischer, M., Kerridge, S., & Dutta, M. (2023). The research administration as a profession (RAAAP) survey. In S. Kerridge, S. Poli, & M. Yang-Yoshihara (Eds.), *The Emerald handbook of research management and administration around the world* (pp. 113–123). Emerald Publishing.
- Research Administrators Certification Council (RACC). (2022a). *Introduction*. <https://cra-cert.org/introduction>
- Research Administrators Certification Council (RACC). (2022b). *Research administrator directory*. <https://cra-cert.org/find-a-certificant>
- Roberts, T. J., Compo, D., & Shambrook, J. (2016, January). Starting small and growing: The profession of research administration and graduate higher education opportunities. *NCURA Magazine*, 48(1), 20–22.
- Roberts, T. J., & House, J. (2006). Profile of a research administrator. *Research Management Review*, 15(1), 41–47.
- Roberts, T. J., Sanders, G., & Sharp, W. (2008). *NCURA: The second twenty-five years*. National Council of University Research Administrators. http://www.ncura.edu/Portals/0/Docs/AboutUs/NCURA_history.pdf?ver=OGJ5MxlQHbD2jl-PF0fUw%3d%3d×tamp=163302586786
- Shambrook, J., & Mintzer, O. (2007). Results from the 2007 Research Administrator Stress Perception Survey (RASPerS). *Research Management Review*, 15(2), 41–52.
- Shambrook, J., & Roberts, T. J. (2011). 2010 Profile of a research administrator. *Research Management Review*, 18(1), 19–30.
- Shambrook, J., Roberts, T. J., & Triscari, R. (2011). Research administrator salary: Association with education, experience, credentials and gender. *Journal of Research Administration*, 42(2), 87–99.
- Smith, J. A., & Shambrook, J. (2015, December). Future trends: The growing diversity of research administration observed in a Master of Research program. *NCURA Magazine*, 47(6), 42–43.
- Society of Research Administrators International. (2022). *Who we are*. <http://www.srainternational.org>
- Vanderford, N. L., Taylor, J., & Zink, H. L. (2019). From the editor's desk. *Journal of Research Administration*, 50(Special Edition). <https://www.srainternational.org/resources/journal/journal-archives>
- Welch, L., & Brantmeier, N. K. (2021). Examining employee retention and motivation trends in research administration. *The Journal of Research Administration*, 52(2), 70–86.
- White House Office of Science and Technology Policy. (2022). *OSTP*. <https://www.whitehouse.gov/OSTP>
- White House President's Council of Advisors on Science and Technology. (2022). *PCAST*. <https://www.whitehouse.gov/PCAST>