



Re-envisioning NIH-Supported Postdoctoral Training (ACD Postdoc WG)

Shelley Berger, PhD & Tara Schwetz, PhD
NIH Advisory Committee to the Director Meeting

December 8, 2022




The Seductive Promise

Postdocs – “worker bees” of academia that would one day be rewarded for their toils with hives of their own

(Paula Stephan, Economist, Georgia State University)

Decline in Postdocs – Not new, but growing challenge...

PNAS April 2014  CrossMark
click for updates

Rescuing US biomedical research from its systemic flaws

Bruce Alberts^a, Marc W. Kirschner^b, Shirley Tilghman^{c,1}, and Harold Varmus^d

^aDepartment of Biophysics and Biochemistry, University of California, San Francisco, CA 94158; ^bDepartment of Systems Biology, Harvard Medical School, Boston, MA 02115; ^cDepartment of Molecular Biology, Princeton University, Princeton, NJ 08540; and ^dNational Cancer Institute, Bethesda, MD 20892

Edited by Inder M. Verma, The Salk Institute for Biological Studies, La Jolla, CA, and approved March 18, 2014 (received for review March 7, 2014)

Science CAREERS

As professors struggle to recruit postdocs, calls for structural change in academia intensify

June 2022

13 JUN 2022 • BY KATIE LANGIN



Science CAREERS

The case of the disappearing postdocs

December 2015

9 DEC 2015 • BY BERYL LIEFF BENDERLY

SCIEN

ScienceAdvances June 2022

The dire need for federal support of molecular research, then and now

Ali Shifatifard

CAREER NEWS | 30 August 2022 **nature**
International weekly journal of science

Lab leaders wrestle with paucity of postdocs

Even high-profile scientists are struggling to recruit qualified postdoctoral researchers.

August 2022

Chris Woolston

CAREERS AND RECRUITMENT

nature biotechnology January 2017

The impact of postdoctoral training on early careers in biomedicine

Shulamit Kahn & Donna K Ginther

Contents lists available at ScienceDirect

 **ELSEVIER**

Journal of Economic Behavior and Organization

journal homepage: www.elsevier.com/locate/jebo

Chasing the academic dream: Biased beliefs and scientific labor markets[☆]

Ina Ganguli^a, Patrick Gaulé^{b,*}, Danijela Vuletić Čugalj^c

October 2022

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^cCERGE-EI, a joint workplace of Charles University and the Economics Institute of the Czech Academy of Science, Czech Republic

SPECIAL REPORT **STAT**

‘The tipping point is coming’: Unprecedented exodus of young life scientists is shaking up academia

By Jonathan Wosen

Nov 2022

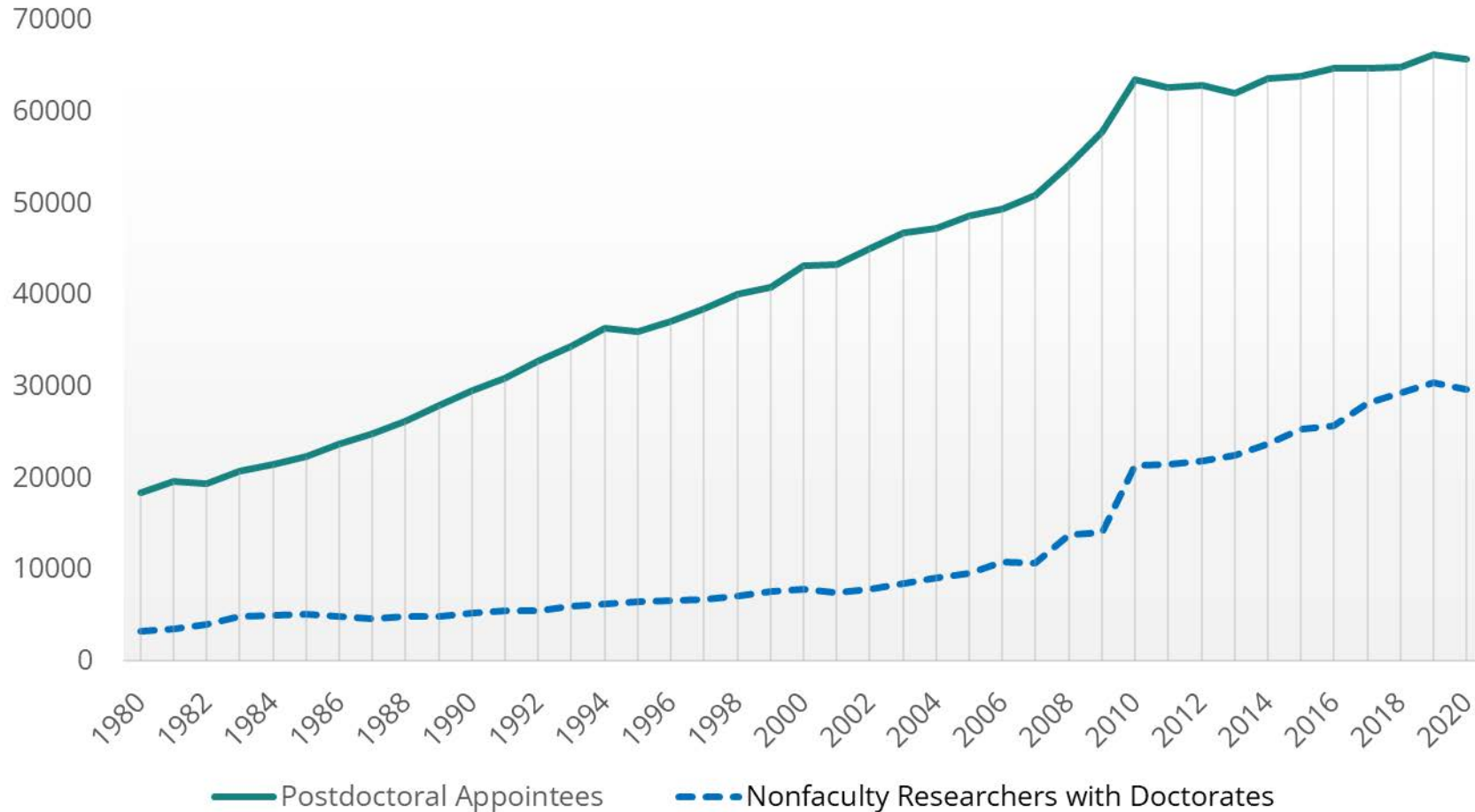
Initial Data Show Multiple Forces Driving Postdoc Decline

- Lower postdoc numbers overall
- Lower international grad students and postdocs
- Fewer F32 applications and awards
- NIH postdoc stipend has increased, but not pacing industry
- Grad students planning academic postdocs continues downward trend
- Grad students and postdocs report downward trend in quality of life, worse for international trainees
- Anecdotal discussions suggest trends worsening since 2020

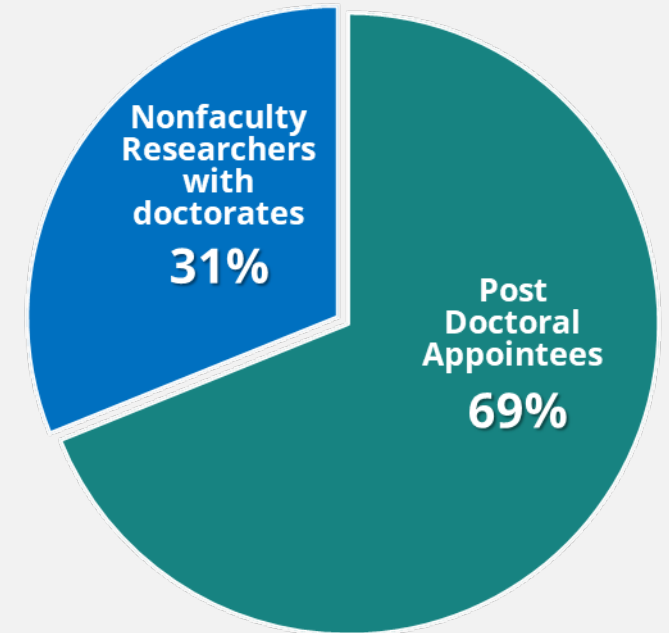


Postdocs numbers have steadily increased since 1980, but stayed relatively flat for the last decade

NSF Statistics: U.S. Researchers by Position Over Time



Researchers by Position in 2020

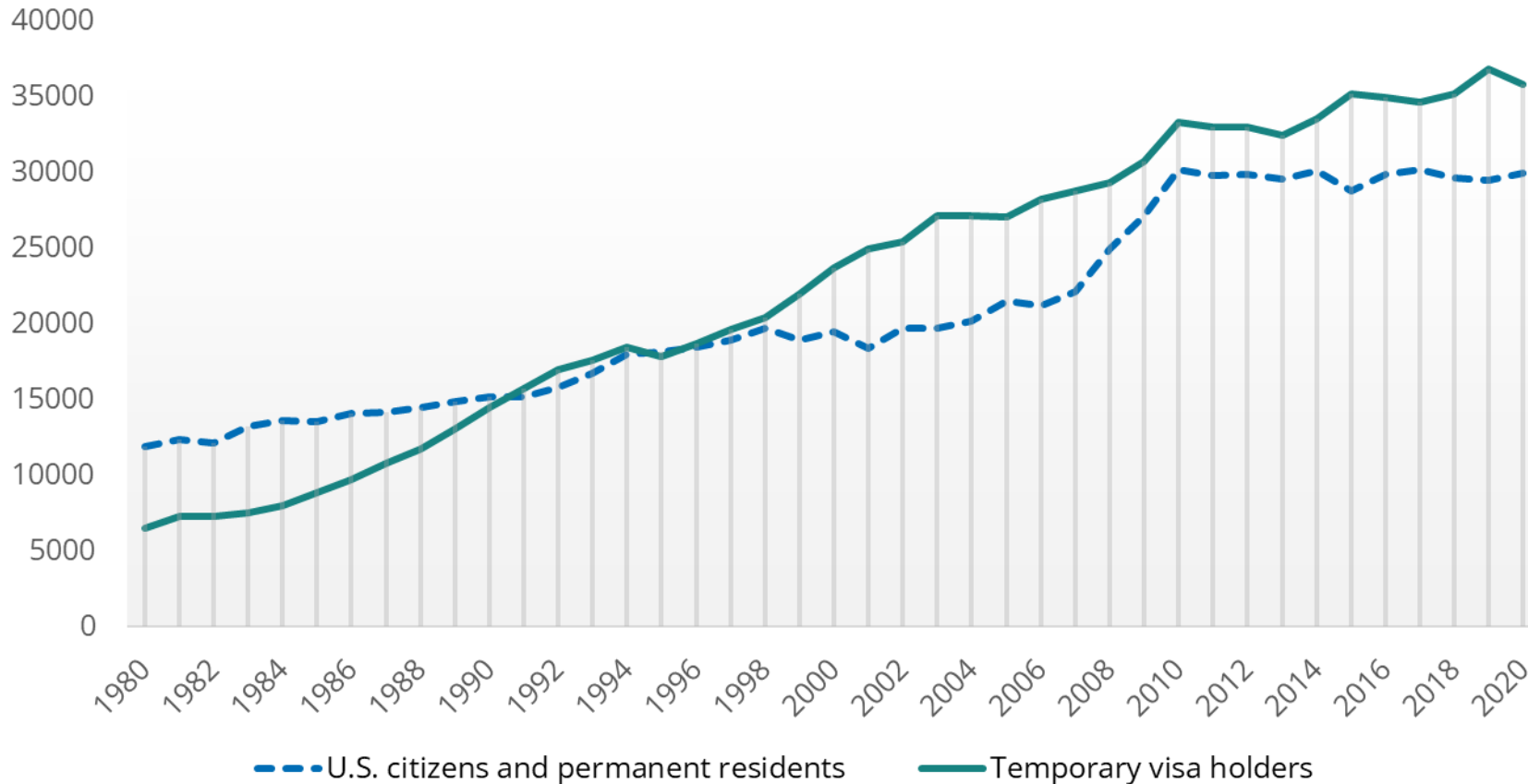




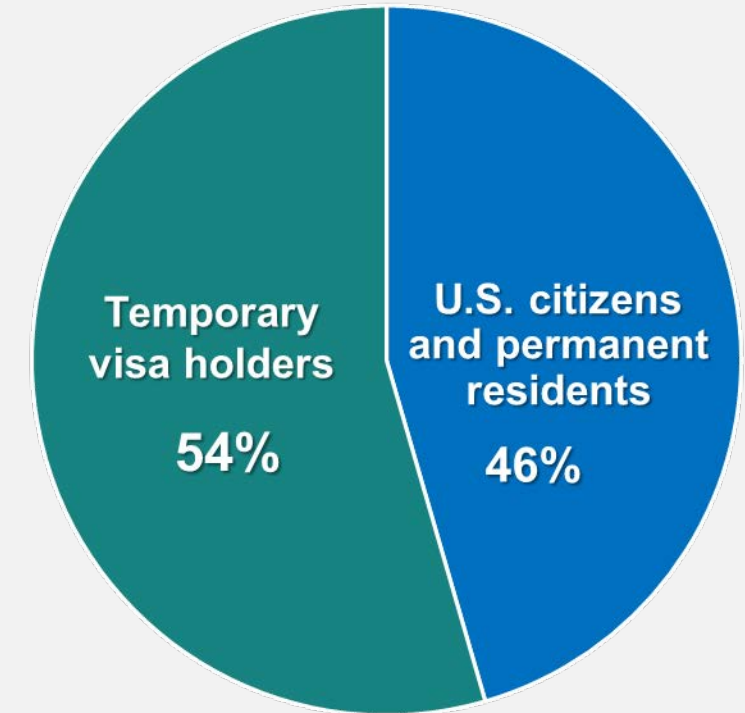
Postdoctoral Appointments by Citizenship

More than half of all postdocs are temporary visa holders

NSF Statistics: Citizenship of U.S. Postdoctoral Appointees



Citizenship of Postdoctoral Appointees in 2020



Slowing Growth in Postdocs by Citizenship

The FASEB Journal • Life Sciences Forum

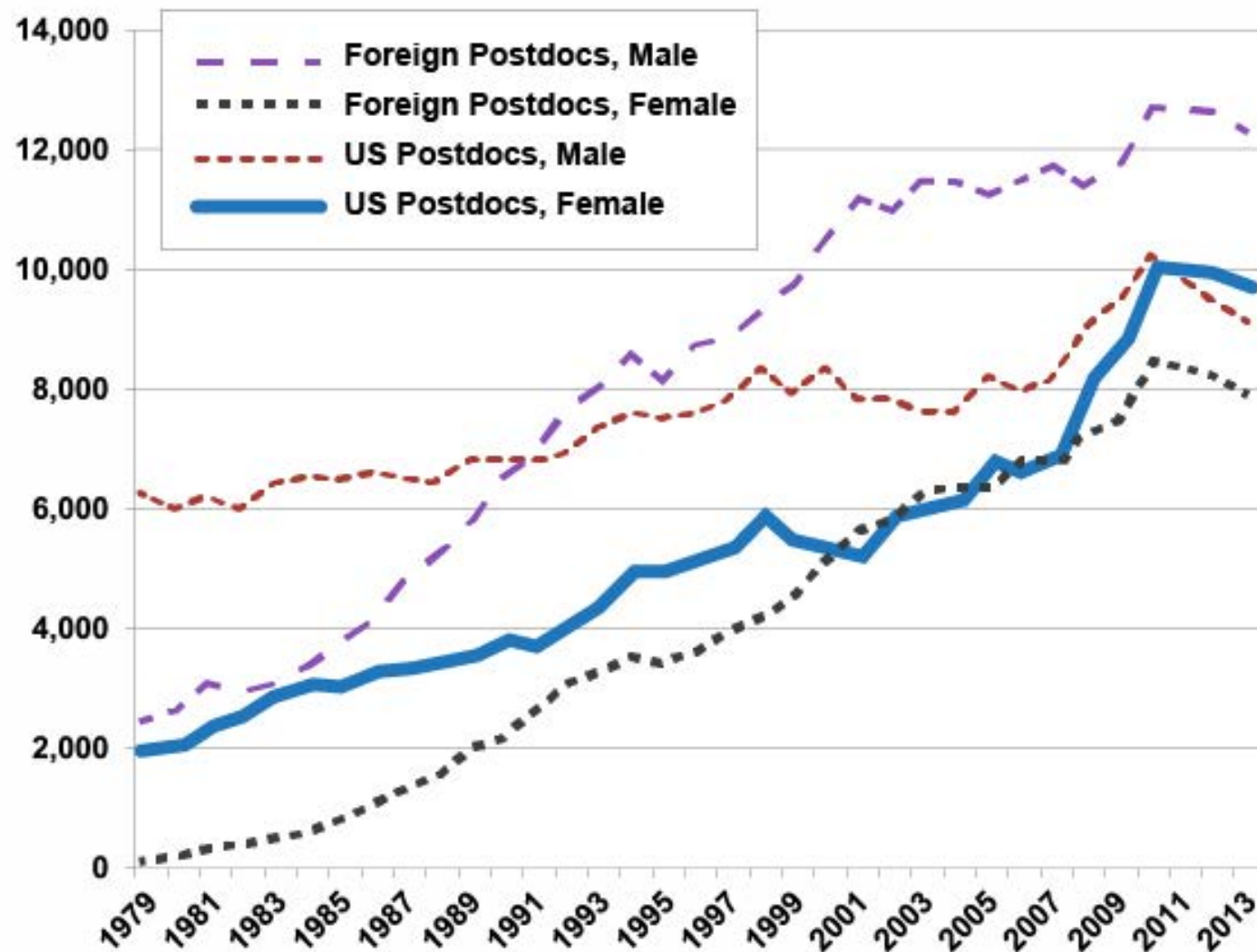
Biomedical science postdocs: an end to the era of expansion

Howard H. Garrison,^{*,1} Louis B. Justement,[†] and Susan A. Gerbi[‡]

^{*}Office of Public Affairs, Federation of American Societies for Experimental Biology, Bethesda, Maryland, USA; [†]Department of Microbiology, University of Alabama, Birmingham, Birmingham, Alabama, USA; and [‡]Department of Molecular Biology, Cell Biology and Biochemistry, Brown University, Providence, Rhode Island, USA

“After >3 decades of steady growth, the number of biological and medical science post-doctorates at doctoral degree-granting institutions recently began to decline.”

FASEBJ., 30, 41–44 (2016)

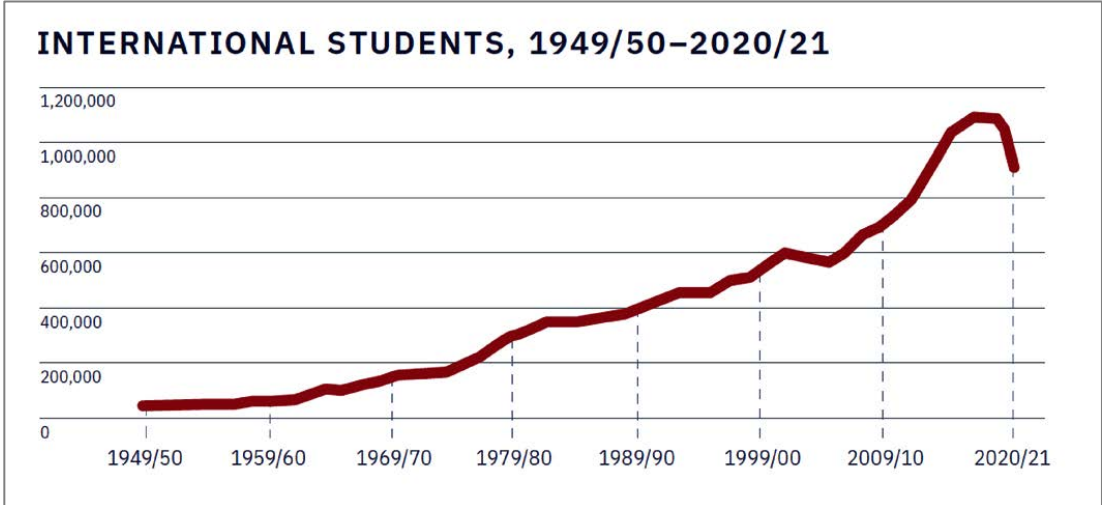
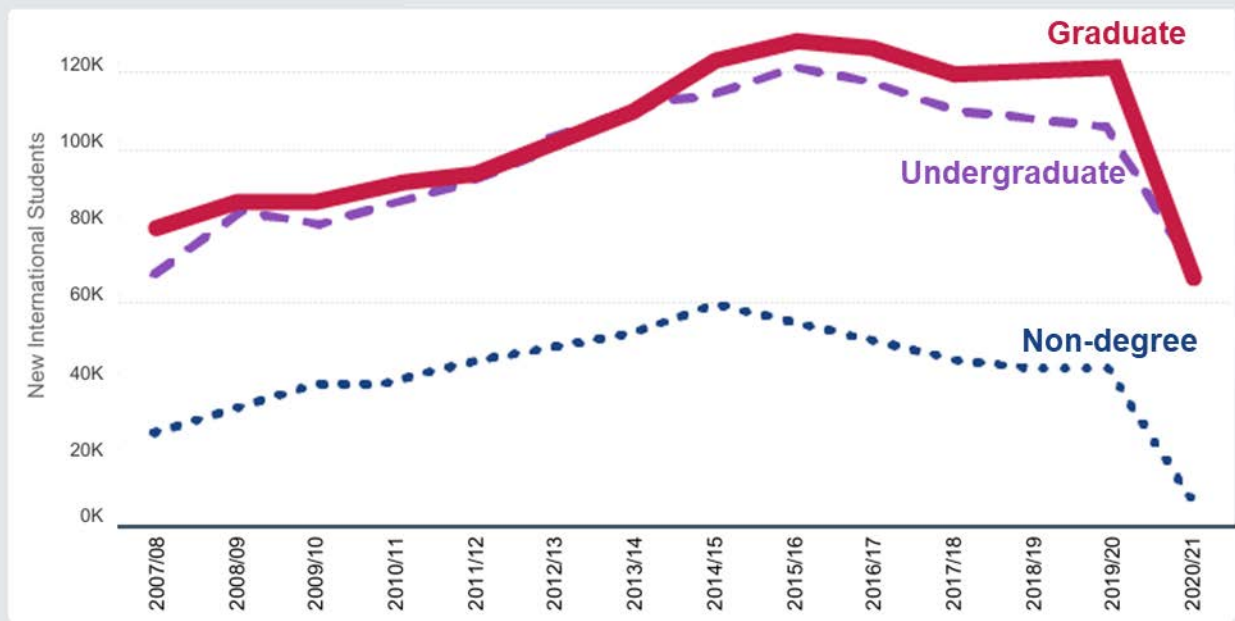


Declining International Student Graduate Enrollment in the U.S.

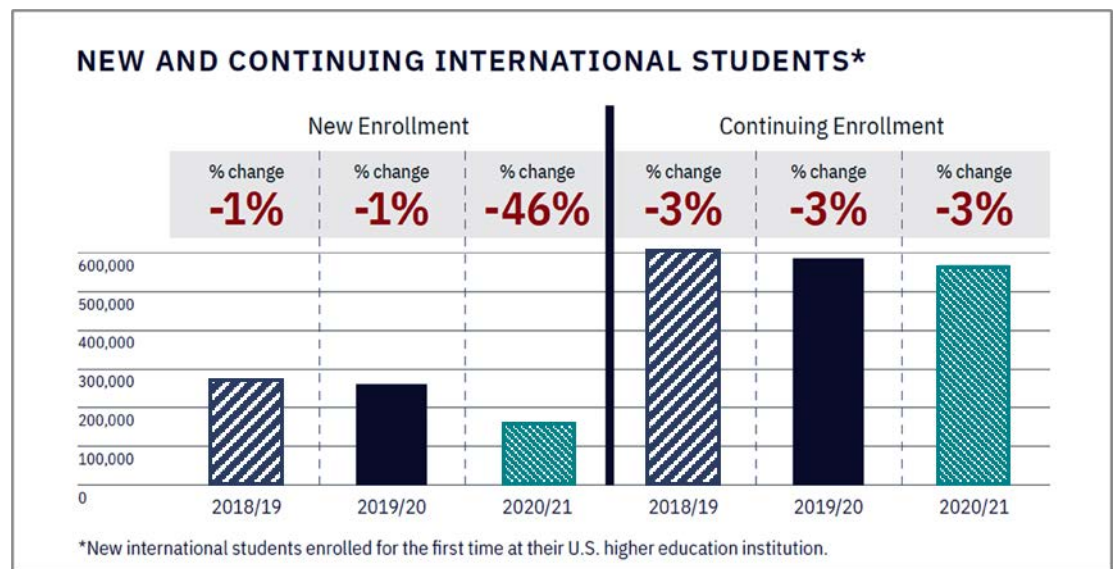


New International Student Enrollment

INTERNATIONAL STUDENT DATA
FROM THE 2021 OPEN DOORS® REPORT



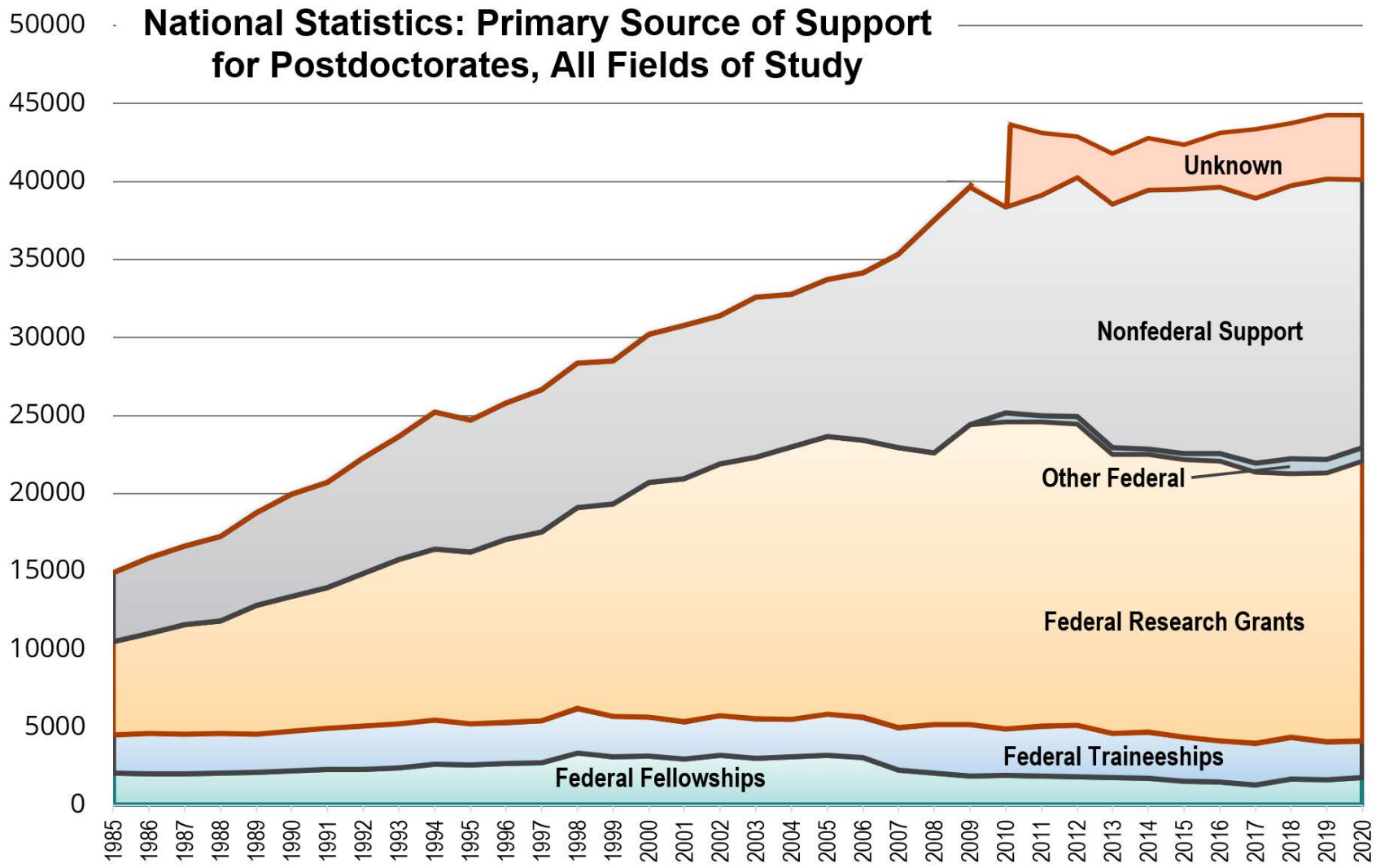
In 2020/21, the total number of international students **declined by 15%** from the prior academic year. This decrease was primarily due to the effects of the COVID-19 pandemic



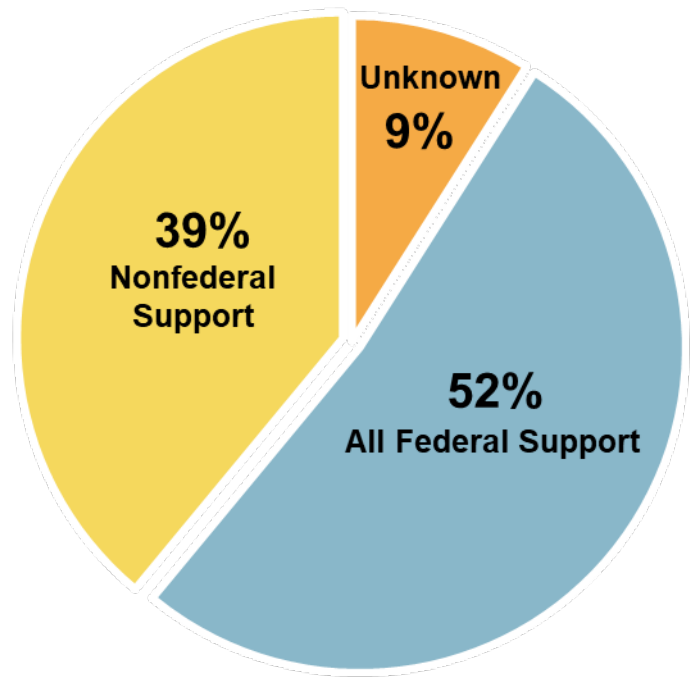
145,528 international students studied at their U.S. university for the first time in 2020/21

Postdoctoral Appointee Primary Source of Support

Over half of all postdocs are federally supported



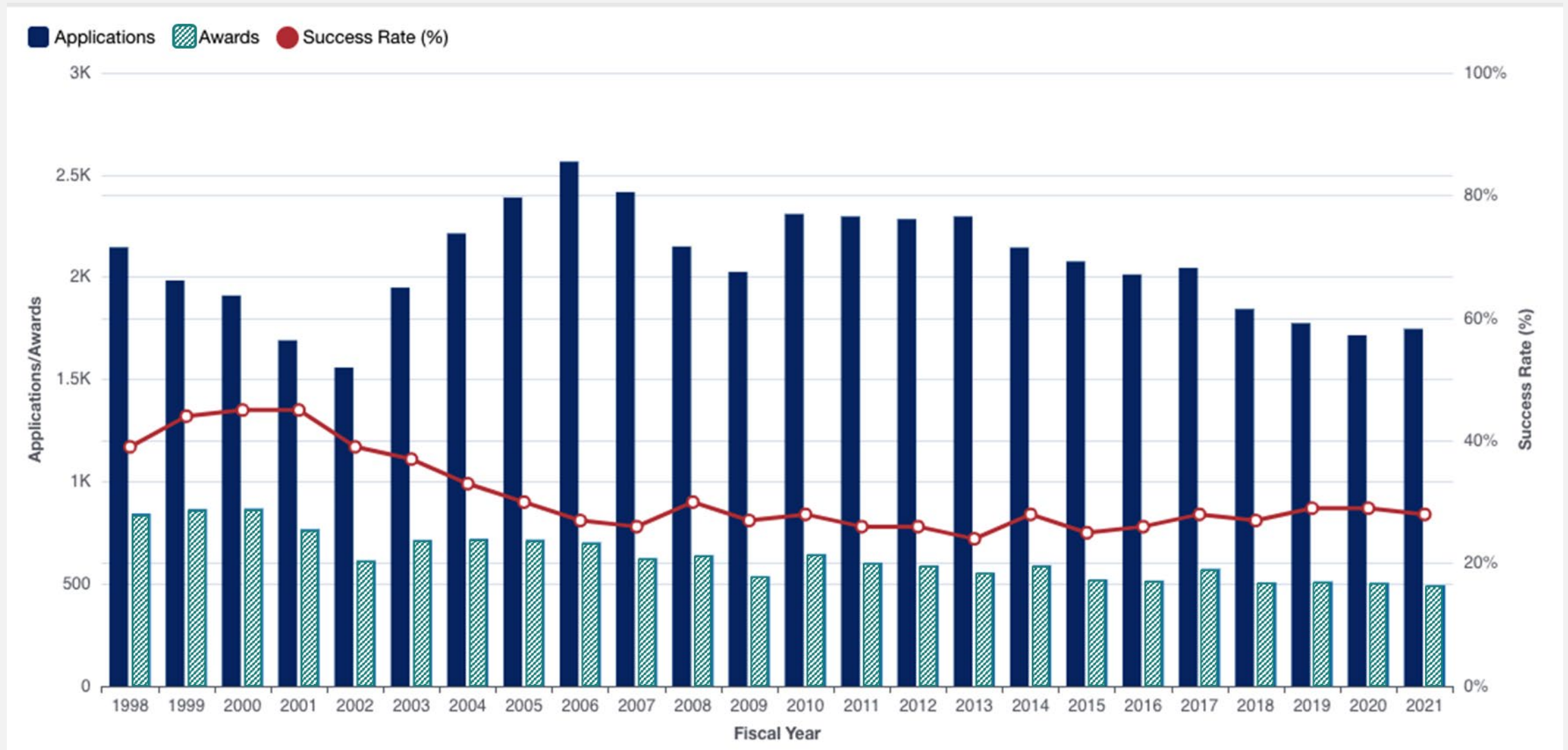
Primary Source of Support for Postdoctorates in 2020



Source: <https://report.nih.gov/nihdatabook/report/263>

NIH NRSA F32 Applications, Awards, and Success Rates

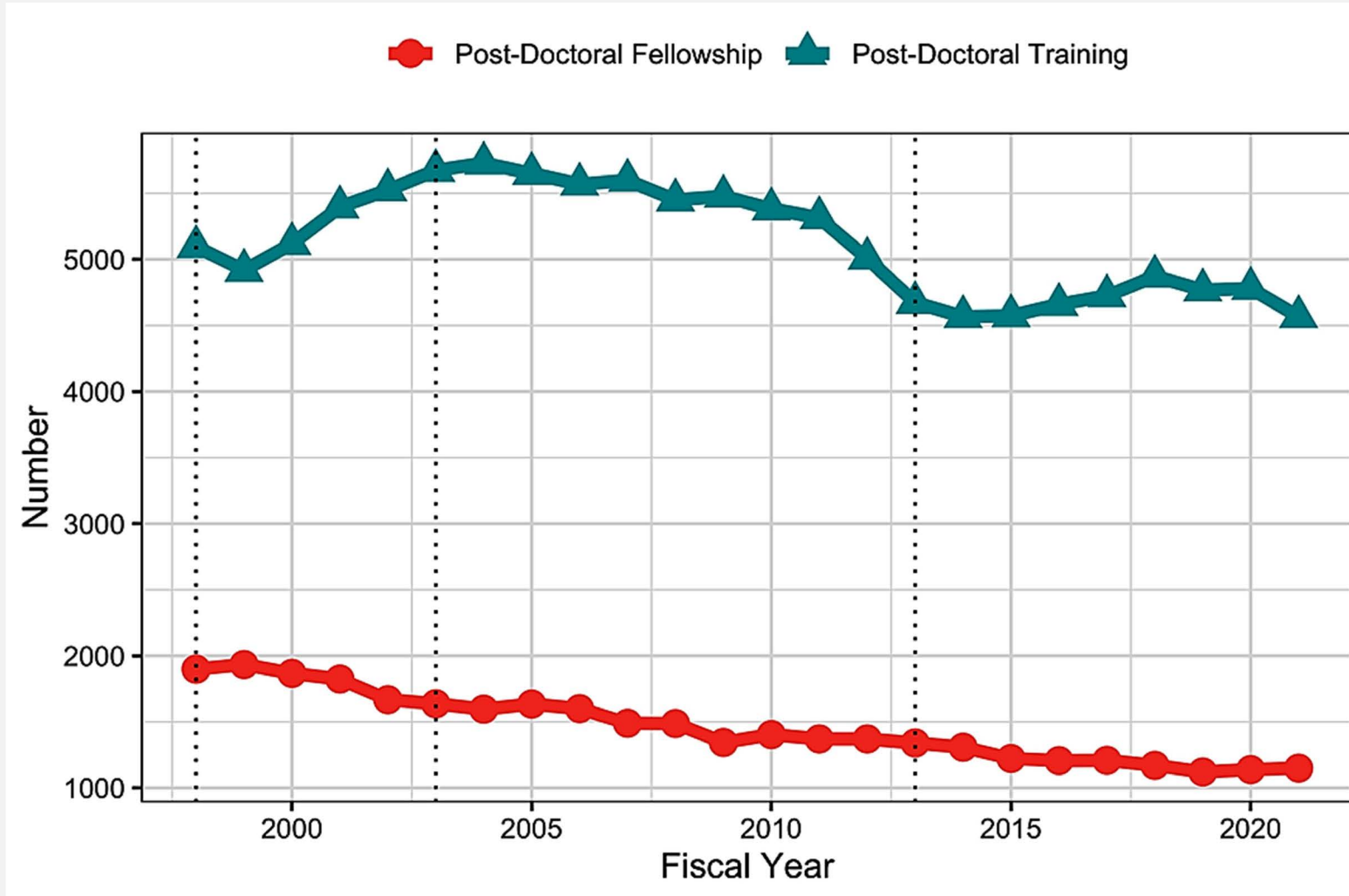
Decreasing applications and awards



NIH NRSA Postdoctoral Fellows and Trainees

Decreasing over time

Number of Postdocs Supported, 1998 - 2021

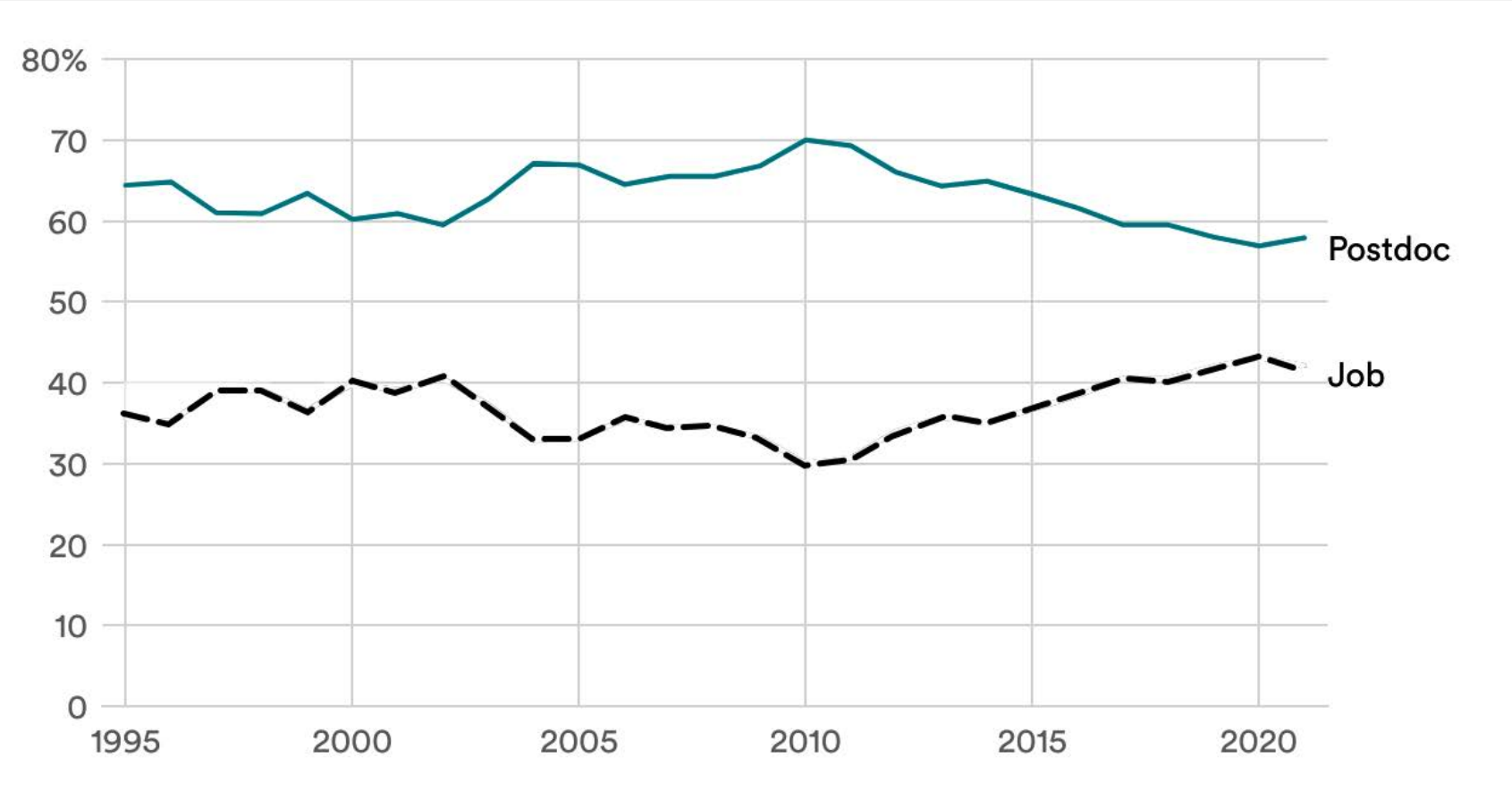


Source: NIH/OER

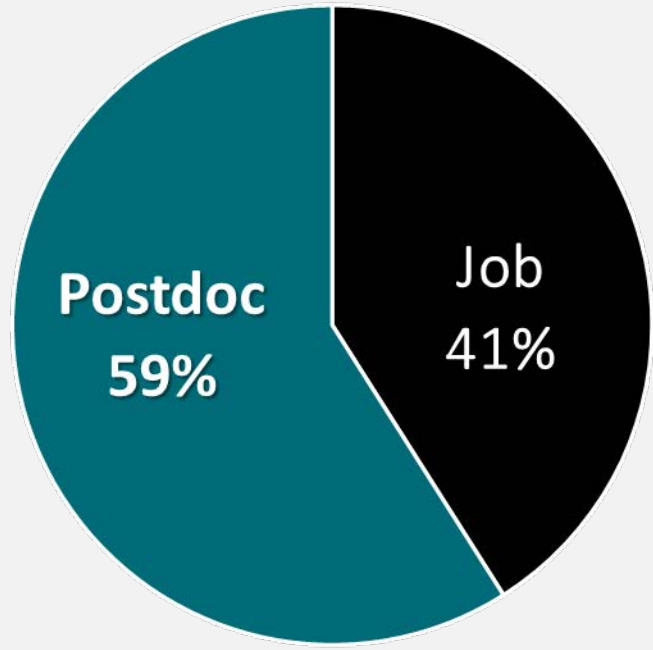
Next Steps for Life Science PhD Graduates

Since 2010, declining number of new PhDs undertaking immediate postdoctoral training

Percent of PhDs with Definite Postgraduate Plans Going into a Postdoc vs. Non-Postdoc Job



Employment Plans of PhDs in 2021

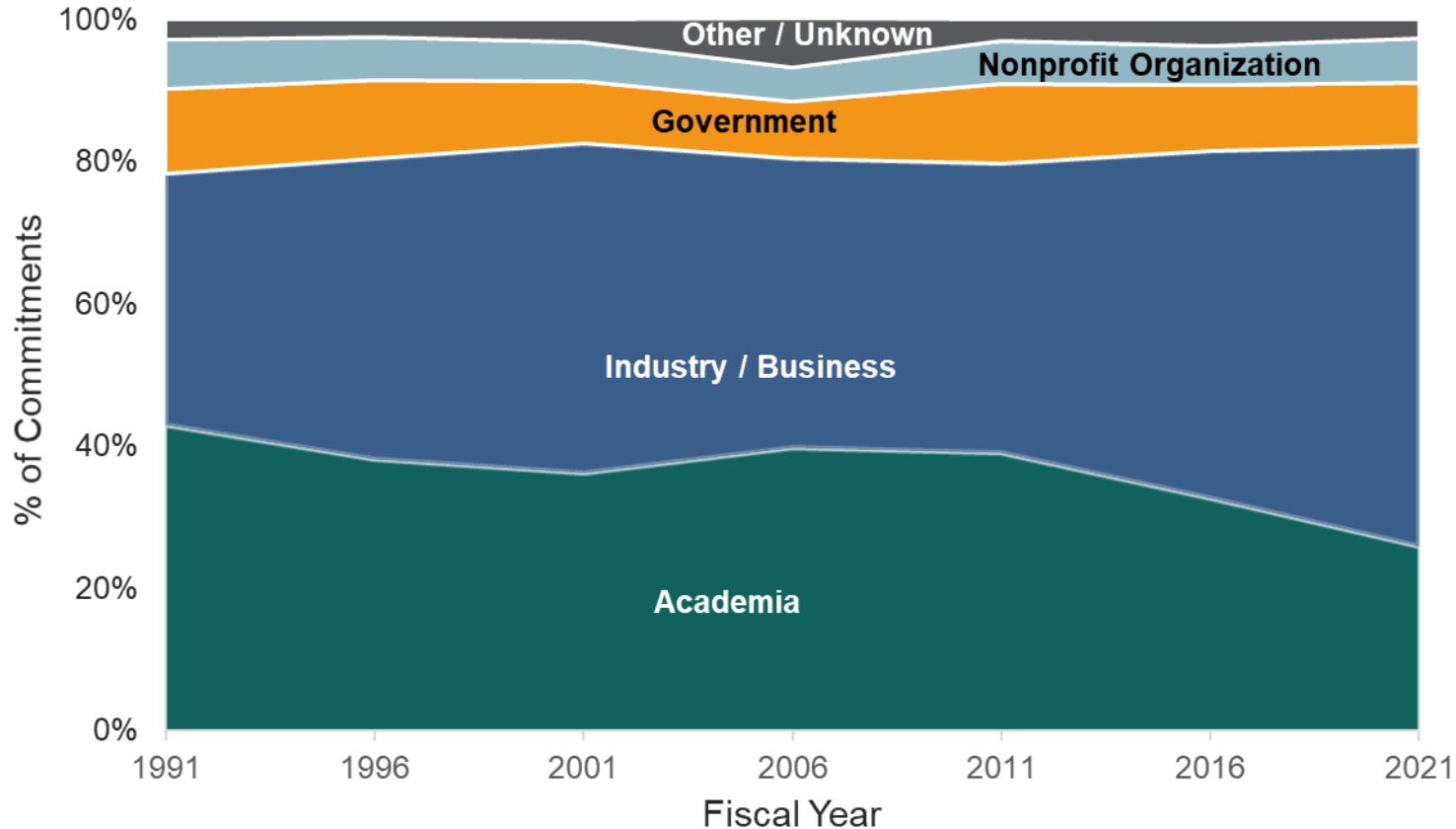


Doctorate Recipient Employment Commitments

Increasing percentage of earned doctorates commit immediately to industry/business

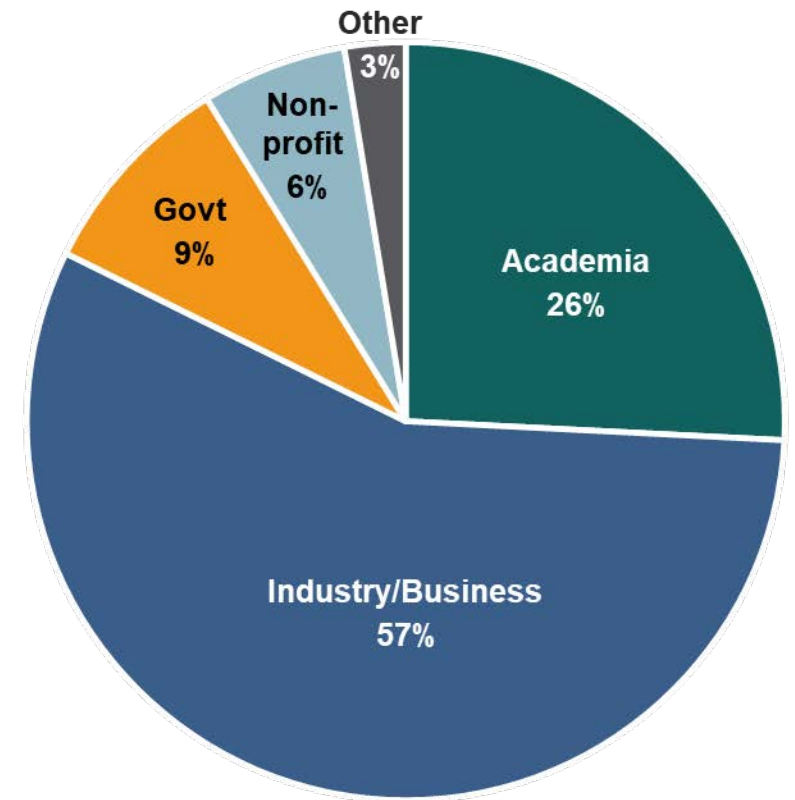


Employment Sector of Science & Engineering Doctorate Recipients with Definite Postgraduation Commitments for U.S. Employment



Academia Industry / Business Government Nonprofit Organization Other / Unknown

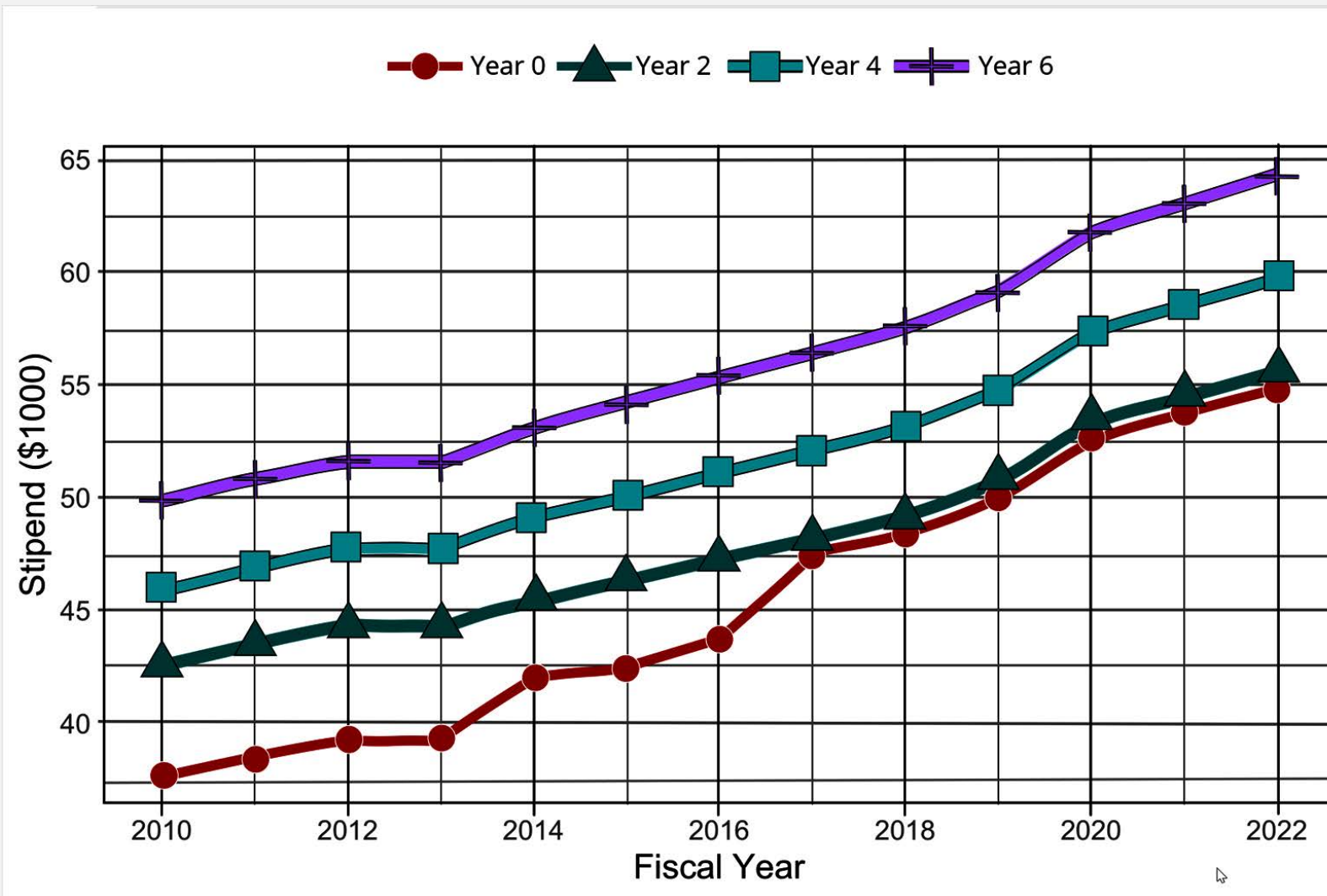
Employment Sector of Science & Engineering Doctorate Recipients in 2021



NIH NRSA Postdoctoral Fellows and Trainees

Increasing stipend over time (starting at \$55K in 2022)

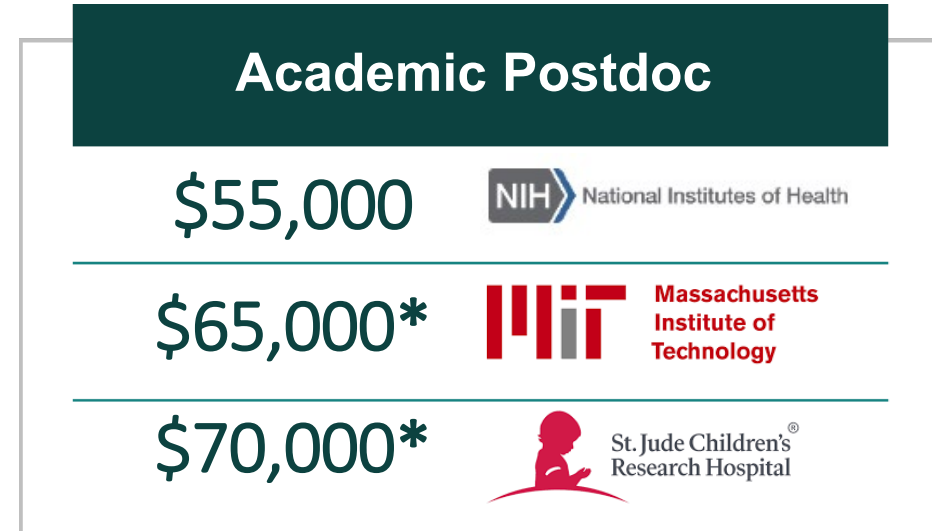
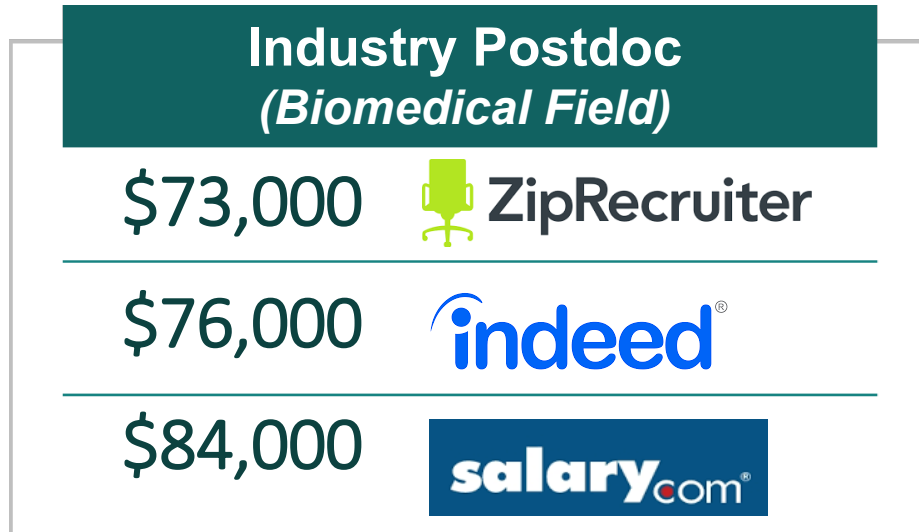
Stipend Level, 2010 - 2022



Source: NIH/OER

Discrepancies in Starting Salary by Sector

Industry postdoc salaries exceed academic postdoc salaries



*In response to the shortage of suitable postdocs, both **MIT** and **St. Jude Children's Research Hospital** have recently raised their starting postdoc salaries

According to NSF's **Survey of Earned Doctorates**, biomedical Ph.D. graduates entering industry jobs can expect to make a median starting salary of **\$105,000** compared to **\$53,000** for an academic postdoc position

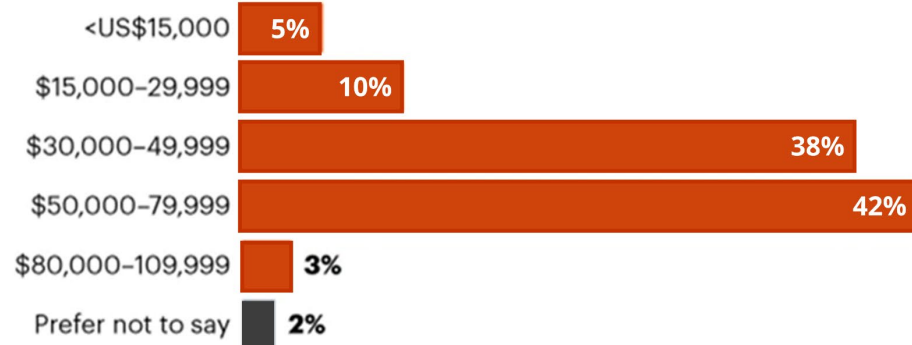
Multi-Factorial Challenge



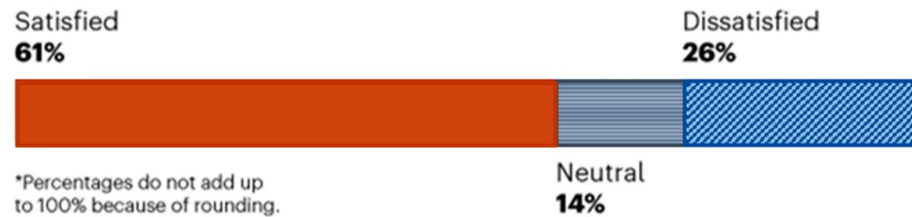
2020 Postdoc Career Satisfaction and Prospects Survey

Postdoctoral researchers worldwide are experiencing great distress around their career prospects, workload, and workplace culture

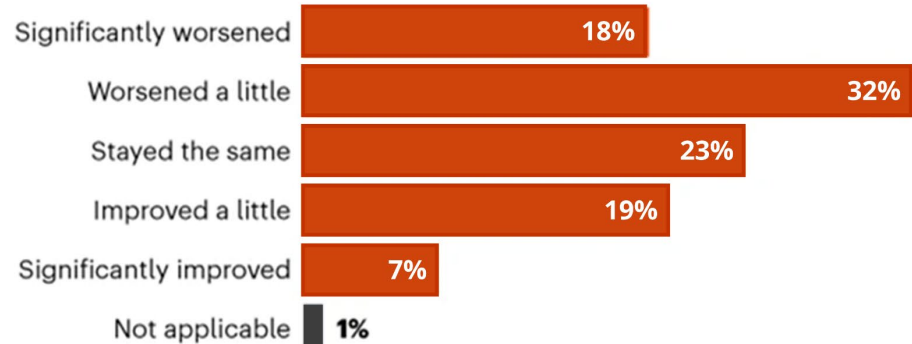
What is your current gross annual salary/compensation (earnings before tax or other deductions) of your primary job?



How satisfied are you in your current position?*



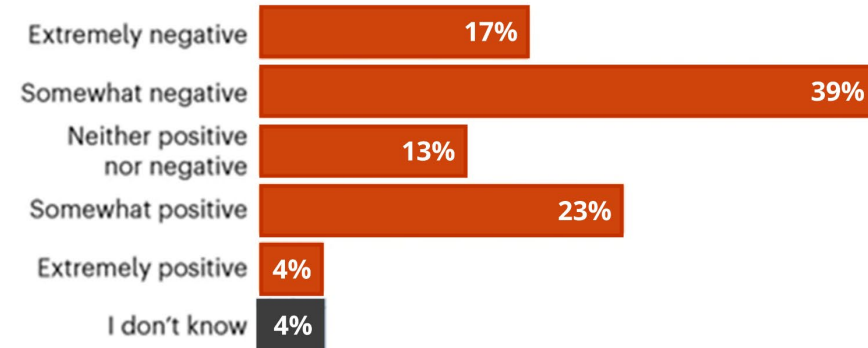
In the past year would you say your level of satisfaction has...



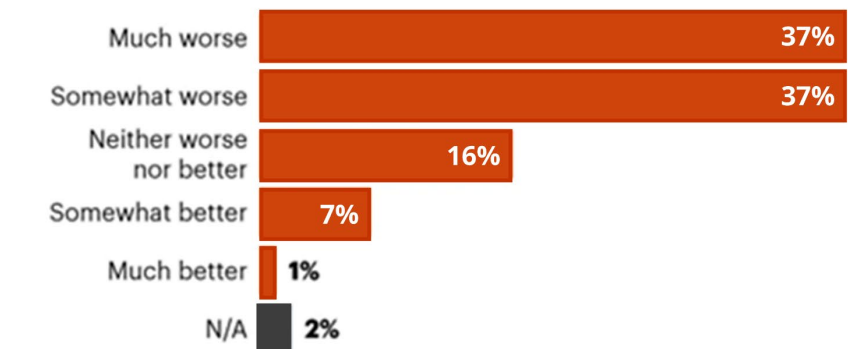
Do you hope to pursue a career in academia?



How do you feel about your job prospects?



Do you see your job prospects as better or worse than those of previous postdoc generations?



Financial Pressures Threaten Graduate Student Stability

QUOTE OF THE DAY

“It's hard to focus on researching, teaching, mentorship, writing papers, applying for grants, when you don't even have enough money for food.”

A biology PhD student in the United States is one of the 85% of respondents to *Nature's* 2022 survey of graduate students who said they worry about having enough money to buy food and cover rent and other expenses.

(*Nature* | 9 min read)

QUOTE OF THE DAY

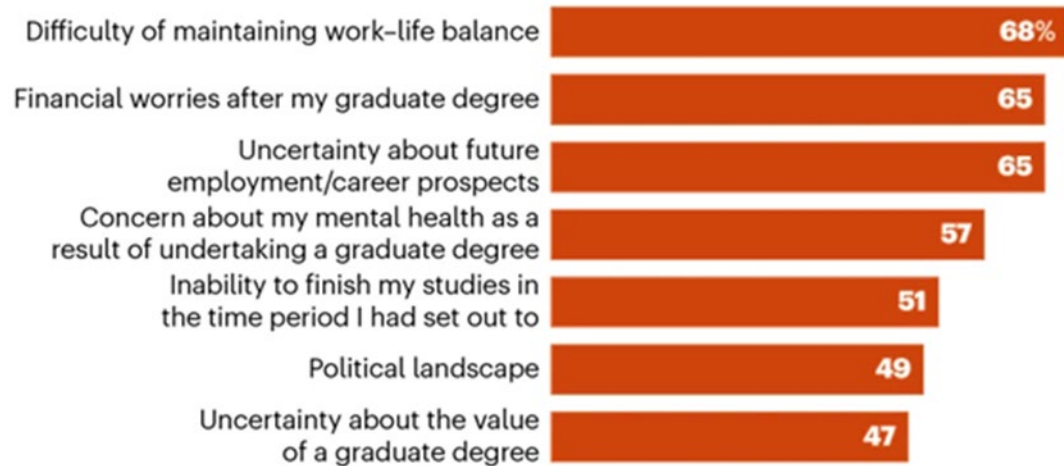
"Financial distress isn't a rite of passage or a temporary inconvenience. It could be an existential threat to today's PhD scholars and master's students."

The cost-of-living crisis is a fundamental threat to the progress of science, argues a *Nature* editorial. (5 min read)

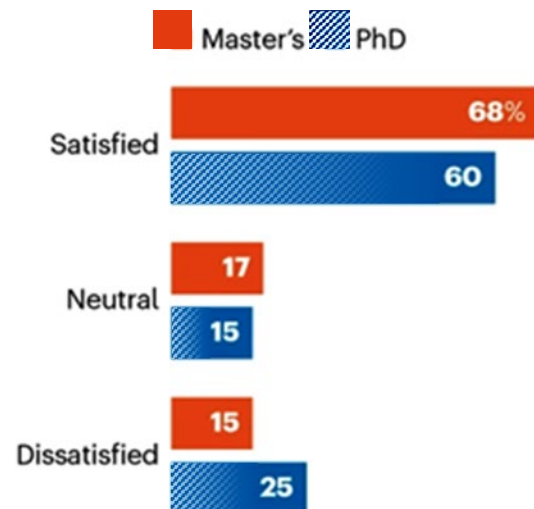
2022 Challenges and Obstacles of Graduate Training Survey

PhD and master's students worldwide struggle with work-life balance, cost of living, and support for training and mental health

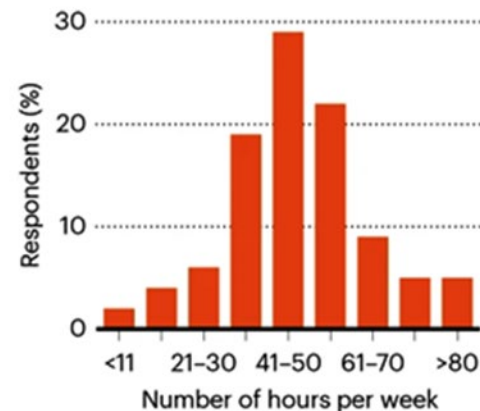
What concerns have you had since you started your graduate degree?



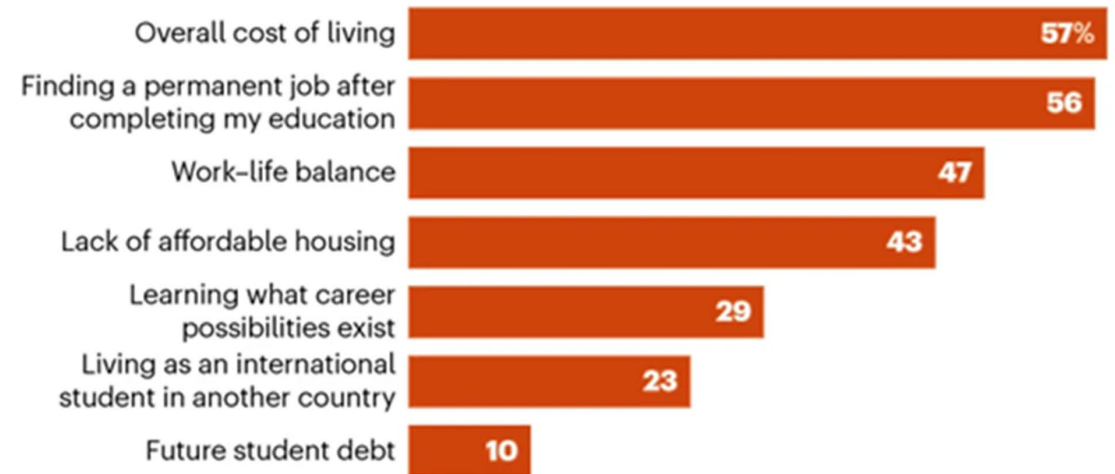
How satisfied are you with your graduate degree experience?



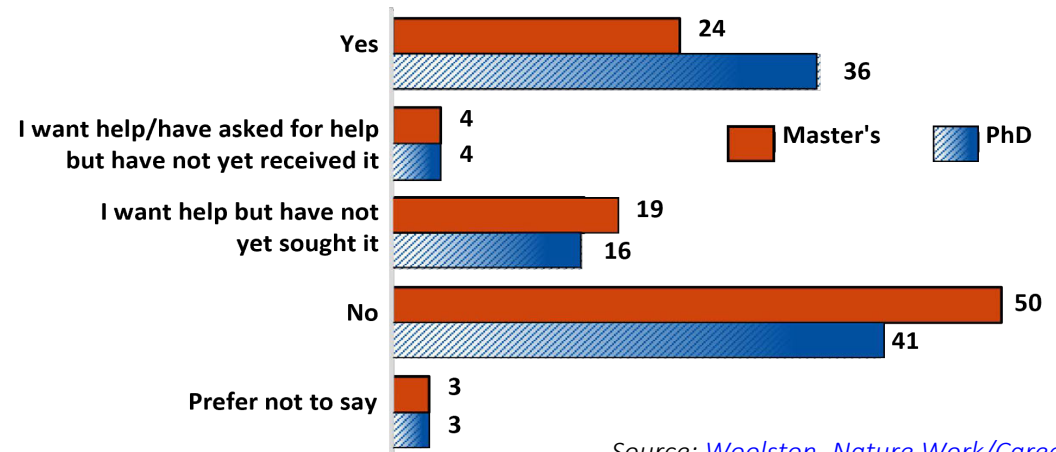
On average, how many hours a week do you typically spend on your graduate degree?



Which of the following would you say are the most difficult for graduate students in the country where you are studying?†



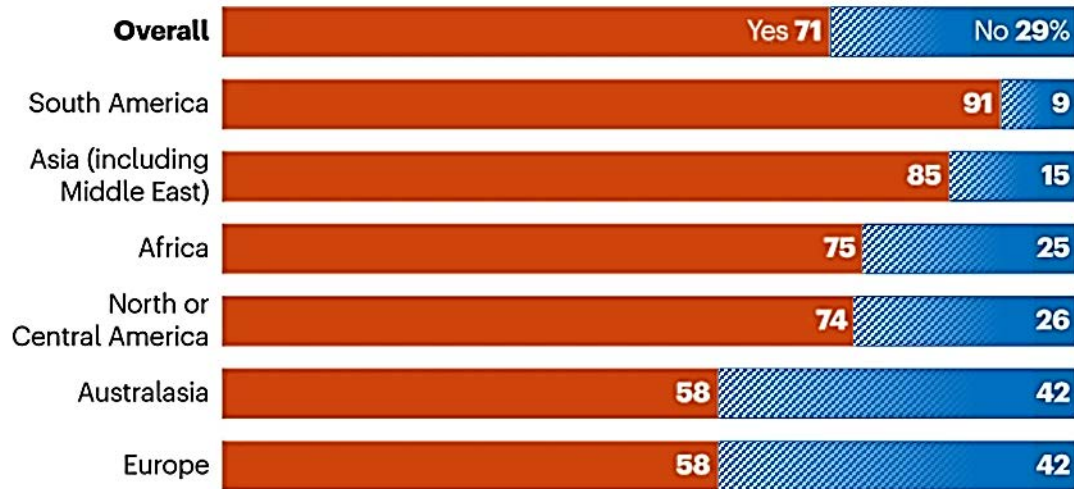
Have you ever received help for anxiety or depression linked to your studies?



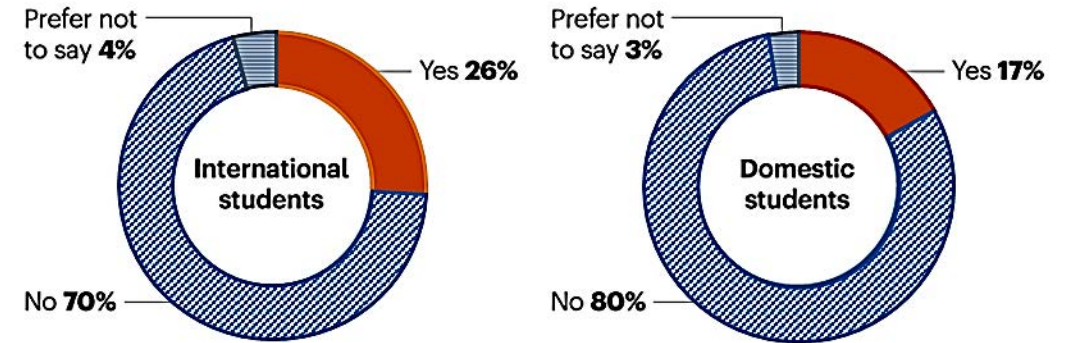
2022 Challenges and Obstacles for International Graduate Students Survey

Financial struggles, visa woes and other issues (e.g., discrimination or harassment) create barriers for many graduate scholars studying abroad

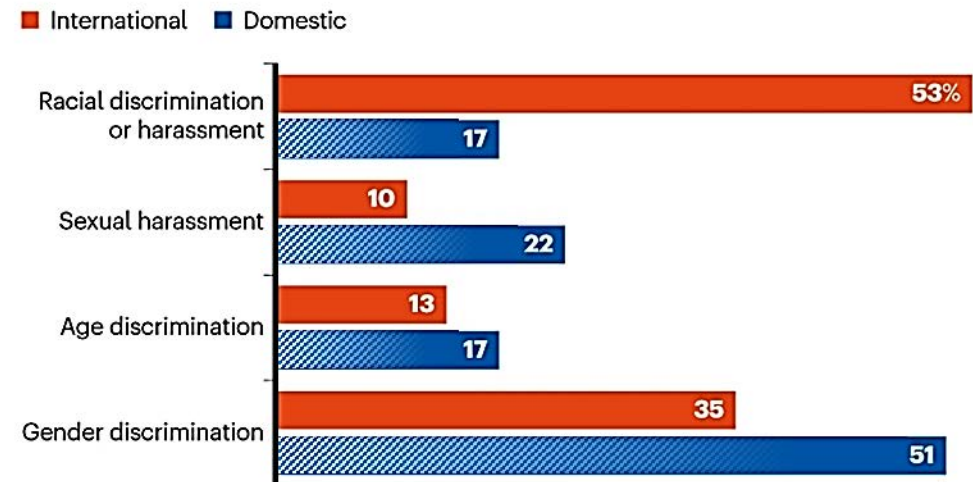
Are you studying in the country you grew up in?



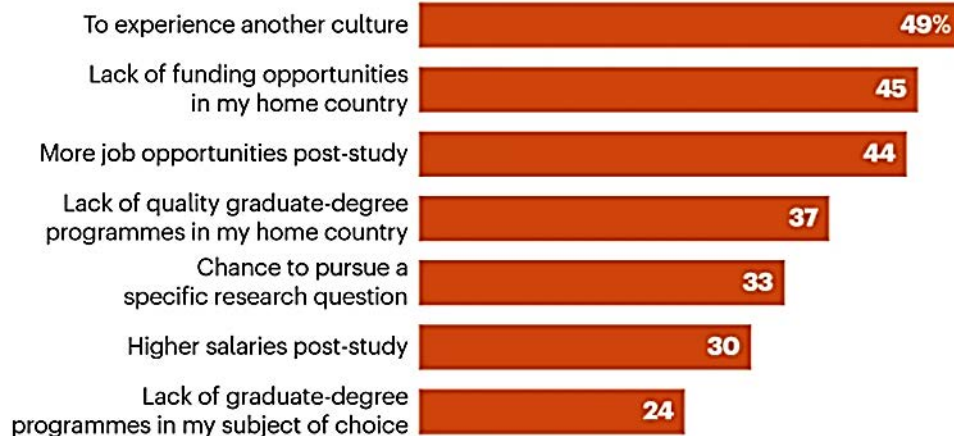
Have you experienced discrimination or harassment during your programme?



If you've experienced discrimination or harassment, what form did it take?



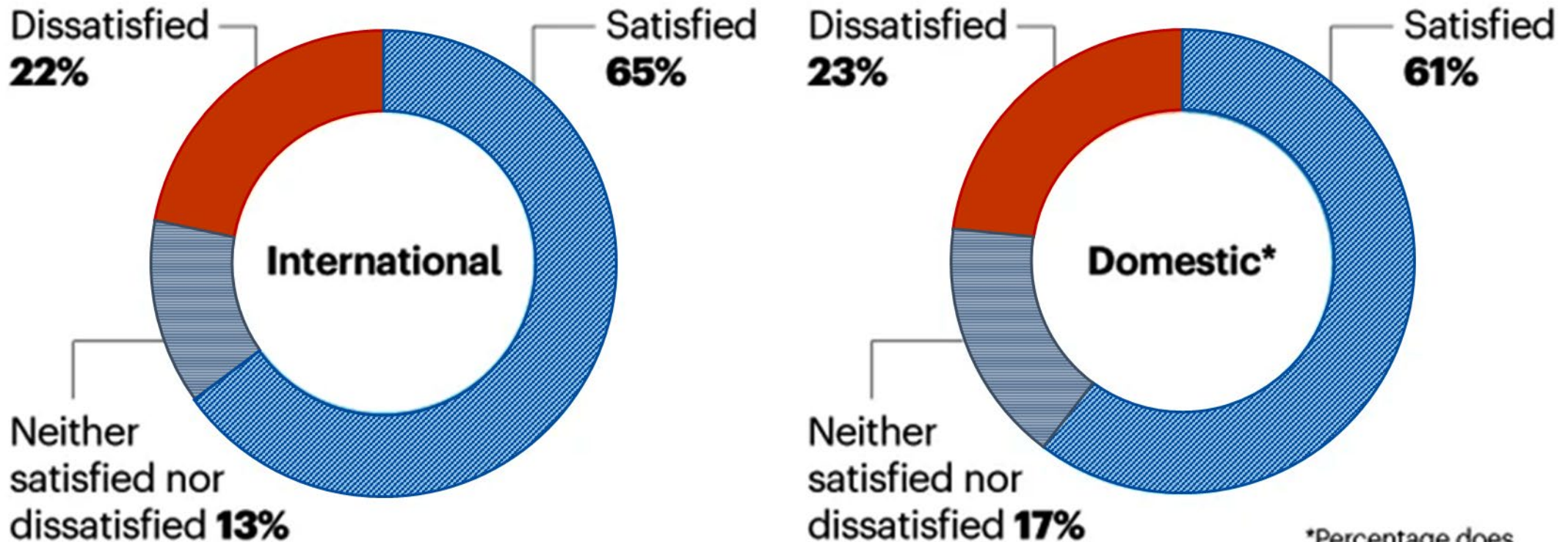
What prompted you to study outside your country of upbringing?



2022 Challenges and Obstacles for International Graduate Students Survey

Despite challenges, majority remain satisfied with their experience

How satisfied are you with your graduate-school experience?



*Percentage does not add to 100% because of rounding.



Charge to the Working Group



- **Evaluate** evidence on the perceived shortage in PhDs seeking U.S. postdocs
- **Assess and consider** factors influencing the scope and persistence of the issue
- **Review and compare** other approaches to postdoctoral training
- **Consider** ways to support postdocs' quality of life and work-life balance, increase retention
- **Engage** key internal and external stakeholders

Proposed Activities

Gather Community Feedback *

- Request for Information
 - Listening Sessions
- } Early 2023

Consult Experts

- Workforce Economists
- Heads of Graduate Student and Postdoc Offices
- Industry Scientists
- International Student Organizations

Review Available Data

- National Science Foundation – *updates expected in December 2022*
- NIH RePORTER
- Organizations Conducting Surveys and Polls
- Published Literature (e.g., Nature workforce surveys)

ACD Working Group

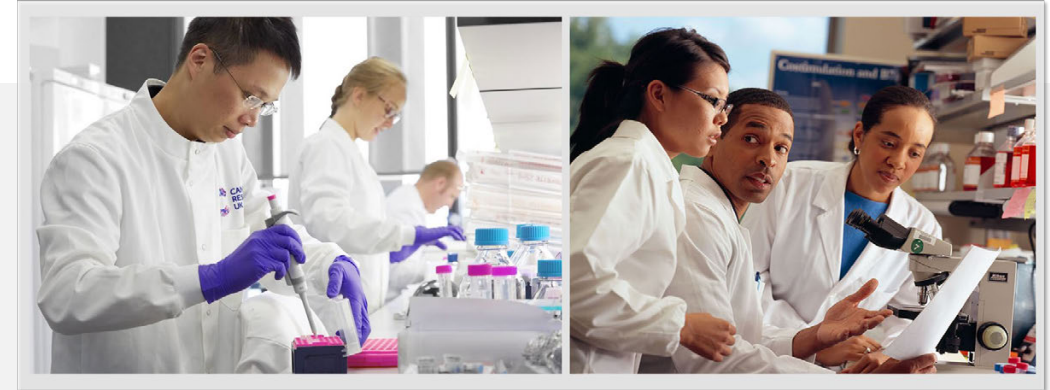
Co-Chairs:



Shelley Berger, PhD
*Principal Investigator,
Daniel S. Och University Professor at
University of Pennsylvania*



Tara Schwetz, PhD
*Acting Principal Deputy Director,
National Institutes of Health*



Executive Secretaries:

- Joel Islam, PhD
- Laura Long, PhD

ACD Working Group Members

**ex officio*



Emily Ackerman, PhD
Harvard University



Rashada Alexander, PhD
AAAS



Mark Becker, PhD
APLU



Marisol Cortes
Johns Hopkins University



Kafui Dzirasa, MD, PhD
Duke University



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University of Kansas



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Chrystal Starbird, PhD
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Bodo Stern, PhD
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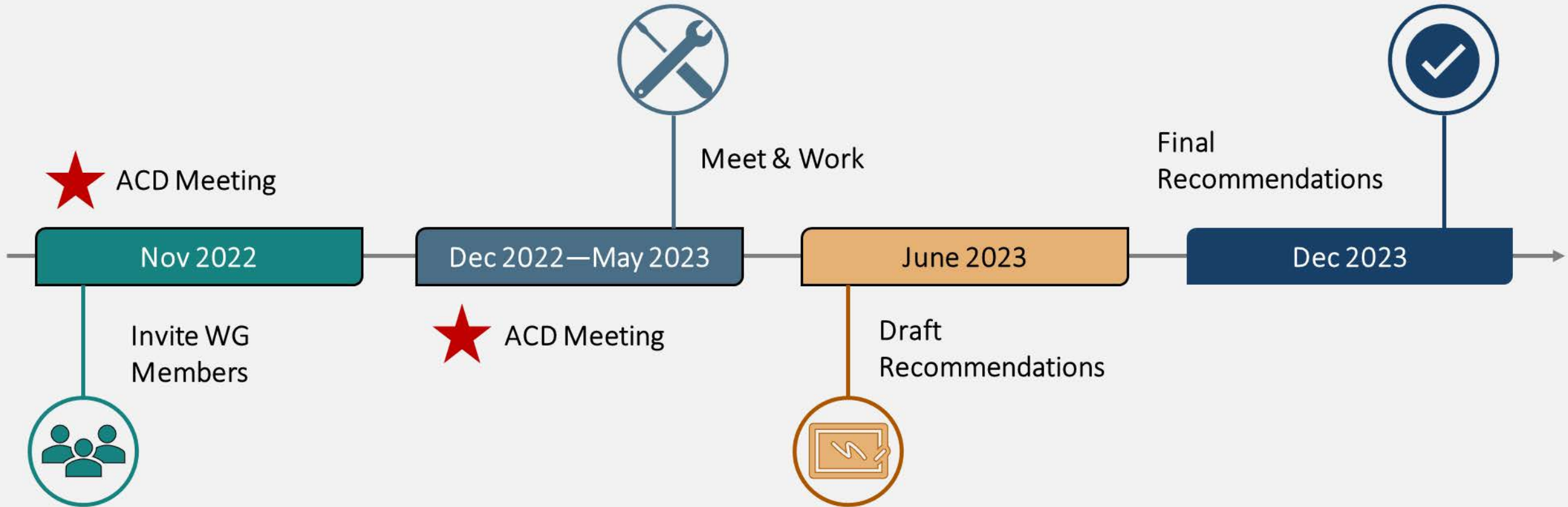


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Jodi Yellin, PhD
AAMC

Timeline





**Welcome ideas, thoughts, and questions
from ACD members**