

# **U.S. DOE CSGF: 1991–2016**

## **A Follow-up Study of Recipients and Programmatic Outcomes**

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# Overview

- Update to prior study in 2012
- Timeline for data collection/analysis:
  - August 2016 to February 2017
- Study included 414 of all 436 DOE CSGF recipients going back to 1991
  - Excluding 5 deceased and 17 with no valid contact information

# Key Questions

- What were the characteristics of DOE CSGF recipients?
- What factors explain recipients' recruitment and entry into the program
- How did recipients perceive their experiences in the program?
- What were the impacts of participation, based on recipients' perceptions?
- What were recipients' career activities and accomplishments since completing the program?

# Methods

- Survey of all DOE CSGF recipients going back to 1991
  - Included alumni and current fellows
  - Overall response rate of 67 percent (278 of 414 total)
    - Alumni: 61 percent (211 of 345 total)
    - Current fellows: 97 percent (67 of 69 total)

# Methods

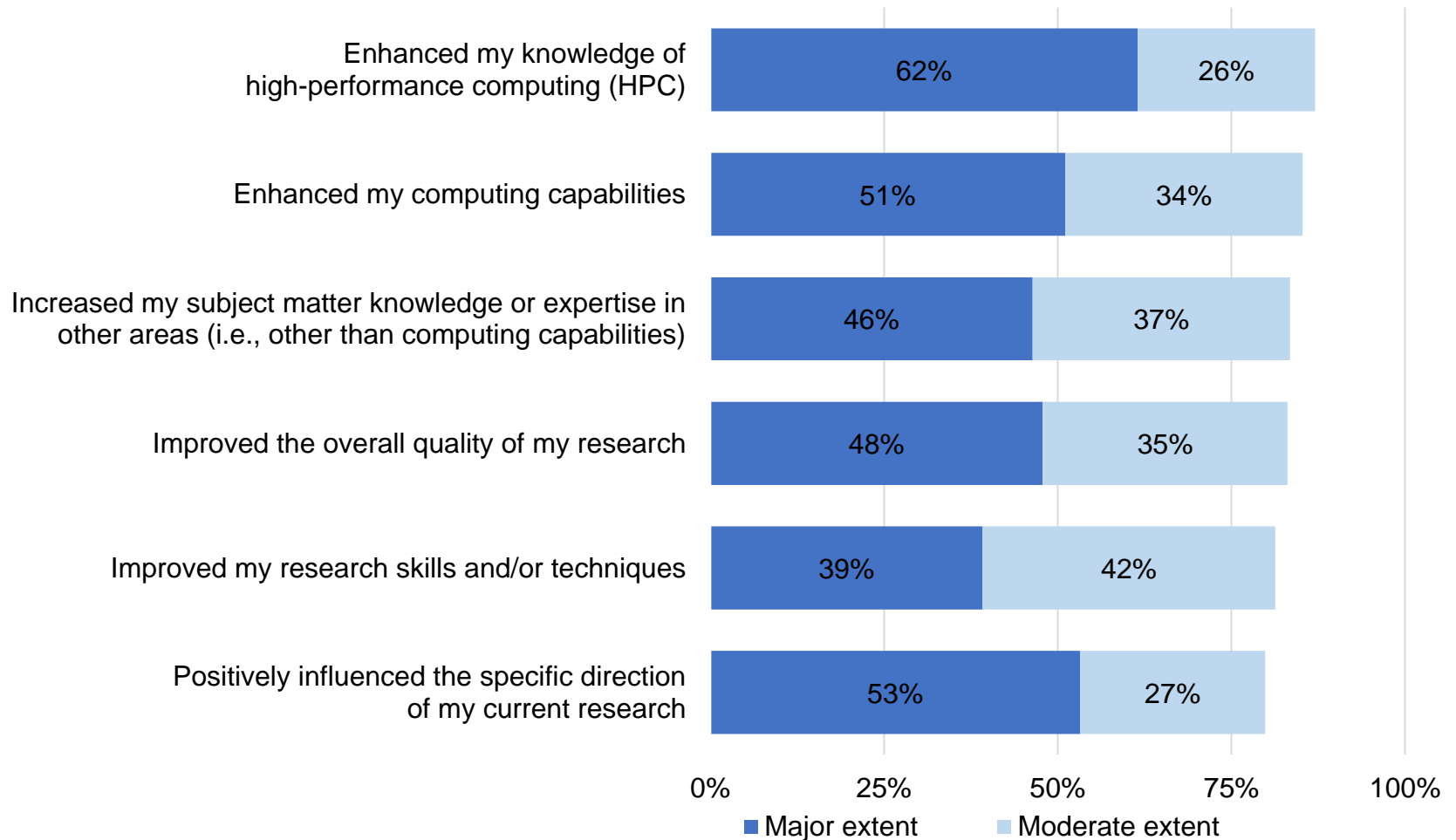
- Interviews with a sample of alumni
  - Sampling approach—include alumni who completed the program between 2006–2013
  - Stratified sample of 40 individuals, taking into account gender, field of study, etc.
  - Conducted phone interviews with 18 individuals

# Methods

- Analysis of curriculum vitae (CV) data collected from alumni and current fellows
  - 75 percent (309) of 414 recipients provided an updated CV
  - CVs were coded for the following:
    - Journal articles
    - Books and book chapters
    - Conference presentations, papers, and posters
    - Awards and honors received
    - Grants and contracts awarded
    - Patents received

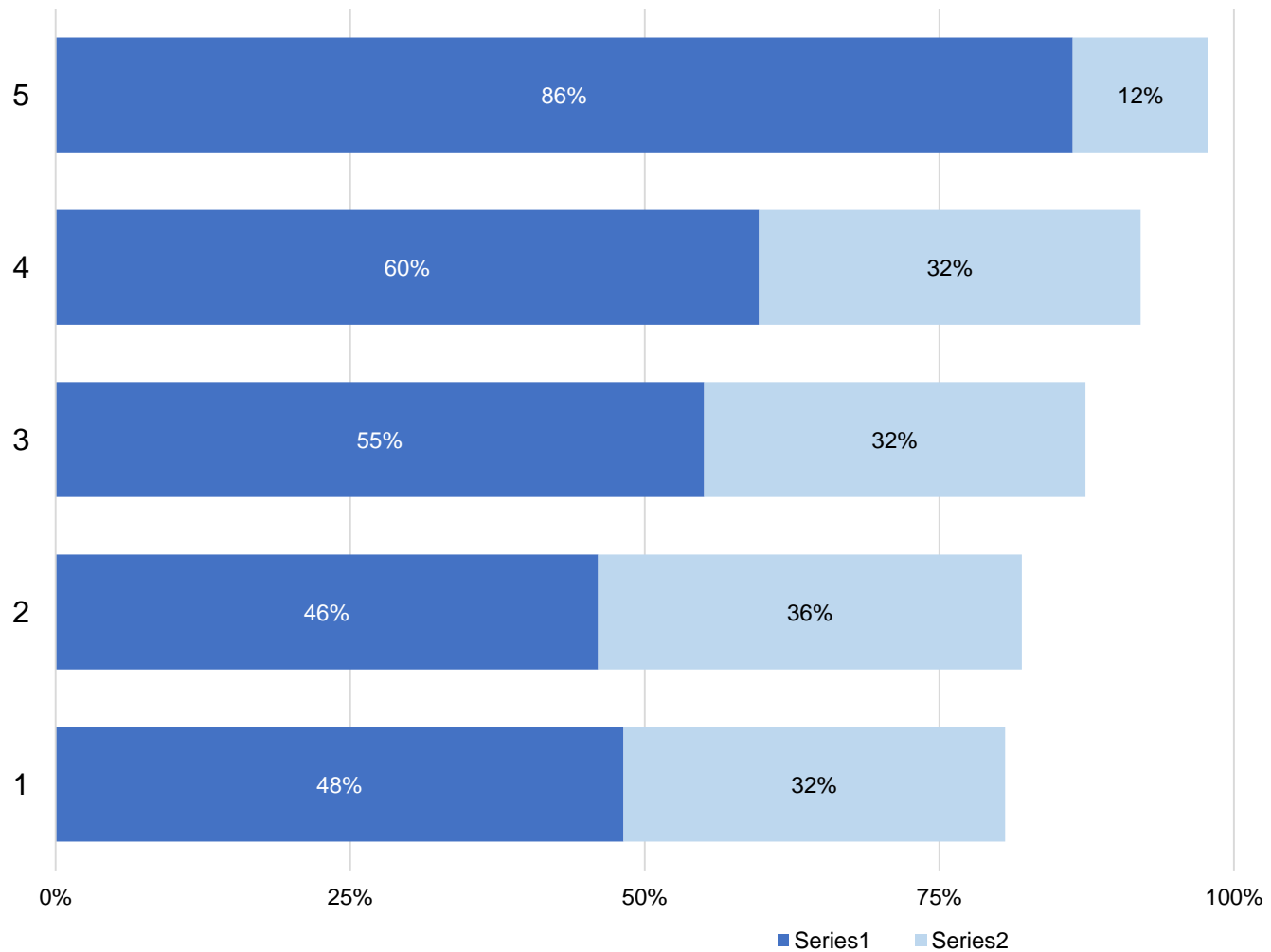
# Findings

# Perceived Impacts of Participation





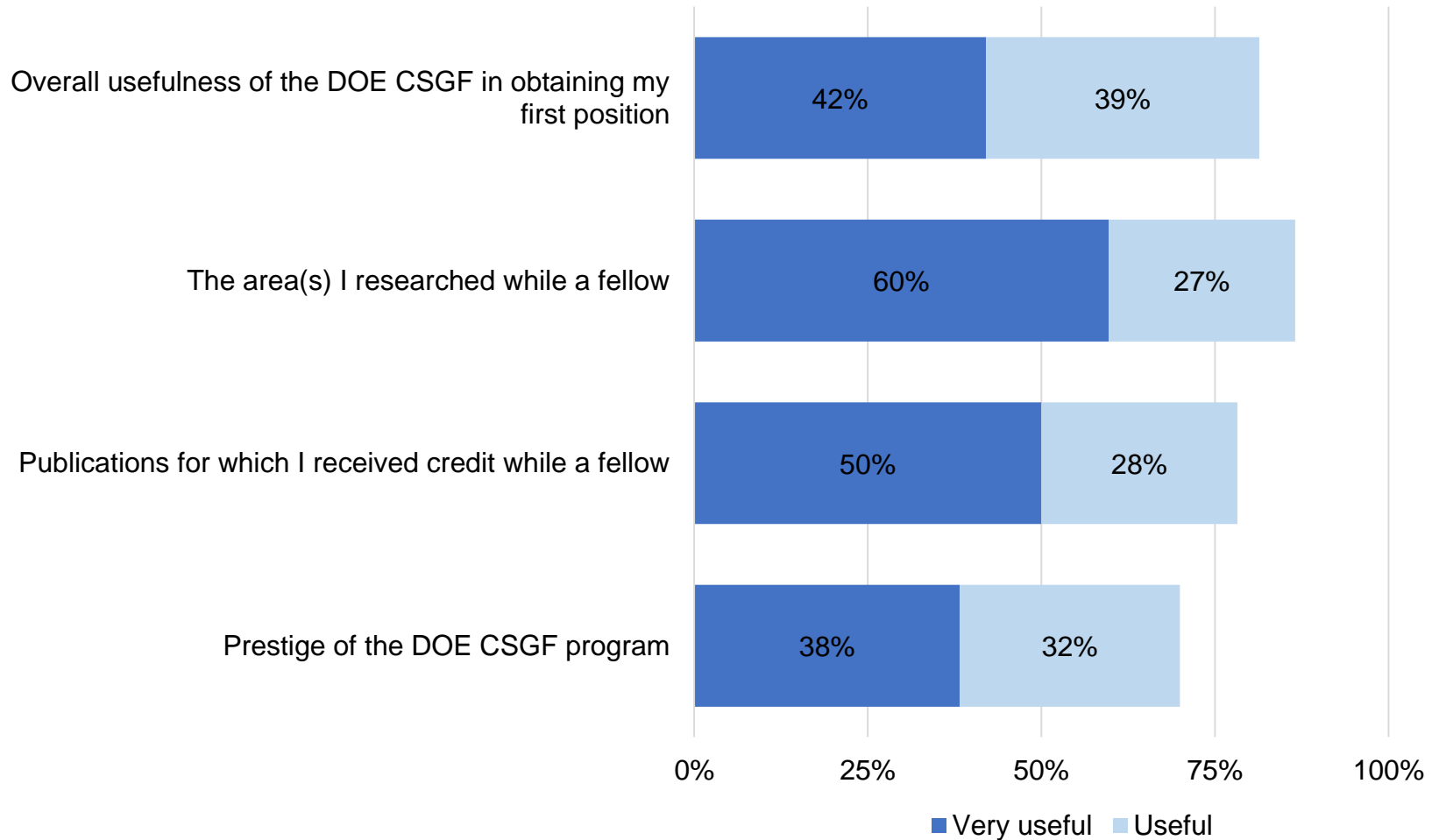
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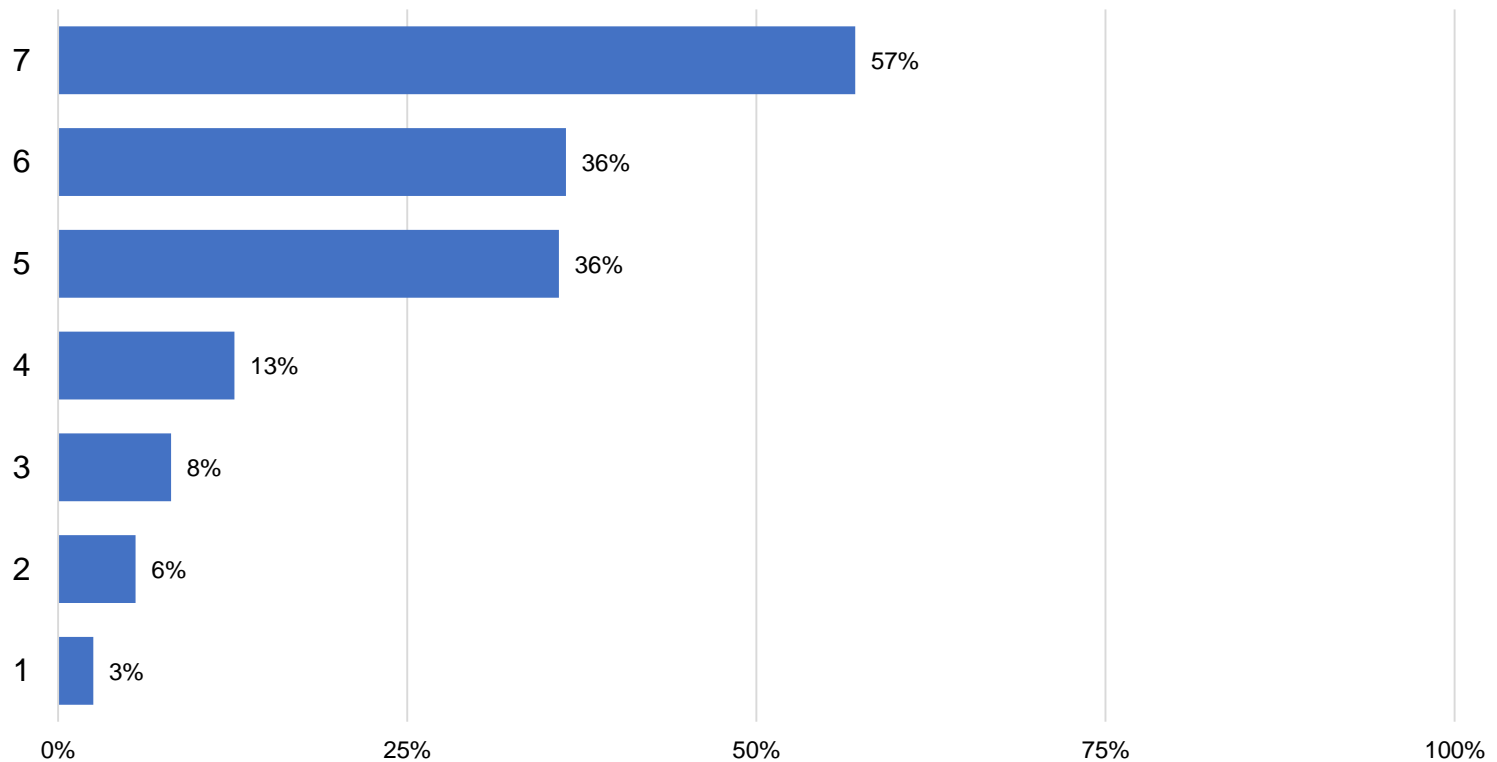
- Skills and content expertise, interdisciplinary skills, and flexibility to pursue topics within the field of CSE that interested them
  - *“the requirements from the fellowship that I take classes including math applications, computer science... really gave me a bigger set of tools so that I could attack much different problems than I would have been able to attack... if I hadn’t had the fellowship...”*
  - *“DOE CSGF gives you a slightly larger view into the research domain that exists... one of the biggest effects is just opening your eyes to what else is going on in computational science around the country in different fields by different people.”*

# Perceived Impacts of Participation



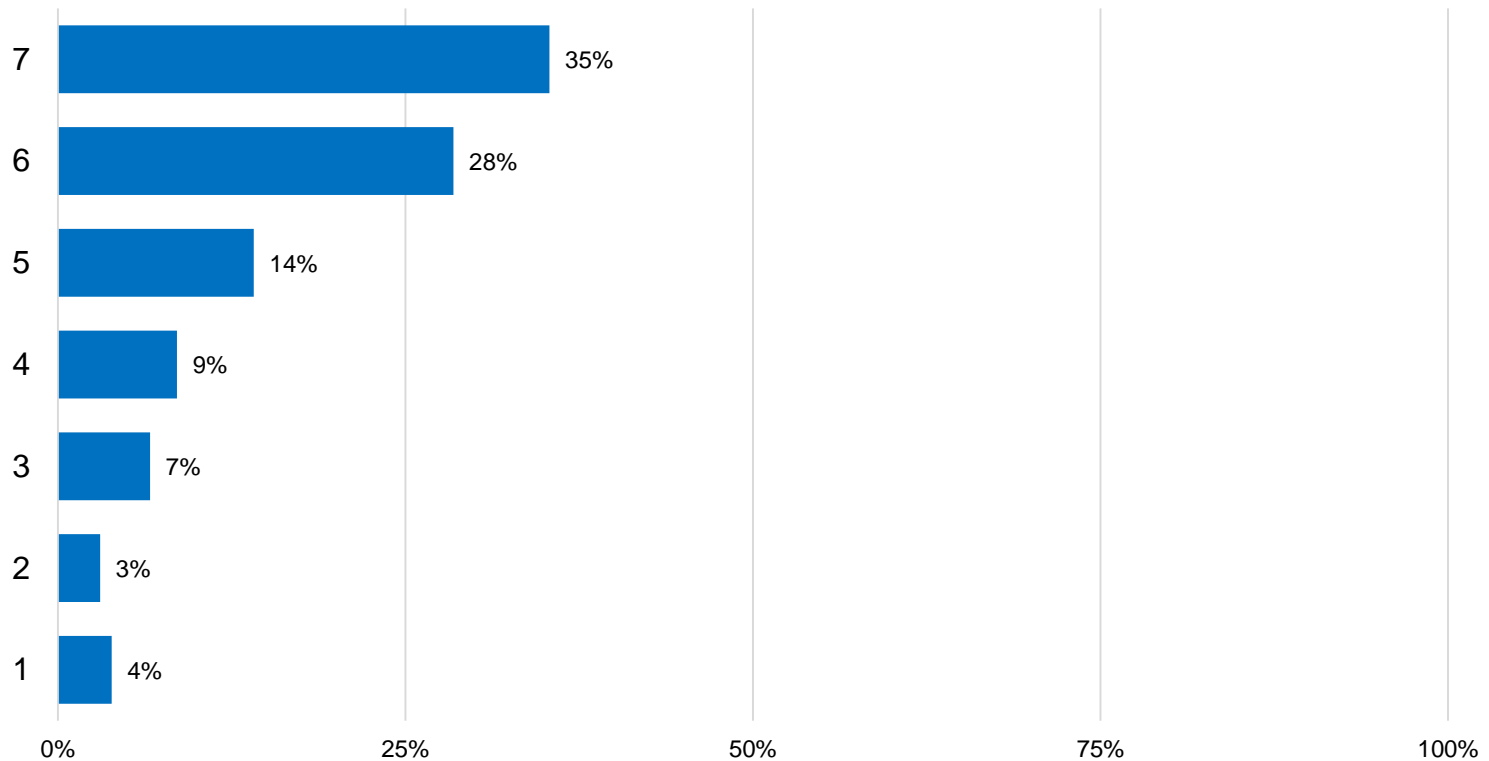
# Career Activities and Accomplishments

- Virtually all alumni have been employed and in a range of settings (survey data)



# Career Activities and Accomplishments

- Most common current employment setting is industry, followed by academia (administrative data)



# Career Activities and Accomplishments

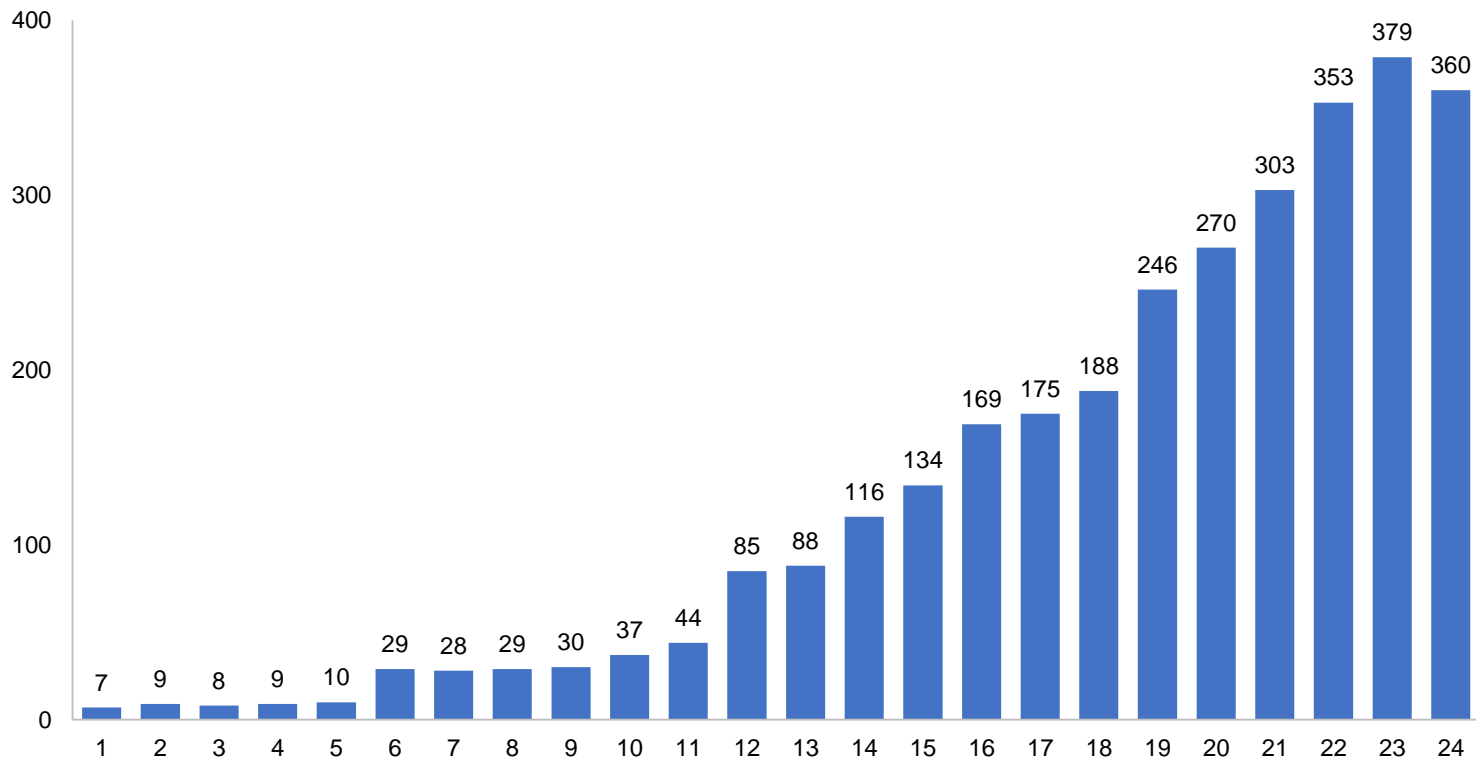
- Alumni have received a large number of professional awards, grants/contracts, and patents
  - Awards
    - 165 of 243 alumni listed at least one award
    - Average number of awards was 3.6 per alumnus
  - Grants/contracts
    - 51 alumni listed at least one grant or contract
    - Average number of grants/contracts was 6.5 per alumnus
  - Patents
    - 35 alumni listed a total of 211 patents
    - Average number of patents per alumnus was 3.4 (excluding one outlier CV with 96 patents)

# Career Activities and Accomplishments

- Alumni have published research at an impressive and compounding rate
  - 217 of 243 alumni listed at least one publication
  - 202 of 243 included at least one journal article
  - The 243 alumni included in the study produced more than 3,200 journal articles

# Career Activities and Accomplishments

- The number of articles increased year to year as the cumulative pool of DOE CSGF recipients grew over time



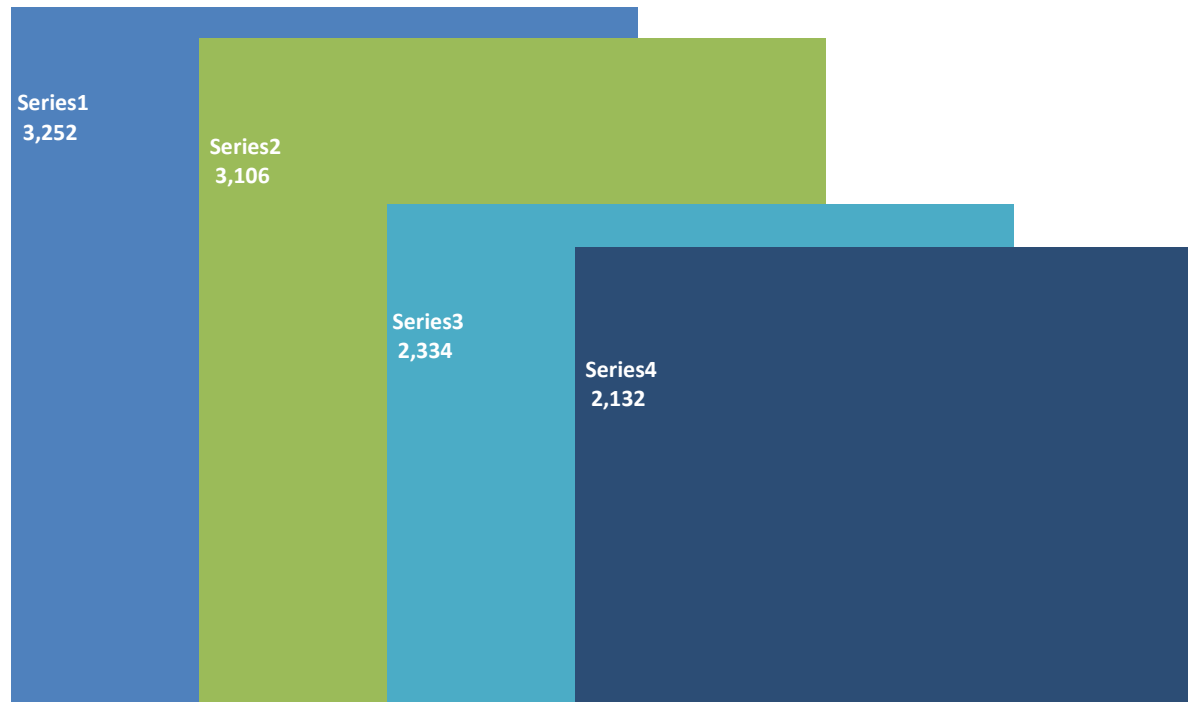


# Career Activities and Accomplishments

- Articles produced by alumni were overwhelmingly published in highly influential journals
  - Bibliometric analysis used to look not only at *how many* publications were produced and *how often*, but where they had published their work
  - Two measures from the Eigenfactor Project
    - Eigenfactor score and Article Influence score
    - These scores indicate the prestige and influence of a given journal in a given year and the average per-article influence for a journal

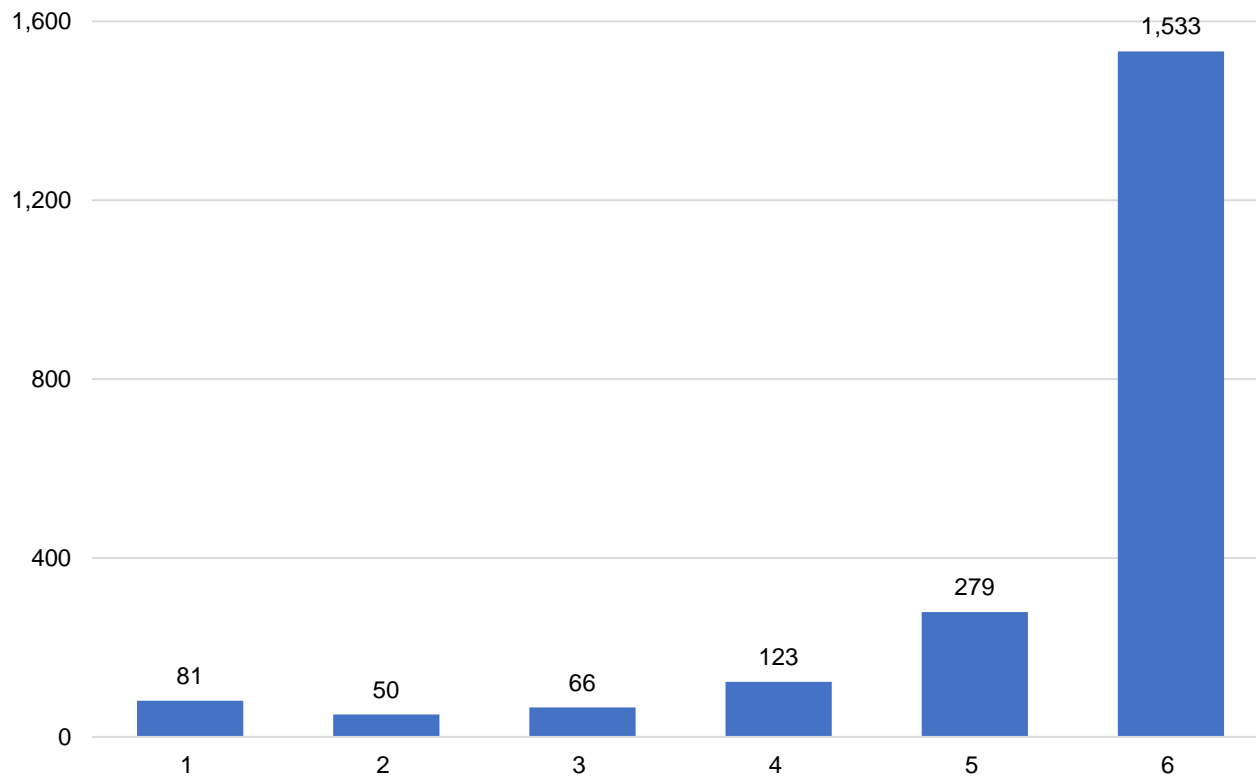
# Career Activities and Accomplishments

- EF and AI data were publicly available for the period of 1997–2014 and included journals in Thomson Reuters' Journal Citation Reports for each year



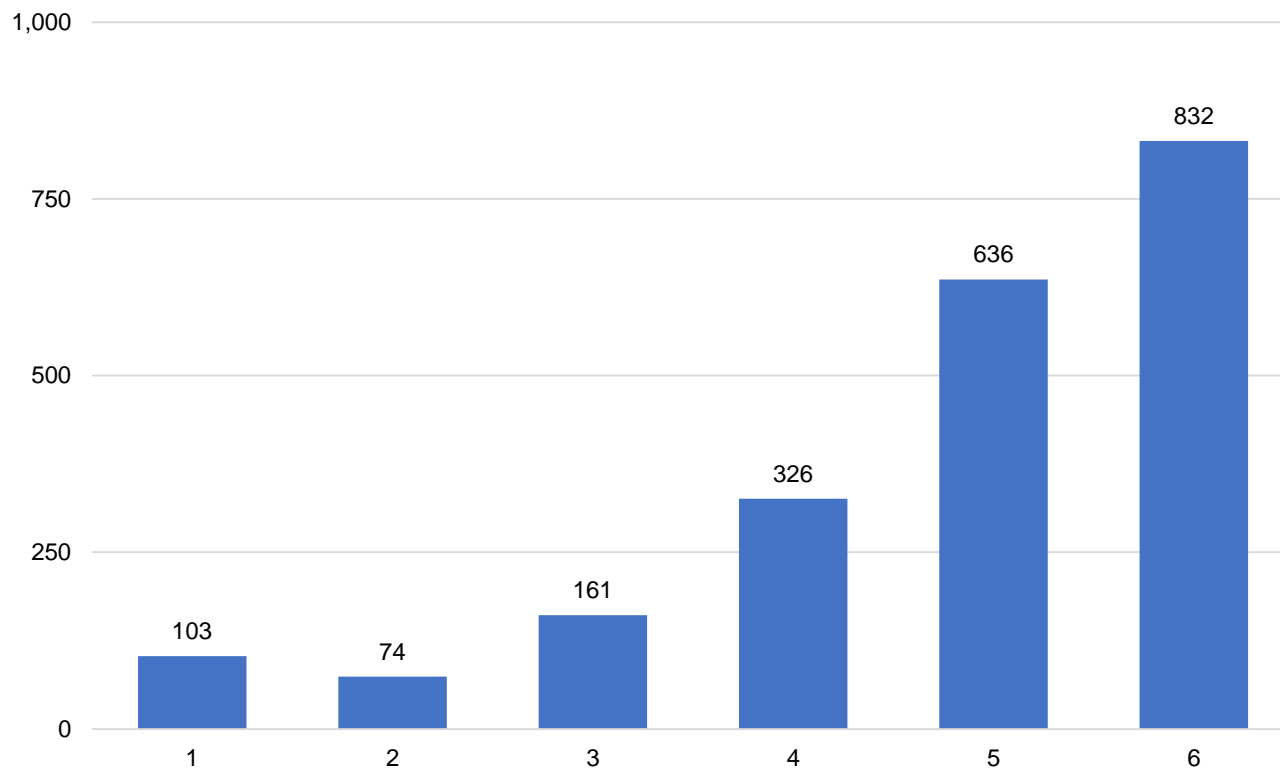
# Career Activities and Accomplishments

- Most articles published by alumni were in journals with EF scores in the top 10 percent



# Career Activities and Accomplishments

- More than two-thirds of articles published were in journals with AI scores in the top two deciles



# Conclusions

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- DOE CSGF is a highly sought after fellowship that draws some of the most promising students in STEM—many choose the program based on its prestige and level of financial support
- The program received high praise from alumni for its unique benefits—alumni reported a highly satisfying experience in the program and cited exposure to HPC, access to DOE laboratories and scientists
- The opportunities provided to students reflect a successful model that offers a broad scope of training and development

# Conclusions

- Many alumni remain involved in the program, by recruiting new fellows, providing guidance for current recipients, and developing relationships
- Long-term career benefits of program participation, including transition directly to employment at DOE laboratories or highly specialized positions in industry/academia
- Many alumni have achieved leadership positions within these settings, thereby helping to spread the influence of the program

# Conclusions

- The program has influenced individuals' career goals and direction, including the desire to work at a DOE laboratory
- The program has enhanced recipients' skills and content expertise, communication skills, and degree of self-confidence in their field
- Bibliometric data reveal how prolific alumni have been and provide evidence on alumni's contributions to the broader scientific community through the generation of new knowledge and innovations



# Questions