CSR’s Initiatives to Address Bias in Peer Review

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Director, NIH Center for Scientific Review (CSR)

National Advisory Child Health and Human Development (NACHHD)
Council
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Fiscal Year 2021 Applications, Major Mechanisms

~88,000 NIH Applications
~66,700 Reviewed (75%)

- R01s: 92%
  ~34,000
- Small Business: 94%
  ~7,500
- Fellowships: 83%
  ~5,600
FY21: 182 Special Initiatives Reviewed by CSR

- SBIR Commercial Readiness
- Cancer Nanotechnology
- Chronic Fatigue Syndrome
- Electronic Nicotine Delivery (ENDS)
- Radx-Rad (PREVAIL)
- Sex and Gender Influences on Health
- Tobacco Regulatory Research
- Extramural building projects
- NARCH
- INCLUDE
- MIRA
- Transformative Research
- RM1 Centers
- Trailblazers
- Alzheimer’s

And many more...
Literature Overview – NIH Funding Gap

Ginther papers:

2011: 83k R01s from PhDs in 2000-2006: Black/AA PIs are 13 percentage points less likely than WH PIs to be funded.
2012: Extended 2011 paper to MDs. Black PIs at med schools less likely than white PIs to be funded but the gap was narrower than at non-med schools.
2016: Extended 2012 paper to examine gender. Black female PhDs more successful than Black male PhDs but Black female MDs less successful than Black male MDs.
2018: 2,397 NIH Biosketches from FY 2003 and 2006: bibliometric measures explained half of the Black/white funding gap.

Ginther more circumspect in later papers – “reviewers can’t see applicants’ race” and “direct evidence of implicit bias in peer review has not been documented”

Other recent papers:

• Forscher 2019: By changing names, created 4 versions of 48 different NIH R01s (gender X race(BL/AA)) = 4 versions. Conducted simulated NIH review. No evidence of white male advantage.
• Erosheva 2020: R01 applications from 2014-16. Black applicants 55% as likely as WH to be funded. Primary study question was whether the relationship of criterion scores to overall impact scores is different, depending on race of PI. Answer is no.
2019 NIH Analysis: “Reviewer Bias” based on Topic Choice

Important Points to Note:

• Award rates differ 4-fold across different topic clusters

• E.g. Cluster A (low award rate): child obesity intervention, physical activity, weight loss program….Cluster B (high award rate): corneal wound healing, ocular surface, cataract development...

• The science of high and low award rate topic clusters are generally not reviewed in the same study sections, so “reviewer bias” to explain differential award rates was puzzling.

“Our analysis shows that all three of the factors that underlie the funding gap...revolve around decisions made by reviewers.” – Hoppe et al., 2019, Science Advances 5:eaaw7238
2021 NIH Reanalysis: Added individual NIH IC award rate as a variable

<table>
<thead>
<tr>
<th>IC Characteristic or Outcome</th>
<th>ICs Higher AAB PIs (N applications = 29,285)</th>
<th>All Other ICs (N applications = 128,120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI AAB</td>
<td>3% (796)</td>
<td>1% (1478)</td>
</tr>
<tr>
<td>Discussed</td>
<td>55% (15,980)</td>
<td>55% (70,369)</td>
</tr>
<tr>
<td>Priority Score Median (25th–75th percentile)</td>
<td>36 (26-45)</td>
<td>36 (26-45)</td>
</tr>
<tr>
<td>Score Mean (SD)</td>
<td>36 (13)</td>
<td>36 (13)</td>
</tr>
<tr>
<td>Percentile Rank Median (25th–75th percentile)</td>
<td>27 (14-41)</td>
<td>27 (14-40)</td>
</tr>
<tr>
<td>Percentile Rank Mean (SD)</td>
<td>28 (16)</td>
<td>27 (16)</td>
</tr>
<tr>
<td>Funded</td>
<td>13% (3950)</td>
<td>17% (21,554)</td>
</tr>
<tr>
<td>Funded if discussed (N=86,349)</td>
<td>25%</td>
<td>31%</td>
</tr>
</tbody>
</table>

“The lower rate of funding for these topics was primarily due to their assignment to ICs [Institutes or Centers] with lower award rates, not to peer-reviewer preferences.” - Lauer et al. 2021, eLife; 10:e67173
2021: CSR’s Anonymization study published

Design

• 400 R01s from Black PIs, 400 from matched white PIs, 400 from randomly-selected white PIs
• Full and redacted versions underwent simulated peer review
• Data collection and analysis done by an external contractor (SSI) using a preregistered plan

Results

• Redaction did not affect scores of Black PIs but worsened scores of white PIs (significant, but small effect size).
• 21% of the time, reviewers identified the PI despite redaction (similar to other studies). Removing these cases did not change the findings.

What does this mean?

• Isolating the effect of race is challenging due to secondary, linked variables (e.g., institutional “prestige”, investigator “pedigree”) tied to racial disparities in access. Redaction may have reduced these “halo effects”.
• Findings support review approaches that diminish the role of PI identity.

Nakamura et al. eLife 2021;10:e71368. DOI: https://doi.org/10.7554/eLife.71368
CSR Initiatives

- Exploring Blinded Review Processes
- Bias Awareness in Peer Review Training for Reviewers & Chairs
- Bias Reporting
- Broadening the Reviewer Pool to Diversify Review Committees
Exploring Blinded Review Processes
CSR/Common Fund HRHR Collaboration: Transformative Research Award (tR01) Reviews

No identifiers (Abstract/Aims/Research Plan only):

- Stage 1: Editorial Board selects top subset
- Stage 2: Subject matter experts assess
- Stage 3: Editorial Board gives preliminary scores, sets discussion order

Identifiers provided (Investigator/Institution)

- Study section meeting with discussion and final scores of all 5 criteria.

- Study section in April 2021, evaluation of process by external contractor → encouraging results with statistically significant increase in demographic diversity of applicant pool

- 25% of respondents: anonymized process affected decision to apply (reasons: funding project, not people, less institutional prestige bias, applicant demographic, avoids rich getting richer)
Exploring Blinded Review Processes

CSRAC Working Groups’ recommendations open the door...

Major Recommendation of both Working Groups:
Reorganize the current five scored review criteria into three scored factors:

1) Importance of the science
2) Feasibility and rigor
3) Investigators and environment

Allows for a multi-stage, partially-blinded review process
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Incorporating Bias Training in Annual Summer Chair Orientation Sessions

~90 Incoming Study Section Chairs/year, 9-10 sessions

Orientation for New Study Section Chairs – 2021

CSR provided orientation and guidance to incoming study section chairs. While the material is geared towards chairs, others in the community might find it useful in better understanding the review process and how meetings are conducted.

Two-hour, interactive, facilitated session

- 15 min overview
- 15 min nuts-and-bolts of chairing
- 1.5 hours of interactive discussion, using a vignette-based framework

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Fairness of the Peer Review Process

What Can You Do As Chair?

- Recognize your influence – in setting and changing the study section culture
- Actively foster a positive study section culture - confidentiality, integrity, encouraging broader participation/inclusion across the committee, call out statements that bias the scientific assessment (institution, career-stage, field, race/gender)
- Promote a focus on significance (ask the question), and consistency in scoring – score/word match, aligned to score guidance.

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Brief Overview – Key Issues in Peer Review – Dr. Noni Byrnes, Director, CSR

Slides
Video

Preparing to Chair a Study Section – Dr. Bruce Reed, Deputy Director, CSR

Slides
Video

Facilitated Discussion Among Chairs

Video
CSR Bias Awareness Training for Reviewers Launched in August 2021

- Objectives – raise awareness of potential biases in peer review, provide tools to intervene
- Targeted the most common biases in the peer review process. *It is not implicit bias training.*
- 30-min, sent to ~10,000 reviewers before their meeting – surveys to inform future versions
- Includes personal testimonials, interactive exercises, narrated mock study section
- Very well-received by scientific community - early survey results indicate increased ability of reviewers to identify bias, increased comfort in intervening

![Survey Results](image)

Sitting through an [@NIH](https://twitter.com/NationalInstitutesOfHealth) training on combatting bias in peer review. It’s very well done, with specific and concrete examples that I’ve personally seen in review.

Bita Moghaddem - Sep 21, 2021

I am generally not a fan of on-line bias awareness training but this was very good and examples were spot-on.

Well done @CSRpeerreview
Acknowledgment CSRAC WG: Bias Awareness Training Module Development

**CSR AC Members**

- Scott Miller, Ph.D.
  Yale University
- Julie Price, Ph.D.
  Harvard Medical School
- Narasimhan Rajaram, Ph.D.
  University of Arkansas at Fayetteville

**Working Group Ad Hocs**

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- Markus Brauer, Ph.D.
  University of Wisconsin-Madison
- Elizabeth Cosgriff-Hernandez, Ph.D.
  University of Texas, Austin
- Carlos Crespo, Ph.D.
  Portland State University
- Karine Gibbs, Ph.D.
  University of California, Berkeley
- Xuemei Huang, Ph.D.
  Pennsylvania State University
- Rakale Quarells, Ph.D.
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**NIH Staff**

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- Kristin Kramer, Ph.D.
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- Charlene Le Fauve, Ph.D.
  COSWD
- Michael Sesma, Ph.D.
  NIGMS
- Tasmeen Weik, Ph.D.
  CSR
CSR Initiatives

- Exploring Blinded Review Processes
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- Broadening the Reviewer Pool to Diversify Review Committees
Reporting Bias in Peer Review: G.Fosu_AssocDir@csr.nih.gov
~1.5k meetings, ~65k apps, ~18k reviewers, ~200k critiques, mistakes will occur

For issues related to respectful interactions, bias or anything else that could affect the fairness of the review process, contact your SRO or the CSR Associate Director of Diversity & Workforce Development at G.Fosu_AssocDir@csr.nih.gov.

Existing CSR policy regarding a potentially flawed/biased review
Assessment by CSR management – is it a flawed review?

- Yes - CSR re-reviews the application in the same council round.
- No – CSR refers PI to program officer for guidance on council appeal process

- On every outgoing staff email
- On CSR’s web page
- On every study section page

Gabriel Fosu, Ph.D.
CSR Initiatives

• Exploring Blinded Review Processes

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• Bias Reporting

• Broadening the Reviewer Pool to Diversify Review Committees
Broadening the Pool of Reviewers

Expansion of the Early Career Reviewer (ECR) program [2020]

- **Sept – Dec 2019**: ECR Program Revamped
  - New database - usable, trackable, accurate
  - CSR SRO guidance developed
  - Single vetting committee to ensure consistency in approving ECR qualifications

- **2020**: ECR Program Expanded
  - 940 ECRs recruited in 2020, compared to 575 in 2019

- **ECR pool is more diverse**: 12.1% URM vs. 8.5% for all CSR reviewers in 2020
Broadening the Pool of Reviewers

Aug 2020: Launched CSR Reviewer Finder Tool (for SROs to find “lesser-known” qualified reviewers)

- IC recommendations
- Early-Career Reviewers
- Applicant Pool
- Funded, under-used PIs
- Society recommendations
- Other Agency
- Funded

Multiple Data Sources

One interface – user-friendly for SROs
Strategies for Diversifying Review Panels

• Emphasizing critical need for the NIH to hear diverse perspectives to fulfill peer review’s mission of identifying the best, most disruptive, novel science.

• The most effective, highest-quality review committees are broadly diverse in multiple dimensions. These include: 1) scientific background and perspective; 2) demographic/geographic; 3) career stage and; 4) peer review experience

• Standing study section membership process is thorough, multiple levels of oversight and approval. We are focusing on enhancing diversity on Special Emphasis Panels

• Raising collective awareness, setting expectations, sharing panel-level data with management/staff

• Providing tools for SROs to find “lesser-known” well-qualified reviewers, building up database with multiple sources of scientific experts [Reviewer Finder]

• SRO training, esp. SRO-to-SRO sharing of best practices in broader recruitment strategies
% of Women in CSR Meetings (All, Standing Study Section, SEP, Applicants)

Summer 2019, 2020, 2021

- All CSR Meetings
  - 2019: 36.3%
  - 2020: 36.6%
  - 2021: 41.3%

- Standing Study Section
  - 2019: 38.7%
  - 2020: 39.4%
  - 2021: 41.9%

- SEP
  - 2019: 34.0%
  - 2020: 33.6%
  - 2021: 40.6%

- CSR Applicants
  - 2019: 32.9%
  - 2020: 32.1%
  - 2021: 33.4%
% of URM in CSR Meetings (All, Standing Study Section, SEP, Applicants)
Summer 2019, 2020, 2021

- All CSR Meetings
  - 2019: 8.3%
  - 2020: 8.4%
  - 2021: 11.6%

- Standing Study Section
  - 2019: 10.1%
  - 2020: 10.8%
  - 2021: 12.5%

- SEP
  - 2019: 6.7%
  - 2020: 5.8%
  - 2021: 10.4%

- CSR Applicants
  - 2019: 7.7%
  - 2020: 7.6%
  - 2021: 8.8%
Up Next: CSR Advisory Council Working Group to Improve NRSA Fellowship Review

CSR AC Members
- Scott Miller, Ph.D. 
  Yale University
- Narasimhan Rajaram, Ph.D. 
  University of Arkansas at Fayetteville
- Elizabeth Villa, Ph.D. 
  University of California, San Diego
- Michael Burton, Ph.D. 
  University of Texas at Dallas
- Barbara Kazmierczak, MD, Ph.D. 
  Yale University
- Nathan Vanderford, Ph.D. 
  University of Kentucky

External
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- Robin Queen, Ph.D. 
  Virginia Tech
- Judith Yanowitz, Ph.D. 
  Magee-Womens Research Institute & Foundation

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  NIH OD
- Alison Gammie, Ph.D. 
  NIGMS
- Lystranne Maynard-Smith, Ph.D. 
  CSR
- Bruce Reed, Ph.D. 
  CSR
- Cibu Thomas, Ph.D. 
  CSR
Soliciting your input

Review Matters

Strengthening Fellowship Review

Bruce Reed, Lystranne Maynard Smith, Cibu Thomas
January 6, 2022

Have you applied for, sponsored, or reviewed NIH fellowship applications? We would like to hear your thoughts on what works, what doesn’t, and how the process could be improved.

National Research Service Award (NRSA) Fellowship (F) awards are intended to support training that will enhance pre- and post-doctoral trainees’ potential to develop into productive, independent research scientists. In 2021, CSR handled the review of more than 5500 of the approximately 6800 NRSA F applications received by NIH. We recently convened a CSR Advisory Council working group, charged with evaluating the fellowship review process and making recommendations to make it as effective and fair as possible for all.

https://www.csr.nih.gov/reviewmatters/2022/01/06/strengthening-fellowship-review/
Discussion