

This is a working document of recommendations for equity and inclusion in academic hiring, specifically in astronomy, and directed at search committees, search committee chairs, and department chairs. Its primary focus at the moment is for postdoctoral and faculty positions. I've drawn some references from the Inclusive Astronomy recommendations, but most of the other sources I've found myself or heard referenced in talks, preparation for review panels (e.g., Chandra) or discussion sessions and looked up later.

The document is divided into three key parts, plus two afterwords; part one details how to prepare for the search, part two how to evaluate applications once gotten, and part three suggests a post-offer or post-hire regrouping. The afterwords include suggestions for critically examining the committee's actions and choices, and finally my personal pie-in-the-sky wish list for changes to hiring. --Document drafted by A. Aarnio, CU Boulder alicia.aarnio@colorado.edu. Copy furnished to AAS Employment Committee in August, 2016

I. Before the job is listed

Setting priorities and tone in advance, establishing accountability¹

- Assess the Department's recent hires (over the past 5 years). Evaluate whether this is in keeping with the goals of the University and/or the Department
- Appoint a member of the committee as inclusion representative to serve as a liaison with University offices for equity and inclusion
- Commit to this accountability for every search: keep in contact with the office for equity and inclusion for accountability throughout the hiring process and touch base again once the hire has been made.

The composition of the hiring committee

- Common sense and unsupported claims dictate that clearly if the committee is as diverse as possible, outcomes will be more diverse than were the committee monolithic. But,
- Research is rather sparse and inconclusive on the effects of the fraction of women/URM on committees, and is often highly specific to a particular promotion level:
 - In some cases, a single woman on the review panel improves outcomes for women;^{2,3}
 - For the specific case of promotion from associate to full professor, it has been found that every additional woman on a seven-person panel further increases odds of a woman's promotion success by 14%; for promotions to associate professor, it was found the gender distribution of the panel had no effect, save

¹ Davidson et al. "Guide to Best Practices in Faculty Search and Hiring" Columbia University Office of the Provost [Electronic Version] Retrieved on 29 July 2016 from Columbia University faculty diversity site: <http://facultydiversity.columbia.edu/best-practices-faculty-search-and-hiring>

that once the panel reaches majority women evaluators, it actually decreases odds of success for female applicants²

- In analyzing just two HST cycles and breaking down the review panels by gender, it was found the number of women on the panel didn't affect the percentage of successful proposals by female PIs. Combining all reviewers for every cycle, not considering panel-by-panel to correct for the fraction of submitted proposals per panel, upholds the conclusion that the fraction of female reviewers doesn't impact the fraction of successful proposals submitted by women⁴
- *Chandra* TACs have always strived to have at least one, if not two, women on a panel. Their success rates have been indistinguishable since cycle 10 (*Chandra* is currently on cycle 18), and they have no data on selection rates as a function of panel composition (source: direct communication with Andrea Prestwich).
- Anecdotally, it appears that diverse hiring committees produce diverse results. This could either be directly due to the composition of the committee, or because the composition of the committee is revelatory of the priorities of the department³

The advertisement

- Include language encouraging applicants from underrepresented groups: include race, gender identity, sexual orientation, disability status. This is an important first look at the department's climate: an unwelcoming advertisement could discourage potential hires from applying in the first place³.
 - great example: Carolyn Brinkworth's recent ad includes:
"The desired experience and skills are listed in the position description ... but we note that research shows that women, in particular, feel that they need to meet all job requirements to be considered, and we would like to remind you that this is not the case. If you have the passion for the work, and have some experience in working with others in equity and inclusion, whether it's in a professional or personal role, we encourage you to apply. We can provide on-the-job support and training for the rest."
- Run ad through word choice checker to be sure gendered words aren't being used
- Circulate ad far and wide- some departments maintain lists of contacts at underserved institutions and ensure a copy is sent there
- Men have been found to have an "information advantage" in knowing positions exist in the first place; efforts must be taken to balance this³

² Natalia Zenevyeva and Manuel Bagues. "Does Gender Matter for Academic Promotion? Evidence from a randomised natural experiment," 2010, Vox. [Electronic version] Retrieved on 1 August 2016 from Vox site: <http://www.voxeu.org/article/does-gender-matter-academic-promotion-evidence-randomised-natural-experiment>

³ Scott Jaschik, "Keys to hiring women in science." 5 August 2009, *Inside Higher Education*. [Electronic version] Retrieved 21 August 2016 from: <https://www.insidehighered.com/news/2008/08/05/women>

Establishing a rubric in advance

- A rubric should be ready before the first application comes in and uniformly applied to all applications
- Every candidate should be required to submit the same documents

II. Evaluation of applicants

Unconscious bias

- On the part of committee members themselves
 - Have everyone begin by taking the implicit bias test⁴ to remind all that it's there; discussing bias before reviewing, making reviewers aware, has been seen to affect outcomes^{5,6}
 - Age groups from 40-65 found to have strongest implicit bias;⁷ tend to make up bulk of evaluating committees -- make committee members' age/career status diverse
 - Research has shown women are more likely to take the findings of studies of bias in academic contexts more seriously than men⁸
- As manifest in recommendation letters
 - Gendered bias: it's becoming more well-known that letters of recommendation written for women tend to be shorter, less strongly endorsing, invoke gendered language, and are more likely to discuss the applicant's personal life⁹
 - Regional bias: "it's amazing to find such a qualified scientist from the South!"
 - Racial bias: microaggressive phrasing, e.g., "he's so eloquent."

⁴ <https://implicit.harvard.edu/implicit/takeatest.html>

⁵ Neil Reid, "Gender-Related Systematics in HST Proposal Selection", 2014, ASP, 126, 944
<http://iopscience.iop.org/article/10.1086/678964>

⁶ Chandra TAC proposal success rate tracking:
<https://aas.org/posts/news/2016/04/update-bias-proposal-reviews>

⁷ Isaac, C., Lee, B., & Carnes, M. (2009). Interventions That Affect Gender Bias in Hiring: A Systematic Review. *Academic Medicine : Journal of the Association of American Medical Colleges*, 84(10), 1440–1446 [Electronic Version] retrieved 31 March 2017 at PubMed
<https://www.ncbi.nlm.nih.gov/pubmed/19881440/>

⁸ Ian M. Handley, Elizabeth R. Brown, Corrine A. Moss-Racusin, and Jessi L. Smith. "Quality of evidence revealing gender biases in science is in the eye of the beholder." 2015, PNAS [Electronic version] retrieved 31 March 2017 from PNAS site <http://www.pnas.org/content/112/43/13201.full>

⁹ Toni Schmader, Jessica Whitehead, & Vicki H. Wysocki "A Linguistic Comparison of Letters of Recommendation for Male and Female Chemistry and Biochemistry Job Applicants" Published in *Sex Roles* (2007). [Electronic version] accessed 29 July 2016 at Springer Link at this site:
<http://link.springer.com/article/10.1007%2Fs11199-007-9291-4>

- Having a rubric in place removes the ability for committee members to use potentially personally-biased statements such as, “I *feel*/ this applicant is the best..”
- Position-specific gender antipathy: a study of promotions in europe to associate professor and to full professor found little gender bias at the lower level promotion reviews, but more at the higher, suggesting the amount of bias is related to the level of position being applied for²

Systemic factors

- Take great care with using metrics that have been shown to be affected by bias (e.g., the h-index¹⁰, student evaluations¹¹, publication rates^{12, 13}).
- Remember that uncompensated work is done by candidates from underrepresented groups that only directly manifests on a CV in the sense that it takes away time from working toward accomplishments heavily weighted in evaluation (e.g., publication rates)
- Bear in mind that bias begins at the student level and can result in accumulated lost opportunity over a candidate’s career path
 - Male professors shown to be less likely to work with female students^{14,15}
 - Proposal bias favors male PIs to female^{16,17}

¹⁰ Clint D. Kelly and Michael Jennions "The h index and career assessment by numbers" Trends in Ecology and Evolution, 21, 4 (2006); Lisa Geraci, Steve Balsis, and Alexander J. Busch Busch "Gender and the h index in psychology" Scientometrics, 105, 2023 (2015)

¹¹ Lillian MacNell, Adam Driscoll and Andrea N. Hunt. "What’s in a Name: Exposing Gender Bias in Student Ratings of Teaching" Innovative Higher Education, 2014

¹² Joseph Price and Joshua Price "Citizenship, gender, and racial differences in the publishing success of graduate student and young academics" [Electronic version]. Retrieved 18 December 2015, from Cornell University, School of Industrial and Labor Relations site:
<http://digitalcommons.ilr.cornell.edu/workingpapers/145/>

¹³ M. R. Symonds, N. J. Gemmell, T. L. Braisher, K. L. Gorringer, and M. A. Elgar. “Gender differences publication output: towards an unbiased metric of research performance.” 2006, PLoS One. [Electronic version] retrieved 31 March 2017 at PubMed <https://www.ncbi.nlm.nih.gov/pubmed/17205131/>

¹⁴ Moss-Racusin et al. “Science faculty’s subtle gender bias favors male students” Proceedings of the National Academy of Science, 2012, [Electronic version] Retrieved 29 July 2016 from PubMed at this site: <http://www.ncbi.nlm.nih.gov/pubmed/22988126>

¹⁵ K. L. Milkman, M. Akinola, D. Chugh. “What happens before? A field experiment exploring how pay and representation differentially shape bias on the pathway to organizations” 2014 Journal of Applied Psychology [Electronic version] Retrieved 31 March 2017 at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2063742

¹⁶ Beasley, A. J. NRAO Statement on Bias in Proposal Evaluations. 2016 [Electronic version] Retrieved 1 August 2016 at NRAO site: <https://science.nrao.edu/observing/proposal-types/gender-related-systematics-in-the-nrao-proposal-review-processes>

- Funding more often granted to male than female PIs¹⁸ at rates estimated up to 7%¹⁹
- Studies have found that women are less likely to self-cite than men²⁰
- Applicants from underrepresented groups need to have more publications and qualifications to be considered as competent as those not from underrepresented groups^{21,22}

The composition of the applicant pool and short list

- Critical mass: the *Chandra* X-ray center team has tracked proposal PI gender and noted once the fraction of women PIs submitting proposals reached 25%, the likelihood of proposal success reached the fraction of applicants⁴
- If only one member of an underrepresented group is in the pool, the statistical likelihood they will be hired is ~0%²³
- If there are no applicants from underrepresented groups present in the final selection pool, for accountability, the hiring committee should be able to explain to the equity office why this is the case¹ (e.g., search and recruiting efforts failed, the scientists who did apply failed to meet a basic criterion in the rubric, etc)

III. After the hire is made

¹⁷ Fernando Patat, "Gender Systematics in Telescope Time Allocation at ESO" 2016, ESO Messenger, 165, 2. [Electronic version] Retrieved 5 October 2016 via arxiv: <https://arxiv.org/abs/1610.00920>

¹⁸ Romy van der Lee and Naomi Ellemers, "Gender contributes to personal research funding success in The Netherlands" 2015, PNAS [Electronic version] Retrieved 1 August 2016 at PNAS site: <http://www.pnas.org/content/112/40/12349.full.pdf>

¹⁹ Lutz Bornmann, Ruediger Mutz and Hans-Dieter Daniel, "Gender differences in grant peer review: A meta-analysis" 2007. [Electronic version] Retrieved 1 August 2016 from the arxiv: <http://arxiv.org/vc/math/papers/0701/0701537v2.pdf>

²⁰ Molly King et al. "Men set their own cites high: Gender and self-citation across fields and over time" 2016, Physics and Society. [Electronic version] Retrieved 1 August 2016 from the arxiv: <https://arxiv.org/abs/1607.00376>

²¹ Wennerås, C., & Wold, A. "Nepotism and sexism in peer-review." 1997, Nature, 387, 341-343

²² Madeline Heilman and Michelle Haynes, "Subjectivity in the Appraisal Process: A Facilitator of Gender Bias in Work Settings" 2008, Eds. Eugene Borgida and Susan Fiske. Beyond Common Sense: Psychological Science in the Courtroom. [Electronic version] Retrieved 1 August 2016 at Wiley site: <http://onlinelibrary.wiley.com/doi/10.1002/9780470696422.ch7/summary>

²³ Johnson, Heckman, & Chan "If There's Only One Woman in Your Candidate Pool, There's Statistically No Chance She'll be Hired" [Electronic version]. Retrieved 29 July 2016, from Harvard Business Review: <https://hbr.org/2016/04/if-theres-only-one-woman-in-your-candidate-pool-theres-statistically-no-chance-she-be-hired>

Convene post-process to debrief, review what was effective and what was not, save a summary for next committee's use. Check back in with the institutional equity office or whichever particular administrative body was initially consulted pre-search to ensure accountability¹.

IV. Suggestions for avoiding the pitfalls

- Anonymized evaluation: give committee CVs/cover letters/research statements for initial ranking with applicant names removed (can be added later as needed)
- Use letters of recommendation as second stage information (once initial anonymized assessment is complete) and if possible, run recommendation letters through online tools²⁴ to detect words that are gender-coded before the committee evaluates them; remove, highlight, or replace them with neutral synonyms
- Prepare final questions to keep in mind to minimize influence of bias and societally-driven assumptions (directly reproduced from the University of Oregon faculty hiring implicit bias guide²⁵):

“Determine whether qualified women and underrepresented minorities are included in your pool at rates expected based on availability, and consider whether evaluation biases and assumptions are influencing your decisions by asking yourself the following questions:

- *Are women and minority candidates subject to different expectations in areas such as numbers of publications, name recognition, or personal acquaintance with a committee member?*
- *Have the accomplishments, ideas, and findings of women or minority candidates been undervalued or unfairly attributed to a research director or collaborators despite contrary evidence in publications or letters of reference?*
- *Is the ability of women or minorities to run a research group, raise funds, and supervise students and staff of different gender or ethnicity being underestimated?*
- *Are assumptions about possible family responsibilities and their effect on a candidate's career path negatively influencing evaluation of a candidate's merit, despite evidence of productivity?*
- *Are negative assumptions about whether women or minority candidates will “fit in” the existing environment influencing evaluation?”*

V. Pie-in-the-sky wish list for hiring

This is my personal wish list (I acknowledge some entries obsolete others).

- Advertisements that explicitly say what the department is looking for. E.g., if you want a cosmologist/extragalactic theorist/observer, please save the stellar people the time of applying.
- A common application!!

²⁴ <http://www.tomforth.co.uk/genderbias/>, <https://textio.com/>

²⁵ <http://facultyhiring.uoregon.edu/special-concerns/>

- Timely notification systems -- I've gotten pushback that HR prohibits this; a workaround should be found somehow, and HR prohibitions don't explain the jobs never heard from at all! The rumor mill cannot be our only means of closure, it's grossly unprofessional.
- Obsolescence of the rumor mill (or not? It is at the very least a source of accountability..)
- Building on the last two points: openly published short lists are sensible, rather than leaving it to candidates to reconstruct based on rumor and colloquium invites.
- Attention to/effort invested in making departments inclusive spaces that will attract and retain applicants of all identities²⁶
- It's an applicant's life and career path, not just a committee meeting. In the depersonalization of the process, it feels like this is forgotten
- That committees keep in mind the cumulative effects of biases on URM applicants: loss of opportunities to get data (proposal evaluation bias), loss of opportunities in getting high name-recognition jobs/fellowships, potentially inadequate mentoring, bias against funding applications
- Feedback for applicants. What if a particular recommender is not writing good letters? Or they didn't get in on time/at all?
- "Wild card" entry: separate applications of URM from non-URM, if the best isn't already in the applicant pool, add them.

²⁶ "AAS Endorses Vision Statement for Inclusive Astronomy" [Electronic version] Retrieved 29 July 2016 at the AAS website here:

<https://aas.org/media/press-releases/aas-endorses-vision-statement-inclusive-astronomy>