Resources on the Status of Women in Physics

This is a collection of resources gathered by Charlotte Olsen and Sabrina Appel on the status of women and other underrepresented groups in Physics. We recognize that this collection is far from comprehensive. However, we hope that it can serve as a useful starting point for anyone looking for information on this subject. Note that the majority of these resources are focused on the status of women and the unique issues faced by women in Physics. However, several of the resources also include information on other underrepresented groups and many of the issues faced by women are also faced by other groups. Most of these resources are papers or articles from various sources, but several are bibliographies, talks, websites or other types of sources. We provide a title, brief description, and a link to each of the resources below. (If you have trouble accessing any of these links, please do not hesitate to reach out to us and we will help you find the resource.)

Title: "Unconscious Bias: Table of Contents"
Brief Description: A very detailed list of studies on unconscious bias sorted by a variety of categories, including field, stage of career, recognitions, subject, identity, type of document etc. for both academia and the general workforce. This resource also includes a summary, quotes, and links to all the resources.
URL:
https://academic.ubc.ca/sites/vpa.ubc.ca/files/documents/Unconscious%20Bias%20Studies%20and%20Resources.pdf

Title: "An annotated bibliography of work related to gender in science"
Brief Description: A detailed list of resources to get you started! This list includes a description of each resource and relevant quotes.
URL: https://arxiv.org/abs/1412.4104

Title: "Science faculty's subtle gender biases favor male students"
Brief Description: A PNAS study which used a resume study to compare the response of science faculty to male and female applicants for a fictional lab manager position. The study finds that male applicants are rated as more hireable and more competent, and are offered a higher starting salary and more mentoring. Female applicants are rated as more likable.
URL: https://www.pnas.org/content/109/41/16474

Title: "Nepotism and Sexism in Peer Review"

Brief Description: An analysis of peer-reviewed postdoc fellowship applications finds that women are regularly scored lower on competency than men. Applicants with ties to the reviewer also scored better.
URL: https://www.nature.com/articles/387341a0

Title: "APS: Women in Physics Statistics"
Brief Description: The APS website has some great statistics on the status of women in Physics going back to the 1960's. The website has a variety of plots comparing graduation rates over time. You can also download the raw data and make your own plots. They also have statistics for individual institutions.
URL: https://www.aps.org/programs/women/resources/statistics.cfm

Title: "Gender inequality in authorship set to persist for decades"
Brief Description: A brief column in Nature about the discrepancy in authorship in STEM. Authorship in Physics studies is predicted to reach gender parity in 260 years, based on the current trend.
URL: https://www.nature.com/articles/d41586-018-05269-9

Title: "LGBT Climate in Physics"
Brief Description: APS report on the current climate for LGBT physicists as the result of the work of the Ad-Hoc Committee on LGBT Issues.
URL: https://www.aps.org/programs/lgbt/upload/LGBTClimateinPhysicsReport.pdf

Title: "High Energy Physics Community Statement"
Brief Description: A brief statement by the High Energy Physics community in the wake of a highly sexist talk at CERN. The statement addresses the issues with the talk and reaffirms the humanity of any person regardless of "ascribed identities such as race, ethnicity, gender identity, religion, disability, gender presentation, or sexual identity."
URL: https://www.particlesforjustice.org/

Title: "The Leaky Pipeline for Postdocs: A study of the time between receiving a PhD and securing a faculty job for male and female astronomers"
Brief Description: Uses a public database of new hires to analyze the time in a transitory state of post-doc purgatory. The study finds that the higher hiring rate for men could be a result of women leaving the field.
URL: https://arxiv.org/abs/1810.01511

Title: "Three years later: gender differences in the advisor's impact on career choice in astronomy and astrophysics"
Brief Description: This study follows a cohort of young astronomers and considers the impact of a variety of factors on whether respondents remain in the field. For example, the study considers the impact of imposter syndrome, mentoring and advising during grad school, the two-body problem, and the gender of the respondent.
URL: https://arxiv.org/abs/1811.11836

Title: "Women's and men's career choices in astronomy and astrophysics"
Brief Description: A precursor to the above article, this paper looks at the same cohort but without the 2015 data. Women were less likely to report a positive relationship with a graduate advisor and more likely to report a two-body problem.
URL:
https://www.aip.org/statistics/reports/women%E2%80%99s-and-men%E2%80%99s-career-choices-astronomy-and-astrophysics

Title: "Sexual harassment reported by undergraduate female physicists"
Brief Description: Uses a survey from attendants of the Conference for Undergraduate Women In Physics (CUWiP) as a sample. Finds that (74.3%; 338=455) of respondents have faced at least one type of sexual harassment.
URL: https://journals.aps.org/prper/pdf/10.1103/PhysRevPhysEducRes.15.010121

Title: "Double jeopardy in astronomy and planetary science: Women of color face greater risks of gendered and racial harassment"
Brief Description: An internet-based survey of the workplace experiences of 474 astronomers and planetary scientists between 2011 and 2015 showing that 40% of women of color reported feeling unsafe in the workplace as a result of their gender or sex, and 28% of women of color reported feeling unsafe as a result of their race. 18% of women of color, and 12% of white women, skipped professional events because they did not feel safe attending, identifying a significant loss of career opportunities due to a hostile climate.
URL: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017JE005256

Title: "Gender differences in individual variation in academic grades fail to fit expected patterns for STEM"
Brief Description: This article finds that while fewer women pursue STEM careers, girls outperform boys at school in the relevant subjects. The study finds less variance in girls STEM grades and a higher mean. Simulation suggest that the top 10% of a class contains equal numbers of boys and girls in STEM and more girls in non-STEM subjects.
URL: https://www.nature.com/articles/s41467-018-06292-0

Title: "Quantitative Evaluation of Gender Bias in Astronomical Publications from Citation Counts"
Brief Description: Uses sample of over 200,000 publications from 1950 to 2015 from five major astronomy journals and determines the gender of the first author for over 70% of all publications. The fraction of papers which have a female first author has increased from less than 5% in the 1960s to about 25% today. They find that the increase of the fraction of papers authored by females is slowest in the most prestigious journals such as Science and Nature. Furthermore, female authors write 19±7% fewer papers in seven years following their first paper than their male colleagues. At all times papers with male first authors receive more citations than papers with female first authors. They show that papers authored by females receive 10.4±0.9% fewer citations than what would be expected if the papers with the same non-gender specific properties were written by the male authors
URL: https://arxiv.org/abs/1610.08984

Title: "Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine"
Brief Description: This book is the consensus study report of the National Academies of Sciences, Engineering, and Medicine. Over the years, research, activity, and funding has gone into improving the representation in women in science, engineering, and medicine. However, as representation improves, women increasingly face biases and barriers, including sexual harassment.
URL:
https://www.nap.edu/catalog/24994/sexual-harassment-of-women-climate-culture-and-consequences-in-academic

Title: "Women and the Imposter Syndrome in Astronomy"
Brief Description: This study considers the effect of imposter syndrome on women in astronomy. A survey of US astronomy and astrophysics graduates found that women were more likely to report feelings associated with imposter syndrome. The study also found that respondents who were mentored were less likely to report feelings of imposter syndrome and mentoring improved retention of students in science.
URL: https://www.aip.org/sites/default/files/statistics/lsags/status-ivie-full.pdf

Title: "Postdoctoral Fellowships in Geoscience"
Brief Description: Not, physics, but STEM related. Women recieve 40% of PhDs in geosciences and only get 10% of the full professorial positions.
URL: https://www.nature.com/articles/ngeo2819

Title: "Coming out in STEM: Factors affecting retention of sexual minority STEM students"
Brief Description: A study of sexual minorities (i.e. LGBTQ+) in Higher Ed. which used a linear regression model. The study finds a drop in retention of 7% as compared to heterosexual peers.
URL: https://advances.sciencemag.org/content/4/3/eaao6373

Title: "Gender-based Systematics in HST Proposal Selection"
Brief Description: Examines proposals from HST cycles 11 through 21. Finds a small, but consistent systematic bias towards male PIs being awarded more telescope time.
URL: https://arxiv.org/pdf/1409.3528.pdf

Title: "Nevertheless she persisted? Gender peer effects in doctoral STEM programs"
Brief Description: This study considers the effects of gender peer composition as a proxy for the "female-friendliness" of the environment and finds that women entering cohorts with no female peers are 11.9% less likely to graduate within 6 years than their male peers. This effects seems to be primarily due to an increase in the probability of dropping out in the first year of the Ph.D. program.
URL: https://www.nber.org/papers/w25028.pdf

Title: "Do evidence-based active-engagement courses reduce the gender gap in introductory physics courses?"
Brief Description: This study compared the performance of male and female students in introductory physics classes that used evidence-based active-engagement (EBAE) strategies and classes that used lecture based (LB) instruction. The students in the EBAE classes overall outperformed those in the LB classes. However, the gender gap persisted in both types of classes or even increased in EBAE classes.
URL: https://drive.google.com/file/d/1_ePAblrbJUbn_gHzShaSwTdovHS1YVVQ/view

Title: "Is agreeing with a gender stereotype correlated with the performance of female students in introductory physics?"
Brief Description: This study shows that female students who agree with gender stereotypes and had more stereotype threat performed worse on conceptual surveys at the end of the semester than female students who did not agree with gender stereotypes, even when there was no difference at the beginning of the course.
URL: https://drive.google.com/file/d/1sJk1SP8_uBSFpB-Xh15rMRgdS8br72mx/view

Title: "Female students with A's have similar physics self-efficacy as male students with C's in introductory courses: A cause for alarm?"

Brief Description: This study compares the self-efficacy of male and female students with similar performance in an introductory physics course. Female students have lower self-efficacy than male students after both physics 1 and 2. In addition, the gap grew throughout the course sequence regardless of the course format. This suggests that the self-efficacy of female students was negatively impacted by their experience in intro physics.
URL: https://drive.google.com/file/d/1Q_DD5xuSjSkcMrRt69MfW_3oybk1cA4w/view

Title: "Talking about Leaving: Why Undergraduates Leave the Sciences"
Brief Description: This is a book about why undergraduates with above average ability in the sciences switch out of STEM and into non-science majors.
URL:
https://www.amazon.com/Talking-About-Leaving-Undergraduates-Sciences/dp/0813366429

Title: "What does access really mean?"
Brief Description: A video of a talk given by Professor Mary James from Reed College at the 2016 APS Conference for Undergraduate Women in Physics (CUWiP) hosted by Oregon State University (OSU). She discusses her personal experiences in physics and relates her experience to what she believes access really means when it comes to access to an education in physics. The hour-long talk covers a variety of topics including bias (conscious and unconscious), growth mindset vs fixed mindset, imposter syndrome, and many other issues which are faced by underrepresented groups in physics.
URL: https://www.youtube.com/watch?v=aEQJGinSAWY

Title: "Another Obstacle for Women in Science: Men Get More Federal Grant Money"
Brief Description: This article discusses the fact that men get more federal grant money that women. For example, male PIs recieved $41000 more than female PIs from NIH.
URL: https://www.nytimes.com/2019/03/05/science/women-scientists-grants.html

Title: "Stereotype Threat and the Intellectual Test Performance of African Americans"
Brief Description: An early study of stereotype threat and the impact that negative stereotypes about a group have on the text performance of members of that group.
URL:
https://users.nber.org/~sewp/events/2005.01.14/Bios+Links/Good-rec2-Steele_&_Aronson_95.pdf