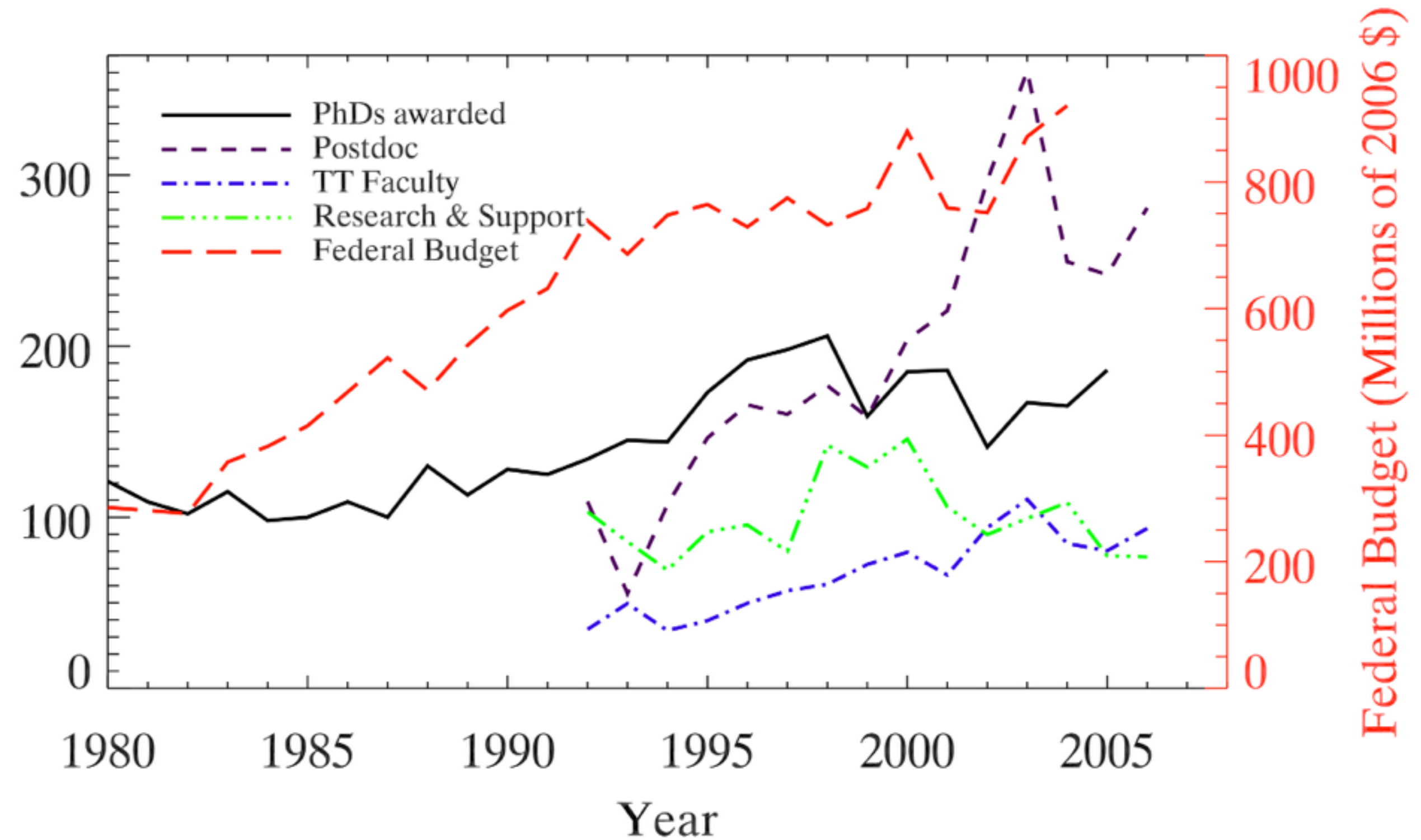


Panel:

- Jennifer Donovan-Meyer**
(NAASC Fellow, NRAO)
- Preshanth Jagannathan**
(Reber Pre-doctoral Fellow, U. Calgary/ NRAO)
- Minnie Mao**
(NRAO Postdoc, NRAO)
- Walter Max-Moerbeck**
(NRAO Postdoc, NRAO)
- Ylva Pihlstrom**
(Associate Professor, U. New Mexico)
- Urvashi Rao**
(Associate Scientist, NRAO)
- Jose Salcido**
(VLA Operator)
- Anna Scaife**
(Associate Professor, U. Southampton)

Moderator: **Betsy Mills** (Jansky fellow, NRAO)

Career



Anil Seth et al. 2009, "Employment and Funding in Astronomy"

AAS Career Profiles (examples)

<http://aas.org/jobs/career-profiles>

Administration

Carie Cardamone - Brown University, Assoc. Director, Center for Teaching & Learning

Consulting

Anonymous – Boston Consulting Group, Consultant

Data Science

Jessica Kirkpatrick - Director of Data Science at InstaEDU

Defense

Anonymous - Federally Funded Research and Development Center, Research Staff

Finance

Melissa Nysewander - Fidelity Investments, Principal Data Scientist

Government

Sethanne Howard - US Naval Observatory, Chief of Nautical Almanac Office (retired)

Industry

Andre Wong – Teledyne Imaging Sensors, ASIC Design Engineer

Management

Doris Daou - NASA Lunar Science Institute, Associate Director

Museums

Doug Roberts – Adler Planetarium & Associate VP for Digital Technologies

Science Communication/Writing

Leslie Sage - *Nature*, Senior Editor

Software

Patrik Jonsson - SpaceX, Software Engineer

Teaching & Learning

Andy Cantrell - Blake School, Mathematics Teacher

Soft Money

Anonymous - Senior Scientist - Soft Money

Academia

Anonymous - Large Research 1 University, Lecturer (non-tenure track)

Education and Public Outreach @NRAO



<http://www.nrao.edu/epo/>

Press Releases

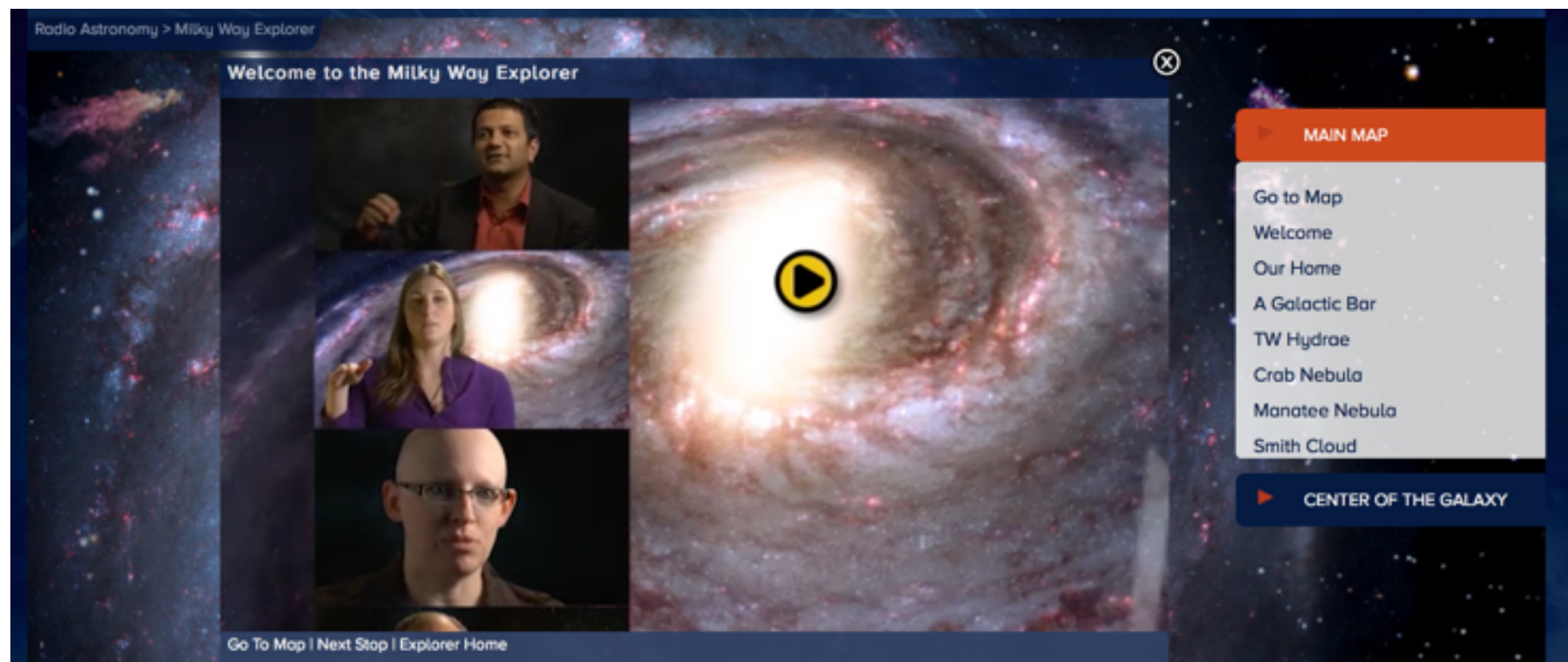
Visitor Center Staffing

Undergraduate observing trips

Telescope Tours

Maintain Public Webpage

Create new activities and videos



Grote Reber Doctoral Fellowship Program

The **Grote Reber Doctoral Research Program** at NRAO (formerly known as the "NRAO Pre-Doctoral Research Program") is jointly sponsored by the NRAO and by universities who wish their Ph.D. thesis students to have a concentrated exposure to research in radio astronomy, its instruments, or computational techniques under the supervision of an NRAO staff astronomer or engineer.

Examples of NRAO Pre-Doctoral students and Reber Fellows and their topics since 1990 are given [here](#).

The program works as follows: with the consent of a student's academic department, the student comes to the NRAO to do thesis research under the supervision of an NRAO scientist or engineer. The duration of the appointment is flexible and may range from several months up to two years. The time spent at the NRAO need not be continuous.

Opportunities for participation in the Reber Fellowship program are available at all three of the NRAO's sites. Reber Fellows are paid a stipend and have access to NRAO's computing resources. Through funds provided by the estate of Grote Reber, Reber Fellows are able to attend one scientific meeting per year to present their Ph.D. research.



To be eligible for the NRAO Reber Fellowship program a student must first:

- Complete all university course requirements so that only the thesis research is needed as an academic requirement for the Ph.D. degree;
- Obtain the consent of his or her thesis advisor and of the chairman of their academic department to participate in the NRAO Reber Fellowship program;
- Contact, or ask the thesis advisor to contact, an NRAO staff member who is willing to serve as thesis co-advisor and as local supervisor of the student's research program.

The student's academic advisor must then contact the program administrator listed below and request to participate in the NRAO Reber Fellowship program. The NRAO program administrator will require:

- A letter from the student's academic advisor and the proposed NRAO staff co-advisor nominating the student for a Reber Doctoral Fellowship appointment.
- A Curriculum Vitae, statement of proposed research plan, and timetable for Ph.D. completion from the student.

There is no fixed application deadline for the NRAO Reber Doctoral Fellowship program. NRAO scientific and engineering staff interested in funding a student through the Reber Doctoral Fellowship program should contact [Alison Peck](#).

Diversity

Fraction of Women in Astronomy

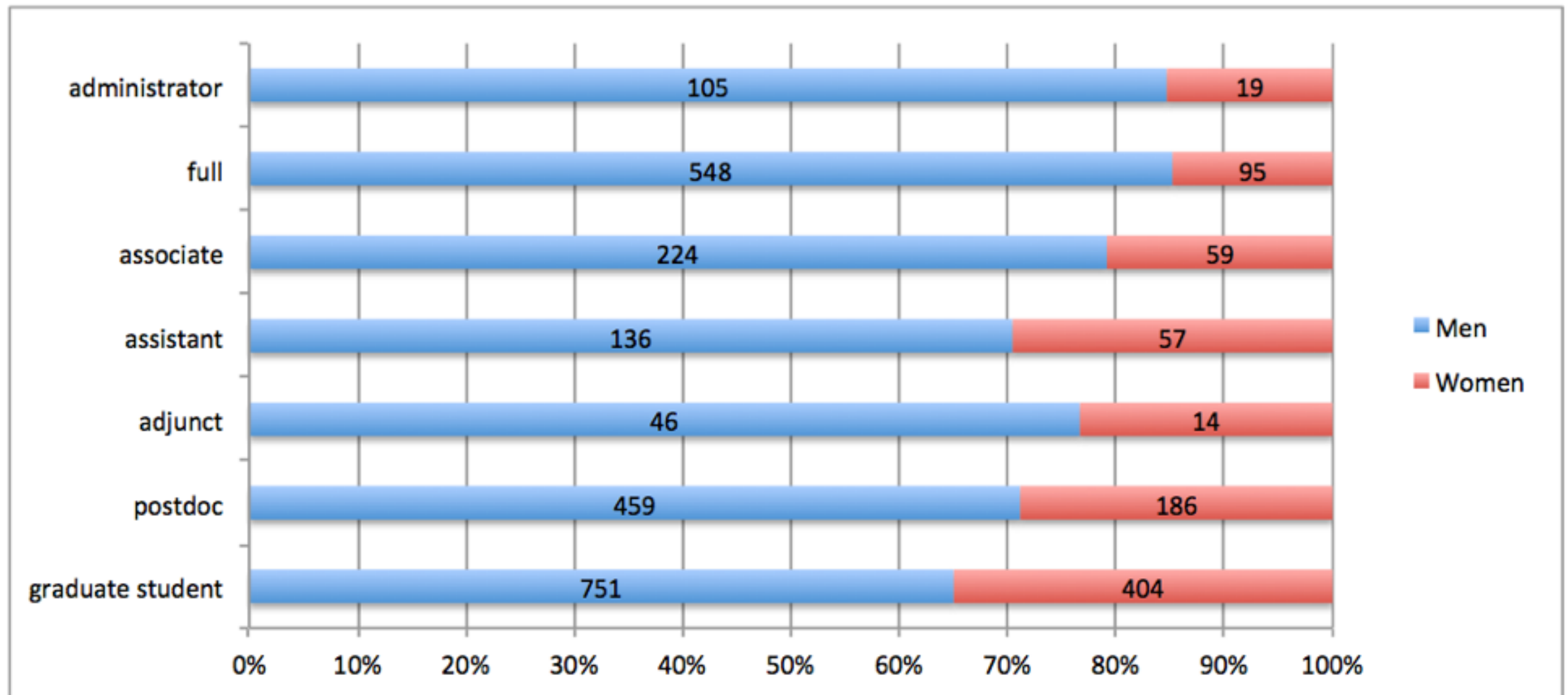


Figure 1: Snapshot of the gender demographics of astronomers as of January 1, 2013. The dividing line between red and blue indicates fractional representation of men and women, while numbers within each bar indicate the total number of men and women represented.

2013 CSWA Demographics Survey

Distribution of Women in Astronomy

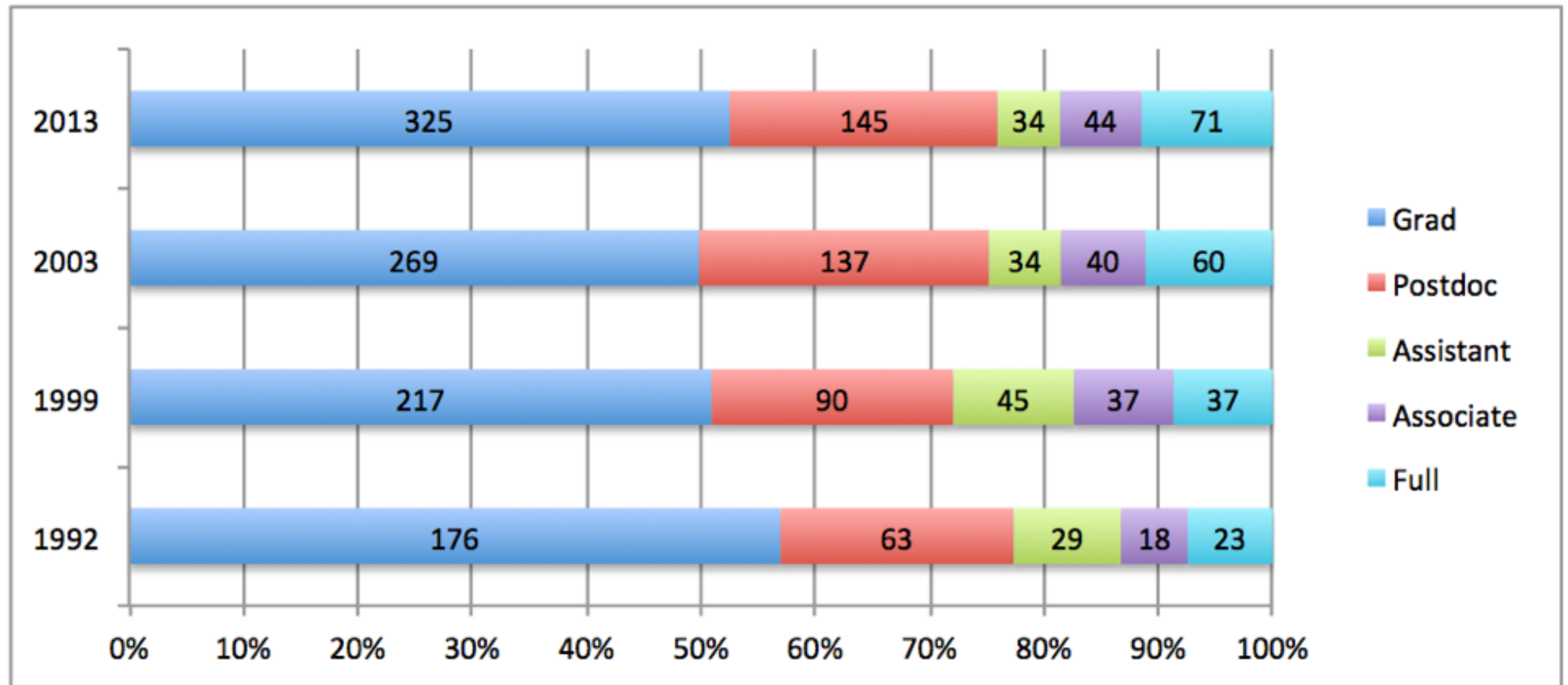


Figure 2: Distribution of female U.S. astronomers by professional rank in the 1992, 1999, 2003, and 2013 surveys. Both tenure-track and research-track scientists are included. As in Figure 1, the absolute numbers in each rank are indicated in black.

2013 CSWA Demographics Survey

Distribution of Men in Astronomy

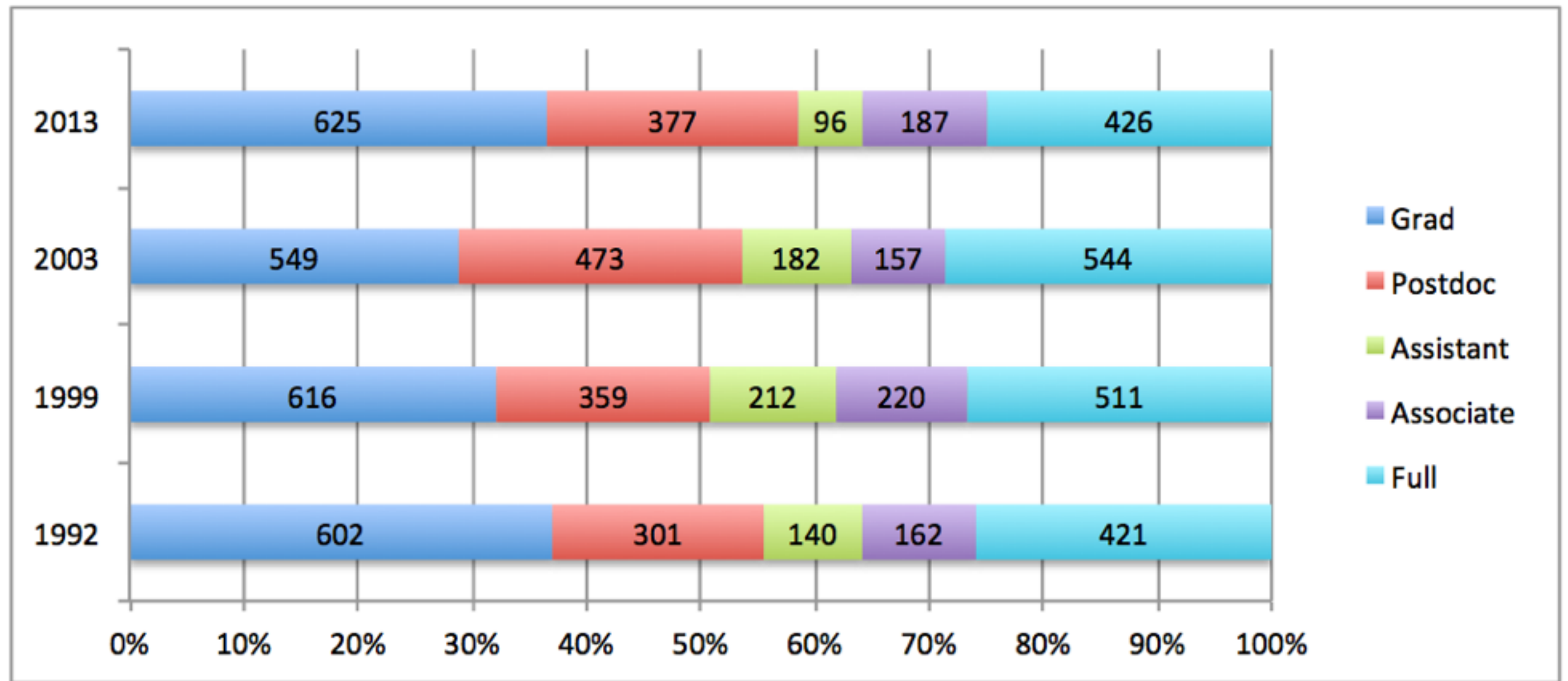


Figure 3: Same as Figure 2, but for male U.S. astronomers.

2013 CSWA Demographics Survey

Barriers:

Unconscious Bias

Given two identical applicants of different gender, both men AND women will tend to rate the man's work higher.

Family

Studies have shown that having children is more likely to have a negative impact on women's careers, and actually has a positive impact on men's careers.

Gender Stereotypes

Women can face hostility both for traits which conform to female stereotypes (but are thought to be incompatible with academia) and for traits which are not stereotypically female (assertiveness)

Lack of mentors, Impostor Syndrome, etc!

Resources:

AAS Committee for the status of women in astronomy (CSWA)

<http://www.aas.org/cswa/>

Women in Astronomy Blog

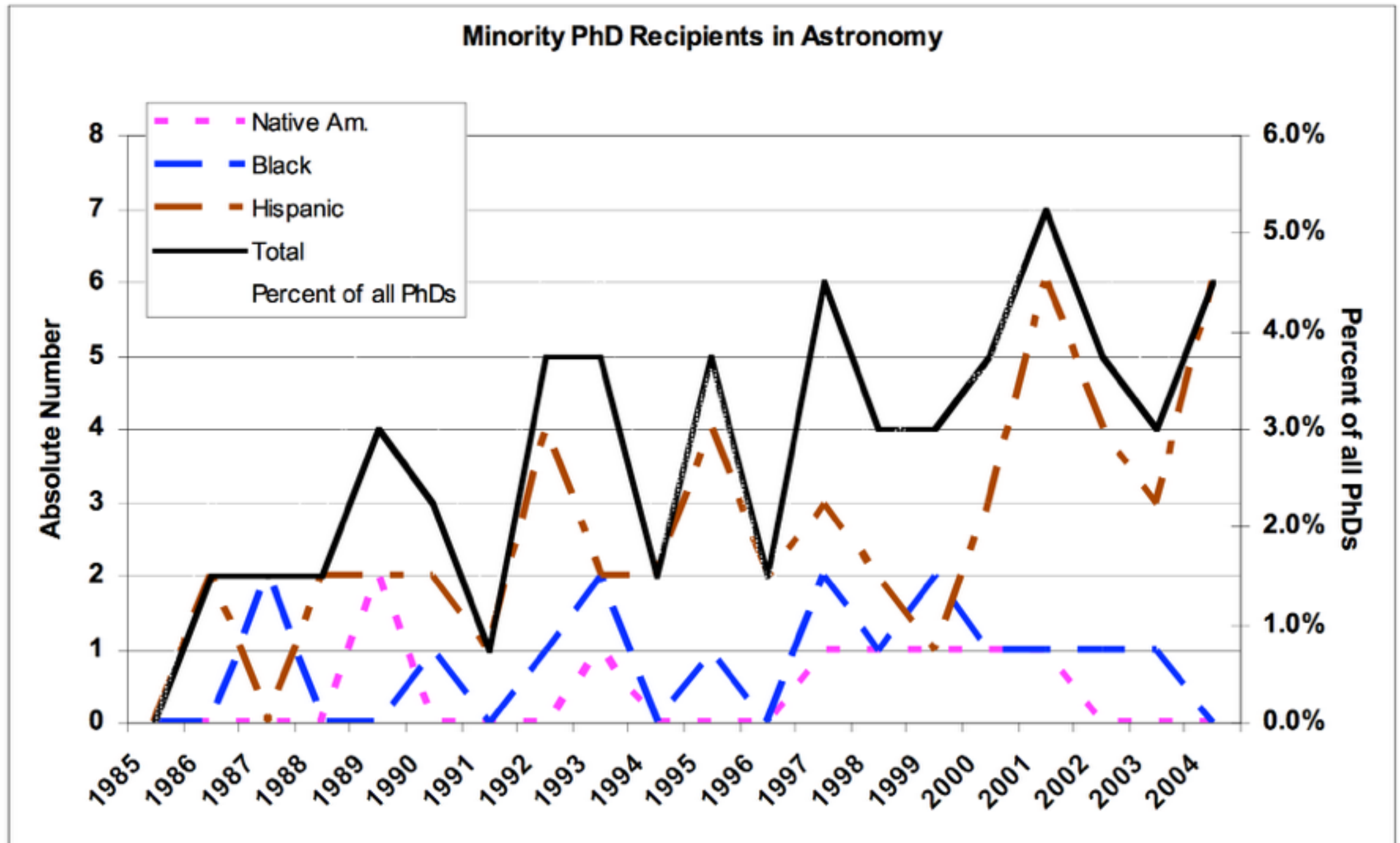
<http://womeninastronomy.blogspot.com>

IAU working group on Women in Astronomy

<http://iauwomeninastronomy.org>

Underrepresented Groups in Astronomy

As of 2009, these minorities represent ~27% of the US population.
There are also <20 minority faculty at US astro PhD-granting institutions.



Norman et al. (2009) Astro2010 white paper

Barriers:

Stereotype threat

Wikipedia: “The experience of anxiety in a situation in which a person has the potential to confirm a negative stereotype about his or her social group. Stereotype threat has been shown to reduce the performance of individuals who belong to negatively stereotyped groups.”

Lack of Privilege

Examples might include: Limited access to high-quality education, lack of family support for pursuing a scientific career, few or no community role models, needing to work to support ones family,

Difficulty building networks and collaborations, difficulty achieving insider status, lack of effective mentoring, Unfavorably department climate, Lack of support, Cultural alienation, Hostility, Accumulation of Disadvantage, Underestimation of Performance, etc.

Norman et al. (2012)

Recent Initiatives:

U. Washington PreMap (2005-)

The Pre-Major in Astronomy Program

<http://www.astro.washington.edu/groups/premap>

Targets students traditionally underrepresented in astronomy (women, African Americans, Latinos, Native Americans, Asians/Pacific Islanders, low-income and first-generation college students). A cohort of students (~15) take an introductory astronomy course in the Autumn quarter, as well as a seminar led by a graduate student. Students participate in a small-group research project and also receive one-on-one mentoring and peer support

U. Maryland GradMap (2013-)



Connects students at local minority-serving institutions with U. Maryland graduate and faculty researchers. By visiting local schools and inviting students to a week-long winter workshop in which they learn valuable research skills and begin a research project, the goal is to give underrepresented students the skills and experience to successfully pursue graduate degrees in physics and astronomy.

Fisk-Vanderbilt Bridge

Fisk-Vanderbilt

Masters-to-PhD Bridge Program

a joint program in astronomy, biology, chemistry, physics, and materials science

- Earn a Masters degree at Fisk in physics or biology or chemistry, with full funding support.
- Along the way, get valuable research experience with caring, dedicated mentors.
- Get fast-track admission to one of the participating Vanderbilt PhD programs, with full funding.

References

Unconscious Bias:

<http://www.aas.org/cswa/unconsciousbias.html>

<http://www.tolerance.org/Hidden-bias>

<http://www.scientificamerican.com/article/sex-and-race-discrimination-in-academia-starts-even-before-grad-school/>

Mervis et al. 2012: <http://www.sciencemag.org/content/337/6102/1592.full>

Effect of family on career, by gender:

http://www.slate.com/articles/double_x/doublex/2013/06/female_academics_pay_a_heavy_baby_penalty.html

<http://curt-rice.com/2011/12/08/the-motherhood-penalty-its-not-children-that-slow-mothers-down/>

Stereotype threat:

<http://www.reducingstereotypethreat.org/definition.html>

Gender stereotypes:

<http://psych.princeton.edu/psychology/research/prentice/pubs/Prentice%20Carranza.pdf>

See also Burgess & Borgida 1999

Impostor syndrome:

http://www.paulinerosecclance.com/pdf/ip_high_achieving_women.pdf

<http://www.nature.com/naturejobs/science/articles/10.1038/nj7245-468a>

Women and Minorities in Astronomy and Science in general:

Norman et al. 2009a <http://www8.nationalacademies.org/astro2010/DetailFileDisplay.aspx?id=440>

Norman et al. 2009b <http://www8.nationalacademies.org/astro2010/DetailFileDisplay.aspx?id=442>

Norman et al. 2009c <http://www8.nationalacademies.org/astro2010/DetailFileDisplay.aspx?id=443>

Nota et al. 2009 <http://www8.nationalacademies.org/astro2010/DetailFileDisplay.aspx?id=417>

<http://sciencelife.uchospitals.edu/2012/01/31/the-invisible-barriers-to-women-in-science/>

<http://www.theguardian.com/higher-education-network/blog/2012/may/24/why-women-leave-academia>

<http://www.popsci.com/science/article/2013-02/science-confirms-obvious-men-and-women-arent-different>

<http://womeninastronomy.blogspot.com/2014/03/the-2013-cswa-demographics-survey.html>

<http://sites.nas.edu/wocconference/files/2012/03/6.3.-American-Astronomical-Society.pdf>

Astronomy job market statistics:

<http://blog.professorastronomy.com/2010/03/state-of-astronomy-job-market.html>