

Physics 224

The Interstellar Medium

Ethics & Research

Based in part on G. Besla's ASTR 520 at U of A &
P. Kalas Astro 250 at UC Berkeley

“The scientific enterprise is built on a foundation of trust. Society trusts that scientific research results are an honest and accurate reflection of a researcher’s work. Researchers equally trust that their colleagues have gathered data carefully, have used appropriate analytic and statistical techniques, have reported their results accurately, and have treated the work of other researchers with respect. When this trust is misplaced and the professional standards of science are violated, researchers are not just personally affronted—they feel that the base of their profession has been undermined. This would impact the relationship between science and society.”

– *On Being a Scientist* National Academy of Sciences, 3rd edition.

Overview

Overview

- Where are you meant to learn about ethics in research?

Overview

- Where are you meant to learn about ethics in research?
- For astronomy - no human or animal subjects, few patents or IP issues, who do we consider in our ethical decisions?

Overview

- Where are you meant to learn about ethics in research?
- For astronomy - no human or animal subjects, few patents or IP issues, who do we consider in our ethical decisions?
- Where do we find information on the professional standards of our fields?

Overview

Overview

- Proposal Writing (proposing new scientific efforts, allocating credit, citations, co-authorship)

Overview

- Proposal Writing (proposing new scientific efforts, allocating credit, citations, co-authorship)
- Proposal Reviewing (conflicts of interest, unconscious bias)

Overview

- Proposal Writing (proposing new scientific efforts, allocating credit, citations, co-authorship)
- Proposal Reviewing (conflicts of interest, unconscious bias)
- Handling Data (publication, making data available)

Ethics of Proposal Writing

What ethical concerns are there when proposing new scientific investigations?

Start by considering who else is potentially affected:

- You
- Your collaborators, students, mentors
- Other researchers in your sub-field
- The field in general
- Funding agencies
- The public

Ethics of Proposal Writing

What ethical concerns are there when proposing new scientific investigations?

Ethics of Proposal Writing

What ethical concerns are there when proposing new scientific investigations?

- Are you in a position to actually perform the investigation if you get the observing time, funding, computer resources, etc?

Ethics of Proposal Writing

What ethical concerns are there when proposing new scientific investigations?

- Are you in a position to actually perform the investigation if you get the observing time, funding, computer resources, etc?
- Have you put in your best faith effort to make sure what you want to do is possible? What are the boundaries to this?

Ethics of Proposal Writing

What ethical concerns are there when proposing new scientific investigations?

- Are you in a position to actually perform the investigation if you get the observing time, funding, computer resources, etc?
- Have you put in your best faith effort to make sure what you want to do is possible? What are the boundaries to this?
- Have you done a thorough search to make sure this information is not available elsewhere?

Ethics of Proposal Writing

What ethical concerns are there when proposing new scientific investigations?

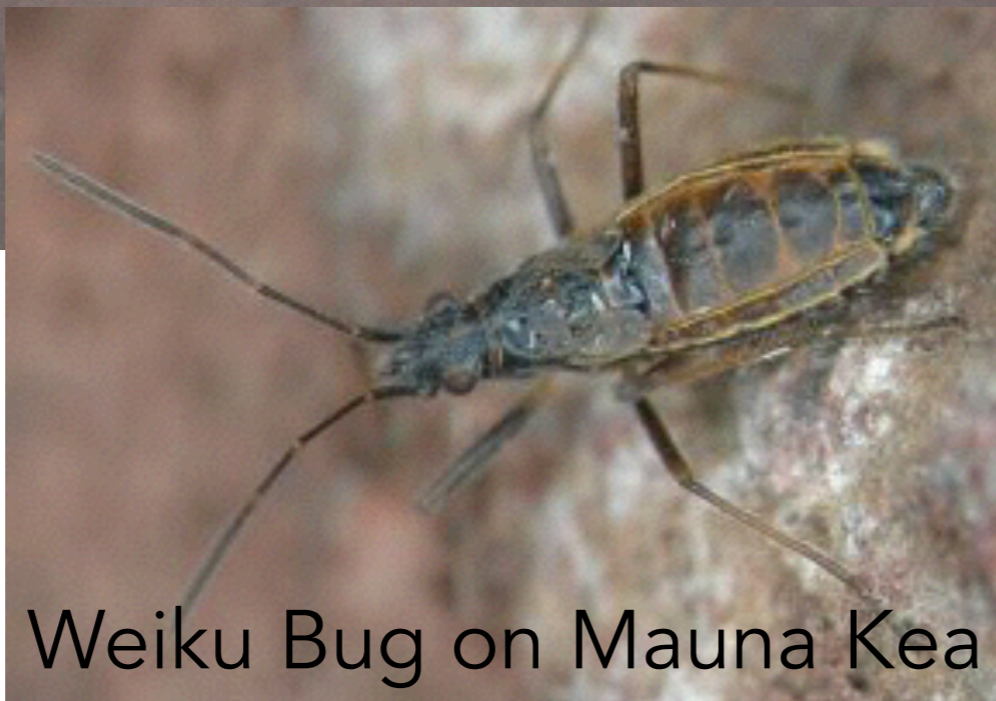
- Are you in a position to actually perform the investigation if you get the observing time, funding, computer resources, etc?
- Have you put in your best faith effort to make sure what you want to do is possible? What are the boundaries to this?
- Have you done a thorough search to make sure this information is not available elsewhere?
- Who are you asking for resources? Are these resources obtained in ways that meet your & the field's ethical standards?

Ethics of Proposal Writing

SOFIA telescope



Environmental
Impact of
Astronomy



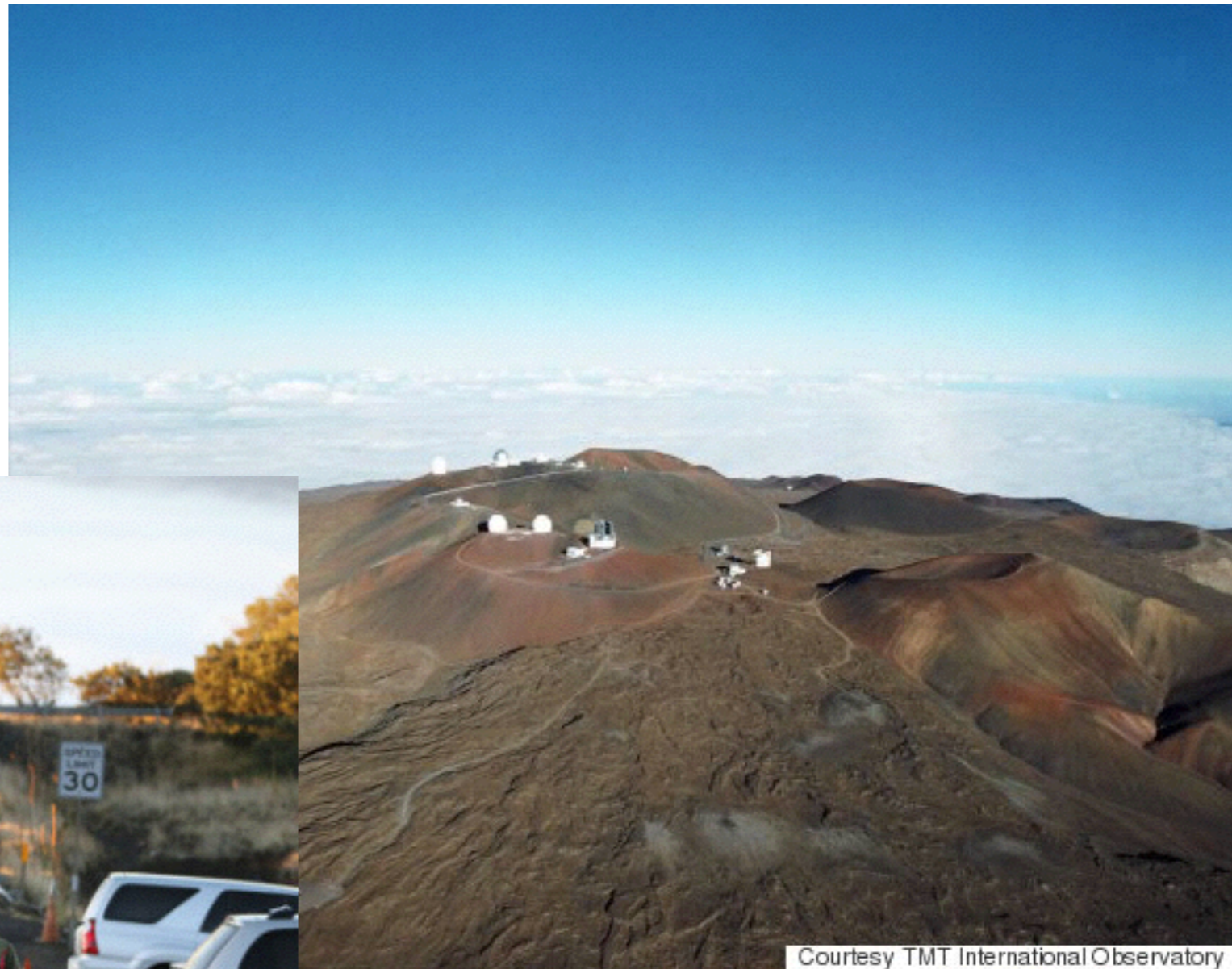
Weiku Bug on Mauna Kea



Red squirrel from Mt. Graham

Ethics of Proposal Writing

Cultural
Impact of
Astronomy



images from http://www.huffingtonpost.com/2015/04/13/hawaii-telescope-protests-tmt-mauna-kea_n_7044164.html

Ethics of Proposal Writing

— The clear, dry skies of [redacted] make it a superb place to install the world's most powerful telescope. A \$500-million [redacted] project to do just that is threatened, however, by roiling clouds of legal uncertainty and political turbulence.

If the problems are not resolved soon, a spokesman for the project said, the telescope could go to another country, perhaps Namibia.

Lawsuits over land titles have challenged [REDACTED] right to give away the land. An investigative committee of [REDACTED] has added more legal questions and controversy.

Ethics of Proposal Writing

SANTIAGO, Chile — The clear, dry skies of the Atacama Desert in northern Chile make it a superb place to install the world's most powerful telescope. A \$500-million European project to do just that is threatened, however, by roiling clouds of legal uncertainty and political turbulence.

If the problems are not resolved soon, a spokesman for the project said, the telescope could go to another country, perhaps Namibia.

There was no trouble in sight when Chilean Gen. Augusto Pinochet signed a "supreme decree" in 1988 donating 280 square miles of desolate Atacama land for an observatory to be built by a scientific consortium of eight European governments. It was only after Pinochet's military dictatorship ended in 1990 that the clouds rolled in.

Lawsuits over land titles have challenged Pinochet's right to give away the land. An investigative committee of Chile's Congress has added more legal questions and controversy.

http://articles.latimes.com/1994-08-06/news/mn-24135_1_observatory-project

Ethics of Proposal Writing

The most serious violations of standards have come to be known as “scientific misconduct.” The U.S. government defines misconduct as “fabrication, falsification, or plagiarism (FFP) in proposing, performing, or reviewing research, or in reporting research results.” All research institutions that receive federal funds must have policies and procedures in place to investigate and report research misconduct, and anyone who is aware of a potential act of misconduct must follow these policies and procedures.

– *On Being a Scientist* National Academy of Sciences, 3rd edition.

Ethics of Proposal Writing

What is plagiarism?

from "Professional and Ethical Standards for the AAS Journals"

Plagiarism is the act of reproducing text or other materials from other papers without properly crediting the source. Such material is regarded as being plagiarized regardless of whether it is cited literally or has been modified or paraphrased. Plagiarism represents a serious ethical breach, and may constitute legal breach of copyright if the reproduced material has been previously published. This includes repeating text from previously published papers by the author or authors (i.e., "self-plagiarism"). Authors who wish to quote directly from other published work must fully cite the original reference, and include any cited text in quotation marks. *AI* and *ApJ* authors are discouraged from including such direct quotations in papers, apart from rare instances when such a quotation is appropriate for historical reasons. Figures may only be reproduced with permission and must be fully cited in the figure caption, following guidelines that are posted on the *ApJ* and *AI* websites.

<http://journals.aas.org/policy/ethics.html>

Ethics of Proposal Writing

Self-plagiarism

- Some people consider this a gray area (see epic Astronomer's facebook thread from April 2015)
- AAS Journals does not - see previous slide.
- Is there an *expectation* that the content is *new*? (<https://www.plagiarismtoday.com/2011/09/07/self-plagiarism-ethical-shortcut-or-moral-scourge/>)
- Do you have co-authors? Are they all on the original and current proposal/publication?
- Are there legal copyright issues involved?
- Who benefits? Who suffers?

Ethics of Proposal Writing

Co-authorship

Publication and Authorship Practices

All persons who have made significant contributions to a work intended for publication should be offered the opportunity to be listed as authors. This includes all those who have contributed significantly to the inception, design, execution, or interpretation of the research to be reported. People who have not contributed significantly should not be included as authors. Other individuals who have contributed to a study should be appropriately acknowledged. The sources of financial support for any project should be acknowledged/disclosed. All collaborators share responsibility for any paper they coauthor, and every coauthor should have the opportunity to review a manuscript before its submission. It is the responsibility of the first author to ensure these.

from "AAS Ethics Statement" - <https://aas.org/about/policies/aas-ethics-statement>

Differences between publications and proposals?

Ethics of Proposal Writing

Co-authorship

The list of authors establishes accountability as well as credit.

When a paper is found to contain errors, whether caused by mistakes or deceit, authors might wish to disavow responsibility, saying that they were not involved in the part of the paper containing the errors or that they had very little to do with the paper in general. However, an author who is willing to take credit for a paper must also bear responsibility for its errors or explain why he or she had no professional responsibility for the material in question.

– *On Being a Scientist* National Academy of Sciences, 3rd edition.

How culpable are co-authors if the lead author commits misconduct?

Ethics of Peer Review

What is involved - an example for the Hubble TAC

Review Criteria *(posted in each meeting room)*

- The scientific merit of the program and its potential contribution to the advancement of scientific knowledge
- The program's importance to astronomy in general
- The extent to which the proposal demonstrates sufficient understanding to assure a thorough analysis of the data
- A demonstration that the unique capabilities of HST are required to achieve the science goals of the program
- A demonstration of timely publication of the results of any previous HST programs
- Evidence for a coordinated effort to maximize the scientific return.
- Reviewers should ensure that the comments address some or all of these primary criteria

<http://www.stsci.edu/hst/proposing/panel/CYCLE23Orientation.pdf>

Ethics of Peer Review

What is involved - an example for the Hubble TAC

Possible panel schedule

- Panels have ~70-90 proposals to discuss
 - Discuss triage *process* at the outset
 - Flag proposals that could be resurrected
 - Discuss and grade non-triaged proposals (~14 hrs)
 - Discuss and grade any resurrected triage proposals (~1 hr)
 - Some panels prefer to group proposals by subject and intersperse the resurrected proposals
 - Finalize ranking of Small, Medium, Snapshot, and Archival proposals and define “do not award” lower limit
 - Panels should consider the scientific balance
 - Panels re-rank proposals without changing the grades
 - Discuss TAC proposals
 - Write final report and review comments
 - Total ~ 20 hours
- ~5 hours

<http://www.stsci.edu/hst/proposing/panel/CYCLE23Orientation.pdf>

Ethics of Peer Review

Conflicts of Interest

Researchers have many interests, including personal, intellectual, financial, and professional interests. These interests often exist in tension; sometimes they clash. The term "conflict of interest" refers to situations where researchers have interests that could interfere with their professional judgment. Managing these situations is critical to maintaining the integrity of researchers and science as a whole.

– *On Being a Scientist* National Academy of Sciences, 3rd edition.

6. Conflicts of Interest or Commitment

Employee members of the University community are expected to devote primary professional allegiance to the University and to the mission of teaching, research and public service. Outside employment must not interfere with University duties. Outside professional activities, personal financial interests, or acceptance of benefits

University of California "Statement of Ethical Values":

http://www.ucop.edu/ethics-compliance-audit-services/_files/stmt-stds-ethics.pdf

Ethics of Peer Review

Conflict of Interest

Our goal is informed, unbiased discussion of each proposal

- Voting committee members should have neither direct nor indirect interest vested in the outcome of the review
- The subset of the review committee discussing the proposal should have sufficient knowledge to assess the science

We identify two types of conflict:

Major conflicts

- Personal involvement (PI or Co-I)
- Recent former advisor/student of PI or Co-I
- Involvement in closely competing proposal (same targets or science)
- Close personal ties (family, etc.) with PI or Co-I

Minor conflicts

- Institutional conflict, i.e. same department/institution as PI or Co-I
- Close collaborator with PI/Co-I on the proposal
- Any other reason for discomfort

Ethics of Peer Review

Confidentiality

All HST Phase I proposals and documents related to the proposal review are strictly confidential.

- They should not be distributed or used in any manner not directly related to the review process.
- They may not be discussed with anyone other than those STScI staff participating in the review activities.
- There should be no discussions with your fellow committee members other than those during the actual committee meeting.
- The proposals and all related documents are to be brought to the Panel or TAC meetings for use there and collection afterward.
Please purge any review files from your computer after the review.
- Your involvement in the Cycle 24 review process itself should also be kept confidential until after the review has been completed, at which time membership lists are published in the STScI Newsletter.

from - <http://www.stsci.edu/hst/proposing/panel/#confidentiality>

What are the ethical boundaries when you are reviewing publications/proposals in your field on topics relevant for your research?

Ethics of Peer Review

from PNAS “Ethical Responsibilities of Reviewers”

- Confidentiality - “Material under review is a privileged communication that should not be shared or discussed with anyone outside the designated review process unless necessary and approved by the editor.”
- Constructive critique - “The purpose of peer review is not to demonstrate the reviewer’s proficiency in identifying flaws. Reviewers should identify strengths and provide constructive comments to help authors resolve weaknesses in the work.”
- Competence - “Reviewers who realize that their expertise in the subject of the article is limited have a responsibility to make their degree of competence clear to the editor. Although reviewers need not be expert in every aspect of the content, the assignment should be accepted only if they have adequate expertise to provide an authoritative assessment.”
- Impartiality & Integrity - “Reviewer comments and conclusions should be based on an objective and impartial consideration of the facts, exclusive of personal or professional bias.”
- Timeliness & Responsiveness - “Reviewers are responsible for acting promptly, adhering to the instructions for completing a review, and submitting it in a timely manner.”

<http://www.pnas.org/site/authors/ethicalresp.xhtml>

Ethics of Peer Review

Unconscious bias: "positive and negative evaluations that occur outside of our conscious awareness and control"

from <http://implicit.harvard.edu/implicit>

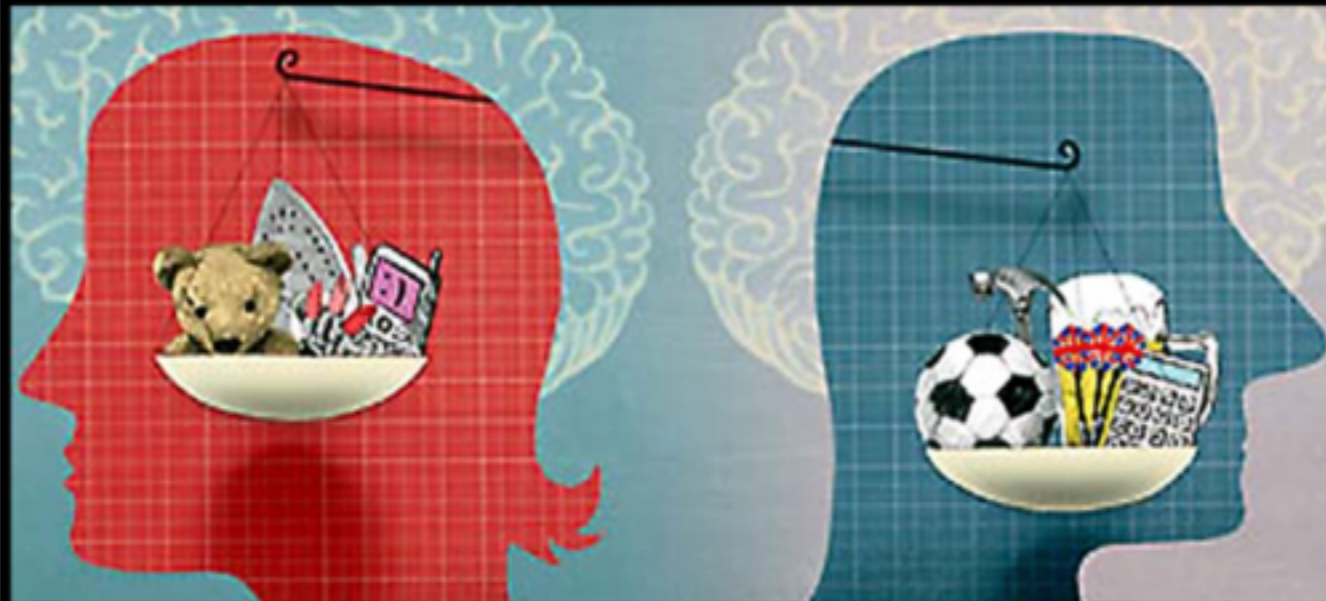
- Steinpreis, Anders & Ritzke (1999): identical applications for faculty position with male or female names - both men and women preferred to hire male candidate
- Bertrand & Mullainathan (2003): *Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination* : "The results show significant discrimination against African-American names: White names receive 50 percent more callbacks for interviews."

Ethics of Peer Review

Introductory slides for the HST TAC

Directors perspective unconscious bias be aware

Expectations or stereotypes influence our judgments of others (*regardless of our own group*).



Plagiarized from Joan T. Schmelz University of Memphis

Gender

Men judging women; women judging women

Men and women BOTH downplay the contributions of women

Race/ethnicity

Whites judging minorities; minorities judging minorities

Whites and minorities BOTH downplay the contributions of minorities

Unconscious bias is NOT discrimination

<http://www.stsci.edu/hst/proposing/panel/Cycle23-Flanagan-Intro.pdf>

Ethics of Peer Review

Gender-based Systematics in HST Proposal Selection

I. Neill Reid, Space Telescope Science Institute

Abstract:

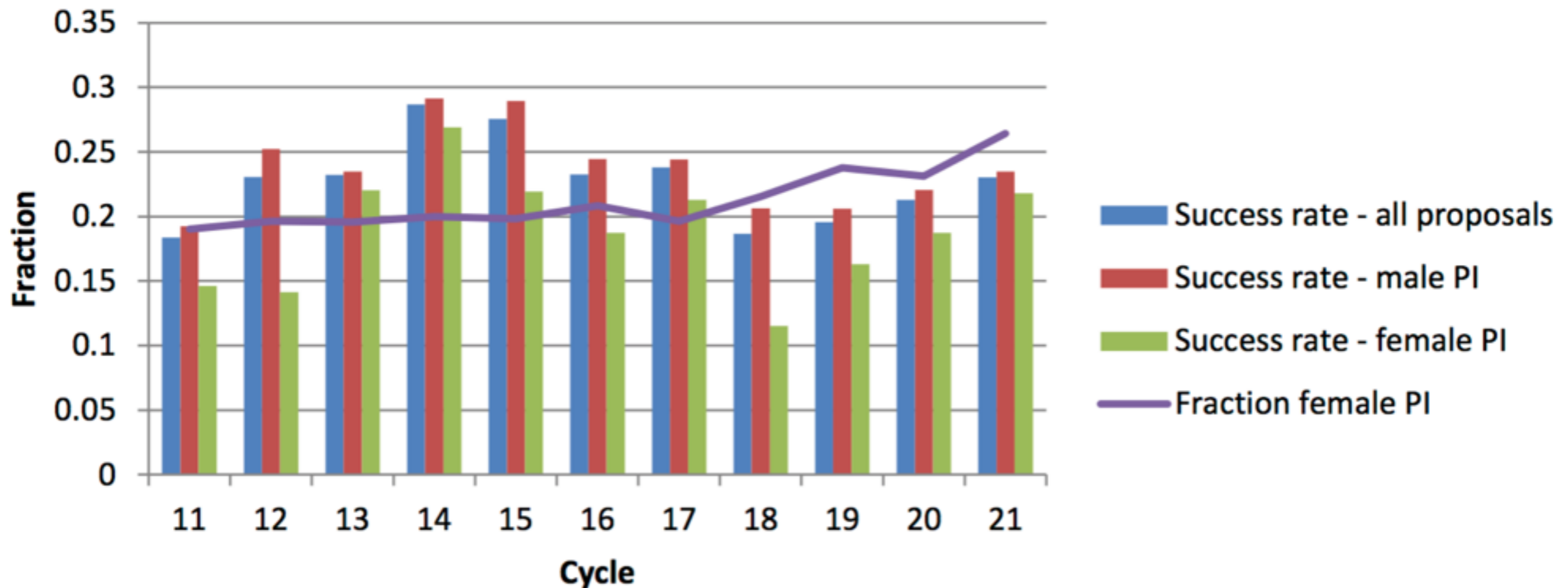
Proposal success rates are calculated for HST Cycles 11 through 21 as a function of the gender of the Principal Investigator (PI). In each cycle, proposals with male PIs have a higher success rate, with the disparity greatest for Cycles 12 and 18. The offsets are small enough that they might be ascribed to chance for any single cycle, but the consistent pattern suggests the presence of a systematic effect. Closer inspection of results from Cycles 19, 20 and 21 shows that the systematic difference does not appear to depend on the geographic origin of the proposal nor does it depend on the gender distribution on the review panels. Segregating proposals by the seniority of the PI, the success rates by gender for more recent graduates (Ph.d. since 2000) are more closely comparable. There is also a correlation between success by gender and the average seniority of the review panel for Cycles 19 and 20, but not Cycle 21. We discuss these results and some consequent changes to the proposal format and additions to the HST TAC orientation process.

Ethics of Peer Review

Gender-based Systematics in HST Proposal Selection

I. Neill Reid, Space Telescope Science Institute

Abstract:



Ethics of Handling Data

Because of the critical importance of methods, scientific papers must include a description of the procedures used to produce the data, sufficient to permit reviewers and readers of a scientific paper to evaluate not only the validity of the data but also the reliability of the methods used to derive those data. If this information is not available, other researchers may be less likely to accept the data and the conclusions drawn from them. They also may be unable to reproduce accurately the conditions under which the data were derived.

The best methods will count for little if data are recorded incorrectly or haphazardly. The requirements for data collection differ among disciplines and research groups, but researchers have a fundamental obligation to create and maintain an accurate, accessible, and permanent record of what they have done in sufficient detail for others to check and replicate their work. Depending on the field, this obligation may require entering data into bound notebooks with sequentially numbered pages using permanent ink, using a computer application with secure data entry fields, identifying when and where work was done, and retaining data for specified lengths of time. In much industrial research and in some academic research, data notebooks need to be signed and dated by a witness on a daily basis.

Ethics of Handling Data

(d) (1) In addition, in response to a Freedom of Information Act (FOIA) request for research data relating to published research findings produced under an award that were used by the Federal Government in developing an agency action that has the force and effect of law, the Federal awarding agency shall request, and the recipient shall provide, within a reasonable time, the research data so that they can be made available to the public through the procedures established under the FOIA. If the Federal awarding agency obtains the research data solely in response to a FOIA request, the agency may charge the requester a reasonable fee equaling the full incremental cost of obtaining the research data. This fee should reflect costs incurred by the agency, the recipient, and applicable subrecipients. This fee is in addition to any fees the agency may assess under the FOIA (5 U.S.C. 552(a)(4)(A)).

(2) The following definitions apply for purposes of paragraph (d) of this section:

(i) *Research data* is defined as the recorded factual material commonly accepted in the scientific community as necessary to validate research findings, but not any of the following: preliminary analyses, drafts of scientific papers, plans for future research, peer reviews, or communications with colleagues. This "recorded" material excludes physical objects (e.g., laboratory samples). Research data also do not include:

https://www.whitehouse.gov/omb/circulars_a110#42

Ethics of Handling Data

Unlikely for FOIA requests for astronomical data,
but does that matter for the ethical questions?

What are your obligations as a student working
in a (possibly) federally funded lab or research group?

Furthermore, researchers sometimes have to take risks to explore an innovative idea or observation. They may have to rely on a theoretical or experimental technique that is not fully developed, or they may have to extend a conjecture into new realms. Such risk taking does not excuse sloppy research, but it should not be condemned as misguided.

Finally, all researchers are human. They do not have limitless working time or access to unlimited resources. Even the most responsible researcher can make an honest mistake in the design of an experiment, the calibration of instruments, the recording of data, the interpretation of results, or other aspects of research.

– *On Being a Scientist* National Academy of Sciences, 3rd edition.