

## PROFESSIONAL ETHICS IN ASTRONOMY: THE AAS ETHICS STATEMENT

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**Abstract.** It is fundamental to the advancement of science that practicing scientists adhere to a consistent set of professional ethical principles. Recent violations of these principles have led a decreased trust in the process of science and scientific results. Although astronomy is less in the spotlight on these issues than medical science or climate change research, it is still incumbent on the field to follow sound scientific process guided by basic ethical guidelines. The American Astronomical Society, developed a set of such guidelines in 2010. This contribution summarizes the motivation and process by which the AAS Ethics Statement was produced.

### 1. Introduction

The news in recent years has featured a number of events in which scientists violated accepted ethical guidelines in the prosecution of their research work and professional lives<sup>1</sup>. These violations occurred across all scientific disciplines and were not isolated to areas of research normally regarded as fraught with ethical challenges (*e.g.* human subject research). Such violations damage the reputation of the scientists involved and the enterprise of science more broadly. They are violations of the public trust in the process of science and cause grave harm to the credibility of scientific knowledge, which can ultimately damage the very Society that science seeks to help and support.

<sup>1</sup>See *e.g.*: [http://en.wikipedia.org/wiki/Jan\\_Hendrik\\_Schön](http://en.wikipedia.org/wiki/Jan_Hendrik_Schön),  
<http://classic.the-scientist.com/news/home/24445/>

The result of this seeming rise in ethical violations in science, combined with the high-profile nature of some occurrences led many scientific societies to undertake the development of professional codes of ethics (see sidebar for sample listing of societies and their various codes of ethics) or a review of existing guidelines. Although few scientific societies provide a policing mechanism to enforce these codes (except in the case of journal publication), their intent is to set a high standard for members of the discipline(s) the society represents and to benefit the execution of scientific research in a particular discipline.

Other groups have undertaken substantial education of their early-career members on the topic of proper conduct in research. The National Academies of Science (of the United States), for example, publish an excellent booklet entitled “On Being a Scientist” (also available for download<sup>2</sup>). The American Astronomical Society provides a copy of this booklet and a similar pamphlet published by Sigma Xi to its junior members when they are first accepted for membership. It is also common for graduate departments in physics or astronomy to provide some training in the general area of proper ethical behavior, though the practice is not uniform across all departments<sup>3</sup>. Given the importance of the topic and the relative ease in presenting a seminar for students along these lines, I think that all departments granting graduate degrees in any science, let alone astronomy, should include this kind of education in their curriculum by default. The omission of this content from a scientist’s education borders on the irresponsible.

From time to time the American Astronomical Society has hosted sessions at its annual meetings on the topic of professional ethics. I organized a session in 2005 at the Minneapolis meeting of the AAS and others have been held in the past as well. The most recent session I organized was entitled “Professional Ethics in Astronomy: An Ongoing Dialogue” and was held at the January 2012 meeting of the Society in Austin, Texas. The session featured a panel of four including: the Editor-in-Chief of the *ApJ*, Ethan Vishniac, discussing plagiarism; John F. Ahearne, Emeritus Director of Sigma Xi’s Ethics Program, discussing honesty in professional activities; Linda Sparke, of NASA Headquarters discussing ethics for proposal review; and Richard Bissell, Director for Policy and Global Affairs at the National Academy of Sciences, who presented the principal findings of several reports issued by the National Research Council/National Academy of Sciences over the past several years.

<sup>2</sup>[http://www.nap.edu/catalog.php?record\\_id=12192](http://www.nap.edu/catalog.php?record_id=12192)

<sup>3</sup>See for example <http://astro.berkeley.edu/~kalas/ethics/>, or [http://www.spsnational.org/governance/ethics/seminar\\_treatment.pdf](http://www.spsnational.org/governance/ethics/seminar_treatment.pdf) for two descriptions of seminars, among many tens available easily online

The point of such sessions is to bring focus to the issue and to provide expert speakers to address recurrent issues or problems, while answering questions from session attendees that might highlight specific personal issues or experiences. These sessions are unusually well attended, especially given that they are scheduled in parallel with other scientific sessions. The AAS is not alone in this regard. Many other scientific societies (*e.g.* APS, AGU, OSA, MRS, ACS, etc.) provide venues for the discussion of this topic.

The increasing attention to the issue of ethics in science, as evidenced by the growing number of scientific society guidelines and the well-attended sessions at our own and other society meetings indicates to me that scientists at all career levels understand the importance of the topic and want to learn more. Fundamentally, our professional lives rest on our credibility, our reputation and our execution of scientific practices. Ethical violations threaten all of these fundamental areas and undercut the whole concept of the scientific enterprise.

## 2. Origin of the AAS Statement

In 2002, incidents of data fabrication shocked the physics community and sparked the American Physical Society's Panel on Public Affairs to form a Task Force on Ethics<sup>4</sup>. After a year or so of work, the task force produced updated ethics statements, which were completed in January 2004 and widely disseminated in the physics community. A summary of the response of early-career physicists to the revised statements may be found online<sup>5</sup>. The release of these statements was also noticed within the astronomy community.

As the AAS did not have an ethics statement at the time, I responded to the release of these statements by proposing to the AAS meeting planning committee in June of 2004 to hold a panel session on professional ethics at the January 2005 meeting of the Society in Minneapolis, mentioned above. My intention (naïve as it turns out) was to spark enough discussion that the Society would decide to craft its own statement. The session in any event was well-attended and the standing-room only crowd included many leaders in our organization as well as early-career members. The panelists included the then Editor-in-Chief of the ApJ, Robert Kennicutt, who discussed issues of plagiarism and Kate Kirby, chair of the APS POPA Task Force on Ethics as well as representatives from NSF and NASA who discussed ethics from the point of view of proposal review. Although the session itself did not spark proposals by the Council to formulate an ethics statement, discussion

<sup>4</sup><http://www.nytimes.com/2002/11/19/science/after-two-scandals-physics-group-expands-ethics-guidelines.html?ref=jhendrikschon>

<sup>5</sup><http://people.hao.ucar.edu/travis/seminar/ethics.pdf>

about the session (especially Rob Kennicutt's penetrating discussion of plagiarism) spread and ultimately reached the ears of John Huchra, who for many years felt this was an important issue and brought it up regularly with colleagues and students, as well maintaining a separate section of his web home page on the topic<sup>6</sup>. He (and others) sent me an email thanking me for organizing the session and that he hoped the topic would become a regular subject of discussion among AAS members.

As fate would have it, John Huchra was subsequently nominated as a candidate for president of the AAS in 2006 and won election to that post beginning in the summer of 2008. AAS presidents spend a year as president-elect, two years as president and one year as past-president, so John became president-elect in June of 2007. Soon after, he and I attended a workshop sponsored by the Council for Engineering and Scientific Society Executives for Chief Elected Officers and Chief Executive Officers of participating organizations (November 2007). The goal of these (useful) workshops is to allow the CEO-CEO partnership to develop in advance of the elected officer actually taking office, while exposing them to best practices in non-profit management. Additionally, the executive gets to understand the priorities of the newly elected volunteer leader and provide advice on how to best achieve those goals. All new Presidents-elect now attend these sessions with the AAS Executive Officer.

At this meeting, he told me that one of his priorities was to develop an AAS statement on professional ethics. He followed up on this initial conversation by inserting the issue as an agenda item for the January 2009 Council meeting in Long Beach, his first winter Council meeting as AAS President. The Council was highly supportive of this goal and a subcommittee was formed to develop a draft statement, which John chaired. The process had begun. He summarized the Council discussion and the actions taken by the APS in an AAS Newsletter column in the March/April 2009 issue<sup>7</sup>.

### 3. Development of the Ethics Statement

John chaired an ad hoc committee of the Council to produce the outline of an ethics statement. Basing it in large part on the APS statement, the committee delivered the draft to the full Council in late spring and a discussion was held at the Council retreat day, held just prior to the normal Council meeting at the summer 2009 AAS meeting. The Council then approved the draft version, but felt that the membership of the Society should be allowed to weigh in on the statement prior to the Council adopting it.

<sup>6</sup><https://www.cfa.harvard.edu/~dfabricant/huchra/#Conduct>

<sup>7</sup>[http://aas.org/archives/Newsletter/Newsletter\\_145\\_2009\\_03\\_March\\_April.pdf](http://aas.org/archives/Newsletter/Newsletter_145_2009_03_March_April.pdf)



*Figure 1.* John Huchra at the National Academy of Sciences Decadal Survey roll out, August 13, 2010. (© Kevin Marvel)

Lee Anne Willson, AAS Vice President, volunteered to moderate a public forum accessible by all members and we announced the opportunity to participate in an online discussion of the statement in an emailed request to all AAS members sent on 2 July 2009. The text of the email is presented here:

#### **AAS Informational Email – 2009-14**

##### **AAS Council Seeks Input On Ethics Statement**

The Council of the AAS has developed and endorsed the following draft ethics statement, pending input from our members. It is intended to represent a consensus, and thus necessarily may not include every issue that is important to each member of the AAS. It is our hope that it will be a useful starting point for discussion of professional ethics with students moving into a professional career. It may also prove useful as a reference to standard practice in US astronomy in some cases where there is an issue that arises, perhaps in the context of cultural differences between areas of science or parts of the world.

While the text of the ethics statement remains the responsibility of the AAS Council, we are interested in hearing from members before we make a final version public. To this end, we have opened a forum on the Ethics Statement at <http://forums.aas.org>. This will be open from now through 15 August. Comments will then be compiled and considered by the Council in preparing the final version.

The draft Ethics Statement is also posted on in this AAS forum and comments may be sent directly to the moderator, Lee Anne Willson, AAS Vice President. Unless you specify otherwise, she will assume you intend your comments to be posted on the forum. You will need to create a login for the forum to post if you do not already have one.

#### **4. The AAS Ethics Statement**

The discussion on the forum was minimal, but the input was highly valuable and some modifications to the statement were incorporated in a new version, which was finalized at the fall Executive Meeting. Final approval of the statement was then included as an agenda item at the winter meeting of the Council and was adopted by the AAS Council on the eighth of January 2010. The statement is reproduced here in its entirety.

##### **AAS Statement on Ethics**

The mission of the American Astronomical Society is to enhance and share humanity's scientific understanding of the Universe. We believe the advancement of astronomy requires that we provide ethical guidelines for AAS members and, for that matter, anyone involved in professional astronomical activities.

Every astronomer is a citizen of the community of science. Each of us shares responsibility for the welfare of this community. We endorse the statement of the American Physical Society that "Science is best advanced when there is mutual trust, based upon honest behavior, throughout the community." All scientists should act ethically in the conduct of their research, in teaching and education, and in relations with both members of the public and other members of the scientific community. We have a special responsibility to students and postdoctoral fellows to train them in ethical conduct.

The American Astronomical Society believes that the following are the minimal standards of ethical behavior relating to the profession.

### **Conduct Towards Others**

All people encountered in one's professional life should be treated with respect. At no time is abusive behavior acceptable. Scientists should work to provide an environment that encourages the free expression and exchange of scientific ideas. They should promote equality of opportunity and treatment for all their colleagues, regardless of gender, race, ethnic and national origin, religion, age, marital status, sexual orientation, disabilities, or any other reason not related to scientific merit.

This principle is clearly stated in our By-Laws (<http://aas.org/governance/bylaws.php>).

More senior members of the profession, especially research supervisors, have a special responsibility to facilitate the research, educational, and professional development of students and subordinates. This includes providing safe, supportive work environments, fair compensation and appropriate acknowledgment of their contribution to any research results. In addition, supervisors should encourage the timely advance of graduate students and young professionals in their career aspirations.

It is also incumbent on senior members of our profession to inform more junior members of these ethical issues and of institutional and government guidelines, policies and procedures related to the oversight and maintenance of ethical standards for research and conduct. It is the responsibility of all members of our Society to familiarize themselves with such guidelines, policies and procedures.

### **Research**

Data and research results should be recorded and maintained in a form that allows review, analysis, and reproduction by others. It is incumbent on researchers involved in large, publicly supported studies to make results available in a timely manner.

Fabrication of data or selective reporting of data with the intent to mislead or deceive is unethical, unacceptable and fraudulent, as is the appropriation of unpublished data or research results from others without permission and attribution.

It should be recognized that honest error is an integral part of the scientific enterprise. It is not unethical to be wrong, provided that errors are promptly acknowledged and corrected when they are detected.

### **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.

Proper acknowledgement of the work of others should always be given, and complete referencing is an essential part of any astronomical research publication. Authors have an obligation to their colleagues and the scientific community to include a set of references that communicates the precedents, sources, and context of the reported work. Deliberate omission of a pertinent author or reference is unacceptable. Data provided by others must be cited appropriately, even if obtained from a public database.

All authors are responsible for providing prompt corrections or retractions if errors are found in published works with the first author bearing primary responsibility. Plagiarism is the presentation of others' words, ideas or scientific results as if they were one's own. Citations to others' work must be clear, complete, and correct. Plagiarism is unethical behavior and is never acceptable.

These statements apply not only to scholarly journals but to all forms of scientific communication including but not limited to press releases, proposals, websites, popular books, and podcasts.

Authors, editors and referees should also be aware of the professional and ethical standards that have been adopted for the AAS journals (<http://aas.org/ethicsPolicy>).

### **Peer Review**

Peer review is an essential component of many aspects of the scientific process such as evaluating research proposals, publishing research results, and evaluating colleagues for career advancement.

Peer review can serve its intended function only if the members of the scientific community are prepared to provide thorough, fair, and objective evaluations based on requisite expertise. Although peer review can be difficult and time-consuming, scientists have an obligation to participate in the process.

Reviewers should disclose conflicts of interest resulting from direct competitive, collaborative, or other relationships with those they are review-

ing and recuse themselves from cases where such conflicts preclude an objective evaluation. It is unethical to seek to gain an advantage by means of reviewing the work of others, either through use of private information or biased reviews of other's work.

Privileged information or ideas that are obtained through peer review must be kept confidential and not used for competitive gain.

### **Conflicts of Interest**

Many activities of scientists and educators have the potential for a conflict of interest. Any professional relationship or action that may either be, or be perceived to be, a conflict of interest should be fully disclosed. Conflict of interest includes, but is not limited to, situations where the outcome of a deliberation will influence the financial status of one of the participants, or situations where decisions will affect the status of a person who is close to one of the participants. Most organizations or activities have mechanisms for managing conflicts, for example, through recusal. If a conflict of interest cannot be properly managed, the activity should be avoided or discontinued.

## **5. Impact and Concluding Thoughts**

It is hard to tell what the impact of the AAS Ethics Statement will be as its future depends on how well the community incorporates the principles detailed in the statement into the education of students and into the professional lives of practicing astronomers. However, within a year of the statement being approved, the Society received several queries, usually from early-career members, asking the Society to in some sense "enforce" the statement. Usually, the individual had experienced some kind of treatment contrary to the principles of the Ethics Statement and was seeking help from the Society to resolve the matter. A generalized example was the perceived improper ordering of authors on a grant proposal. In many cases, it was clear that the complainant was in fact the victim of poor ethical behavior or at least unintentional decision-making.

However, the intent of the ethics statement was never to be a set of laws, enforceable in some way by the AAS. The intent – as is common for most such Society statements – was to establish a set of principles that members should strive to achieve and implement as professional scientists. They are therefore somewhat broadly defined and not specific enough to be used to enable enforcement. That said, the AAS journals have their own ethical guidelines<sup>8</sup> and enforcement mechanisms (rarely, if ever used, thankfully),

<sup>8</sup><http://iopscience.iop.org/0004-637X/page/Ethics%20policy>

with the Editors-in-Chief and ultimately the publications board serving as the deciding authorities.

Professional societies should develop their own ethical guidelines, primarily as specific scientific practices that vary discipline-to-discipline may also impose unique ethical requirements, although certain principles stand in common across disciplines. Ethical standards should be based on member input, discussion and approval. Efforts should be made to educate and inform members of the ethical guidelines and the reasoning behind them. However, in large part, it is incumbent on the members themselves to live up to the standards and to educate the next generation of members as to their value and importance. Additionally, as times change, as technologies evolve and as the ways scientists interact, collaborate and research change, the ethical guidelines of the profession should be reviewed. From time, to time, perhaps once a decade, they should be considered carefully and perhaps revised.

Although the death of John Huchra in 2010 took away a valued leader in our field well before his time, we are exceedingly lucky to have had his guidance and leadership in the development of the AAS Ethics Statement. I view it as a small, but important piece of his overall legacy and a major component of his accomplishments as AAS president.

John hoped mainly to help inform students about the right way to do 'our business', hence his efforts reaching out to students at the CFA, at meetings and on his colloquium visits, but he also hoped that the statement would help all astronomers work well together, treat each other fairly and with dignity and respect. I think the statement meets these goals and I know my colleagues, the members of the AAS and indeed, all practicing astronomers will find benefit in reading and considering its aspirational guidance.

### **Acknowledgement**

John Huchra was originally planning to write this chapter for OPISA series before his untimely death. It was a pleasure to work with John as president of the AAS and in the development of the AAS Ethics Statement. I am sure my version of his article would meet with his approval, perhaps after a few revisions, a handful of edits and some deep discussion, not necessarily in that order. That is what I liked best about John, he made you perform better and feel good doing the extra work to meet his expectations.

In response to a well-intentioned member comment he received in mid-summer 2010 (stating, essentially, that the portion of the ethics statement regarding professional civility was not necessary) John wrote the following response, which I think provides some clear insight to why he felt the work

to develop and pass the statement was so necessary: ethical guidelines – uniformly followed – could provide protection for students and those less able to defend themselves from the inappropriate or unfair behavior of others. This is also clear in the words of the second paragraph of the AAS Ethics Statement itself, which John crafted.

Dear [xxx],

Thanks for the note. I grew up outside New York City and very poor so it was hard to play at being an astronomer. Sandlot baseball was much easier for me and my scruffy friends. But I did play at being a chemist and blew things up whenever I could find the right ingredients – and escape parental supervision.

On your other point, unfortunately there is incivility, sometimes at meetings but very often in the editorial process (both referees and authors stooping to ad hominem slurs all too regularly). This past meeting was pretty good, but at the DC meeting there were several incidents that required some disentangling, and that generally means there are more problems that aren't being reported. The most egregious ones at meetings are when senior people browbeat students, either at talks or at posters, going beyond just a good scientific debate.

Take care,

John Huchra

## Resources

There are many sources of ethics information and case studies appropriate to astronomers. Here is a selected subset of relevant information available online:

- The American Physical Society Guidelines for Professional Conduct:  
(<http://www.aps.org/policy/statements/02.2.cfm>)
- The DHHS Office of Research Integrity guide An Introduction to the Responsible Conduct of Research.  
(<http://ori.dhhs.gov/documents/rcrintro.pdf>)
- The Federal policy on research misconduct.  
([http://www.ostp.gov/cs/federal\\_policy\\_on\\_research\\_misconduct](http://www.ostp.gov/cs/federal_policy_on_research_misconduct))