Howard Hughes Medical Institute
Science and Janelia

# Guidelines for Scientific Research

## Purpose

These guidelines describe general standards for conduct in research and scholarship. They are intended to establish a common understanding of expectations and responsibilities relating to research in the Institute's laboratories, thereby promoting the quality and integrity of the work and interactions in the laboratories and resulting publications, and helping to prevent research misconduct.

## Responsibilities of Heads of Laboratories

Although everyone involved in science must take personal responsibility for maintaining the highest standards of integrity, the laboratory head (e.g., HHMI Investigators and Freeman Hrabowski Scholars at HHMI's host-based sites, and Senior Group Leaders, Group Leaders, and Fellows at HHMI's Janelia Research Campus) bears ultimate responsibility for the validity of all communicated and published information from their laboratory and for the publication of the data that may ensue from work in the laboratory.

Each laboratory head should ensure that personnel for whom they have responsibility receive appropriate supervision and training. In particular, the laboratory head should teach and encourage careful scrutiny and interpretation of results, emphasizing the importance of and reliance on sound primary data.

The laboratory head must have a clear understanding of the nature of all primary data generated by their personnel, including how these data are acquired, analyzed, and interpreted. As a general rule, primary data generated by less-experienced laboratory members, such as new students or technical staff, and their analysis and interpretation of these data, should be carefully reviewed and evaluated either by the laboratory head or one or more other experienced laboratory members to whom the laboratory head is comfortable entrusting this important function. This kind of review and evaluation will allow the laboratory head to ensure that newer laboratory personnel are receiving the guidance and training they need, and will help the laboratory head to maintain the quality of the laboratory's research.

Laboratory heads should take time to carefully consider the validity and reliability of their laboratory's data, and its analysis and interpretation, and to look into any questions that may arise, before the data, analysis, or interpretation are communicated outside of the laboratory. Questions may arise, for example, not only when primary data seem incorrect, but also when primary data seem implausibly consistent or precise.

## Interactions Within and Outside of the Laboratory

Laboratory heads should encourage their personnel to work with other colleagues, to share data, and to discuss results freely. Although some confidentiality about methods and data before publication may sometimes be prudent, laboratory heads should promote collegial, open, fair, and professional interactions both within their laboratory and between their laboratory members and others outside of the laboratory.

## Documentation and Management of Data

Well-designed and clearly written protocols, careful recording of data as they are gathered, and reliable data storage are essential. Detailed notebooks or equivalent documentation should be kept in a manner such that data can be properly reviewed. Where primary data cannot be kept in notebooks, for example in the case of large electronic datasets, proper documentation and management of the data includes recording the creation date and time, keeping track of all changes made to the electronic data files, and otherwise taking steps to ensure the integrity of the data. If HHMI Investigators and Freeman Hrabowski Scholars maintain unpublished research data in personal accounts with cloud-based storage providers, they should take care that all those with access take appropriate steps to ensure the integrity and security of the data. Research data that are kept in electronic format and are needed for ongoing research or to support published research findings should also be appropriately backed up in case of system failure.

Research should be done with care and with appropriate controls. HHMI's general expectation is that all experiments should be verified by repetition or subsequent further experimentation prior to publication, and should be reproducible in the same laboratory or a different laboratory with similar experimental skills.

At host-based sites, any policies of the host institution regarding the retention of primary data must also be followed. At Janelia, as well as at host institutions that do not have their own applicable policies, original records of primary data that are sufficient to allow the findings of the research to be easily reconstructed should normally be stored (whether in electronic or paper format) by the laboratory of origin for at least seven years after generation, although depending on circumstances a longer retention period may be appropriate (for example, if publication does not occur for some time after generation of the data, or if there is a patent filing).

At Janelia, HHMI will keep a copy of primary data of departing scientists, including laboratory notebooks, but reserves the right to retain the original records. In all cases, however, scientists leaving Janelia will be able to retain either the original or a copy of their laboratory notebooks.

## Responsibility for Publications

Institute personnel should be scrupulous about crediting the accomplishments of others, especially persons from other laboratories. Publications describing original research should list as authors all

those, but only those, who contributed significantly to that research. Acknowledgments may be appropriate for the contributions of others, such as those who provided materials used in the research. All authors whose names appear on a paper should have reviewed the manuscript carefully before its submission for publication and should be prepared to stand behind the conclusions.

If an HHMI laboratory head finds error(s) in one of their publications that do not affect the publication's scientific integrity or reliability and can be clarified with a correction or a posted comment (if permitted by the journal), the laboratory head should work with other authors and the publishing journal to make the clarification. Examples include correction of typographical errors that may be confusing to readers, correction of the spelling of an author's name so that the publication may be more easily found and correctly cited, addition of an author, or addition of an acknowledgment of a laboratory that provided reagents used in the published work.

On occasion, an HHMI laboratory head may find error(s) in one of their publications that affect the scientific integrity or reliability of all or a part of the publication, such as significant errors in the presentation or analysis of data. The laboratory head is expected to exercise sound judgment in deciding what steps, if any, are necessary to address the situation, and to coordinate with other authors and the publishing journal to take those steps. Depending on the scope and nature of the errors, it may be appropriate and sufficient for the journal to issue a correction or for the literature to be corrected through additional published commentary. For example, if the data in one of many figures in a publication prove to be incorrect or poorly presented, but the errors do not affect the primary conclusion(s) of the work, a correction may be warranted.

In some cases, however, an HHMI laboratory head may conclude, for reasons ranging from honest error to research misconduct, that correction of a publication is not possible, and that the work should not have been published and its data and primary conclusion(s) should not be used for future research or other purposes. In these circumstances, laboratory heads should work with other authors and the publishing journal to retract the publication. This is the case regardless of the nature of the published work; however, laboratory heads should consider the additional implications if the work in question could be relied upon by health care providers or patients in making treatment or diagnostic decisions. Retraction notices should clearly state the reason for the retraction, so as to distinguish honest error from misconduct. Depending on the journal, it may be possible to retract and replace a publication that includes reliable science but also contains significant inadvertent errors that affect major findings or conclusions of the publication. Laboratory heads should also coordinate with HHMI and host institution personnel in these situations, as appropriate.

## Related Procedures, Forms and Policies

Research Misconduct Policy

## Contacts

If you have questions about any aspects of this policy, please contact the Senior-Director-Scientific Officer (for Investigators), Senior Director- Scientific Program Officer (for Freeman Hrabowski Scholars), or HHMI attorney responsible for your site.

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