**Let’s Talk About Rigor and Reproducibility!**

This discussion guide is intended for fellows and early-career researchers initiating conversations with mentors and others on addressing NIH’s Rigor and Reproducibility [requirements for career development and training goals](https://grants.nih.gov/policy/reproducibility/guidance.htm). For more information on NIH’s Rigor and Reproducibility including webinars and presentations, see the [ReaDI Program’s Reproducibility webpage](https://research.columbia.edu/reproducibility-resources-and-guidelines-topic).

Applicants are expected to address any new research skills planned to acquire in areas of rigorous research design, experimental methods, quantitative approaches, and data analysis and interpretation. For each of the areas below, list what research skills you will require to learn and further develop to carry-out the research project?

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| --- | --- |
| Rigorous Research Design  (Review [Planning a Rigorous Experiment checklist](https://research.columbia.edu/sites/default/files/content/RCT%20content/ReaDI%20Program/Rigor_ExptDesigh_Checklist.pdf)) |  |
| Experimental Methods |  |
| Quantitative Approaches |  |
| Data Analysis and Interpretation |  |

For each of the skills listed above identify concrete ways those skills can be acquired:

* Mentor-mentee interaction
  + Is the mentor sufficiently qualified and willing to provide training?
  + Trainings should include, at a minimum:
    - Hands-on training
    - Regular meetings that include data review
* Formal coursework
  + What classes are available for enrollment (or available for auditing) that will further enhance skills?
  + Be creative and look for courses in other departments. Seek courses that reinforce critical thinking skills, data management strategies, and data analyses
  + Example courses:
    - Statistics for Basic Sciences (PHAR G8012)
    - [Introduction to Computational and Quantitative Biology (MICR G4120)](https://microbiology.columbia.edu/icqb)
    - [Experimental Design & Analysis for Behavioral Research](https://www8.gsb.columbia.edu/courses/phd/2020/spring/b9608-001) (B9608-001)
    - [Experimental Research: Design, Analysis and Interpretation (GU47678)](https://polisci.columbia.edu/content/experimental-research-design-analysis-and-interpretation)
    - [Research Methods and Statistic Courses in Psychology Department](file:///C:\Users\sfs2110\AppData\Local\Microsoft\Windows\Temporary%20Internet%20Files\Content.Outlook\2J32KZE5\%09https:\psychology.columbia.edu\content\research-methods-statistics-courses)
    - [Mailman School of Public Health Courses](https://www.mailman.columbia.edu/academics/course-directory)
    - Online courses:
      * Coursera: <https://www.coursera.org/>
      * edX <https://www.edx.org/school/columbiax>
* Mini-Lecture Series and Seminars
  + What lectures and seminars are available to develop skills? Look for offerings within own department and complimentary disciplines.
    - Several Columbia departments, centers, and research offices have education initiatives.[[1]](#footnote-1) Below are a few examples:
      * [CTSA](https://www.irvinginstitute.columbia.edu/)
        + [Biostatistics in Action: Tips for Clinical Researchers Lecture Series](https://www.irvinginstitute.columbia.edu/services/biostatistics-action-tips-clinical-researchers-lecture-series)
        + [Statistical software mini-courses](file:///C:\Users\sfs2110\AppData\Local\Microsoft\Windows\Temporary%20Internet%20Files\Content.Outlook\2J32KZE5\o%09https:\www.irvinginstitute.columbia.edu\services\statistical-software-mini-courses)
      * [Office of Research Compliance and Training](https://research.columbia.edu/office-research-compliance-and-training)
        + [ReaDI Program](https://research.columbia.edu/ReaDI-Program)
        + [PCRI Symposium](https://research.columbia.edu/pcri)
      * [Research Data Services](https://library.columbia.edu/services/research-data-services.html)
      * [Augustus C. Long Health Sciences Library](https://library.cumc.columbia.edu/)
      * [P&S Academic Affairs](https://www.ps.columbia.edu/administration/academic-affairs)
      * [Office of Postdoctoral Affairs](https://research.columbia.edu/office-postdoctoral-affairs)

**Other Opportunities for Training**

* Literature searches
  + [Search protocol repositories to learn about the latest techniques](https://research.columbia.edu/experimental-design#/cu_accordion_item-12425).
  + Remain informed on best practices and guidelines. Set-up literature alerts.
  + Work with [librarians](https://library.cumc.columbia.edu/library-classes-assistance) for improving literature search strategies.
* Professional Communities
  + Several professional communities have developed resources to address reproducibility issues. They may also offer webinars and informational sessions during national conferences.
* Online trainings and Resources
  + There are several free trainings that are available. These can be found on Columbia’s [ReaDI Program website](https://research.columbia.edu/ReaDI-Program).
  + [Rigor and Reproducibility Training modules](https://www.nih.gov/research-training/rigor-reproducibility/training#Modules)
  + [NIH Clearing House](https://www.nigms.nih.gov/training/pages/clearinghouse-for-training-modules-to-enhance-data-reproducibility.aspx)

1. Trainings offered by offices may not be held on a regular schedule. Keep informed of when trainings are being offered and take advantage when they are available. [↑](#footnote-ref-1)