NIH Fellowship Applications: Tools for Success

1. NIH fellowship overview
   • Types of fellowships and eligibility
   • Factors to consider when applying
   • Tips from a Program Director

2. Components of a fellowship application/review criteria

3. Writing a competitive application
   • Prepare to write
   • Grantsmanship and review criteria
   • Completing the application

4. Peer review
   • Scoring system
   • Summary statement
   • Institute funding pay-lines
Grant Funding for Trainees

*National Research Service Awards (NRSA)

F30 *, F31 *

F32 *

K awards

Institutional Awards: R25, T32, K12

Courtesy of Susan Perkins, PhD, NCI Training Division
1. NRSA Fellowship (Fs) Overview

• The Ruth L. Kirschstein National Research Service Award (NRSA) is a congressionally mandated program

• Provide research training support for:
  • Predoctoral trainees enrolled in a PhD program (F31)
  • Predoctoral trainees enrolled formal dual doctoral degree program (MD/PhD, DDS/PhD) (F30)
  • Postdoctoral fellows (F32)

• Offerings vary by institute

• Training award, not a research award

• For individuals committed to a career in research

• U.S. citizenship or green card required

Courtesy of Susan Perkins, PhD, NCI Training Division
### Participating Institutes

#### F31

- [F31](https://grants.nih.gov/grants/guide/pa-files/PA-16-309.html)

  - National Cancer Institute (NCI)
  - National Eye Institute (NEI)
  - National Heart, Lung, and Blood Institute (NHLBI)
  - National Human Genome Research Institute (NHGRI)
  - National Institute on Aging (NIA)
  - National Institute on Alcohol Abuse and Alcoholism (NIAAA)
  - National Institute of Allergy and Infectious Diseases (NIAID)
  - National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
  - National Institute of Biomedical Imaging and Bioengineering (NIBIB)
  - Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)
  - National Institute on Deafness and Other Communication Disorders (NIDCD)
  - National Institute of Dental and Craniofacial Research (NIDCR)
  - National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)
  - National Institute on Drug Abuse (NIDA)
  - National Institute of Environmental Health Sciences (NIEMS)
  - National Institute of Mental Health (NIMH)
  - National Institute of Neurological Disorders and Stroke (NINDS)
  - National Institute of Nursing Research (NINR)
  - National Institute on Minority Health and Health Disparities (NIMHD)
  - National Library of Medicine (NLM)
  - National Center for Complementary and Integrative Health (NCCIH)
  - Division of Program Coordination, Planning and Strategic Initiatives, Office of Research Infrastructure Programs (ORIP)

#### F32


  - National Cancer Institute (NCI)
  - National Eye Institute (NEI)
  - National Heart, Lung, and Blood Institute (NHLBI)
  - National Human Genome Research Institute (NHGRI)
  - National Institute on Aging (NIA)
  - National Institute on Alcohol Abuse and Alcoholism (NIAAA)
  - National Institute of Allergy and Infectious Diseases (NIAID)
  - National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
  - National Institute of Biomedical Imaging and Bioengineering (NIBIB)
  - Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)
  - National Institute on Deafness and Other Communication Disorders (NIDCD)
  - National Institute of Dental and Craniofacial Research (NIDCR)
  - National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)
  - National Institute on Drug Abuse (NIDA)
  - National Institute of Environmental Health Sciences (NIEHS)
  - National Institute of General Medical Sciences (NIGMS)
  - National Institute of Mental Health (NIMH)
  - National Institute of Nursing Research (NINR)
  - National Institute on Minority Health and Health Disparities (NIMHD)
  - National Center for Complementary and Integrative Health (NCCIH)

As of Jan 3, 2019
NRSA Fellowships Provide:

- **Stipend (full-time effort required)**
  - Predocs (F30 or F31): $24,324 per year for up to 5 or 6 years
  - Postdocs (F32): $48,432-$59,736 per year for up to 3 years

- **Partial tuition and fees**
  - 60%, up to $16,000 (F30 and F31) or $4,500 (F32)

- **Funds for training-related expenses (primarily health insurance, travel)**
  - $4,500 for predocs, $9,850 for postdocs
Fellowship applications: factors to consider

• Sponsor funding
  • Fs do not fund the research project; therefore, priority is given to applications for which the sponsor has R01 or equivalent research funding

• Time of submission
  • F30: typically in year 4 of a dual degree program
  • F31: typically in year 3 of a PhD program
  • F32: typically in 1st or 2nd year of a postdoc fellowship

• Publications
  • F30s and F31s: 40-50% of successful applicants have at least one 1st author publication
  • F32s: 60% of successful applicants have 3 or more 1st author publications

Courtesy of Susan Perkins, PhD, NCI Training Division
Beware of Scientific Overlap!

• The proposed research should derive from the collaborative intellectual input of both applicant and sponsor(s). It cannot solely be a research project previously devised by one of more of the sponsors.

• Extensive text duplication between the fellowship and sponsor’s application, or rewording large sections while retaining the scientific goals and objectives, is unacceptable.

Courtesy of Susan Perkins, PhD, NCI Training Division
NRSA Review criteria

- Applicant qualifications
- Sponsor qualifications
- Research Training Plan
- Training Potential
- Environment and Institutional Commitment to research

“A fellowship is a research project that is integrated with a training plan. The review will focus on the applicant’s potential for a productive career, the applicant’s need for the proposed training, and the degree to which the research project and the training plan, the sponsor(s), and the environment will satisfy those needs.” Susan Perkins, PhD, NCI Training Division
Tips from a Program Director

• Know the due dates
  • April 8, August 8, December 8 by 5 pm local time

• Contact your program director early to discuss
  • Provide your CV or NIH Biosketch and a draft of your specific aims

• Work closely with your sponsor and co-sponsor
  • They write part of the application

• Contact your reference letter writers (referees) early
  • Minimum or 3 letters required; up to 5
  • Due by 5 pm local time on due date

Courtesy of Susan Perkins, PhD, NCI Training Division
2. Components of the Application

• Applicants Background and Goals for Training
  • Research Experience
  • Training Goals and Objectives
  • Activities Planned Under This Award

• Specific Aims and Research Strategy
  • Tailored to the applicant’s experience level

• Sponsor and Co-Sponsor Statements

• Institutional Environment and Commitment to Training

• Letters of Support (Collaborators, consultants, etc)
  • Not the same as reference letters
  • Should describe substantive role and contribution to research plan and/or research training
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<td>Applicant’s Background and Goals for Fellowship Training</td>
<td>6</td>
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<tr>
<td>Specific Aims</td>
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<tr>
<td>Research Strategy</td>
<td>6</td>
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<tr>
<td>Sponsor and Co-sponsor Statements</td>
<td>6</td>
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<tr>
<td>Letters of Support from Collaborators, Contributors, Consultants</td>
<td>6</td>
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<tr>
<td>Institutional Environment and Commitment to Training</td>
<td>2</td>
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<tr>
<td>Biographical Sketch (Biosketch)</td>
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• Read the Funding Opportunity Announcement (FOA)
  • Table of IC-Specific Information, Requirements, and Staff contacts: https://grants.nih.gov/grants/guide/contacts/parent_F31.html

• Read the SF424 Application Form Instructions
  • https://grants.nih.gov/grants/how-to-apply-application-guide.html

Courtesy of Susan Perkins, PhD, NCI Training Division
3. Writing a Competitive Application

• **Summary: before you start**
  - Speak with Agency Program Director
  - Speak with Colleagues who are awardees
  - Review funded applications if possible
  - Review agency’s review criteria
  - Strengthen pilot data
  - Identify who will write letters of reference
  - Identify what will make the application more competitive
  - Become informed about career development opportunities, courses, etc. that will enhance your training
  - Become informed core facilities/research resources
• **Components of an Outstanding Application**

  • Research that is Feasible, Relevant, Unique, Innovative, Clear and Consistent
  • An explicitly stated hypothesis
  • A list of specific aims and objectives that will be used to examine the hypothesis
  • A discussion of rationale and potential impact
  • A description of the methods/approaches/techniques to address each aim
  • A logical outline and well-designed figures
  • A discussion of limitations and challenges and how they will be addressed
  • An organized research and career developmental plan
  • Review by mentor/colleagues prior to submission
Title and Abstract

- **Title:** Straightforward, clear, usually partially-understandable even to non-expert (not always to layperson)

- **Abstract:** read by most (not likely all of study section); anyone in study section who is going to comment on (support/criticize) your grant will read/skim the abstract

- Consider conveying 4 things in your **Abstract**
  - What is the important topic?
  - What is known?
  - What is unknown?
  - What are you going to do?

Title and Abstract should NOT be an after-thought! Often the TITLE and ABSTRACT determine which study section your application ends up in!
Specific Aims and Hypotheses

The Research Process

Research Question - Broad based inquiry

Hypothesis
Hypothesis
Hypothesis

Specific Aims - the steps you are going to take to test hypothesis
Hypotheses

• **State your question as a Hypothesis**
  • What hypotheses are you intending to test?
  • Why are your hypotheses interesting?
  • Are your hypotheses testable?
  • Will your Aims suitably address your hypotheses?
Specific Aims

- State **concisely** the **goals** of the proposed research and summarize the expected outcome(s), including the **impact** that the results of the proposed research will exert on the research field(s) involved.

- List succinctly the specific objectives of the research proposed, e.g., to **test a stated hypothesis**, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology.

- **Specific Aims** are limited to one page.
Research Strategy

• Is the proposed research project of high specific quality and is it well integrated with the research training plan?

• Is the project significantly distinct from the sponsors funded research? Beware of overlap!

• Is the research project consistent with the applicants stage of research development?

• Is the proposal time frame feasible to accomplish the proposed training?
Research Strategy

• Goal: A tailored research training plan, including a description of the research strategy (preferably hypothesis-driven) well-suited to the stage of applicant’s career development

• Approach: for each Aim include
  • Rationale- for subaims and proposed studies
  • Background/preliminary results
  • Methods/Statistics
  • Expected outcomes and interpretation
  • Potential pitfalls and alternative strategies
Fellowship Applicant

• Are the applicant's academic record and research experience of high quality?

• Does the applicant have the potential to develop into an independent and productive researcher in biomedical, behavioral or clinical science?

• Does the applicant demonstrate commitment to a career as an independent researcher in the future?
Selection of Sponsor/co-Sponsor

• Think: research expertise, training experience and success
• If mentor is an Assistant Professor, may need to choose add’l senior person
• Mentoring teams (committees) are sometimes appropriate
• Are the sponsor(s’) research qualifications (including recent publications) and track record of mentoring individuals at a similar stage appropriate for the needs of the applicant?
• Is there evidence of a match between the research interests of the applicant and the sponsor(s)?
• Do the sponsor(s) demonstrate an understanding of the applicant’s training needs as well as the ability and commitment to assist in meeting these needs?
• Is there evidence of adequate research funds to support the applicant’s proposed research project duration of the fellowship?
Goals for Fellowship Training and Career

- Think: Thesis committee composition, conferences, coursework, publications, national meetings, professional skill development
- Is the proposed research plan of high scientific quality?
- Does it relate to the applicant's training plan?
- Is the training plan consistent with the applicant's stage of research development?
- Will the research training plan provide the applicant with individualized and supervised experiences that will develop research skills needed for his/her independent and productive research career?
Training Potential

• Does the proposed research training plan have the potential to provide the applicant fellow with the requisite individualized and supervised experiences that will develop his/her research skills?

• Does the proposed research training have the potential to serve as a sound foundation that will lead the applicant fellow to an independent and productive career?
Institutional Environment & Commitment to Training

• Are the research facilities, resources (e.g. equipment, laboratory space, computer time, subject populations), and training opportunities (e.g. seminars, workshops, professional development opportunities) adequate and appropriate?

• Is the institutional environment for the applicant’s scientific development of high quality? Is there appropriate institutional commitment to fostering the applicant's mentored training toward his/her research career goals?
Other Sections

• Biosketch

• Budget

• Vertebrate Animals/Human Subjects

• Letters of reference: Provide program announcement number, NIH commons user name, update CV, specific aims

• Responsible Conduct of Research: Ethics classes to be taken
4. Peer Review

**THE NIH PEER REVIEW PROCESS**

- Conducted according to the Federal Advisory Committee Act
  - Meetings are closed to the public
  - All materials and discussions – strictly confidential
- Over 80,000 applications reviewed per year
- Almost 18,000 reviewers
Review Process for a Research Grant Application

National Institutes of Health

- Assigns to Study Section & Institute
  - Study Section
    - Evaluates for Scientific Merit
  - Institute
    - Evaluates for Program Relevance
  - Advisory Councils and Boards
    - Recommends Action
  - Institute Director
    - Takes final action for NIH Director

Research Grant Application

- Initiates Research Idea
- Submits Application

School or Other Research Center

- Allocates Funds

Ctr for scientific review (CSR)
Center For Scientific Review (CSR)

The portal for NIH grant applications and their initial review for scientific merit. Organizes the peer review study sections that evaluate the majority of NIH applications. Not tied to a specific NIH institute. Their mission is to see that NIH grant applications receive fair, independent, expert, and timely reviews -- free from inappropriate influences -- so NIH can fund the most promising research.
Study Section

- Selected reviewers (expertise & availability)
- In some cases can be broad in expertise
- Each reviewer assigned grants ahead of time
- ‘Triage’ those with poor (high) scores
- Review the remainder
- 1-2 days (exhausting)
# NIH Study Section Scale 1-9

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<thead>
<tr>
<th>Impact</th>
<th>Score</th>
<th>Descriptor</th>
<th>Additional Guidance on Strengths/Weaknesses</th>
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<tr>
<td>High</td>
<td>1</td>
<td>Exceptional</td>
<td>Exceptionally strong with essentially no weaknesses</td>
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<tr>
<td></td>
<td>2</td>
<td>Outstanding</td>
<td>Extremely strong with negligible weaknesses</td>
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<tr>
<td></td>
<td>3</td>
<td>Excellent</td>
<td>Very strong with only some minor weaknesses</td>
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<tr>
<td>Medium</td>
<td>4</td>
<td>Very Good</td>
<td>Strong but with numerous minor weaknesses</td>
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<tr>
<td></td>
<td>5</td>
<td>Good</td>
<td>Strong but with at least one moderate weakness</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Satisfactory</td>
<td>Some strengths but also some moderate weaknesses</td>
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<tr>
<td>Low</td>
<td>7</td>
<td>Fair</td>
<td>Some strengths but with at least one major weakness</td>
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<td></td>
<td>8</td>
<td>Marginal</td>
<td>A few strengths and a few major weaknesses</td>
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<td></td>
<td>9</td>
<td>Poor</td>
<td>Very few strengths and numerous major weaknesses</td>
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**Minor Weakness:** An easily addressable weakness that does not substantially lessen impact

**Moderate Weakness:** A weakness that lessens impact

**Major Weakness:** A weakness that severely limits impact
Reviewer’s overall assessment “that the fellowship will enhance the applicant’s potential for, and commitment to, an independent scientific research career”.

Comments on the Applicant’s need for the proposed training and the likelihood that the research project, training plan, sponsor and environment will meet that need.
How strong are the Applicant’s academic record and research experiences?

Does the applicant have the potential to develop into an independent and successful researcher?

Is the applicant committed to a research career (in field X)?
Does the sponsor have the research qualifications (including recent publications) to provide a good training environment?

Does the sponsor have mentoring experience appropriate for the needs of the applicant?

Does the sponsor demonstrate an understanding of the applicants training needs and the ability and commitment to assist in meeting those needs?

https://grants.nih.gov/grants/peer/critiques/f_D.htm
3. **Research Training Plan**

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<th>Weaknesses</th>
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*Is the proposed research project of high scientific quality, and is it well integrated with the proposed research training plan?*

*Is the research project consistent with the applicant's stage of research development?*

*Is the proposed time frame feasible to accomplish the proposed training?*
4. **Training Potential**

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<th>Weaknesses</th>
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Are the proposed research project and training plan likely to provide the applicant with the requisite individualized and mentored experiences in order to obtain appropriate skills for a research career?

*Does the training plan take advantage of the applicant’s strengths, and address gaps in needed skills?*

*Does the training plan document a clear need for, and value of, the proposed training?*

*Does the proposed training have the potential to serve as a sound foundation that will clearly enhance the applicant’s transition to the next career stage and enhance the applicant’s ability to develop into a productive researcher?*
Are the research facilities, resources (e.g. equipment, laboratory space, computer time, subject populations), and training opportunities (e.g. seminars, workshops, professional development opportunities) adequate and appropriate?

Is the institutional environment for the applicant’s scientific development of high quality?

Is there appropriate institutional commitment to fostering the applicant’s mentored training?
ADDITIONAL REVIEW CRITERIA

As applicable for the project proposed, reviewers will consider the following additional items in the determination of scientific and technical merit, but will not give separate scores for these items.

— A response for Protections for Human Subjects, Vertebrate Animals, and Biohazards is required from reviewers for all applications.

— A response for Inclusion of Women, Minorities and Children is required from reviewers for Human Subjects Research Applications.

### Protections for Human Subjects

Click Here to Select

Comments (Required Unless Not Applicable):

- [ ]

Data and Safety Monitoring Plan (Applicable for Clinical Trials Only):

Click Here to Select

Comments (Required Unless Not Applicable):

- [ ]

### Inclusion of Women, Minorities and Children

Applicable Only for Human Subjects research and not IRB Exemption #4.

- Sex/Gender: Click Here to Select
- Race/Ethnicity: Click Here to Select
- For NIH-Defined Phase III trials, Plans for valid design and analysis: Click Here to Select
- Inclusion/Exclusion of Children under 18: Click Here to Select

Comments (Required Unless Not Applicable):

- [ ]
### Vertebrate Animals

Is the proposed research involving vertebrate animals scientifically appropriate, including the justifications for animal usage and protections for research animals described in the Vertebrate Animal section (and method of euthanasia described in the Cover Page Supplement or PHS Fellowship Supplemental Form, if applicable)?

**Click Here to Select**

Comments (Required Unless Not Applicable):
- [ ]

### Biohazards

**Click Here to Select**

Comments (Required Unless Not Applicable):
- [ ]

### Resubmission

Comments (if applicable):
- [ ]

### Renewal

Comments (if applicable):
- [ ]
# ADDITIONAL REVIEW CONSIDERATIONS

As applicable for the project proposed, reviewers will address each of the following items, but will not give scores for these items and should not consider them in providing an overall impact score.

## Training in the Responsible Conduct of Research

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ADDITIONAL COMMENTS TO APPLICANT

Reviewers may provide guidance to the applicant or recommend against resubmission without fundamental revision.

Additional Comments to Applicant (Optional)

- [Redacted]
Study Section Outcomes

• Discussed applications
  • Receives Impact/Priority Scores
  • Receives scores for individual core review criteria (final scores)
  • Summary statement reflects discussion

• Not Discussed applications
  • Receives scores for individual core review criteria (preliminary scores)
  • Summary statement is not updated
SUMMARY STATEMENTS

- The legal summary of the review meeting
- Includes all three reviewer critiques, largely unedited
- Includes a resume, which is a summary of the discussion of the meeting, focusing on the major strengths and weaknesses that resulted in the overall impact score
- Used by council, applicants, program staff
Funding: Pre-doc fellowships (F31)
Funding: Post-doc fellowships (F32)


National Institutes of Health Online Reporting Tool (RePORT)
NRSA INITIATIVE

• A program to encourage submission of NRSA’s on our campus and enhance our success rate

• Pilot funded by the Vice-Chancellor for Research

• Open to trainees in all UC Anschutz schools

• Will provide guidance in grant development and objective pre-review of applications

• Not a grant writing course
MOCK STUDY SECTION TIMELINE

• Sept 10 – letter of intent (LOI) due
  • Specific aims (one page) and a list of collaborators.
  • Based on your LOI you will be assigned a “Core” faculty contact person (Core Reviewer).
  • The CR will be your primary contact throughout the submission process.
  • The CR will meet with the trainee (and mentor if possible) at least once during the writing process to provide feedback and guidance.
TIMELINE Cont’d

• **October 28**<sup>th</sup> - full application due
  • This includes the trainee and the mentors training plan, but not letters of support.
  • No partial/incomplete applications will be accepted!!!

• **Mock Study** - tentatively the week of Nov 4<sup>th</sup>. Trainees are required to attend. Mentors are encouraged to attend.
Good Luck!!!