

NIH Fellowship Applications: Tools for Success

2021

Mary Reyland, PhD

Kristin Artinger, PhD

1. NIH fellowship overview

- Types of fellowships and eligibility
- Factors to consider when applying
- Tips from a Program Director

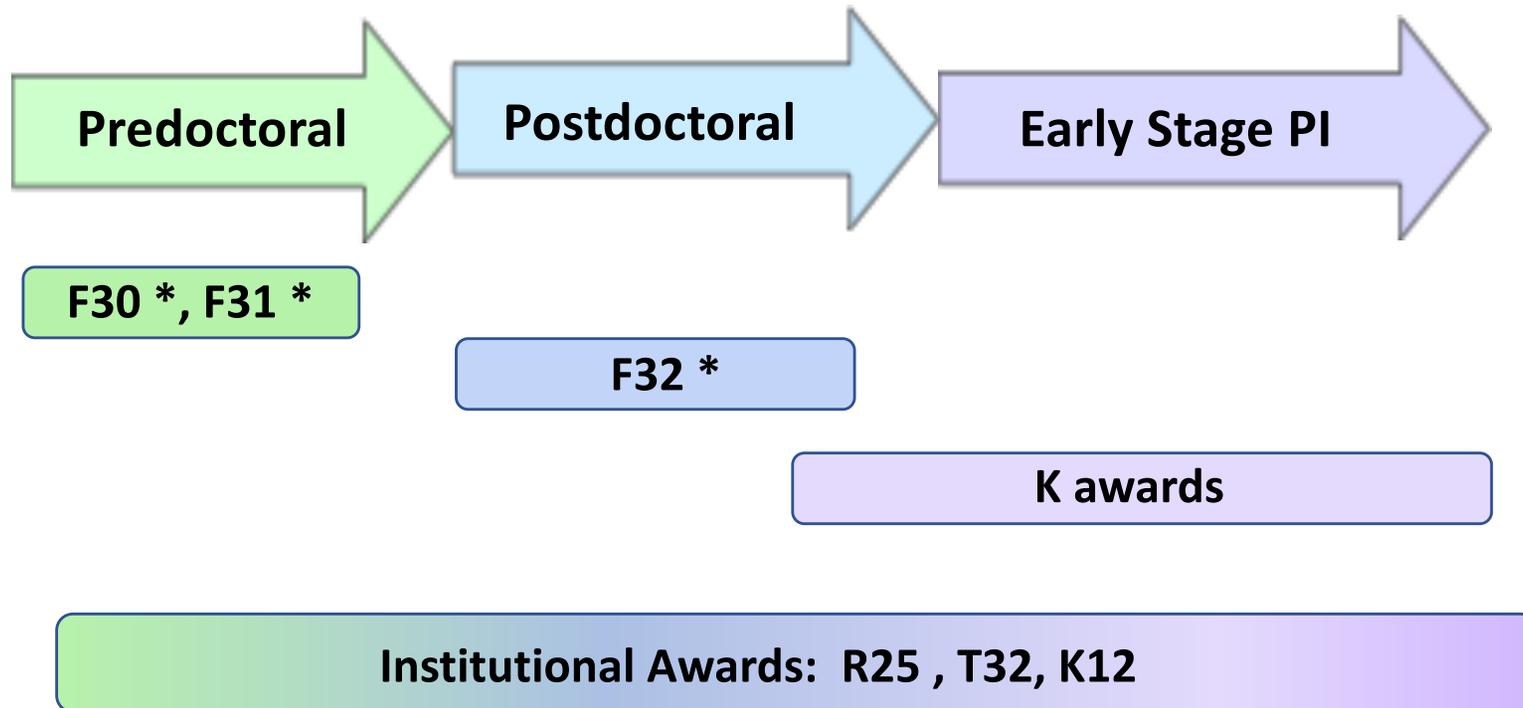
2. Writing a competitive application

- Prepare to write
- Grantsmanship and review criteria
- Completing the application

3. Peer review

- Scoring system
- Summary statement
- Institute funding pay-lines

Grant Funding for Trainees



***National Research Service Awards (NRSA)**

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

NRSA Fellowships Provide:

- Stipend (full-time effort required)
 - Predocs (F30 or F31): \$25,836 per year (March 2021) for up to 5 years
 - Postdocs (F32): \$53,760-\$65,292 per year (March 2021) for up to 3 years
- Partial tuition and fees
- Funds for training-related expenses (primarily health insurance, travel)

Participating Institutes

F31

<https://grants.nih.gov/grants/guide/pa-files/PA-21-051.html>

National Center for Complementary and Integrative Health [\(NCCIH\)](#)
National Cancer Institute [\(NCI\)](#)
National Eye Institute [\(NEI\)](#)
National Human Genome Research Institute [\(NHGRI\)](#)
National Heart, Lung, and Blood Institute [\(NHLBI\)](#)
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 [\(NIAMS\)](#)
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 of Environmental Health Sciences [\(NIEHS\)](#)
National Institute of Mental Health [\(NIMH\)](#)
National Institute on Minority Health and Health Disparities [\(NIMHD\)](#)
National Institute of Nursing Research [\(NINR\)](#)
National Institute of Neurological Disorders and Stroke [\(NINDS\)](#)
National Library of Medicine [\(NLM\)](#)
Office of Research Infrastructure Programs [\(ORIP\)](#)
National Institute on Drug Abuse [\(NIDA\)](#)

F32

<https://grants.nih.gov/grants/guide/pa-files/PA-21-032.html>

National Center for Complementary and Integrative Health [\(NCCIH\)](#)
National Cancer Institute [\(NCI\)](#)
National Eye Institute [\(NEI\)](#)
National Human Genome Research Institute [\(NHGRI\)](#)
National Heart, Lung and Blood Institute [\(NHLBI\)](#)
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 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 Drug Abuse [\(NIDA\)](#)
National Institute on Minority Health and Health Disparities (NIMHD)

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

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

Tips from a Program Director

- Know the due dates
 - April 8, August 8, December 8 by 5 pm local time (a few exceptions so check)
- 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 of 3 letters required; up to 5
 - Due by 5 pm local time on due date

- Read the Funding Opportunity Announcement (FOA)
 - Table of IC-Specific Information, Requirements, and Staff contacts: <https://grants.nih.gov/grants/guide/pa-files/pa-19-195.html#Application%20Types%20Allowed>
- Read the SF424 Application Form Instructions
 - <https://grants.nih.gov/grants/how-to-apply-application-guide/forms-e/general-forms-e.pdf>

2. Writing a Competitive Application

- Summary: before you start
 - Speak with Agency Program Director (≈4 months ahead)
 - Speak with your Departmental Grants Specialist (≈4 months ahead)
 - Talk with your sponsor about your training plan (≈4 months ahead)
 - Identify who will write letters of reference (≈2-3 months ahead)
 - Speak with Colleagues who are awardees
 - Review funded applications (e.g. [weblink for some recently funded applications](#))
 - Review agency's review criteria
 - Strengthen pilot data (should be solid! Not required for F31, but good data never hurts)
 - Identify what will make the application more competitive
 - Identify research and/or career development opportunities

Components of the Application

- a. Title and Abstract
- b. Applicants Background and Goals for Training
- c. Research Training Plan
 - Specific Aims
 - Research strategy
 - Significance
 - Approach
- d. Respective Contributions (trainee/sponsor)
- e. Selection of Sponsor and Institution
- f. Training in the Responsible Conduct of Research
- g. Sponsor and Co-Sponsor Statements
- h. Institutional Environment and Commitment to Training (Program Director)
- i. Letters of Support (collaborators, consultants, etc)
- j. Description of Candidate's Contribution to Program Goals (promote diversity).
Provided by Chair/Dean/Program Director

An Outstanding Application Includes:

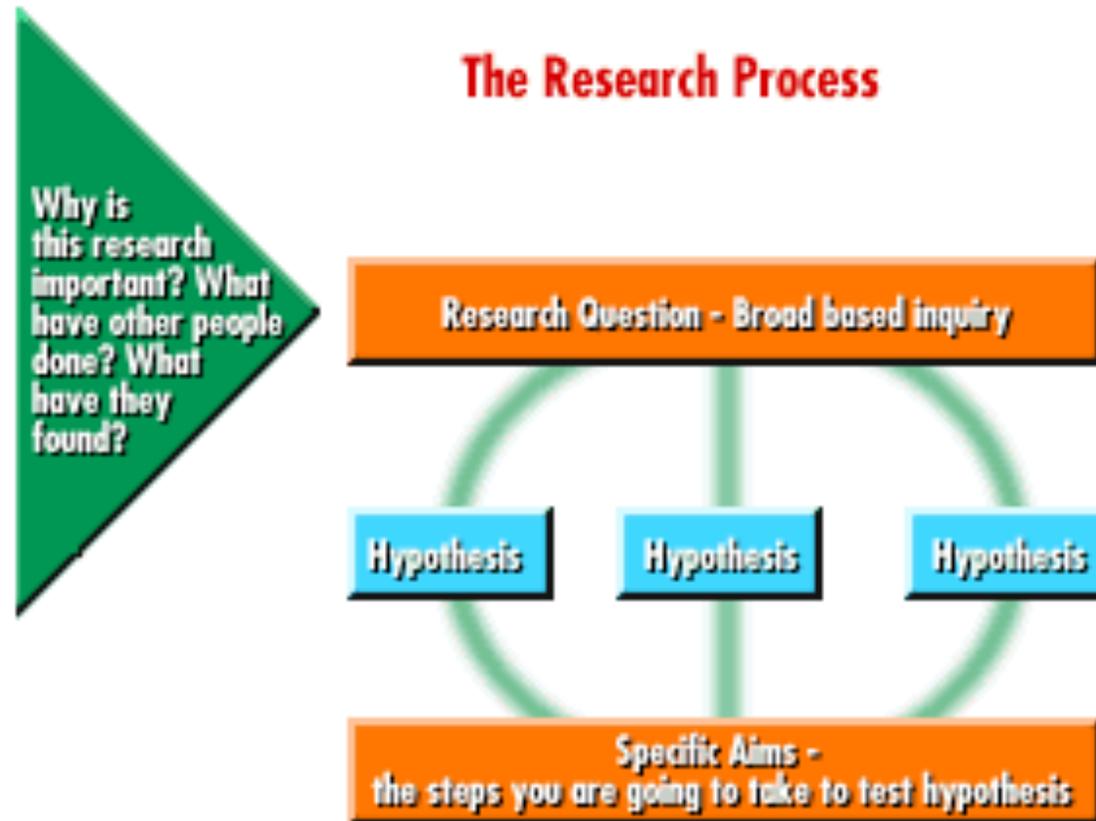
- Research that is Feasible, Relevant, Unique, Innovative and provides training opportunities
- Well-organized training and career development plans that highlight the training goals and how the planned research and other activities will reach those goals
- Consistency between sections written by trainee, mentor and collaborators
- Writing that is clear and logical, with well-designed figures and tables
- Research plan with an explicitly stated hypothesis and complementary specific aims that rigorously examine the hypothesis
- A discussion of rationale, gap in knowledge and potential impact
- A description of the methods/approaches/techniques/expected outcomes/interpretations for each aim, along with limitations/challenges and how they will be addressed
- Review by mentor AND 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



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

- The single most important page of the application, usually the only one read by the entire study section.
- 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

- 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

Research Strategy

Reviewers will ask:

- Is the proposed research project of high quality and is it well integrated with the research training plan?
- Is the project significantly distinct from the sponsor's funded research? Beware of overlap!
- Is the research project consistent with the applicant's stage of research development?
- Is the proposal time frame feasible to accomplish the proposed training?

Fellowship Applicant

Reviewers will ask:

- 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, choose a senior co-sponsor.
- Mentoring teams (committees) are sometimes appropriate; can provide expertise in areas not covered by your sponsor (i.e. a clinician mentor).
- If you have co-mentor/mentoring team, explain how each person will contribute to your success.

Reviewers will ask:

- 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 and training for the duration of the fellowship?

Goals for Fellowship Training and Career

- Think: Thesis committee composition, conferences, coursework, publications, national meetings, professional skills.

Reviewers will ask:

- Is the proposed research plan of high scientific quality?
- Does it relate to the applicant's training plan? Make sure your training plan includes how you will get the skills/knowledge base you need to do the proposed research.
- 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 and other professional skills needed for his/her independent and productive research career?

Training Potential

Reviewers will ask:

- 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

Reviewers will ask:

- Are the research facilities, resources (e.g. equipment, laboratory space, computer time, subject populations, core facilities), 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 (e.g. postdoc office, career development workshops) to fostering the applicant's mentored training toward his/her research career goals?

Other Sections

- Biosketch
- Budget
- Vertebrate Animals/Human Subjects
- Letters of reference
- Letters of support (if needed, always a plus)
- Responsible Conduct of Research: Ethics classes to be taken

Institutional Players

- Your mentor!
- NRSA Development Program
- Your Department Grants Specialists
- Office of Grants and Contracts – they are the interface with NIH

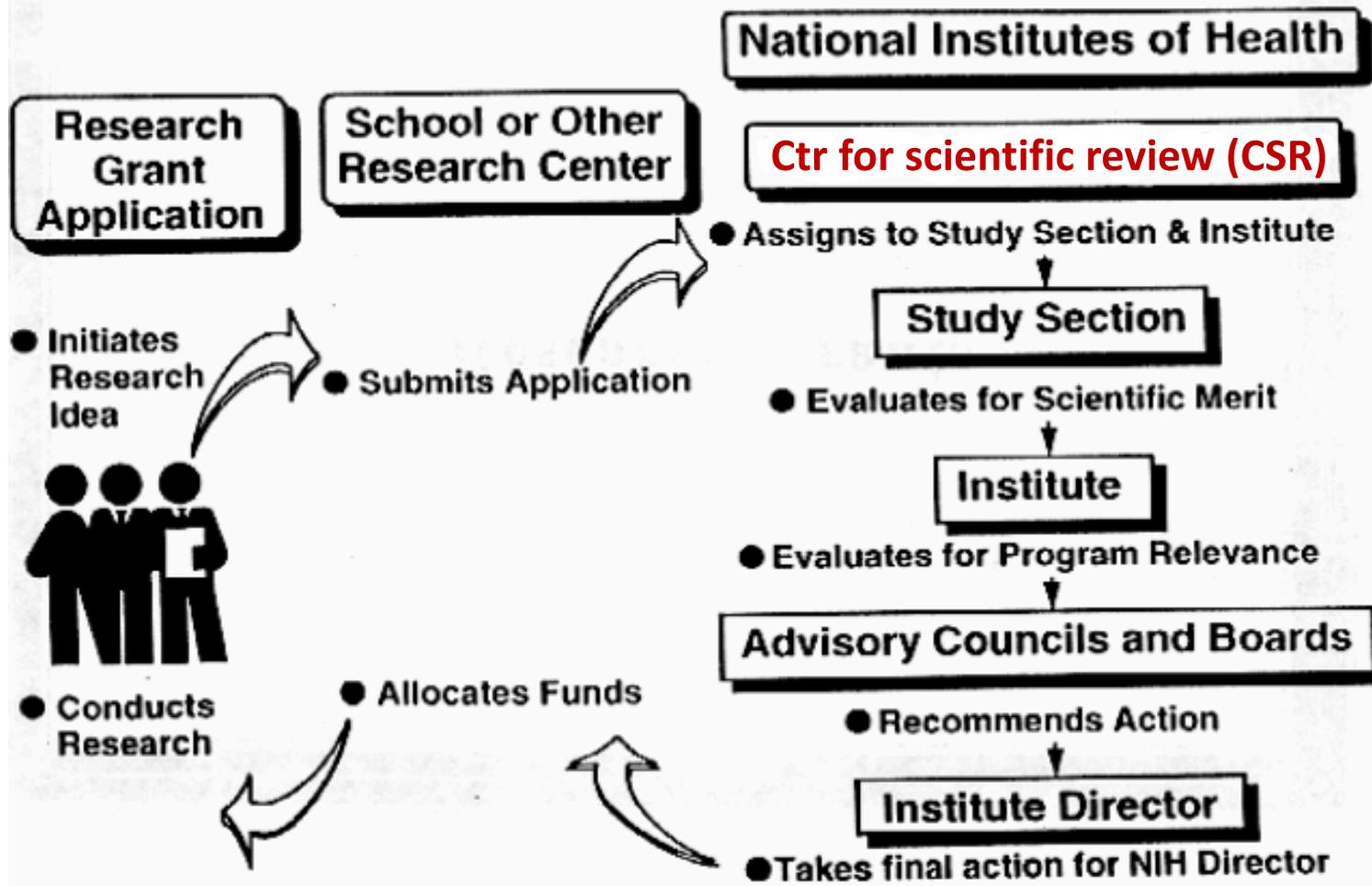
3. Peer Review

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



Dual Review System for Grant Applications

Study Section

First Level of Review

Scientific Review Group

- Provides initial scientific review of grant applications
- Makes recommendations for appropriate level of support and duration of award



Council

Second Level of Review

Institute's Council

- Assesses quality of SRG review of grant applications
- Makes recommendations to institute staff on funding
- Evaluates program priorities and relevance
- Advises on policy

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

Impact	Score	Descriptor	Additional Guidance on Strengths/Weaknesses
High	1	Exceptional	Exceptionally strong with essentially no weaknesses
	2	Outstanding	Extremely strong with negligible weaknesses
	3	Excellent	Very strong with only some minor weaknesses
Medium	4	Very Good	Strong but with numerous minor weaknesses
	5	Good	Strong but with at least one moderate weakness
	6	Satisfactory	Some strengths but also some moderate weaknesses
Low	7	Fair	Some strengths but with at least one major weakness
	8	Marginal	A few strengths and a few major weaknesses
	9	Poor	Very few strengths and numerous major weaknesses

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

F30/F31/F32/F33 Review

If you cannot access the hyperlinks below,
visit http://grants.nih.gov/grants/peer/critiques/f_D.htm.

Application #:

Applicant:

OVERALL IMPACT

Reviewers will provide an overall impact score to reflect their assessment of the likelihood that the fellowship will enhance the candidate's potential for, and commitment to, a productive independent scientific research career in a health-related field, in consideration of the following scored and additional review criteria. An application does not need to be strong in all categories to be judged likely to have a major impact.

[Overall Impact/Merit](#) Write a paragraph summarizing the factors that informed your Overall Impact score.

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.

SCORED REVIEW CRITERIA

Reviewers will consider each of the five review criteria below in the determination of scientific and technical merit, and give a separate score for each.

1. [Fellowship Applicant](#)

Strengths

-

Weaknesses

-

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)?

2. Sponsors, Collaborators, and Consultants

Strengths

-

Weaknesses

-

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 of the applicants training needs and the ability and commitment to assist in meeting those needs?

3. Research Training Plan

Strengths

-

Weaknesses

-

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

Strengths

-

Weaknesses

-

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?

5. Institutional Environment & Commitment to Training

Strengths

-

Weaknesses

-

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](#)

Click Here to Select ▾

Comments on Format (Required):

- [REDACTED]

Comments on Subject Matter (Required):

- [REDACTED]

Comments on Faculty Participation (Required):

- [REDACTED]

Comments on Duration (Required):

- [REDACTED]

Comments on Frequency (Required):

- [REDACTED]



[Applications from Foreign Organizations](#)

Click Here to Select 

Comments (Required Unless Not Applicable):

- 

[Select Agents](#)

Click Here to Select

Comments (Required Unless Not Applicable):

- 

[Resource Sharing Plans](#)

Click Here to Select

Comments (Required):

- 

[Budget and Period of Support](#)

Click Here to Select

Recommended budget modifications or possible overlap identified:

- 

ADDITIONAL COMMENTS TO APPLICANT

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

[Additional Comments to Applicant](#) (Optional)

- 

Study Section Outcomes

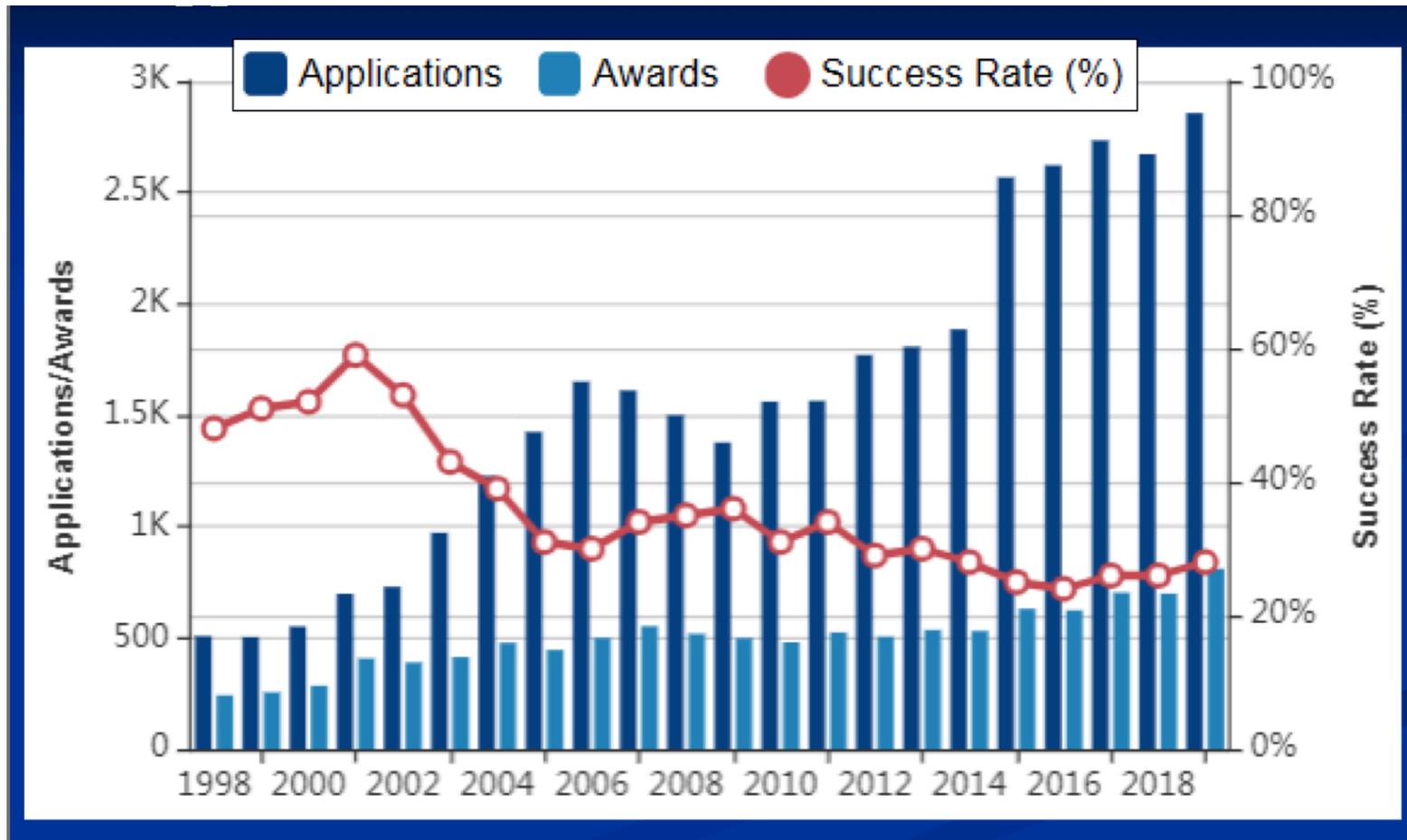
- Discussed applications
 - Receives Impact/Priority Scores
 - Receives scores for individual core review criteria (final scores)
 - Summary statement reflects discussion
- Not Discussed applications
 - Receives scores for individual core review criteria (preliminary scores)
 - Summary statement is not updated



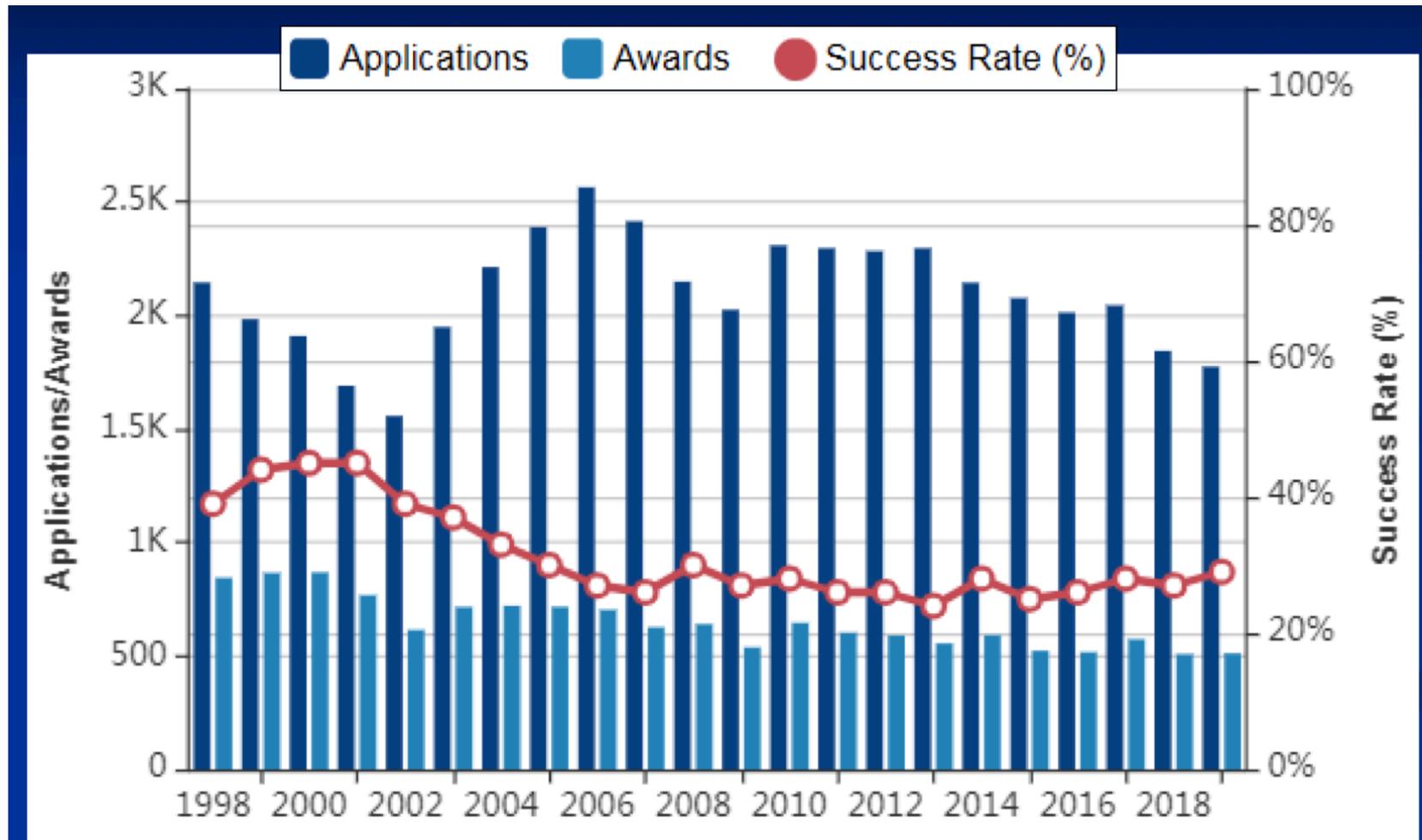
SUMMARY STATEMENTS

- ◉ 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)



Coming soon!

- December 8th NRSA submission deadline
- CU Anschutz Pre-review and Mock Study Section:
 - Letter of Intent due October 1st
 - Application due October 29th
 - Mock Study Section November 10th (9am-noon)
- Look for notices: flyers & emails
- [Link for more information](#)

Documents needed for Mock study section

Required documents for mock study section:

- Candidate Biosketch
- Sponsor Biosketch
- Co-sponsor Biosketch (if there is a co-sponsor)
- Applicants background and goals for fellowship training including past research, training goals and objectives, activities planned under this award
- Specific aims
- Research Strategy and references
- Sponsor statement

Optional (but useful if have):

- Summary
- Narrative
- Respective contributions
- Letters of support from collaborators and consultants. If letters are not available then a list of letters that will be obtained before full submission to NIH

Start Early

Use your Resources

Good Luck!!!