Perfecting and Integrating the Career Development Components of an NIH K Grant Application

Emory University
May 10, 2021

Jaime S. Rubin, Ph.D.
Dept. of Medicine
College of Physicians and Surgeons
Columbia University

Course: "Funding and Grantsmanship for Research and Career Development Activities"
http://grantscourse.columbia.edu/

NIH Career Development (K) Applications
- NIH Review
  - Process
  - Scoring System
  - Criteria
- Components of the NIH Application
  - Non-Technical/Scientific Sections
  - Best Practices for Addressing the Review Criteria

NIH's Evaluation System
9-point rating scale (1=exceptional; 9=poor)

Impact | Score | Descriptor | Additional Guidance on Strengths/Weaknesses
--- | --- | --- | ---
High Impact | 1 | Exceptional | Exceptionally strong with essentially no weaknesses
2 | Outstanding | Extremely strong with negligible weaknesses
3 | Excellent | Very strong with only some minor weaknesses
4 | Very Good | Strong but with numerous minor weaknesses
Medium Impact | 5 | Good | Strong but with at least one moderate weakness
6 | Satisfactory | Some strengths but also some moderate weaknesses
Low Impact | 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: A weakly addressable weakness that does not substantially lessen impact
Major Weakness: A weakness that severely limits impact


Jaime S. Rubin, Ph.D.;
http://grantscourse.columbia.edu/
“Perfecting and Integrating the Career Development Components of an NIH K Grant Application”
Emory University – May 10, 2021

Initial Review Group or Study Section Actions

- **Discussed applications:**
  - Receives Impact/Priority Scores
  - Receives Scores for individual core review criteria

- **Not Discussed:**
  - Receives Scores for individual core review criteria
  - Not Recommended for Further Consideration (NRFC)
  - Other: e.g. Deferred

K awards Payline: NHLBI

<table>
<thead>
<tr>
<th>Payline</th>
<th>Grant Program</th>
<th>Grant Program Description</th>
<th>Percentile</th>
<th>Priority Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>R01</td>
<td>Research Project Grant</td>
<td>16</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>R01ES1</td>
<td>Early Stage Investigators</td>
<td>26</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Awards</td>
<td>Career Development Awards</td>
<td>N/A</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

NIH's Review Criteria

- **Overall Impact Score**
  - “assessment of the likelihood that the proposed career development and research plan will enhance the candidate’s potential for a productive, independent scientific research career in a health-related field…”

- **Core Review Criteria**
  A separate score is given for each
Separate Scores for the Individual Criteria

- All applications receive scores (even those not discussed at study section)
- Individually reported in summary statement
- Major strengths and weaknesses that influenced the overall impact/priority score - ¼ page per criterion

1. Candidate

- “Does the candidate have the potential to develop as an independent and productive researcher?
- Are the candidate’s prior training and research experience appropriate for this award?
- Is the candidate’s academic, clinical (if relevant), and research record of high quality?
- Is there evidence of the candidate's commitment to meeting the program objectives to become an independent investigator in research?”

1. Candidate

- “Do the reference letters address the above review criteria, and do they provide evidence that the candidate has a high potential for becoming an independent investigator?”
2. Career Development Plan/Career Goals & Objectives

- “What is the likelihood that the plan will contribute substantially to the scientific development of the candidate and lead to scientific independence?
- Are the candidate's prior training and research experience appropriate for this award?
- Are the content, scope, phasing, and duration of the career development plan appropriate when considered in the context of prior training/research experience and the stated training and research objectives for achieving research independence?"

3. Research Plan

- “Are the proposed research questions, design, and methodology of significant scientific and technical merit?
- Is the prior research that serves as the key support for the proposed project rigorous?
- Has the candidate included plans to address weaknesses in the rigor of prior research that serves as the key support for the proposed project?
- Has the candidate presented strategies to ensure a robust and unbiased approach, as appropriate for the work proposed?"

NIH Review criteria – changes

- For applications with deadlines on or after January 25, 2019

<table>
<thead>
<tr>
<th>Section</th>
<th>Criteria</th>
<th>Current language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scored Review Criteria</td>
<td>Research Plan</td>
<td>Is there a strong scientific premise for the project?</td>
</tr>
<tr>
<td>Scored Review Criteria</td>
<td>Research Plan</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

4. Mentor(s), Co-mentor(s), Consultant(s), Collaborator(s)

- “Are the qualifications of the mentor(s) in the area of the proposed research appropriate?
- Do(es) the mentor(s) adequately address the candidate's potential and his/her strengths and areas needing improvement?
- Is there adequate description of the quality and extent of the mentor's proposed role in providing guidance and advice to the candidate?
- Is the mentor's description of the elements of the research career development activities, including formal course work adequate?”
4. Mentor(s), Co-mentor(s), Consultant(s), Collaborator(s)
   - “Is there evidence of the mentor’s, consultant’s and/or collaborator’s previous experience in fostering the development of independent investigators?
   - Is there evidence of the mentor’s current research productivity and peer-reviewed support?
   - Is active/pending support for the proposed research project appropriate and adequate?
   - Are there adequate plans for monitoring and evaluating the career development awardee’s progress toward independence?”

5. Environment and Institutional Commitment to the Candidate
   - “Is there clear commitment of the sponsoring institution to ensure that the required minimum of the candidate’s effort [usually 75%] will be devoted directly to the research described in the application, with the remaining percent effort being devoted to an appropriate balance of research, teaching, administrative, and clinical responsibilities?
   - Is the institutional commitment to the career development of the candidate appropriately strong?”

Additional Review Criteria
Evaluated for the overall impact score, but not given an individual score
- Protections for Human Subjects
- Inclusion of Women, Minorities, and Individuals Across the Lifespan (as of Jan 25, 2019)
- Vertebrate Animals
- Biohazards
- Resubmissions
- Response to previous reviewers’ comments and subsequent changes made to the proposal

Additional Review Considerations
Not given an individual score and not considered for the overall impact score
- Training in the Responsible Conduct of Research
  - Address required components (training faculty involvement)
- Select Agent Research
- Resource Sharing Plans
  1) Data Sharing Plan; 2) Sharing Model Organisms; and 3) Genomic Data Sharing Plan
- Authentication of Key Biological and/or Chemical Resources
  - Plans for identifying and ensuring the validity of resources
- Budget and Period of Support
Guidance for NIH Reviewers

- Rigor and Transparency
- Sex as a Biological Variable
- Vertebrate Animals
- Human Subjects Section
- Clinical Trials
- Single IRB for multi-site studies
- Inclusion on the Basis of Sex/Gender, Race, Ethnicity, and Age in Clinical Research
- Human Embryonic Stem Cells
- Authentication of Key Biological and/or Chemical Resources
- Select Agents
- Resource Sharing Plans
- Budget Information
- Revision Applications

Guidelines for NIH Reviewers

- Human Embryonic Stem Cells
- Authentication of Key Biological and/or Chemical Resources
- Select Agents
- Resource Sharing Plans
- Budget Information
- Revision Applications

Topics to be Discussed

NIH Career Development (K) Applications

- NIH Review
- Process
- Scoring System
- Criteria

Components of the NIH Application

- Non-Technical/Scientific Sections
- Best Practices for Addressing the Review Criteria
“Perfecting and Integrating the Career Development Components of an NIH K Grant Application”
Emory University – May 10, 2021

1 + 12 Pages Combined

- Candidate Information
  - Section 2
- Research Plan
  - 3. Specific Aims (1 page)
  - 4. Research Strategy

2. Candidate Information

- Candidate’s Background
- Career Goals and Objectives
- Candidate’s Plan for Career Development/Training Activities During Award Period

Not everything that can be counted counts.
Not everything that counts can be counted.

Quoting Investigator suggests crediting sociologist William Bruce Cameron.
http://quoteinvestigator.com/2010/05/26/everything-counts-einstein/
2. Candidate’s Background
- Scientific history/Unique expertise
  - Previous work
    - Consistent themes, or
    - Why research interests have changed direction
  - Relationship to career path described in application
- Other didactic/training experiences
  - e.g., Master’s degree
- Other research experiences
  - e.g., MD/PhD, Medical school, Fellowship
  - Reasons for basic, clinical, translational, epidemiology, behavioral, multidisciplinary research, relevant publications

Personal Statement/
Candidate’s Background
When describing a previous research experience:
- What did you learn and accomplish?
  - “Intellectual aspects”
  - Do not focus on technical aspects
- Why the transition from one research project/area/mentor/institution to the next?
- How/Why did your interests change or evolve?
- Cite any resulting publications/abstracts
- Describe any honors, awards and resulting conference/workshop presentations

Career Goals and Objectives
- Justify award
  - Fits into past and future research career
- Skills that are lacking
  - Identification of specific modules to address areas for growth, provides justification of award
  - Role of specific Mentor(s) and Advisory Committee member(s)

Career Development and Research Arrangements
- Multiple Mentors (mentored awards)
- Advisors (mentored awards)
- Co-investigators/Collaborations
- Subcontracts to other institutions
- Multidisciplinary/Interdisciplinary

Mentors/Advisory Committee
- Scientific area per Mentor/Committee member
- Schedule of meetings

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Role</th>
<th>Area of Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name (Title)</td>
<td>Mentor</td>
<td></td>
</tr>
<tr>
<td>Name (Title)</td>
<td>Co-Mentor</td>
<td></td>
</tr>
<tr>
<td>Name (Title)</td>
<td>Advisory Board Member</td>
<td></td>
</tr>
<tr>
<td>Name (Title)</td>
<td>Advisory Board Member</td>
<td></td>
</tr>
<tr>
<td>Name (Title)</td>
<td>Advisory Board Member</td>
<td></td>
</tr>
<tr>
<td>Name (Title)</td>
<td>Collaborator</td>
<td></td>
</tr>
<tr>
<td>Name (Title)</td>
<td>Consultant</td>
<td></td>
</tr>
</tbody>
</table>
Short-term Career Goals
- Timeline for funded period
  - Year 1: Preliminary data
  - Year 2: Submit publications (possible journals), Presentations at national meetings (examples), Formulation of R01 application
  - Years 3-5: By the end of the funded period, applicant will be an independent investigator near to R01 funding

Long-term Career Goals
- Scientific goals
  - Basic science, translational, clinical, epidemiologic, behavioral
- Mentoring goals
  - How mentoring has been important to you
  - Previous/current mentoring responsibilities
- Networking goals
  - Multidisciplinary activities, grants, etc.

Career Development/Training Activities During Award Period
- Review of didactic courses, clinical training, and research experiences to date
- New research skills/ knowledge required
- Identification of training required to fill gaps in knowledge in order to reach long term goals
  - Rational for each of the training activities

Module Mentor(s) Mode of Learning
<table>
<thead>
<tr>
<th>Scientific Area (1-3)</th>
<th>Specific names</th>
<th>Coursework (completed and new)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1-on-1 meetings (schedule? e.g. weekly)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guided readings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research meetings (schedule? e.g. weekly)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Applied training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clinical experience</td>
</tr>
<tr>
<td>Career skills</td>
<td></td>
<td>Improving communication skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grant writing course</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Professional workshops/seminars</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaborations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abstracts and manuscripts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R01/Small grant application submission</td>
</tr>
<tr>
<td>Research management</td>
<td></td>
<td>Supervising technical support personnel, organizing lab meetings, journal clubs</td>
</tr>
<tr>
<td>Mentorship</td>
<td></td>
<td>e.g. training new lab members, undergraduate, summer students</td>
</tr>
</tbody>
</table>

New Section on each Module
- Reason for module
- Specific description of each “Mode of Learning”
  - Role of Mentor(s) and Advisor(s)
  - Specific courses, workshops, and other didactics
  - Details on research meetings
- Module: Career skills
  - Grantsmanship
  - Becoming a mentor
  - Research Group/Laboratory management
Summary of coursework
- List previous relevant coursework
- Proposed coursework
  - Course number and description
  - Include career development courses (e.g., grant writing) and responsible conduct of research
  - Additional didactic activities
  - e.g., Those offered by professional societies, workshops, symposiums

Clinical and/or Teaching activities
- Relationship to proposed research and career development activities
- Be specific, mention hrs. per week (cal months)
- Percentage of time for each activity
- Restate % of time dedicated to research
- Timetable

Table: Career Development/Training Activities During Award Period

<table>
<thead>
<tr>
<th>Career Development Activities</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentors:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mentor (name) – frequency (e.g. weekly) of individual meetings, frequency of lab meetings, frequency and listing of specific journal clubs, seminars, and other recurring relevant programs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Co-Mentor (name) – frequency (e.g. weekly) of individual meetings, frequency of lab meetings, frequency and listing of journal clubs, seminars, and other recurring relevant programs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Advisory Group – frequency (e.g. quarterly) of meetings</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Workshops &amp; Additional Training Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold Spring Harbor Course on….</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woods Hole Workshop on….</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Association for…. Junior Investigators Training on….</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTSA &quot;K to R&quot; Program</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IRB 101 Course</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NYAS Science Alliance Sessions on….</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Scientific Conferences/Communication Skills (Oral / Poster Presentations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symposium of the NY Academy of…. (annual)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Congress of…. (annual)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>American Association for…. (annual)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Society of…. (biennial)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Career Development Activities</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mentor (name) – Specific area of research and/or methodology</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Co-Mentor (name) – Specific area of research and/or methodology</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-Investigator 1 (name) – Specific area of research and/or methodology</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-Investigator 2 (name) – Specific area of research and/or methodology</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborator 1 (name) – Specific area of research and/or methodology</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborator 2 (name) – Specific area of research and/or methodology</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal Coursework</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course #1: Specific Course # / Formal Title</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course #2: Specific Course # / Formal Title</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsible Conduct of Research and Related Policy Issues</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funding for Research Activities</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Career Development Activities</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentoring Skills (responsibility shared with K mentors)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students (summer, undergraduate, medical)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication Skills (Written)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation of manuscripts for peer reviewed journals</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant Writing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTSA pilot award for junior investigator</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Career for…. award for new investigators</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R01 preparation and submission (on research funded by K award)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Jaime S. Rubin, Ph.D.
Columbia University, New York, NY
Perfecting and Integrating the Career Development Components of an NIH K Grant Application

Emory University – May 10, 2021

3. Specific Aims (1 page)
4. Research Strategy

- Not overly ambitious
- Appropriate for the career level and of the applicant
- Appropriate for the length of the K award
- Achievable research goals
- Appropriate for the Mentor's expertise/background
- Appropriate for the Mentor's available funding
- Appropriate of the Institution's resources

Timeline for Specific Aims and Benchmarks/Milestones of Research Progress

<table>
<thead>
<tr>
<th>Benchmarks/Milestones</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of Specific Aim 1a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary of Specific Aim 1b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary of Specific Aim 2a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary of Specific Aim 2b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary of Specific Aim 3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specific Aims: Milestones

- Specific Aim 1a Milestone:
- Specific Aim 1b Milestone #1:
- Specific Aim 1b Milestone #2:
- Specific Aim 2a Milestone #1:
- Specific Aim 2a Milestone #2:
- Specific Aim 2b Milestone #1:
- Specific Aim 2b Milestone #2:
- Specific Aim 3 Milestone:
“Perfecting and Integrating the Career Development Components of an NIH K Grant Application”
Emory University – May 10, 2021

Implementing Rigor and Transparency in NIH & AHRQ Career Development Award Applications

Notice Number: NOT-OD-16-012

These updates focus on four areas deemed important for enhancing rigor and transparency:
1) the scientific premise forming the basis of the proposed research,
2) rigorous experimental design for robust and unbiased results,
3) consideration of relevant biological variables, and
4) authentication of key biological and/or chemical resources.

Updates include:
- Revisions to application guide instructions for preparing your research strategy attachment
- Use of a new "Authentication of Key Biological and/or Chemical Resources" attachment
- Additional rigor and transparency requirements to be adhered to for career development applications

https://gründe.nih.gov/grants/post/critiques/k.htm

Reviewer Guidance on Rigor and Transparency: Research Project Grant and Mentored Career Development Applications

OVERVIEW: MENTORING CAREER DEVELOPMENT AWARD (K) APPLICATIONS

<table>
<thead>
<tr>
<th>Element of Rigor and Transparency</th>
<th>Section of Application</th>
<th>Criteria Score</th>
<th>Additional Review Consideration</th>
<th>Contributes to Overall Impact Score?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigor of the Prior Research</td>
<td>Research Strategy</td>
<td>Research Plan</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Strengthen Rigor</td>
<td>Research Strategy</td>
<td>Research Plan</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Consideration of Relevant Biological Variables, such as sex</td>
<td>Research Strategy</td>
<td>Research Plan</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Authentication of Key Biological and/or Chemical Resources</td>
<td>Research Strategy</td>
<td>Research Plan</td>
<td>N/A</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Guidance: Rigor and Reproducibility in Grant Applications

NIH research grant and career development award instructions and review language focus on four key areas:
1. The rigor of the prior research
2. Rigorous experimental design for robust and unbiased results
3. Consideration of relevant biological variables
4. Authentication of key biological and/or chemical resources

https://gründe.nih.gov/grants/post/critiques/k.htm

6. Training in the Responsible Conduct of Research

- Format, 2) Subject Matter, 3) Faculty Participation, 4) Duration, and 5) Frequency of Instruction
- Role of Mentor
- Prior instruction in RCR
- Once every four years requirement
- Don’t do the minimum
- Additional IRB or IACUC-related programs?
- http://gründe.nih.gov/training/responsibleconduct.htm
- No more than 1 page
8. Plans and Statements of Mentor and Co-Mentor(s)

- Mentor’s assessment of the Candidate
- Mentor’s research and career development plans for the Candidate
  - Research
  - Career development activities
    - Seminars, scientific meetings, presentations, becoming a mentor, RCR
  - Expectations for publications
- What aspect of the research will the candidate be allowed to take to start their own independent research career
- Mentor’s plans for providing mentoring and supervision
  - How this will promote candidate’s development
- Plan for Candidate’s Transition from Mentored Stage to Independent Investigator
- Candidate’s additional responsibilities
  - Courses, seminars, lab meetings
  - Teaching, clinical, administrative
- Source of support for Candidate’s research project
  - Grants
  - Core/shared facilities
  - Technical support
- Previous experience as a Mentor
  - Previous mentees - Type (e.g., graduate student, post-doctoral fellow, junior faculty), Number, Career Outcomes
- Mentor and Co-Mentors
  - How mentorship responsibilities will be shared
  - How different areas of expertise enhance mentorship
  - Past collaborative research/co-mentorship activities
- Addition instructions if clinical trials proposed
- No more than 6 pages

Possible Problems Specific for Mentored Fellowship & Career Development Awards

- Mentor
  - Too many other responsibilities (e.g., administrative, clinical)
  - Too many other mentees (e.g., students, post-docs, junior faculty)
  - Not appropriate scientifically
  - Too junior
  - Limited experience as a mentor
  - Limited funds to support proposed research

9. Letters of Support from Collaborators, Contributors, and Consultants

- Advisory Committee (described in Section 2)
  - Purpose
    - Reviews research progress, publications, R01 submission, career development activities, didactic program
    - Provides scientific guidance
    - Documents meetings with an annual report
  - Name, title, and short paragraph on each member in Section 2
  - Each should provide a letter and NIH Biosketch
Collaborators and Consultants (described in Section 2)
- Name, title, and short paragraph on each individual in Section 2
- Each should provide a letter and NIH Biosketch
- Director of Core Facility
- Source of “special” research resource (e.g., data set, patient samples, unique animal model/cell line/reagent)
- No more than 6 pages

Environment and Institutional Commitment to the Candidate
- 10. Description of Institutional Environment
- Information relevant to Candidate’s research and career development activities
  - Institution, Dept./Division, Institute
  - Other schools, centers, shared resources, core facilities, CTSA, etc.
  - Degree programs, courses, seminars, journal clubs
  - Institution’s/Dept.’s formal mentoring program
- No more than 1 page

Possible Problems Specific for Mentored Career Development Awards Institution
- Limited scientific/technical resources (e.g., core facilities, biostatistical support, patient population)
- Limited career development opportunities (e.g., courses, workshops)
- Limited opportunities for career advancement

Environment and Institutional Commitment to the Candidate
- 11. Institutional Commitment to the Candidate’s Research Career Development
  - Letter from Dept. Chair/Institute Director
  - Specifics on protected time (most K awards: 75%)
  - Specifics on faculty appointment (full-time)
  - Statement that appointment and salary are not contingent on award
  - Statement on availability of research resources, personnel, office and research space, equipment, etc. required for project
  - Statement that mentors and collaborators will be able to provide time and support for mentoring/research responsibilities
  - Signed and dated on letterhead stationery
- No more than 1 page
Environment and Institutional Commitment to the Candidate

12. Description of Candidate’s Contribution to Program Goals
   - Required for applicants to “diversity-related” career development funding programs
     - e.g., Diversity-related K01’s and K22’s
   - Institutional letter
     - Addresses how the applicant’s participation in this funding program “to promote diversity in health-related research”

R&R Other Project Information:

10. Facilities & Other Resources

Scientific/Technical Resources
   - Facilities to be used for the conduct of the proposed research
     - Laboratory
     - Animal
     - Computer
     - Office
     - Clinical [patient/research subject populations]
     - Other Core facilities [e.g., research pharmacy, biostatistics, technical cores (microscopy, biomarkers), biohazards]
   - Discuss how the proposed studies will benefit from the unique features of the scientific environment, subject populations, or collaborative arrangements

Career Development Resources - also referenced in “main body” of the grant (Table) and Mentor’s section

- Career development programs
  - Institutional (e.g., Office of Faculty Affairs)
  - Department/Institute
  - Professional societies
- Formal degree programs and other didactics
  - Degree program
  - Scientific courses: e.g., Statistics
  - Career Development courses: e.g., Funding & Grantsmanship
- Workshops, webinars, other training programs

R&R Other Project Information:

10. Facilities & Other Resources

Career Development Resources
   - More complete descriptions of programs referenced in:
     - 2. Career Development/Training Activities During Award Period
     - 8. Plans and Statements of Mentor and Co-Mentor(s)
     - 10. Description of Institutional Environment
     - 11. Institutional Commitment to the Candidate’s Research Career Development
   - Cannot be used to avoid page limitations of other application sections

Jaime S. Rubin, Ph.D.
Columbia University, New York, NY
Common Problems with Grant Applications from New Investigators

- Does not address/follow funding agency’s mission, specific instructions, budget limits, etc.
- Overly ambitious
e.g., $, time, expertise, career level, resources
- Fishing expedition
- Not hypothesis driven
- Descriptive, not mechanistic project
- No or insufficient preliminary data
- Demonstrates feasibility of project, scientifically as well as by investigator’s team

NIH “K” Sites of Interest

- K Kiosk – includes Program Announcements for K01, K07, K08, K22, K23, K25, and K99 grant mechanisms
  https://researchtraining.nih.gov/programs/career-development
- Career Development (K) Applications Instructions
  https://grants.nih.gov/grants/how-to-apply-application-guide/form-
  /general/o10-how-to-use-the-application-instructions.htm
- Reference Letters
  https://grants.nih.gov/grants/how-to-apply-application-guide/submission-
  process/reference-letter.htm

NIH “K” Sites of Interest

- Application Page Limits
  https://grants.nih.gov/grants/how-to-apply-
  application-guide/format-and-write/page-limits.htm
- NIH Biosketch Format Pages, Instructions and Samples
  https://grants.nih.gov/grants/forms/biosketch.htm
- Instruction in the Responsible Conduct of Research
  https://grants.nih.gov/grants/guide/notice-files/NOT-
  OD-10-019.html

NIH “K” Sites of Interest

- NIH Research Training and Career Development Programs
  https://researchtraining.nih.gov/
- Research Training and Career Development Programs at Specific Institutes
  https://researchtraining.nih.gov/institute