Career Development Workshops

**Presenters**

**Joan M. Lakoski, PhD**, is the Associate Vice Chancellor for Academic Career Development at the University of Pittsburgh Schools of the Health Sciences, the Associate Dean for Postdoctoral Education, Professor of Pharmacology and Chemical Biology, and Professor in the Clinical Research Science Institute at the University of Pittsburgh School of Medicine. Dr. Lakoski received her doctoral degree in Pharmacology from the University of Iowa and completed postdoctoral training in the Department of Psychiatry at the Yale University School of Medicine. Dr. Lakoski is a member of the graduate faculty at the University of Pittsburgh and conducts research on the neuroendocrinology of aging, the impact of mentoring, and serves on NIH Scientific Research review panel. She serves as Director of Faculty Development and Director of Mentorship for the Clinical Translational Research Institute, as Co-Director of the Multidisciplinary Clinical Research Scholars (KL2) Program, and as Director of the RiMED Fellows Program for international postdoctoral fellows. Dr. Lakoski was the recipient of the 2007 Postdoctoral Advocate Award from the University of Pittsburgh Postdoctoral Association. Her administrative responsibilities encompass oversight of comprehensive career development services, including development of mentoring programs for professional students, postdoctoral fellows, residents, clinical fellows and faculty, to empower the health science professional at the University of Pittsburgh. She serves in leadership roles in a variety of professional organizations including President of the Society for Executive Leadership in Academic Medicine (SELAM) International; Chair of the Teaching Section, International Union Basic Science and Clinical Pharmacology (IUPHAR); and Chair of the Association of American Medical Colleges Group on Graduate Research, Education, and Training Postdoctorate Leaders Section. She is currently a member of the Committee to Study the National Needs for Biomedical, Behavioral, and Clinical Research Personnel of the Policy and Global Affairs Division of the National Academy of Sciences and the National Research Council.

**Robert J. Milner, Ph.D.**, is Director of the Office of Postdoctoral Affairs, Co-Director of the Junior Faculty Development Program, and Professor of Neural and Behavioral Sciences at the Pennsylvania State University College of Medicine. Dr. Milner received his doctoral degree from The Rockefeller University, completed postdoctoral training at The Salk Institute, and held faculty positions at Salk and at the Research Institute of Scripps Clinic before moving to Penn State. He has a long-standing interest in the professional development and education of individuals at all stages of academic careers. His background as a basic science researcher in the field of neuroscience and as a former department chair provides a wealth of experience and knowledge about the challenges of advancing an academic career. He is also the Co-Director of the Intercollege Graduate Program in Neuroscience at Penn State and directs courses in neuroscience, professional development, and ethics for graduate students. Dr. Milner received the Distinguished Educator Award from the Penn State College of Medicine in 2007. He is also the 2009 recipient of both the Graduate Program Leadership Award from Penn State’s Graduate School and the Faculty Mentorship Award from the Penn State Hershey Postdoctoral Society. Dr. Milner has accepted the position of Associate Vice Provost for Professional Development at the University of Massachusetts Medical School starting July 1, 2010.
The National Institutes of Health is an Agency of the US Public Health Service

Mission:
research, training, education

• 27 Institutes & Centers

Budget (FY10) = $31.2 billion

Extramural Research & Training (81%)

Intramural (19%)
Admin (9%)

Extramural Research in each NIH Institute is organized into Programs

• each Program covers an area of research

Program Officers:
• administer funded grants in their area
• each NIH Institute has a Program Officer for training & career development

Cultivating the interest and support of program officers is essential!

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NIH has several programs targeted to New & Early Stage Investigators

Definition of New & Early Stage Investigators

New Investigator:
• has not been PI on a significant NIH research grant (e.g., R01)
• can have held small research grants (e.g., R03, R21), K awards, Fellowships

Early Stage Investigator (ESI):
• a new investigator within 10 years of doctorate or completing residency

Status defined in your eRA Commons profile

Make sure that your profile is current!

You must have an eRA Commons username to submit applications to NIH

https://commons.era.nih.gov/commons/

Dividing up the $31 billion pie . . .

Career Development Awards
~$700 million
(~2.3%)
NIH Career Development (K) Awards provide support for research careers
- ~2.4% NIH budget: ~$705 million (FY10)
- ~4,335 awards (FY10)
- currently 14 different types (K01-K99)
  - for clinicians & basic scientists
  - for junior & senior faculty
- Mentored K awards designed for postdocs & junior faculty
  ➔ K01, K08, K23, K99/R00

The Goal of Mentored K Awards
To provide support and “protected time” (3-5 years) for an intensive, supervised career development experience in the biomedical, behavioral, or clinical sciences leading to research independence.

A dedicated mentor is essential for
- successful application
- successful outcome

NIH provides funding for career development at different stages

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Mentored K Awards for clinicians

<table>
<thead>
<tr>
<th>MD</th>
<th>Residency/ Specialty/ Sub-Spec.</th>
<th>Faculty → Independent investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>K08</td>
<td>Mentored Clinical Scientist Award</td>
<td></td>
</tr>
<tr>
<td>K23</td>
<td>Mentored Patient-Oriented Research</td>
<td></td>
</tr>
<tr>
<td>K24</td>
<td>Mid-Career Investigator in Patient-oriented Research</td>
<td></td>
</tr>
</tbody>
</table>

K08: Mentored Clinical Scientist Award

— to develop clinician research scientists as independent investigators

Requires:

- clinical doctoral degree
- must have initiated postgraduate training
- mentor with extensive research experience
- 75% effort over 3-5 years

K23: Mentored Patient-Oriented Research Career Development Award

— to develop investigators committed to patient-oriented research

Requires:

- clinical or nursing doctoral degree
- completion of all clinical training
- mentor with extensive research experience
- 75% effort over 3-5 years
K24: Mid-Career Investigator Award in Patient-Oriented Research

- to support established investigators committed to patient-oriented research
- outstanding clinical scientists engaged in patient-oriented research
- within 15 years of specialty training
- provides mentoring for beginning clinicians (K23)

Success rates: K Awards for clinicians

Data from: http://grants.nih.gov/training/outcomes.htm#funded

Mentored K Awards for basic scientists

<table>
<thead>
<tr>
<th>PhD</th>
<th>Postdoc</th>
<th>Faculty —&gt; Independent investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>K01</td>
<td>Mentored Research Scientist Award</td>
<td></td>
</tr>
<tr>
<td>K22</td>
<td>Career Transition Award</td>
<td></td>
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</table>

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K01: Mentored Research Scientist Award

— career development in a new area of research

• for candidates with potential for productive independent research
• mentor with extensive research experience
• 75% effort over 3-5 years
• differences among Institutes: NCI no longer participates

K22: Career Transition Award

— support for postdoctoral fellows in transition to faculty positions

• for candidates with potential for productive independent research
• differences among Institutes: may involve training in intramural NIH programs

Success rates:
K Awards for basic scientists

Data from: http://grants.nih.gov/training/outcomes.htm#funded
K99/R00: Pathway to Independence Award

- to facilitate independent funding earlier in an investigator's career

- for highly promising postdoctoral scientists
- established in response to increasing age of first independent support
- non-citizens are eligible

K99/R00 Awards combine elements of K and R (research) awards

<table>
<thead>
<tr>
<th>student</th>
<th>post doc</th>
<th>junior faculty</th>
<th>senior faculty</th>
</tr>
</thead>
</table>

training awards:

- F31
- F32
- K Awards

research awards:

- R01
- P01

K99/R00 Awards provide up to five years of support in two phases

K99 Phase:

- 1-2 years of mentored support for highly promising postdoctoral research scientists

R00 Phase:

- up to 3 years of support contingent on securing an independent research position
**Common features of K Awards**

**Eligibility:**
- doctoral degree
- US Citizen, non-citizen national, or permanent resident (*except K99/R00*)
- not eligible if previous PI on R or K grants

**Duration:** 3–5 years

**Effort:** minimum 75%

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**For more information on K awards see the NIH website — “K Kiosk”**

http://grants.nih.gov/training/careerdevelopmentawards.htm

*Contact the appropriate Program Officer!*

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**Information on K Awards by NIH Institute**

*Spreadsheet:*
Comparison of K awards across Institutes & Centers

*Handout:*
funding of awards by each Institute

http://grants.nih.gov/training/K-Awards_Across_ICs.xls

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The Grant Triangle defines the relationship between you, your institution, and NIH

1. an application is initiated & prepared by an investigator
2. application is submitted to NIH through the investigator's home institution
3. NIH study section reviews the proposal & the score is sent to a NIH Institute
4. the Institute Council decides whether to fund the grant
5. an Institute Program sends funding for the grant to the home institution
6. the home institution administers the grant for the investigator

The Grant Review Process — Important Concepts

• applications must be submitted from a recognized institution
• each application has two independent reviews within NIH: “Dual Review”
• funding goes to the investigator’s home institution not the investigator

Most grant reviews at NIH are managed by the Center for Scientific Review (CSR)

• independent unit within NIH separate from Institutes
• administers review panels (Study Sections)
• receives & assigns applications:
  • to Study Sections for review
  • to Institutes for funding
• some types of proposals are reviewed by panels within NIH institutes

What is your image of a Study Section?

NIH Study Sections usually meet for 1–2 days, 3 times per year

Members:
• working scientists (~15-30)
• one member serves as Chair

Scientific Review Officer (SRO):
• NIH staff person
• assigns grants to reviewers, collates reviews etc

Each proposal is reviewed by 2–3 reviewers
• primary & secondary reviewers provide written critiques
• tertiary (“reader”) reads & comments
• the review criteria are defined for each application type
• each proposal gets an Impact Priority score:
  • 10 (exceptional) to 90 (worst)
  • bottom 50% may be unscored
Each reviewer gives a score on a range of 1 (exceptional) to 9 (poor)

<table>
<thead>
<tr>
<th>Impact</th>
<th>Score</th>
<th>Descriptor</th>
<th>Additional guidance on Strengths/Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>1</td>
<td>Exceptional</td>
<td>Exceptionally strong with essentially no weaknesses</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Outstanding</td>
<td>Extremely strong with negligible weaknesses</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Excellent</td>
<td>Very strong with only some minor weaknesses</td>
</tr>
<tr>
<td>Medium</td>
<td>4</td>
<td>Very Good</td>
<td>Strong but with numerous minor weaknesses</td>
</tr>
<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>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>Poor</td>
<td>Very few strengths and numerous major weaknesses</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Marginal</td>
<td>A few strengths and a few major weaknesses</td>
</tr>
</tbody>
</table>

Non-numerical score options: NT = Not Recommended for Further Consideration, Off = Unrated, ALL = All, Op = Conflict, OP = Not Present, N/D = Not Discussed

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


For K awards 5 individual criteria are also reviewed & scored on the 1-9 scale

1. Candidate
2. Career Development Plan/Career Goals & Objectives/Plan to Provide Mentoring
3. Research Plan
4. Mentor(s), Consultant(s), Collaborator(s)
5. Environment and Institutional Commitment to the Candidate

These criteria are applied differently for different K award types

Other criteria are reviewed for adequacy

- Protections for Human Subjects
- Inclusion of Women, Minorities, and Children
- Vertebrate Animals
- Biohazards
- Select Agents
- Education in Responsible Conduct in Research (RCR)
- Budget and Period of Support
- Resource Sharing Plans
A typical sequence of review . . .

• process moderated by Chair
• reviewers indicate preliminary enthusiasm
• primary & secondary reviewers present
• tertiary reviewer comments
• open discussion among panel
• reviewers recommend final scores
• all panel members score application
• SRO writes summary of discussion

What happens next . . .

• written reviews & scores (“pink sheets”) are collated by SRO & distributed to applicant via the eRA Commons
• the Institute Advisory Council determines the payline based on available funding
  • approves grants for funding
• Notice of Award sent to applicant & institution

Before applying you must obtain & be familiar with 3 sources of information

• SF424 (R&R) Application Guide (Version B!)
• Program Announcement (PA) for your Award (e.g., F32, K08)
• Application Form for your Award (e.g., F32, K08)
Read the Program Announcement (PA) — link to application package

Program Announcements for K awards (see K Kiosk *)

K01: Mentored Research Scientist Development Award  
PA-10-056

K08: Mentored Clinical Scientist Research Career Development Award  
PA-10-059

K22: see individual institutes on K Kiosk*

K23: Mentored Patient-Oriented Research Career Development Award  
PA-10-060

* http://grants.nih.gov/training/careerdevelopmentawards.htm

Each application package is for a specific Award

• Application package is a pdf document

Make sure you have the correct application package!
The application consists of electronic forms + attachments (pdf)
Format for attachments is defined:
- single-spaced
- specific fonts & sizes
- single column
- minimum margins

*Applications that do not conform may be returned without review!*

The electronic submission system assembles the separate pdfs & forms into a single application
You attach pdfs & upload the forms
eRA system assembles a single application

Application for a K award should be a collaboration between you & your advisor
You (the “applicant”) are Principal Investigator
- you are responsible for submitting the application
- you write the research training plan in collaboration with your sponsor

Your advisor/mentor is the Sponsor
- she/he must write sections of the application

*You must involve your advisor/mentor early & often in crafting the application!*
There are additional components & instructions for K Awards

Career Development Supplemental Form:

Instructions:
Part I, Section 7 — preparation of a K award proposal

Complete the Cover Component according to standard instructions

• Consult with your grants office for help in completing the forms

Title: limited to 81 characters & spaces

You sign the application by checking “I agree” (Page 2)

• remember that in submitting the application, you certify that the contents are “true, complete, and accurate”
Other Project Information Form

1. Human Subjects
2. Vertebrate Animals

7. Abstract
   • attach as pdf file
   • no more than 30 lines
   • for K awards, the abstract should include a description of your research project, plus your career goals & training plan

Other Project Information Form

9. Bibliography
   • for whole proposal
   • attach as pdf file

10. Facilities & Other Resources
11. Equipment
   • detailed description of resources and equipment available to candidate
   • establishes feasibility of proposal

Attach your Biosketch:
the format of the biosketch has changed!

Five sections:
• education
  A. Personal statement — why are you best suited for this project
  B. Positions & honors
  C. Selected publications — limit of 15 — with NIH Manuscript Submission ref #
  D. Research Support
Attach Biosketch & Research Support for Mentor, Co-Mentor, & Key Persons

Research Support
• list current & pending projects
• include major goals, direct costs
• only required for mentored awards

Budget: allowable costs may differ by award type & institute
• consult your grants office &/or Program Officer
• modular budgets not used for K awards
• only a few budget categories used

The Career Development Supplemental Form contains the proposal itself

Important sections:
• Introduction (if applicable)
• Candidate Information
• Statements of Support
• Environment and Institutional Commitment
• Research Plan
• Human Subjects, etc
Each component is attached as a separate pdf
Key sections have a page limit: this limit has been reduced!

Candidate Information (items 2–5) + Research Strategy (item 11) = 25 12 pages total + 1 page for Specific Aims

Tip: write the Candidate Information & Research Strategy as a single document

- better able to assess fit to 12 page limit
- then separate into sections for uploading as pdfs
- NIH will not count white space generated as part of page limits

Candidate Information & Research Plan (12 pages total)

The supplemental sections correspond to the review criteria for K Awards

- Candidate
- Career development plan
- Research strategy
- Mentor
- Environment & Institutional commitment

Remember the criteria as you write your proposal!
Candidate’s Background (item 2)
- describe any relevant information about you that is not included in your Biosketch
- e.g., research, clinical training experience
- be succinct: this section is included in the 12-page limit!

Describe your “Scientific Biography” in Career Goals & Objectives (item 3)
- justify the proposal by describing how it fits into your career development
- describe previous scientific history
- how the award will enable you to enhance your career objectives
- include reasons for any changes in career direction

Mentored K Award applications require letters of reference
- required for K01, K08, K22, K23 & K99/R00 applications
- 3–5 letters from individuals other than those involved in the application
  - i.e., not sponsor/mentor or collaborators
  - should address candidate’s competence & potential as an independent investigator

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List your referees in the “Other Attachments” section

Item #12 in Research & Other Project Information

List of Referees:
- at least 3, not including your sponsor
- you must include the name of the referee, departmental affiliation, and institution
- same list must be included in the Cover Letter Component

“Applicants must include a cover letter”

- list Referees (including contact information)
- can request assignment to a specific Institute and/or review panel:

Application Title
Please assign this application to the following:
Institute/Center:
- National Cancer Institute (NCI)
Scientific Review Group:
- Cancer Etiology Study Section (CE)

Reference letters are submitted through the eRA Commons

Instructions for referees:
http://grants.nih.gov/grants/funding/424 Referee_Instructions_Mentored_Career_Awards.doc

- complete & send instruction form to each referee
- letters must be submitted within 5 days of application submission date
Tips for Best Reference Letters

- develop effective working relationships with potential referees
- keep your referees updated on your progress
- make your referees’ job easy, provide:
  - current CV, reprints
  - draft of proposal

*Remember: this is a personal & professional relationship that may last your entire career*

Describe what you will learn in the Career Development Plan (item 4)

- describe new skills & knowledge
  - provide details of courses & workshops
- define distribution of effort for activities (use timeline)
- relate activities to career development & research plans

*Proposing to do what you already know will be viewed as having no training potential!*

Items that you must include in a Career Development Plan

Describe your goals:

- what you hope to achieve . . .
- describe specific activities designed to achieve each goal
- include a specific aspect of advanced research training and professional skills (e.g. training in grant writing)
- describe how your institutional environment will enhance your success in achieving your goals
Your mentor(s) must describe detailed plans for mentoring

- the specific expertise of your mentors and how their guidance will help you to achieve your goals
- the specifics of mentoring, including frequency of meetings (e.g., weekly)
- consider adding an Advisory Committee to monitor your progress every 6 months

Include a Timeline for your Career Goals & Objectives

List:
- your distribution of effort
- specific objectives for each year
- plans for subsequent grant support

Research Plan should “develop skills needed by a researcher”

- should be hypothesis-driven
- not overly ambitious or routine

The format of the Research Plan has changed:
- Specific Aims (1 page)
- Research Strategy:
  a) Significance
  b) Innovation
  c) Approach

Experimental details should be cited using references & not described in detail!
To communicate effectively your proposal should answer these questions:

Significance:
- Why is this study important?
- How will it change the field?

Innovation:
- What is novel about the proposed research?

Approach:
- Are the experiments feasible?
- What will be accomplished?

*Keep it simple, concise & logical!*

Crafting a successful proposal requires good communication skills

Know your audience:

Design a clear experimental plan

- have a clearly stated, testable hypothesis
- keep the proposal focused
- indicate outcomes: what will you learn?
- anticipate pitfalls; outline alternatives
- provide a timeline: limit the experiments to what can be accomplished within the time period
The Mentor must have a strong record of research and mentoring

- Your mentor should meet these qualifications (& document them adequately!)
- If not, provide a plan to correct any deficiencies:
  - co-mentor(s)
  - mentoring advisory team

Statements by Mentor must also explain how award will develop candidate’s career

Should include:

- plans for candidate’s career development
- source(s) of support for research project
- supervision & mentoring of candidate
- candidate’s teaching load (if any)
- plan for transition of candidate to an independent investigator

A strong statement of Institutional Commitment is essential (item 9)

- on institutional letterhead
- commitment to candidate independent of award
- agreement to provide protected time for candidate’s research & career development
- equipment, lab space, office, facilities, resources
You must include plans for instruction in Responsible Conduct in Research

- describe in Item 5
- follow new NIH guidelines for RCR instruction

**NOT-OD-10-019**

“Applications lacking a plan for instruction in responsible conduct of research will be considered incomplete and may be delayed in the review process or not reviewed.”

Write to the review criteria

- Candidate
- Career development plan
- Research plan
- Mentor
- Environment & Institutional Commitment
- RCR Instruction

*A strong response for each criterion*

There are three deadlines per year for submission of NIH Awards

**K awards:**

<table>
<thead>
<tr>
<th>Receipt</th>
<th>Review</th>
<th>Council</th>
<th>Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 12</td>
<td>June-July</td>
<td>Sept-Oct</td>
<td>December</td>
</tr>
<tr>
<td>June 12</td>
<td>Oct-Nov</td>
<td>Jan-Feb</td>
<td>April</td>
</tr>
<tr>
<td>Oct 12</td>
<td>Jan-Feb</td>
<td>May-June</td>
<td>July</td>
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</table>

- applications must be received electronically on or before the receipt date
- applications are submitted by institutional officials
- your Grants Office may have a much earlier submission deadline
Plan ahead for resubmission!

18 months

15 Steps to the Payline: Checklist

Step 1 Start the Application

• An Idea
• A Mentor
• An Institution
Step 2: Start with the right attitude

Step 3: Find Information & Make Connections

Step 4: Frame the Question

Define the specific aims of your proposal

A Testable Hypothesis

Funded

Good research is hypothesis driven
Step 5  Define the Goals

Research Plan  Training Program

What you’ll accomplish  What you’ll learn

Step 6  Contact References

Step 7  Stock the Reservoirs

Specific Aims  Background Significance  Experimental Plan
Step 8 Draft the proposal

Step 9 Build a Model

Step 10 Get feedback!

Ask someone who is not in your field to read your proposal!
Step 11  Comply with the regulations (in good time!)

Assurances/Certifications
- Human Subjects
- Animal Welfare
- 
- 

“Blue Sheet”

Step 12  Manage your Mentor

Sponsor’s Checklist
- Mentor’s Statement
- Environment & Institution
- Feedback on draft

Step 13  Proof & spell check
Step 14  Submit the proposal

Electronic Submission

Step 15  Receive & respond to reviews

The Decision

Reject
Reapply
Funded

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