Writing An NIH Research Proposal

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Overview of Session

- **Today’s Workshop**
  - NIH funding mechanisms
  - Understanding the NIH format and review criteria
  - Writing tips for successful applications

- **Future Additional Workshop Topics**
  - Defining your research question and writing specific aims
  - Aligning methods with your aims
  - The art of the personal statement on the biosketch
  - Crafting a budget for personnel, materials and subcontracts
  - Tips from the junior investigator view
  - Mock Study Section
  - Beyond the NIH – DOE, DOD, NSF, Foundations…
"I like the new format, but the Power Play option scares me."
New Investigators: Still a priority
NIH Funding Mechanisms

- **F** = Fellowships (pre- & post-doc)
- **K** = Career Development Awards
- **T** = Training Grants
- **R** = Research Projects
- **P** = Program Project/Center Grants
- **U** = Cooperative Agreements Grants
Career Development Awards


<table>
<thead>
<tr>
<th>Pre-Bac</th>
<th>Institutional Training Grant (T34)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grad/med student</td>
<td>Institutional Training Grant (T32)</td>
</tr>
<tr>
<td>Post-doctoral</td>
<td>Individual NRSA Fellowship (F31, F30)</td>
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<tr>
<td>Early</td>
<td>Institutional Training Grant (T32)</td>
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<tr>
<td>Middle</td>
<td>Individual NRSA Fellowship (F32)</td>
</tr>
<tr>
<td>Senior</td>
<td>Pathway to Independence Award (K99/R00)</td>
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<tr>
<td></td>
<td>Mentored Research Scientist Development Award (K01)</td>
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<td></td>
<td>Mentored Clinical Scientist Development Award (K08)</td>
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<td></td>
<td>Mentored Patient-Oriented RCDA (K23)</td>
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<tr>
<td></td>
<td>Mentored Quantitative RCDA (K25)</td>
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<td></td>
<td>Independent Scientist Award (K02)</td>
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<tr>
<td></td>
<td>Midcareer Investigator Award in Patient-Oriented Research (K24)</td>
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<tr>
<td></td>
<td>Senior Scientist Award (K05)</td>
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</table>

Graphic represents a small sample of NIH funding mechanisms available.
What does it take to be K-competitive?

- Demonstration of commitment to research
  - At least 1-2 publications (more is better!)
- Evidence of strong mentor-mentee relationship
- Clear training plan to show how you will develop research skills
- Good project
Research Grants: R03

- Small grants – Scope includes:
  - Pilot/feasibility studies
  - Secondary analyses
  - Development of research methodology or technology
- Maximum time = 2 years
- Maximum budget = $100,000 ($50K/yr)
Research Grants: R21

- Focus on exploratory/developmental work
  - Novel/innovative/riskier ideas
  - Extend previous work in new directions
- Maximum time = 2 years
- Maximum budget = $275,000 (no more than $200K in a single yr)
Research Grants: R01

- Research project grant
  - Broad range of projects
- Maximum time = 5 years, some eligible for competitive renewal
  - Many argue for smaller first project (3 yr)
- Maximum budget = no specified limit
  - Best to aim for $350K/yr to start
What Grant Type? What Institute?

- **Step 1**: Draft an abstract with Aims (with input from mentors!)

- **Step 2**: Choose an Institute
  - Read their web pages to learn about THEIR priorities
  - Decide how your work fits/enhances their research agenda/portfolio

- **Step 3**: Call the Program Officer
  - Job = advocate for researchers, demystify process
  - Will help you with “fit” – how your work aligns with Institute mission
## 27 Institutes/Centers + Director’s Office

<table>
<thead>
<tr>
<th>NCI</th>
<th>NIAMS Arthritis &amp; Musculoskeletal/Skin</th>
<th>NIEHS Environmental Health</th>
<th>NCCAM Complementary &amp; Alternative Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEI</td>
<td>NIBIB Biomed Imaging &amp; Bioeng.</td>
<td>NIGMS General Medical Sciences</td>
<td>NCATS Advancing Translational Science</td>
</tr>
<tr>
<td>NHLBI</td>
<td>NICHD Child Health &amp; Development</td>
<td>NIMH Mental Health</td>
<td>CIT Information Technology</td>
</tr>
<tr>
<td>NHGRI</td>
<td>NIDCD Deafness &amp; Comm Disorders</td>
<td>NIMHD Minority Health/Disparities</td>
<td>CSR Scientific Review</td>
</tr>
<tr>
<td>NIA</td>
<td>NIDCR Dental &amp; Craniofacial Research</td>
<td>NINDS Neuro &amp; Stroke</td>
<td>FIC Fogarty Int’l Center</td>
</tr>
<tr>
<td>NIAAA</td>
<td>NIDDK Diabetes, Digestive &amp; Kidney</td>
<td>NINR Nursing Research</td>
<td>CC Clinical Center</td>
</tr>
<tr>
<td>NIAID</td>
<td>NIDA Drug Abuse</td>
<td>NLM Library of Medicine</td>
<td>OD Office of the Director</td>
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</table>

- NCI: Cancer
- NEI: Eye
- NHLBI: Heart, Lung, Blood
- NHGRI: Genome
- NIA: Aging
- NIAAA: Alcohol
- NIAID: Allergy/Infectious Disease
## Grant Cycles – Standard Dates

http://grants.nih.gov/grants/funding/submissionschedule.htm

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cycle I-Winter</th>
<th>Cycle II-Spring</th>
<th>Cycle III-Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Due Dates:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R01</td>
<td>February 5</td>
<td>June 5</td>
<td>October 5</td>
</tr>
<tr>
<td>K</td>
<td>February 12</td>
<td>June 12</td>
<td>October 12</td>
</tr>
<tr>
<td>R03/R21</td>
<td>February 16</td>
<td>June 16</td>
<td>October 16</td>
</tr>
<tr>
<td><strong>Scientific Merit Review</strong></td>
<td>June – July</td>
<td>October – November</td>
<td>February - March</td>
</tr>
<tr>
<td><strong>Advisory Council Round</strong></td>
<td>August or October</td>
<td>January</td>
<td>May</td>
</tr>
<tr>
<td><strong>Earliest Start Date</strong></td>
<td>September or December</td>
<td>April</td>
<td>July</td>
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New NIH Format = Paradigm Shift

- Greater emphasis on:
  - Quality (versus quantity) of content
  - Funding New/Early stage investigators
- Shortening the research plan
  - Elimination of sections for literature review and presentation of preliminary data
- 9-point evaluation scale
- Standardization and shortening of reviews
- Linkage of sections of the application to each of the 5 core review criteria
New Sections Template

- Specific Aims (1 page)
- Research Strategy (12 pages for most)
  - Significance
  - Innovation
  - Approach
- Timetable
- Future Directions (optional)
5 Core Review Criteria

- **Significance** – Addresses an important problem or critical barrier to progress
- **Investigators** – Qualifications of the team
- **Innovation** – Novel concepts or approach
- **Approach** – Feasibility/strength/match of strategy to project aims. Adequate human subjects protections
- **Environment** – Institutional support/resources
How are applications scored?

- 2 reviewers assigned to review in detail; others often only read abstract and aims page
- Each assigned reviewer is required to score each of the 5 core review criteria
- Each assigned reviewer gives a preliminary overall impact score (not an average or addition)
  - Performed prior to the meeting
  - Applications are ranked by the overall impact score – only the upper half are discussed
- Discussed applications are then assigned a final impact score by each member of the panel and averaged
### What do the 1-9 scores mean?

<table>
<thead>
<tr>
<th>Impact</th>
<th>Score</th>
<th>Descriptor</th>
<th>Additional Guidance</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>Fair</td>
<td>Some strengths but with at least one major weakness</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Marginal</td>
<td>A few strengths and a few major weaknesses</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Poor</td>
<td>Very few strengths and numerous major weaknesses</td>
</tr>
</tbody>
</table>
Writing Tips: Getting ready

- Plan ahead
  - 6 months pilot work + research question
  - 6 months writing the grant
  - Involve mentor / co-investigators with warning

- Write and revise a 1-2 pg concept paper
  - Share ahead of every meeting
  - Revise between meetings
  - This will become Specific Aims section . . .
Writing Tips

- **Tell a story . . .**
  - Build your argument
  - Help reviewers care

- **Punctuate key points**
  - Write the Aims first….and Last.
  - You are writing a prose poem - use subheads/bold key sentences that structure the argument.

- **Use a conceptual framework and model**
  - Diagram cause-effect or temporal relations
  - Make the link between aims and products clear
New Investigators: You are the next generation!

- NIH website for new investigators:
  http://grants.nih.gov/grants/new_investigators/

**New Investigator**: has not previously competed successfully as PD/PI for a substantial NIH independent research award.

New and **Early Stage Investigator** Policies:
Early Stage Investigators are within 10 years of completing their terminal degree or medical residency.
Tips for the Junior Investigator

- Find a MENTOR
- **Interdisciplinary** collaboration is a MUST!
- Know the experts in the “niche area” you are investigating
  - Begin to develop these relationships, citation index today
- Make sure you are getting Funding Opportunity Announcements (FOA) & Program Announcements (PA)
  - Sign up for alerts through Pivot (see GFIS for more info)
- Seek and build a **Research Team** early in your career
  - NEVER write a grant alone – you will burn out early on!
Final word: Resilience & Perseverance

- Self inventory
  - Identify your strengths and capacities
  - Identify where you need complementary skills
  - What kind of team or mentor do you need
  - What are you passionate about?

- Balance
  - Find ways to refresh and sustain yourself.
  - This is a marathon, not a sprint!
Know this website!

http://grants.nih.gov/grants/oer.htm
And this one!
customs.lib.washington.edu/services/gfis
Thank You! Questions?

Thanks to our Graduate School staff for supporting this webinar, and to Helene Starks, faculty in Bioethics& Humanities for sharing her experience.

Slides will be posted on our Core Programs website following the webinar today:

http://www.grad.washington.edu/profdev/

Please contact me if you have any questions:

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