Cracking the NIH Code: How to Land an Early Career Investigator Award

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Funding Sources

• National Institute of Mental Health (KNO)

• Harvard University Center for AIDS Research (KNO)

• NHLBI K08HL136858 (DJ)

• National Institute on Drug Abuse K23DA045242 (SC)
Objectives

I. Introductions
II. Why consider an NIH K grant?
III. Are others in EM doing this?
IV. Components of the K grant
V. Failures and successes
Translational approach in the study of mitochondrial dysfunction with treatment in acute care illnesses

- Anesthesia and Critical Care Mitochondrial Unit (ACMU)
- Colket Translational Research Building
Wearable Biosensors: Novel Applications Across the Spectrum of Opioid Use Disorder

- University of Massachusetts Medical School
Enhancing engagement in HIV Care for refugees in sub-Saharan Africa

- Brigham and Women’s Hospital
- Massachusetts General Hospital
- Harvard Medical School
I. Introductions ✓

II. Why consider an NIH K grant?

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V. Failures and successes
Academic Tracks

**Dabbler:** Research as a hobby; Buff CV; Rarely have any salary support; mostly low hanging fruit like case reports (Academic clinician)

**Collaborator:** A more formal research pursuit; plays a big role in research projects; paid for effort (10-30%) usually as a Co-I (Equivalent to clinical educator track)

**Principal Investigator:** An independent researcher with an active research portfolio-Gold standard in academia (75-85% effort)= Indirects, Rank, Prestige
What is a K-series grant?

• 3-5 years
• 75% protected time
• Close mentorship from senior investigators
• Time to learn and grow as a researcher
• Bridge to independency (R01)
Which K?

- **K08**: Mentored clinician-scientist for basic science research
  - 7 in EM over 10 years

- **K23**: Mentored clinically oriented research
  - 45 in EM over 10 years

- **K99/R00**: 2 years of mentored support and support 3 years as an independent investigator (More for advanced candidates, often post-doctoral fellows)
  - 1 in EM over 10 years
Benefits of a research career

1. Loans!
2. Clinical research applications
3. Mentoring
4. Career satisfaction
I. Introductions ✓

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How are we doing as a specialty?
Grants Per Year by Specialty

Percent Change in Grants*


* Number of grants standardized to 2008 for each specialty for comparison purposes.
I. Introductions ✓

II. Why consider an NIH K grant? ✓

III. Are others in EM doing this? ✓

IV. Components of the K grant

V. Failures and successes
Applications are scored on 5 criteria:

1. Candidate
2. Career Development Plan, Goals and Objectives
3. Research Plan (Includes review of Scientific Premise, rigorous experimental design, biological variables)
4. Mentor(s), Consultants(s), Collaborator(s)
5. Environment and Institutional Commitment to the Candidate

Example: 3 reviewers score each criteria (1-9); lower is better.

<table>
<thead>
<tr>
<th>Reviewer</th>
<th>Candidate</th>
<th>Career Plan</th>
<th>Research</th>
<th>Mentors</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Two</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Three</td>
<td>1</td>
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<td>2</td>
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</tbody>
</table>
The center of a K award is the candidate (aka you!)

- Demonstrate your potential to be an independent investigator
  - Show your accomplishments and how they relate
  - Publications
  - Letters of support
- Prove you are awesome... but not too awesome
- Demonstrate your plan to fill the gap with a plan for training and mentoring
1. Candidate continued:

Weaving your story into various parts of the grant

The Candidate Background

• Your research, academic and/or clinical record and how they link to your research program

• The pieces of your puzzle that the K23 will complete

The Career Goals Section

• Short term (complete K; expert in X with Y, Z skills; niche; R01)

• Long term (federally funded independent investigator)
2. Career Development Plan, Goals, Objectives:

Training goals/career development plan will explain specifically how you will fill your gap

Each component must contribute substantially to your scientific development

- Classes, seminars, practical experience (+/- a degree)
- Meetings you will attend
- Independent study with your mentors
- What techniques or skills you will learn
- Who will teach you
- Time line (outline timing making anticipated progress clear)
- Transition to independence
### Table 2.2. Training Goals, Training Activities and Projected Timeline

<table>
<thead>
<tr>
<th>Training Goal</th>
<th>Training Activity</th>
<th>Year</th>
</tr>
</thead>
</table>
| **1: Millennium PhD Program**  
(Boyer, Smelson) | Coursework (Outlined Below) | X |
| | Dissertation Preparation | X |
| | Mentored Research | X |
| **2. mHealth and Behavioral Research Methods**  
(Boyer, Smelson) | Ethics for Clinical Research *(UMMS)* | X |
| | Measurement & Instrumentation in Research *(UMMS)* | X |
| | Dartmouth/NIH Center for Technology & Behavioral Health | X |
| | Bi-Weekly Meeting with Dr. Boyer | X |
| | Bi-weekly meetings with Dr. Smelson | X |
| | CPDD Annual conference | X |
| | Research Experience | X |
| **3. Signal processing analytics and big data approaches**  
(Indic) | Predictive Analytics World Healthcare Seminar | X |
| | MATLAB Fundamentals*(Online) | X |
| | MATLAB Data Processing and Visualization*(Online) | X |
| | MATLAB Machine Learning*(Online Course) | X |
| | Independent Study: Signal Processing *(Online, with Dr. Indic) | X |
| | Weekly/bi-weekly conference with Dr. Indic | X |
| | IEEE International Conference | X |
| | Research Experience | X |
| **4. Data Analytics/Data Science**  
(Fang, Ganesan) | Empirical Introduction to Statistical Learning *(UMMS)* | X |
| | Introduction to R *(UMMS)* | X |
| | Introduction to Python *(UMMS)* | X |
| | Introduction to Data Science *(UMass Dartmouth)* | X |
| | Mobile Health Sensing and Analytics *(UMass Amherst)* | X |
| | Data Analysis and Visualization *(UMass Dartmouth)* | X |
| | Bi-weekly meetings with Dr. Fang | X |
| | QHS Seminar Series | X |
| | Research Experience | X |
| **5. Grant Writing, Research Presentation and Dissemination**  
(Boyer, Smelson) | Communicating Science *(UMMS)* | X |
| | Grant Writing *(UMMS)* | X |
| | R01 Preparation/Submission | X |
| | Presentation to Addiction Medicine/Engineering/QHS | X |
| | Submit research to toxicology, pain management, behavioral science, and signal processing annual meetings | X |
| | Research Experience | X |

Formal Coursework marked with an asterisk followed by the course location in parentheses.

UMMS: UMass Medical School  
QHS: Qualitative Health Science
3. Research Plan (8 pages)

- Specific Aims (1 page)
- Significance (0.5-1 page)
- Innovation (0.5-1 page)
- Approach (6-7 pages)
Specific aims (1 page)

- Introduction paragraph about the significance of the problem and the gap in knowledge
- List the specific aims (2-4 aims)
  - Strong language (identify, define, quantify, determine)
  - Narrowly focused, concrete objective
- How this research meets the research priorities of the intended agency and the impact the results will have on research field
- How the candidate/mentor team are well-poised to complete the research and transition the mentee to independent funding
Specific aims: Significance

• Why is your work important?
• What does the literature show?
• How will your work be a “significant advance”?
• IMPORTANT new criteria
  ▪ Scientific Rigor
  ▪ Scientific Premise
  ▪ Sex as a biological variable
Specific aims: Innovation

• How will this change science/medicine?
• Novel approach?
• New intervention?
• Scalability, widespread “Trans-NIH applicability”
Specific aims: Approach

• Preliminary work and study design
• Describe your study in detail
• Reflect and expand on specific aims
• Statistical analysis
• Barriers and how you will address them
• Details of your deliverables
# Sample timeline

## Table 2: Timeline for Training Domains (A-C) & Research Specific Aims (1-3)

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall (F), Spring (S), Summer (Sum)</strong></td>
<td>F</td>
<td>S</td>
<td>Sum</td>
<td>F</td>
<td>S</td>
</tr>
<tr>
<td><strong>Training Domains</strong></td>
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<tr>
<td>A) Health behavior/ecologic context &amp; HIV, mental health</td>
<td>B) Health service utilization analytics</td>
<td>C) Intervention mapping &amp; evaluation among refugees</td>
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<tr>
<td><strong>Coursework</strong></td>
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<tr>
<td>SBS 281</td>
<td>EPI 219</td>
<td>BIO 212</td>
<td>IM</td>
<td>GMH</td>
<td>GHP 534</td>
</tr>
<tr>
<td>Ethics</td>
<td>GIS</td>
<td>M1</td>
<td>M2</td>
<td>M3</td>
<td>M4</td>
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<tr>
<td><strong>Aim 1: Qualitative</strong></td>
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<tr>
<td><strong>Aim 2: Survey/GIS</strong></td>
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<tr>
<td><strong>Aim 3: Pilot</strong></td>
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<tr>
<td><strong>RCR Training</strong></td>
<td>Partners RCR Training &amp; HSPH Course</td>
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<tr>
<td><strong>Seminars</strong></td>
<td>Harvard CFAR Seminars &amp; Research in Progress Meetings, MPEC Research in Progress Meetings</td>
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<tr>
<td><strong>Professional Development</strong></td>
<td>Intl AIDS Society Mtg; Conf on Retroviruses and Opportunistic Infections (CROI); Intl Conf on HIV Treatment and Prevention Adherence; IDWeek; Global Health &amp; Innovation Conf (Yale); Consortium of Universities for Global Health</td>
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</tbody>
</table>

EPI: Epidemiology; GHP: Global Health and Population; GMH: Global Mental Health; SBS: Social and Behavioral Sciences; BIO: Biological Sciences; GIS: Geographic Information Systems; TIDIRH: Institute for Dissemination and Implementation Research in Health; RCT: Randomized Clinical Trials; M: Manuscript; RCR: Responsible Conduct of Research, IAS: International AIDS Society, CROI: Conference on Retroviruses and Opportunistic Infections, Intl: International
Choosing the right mentorship team is crucial!

- Composed of a primary and 2-4 secondary mentors (generally)
  - Should have specific roles in your plan and be complementary to one another
- Key component for getting the award (and for your success overall!)
- Not just people you like to hang out with... should:
  - Be NIH Funded
  - Have a track record of successfully mentoring junior investigators to independent funding (preferably though the K process)
  - Willing to commit the time, and invest in your success
- Can be supplemented with consultants, advisors, or collaborators
5. Mentor, Consultants, Collaborators continued

The description of the mentorship team is equally important

- Must describe their qualifications, history of funding, and relevance to your project
- Must demonstrate a clear commitment to you and a clear role in your plan for career development and pathway to independence
  - What will they teach you, milestones, meeting frequency
  - Must be clearly involved and have the time to commit
- Mentors and collaborators must have real roles – i.e.
  - Must show type of relationship (i.e., abstracts or pubs)
5. Environment and Institutional Commitment to the Candidate

- Description of institution environment (1 page)
  - Outline physical space/lab resources
- Responsible Conduct of Research (1 page)
  - Highlight opportunities and infrastructure are your institution
- Institutional commitment to candidate’s research career development (1 page)
- Letters of support (6 pages)
  - Chair letter must indicate your time will be protected and HOW they will guarantee that
Administrative Stuff

• Responsible conduct of research
• Human subjects
• Facilities and Resources
• Budget
• Budget justification
• Project summary, abstract, public health significance
• Biosketches
• Cover letter
Letters

• 3 outside peers who know your work, know your potential
• Letter of support from your Department Chair
• Letters of support from your Mentors
• Letters from Collaborators

Are you ready to apply?

- Long term process- 18 months from submission to funding!
- Do you have enough preliminary data and publications?
- Are you committed to a career as a researcher?
- Is your DEPARTMENT committed to you?
- Mentoring team
https://projectreporter.nih.gov
I. Introductions ✓
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Helpful resources

K Kiosk (Career Award Wizard and Links to Awards):  
http://grants.nih.gov/training/careerdevelopmentawards.htm


The path to a career development award is a long (but worthwhile) one; focusing on what's important will enhance your chance of success!

Thanks!
Questions?

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