Transitioning to Research Independence: Funding and Grantsmanship for Newly Independent Investigators

July 13, 2017

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Dept. of Medicine
College of Physicians and Surgeons
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Course: “Funding and Grantsmanship for Research and Career Development Activities”
http://grantscourse.columbia.edu/
Topics to be Discussed

- Funding Agencies
  - Government
    - Federal: National Institutes of Health, Dept. of Defense
  - Non-Government: Voluntary Health Organizations, Professional Societies, Foundations, Industry

- Types of Awards
  - Grants, Contracts, Cooperative agreements,
    - e.g. Research grants, fellowships, career development awards

- Funding Announcements

- Grant Review Processes: National Institutes of Health

- Identifying Funding

- Approaches for Competitive Applications

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Federal Agencies

- Dept. of Agriculture
- **Dept. of Defense**
  - Congressionally Directed Medical Research Programs (CDMRP)
- Dept. of Education
- Dept. of Energy
- **Dept. of Health & Human Services**
  - National Institutes of Health
- Dept. of Homeland Security
- Dept. of Justice
- Environmental Protection Agency
- National Aeronautics & Space Administration
- National Science Foundation

DoD Congressionally Directed Medical Research Programs (CDMRP)

1992-2016: $10.8 Billion (appropriations)
1992-2015: 14,829 grants/contracts awarded

- Breast Cancer: $3.29 B
- Prostate Cancer: $1.53 B
- Peer Reviewed Medical: $1.4 B

http://cdmrp.army.mil/about/fundinghistory.shtml
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National Institutes of Health

- National Cancer Institute
- National Eye Institute
- National Heart, Lung, & Blood Institute
- National Human Genome Research Inst
- National Institute on Aging
- National Inst of Alcohol Abuse & Alcoholism
- National Inst of Allergy & Infectious Diseases
- National Inst of Arthritis & Musculoskeletal & Skin Diseases
- National Institute of Child Health & Human Development
- National Inst on Deafness & other Communication Disorders
- National Inst of Dental & Craniofacial Research
- National Institute of Diabetes & Digestive & Kidney Diseases
- National Institute on Drug Abuse
- National Institute of Environmental Health Sciences
- National Institute of General Medical Sciences
- National Institute of Mental Health
- National Inst of Neurological Dis and Stroke
- National Institute of Nursing Research
- National Library of Medicine
- National Ctr for Complementary & Integrative Health
- National Ctr on Minority Health & Health Disparities
- National Ctr Adv Translational Sciences
- John E. Fogarty International Center
- Office of the Director
- Center for Scientific Review
- Center for Information Technology
- NIH Clinical Center

Adapted from: NIH (DRG) - Peer Review of NIH Research Grants Applications

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Types of Awards

- Individual fellowships
- Training grants
- Career transition awards
- Career development awards
- Research grants
- Cooperative agreements
- Administrative supplements
- Contracts
- Institutional Clinical & Translational Science Award (CTSA)
- Loan Repayment Program
Not All Funding Opportunities Are the Same

- **Different mission statements**
  - Fellowships (F’s)/Training grants (T’s)
  - Career development (K’s)/Scholar awards
  - Research project (R’s)

- **Different funding**
  - Stipend/Salary
  - Pilot awards vs. Comprehensive research costs

- **Different time frames**
  - Not renewable: e.g. 5 years (K’s), 3 years (F’s), 2 years (T’s)
  - Renewable: 4 - 5 years (R01) each competitive period
Timeline of Funding for Junior Investigators

Graduate School
- Individual Fellowship Training Grant
- Mentor’s Research Grant

Post-doctoral Years
- Individual Post-doc Fellowship
- Institutional T32 Post-doc Training Grant slot
- Mentor’s Research Grant

Instructor/Assistant Professor
- Career Transition Awards
Timeline of Funding for Junior Investigators

- **Short term Training**
- **Research Support**
- **Fellowship – Research Years**
- **Instructor/Assistant Professor**

**Medical School**

- Year-long Enhancement Programs
- MD/PhD Fellowship or Institutional T32

**Internship/Residency**

**Fellowship – Research Years**

- Individual Post-doc Fellowship or Institutional T32 Post-doc Training Grant slot

**Instructor/Assistant Professor**

- Career Transition Awards

Pathway to Independence Award

- Career Transition Award (K99/R00)
- No citizenship requirement
- Applicants must:
  - Have earned a clinical or research doctorate
  - Have no more than 4 years of research experience since completing the requirements of the doctoral degree
  - Have not been the principal investigator of an NIH research grant (e.g., R01, R03, R21), career development award (e.g., K01, K07, K08, K23, K25), other peer-reviewed NIH or non-NIH research grant over $100,000 direct costs per year, or have been a project leader on a sub-project of a program project (P01) or a center (P50) grant.

1-2 years as a mentored **K award** for “post-docs”
- Funding level is Institute-specific
  - Salary and Research Support
- 75% effort

3 years as a **Research award** for independent investigators
- **Total/year:** $249,000 (salary and research expenses)
  - D.C. + institution’s I.C. rate
- Must have an independent research position

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<th>Total Funding</th>
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<tbody>
<tr>
<td>2007</td>
<td>K99</td>
<td>NHLBI</td>
<td>92</td>
<td>24</td>
<td>26%</td>
<td>$2,074,283</td>
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<tr>
<td>2008</td>
<td>K99</td>
<td>NHLBI</td>
<td>85</td>
<td>25</td>
<td>29%</td>
<td>$2,277,137</td>
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<tr>
<td>2009</td>
<td>K99</td>
<td>NHLBI</td>
<td>77</td>
<td>34</td>
<td>44%</td>
<td>$3,373,194</td>
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<tr>
<td>2010</td>
<td>K99</td>
<td>NHLBI</td>
<td>91</td>
<td>35</td>
<td>38%</td>
<td>$3,759,077</td>
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<tr>
<td>2011</td>
<td>K99</td>
<td>NHLBI</td>
<td>106</td>
<td>22</td>
<td>21%</td>
<td>$2,353,970</td>
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<tr>
<td>2012</td>
<td>K99</td>
<td>NHLBI</td>
<td>130</td>
<td>39</td>
<td>30%</td>
<td>$4,121,559</td>
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<tr>
<td>2013</td>
<td>K99</td>
<td>NHLBI</td>
<td>112</td>
<td>25</td>
<td>22%</td>
<td>$2,680,777</td>
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<tr>
<td>2014</td>
<td>K99</td>
<td>NHLBI</td>
<td>167</td>
<td>40</td>
<td>24%</td>
<td>$4,590,006</td>
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<tr>
<td>2015</td>
<td>K99</td>
<td>NHLBI</td>
<td>111</td>
<td>27</td>
<td>24.3%</td>
<td>$3,094,830</td>
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<tr>
<td>2016</td>
<td>K99</td>
<td>NHLBI</td>
<td>124</td>
<td>32</td>
<td>25.8%</td>
<td>$4,066,065</td>
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Timeline of Funding for Junior Investigators

Short term Training

Medical School

Year-long Enhancement Programs
MD/PhD Fellowship or Institutional T32

Research Support

Internship/Residency

Individual Post-doc Fellowship or Institutional T32 Post-doc Training Grant slot

Fellowship – Research Years

Instructor/Assistant Professor

Career Transition Awards

Individual Mentored K Career Development Award

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Research Career Programs (K)

- Provides predominantly salary support
- Minimum requirements for the amount of effort that must be devoted to research and career development (e.g. 75%, some exceptions to 50%)
- Up to 5 years
- Specified salary levels
- US citizen/permanent resident.
- Can reduce effort to 50% in last 2 years if PI of NIH research grant

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Mentored Clinical Scientist Development Award (K08)

- Support to develop outstanding independent clinician research scientists
- Basic and translational science

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Mentored Patient-Oriented Research Career Development Award (K23)

- **Patient-oriented research:** Research conducted with human subjects (or on material of human origin) for which an investigator directly interacts with human subjects.

- **Research areas:** (1) Mechanisms of human disease, (2) Therapeutic interventions, (3) Clinical trials, and (4) Development of new technologies.

Mentored Research Scientist Development Award (K01)

Not all NIH Institutes participate in program. Participating Institutes may use for different purposes.

- Train in a new field
- Specific research areas
- Hiatus in research career
- Increase research workforce diversity

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Mentored Research Scientist Development Awards (K01)

- **NIMH:**
  - Supports “broad spectrum of basic and translational research, including basic neuroscience, human genetics, adult and developmental translational research, services and intervention research, and AIDS-related research”

- **NINDS:**
  - Supports “postdoctoral researchers… Candidates are encouraged to apply for support… between the second through fourth year of cumulative mentored postdoctoral research experience…”

- **NCI, NHLBI, NINDS:** Promote Faculty Diversity

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Mentored Research Scientist Development Awards (K01)

- **NIDDK:**
  - For “experienced postdoctoral (two years minimum) and/or recently appointed junior faculty (usually with a Ph.D. degree) in biomedical, behavioral, or clinical sciences”

- **NIAID:**
  - (a) Epidemiology
  - (b) Modeling Techniques
  - (c) Outcomes Research

- **NLM:** Biomedical Informatics and Data Science
Mentored Research Scientist Development Awards (K01)

- **NINR:**
  - Supports “research in the areas of symptom management, pulmonary, critical care, trauma, reproductive health, genetics, epigenetics, behavioral research, incorporation of advanced technology and end-of-life and palliative care”

- **NICHD:**
  - (a) Medical Rehabilitation Research
  - (b) Child Abuse and Neglect
  - (c) Population Research

- **FIC:**
  - International Research Scientist Development Award (IRSDA)

Mentored Research Scientist Development Awards (K01)

- **NHGRI:**
  - (a) Genomic Sciences
  - (b) Ethical, legal and social issues (ELSI)

- **NHLBI:**
  - (a) Epidemiology
  - (b) Biostatistics
  - (c) Outcomes Research
  - (d) Implementation Research

Mentored Quantitative Research Career Development Award (K25)

- Investigators with quantitative scientific and engineering backgrounds outside of biology or medicine
- Focus their research on behavioral and/or biomedical research (basic or clinical)
Cancer Prevention, Control, Behavioral, and Population Sciences
Career Development Award (K07)

- NCI program
- Support individuals with health professional or science doctoral degrees who are not fully established investigators
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<tr>
<td>2016</td>
<td>K23</td>
<td>NCI</td>
<td>31</td>
<td>5</td>
<td>16.1%</td>
<td>$825,671</td>
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<td>2016</td>
<td>K23</td>
<td>NHLBI</td>
<td>101</td>
<td>45</td>
<td>44.6%</td>
<td>$8,086,510</td>
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<td>2016</td>
<td>K23</td>
<td>NIDCR</td>
<td>5</td>
<td>2</td>
<td>40.0%</td>
<td>$263,164</td>
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<tr>
<td>2016</td>
<td>K23</td>
<td>NIDDK</td>
<td>62</td>
<td>28</td>
<td>45.2%</td>
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<td>2016</td>
<td>K23</td>
<td>NINDS</td>
<td>41</td>
<td>6</td>
<td>14.6%</td>
<td>$1,124,099</td>
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<tr>
<td>2016</td>
<td>K23</td>
<td>NIAID</td>
<td>42</td>
<td>17</td>
<td>40.5%</td>
<td>$2,943,258</td>
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<tr>
<td>2016</td>
<td>K23</td>
<td>NIGMS</td>
<td>6</td>
<td>4</td>
<td>66.7%</td>
<td>$661,996</td>
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<td>2016</td>
<td>K23</td>
<td>NICHD</td>
<td>76</td>
<td>15</td>
<td>19.7%</td>
<td>$2,022,733</td>
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<td>2016</td>
<td>K23</td>
<td>NEI</td>
<td>17</td>
<td>8</td>
<td>47.1%</td>
<td>$1,717,613</td>
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<td>2016</td>
<td>K23</td>
<td>NIEHS</td>
<td>4</td>
<td>3</td>
<td>75.0%</td>
<td>$457,410</td>
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<td>2016</td>
<td>K23</td>
<td>NIA</td>
<td>36</td>
<td>13</td>
<td>36.1%</td>
<td>$2,042,013</td>
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<tr>
<td>2016</td>
<td>K23</td>
<td>NIAMS</td>
<td>16</td>
<td>7</td>
<td>43.8%</td>
<td>$1,200,701</td>
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<td>2016</td>
<td>K23</td>
<td>NIDCD</td>
<td>11</td>
<td>4</td>
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<td>$725,296</td>
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<td>2016</td>
<td>K23</td>
<td>NIMH</td>
<td>62</td>
<td>22</td>
<td>35.5%</td>
<td>$3,844,905</td>
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<td>2016</td>
<td>K23</td>
<td>NIDA</td>
<td>37</td>
<td>15</td>
<td>40.5%</td>
<td>$2,669,200</td>
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<td>2016</td>
<td>K23</td>
<td>NIAAA</td>
<td>14</td>
<td>5</td>
<td>35.7%</td>
<td>$929,949</td>
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<tr>
<td>2016</td>
<td>K23</td>
<td>NINR</td>
<td>9</td>
<td>5</td>
<td>55.6%</td>
<td>$716,110</td>
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<tr>
<td>2016</td>
<td>K23</td>
<td>NIBIB</td>
<td>1</td>
<td>1</td>
<td>100.0%</td>
<td>$197,424</td>
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<tr>
<td>2016</td>
<td>K23</td>
<td>NCCIH</td>
<td>4</td>
<td>2</td>
<td>50.0%</td>
<td>$273,682</td>
</tr>
</tbody>
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| 2016        | K23           | Activity Total         | 575                           | 207                            | 36.0%            | $35,665,755      |
Timeline of Funding for Junior Investigators

- **Medical School**
- **Short term Training**
- **Research Support**
- **Fellowship – Research Years**
  - Individual Post-doc Fellowship or Institutional T32 Post-doc Training Grant slot
- **Instructor/Assistant Professor**
  - Institutional K12 Career Development Slot

Year-long Enhancement Programs
- MD/PhD Fellowship or Institutional T32
- Career Transition Awards
- Individual Mentored K Career Development Award

Mentored Clinical Scientist Development Program Award (K12)

- Support to an institution for career development experiences for junior investigators leading to research independence

- Institutions recruit and select candidates into their programs

- Candidates must meet the same criteria as for the individual mentored clinical scientist development award

Mentored Clinical Scientist Development Program Award (K12)

- **Multi-Institute:** Women’s Health

- **Institute specific**
  - NCI: Clinical oncology
  - NEI: Clinical vision scientists
  - NIDDK: Pediatric diabetes research
  - NICHD:
    - Child health
    - Pediatric scientists
    - Women’s reproductive health

Mentored Clinical Scientist Development Program Award (K12)

- Institute specific
  - NHLBI: Late stage (T4) translation research
  - NIDCR: Temporomandibular joint disorders and orofacial pain
  - NIDA: Drug abuse and addiction
  - NINDS: Child Neurologists

- CTSA - Clinical and Translational Scientist Award: KL2
Career Development (K) Support to Research Grant (R01)

K01/K08/K23 → R01
K12 → K23
K12 → K23
K01/K08/K23 → R01
K12 → R01

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Research Grant (NIH R01)

- Supports a discrete, specified project
  - Specific Aims

- “Comprehensive” funding

- Modular budgets up to $250,000/year

- Multi-year

- Flexibility

- Most NIH-supported investigator-initiated research is through this funding mechanism

Research Grant (NIH R01)

- Funds research project
  - Salaries of PI and other research personnel
  - Supplies, reagents, etc
  - Animal costs
  - Patient care costs
  - Core facilities
  - Travel to national meetings

- Multi-Year (4yrs – 5yrs)

- Renewable
  - e.g. original grant + 2 renewals = 15yrs

Small Research Grants (R03)

- Supports, e.g.:
  - Pilot or feasibility studies;
  - Collection of preliminary data;
  - Secondary analysis of existing data;
  - Small, self-contained research projects;
  - Development of new research technology.

- 2 years of funding
- Budget: Direct costs up to $50,000/yr
- Not renewable
- Some Institutes only accepts applications in response to their specific funding opportunity announcements.

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Exploratory/ Developmental Grants (R21)

- Encourages new, exploratory and developmental research projects by providing support for the early stages of project development. Sometimes used for pilot and feasibility studies.
- 2 years of funding
- Budget: $275,000 (D.C.) over two years
- Investigator-initiated R21 studies not funded by all Institutes
Research Project Grants: Applications, Awards, and Success Rates
Program Projects and Centers

Program Projects (P01)

- Specific major objective or a basic theme
- Usually 3 or more Research Projects ("R01-like") and Cores (administrative and technical)

Center Core Grants (P30)

- Shared resources and facilities for a number of investigators who focus on a common research problem
Administrative Supplements

- To promote **reentry** into biomedical and behavioral research careers
  - Individuals who have interrupted their research careers to care for children or parents or to attend to other family responsibilities

- To promote **diversity** in health-related research
  - Individuals from underrepresented racial and ethnic groups
  - Individuals with disabilities
  - Individuals from socially, culturally, economically, or educationally disadvantaged backgrounds that have inhibited their ability to pursue a career in health-related research

Instrumentation

National Institutes of Health

Shared Instrumentation Grant Program (S10)

- Major User Group of ≥3 PI’s of active NIH research grants
- Major User Group: Minimum of 35% of the Accessible User Time (AUT)
- NIH-funded projects: Minimum of 75% of the Accessible User Time (AUT)
- “Purchase or upgrade a single item of expensive, state-of-the-art, specialized, commercially available instrument or an integrated instrumentation system”
- Grant provides $50,000 - $600,000

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Instrumentation

National Institutes of Health

- High-End Instrumentation Grant Program (S10)
  - Major User Group of ≥3 PI’s of active NIH research grants
  - Major User Group: Minimum of 35% of the Accessible User Time (AUT)
  - NIH-funded projects: Minimum of 75% of the Accessible User Time (AUT)
  - “Purchase or upgrade a single item of expensive, specialized, commercially available instruments or integrated systems”
  - Grant provides $600,000 - $2,000,000

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NIH CTSA Awards: A Home for Clinical and Translational Science

Source: Zerhouni (NIH) [9/06]
Institutional Clinical & Translational Science Award

- **National network** of medical research institutions (hubs)
  - > 50 medical research institutions (31 states and D.C.)
  - “Hubs collaborate locally and regionally to catalyze innovation in training, research tools and processes.”

- Improve the **translational research processes**

- Enables **research teams** (e.g. scientists, patient advocacy organizations, community members) to address system-wide clinical and translational scientific and operational problems

Institutional Clinical & Translational Science Award

Program goals:

- “Train and cultivate the translational science workforce;
- Engage patients and communities in every phase of the translational process;
- Promote the integration of special and underserved populations in translational research across the human lifespan;
- Innovate processes to increase the quality and efficiency of translational research, particularly of multisite trials; and
- Advance the use of cutting-edge informatics”

# NIH Extramural Program

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Adapted from: NIH (DRG) - Peer Review of NIH Research Grants Applications
Cooperative Agreements

- **U01: Research Project**
  - To support a *discrete project*

- **U10: Cooperative Clinical Research**
  - “To support *clinical evaluation* of various methods of therapy and/or prevention in *specific disease areas*…”

- **U19: Research Program**
  - Supports “a research program of *multiple projects* directed toward a *specific major objective*, … *multidisciplinary and often long-term approach*”

- **U54: Specialized Center**
  - “To support any part of the *full range of research* and development from very *basic to clinical*; … a *multidisciplinary attack*… *regional or national resources*”

Cooperative Agreements

Since cooperative agreement funding frequently involves a “network” of awards, there may be NIH Institute funding considerations [e.g., programmatic priorities, diversity of research subjects in clinical research (ethnicity, socioeconomic status, age, gender, disease-related, geographic)] that are in addition to the “usual” NIH review criteria (e.g., Significance, Investigators, Innovation, Approach, Environment).

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Contracts

Review Criteria

- **Differs from that of grants**
- Offerors respond to a ‘Request for Proposal’ (RFP) or a ‘Broad Agency Announcement’ (BAA)
- Proposals evaluated against **criteria specified in RFP**
- **Recommendations of peer reviewers**, and the results of separate NIH staff reviews, provide the basis for discussions with offerors in the competitive range
- Offeror is requested to submit **“Best And Final Offer” (BAFO)**
- Final **selection** of offeror is made on the basis of the **BAFO**, judged most advantageous to the government, according to the **RFP evaluation criteria**
Topics to be Discussed

- Funding Agencies
  - Government
    - Federal: National Institutes of Health, Dept. of Defense
    - Non-Government: Voluntary Health Organizations, Professional Societies, Foundations, Industry
  - Types of Awards
    - Grants, Contracts, Cooperative agreements,
      - e.g. Research grants, fellowships, career development awards

- Funding Announcements
- Grant Review Processes: National Institutes of Health
- Identifying Funding
- Approaches for Competitive Applications

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Funding Announcements

Diagram:
- RFA: Targeted research
- Institute-Specific PA: Research in a stated area of scientific interest
- Parent PA: Investigator-initiated research in any area

Narrow

Broad

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Funding Opportunity Announcement (FOA)

- FOA Mechanism
  - Published in the NIH Guide for Grants and Contracts (RFAs, PAs) and Grants.gov
  - Grants.gov notice includes application information and forms
Parent Announcement

- Funding Opportunity Announcement for unsolicited investigator-initiated grant applications (e.g. R01, R03, R21)
  - Allows electronic submission of grant applications that are not in response to specific Program Announcement or RFA.
  - Published in the NIH Guide for Grants and Contracts and Grants.gov
  - Grants.gov notice includes application information and forms

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
NIH Research Project Grant (Parent R01)

National Cancer Institute (NCI)
National Eye Institute (NEI)
National Heart, Lung, and Blood Institute (NHLBI)
National Human Genome Research Institute (NHGRI)
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 on Drug Abuse (NIDA)
National Institute of Environmental Health Sciences (NIEHS)
National Institute of General Medical Sciences (NIGMS)
National Institute of Mental Health (NIMH)
National Institute of Neurological Disorders and Stroke (NINDS)
National Institute of Nursing Research (NINR)
National Institute on Minority Health and Health Disparities (NIMHD)
National Library of Medicine (NLM)
National Center for Complementary and Integrative Health (NCCIH)
Division of Program Coordination, Planning and Strategic Initiatives, Office of Research Infrastructure Programs (ORIP)

NIH Small Research Grant Program (Parent R03)

National Human Genome Research Institute (NHGRI)
National Institute on Aging (NIA)
National Institute on Alcohol Abuse and Alcoholism (NIAAA)
National Institute of Allergy and Infectious Diseases (NIAID)
National Institute of Biomedical Imaging and Bioengineering (NIBIB)
Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)
National Institute on Drug Abuse (NIDA)
National Institute of Environmental Health Sciences (NIEHS)
National Institute of Mental Health (NIMH)
National Institute of Neurological Disorders and Stroke (NINDS)
National Institute on Minority Health and Health Disparities (NIMHD)

PA-16-162

No set-aside of funds

Describes existence of an NIH extramural research program

May describe new or expanded interest in a particular extramural program

May be a reminder of a continuing interest in an extramural program

Applications reviewed at Center for Scientific Review (CSR) not the Institute

Published in the NIH Guide for Grants and Contracts and Grants.gov
Program Announcement (PAR)

- Program Announcement Reviewed in an Institute (PAR) Mechanism
  - Grant applications are reviewed at the Institute and not the Center for Scientific Review (CSR)
  - Usually some applications are funded

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Request For Applications (RFA)

- Formal announcement describing an institute initiative in a well-defined scientific area
- Invitation to the field to submit research grant applications for a one-time competition
- Set-aside of funds for a certain number of awards
- Published in the *NIH Guide for Grants and Contracts* and *Grants.gov*

Adapted from: NIH (DRG) - Peer Review of NIH Research Grants Applications
Request For Proposals (RFP)

- Formal announcement describing an institute initiative in a well-defined scientific area
- Invitation to the field to submit contract applications for a one-time competition
- Set-aside of funds for a certain number of awards
- Published in FedBizOpps

Topics to be Discussed

- Funding Agencies
  - Government
    - Federal: National Institutes of Health, Dept. of Defense
  - Non-Government: Voluntary Health Organizations, Professional Societies, Foundations, Industry

- Types of Awards
  - Grants, Contracts, Cooperative agreements,
    - e.g. Research grants, fellowships, career development awards

- Funding Announcements

- Grant Review Processes: National Institutes of Health

- Identifying Funding

- Approaches for Competitive Applications

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
# Application Due Dates

<table>
<thead>
<tr>
<th>Activity Codes</th>
<th>Program Description</th>
<th>Cycle I Due Date</th>
<th>Cycle II Due Date</th>
<th>Cycle III Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>R01 new</td>
<td>Research Grants</td>
<td>February 5</td>
<td>June 5</td>
<td>October 5</td>
</tr>
<tr>
<td>K series new</td>
<td>Research Career Development</td>
<td>February 12</td>
<td>June 12</td>
<td>October 12</td>
</tr>
<tr>
<td>R03, R21, R33, R21/R33, R34, R36, UH2, UH3, UH2/UH3 new</td>
<td>Other Research Grants and Cooperative Agreements</td>
<td>February 16</td>
<td>June 16</td>
<td>October 16</td>
</tr>
<tr>
<td>F Series Fellowships (including F31 Diversity – NOT-OD-17-029) new, renewal, resubmission</td>
<td>Inddual National Research Service Awards (Standard) (see NRSA Training Page)</td>
<td>April 8</td>
<td>August 8</td>
<td>December 8</td>
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</tbody>
</table>

[http://grants.nih.gov/grants/funding/submissionschedule.htm](http://grants.nih.gov/grants/funding/submissionschedule.htm)

<table>
<thead>
<tr>
<th>Activity Codes</th>
<th>Program Description</th>
<th>Cycle I Due Date</th>
<th>Cycle II Due Date</th>
<th>Cycle III Due Date</th>
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<tbody>
<tr>
<td>All Activity Codes Cited Above</td>
<td><strong>AIDS and AIDS-Related Applications</strong></td>
<td>May 7</td>
<td>September 7</td>
<td>January 7</td>
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<tr>
<td><em>Effective. Sept 5, 2015 - N/A for SBIR/STTR Applications using Standard Due Dates</em></td>
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<tr>
<td>NOTE: See Key Dates section of funding opportunity announcement to determine if AIDS dates apply.</td>
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</table>

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

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
<table>
<thead>
<tr>
<th>Activity Codes</th>
<th>Program Description</th>
<th>Cycle I Due Date</th>
<th>Cycle II Due Date</th>
<th>Cycle III Due Date</th>
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<td>July 12</td>
<td>November 12</td>
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<td>R03, R21, R33,</td>
<td>Other Research Grants and Cooperative</td>
<td>March 16</td>
<td>July 16</td>
<td>November 16</td>
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<td>R21/R33, R34,</td>
<td>Agreements</td>
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<td>R36, UH2, UH3,</td>
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<tr>
<td>UH2/UH3</td>
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## Review and Award Cycles

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<th>Cycle II</th>
<th>Cycle III</th>
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</thead>
<tbody>
<tr>
<td>Application Due Dates</td>
<td>January 25 - May 7</td>
<td>May 25 - September 7</td>
<td>September 25 - January 7</td>
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<tr>
<td>Scientific Merit Review</td>
<td>June - July</td>
<td>October - November</td>
<td>February - March</td>
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<tr>
<td>Advisory Council Round</td>
<td>August or October *</td>
<td>January</td>
<td>May</td>
</tr>
<tr>
<td>Earliest Project Start Date</td>
<td>September or December *</td>
<td>April</td>
<td>July</td>
</tr>
</tbody>
</table>

[http://grants.nih.gov/grants/funding/submissionschedule.htm](http://grants.nih.gov/grants/funding/submissionschedule.htm)

Review Process for a Research Grant Application

National Institutes of Health

Research Grant Application

School or Other Research Center

- Initiates Research Idea
- Submits Application

- Assigns to Study Section & Institute

Study Section

- Evaluates for Scientific Merit

Institute

- Evaluates for Program Relevance

Advisory Councils and Boards

- Recommends Action

Institute Director

- Takes final action for NIH Director

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
NIH REFERRAL AND REVIEW SYSTEM
REGULAR RESEARCH GRANT APPLICATIONS

CSR
<table>
<thead>
<tr>
<th>CSR</th>
<th>Institutes</th>
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<tr>
<td>• Research Grants (R01, R03)</td>
<td>• Multi-Project Grants (P01, P50, etc)</td>
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<tr>
<td>• Fellowships (F’s)</td>
<td>• Training Grants (T’s)</td>
</tr>
<tr>
<td>• Small Business</td>
<td>• Career Development (K’s)</td>
</tr>
<tr>
<td></td>
<td>• Conference Grants (R13)</td>
</tr>
<tr>
<td></td>
<td>• Research Grants in response to RFAs</td>
</tr>
<tr>
<td></td>
<td>• Contracts</td>
</tr>
</tbody>
</table>

Adapted from: NIH (DRG) - Peer Review of NIH Research Grants Applications

Dual Review System for Grant Applications

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

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

Adapted from: NIH (DRG) - Peer Review of NIH Research Grants Applications

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Application to CSR

Applicant can request IRG and IC

CSR assigns to IRG, IC

Review by CSR IRG

Summary statement to applicant

Second level Council review

Fundable

NIAID negotiates award

Not funded

Applicant evaluates feedback

Grant ends, renewal

Revised application

CSR sends to NIAID

New RFAs, other*

ROIs, revised RFAs, other*
Center for Scientific Review
- Integrated Review Groups (IRG's) -

- AIDS and Related Research
- Biobehavioral and Behavioral Processes
- Biological Chemistry and Macromolecular Biophysics
- Biology of Development and Aging
- Bioengineering Sciences and Technologies
- Brain Disorders and Clinical Neuroscience
- Cell Biology
- Cardiovascular and Respiratory Sciences
- Digestive, Kidney, and Urological Sciences
- Emerging Technologies and Training Neurosciences
- Endocrinology, Metabolism, Nutrition and Reproductive Sciences
- Genes, Genomes and Genetics
- Healthcare Delivery and Methodologies

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- Immunology
- Infectious Diseases and Microbiology
- Integrative, Functional, and Cognitive Neuroscience
- Interdisciplinary Molecular Sciences and Training
- Molecular, Cellular, and Developmental Neuroscience
- Musculoskeletal, Oral and Skin Sciences

- Oncology 1 – Basic Translational
- Oncology 2 – Translational Clinical
- Population Sciences and Epidemiology
- Risk, Prevention and Health Behavior
- Surgical Sciences, Biomedical Imaging, and Bioengineering
- Vascular and Hematology
The Oncology 2 – Translational Clinical Integrated Review Group (OTC IRG) will consider applications involving translational and clinical investigations that encompass cancer prevention, diagnosis and treatment. Specifically, the OTC IRG reviews research grant applications related to mechanism of action of cancer therapeutic agents in both in vitro and in vivo model systems; development and evaluation of experimental therapies of neoplastic diseases; translation of basic research to clinical practice; development or optimization of treatment modalities; radiation biology and therapy; chemoprevention; and development of biomarkers/signatures for tumor detection and diagnosis.
Oncology 2 - Translational Clinical IRG

- Basic Mechanisms of Cancer Therapeutics [BMCT]
- Cancer Biomarkers [CBSS]
- Chemo/Dietary Prevention [CDP]
- Cancer Immunopathology and Immunotherapy [CII]
- Clinical Oncology [CONC]
- Drug Discovery and Molecular Pharmacology [DMP]
- Developmental Therapeutics [DT]
- Radiation Therapeutics and Biology [RTB]
- 3 Translational Clinical Small Business Special Emphasis Panels

In Oncology 1 IRG: 2 Fellowship Panels [F09A and B]
The Radiation Therapeutics and Biology [RTB] Study Section reviews applications on therapeutic interactions of ionizing radiation, radionuclides, electromagnetic radiation, and heat at the molecular, cellular, organ and patient levels. This ranges from basic studies of DNA damage responses and DNA repair to preclinical applications in which dose, dose rate, type of radiation, and quality of radiation are variables. RTB focuses on both clinical work and animal model.
# Membership Roster - RTB

**Radiation Therapeutics and Biology Study Section**  
**Center For Scientific Review**  
*(Terms end 6/30 of the designated year)*

## Chairperson

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sgouros, George, PHD (17)</td>
<td>Professor</td>
<td>Department of Radiology, School of Medicine, Johns Hopkins University</td>
<td>Baltimore, MD 21231</td>
</tr>
</tbody>
</table>

## Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad, Nihal, PHD (19)</td>
<td>Professor</td>
<td>Department of Dermatology, University of Wisconsin - Madison</td>
<td>Madison, WI 53706</td>
</tr>
</tbody>
</table>
How to Direct a Grant Application to the Appropriate Study Section

- Review research areas of Integrated Review Group
- Review research areas of Study Section
- Review roster of Study Section members
  - Do not contact reviewers
- Review Study Section’s funded grants in RePorter
- Discuss with colleagues in similar research area
- Request via Form in Application
**PHS Assignment Request Form**

**Awarding Component Assignment Request (optional)**

If you have a preference for an Awarding Component (e.g., EM lab/tenancy assignment), please use the link below to identify the most appropriate assignment, then enter the short abbreviation (e.g., NCI for National Cancer Institute) in “Assign to/Do Not Assign To Awarding Component” sections below. Your first choice should be in column 1. All requests will be considered; however, locus of review is predetermined for some applications and assignment requests cannot always be honored.

Information about Awarding Components can be found here: [https://grants.nih.gov/grants/phs_assignment_information.html#Awarding Components](https://grants.nih.gov/grants/phs_assignment_information.html#Awarding Components)

<table>
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<tr>
<th>Assign to Awarding Component:</th>
<th>1</th>
<th>2</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>Do Not Assign to Awarding Component:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Study Section Assignment Request (optional)**

If you have a preference for a study section assignment, please use the link below to identify the most appropriate study section, then enter the short abbreviation for that study section in “Assign to/Do Not Assign to Study Section” sections below. Your first choice should be in column 1. All requests will be considered; however, locus of review is predetermined for some applications and assignment requests cannot always be honored.

For example, you would enter “CAMP” if you wish to request assignment to the Cancer Molecular Pathobiology study section or enter “ZRG1 HDMI-R” if you wish to request assignment to the Healthcare Delivery and Methodologies SBIR/STTR panel for informatics. Be careful to accurately capture all formatting (e.g., spaces, hyphen) when you type in the request.

Information about Study Sections can be found here: [https://grants.nih.gov/grants/phs_assignment_information.html#Study Section](https://grants.nih.gov/grants/phs_assignment_information.html#Study Section)

<table>
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<tbody>
<tr>
<td>Do Not Assign to Study Section:</td>
<td>Only 20 characters allowed</td>
<td></td>
<td></td>
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</tbody>
</table>
NIH's Review Criteria

- Overall Impact Score
  - Reflects project’s potential to exert a sustained, powerful influence on the research field(s) involved (using five core review criteria, and additional review criteria)
  - An application does not need to be strong in all categories to be judged likely to have major scientific impact.
NIH's Review Criteria

Core Review Criteria
A separate score is given for each for each.

(A) Significance
(B) Investigators
(C) Innovation
(D) Approach
(E) Environment
NIH's Review Criteria

Considered in determining merit, but not given scores

- Protections for Human Subjects
- Inclusion of Women, Minorities and Children
- Vertebrate Animals
- Budget and Period of Support
- Resource Sharing Plans

Requests for Applications (RFAs) May include additional elements, relating to the specific programmatic needs of the RFA

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Implementing Rigor and Transparency in NIH & AHRQ Research Grant Applications

Notice Number: NOT-OD-16-011

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 questions reviewers will be asked to consider when reviewing applications

https://grants.nih.gov/grants/peer/critiques/rpg.htm
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 questions reviewers will be asked to consider when reviewing applications

https://grants.nih.gov/grants/peer/critiques/k.htm
Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
NIH's Evaluation/Scoring System

9-point rating scale (1=exceptional; 9=poor)

<table>
<thead>
<tr>
<th>Impact</th>
<th>Score</th>
<th>Descriptor</th>
<th>Strengths/Weaknesses</th>
</tr>
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<tbody>
<tr>
<td>High Impact</td>
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<td>Exceptional</td>
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<tr>
<td></td>
<td>2</td>
<td>Outstanding</td>
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<tr>
<td></td>
<td>3</td>
<td>Excellent</td>
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</tr>
<tr>
<td>Moderate Impact</td>
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<td>Good</td>
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<td>9</td>
<td>Poor</td>
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<tr>
<td>Impact</td>
<td>Score</td>
<td>Descriptor</td>
<td>Additional Guidance on Strengths/Weaknesses</td>
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<td>-------</td>
<td>--------------</td>
<td>--------------------------------------------</td>
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<tr>
<td>High</td>
<td>1</td>
<td>Exceptional</td>
<td>Exceptionally strong with essentially no weaknesses</td>
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<td>2</td>
<td>Outstanding</td>
<td>Extremely strong with negligible weaknesses</td>
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<td>Excellent</td>
<td>Very strong with only some minor weaknesses</td>
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<td>Medium</td>
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<td>Very Good</td>
<td>Strong but with numerous minor weaknesses</td>
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<tr>
<td>Low</td>
<td>7</td>
<td>Fair</td>
<td>Some strengths but with at least one major weakness</td>
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<td>8</td>
<td>Marginal</td>
<td>A few strengths and a few major weaknesses</td>
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<tr>
<td></td>
<td>9</td>
<td>Poor</td>
<td>Very few strengths and numerous major weaknesses</td>
</tr>
</tbody>
</table>

**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
Separate Scores for the 5 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

<table>
<thead>
<tr>
<th>1. Significance</th>
<th>Please limit text to ¼ page</th>
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<tbody>
<tr>
<td><strong>Strengths</strong></td>
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</tbody>
</table>
Impact Score

- Preliminary Impact Scores determine which applications discussed at study section
  - Impact Score given by each member of the study section

- Overall Impact Score (for discussed applications):
  Average of reviewers’ Impact Scores
  (rounded to one decimal place) x10
  - 81 possible overall Impact Scores
    (10 – 90, whole numbers)
Calculating Percentile

<table>
<thead>
<tr>
<th>Rank</th>
<th>Impact Score</th>
<th>Percentile</th>
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<td></td>
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<td>80</td>
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</table>

Percentile Value Calculation

- Relative rank for each priority score on a scale from 10 to 90.

- Follows NIH convention: Inverse relationship of priority score to scientific merit - lowest percentile value represents the highest scientific merit

- Specifies the percent of applications with scores equal to or better than (lower impact score) the application

\[ P = \frac{100}{N} \times (k^{1/2}) \]

- \( P = \) Percentile Value
- \( k = \) Numerical Rank of Impact Score
- \( N = \) Total number of applications

Calculating Percentile

80 applications*, 14 of which were not recommended for further consideration

<table>
<thead>
<tr>
<th>Rank</th>
<th>Impact Score</th>
<th>Percentile</th>
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<td>15</td>
<td>1.9</td>
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<td>3</td>
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<td>3.1</td>
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<tr>
<td>4</td>
<td>21</td>
<td>4.4</td>
</tr>
<tr>
<td>//</td>
<td>//</td>
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</tr>
</tbody>
</table>

80

Rank = 3

\[ P = \frac{100}{80} \times (3^{1/2}) = 3.1 \]

* Study section’s last three review cycles
Council Actions

- Concurrence with Study Section action
- Modification of Study Section action based on program or policy considerations
- Deferral for further review

Adapted from: NIH (DRG) - Peer Review of NIH Research Grants Applications

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
What Determines which Awards are Made?

- Scientific Merit
- Program Considerations
- Availability of Funds
## Challenging Times for All Researchers

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall success rate for NIH RO1* Proposals</td>
<td>32%</td>
<td>24%</td>
</tr>
<tr>
<td>Success rate on first submission</td>
<td>29%</td>
<td>12%</td>
</tr>
</tbody>
</table>

## Especially for Young Investigators

<table>
<thead>
<tr>
<th></th>
<th>Then 1990</th>
<th>Now 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at first Ro1* grant</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>% of Ro1s* that go to first-time investigators</td>
<td>29%</td>
<td>25%</td>
</tr>
</tbody>
</table>

*RO1 Equivalents: RO1, R29, R37  
Source: National Institutes of Health
Age Distribution of NIH RPG Investigators: 1980

Average Age
New R01 Investigator: 37.2

Sources: IMPAC II Current and History Files

http://enhancing-peer-review.nih.gov/meetings/Peer%20Review%20Implementation%20FINAL%20DRAFT%20update%20-

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Age Distribution of NIH RPG Investigators: 2006

Average Age
New R01 Investigator: 42.2

Sources: IMPAC II Current and History Files

http://enhancing-peer-review.nih.gov/meetings/Peer%20Review%20Implementation%20FINAL%20DRAFT%20update%20-

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Preliminary Projection of Age Distribution of NIH RPG Investigators: 2020

Sources: IMPAC II Current and History Files and Preliminary Demographic Projection Model
Figure 1. Average Age of Principal Investigators with MD, MD-PhD, or PhD at the time of First R01 Equivalent Award from NIH, Fiscal Years 1980 to 2011
“Over the past three decades, we’ve seen profound shifts in the average age at which a principal investigator receives their first R01. During the period from 1980 to 2001, the average age increased nearly 0.3 years per year. Since that time, the average age at first R01 award has leveled off near 42 for PhDs. It is higher for researchers with an MD or an MD/PhD.” [Dr. Sally Rockey, NIH Deputy Director for Extramural Research (2/3/12)]
NIH R01 Principal Investigators: Age 36 and Younger / Age 66 and Older

http://nexus.od.nih.gov/all/rock-talk/

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Young, Brilliant and Underfunded

By ANDY HARRIS

We'll never know what medical breakthroughs were missed because young scientists were not provided with resources.

The New York Times

OCT. 2, 2014
A study for the National Bureau of Economic Research from 2005 examined the age at which over 2,000 Nobel Prize winners and other notable scientists in the 20th century came up with the idea that led to their breakthrough. Most were between 35 and 39. Yet the median age of first-time recipients of R01 grants, the most common and sought-after form of N.I.H. funding, is 42, while the median age of all recipients is 52. More people over 65 are funded with research grants than those under age 35.
Early Stage Investigator (ESI)

- Has **not** previously been awarded “significant NIH independent research award”
  - Includes R01’s, projects on P01
  - Does not include: R03’s, R21’s, F’s, K’s, loan repayment

- **Within 10 years of terminal research degree/completion of medical residency**
  - Extensions permitted (family care, additional clinical training)

# Early Stage Investigators: NHLBI

<table>
<thead>
<tr>
<th>Grant Program</th>
<th>Grant Program Description</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>R01</td>
<td>Research Project Grant</td>
<td>15</td>
</tr>
<tr>
<td>R01 ESI</td>
<td>Early Stage Investigators</td>
<td>25</td>
</tr>
</tbody>
</table>

FY17

http://www.nhlbi.nih.gov/research/funding/general/current-operating-guidelines
R01-Equivalent grants, New (Type 1): Success rates, by career stage of investigator
Topics to be Discussed

- **Funding Agencies**
  - Government
    - Federal: National Institutes of Health, Dept. of Defense
  - Non-Government: Voluntary Health Organizations, Professional Societies, Foundations, Industry

- **Types of Awards**
  - Grants, Contracts, Cooperative agreements,
    - e.g. Research grants, fellowships, career development awards

- **Funding Announcements**

- **Grant Review Processes: National Institutes of Health**

- **Identifying Funding**

- **Approaches for Competitive Applications**

Total support for biomedical research in the U.S. in 2012 = $130.4 billion*.

$41.1 billion
Federal Government

$17.8 billion
Other

$2.4 billion
Foundations & Public Grantmaking Charities

$69.2 billion
Industry

*Source: Research!America
Award funding covers the broad spectrum of basic discovery and translational and clinical research.

- 61% Translational and Clinical Research
- 38% Basic Discovery Research
- 1% Other

Nearly half of the award dollars were for early career development and training, compared to about 5% of NIH grants.

- 51% Research
- 44% CD&T*
- 5% Other

*CD&T: Career Development and Training

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Non-Government Funding Agencies

Non-profit agencies
- Voluntary Health Organizations
- Professional Societies
- Private Foundations

For profit agencies
- Biotechnology Companies
- Pharmaceutical Companies
Post-doc: Individual Fellowship

- Voluntary Health Organizations, Foundations, Professional Societies -

- American Cancer Society
- American Heart Association (Founders)
- American Kidney Fund
- American Liver Foundation
- Daland Fellowships in Clinical Investigation
- Helen Hay Whitney Foundation

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Career Transition Awards

- **BWF: Career Awards for Medical Scientists**
  - To support physician-scientists during the last years of a mentored postdoctoral/fellowship position and the beginning years of an independent faculty position.
  - Candidates must hold an M.D., D.O., D.D.S., or D.V.M. degree
  - 75% effort to research-related activities
  - Funding: $700,000 over five years
    - **Postdoctoral/Fellowship Portion**: Years 1 and 2
      Annual Total: $95,000
    - **Faculty Portion**: Years 3-5
      Annual Total: $170,000

Research Career Development/Scholar Programs

- AGA Research Foundation
  - Research Scholar Awards
- American Heart Association
  - Scientist Development Grant
- Robert Wood Johnson Foundation
  - Harold Amos Medical Faculty Development Program
- Damon Runyon Cancer Research Foundation
  - Clinical Investigator Award
- Doris Duke Charitable Foundation
  - Clinical Scientist Development Grant

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Grantseeking from Corporations

- Identify companies that might be interested in your research
- Learn as much as possible about the company (e.g. business activities, past giving history)
- Determine the best method of approach (e.g. formal application, personal contacts)
- Articulate your research objectives so as to be in line with the company's giving rationale

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Pharmaceutical/Biotech Companies

- Independent foundations

- Research agreements:
  - Companies support investigators for a specific research project
  - Agreement reviewed/negotiated by Columbia Technology Ventures (e.g. intellectual property protection)

- Clinical trials

- On going nationally competitive research awards/honorific awards
Gifts

- Gifts are not sponsored projects.

- Although funds may be used to support research efforts, they are not for a specific research project (i.e. no listing of specific aims). Unlike sponsored projects, gift agreements do not contain an itemized budget and do have the same university financial reporting requirements.

- Gifts are solicited and managed by the university's development offices, not by the grants office.
Example: Research Interests in Digestive Diseases

Non-government, non-profit agencies

• Voluntary Health Organizations
• Professional Societies
• Private Foundations
Voluntary Health Organizations

- **American Cancer Society**
  - Mentored Training and Career Development Grants
    - Postdoctoral Fellowships
    - Mentored Research Scholar Grant
  - Research Grants for Independent Investigators
    - Research Scholar Grants
  - Health Professional Training Grants
  - Professors
    - Research Professor, Clinical Research Professor
  - New Initiatives and Requests for Applications
- American Liver Foundation
  - Postdoctoral Research Fellowship Award
  - Liver Scholar Award

- Cancer Research Institute, Inc.
  - Irvington Postdoctoral Fellowship
  - Clinic and Laboratory Integration Program (CLIP) Grants
  - Investigator Awards

- Lustgarten Foundation (pancreatic cancer)
  - Research Investigator Awards
Crohn’s & Colitis Foundation of America
- Student Research Awards (college/graduate/medical)
- Research Fellowship Awards
- Career Development Awards
- Senior Research Awards
- Scientific Conferences and Workshops

Damon Runyon Cancer Research Foundation
- Damon Runyon Fellowship Award
- Damon Runyon Clinical Investigator Award
- Damon Runyon Physician-Scientist Training Award
- Damon Runyon-Rachleff Innovation Award
Professional Societies

- **American College of Gastroenterology**
  - Junior Faculty Development Grants
  - Clinical Research Awards
  - “Smaller Programs” Clinical Research Award

- **American Association for the Study of Liver Diseases**
  - Pinnacle Research Award in Liver Diseases
  - Clinical and Translational Research Fellowship
  - Advanced/Transplant Hepatology Fellowship Program
  - Career Development Award in Liver Transplantation Clinical and Translational Research Awards

- **American Gastroenterological Association/AGA Research Foundation**
  - Student Awards
  - Career Development Awards
  - Young Investigator Awards
  - Established Investigator Awards
  - Travel Awards

- **American Society for Gastrointestinal Endoscopy/ASGE Foundation**
  - Research Awards

Private Foundations

- **Kenneth Rainin Foundation**
  - Inflammatory Bowel Disease (IBD)
    - Innovator Awards
    - Breakthrough Awards
    - Synergy Awards

- **Leona M. and Harry B. Helmsley Charitable Trust**
  - IBD and Crohn's Disease
Topics to be Discussed

- Funding Agencies
  - Government
    - Federal: National Institutes of Health, Dept. of Defense
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- Types of Awards
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- Funding Announcements

- Grant Review Processes: National Institutes of Health

- Identifying Funding

- Approaches for Competitive Applications

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
How to Find Funding Opportunities

- Networking
- Speak to colleagues who are in a similar field
- Speak to colleagues who have been on governmental or private agency review panels
- Speak to colleagues who are on (advisory) boards of private agencies
- Acknowledgement section of publications, oral/poster presentations, press releases, etc.

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
General Resources

- Grants.gov
  - Database and application system for Federal grants

- FedBizOpps (Federal Business Opportunities)
  - Single point-of-entry for Federal contracts
General Resources

- **Foundation Center**
  - [http://foundationcenter.org/](http://foundationcenter.org/)
  - [http://foundationcenter.org/newyork/](http://foundationcenter.org/newyork/)

- **SPIN funding database**
  - [https://www.infoed.columbia.edu/](https://www.infoed.columbia.edu/)
  - e-mail alerts matching research area(s) of interest
■ National Institutes of Health
  ▪ http://grantscourse.columbia.edu/nih.htm

■ Tips for Writing Grant Applications
  ▪ http://grantscourse.columbia.edu/writing.htm
Other Sources of Information

- Sponsor publications/website/social media which describe research-programmatic interests (e.g. newsletters, strategic plans, annual reports)

- Sponsor e-mail alert modules
  - NIH
      - Able to save queries and have “ongoing” results e-mailed as funding alerts
SPIN Funding Database

Chosen Keywords
Rehabilitation/Therapy, Occupation/Vocation

Select Keywords
- AND
- OR
Rehabilitation/Therapy, Occupation/Vocation (129)

You have additional filters active. Click here to edit them.

Results Found: 99

Drag a column header and drop it here to group by that column

Save Current Search
- Search name: Rehab Therapy
- User: Select an Option
- Would you like to configure SMARTS™ automation? Help Note: This can be setup or edited under Funding Alerts later.
- Receive email updates? HTML
- Update frequency: Daily

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e-mail alerts matching research area(s) of interest
The Foundation Center

New York
32 Old Slip, 24th Floor
New York, NY 10005-3500
tel: 212-620-4230
http://foundationcenter.org/
http://foundationcenter.org/newyork/
Training

- **Courses:** Proposal Writing Workshop and Bootcamp
- Webinars
- Self-Paced eLearning

The Foundation Directory Online

- 100,000 Grantmakers
- 3.4 million grants
- Tax statements (990’s) showing previous awards
- Access via Columbia University
  - [http://www.columbia.edu/cgi-bin/cul/resolve?clio3328966](http://www.columbia.edu/cgi-bin/cul/resolve?clio3328966)
<table>
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<th>#</th>
<th>Grantmaker Name</th>
<th>City, State / Country</th>
<th>Total Assets</th>
<th>Total Giving</th>
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<td>$230,753,645</td>
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<td>2</td>
<td>Cohen Foundation, Inc., Steven &amp; Alexandra M</td>
<td>Greenwich, CT</td>
<td>$565,933,968</td>
<td>$50,932,009</td>
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<tr>
<td>3</td>
<td>Autism Speaks</td>
<td>New York City, NY</td>
<td>$19,677,425</td>
<td>$18,934,366</td>
</tr>
</tbody>
</table>
Topics to be Discussed

- Funding Agencies
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    - Federal: National Institutes of Health, Dept. of Defense
  - Non-Government: Voluntary Health Organizations, Professional Societies, Foundations, Industry

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- Funding Announcements

- Grant Review Processes: National Institutes of Health

- Identifying Funding

- Approaches for Competitive Applications
Approaches for Competitive Applications

- Identify Funding
- Prepare to Write the Grant Application
- Complete the Grant Application

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Identify Funding

- Identify appropriate funding agencies
  - Government
  - Non-government

- Identify appropriate funding mechanisms
  - Research
  - Training

- Create a calendar of application deadlines for identified funding programs
Approaches for Competitive Applications

- Identify Funding
- Prepare to Write the Grant Application
- Complete the Grant Application
It’s not the will to win, but the will to prepare to win that makes the difference.

Bear Bryant, University of Alabama
Prepare to Complete the Grant Application

- Speak with Agency Program Officer
- Speak with colleagues who are/were awardees
- Review funded applications if possible
- Review agency’s review criteria
- Identify what will make the application more competitive
  - Research and/or career development arrangements
  - Access to core facilities/research resources
- Strengthen “Preliminary Work/ Pilot Data”
- Who will write confidential letters of reference?
Research and Career Development Arrangements

- Multiple Principle Investigators (research awards)
- Multiple Mentors (mentored awards)
- Advisors (mentored awards)
- Co-investigators/Collaborations
- Subcontracts to other institutions
- Multidisciplinary/Interdisciplinary

Jaime S. Rubin, Ph.D.: http://grantscourse.columbia.edu
Prepare to Complete the Grant Application

- Identify and meet with Co-investigators, Collaborators, Consultants, Advisors
  - Identify roles and responsibilities
  - Administrative requirements
    (e.g. if other countries/institutions are involved)
- Identify necessary core facilities and other research resources
- Meet with research administrators
- Human subjects, lab animals and any other regulatory issues?

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Approaches for Competitive Applications

- Identify Funding
- Prepare to Write the Grant Application
- **Complete the Grant Application**
Complete the Grant Application

- Review the application instructions
- Identify the different components
- Create a checklist
- Create an outline
  - Content, Length of section (vis a vis page limits)
- Identify and delegate responsibilities for the different components
  - Technical/Scientific
  - Administrative – e.g. budget
  - Regulatory
  - Draft letters of collaboration/support

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Complete the Grant Application

- Confirm page limits for each component
- Create a schedule for any required meetings
- Determine:
  - Shared computer drive/folders
  - Naming of files (dates?)
  - Track changes?
  - Font, margin, format of literature citation
- Set a **firm** time-line for each responsibility
  - Writing milestones
  - Absolute deadline date for final compilation

Complete the Grant Application

- Read **instructions**

- **Never assume** that reviewers “will know what you mean”

- Refer to **literature** thoroughly and thoughtfully

- Explicitly state the **rationale** of the proposed investigation (“**the hypothesis of my study is...**”)

- Discuss **limitations** and potential “**challenges**” and how these will be addressed (e.g., “**alternate approaches**”)

- Include well-designed **tables and figures**

- Present an **organized**, lucid write-up (use an **outline**)

- Ask colleagues to **review** and comment
Complete the Grant Application

- Read instructions
- Never assume that reviewers “will know what you mean”
- Refer to literature thoroughly and thoughtfully
- Explicitly state the rationale of the proposed investigation (“the hypothesis of my study is…”)
- Discuss limitations and potential “challenges” and how these will be addressed (e.g., “alternate approaches”)
- **Include well-designed tables and figures**
- Present an organized, lucid write-up (use an outline)
- Ask colleagues to review and comment
Include Well-Designed Tables and Figures

- Include explanatory caption with the figure (not buried in text)
- Not overly complicated
- Informative, even if printed in black and white
- Easy for the reviewers to read
- Tips:
  - Bold label in text (e.g., Fig. 4) so it’s easier for reviewers to locate relevant text for individual Figure
  - Try to have Figure and relevant text on the same page
# 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>

Anticipate Questions and Answer them before they are asked

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Quote Investigator suggests crediting sociologist William Bruce Cameron
http://quoteinvestigator.com/2010/05/26/everything-counts-einstein/
Investigator

- Competent
- Enthusiastic
- Thorough
- Professional
Personal Statement/
Candidate’s Background

When describing a previous research experience:

- What was the hypothesis/scientific question?
- Why was the study important?
- What were the findings and conclusions?
- What were your role and responsibilities?
- What did you learn and accomplish?
  - “Intellectual aspects”
  - Do not focus on technical aspects
- Cite any resulting publications
- Describe any honors/awards and conference/workshop presentations

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Possible Problems Specific for Mentored Fellowship Awards

Mentor

- Too many other responsibilities
  (e.g. administrative, clinical)
- Too many other mentees
  (e.g. students, post-docs)
- Not appropriate scientifically
- Too junior
- Limited experience as a mentor
- Limited funds to support proposed research
Possible Problems Specific for Mentored Fellowship Awards

Institution

- Limited scientific/technical resources
- Limited career development opportunities
- Limited opportunities for career advancement
Elements of a Good Proposal

- Feasible
- Relevant
- Unique
- Innovative
- Clear
- Brief
- Consistent
Common Problems with Grant Applications from New Investigators

- Does not address/follow funding agency’s mission, specific instructions, budget limits, etc.
- Overly ambitious
- Not independent of previous mentor’s research
- Fishing expedition
- Not hypothesis driven
- Descriptive, not mechanistic project
- Unfocussed
- No or insufficient preliminary data
- Unrealistic budget
- Methodologies beyond the expertise of investigator or research team
NIH: one round of applications
Pink Sheet: Reviewers’ Comments
Bell Curve of Reviewer’s Grant Applications

Definitely do not fund

Fine

Definitely fund

Great

Poor Statistics
Research Resources
not Adequately Described

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Career Development/Research Training Plan not Comprehensive
Figure Caption Font too Small
All Components of the Application are as Strong as Possible
Good Luck!