New Fellows Retreat:
Career Development and Research
Funding/Grantsmanship for Junior Investigators

January 15, 2016

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Course: “Funding and Grantsmanship for Research and Career Development Activities”
http://grantscourse.columbia.edu/
Topics to be Discussed

- **Types of Awards**
  - Fellowships (F’s), Training grants (T’s), Career Development awards (K’s), Research grants (R’s), Loan Repayment Program

- **Funding Agencies**
  - Federal
    - National Institutes of Health
  - Voluntary Health Organizations, Professional Societies, Foundations, Industry, Other

- **Planning & Organizing a Research Proposal**

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
  - Comprehensive research costs

- **Different time frames**
  - Not renewable: 5 years (K’s), 3 years (F’s), 2 years (T’s)
  - Renewable: 4 years-5 years (R01) each competitive period

Types of Awards

- Individual fellowships
- Training grants
- Career transition awards
- Career development awards
- Research grants
- Program Projects
- Administrative supplements
- Cooperative agreements
- Institutional Clinical & Translational Science Award (CTSA)
- Subcontracts
- Contracts
- Loan Repayment Program

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Timeline of NIH Funding for Junior Investigators

- Medical School
- Internship/Residency
- Fellowship – Research Years
- Instructor/Assistant Professor

- Short term Training
- Research Support
- Individual Post-doc Fellowship or Institutional T32 Post-doc Training Grant slot

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

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Post-doc: Institutional Training Grant (NIH-T32)

- Post-docs selected by institution
- Research training in specific area
- Defined number of slots
- Stipend, health fees, tuition, travel

Dept of Medicine:
NIH Institutional Training Grants

- Columbia University Training Program in **Lung Science** [J. Bhattacharya (Pulmonary)]

- Training Program in **Endocrinology and Metabolism** [J. Bilezikian (Endocrinology)]

- Postdoctoral Training in **Arteriosclerosis** Research [H. Ginsberg (Preventive Medicine)]

- Columbia Integrated Training Program in **Infectious Disease** Research [S. Hammer/F. Lowy (Infectious Diseases)]
Dept of Medicine:
NIH Institutional Training Grants

- **Postdoctoral Training in Cardiovascular Disease**
  [S. Marx (Cardiology) - M. Hardy (Surgery)]

- **Obesity Research** Center Training Grant
  [F.X. Pi-Sunyer (Endocrinology/NYORC)]

- **Primary Care** Research Fellowship
  [S. Shea (General Medicine)]

- **Multidisciplinary Training in Translational Gastrointestinal and Liver Research**
  [T. Wang (GI)]
CUMC:
NIH Institutional Training Grants

- **Cancer Biology** (R. Baer)
- **Medical Genetics** (A. Christiano)
- **Biomedical Informatics** (G. Hripcsak)
- **Cardiovascular Translational Research** (A. Marks)

Post-doc: Individual Fellowship

- Supports specific individual
- Stipend, health fees, tuition, travel
- NIH: F32

Review criteria:
- Individual fellow
- Mentor
- Research project
- Research environment

Post-doc Fellowships (F32s)
Applications, awards, and success rates
Post-doc: Individual Fellowship
- Voluntary Health Organizations, Foundations, Professional Societies -

- **American Association for the Study of Liver Diseases/Liver Research Fund**
  - Advanced/Transplant Hepatology Fellowship
  - Clinical and Translation Research Award

- **American College of Cardiology/ACCF**
  - Merck Research Fellowships in Cardiovascular Disease and Cardiometabolic Disorders

Post-doc: Individual Fellowship
- Voluntary Health Organizations, Foundations, Professional Societies -

- **American College of Gastroenterology**
  - Clinical Research Award
- **American Heart Association (Founders Affiliate)**
  - Postdoctoral Fellowship
- **American Kidney Fund**
  - Clinical Scientist in Nephrology Fellowship

Post-doc: Individual Fellowship

- Voluntary Health Organizations, Foundations, Professional Societies -

- **American Liver Foundation**
  - Postdoctoral Research Fellowship Award

- **American Philosophical Society**
  - Daland Fellowships in Clinical Investigation

- **American Society of Clinical Oncology/Conquer Cancer Foundation**
  - Young Investigator Award
Post-doc: Individual Fellowship
- Voluntary Health Organizations, Foundations, Professional Societies -

- **American Society of Nephrology Foundation for Kidney Research**
  - Ben J. Lipps Research Fellowship

- **Damon Runyon Cancer Research Foundation**
  - Damon Runyon Fellowship Award

- **Endocrine Fellows Foundation**
  - Endocrine Research Grant

Post-doc: Individual Fellowship
- Voluntary Health Organizations, Foundations, Professional Societies -

- **Flight Attendant Medical Research Institute**
  - Young Clinical Scientist Award

- **Francis Families Foundation**
  - Parker B. Francis Fellowship

- **Rheumatology Research Foundation**
  - Scientist Development Grant

- **Stony Wold - Herbert Fund**
  - Fellowship

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- Year-long Enhancement Programs
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- Career Transition Awards

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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
    - NHLBI: $75K for salary plus fringe benefits, $25K for research support (+ 8% I.C.)
  - 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
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.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 of the Award: Years 3-5
    Annual Total: $170,000

Career Transition Awards

- **American Heart Association (National) Fellow-to-Faculty Transition Award**
  - Provides funding for the “period of career development that spans the completion of research training through the early years of the first faculty/staff position”
  - **Training stage:** Maximum of $65,000 per year
  - **Faculty stage:** Maximum of $132,000 per year
  - Award Duration: 5 years

Career Transition Awards

- **JDRF: Advanced Postdoctoral Fellowships**
  - Provides an opportunity to receive full-time research training and to assist awardees in transitioning from a fellowship to an independent (faculty-level) position
  - First degree (PhD, MD, DMD, DVM, or equivalent) received no more than 5 years before the fellowship
  - $90,000 per year for up to 3 years
  - **Transition Award**: Optional transition year in which awardees may request funding support for their first year as a faculty member (up to $110,000 for one year)

Timeline of NIH Funding for Junior Investigators

Medical School
- Short term Training
- Year-long Enhancement Programs
  - MD/PhD Fellowship
  - or Institutional T32

Internship/Residency
- Research Support
- 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)

- Minimum Effort: e.g. 75% (sometimes 50%)
  - Research & Career development activities
- Predominantly salary support
- Up to 5 years
- US citizen/permanent resident
- 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
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
Research Career Development Awards

A chart showing the number of awards over fiscal years from 1997 to 2014, with categories for K01, K08, K23, K25, and K99.
<table>
<thead>
<tr>
<th>IC</th>
<th>Fiscal Year</th>
<th>Topic</th>
<th>Mechanism</th>
<th>Activity</th>
<th>Type</th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHLBI</td>
<td>2012</td>
<td>Success Rate</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>21%</td>
</tr>
<tr>
<td>NHLBI</td>
<td>2012</td>
<td>Applications - Number</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>86%</td>
</tr>
<tr>
<td>NHLBI</td>
<td>2012</td>
<td>Awards - Number</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>18%</td>
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<tr>
<td>NHLBI</td>
<td>2013</td>
<td>Awards - Number</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>32%</td>
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<tr>
<td>NHLBI</td>
<td>2013</td>
<td>Applications - Number</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>107%</td>
</tr>
<tr>
<td>NHLBI</td>
<td>2013</td>
<td>Success Rate</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>30%</td>
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<tr>
<td>NHLBI</td>
<td>2014</td>
<td>Applications - Number</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>77%</td>
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<tr>
<td>NHLBI</td>
<td>2014</td>
<td>Awards - Number</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>29%</td>
</tr>
<tr>
<td>NHLBI</td>
<td>2014</td>
<td>Success Rate</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>37.66%</td>
</tr>
</tbody>
</table>
Research Career Development/Scholar Programs

- **American College of Gastroenterology**
  - Junior Faculty Development Grant

- **American Gastroenterological Association Research Foundation**
  - Research Scholar Awards

- **American Liver Foundation**
  - Liver Scholar Award

- **American Heart Association**
  - Scientist Development Grant

Research Career Development/Scholar Programs

- **American Society of Clinical Oncology - Conquer Cancer Foundation**
  - Career Development Award

- **American Society of Nephrology/Foundation for Kidney Research**
  - Career Development Grants

- **Damon Runyon Cancer Research Foundation**
  - Clinical Investigator Award

- **Doris Duke Charitable Foundation**
  - Clinical Scientist Development Award
Research Career Development/Scholar Programs

- Rheumatology Research Foundation
  - Scientist Development Grant

- Robert Wood Johnson Foundation
  - Harold Amos Medical Faculty Development Program

- American Society of Hematology
  - ASH-Harold Amos Medical Faculty Development Program
Timeline of NIH Funding for Junior Investigators

Short term Training
Medical School

Research Support
Internship/Residency

Individual Post-doc Fellowship or Institutional T32 Post-doc Training Grant slot
Fellowship – Research Years

Institutional K12 Career Development Slot
Instructor/Assistant Professor

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

Career Transition Awards

Individual Mentored K Career Development Award

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CTSA Awards: A Home for Clinical and Translational Science

Source: Zerhouni (NIH) [9/06]

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Mentored Clinical Scientist Development Program Award (K12)

- Support to an institution for career development experiences for clinicians 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.

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Mentored Clinical Scientist Development Program Award (K12)

- CTSA - Clinical and Translational Scientist Award

- TRANSFORM Scholars Mentored Career Development program

  [Training and Nurturing Scientists for Research that is Multidisciplinary]

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CUMC Research Training/Didactic Programs

- **Patient-Oriented Research (POR) Master's of Science Program**: Two-year, 30-credit M-SPH degree program of comprehensive didactic training for conducting clinical and translational research.

- **Columbia Summer Research Institute (CSRI)**: 5-week (10 credit) training program in research design and statistical analysis for patient-oriented research.

- **Epidemiology and Population Health Summer Institute (EPIC)**: Dept of Epidemiology's series of week-long, non-credit courses - provides foundational knowledge and applied skills for advancing population health research.

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NIH Career Development Support to Independent Research Funding

- K08/K23 → Independent Grant
- K12 → K23 → Independent Grant
- K12 → K23 → Independent Grant
- K08/K23 → Independent Grant
- K12 → Independent Grant

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R01 Research Award

Independent Investigator

Funds research project
- Salaries of PI and other research personnel
- Supplies, reagents, etc
- Animal costs
- Patient care costs
- Core facilities
- Page charges for publications

Multi-Year (4 yrs – 5 yrs)
Renewable (e.g. original grant + 2 renewals = 15 yrs)

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Timeline of NIH Funding for Junior Investigators

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Fellowship – Research Years

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Career Transition Awards

NIH Loan Repayment Program

Individual Mentored K Career Development Award

Juan S. Rubin, Ph.D. [http://grantscourse.columbia.edu](http://grantscourse.columbia.edu)
NIH’s Extramural Loan Repayment Program

http://www.lrp.nih.gov/

- Up to $35,000/year towards educational loan debt
- Conduct qualified research activities for at least 50% of professional effort (or 20 hours per week) for 2 years
- Qualifying educational loan debt equals or exceeds 20% of the applicant's institutional base salary

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NIH’s Extramural
Loan Repayment Program

- May competitively apply for one-year renewal
- Repayments represent taxable income and are paid in addition to loan

Eligibility:
- U.S. citizen/Permanent residence
- Recipient of M.D., Ph.D., D.D.S. D.M.D., or other specified equivalent doctoral degree

NIH’s Extramural Loan Repayment Program

Extramural Programs

- Clinical Research
- Health Disparities Research
- Clinical Researchers from Disadvantaged Backgrounds
- Pediatric Research
- Contraception and Infertility Research

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
# NIH Extramural Loan Repayment Programs FY 2014

## Funding by Program (New + Renewal)

<table>
<thead>
<tr>
<th>LRP</th>
<th>Awards</th>
<th>Funding</th>
<th>Mean Award</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Research</td>
<td>819</td>
<td>$40,205,320</td>
<td>$49,091</td>
<td>$31,587</td>
</tr>
<tr>
<td>Pediatric Research</td>
<td>315</td>
<td>$17,179,974</td>
<td>$54,540</td>
<td>$31,256</td>
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<tr>
<td>Health Disparities Research</td>
<td>191</td>
<td>$9,444,008</td>
<td>$49,445</td>
<td>$30,102</td>
</tr>
<tr>
<td>Clinical Research for Individuals from Disadvantaged Backgrounds</td>
<td>17</td>
<td>$1,162,447</td>
<td>$68,379</td>
<td>$22,790</td>
</tr>
<tr>
<td>Contraception and Infertility Research</td>
<td>15</td>
<td>$1,015,621</td>
<td>$67,708</td>
<td>$32,744</td>
</tr>
<tr>
<td>Total</td>
<td>1,357</td>
<td>$69,007,370</td>
<td>$50,853</td>
<td>$31,378</td>
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<tr>
<th>LRP</th>
<th>New + Renewal</th>
<th></th>
<th></th>
<th>New</th>
<th></th>
<th></th>
<th>Renewal</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Applications</td>
<td>Awards</td>
<td>Success Rate</td>
<td>N</td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical Research</td>
<td>1,495</td>
<td>819</td>
<td>55</td>
<td>878</td>
<td>375</td>
<td>43</td>
<td>617</td>
<td>444</td>
<td>72</td>
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<tr>
<td>Pediatric Research</td>
<td>607</td>
<td>315</td>
<td>52</td>
<td>377</td>
<td>153</td>
<td>41</td>
<td>230</td>
<td>162</td>
<td>70</td>
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<tr>
<td>Health Disparities Research</td>
<td>505</td>
<td>191</td>
<td>38</td>
<td>304</td>
<td>115</td>
<td>38</td>
<td>201</td>
<td>76</td>
<td>38</td>
</tr>
<tr>
<td>Clinical Research for Individuals from Disadvantaged Backgrounds</td>
<td>42</td>
<td>17</td>
<td>40</td>
<td>32</td>
<td>13</td>
<td>41</td>
<td>10</td>
<td>4</td>
<td>40</td>
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<tr>
<td>Contraception and Infertility Research</td>
<td>36</td>
<td>15</td>
<td>42</td>
<td>24</td>
<td>7</td>
<td>29</td>
<td>12</td>
<td>8</td>
<td>67</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>2,685</strong></td>
<td><strong>1,357</strong></td>
<td><strong>51</strong></td>
<td><strong>1,615</strong></td>
<td><strong>663</strong></td>
<td><strong>41</strong></td>
<td><strong>1,070</strong></td>
<td><strong>694</strong></td>
<td><strong>65</strong></td>
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</tbody>
</table>


LRP: Clinical Research
– New Applications -

https://www.lrp.nih.gov/about_the_programs/clinical.aspx

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LRP: Clinical Research
– Renewal Applications –

- Applications
- Awards

<table>
<thead>
<tr>
<th>Year</th>
<th>Applications</th>
<th>Awards</th>
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<tbody>
<tr>
<td>FY08</td>
<td>710</td>
<td>502</td>
</tr>
<tr>
<td>FY09</td>
<td>675</td>
<td>469</td>
</tr>
<tr>
<td>FY10</td>
<td>648</td>
<td>470</td>
</tr>
<tr>
<td>FY11</td>
<td>645</td>
<td>468</td>
</tr>
<tr>
<td>FY12</td>
<td>726</td>
<td>493</td>
</tr>
<tr>
<td>FY13</td>
<td>356</td>
<td>531</td>
</tr>
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    - National Institutes of Health, AHRQ, HRSA
    - Voluntary Health Organizations, Professional Societies, Foundations, Industry, Other

- **Planning & Organizing a Research Proposal**
NIH: one round of applications

http://www3.cancer.gov/admin/gab/02gpb/nci_grants_bk.pdf

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When Preparing an 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
- Discuss “challenges” and how these will be addressed (e.g., alternate approaches)
- Include well-designed tables and figures
- Present an organized, lucid write-up
- Ask colleagues to review and comment
Elements of a Good Proposal

- Feasible
- Relevant
- Unique
- Innovative
- Clear
- Brief
- Consistent
Anticipate Questions and Answer them before they are asked.

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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
Good Luck!