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

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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**

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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

**Short term Training**
- Medical School

**Research Support**
- Internship/Residency

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

**Instructor/Assistant Professor**
- Year-long Enhancement Programs
  - MD/PhD Fellowship or Institutional T32

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

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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

Timeline of NIH Funding for Junior Investigators

- **Medical School**
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  - Research Support

- **Fellowship – Research Years**
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- **Instructor/Assistant Professor**
  - Year-long Enhancement Programs
    - MD/PhD Fellowship or Institutional T32
  - 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
  - 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
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.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

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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

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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

- **Short term Training**
  - Medical School

- **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

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

![Graph showing the number of awards over fiscal years with different codes for various types of awards.]
<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>
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<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>
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<td>NHLBI</td>
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<td>Applications - Number</td>
<td>Research Grants - Career Awards</td>
<td>K23</td>
<td>New</td>
<td>86</td>
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<td>NHLBI</td>
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<td>Awards - Number</td>
<td>Research Grants - Career Awards</td>
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<td>New</td>
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<td>NHLBI</td>
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<td>Awards - Number</td>
<td>Research Grants - Career Awards</td>
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<td>New</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>
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<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>
</tr>
<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>
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<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

- **Medical School**
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- **Fellowship – Research Years**
  - Institutional K12 Career Development Slot

- **Instructor/Assistant Professor**
  - Individual Mentored K Career Development Award
  - Career Transition Awards

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

CTSA Awards: A Home for Clinical and Translational Science

Source: Zerhouni (NIH) [9/06]
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.

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]
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.
NIH Career Development Support to Independent Research Funding

K08/K23 → Independent Grant

K12 | K23
K12 | K23
K08/K23

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 (4yrs – 5yrs)
Renewable (e.g. original grant + 2 renewals = 15yrs)
Timeline of NIH Funding for Junior Investigators

Medical School
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Instructor/Assistant Professor
- Instructor/Assistant Professor
  - Career Transition Awards
  - Individual Mentored K Career Development Award

NIH Loan Repayment Program

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
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

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NIH’s Extramural Loan Repayment Program

Extramural Programs

- Clinical Research
- Health Disparities Research
- Clinical Researchers from Disadvantaged Backgrounds
- Pediatric Research
- Contraception and Infertility Research
<table>
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<tr>
<th>LRP</th>
<th>Awards</th>
<th>Funding</th>
<th>Mean Award</th>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>Clinical Research</td>
<td>819</td>
<td>$40,205,320</td>
<td>$49,091</td>
<td>$31,587</td>
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<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>
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<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>
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<td>Contraception and Infertility Research</td>
<td>15</td>
<td>$1,015,621</td>
<td>$67,708</td>
<td>$32,744</td>
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<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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</table>
### NIH Extramural Loan Repayment Programs FY 2014

#### Applications, Awards, and Success Rates by Program

<table>
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<tr>
<th>LRP</th>
<th>New + Renewal</th>
<th></th>
<th></th>
<th>New</th>
<th></th>
<th></th>
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<th>Renewal</th>
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<tbody>
<tr>
<td></td>
<td>Applications</td>
<td>Awards</td>
<td>Success</td>
<td>N</td>
<td>n</td>
<td>Success</td>
<td>N</td>
<td>Awards</td>
<td>n</td>
<td>Success</td>
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<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>
<td></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>
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<td>Health Disparities Research</td>
<td>505</td>
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<tr>
<td>Clinical Research for Individuals from Disadvantaged Backgrounds</td>
<td>42</td>
<td>17</td>
<td>40</td>
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<td>10</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>
<td></td>
</tr>
</tbody>
</table>
LRP: Clinical Research
– New Applications –

![Bar chart showing applications and awards from FY08 to FY13](chart.png)
LRP: Clinical Research – Renewal Applications -

![Bar chart showing applications and awards from FY08 to FY13](chart.png)

- Applications: FY08 - 710, FY09 - 675, FY10 - 648, FY11 - 645, FY12 - 726, FY13 - 531

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

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, 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

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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!