Disclosure Information

A) Relationship with companies who manufacture products used in the treatment of the subjects under discussion
   Yes____  No __X__  If "Yes," list company(ies) with the relationship(s) below.

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<thead>
<tr>
<th>Relationship</th>
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<td>Research Support</td>
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<td>Other Financial Support</td>
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<td>Large Gift(s)</td>
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B) Relationships with any of the commercial supporters of this CME activity:  No

C) Discussion of unlabeled uses:  Yes _____  No__X____
Topics to be Discussed

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

- Types of Awards
  - Fellowships (F’s), Training grants (T’s), Career Transition Awards, Research grants,

- Approaches for Competitive Applications
  - Planning & Organizing Research and Career Development Proposals
Topics to be Discussed

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

- **Types of Awards**
  - Fellowships (F’s), Training grants (T’s), Career Transition Awards, Research grants,

- **Approaches for Competitive Applications**
  - Planning & Organizing Research and Career Development Proposals

National Institutes of Health

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

Jaime S. Rubin, Ph.D.; http://grantcourse.columbia.edu
Topics to be Discussed

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

- **Types of Awards**
  - Fellowships (F’s), Training grants (T’s), Career Transition Awards, Research grants,

- **Approaches for Competitive Applications**
  - Planning & Organizing Research and Career Development Proposals

Types of Awards

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

Not All Funding Opportunities Are the Same

- **Different mission statements**
  - 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
Timeline of Funding for Junior Investigators

- Short term Training
- Research Support

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

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

Residents - Research

**American Medical Association Foundation**
- Cardiovascular/pulmonary diseases, HIV/AIDS, and pancreatic cancer ($2,500)
- Neoplastic diseases ($5,000)

**American College of Gastroenterology / ACG Institute for Clinical Research & Education**
- Clinical Research Awards: $50,000 and $15,000

**Stony Wold-Herbert Fund**
- Training Fellowships in the field of lung/respiratory diseases, including tuberculosis; Support for physicians entering the third post-graduate or late year of training
Residents – Research/Travel

- **Rheumatology Research Foundation**
  - Ephraim P. Engleman Endowed Resident Research Preceptorship/Resident Research Preceptorship Award ($15,000)
  - Medical and Pediatric Resident Research Award (to attend the annual meeting)

- **American Society of Hematology**
  - HONORS (Hematology Opportunities for the Next Generation of Research Scientists) - $5,000 stipend to conduct research and $1,000 each year for two years to attend the ASH annual meeting
Residents - Travel

American Heart Association:

Travel Stipends to Scientific Sessions

- Council on Arteriosclerosis, Thrombosis and Vascular Biology (ATVB)
- Council on Basic Cardiovascular Sciences (BCVS)
- Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation (3CPR)
- Council on Clinical Cardiology (CLCD)
- Council on Functional Genomics and Translational Biology (FGTB)
- Council on Peripheral Vascular Disease (PVD)
Timeline of Funding for Junior Investigators

- **Medical School**
- **Short term Training**
- **Research Support**
- **Fellowship – Research Years**
- **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

Do your fellowship programs of interest have a T32?
DoM NIH Training Grants

- Columbia University Training Program in **Lung Science** [J. Bhattacharya (Pulmonary)]
- Training Program in **Endocrinology and Metabolism** [J. Bilezikian (Endocrinology)]
- Molecular **Oncology** Training Program [S. Emerson and G. Schwartz (Hematology and Oncology)]
- Precision Medicine Research in **Nephrology** [A. Gharavi and J. (Nephrology)]
- Postdoctoral Training in **Arteriosclerosis** Research [H. Ginsberg (Preventive Medicine)]
DoM NIH Training Grants

- Columbia Integrated Training Program in **Infectious Disease** Research
  [S. Hammer/F. Lowy (Infectious Diseases)]

- 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)]
CU Irving Institute/CTSA Funding Programs

- **TRANSFORM TL1 Postdoctoral Precision Medicine Training Program:** Two-year mentored training program combining integrated didactic training, mentoring, and multidisciplinary research.

- **Precision Medicine Research Fellowship:** Two-year program to train physicians/researchers to use genomics and complex clinical data to improve clinical care and clinical outcomes by tailoring prevention, screening, and medical interventions based upon individual patient characteristics.
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

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Post-doc: Individual Fellowships

Non-government, non-profit agencies

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

- Voluntary Health Organizations, Foundations, Professional Societies -

- American Association for the Study of Liver Disease
- American College of Cardiology Foundation/Merck
- American Heart Association (Founders)
- American Kidney Fund
- American Liver Foundation
- ASN Foundation for Kidney Research
- Conquer Cancer Foundation/American Society of Clinical Oncology
- Daland Fellowships in Clinical Investigation
- New York Academy of Medicine

American Heart Association (Founders Affiliate)

- Postdoctoral Fellowship Program
- Cardiovascular and stroke research
- Basic, clinical, and population research

Funding
- Stipend: $47,484-$58,560
- Fringe Benefits: $1,000 (Health insurance)
- Project support: $3,000

Award Duration: 2 years

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Timeline of Funding for Junior Investigators

- **Short term Training**
  - Medical School

- **Research Support**
  - Internship/Residency

- **Fellowship – Research Years**
  - Fellowship – Research Years

- **Instructor/Assistant Professor**

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

**Career Transition Awards**
- Individual Post-doc Fellowship or Institutional T32 Post-doc Training Grant slot

NIH: Pathway to Independence 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.

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
1-2 years as a mentored K award for “post-docs”
- Funding level is Institute-specific
  - Salary (plus fringe benefits), 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
Research Career Development Awards

The purpose of the NIH Pathway to Independence Award (K99/R00) program is to increase and maintain a strong cohort of new and talented, NIH-supported, independent investigators. This program is designed to facilitate a timely transition of outstanding postdoctoral researchers with a research and/or clinical doctorate degree from mentored, postdoctoral research positions to independent, tenure-track or equivalent faculty positions. The program will provide independent NIH research support during this transition in order to help awardees to launch competitive, independent research careers.

Prospective candidates are encouraged to contact the relevant NIH staff for IC-specific programmatic and budgetary information: Table of IC-Specific Information, Requirements and Staff Contacts.

5. NIH should establish a new physician-scientist-specific granting mechanism to facilitate the transition from training to independence. This program should be similar to the K99/R00 program whose funding currently goes almost exclusively to individuals holding a PhD degree. This new grant program could serve either as a replacement or transition from existing K Awards for physician scientists, and should provide a longer period of support, potentially lengthening the R00 phase to 5 years (with an interim staff review at year 3). This new grant series, as well as K and all other training awards, should rigorously enforce protected time of at least 75 percent effort and provide sufficient salary support to make that possible.
Additional Information for Physician-Scientists

For the purposes of this program, physician-scientists include individuals with an MD, DO, DDS/DMD, DVM/VMD, or nurses with research doctoral degrees who devote the majority of their time to biomedical research. The K99/R00 is intended for those physician-scientists who already have substantial research training and are dedicated to initiating a strong, research-intensive career as physician-scientists. The K99/R00 program is designed to facilitate a timely transition of outstanding physician-scientists from mentored, research positions to independent, tenure-track or equivalent faculty positions, and to provide independent NIH research support during the transition. Individuals who need a longer period of mentored career development before they are prepared to begin the transition to research independence should consider the K08 or K23 program (see: K Kiosk).

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

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

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

Career Transition Awards

Instructor/Assistant Professor

Individual Mentored K Career Development Award

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

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
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
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
Mentored Research Scientist Development Awards (K01)

- **NCI, NHLBI:**
  - Underrepresented faculty

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

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

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

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

- **IFIC:**
  - International Research Scientist Development Award (IRSDA)
## Mentored Career Development Award in Biomedical Big Data Science for Clinicians and Doctorally Prepared Scientists (K01)

<table>
<thead>
<tr>
<th>National Human Genome Research Institute (NHGRI)</th>
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<tbody>
<tr>
<td>National Cancer Institute (NCI)</td>
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<td>National Eye Institute (NEI)</td>
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<td>National Institute on Aging (NIA)</td>
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<td>National Institute of Allergy and Infectious Diseases (NIAID)</td>
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<td>Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)</td>
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<td>National Institute on Deafness and Other Communication Disorders (NIDCD)</td>
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<td>National Library of Medicine (NLM)</td>
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<td>National Center for Complementary and Alternative Medicine (NCCAM)</td>
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<td>Office of Behavioral and Social Sciences Research (OBSSR)</td>
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<td>Office of Strategic Coordination (Common Fund)</td>
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**RFA-HG-14-007**

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<th>Fiscal Year</th>
<th>Activity Code</th>
<th>NIH Institute / Center</th>
<th>Number of Applications Reviewed</th>
<th>Number of Applications Awarded</th>
<th>Success Rate</th>
<th>Total Funding</th>
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<td>K23</td>
<td>NCI</td>
<td>22</td>
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<td>NIDDK</td>
<td>73</td>
<td>33</td>
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**2015** K23 Activity Total: **589** Applications Reviewed, **206** Applications Awarded, **35.0%** Success Rate, **$33,702,155** Total Funding

*Research Portfolio Online Reporting Tools (RePORT) [nih.gov/success_rates/index.aspx](http://nih.gov/success_rates/index.aspx)*  
Agency for Healthcare Research and Quality

- **AHRQ K08:** Mentored Clinical Scientist Research Career Development Award
  - Quality,
  - Safety,
  - Efficiency,
  - Effectiveness of health care

- **AHRQ K08:** Patient-Centered Outcomes Research (PCOR) Mentored Clinical Investigator Award

- **AHRQ K01:** Patient-Centered Outcomes Research (PCOR) Mentored Research Scientist Development Award

Centers for Disease Control and Prevention

- **CDC K01:**
  - National Institute for Occupational Safety and Health
  - Mentored Research Scientist Development Award
    - “career development experience in occupational health and safety research leading to research independence”

Research Career Development/Scholar Programs

Non-government, non-profit agencies

- Voluntary Health Organizations
- Professional Societies
- Private Foundations
Research Career Development/Scholar Programs

- AGA Research Foundation
  - Junior Investigator Research Award
- 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

Timeline of Funding for Junior Investigators

**Medical School**
- Short term Training

**Internship/Residency**
- Research Support
  - Individual Post-doc Fellowship or Institutional T32 Post-doc Training Grant slot

**Fellowship – Research Years**
  - Year-long Enhancement Programs
    - MD/PhD Fellowship or Institutional T32
  - Institutional K12 Career Development Slot

**Instructor/Assistant Professor**
- 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 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)

- **Multi-Institute**: Women’s Health
- **Institute specific**
  - NCI: Clinical oncology
  - NHLBI
    - Emergency Medicine
- **CTSA - Clinical and Translational Science Award**
NIH CTSA Awards:
A Home for Clinical and Translational Science

Source: Zerhouni (NIH) [9/06]
Mentored Clinical Scientist Development Program Award (K12)

- CTSA – Clinical and Translational Science Award
  - CUMC: TRANSFORM
    (Training and Nurturing Scientists for Research that is Multidisciplinary)

Research-Oriented Masters Degree Programs

- Comprehensive courses in clinical research/
  “Patient-Oriented Research” (POR)
  - Biostatistics, epidemiology, study design,
    bioethics, legal and regulatory issues
- For the career development of clinical investigators

CUMC Research Training/Didactic Programs

- **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 opportunities to gain foundational knowledge and applied skills for advancing population health research.
Timeline of Funding for Junior Investigators

Short term Training

Medical School

Research Support

Internship/Residency

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

NIH Loan Repayment Program

Jaime S. Rubin, Ph.D. 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

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
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
- Pediatric Research
- Health Disparities Research
- Clinical Researchers from Disadvantaged Backgrounds
- Contraception and Infertility Research

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<th>LRP</th>
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Career Development (K) Support to Research Grant (R01)

K01/K08/K23 ➔ R01

K12 | K23 ➔ R01

K12 | K23 ➔ R01

K01/K08/K23 ➔ R01

K12 ➔ R01

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

- Supports a discrete, specified project
- “Comprehensive” funding
- Modular budgets up to $250,000/year
- Multi-year
- Flexibility
- Most of the research that NIH supports 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
Research Project Grants: Applications, Awards, and Success Rates
## Challenging Times for All Researchers

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

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

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

Average Age
New R01 Investigator:
37.2

Sources: IMPAC II Current and History Files
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
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 RO1 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.

Young scientists lead the way on fresh ideas

Analysis of millions of papers finds that junior biomedical researchers tend to work on more innovative topics than their senior colleagues do.

Young researchers are much more likely than older scientists to study exciting innovative topics, according to a text analysis of more than 20 million biomedical papers published over the past 70 years. More-senior researchers are more likely to publish in hot areas when they are supervising a younger scientist.

**Young scientists go for fresh ideas.**

Callaway E.


---

Age and the Trying Out of New Ideas

Mikko Packalen, Jay Bhattacharya

NBER Working Paper No. 20920

http://www.nature.com/news/young-scientists-lead-the-way-on-fresh-ideas-1.16934
http://www.nber.org/papers/w20920

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Pairings of young first authors and mid-career last authors are the most likely to work on the hottest biomedical topics.

Share of publications trying out new ideas
- >23%
- 20–23%
- 17–20%
- <17%

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>Percentile</th>
<th>Priority Score</th>
<th>Description</th>
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<tr>
<td>R01</td>
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</tr>
<tr>
<td>ESI</td>
<td>24*</td>
<td></td>
<td>Early Stage Investigators</td>
</tr>
</tbody>
</table>

*Summary Statement issues must be satisfactorily resolved on applications >19 percentile.*

---

**FY16**


R01-Equivalent grants, New (Type 1) Success rates, by career stage of investigator
Topics to be Discussed

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

- Types of Awards
  - Fellowships (F’s), Training grants (T’s), Career Transition Awards, Research grants,

- Approaches for Competitive Applications
  - Planning & Organizing Research and Career Development Proposals
Approaches for Competitive Applications

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

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
NIH's Review Criteria

- **Overall Impact Score – Research Grant**
  - Reflects project’s potential to exert a sustained, powerful influence on the field(s) involved

- **Core Review Criteria - Research Grant**
  - Significance
  - Investigators
  - Innovation
  - Approach
  - Environment
Multiple Principle Investigators (research awards)

Multiple Mentors (mentored awards)

Advisors (mentored awards)

Co-investigators/Collaborations

Subcontracts to other institutions

Multidisciplinary/Interdisciplinary
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?

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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

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 “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
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 “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
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

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<thead>
<tr>
<th>Benchmarks/ Milestones</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
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<tr>
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<tr>
<td>Summary of Specific Aim 3</td>
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</table>
Anticipate Questions and Answer them before they are asked
Research Training Plan Section

3. Specific Aims
4. Research Strategy

Fellowship Applicant Section

2. Applicant's Background and Goals for Fellowship Training

Quote Investigator suggests crediting sociologist William Bruce Cameron
http://quoteinvestigator.com/2010/05/26/everything-counts-einstein/

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Personal Statement

When describing a previous research experience:

- What was the hypothesis/scientific question?
- What were the findings and conclusions?
- Why was the study important?
- What were your role and responsibilities?
- What did you learn and accomplish?
  - “Intellectual” aspects
  - Do not focus on technical aspects
Investigator

- Competent
- Enthusiastic
- Thorough
- Professional
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

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

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Bell Curve of Reviewer’s Grant Applications

Definitely do not fund

Fine

Definitely fund

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
Research Resources not Adequately Described

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