“The Joy of Research”

National Student Research Forum
April 23, 2015

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Dept. of Medicine
College of Physicians and Surgeons
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Take Home Messages

- Role Models are important
- Mentors are important
- Colleagues are important
- Be Open to New Ideas and Challenges
- Take Advantage of Unique Opportunities
- Networking – whether by accident or on purpose - is important
- Funding is Important
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,

- **Planning & Organizing a Research Proposal**
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Planning & Organizing a Research Proposal
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
- Medical School
- Internship/Residency
- Fellowship – Research Years
- Instructor/Assistant Professor

Medical Student: Short Term Training

- NIH
  - T35 training grant: Summer between 1\textsuperscript{st} and 2\textsuperscript{nd} years
  - NIH campus: Summer Internship Program
  - NIDDK: Medical Student Research Program in Diabetes

- AOA Honor Medical Society - Carolyn L. Kuckein Student Research Fellowships
  - For research in clinical investigation, basic research, epidemiology, and social sciences/health services research
Medical Student: Short Term Training

- **American Heart Association:**
  - Student Scholarships
    - Cardiovascular Disease
    - Cerebrovascular Disease and Stroke

- **American Medical Association Foundation**
  - Seed Grant Research Program
  - Supports research in: Cardiovascular/Pulmonary Diseases and Pancreatic Cancer

Medical Student: Short Term Training

- American Skin Association
  - Medical Student Grant
- American Society of Nephrology
  - Student Scholar Grant
- Crohn's and Colitis Foundation of America
  - Student Research Fellowship Awards
- Endocrine Society
  - Research Fellowships
- Infectious Diseases Society of America
  - Medical Scholars Program

Medical Student: Short Term Training

- HIV Vaccine Trials Network (HVTN)/Fred Hutchinson Cancer Research Center
  - Research and Mentorship Program (RAMP) Scholars
- Wilderness Medical Society
  - Charles S. Houston Grant
Timeline of Funding for Junior Investigators

Medical School

Internship/Residency

Fellowship – Research Years

Instructor/Assistant Professor

Short term Training

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

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Medical Student:
Year-long Enhancement Programs

- NIH
  - Medical Research Scholars Program
    - Mentored basic, clinical, or translational research
  - Fogarty International Center
    - Global Health Program for Fellows and Scholars
    - Fulbright-Fogarty Fellowships in Public Health
  - National Institute of Diabetes and Digestive and Kidney Diseases
    - Medical Student Research Training Program
  - National Institute of Environmental Health Sciences
    - Fellowships in Environmental Medicine for Medical Students

Medical Student: Year-long Enhancement Programs

- **Centers for Disease Control & Prevention**
  - CDC-Hubert Global Health Fellowship

- **Doris Duke Charitable Foundation**
  - International/Global Health

- **Hughes (Howard) Medical Institute**
  - Medical Research Fellows Program
    - Academic or Nonprofit Research Institution
    - Janelia Research Campus (VA)
    - KwaZulu-Natal Research Institute for Tuberculosis and HIV (K-RITH) (Durban, South Africa)

Medical Student: Year-long Enhancement Programs

- American Diabetes Association
  - Clinical Scholars Award
- American Heart Association
  - Medical Student Research Program (Founders Affiliate)
- American Society of Nephrology
  - Student Scholar Grant
- Research to Prevent Blindness
  - Medical Student Fellowships
- Sarnoff Endowment for Cardiovascular Science
  - Fellowship Training Program

Timeline of Funding for Junior Investigators

- **Short term Training**
  - Medical School

- **Research Support**
  - Internship/Residency
  - Fellowship – Research Years
  - Instructor/Assistant Professor

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

Residents

- American Academy of Otolaryngology - Head and Neck Surgery
  - Resident Research Grant

- American Academy of Pediatrics
  - Resident Research Grant

- American College of Gastroenterology
  - Clinical Research Awards

- American College of Surgeons
  - Resident Research Scholarship

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Timeline of Funding for Junior Investigators

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

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

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

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Timeline of Funding for Junior Investigators

- Individual Fellowship Training Grant
- Mentor’s Research Grant

Graduate School

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

Post-doctoral Years

Instructor/Assistant Professor

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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

Do your fellowship programs of interest have a T32?

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Post-doc: Individual Fellowship

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

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

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Post-doc Fellowships (F32s)
Applications, awards, and success rates

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Training Grants and Fellowships: Pre- and Post-Doctoral Positions
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

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Timeline of Funding for Junior Investigators

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

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

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

- Career Transition Awards

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Timeline of Funding for Junior Investigators

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

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

Instructor/Assistant Professor
- Career Transition Awards

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Career Transition Award

- 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.
1-2 years as a mentored K award for “post-docs”

- Funding level is Institute-specific
  - NHLBI, NIDDK, NIA, NICHD: $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

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 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
Career Transition Awards
Individual Mentored K Career Development Award

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

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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
  - e.g. NIDDK: $90K, NCI: $100K
- 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
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)

- **Many Institutes**: Big Data Science
- **NIMH**
  - 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
- **NCI, NHLBI, NINDS**: Underrepresented faculty
- **NIAID**:
  - (a) Epidemiology
  - (b) Modeling Techniques
  - (c) Outcomes Research

Mentored Research Scientist Development Awards (K01)

- **NIDDK:**
  - Advanced postdoctoral and/or newly independent research scientists

- **NHLBI:**
  - (a) Epidemiology
  - (b) Biostatistics
  - (c) Comparative effectiveness

- **NHGRI**
  - (a) Genomics, proteomics, population genomics
  - (b) Ethical, legal and social issues (ELSI)

- **NIA: Aging and Health Disparities Research**
Mentored Research Scientist Development Awards (K01)

- **NINR**
  - (a) Symptom management
  - (b) Pulmonary, critical care, trauma
  - (c) Reproductive health
  - (d) 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 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)
Research Career Development Awards
- **AHRQ K08**: Mentored Clinical Scientist Research Career Development Award Health Services Research
  - Safety and Quality
  - Effectiveness
  - Efficiency

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

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

- Basic, behavioral, and applied sciences
- Health promotion
- Disease prevention
- Injury and disability prevention
- Health protection from infectious, environmental and terrorist health threats
Research Career Development/Scholar Programs

- AGA Research Foundation
  - Research Scholar Awards
- American Heart Association
  - Scientist Development Grant
- Damon Runyon Cancer Research Foundation
  - Clinical Investigator Award
- Doris Duke Charitable Foundation
  - Clinical Scientist Development Grant
Timeline of Funding for Junior Investigators

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

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

Institutional K12 Career Development Slot

Career Transition Awards

Individual Mentored K Career Development Award

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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)

- **Multi-Institute:** Women’s Health
- **Institute specific**
  - NCI: Clinical oncology
  - NEI: Clinical vision scientists
  - NIDDK: Pediatric diabetes research
  - NICHD:
    - Pediatric scientist/Child health
    - Rehabilitation research
    - Reproductive health

Mentored Clinical Scientist Development Program Award (K12)

- **Institute specific**
  - NIDCR: Temporomandibular joint disorders and orofacial pain
  - NHLBI
    - Clinical hematology/Transfusion medicine
    - Emergency Medicine
  - NIDA: Drug abuse and addiction
  - NINDS: Neurological sciences, Neuro Surgery

- **CTSA - Clinical and Translational Scientist Award**

NIH CTSA Awards:
A Home for Clinical and Translational Science

Source: Zerhouni (NIH) [9/06]
Institutional Clinical Research Curriculum Award (CRCA) (K30)

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

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Timeline of Funding for Junior Investigators

Short term Training

Medical School

Research Support

Internship/Residency

Fellowship – Research Years

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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

Individual K12 Career Development Slot

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

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

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Percent of Total Awards by LRP

- Clinical Research (57%)
- Pediatric Research (25%)
- Health Disparities Research (16%)
- Contraception and Infertility Research (2%)
- Clinical Research for Individuals from Disadvantaged Backgrounds (1%)
### NIH Extramural Loan Repayment Programs FY 2012

#### Funding

**New and Renewal by Program**

<table>
<thead>
<tr>
<th>LRP</th>
<th>New</th>
<th>Renewal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Awards</td>
<td>Funding</td>
<td>Awards</td>
</tr>
<tr>
<td>Pediatric Research</td>
<td>168</td>
<td>$11,560,880</td>
<td>214</td>
</tr>
<tr>
<td>Health Disparities Research</td>
<td>122</td>
<td>$6,108,530</td>
<td>120</td>
</tr>
<tr>
<td>Clinical Research for Individuals from Disadvantaged Backgrounds</td>
<td>9</td>
<td>$624,407</td>
<td>10</td>
</tr>
<tr>
<td>Contraception and Infertility Research</td>
<td>18</td>
<td>$996,637</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>706</td>
<td>$42,629,607</td>
<td>848</td>
</tr>
</tbody>
</table>

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**Note:** The table above provides a breakdown of new and renewal awards and funding for various NIH Extramural Loan Repayment Programs for FY 2012, with a focus on Clinical Research.
<table>
<thead>
<tr>
<th>LRP</th>
<th>New</th>
<th>Renewal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Applications</td>
<td>Awards</td>
<td>Success Rate</td>
</tr>
<tr>
<td>Clinical Research</td>
<td>959</td>
<td>389</td>
<td>41%</td>
</tr>
<tr>
<td>Pediatric Research</td>
<td>467</td>
<td>168</td>
<td>36%</td>
</tr>
<tr>
<td>Health Disparities Research</td>
<td>338</td>
<td>122</td>
<td>36%</td>
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<tr>
<td>Clinical Research for Individuals from Disadvantaged Backgrounds</td>
<td>23</td>
<td>9</td>
<td>39%</td>
</tr>
<tr>
<td>Contraception and Infertility Research</td>
<td>48</td>
<td>18</td>
<td>38%</td>
</tr>
<tr>
<td>Total</td>
<td>1,835</td>
<td>706</td>
<td>38%</td>
</tr>
</tbody>
</table>
Career Development (K) Support to Research Grant (R01)

K01/K08/K23 → R01

K12 → K23 → R01

K12 → K23 → R01

K01/K08/K23 → R01

K12 → R01

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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)

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R01 Research Grant

- 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 Project Grants: Applications, Awards, and Success Rates

![Graph showing the number of applications, awards, and success rates over fiscal years from 1995 to 2014. The graph indicates an increase in applications and awards over time, with a corresponding decrease in success rates.](http://grantscourse.columbia.edu)
## 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
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)]

http://nexus.od.nih.gov/all/2012/02/03/our-commitment-to-supporting-the-next-generation

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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

Percent of PIs

Age

Sources: IMPAC II Current and History Files

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

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Preliminary Projection of Age Distribution of NIH RPG Investigators: 2020

Sources: IMPAC II Current and History Files and Preliminary Demographic Projection Model
Young, Brilliant and Underfunded

By ANDY HARRIS

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

Comments

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.
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.

[Links to papers and additional resources]

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**Young scientists go for fresh ideas.**

Callaway E.


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**Age and the Trying Out of New Ideas**

Mikko Packalen, Jay Bhattacharya

* NBER Working Paper No. 20920

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

**HOT SPOT**

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>
</tr>
</thead>
<tbody>
<tr>
<td>RO1</td>
<td>11.0</td>
<td></td>
<td>Research Project Grant</td>
</tr>
<tr>
<td>ESI</td>
<td>21.0*</td>
<td></td>
<td>Early Stage Investigators</td>
</tr>
<tr>
<td>R21</td>
<td>11.0</td>
<td></td>
<td>Innovative Research Grants</td>
</tr>
</tbody>
</table>

*Summary Statement issues must be satisfactorily resolved on applications >16 percentile.

**FY15**

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
  - 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,

- Planning & Organizing a Research Proposal
NIH: one round of applications
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
Collaborations
Subcontracts
Multiple Principle Investigators
  Now permitted by NIH
Co-investigators
Multidisciplinary/Interdisciplinary
Investigator

- Competent
- Enthusiastic
- Thorough
- Professional
Anticipate Questions
and
Answer them before
they are asked
Bell Curve of Reviewer’s Grant Applications

Poor Statistics
Research Resources
not Adequately Described
Career Development/Research Training Plan
not Comprehensive

Jaime S. Rubin, Ph.D.; http://grantscourse.columbia.edu
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All Components of the Application are as Strong as Possible
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!