Career Development and Research Funding/Grantsmanship for Junior Investigators

- Department of Medicine -
Fellows Career Guidance Breakfast: Academic and Research Careers

December 1, 2017

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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**
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

Types of Awards

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- Loan Repayment Program
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- Subcontracts
- Contracts
- Loan Repayment Program

Timeline of NIH 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

**Research Support**

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

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

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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. Barasch (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)]
CUMC: NIH Institutional Training Grants

- Irving Institute/CTSA: TRANSFORM TL1 Training Program supports Post-Doctoral Fellows (and PhD or MD/PhD students) (W. Chung)
- Biomedical Informatics (G. Hripcsak)
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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Post-doc: Individual Fellowship

- Voluntary Health Organizations, Foundations, Professional Societies -

- **American Association for the Study of Liver Diseases/AASLD Foundation**
  - Advanced/Transplant Hepatology 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**
  - 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 -

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

- **Rheumatology Research Foundation**
  - Scientist Development Award

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

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Timeline of NIH 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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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
  - 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

[Bar chart showing the number of awards from 1997 to 2016, with different types of awards represented by different colors.]

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.
Notice of Reissuance of the NIH Pathway to Independence Award (Parent K99/R00)

Notice Number: NOT-OD-16-049

Key Dates
Release Date: January 8, 2016

Implementation
In response to the Physician Scientist Workforce Working Group recommendations, NIH is reissuing the K99/R00 FOA to provide additional information for physician-scientists who may wish to apply for this program. Specifically:

- **Section I. Funding Opportunity Description**: A separate section has been added under "Additional Information for Physician-Scientists" to further clarify features of K99/R00 program suited to physician scientists, and to provide guidance to applicants with respect to career stage and timing of the application.
- **Section III. Eligibility Information**: A separate section has been added under "Physician-Scientists in positions not designated as postdoctoral positions" to provide additional guidance on the differences between independence in clinical responsibilities and independence in research. In addition, more specific guidance is provided under "Level of Effort" and "Mentor(s)" sections.
- **Section VI. Award Administration Information**: Under the section "Transition to the Independent Phase" additional guidance is provided regarding institutional commitment to the awardee during the R00 phase of the award and beyond.
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).
The purpose of the NIAID Physician-Scientist Pathway to Independence Award (K99/R00) program is to increase and maintain a strong cohort of new and talented independent physician-scientists. This program is designed to facilitate a timely transition of outstanding postdoctoral researchers with a clinical doctorate degree from mentored, postdoctoral research positions to independent, tenure-track or equivalent faculty positions. The program will provide independent NIAID research support during this transition to help awardees launch competitive, independent research careers in biomedical fields and thereby help to address the national physician-scientist workforce shortage.
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 NIH 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

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

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
<table>
<thead>
<tr>
<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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<tbody>
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<td>K23</td>
<td>NCI</td>
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2016 K23 Activity Total 575 207 36.0% $35,665,755
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<td>46</td>
<td>49%</td>
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<td>90</td>
<td>38</td>
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<td>K23</td>
<td>NHLBI</td>
<td>89</td>
<td>39</td>
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<td>36</td>
<td>38.3%</td>
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<td>2016</td>
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<td>NHLBI</td>
<td>101</td>
<td>45</td>
<td>44.6%</td>
<td>$8,086,510</td>
</tr>
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Research Career Development/Scholar Programs

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

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

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

- **American Heart Association**
  - Career Development Award
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
  - Harold Amos Medical Faculty Development Program Award

- **Damon Runyon Cancer Research Foundation**
  - Clinical Investigator Award
Research Career Development/Scholar Programs

- **Doris Duke Charitable Foundation**
  - Clinical Scientist Development Award

- **Rheumatology Research Foundation**
  - Scientist Development Award

- **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

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

- **Instructor/Assistant Professor**
  - Instructor/Assistant Professor
    - Institutional KL2/K12 Career Development Slot

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

- **Career Transition Awards**
  - Career Transition Awards

- **Individual Mentored K Career Development Award**
  - Individual Mentored K Career Development Award

Mentored Clinical Scientist Development Program Award (K12)

- Support to an institution for the career development experiences of 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.
CTSA Awards:
A Home for Clinical and Translational Science

CTSA HOME

Trial Design

Advanced Degree-Granting Programs

Participant & Community Involvement

Regulatory Support

Biostatistics

Clinical Resources

Clinical Research Ethics

Biomedical Informatics

NIH

Industry

Other Institutions

Source: Zerhouni (NIH) [9/06]

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Mentored Clinical Scientist Development Program Award (KL2)

- CTSA - Clinical and Translational Scientist Award
- CUMC TRANSFORM Scholars Mentored Career Development program
  [Training and Nurturing Scientists for Research that is Multidisciplinary]

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CTSA Awards: A Home for Clinical and Translational Science

Source: Zerhouni (NIH) [9/06]
Research-Oriented Masters Degree Programs

- Comprehensive didactic training for conducting clinical and translational research
- “Patient-Oriented Research” (POR)
  - Two-year, 30-credit M-SPH degree
  - Biostatistics, epidemiology, study design, bioethics, legal and regulatory issues
- For the career development of clinical investigators

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CU Irving Institute/CTSA Funding Programs

- Irving Institute/CTO Pilot Awards:
- Imaging Pilot Awards
- Collaborative and Multidisciplinary Pilot Research Awards (CaMPR)
- Bench to Bedside Award (formally CaMPR-BASIC)
- Health Practice Research Awards
- Personalized Medicine Pilot Awards
- Integrating Special Populations
- Translational Therapeutics (TRx) Awards
- Community-Based Participatory research Training Pilot Awards Program
CU Irving Institute/CTSA
Funding Programs

- **TL1 Program**: TRANSFORM TL1 Training Program supports Post-Doctoral Fellows (and PhD or MD/PhD students)

- **KL2 Program**: TRANSFORM KL2 Scholars Mentored Career Development program

- **Irving Scholars**: Dept. of Medicine is usually permitted to nominate up to four candidates each year
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.

Reach for the First R01 Course: Participants receive five free hours of biostatistical consulting, access to CTSA resources, two expert pre-reviews on an early R01 draft application, and bi-monthly closely-monitored meetings.
CU Funding Programs

- **Irving Scholars**: Florence and Herbert Irving Clinical Research Career Awards
  - 3-year program, $60,000 per year

- **Louis V. Gerstner, Jr. Scholars Program**
  - 3-year program, $75,000 per year
  - Supports physicians who are on a research track and conduct translational research designed to bring new treatments to patients

- **Paul A. Marks Scholars Program**
  - 3-year program, $100,000 per year
  - Supports outstanding young physician scientists
Dept. of Medicine Funding Programs

- **Burch-Lodge Scholars Program**
  - Supports a junior investigator near the end of their clinical fellowship and also their transition to a junior faculty position in the Dept. of Medicine
  - Initial year: 1 award of $60,000 - $30,000 in the final months of fellowship and $30,000 after they have been appointed as a new faculty member

- **M. Irené Ferrer Scholar Award in Gender-Specific Medicine**
  - One award of $60,000 is available annually
  - Eligibility: Assistant Professor in the Dept. of Medicine
  - Proposed research should include gender as a specific variable in the protocol
NIH Career Development Support to Independent Research Funding

K08/K23 → Independent Grant

KL2 | K23 → Independent Grant

KL2 | K23 → Independent Grant

K08/K23 → Independent Grant

KL2 → Independent Grant

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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

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

Medical School

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

Institutional KL2/K12 Career Development Slot

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

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

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<table>
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<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Applications</strong></td>
<td>3,516</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of Awards</strong></td>
<td>1,580</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Success Rate</strong></td>
<td>45%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Mean Award</strong></td>
<td>$66,964</td>
<td></td>
<td></td>
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<tr>
<td><strong>Mean Age of Awardees</strong></td>
<td>35 Years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Funding</strong></td>
<td>$105,802,834</td>
<td></td>
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</tr>
</tbody>
</table>
Applications & Awards by Degree

- **MD**
  - 2013: 400
  - 2014: 300
  - 2015: 200
  - 2016: 100

- **PhD**
  - 2013: 400
  - 2014: 300
  - 2015: 200
  - 2016: 100

- **MD+PhD**
  - 2013: 40
  - 2014: 30
  - 2015: 20
  - 2016: 10

- **Other**
  - 2013: 60
  - 2014: 50
  - 2015: 40
  - 2016: 30

Success Rate by Degree

- MD
- PhD
- MD+PhD
- Other

Percent of Applicants
- 2013: 50%
- 2014: 60%
- 2015: 70%
- 2016: 80%

Fiscal Year

- 2013
- 2014
- 2015
- 2016

**Sources:**
- https://www.lrp.nih.gov/data-reports
- http://grantscourse.columbia.edu

Jaime S. Rubin, Ph.D.
ADVISORY COMMITTEE TO THE DIRECTOR

Physician-Scientist Workforce

6. NIH should expand Loan Repayment Programs and the amount of loans forgiven should be increased to more realistically reflect the debt burden of current trainees. This program should also be made available to all students pursuing biomedical physician-scientist researcher careers, regardless of particular research area or clinical specialty.

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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**
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?

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NIH's Career Development Grant - Review Criteria -

- **Overall Impact Score**
  - “Enhance the candidate’s potential for a productive, independent scientific research career”

- **Core Review Criteria**
  - Candidate
  - Career Development Plan/Career Goals & Objectives
  - Research Plan
  - Mentor(s), Co-mentor(s), Consultant(s), Collaborator(s)
  - Environment and Institutional Commitment to the Candidate

Research and Career Development Arrangements

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

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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** reviewers “will know what you mean”
- Refer to **literature** thoroughly and thoughtfully
- Explicitly state the **rationale** of the proposed investigation (“the hypothesis of my study is…”)
- Discuss **limitations** and potential “challenges” and how these will be addressed (e.g., “alternate approaches”)
- Include well-designed **tables and figures**
- Present an **organized** research/career development plan (use an **outline**)
- Ask colleagues to **review** and comment
Complete the Grant Application

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

- Include explanatory caption with the figure (not buried in text)
- Not overly complicated
- Informative, even if printed in black and white
- Easy for the reviewers to read

Tips:
- Bold label in text (e.g., Fig. 4) so it’s easier for reviewers to locate relevant text for individual Figure
- Try to have Figure and relevant text on the same page
# Timeline for Specific Aims and Benchmarks/Milestones of Research Progress

<table>
<thead>
<tr>
<th>Benchmarks/ Milestones</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of Specific Aim 1a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary of Specific Aim 1b</td>
<td></td>
<td></td>
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<tr>
<td>Summary of Specific Aim 2a</td>
<td></td>
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<tr>
<td>Summary of Specific Aim 2b</td>
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<tr>
<td>Summary of Specific Aim 3</td>
<td></td>
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</tr>
</tbody>
</table>
Anticipate Questions
and
Answer them before
they are asked
Not everything that can be counted counts.
Not everything that counts can be counted.

Research Training Plan Section
3. * Specific Aims
4. * Research Strategy

Fellowship Applicant Section
2. * Applicant's Background and Goals for Fellowship Training

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

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Investigator

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

When describing a previous research experience:

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

Possible Problems Specific for Mentored Fellowship Awards

Mentor

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

**Institution**

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

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

- Does not address/follow funding agency’s mission, specific instructions, budget limits, etc.
- Overly ambitious
- Not independent of previous mentor’s research
- Fishing expedition
- Not hypothesis driven
- Descriptive, not mechanistic project
- Unfocussed
- No or insufficient preliminary data
- Unrealistic budget
- Methodologies beyond the expertise of investigator or research team

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NIH: one round of applications
Pink Sheet: Reviewers’ Comments
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
Career Development/Research Training Plan
not Comprehensive
Figure Caption Font too Small
All Components of the Application are as Strong as Possible
Good Luck!