Strategies for Successful NIH Training Grant (T32) Proposals

July 20, 2012
NCURA Pre-Award Research Administration Conference

Jaime S. Rubin, Ph.D.
Dept. of Medicine
College of Physicians and Surgeons
Columbia University
NIH Training Grants

- **Timeline of funding for junior investigators**
- **Institutional National Research Service Award**
  - General description
  - No. of applications, awards, and success rate
- **Research**
- **Mentors**
- **Applicant pool**
- **Training program**
NIH Training Grants

- Didactics, career development, other activities
- Role of Institutions
- Tables
- NIH Review of Training Grant Applications
  - Role of NIH Institute
  - Scoring scale, Impact Scores
  - Review criteria
  - Payline
  - Resubmission: Responding to reviewers’ comments
- Online Databases for info on training grants
NIH Training Grants

- Timeline of funding for junior investigators
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Timeline of NIH Funding for Junior Investigators (M.D.’s)

**Medical School**
- T35 Training Grant
- Summer Research between 1st and 2nd Years

**Internship/Residency**
- NIH Doris Duke
- Howard Hughes

**Fellowship – Research Years**
- Individual F32 Post-doc Fellowship or Institutional T32 Post-doc Training Grant slot
- Pathway to Independence (PI) Award (K99/R00)

**Instructor/Assistant Professor**
- Institutional K12 Career Development Slot
- Individual Mentored K Career Development Award
Timeline of NIH Funding for Junior Investigators (Ph.D.’s)

Graduate School

- Individual Fellowship
- T32 Training Grant
- Mentor’s Research Grant

Post-doctoral Years

- Individual Post-doc Fellowship (F32) or Institutional T32 Post-doc Training Grant slot

Instructor/Assistant Professor

- Career Transition Awards

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NIH Training Grants

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Institutional National Research Service Award (T32)

- Institutions support selected trainees for research training in specified areas
- Defined number of slots
  - Pre-docs, post-docs, or both
- Provides, stipend, health fees, tuition, travel
NRSA Institutional Research Training Grants
Applications, awards, and success rates

![Bar chart showing applications, awards, and success rates over fiscal years 1998 to 2011.](chart)

- **Applications** (blue bars)
- **Awards** (green bars)
- **Success Rate (%)** (red line)
Research Project Grants
Applications, awards, and success rates

[Graph showing applications, awards, and success rates from 1995 to 2011]
NRSA Institutional Research Training Grants and Fellowships: Positions Awarded
NRSA Institutional Research Training Grants & Fellowships: Funding in current and constant dollars
NIH Training Grants

- Timeline of funding for junior investigators
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Research

- Thematic
- Multidisciplinary/Interdisciplinary
- Collaborative
- State-of-the-art
Research Area #1

Research Area #2

Research Area 3
Research Area #1

Research Area #2

Research Area #3
NIH Training Grants

- Timeline of funding for junior investigators
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- Mentors
- Applicant pool
- Training program
Mentors - 1

- Quality
  - NIH-funded
  - History of successfully mentoring pre-docs and post-docs
    - Past mentees currently hold academic positions with NIH funding
  - Publications in research areas
  - History of collaborations
Mentors - 2

- Quantity
  - “Critical mass” in research areas
  - Age distribution
    - Junior faculty w/o NIH funding: Possible co-mentors w/ more senior faculty
- Gender distribution
- Coincides with requested number of slots
NIH Training Grants

- Timeline of funding for junior investigators
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  - No. of applications, awards, and success rate
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- Training program
Applicant Pool

- **Quantity**
  - Training Grant Eligible [TGE]
  - Coincides with requested number of slots
- **Quality**
  - Past research experiences
  - Academic record
Applicant Pool – Numbers Matter

■ Quantity

■ Table 7B. Admissions Records for Postdoctoral Applicants:

  e.g. Table footnote: 870 total applicants. 25% (235) are interested in the 2-year research-training program. 80% of these individuals (192) are TGE. Numbers shown under “Applied” columns are only for those applicants interested in research program.

■ Quality

■ Table 8A. Qualifications of Recent Predoctoral Applicants requests info on undergraduate GPA’s and GRE and/or MCAT Scores
NIH Training Grants

- Timeline of funding for junior investigators
- Institutional National Research Service Award
  - General description
  - No. of applications, awards, and success rate
- Research
- Mentors
- Applicant pool
- Training program
Training Program - 1

- Formal organizational structure
  - Director(s)
    - Expertise and experience as leader and administrator
  - Associate Program Directors
  - Programmatic Committees
  - Advisory Committees
    - Internal and External
Training Program - 2

- Formal Processes
  - Recruitment/Admissions
    - Committee
    - Selection Process
    - Advertisement
    - Materials
    - Underrepresented Minorities
  - Trainees’ selection of mentors
  - Monitoring of trainees’ academic/research progress
  - Didactic program
  - Measurement/Evaluation of training program;
    e.g. outcomes, questionnaires for mentors and mentees
NIH Training Grants

- Didactics, career development, other activities
- Role of Institutions
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- Online Databases for info on training grants
Didactics, Career Development, and Other Activities

- Formal courses
- Retreat
- Seminars/Journal Clubs
- Research presentations
- Training in the Responsible Conduct of Research

Program-specific activities are important
NIH Training Grants

- Didactics, career development, other activities
- **Role of Institutions**
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Institution

- **Need**
  - Support for trainees not otherwise available
  - Support, resources, and commitment
  - Letters

- Training program integrated into research and academic infrastructure
NIH Training Grants

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Tables

- Very time- and labor-intensive
- Lots of different data elements on mentors, applicant pool, and past and current trainees
- Information from many different schools, departments, etc.
- Cannot start too early
Tables

- Data on mentors
  - Current funding
  - Current training grants
  - Historic data on past mentees

- Data on potential trainees
  - Past applicants to training program

- Data on previously/currently supported trainees
  - Outcomes:
    - Still in academic research?, Independent investigators?, NIH funded?
NIH Training Grants

- Didactics, career development, other activities
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NIH Review of Training Grant Applications

- Role of NIH Institute
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- Resubmission: Responding to reviewers’ comments

Online Databases for info on training grants
NIH Review of
Training Grant Applications

- NIH Review Processes
- Scoring Scale, Impact Scores
- Review Criteria
- Payline
- Resubmission: Responding to reviewers’ comments
Review Process for a Research Grant Application

National Institutes of Health

Research Grant Application

School or Other Research Center

- Initiates Research Idea
  - Submits Application

- Assigns to Study Section & Institute
  - Evaluates for Scientific Merit
    - Institute
      - Evaluates for Program Relevance
        - Advisory Councils and Boards
          - Recommends Action
            - Institute Director
              - Takes final action for NIH Director

Ctr for Scientific Review
<table>
<thead>
<tr>
<th>CSR</th>
<th>Institutes</th>
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<tbody>
<tr>
<td>• Research Grants (R01, R03)</td>
<td>• Multi-Project Grants (P01, P50, etc)</td>
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<td>• Fellowships (F’s)</td>
<td>• Training Grants (T’s)</td>
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<td>• Small Business</td>
<td>• Career Development (K’s)</td>
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<td>• Conference Grants (R13)</td>
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<td>• Research Grants in response to RFAs</td>
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<td>• Contracts</td>
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<td>National Institutes of Health</td>
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<td><strong>National Inst of Allergy &amp; Infectious Diseases</strong></td>
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<td><strong>National Institute of Child Health &amp; Human Development</strong></td>
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<td><strong>National Inst on Deafness &amp; other Communication Disorders</strong></td>
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<td><strong>National Inst of Dental &amp; Craniofacial Research</strong></td>
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<td><strong>National Institute of Diabetes &amp; Digestive &amp; Kidney Diseases</strong></td>
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<td><strong>Office of the Director</strong></td>
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<td><strong>Center for Scientific Review</strong></td>
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<td><strong>Center for Information Technology</strong></td>
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<td><strong>WG Magnuson Clinical Center</strong></td>
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Adapted from: NIH (DRG) - Peer Review of NIH Research Grants Applications

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**NIH's New Evaluation System (1/09)**

9-point rating scale (1=exceptional; 9=poor)

<table>
<thead>
<tr>
<th>Impact</th>
<th>Score</th>
<th>Descriptor</th>
<th>Strengths/Weaknesses</th>
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<tbody>
<tr>
<td><strong>High Impact</strong></td>
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<td>1</td>
<td>Exceptional</td>
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<td>2</td>
<td>Outstanding</td>
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<td>3</td>
<td>Excellent</td>
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<td><strong>Moderate Impact</strong></td>
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<td>Very Good</td>
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<td>Satisfactory</td>
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<td><strong>Low Impact</strong></td>
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<td>8</td>
<td>Marginal</td>
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<td>Poor</td>
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<thead>
<tr>
<th>Impact</th>
<th>Score</th>
<th>Descriptor</th>
<th>Additional Guidance on Strengths/Weaknesses</th>
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</thead>
<tbody>
<tr>
<td>High</td>
<td>1</td>
<td>Exceptional</td>
<td>Exceptionally strong with essentially no weaknesses</td>
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<tr>
<td></td>
<td>2</td>
<td>Outstanding</td>
<td>Extremely strong with negligible weaknesses</td>
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<tr>
<td></td>
<td>3</td>
<td>Excellent</td>
<td>Very strong with only some minor weaknesses</td>
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<tr>
<td>Medium</td>
<td>4</td>
<td>Very Good</td>
<td>Strong but with numerous minor weaknesses</td>
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<td></td>
<td>5</td>
<td>Good</td>
<td>Strong but with at least one moderate weakness</td>
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<td></td>
<td>6</td>
<td>Satisfactory</td>
<td>Some strengths but also some moderate weaknesses</td>
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<tr>
<td>Low</td>
<td>7</td>
<td>Fair</td>
<td>Some strengths but with at least one major weakness</td>
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<td></td>
<td>8</td>
<td>Marginal</td>
<td>A few strengths and a few major weaknesses</td>
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<tr>
<td></td>
<td>9</td>
<td>Poor</td>
<td>Very few strengths and numerous major weaknesses</td>
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</tbody>
</table>

**Minor Weakness:** An easily addressable weakness that does not substantially lessen impact

**Moderate Weakness:** A weakness that lessens impact

**Major Weakness:** A weakness that severely limits impact

OVERALL IMPACT

Reviewers are asked to provide an overall impact/priority score to reflect their assessment of the likelihood for the project to promote the training of pre- and postdoctoral fellows in biomedical, behavioral and clinical research, in consideration of the following five core review criteria, and the additional review criteria (as applicable for the project proposed).

**Overall Impact** Write a paragraph summarizing the factors that informed your Overall Impact score.
Are the research facilities and research environment conducive to preparing trainees for successful careers as biomedical scientists? Do the objectives, design and direction of the proposed research program ensure effective training? Is the proposed program of training likely to ensure that trainees will be prepared for successful and productive scientific careers? Do the courses, where relevant, and research training experiences address state-of-the-art science relevant to the aims of the program? Does the program provide training in inter- or multi-disciplinary research and/or provide training in state of the art or novel methodologies and techniques? Is a significant level of institutional commitment to the program evident?

1. **Training Program and Environment**

<table>
<thead>
<tr>
<th>Strengths</th>
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<th>Weaknesses</th>
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http://grants.nih.gov/grants/peer/critiques/t32.htm
Does the Training PD/PI have the scientific background, expertise, and experience to provide strong leadership, direction, management, and administration to the proposed research training program? Does the PD/PI plan to commit sufficient time to the program to ensure its success? Is sufficient administrative and research training support provided for the program? For applications designating multiple PD/PIs, is a strong justification provided that the multiple PD/PI leadership approach will benefit the training program and the trainees? Is a strong and compelling leadership approach evident, including the designated roles and responsibilities, governance, and organizational structure consistent with and justified by the aims of the training program and with the complementary expertise of each of the PD/PIs?

2. **Training Program Director/Principal Investigator (PD/PI)**

<table>
<thead>
<tr>
<th>Strengths</th>
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<table>
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<tr>
<th>Weaknesses</th>
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</table>
Are sufficient numbers of experienced preceptors/mentors with appropriate expertise and funding available to support the number and level of trainees proposed in the application? Do the preceptors/mentors have strong records as researchers, including successful competition for research support in areas directly related to the proposed research training program? Do the preceptors/mentors have strong records of training pre- and/or postdoctorates?

### 3. Preceptors/Mentors

**Strengths**
- 

**Weaknesses**
- 

http://grants.nih.gov/grants/peer/critiques/t32.htm
Is a recruitment plan proposed with strategies to attract high quality trainees? Are there well-defined and justified selection criteria and retention strategies? Is a competitive applicant pool in sufficient numbers to warrant the proposed size and levels (predoctoral, postdoctoral and/or short-term) of the training program in evidence? For applications that request short-term research training positions, does the program have the ability to recruit high quality, short-term trainees?

<table>
<thead>
<tr>
<th>4. <strong>Trainees</strong></th>
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<tbody>
<tr>
<td><strong>Strengths</strong></td>
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<td><strong>Weaknesses</strong></td>
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</table>

http://grants.nih.gov/grants/peer/critiques/t32.htm
How successful are the trainees (or for new applications, other past students/fellows in similar training) in completing the program? How productive are trainees (or for new applications other past students/fellows) in terms of research accomplishments and publications? How successful are trainees (or other past students/fellows) in obtaining further training appointments, fellowships, and career development awards? How successful are the trainees in achieving productive scientific careers, as evidenced by successful competition for research grants, receipt of honors or awards, high-impact publications, receipt of patents, promotion to scientific leadership positions, and/or other such measures of success? Does the program have a rigorous evaluation plan to review the quality and effectiveness of the training? Are effective mechanisms in place for obtaining feedback from current and former trainees and monitoring trainees' subsequent career development?

<table>
<thead>
<tr>
<th>5. Training Record</th>
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<tr>
<td><strong>Strengths</strong></td>
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<tr>
<td><strong>Weaknesses</strong></td>
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</tbody>
</table>

http://grants.nih.gov/grants/peer/critiques/t32.htm
Pink Sheet: Reviewers’ Comments
Final Score:

10 x Average (to one decimal point) of the Overall/Priority Score [1 – 9 (whole integers)] provided by all eligible reviewers.

Range: 10 – 90

Example: 20 reviewers

 Scores: 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 3, 3,

\[ 10 \times \frac{44}{20} = 10 \times 2.2 = 22 \]
NHLBI: FY2012 Training Grant
Priority Score Payline

| T32/T35 | 25 | Institutional NRSA Training |

http://www.nhlbi.nih.gov/funding/policies/operguid.htm

NCURA 6th Annual Pre-Award Research Administration Conference
General *modus operandi* for responding to Reviewers’ comments
General *modus operandi* for responding to Reviewers’ comments

They say jump!
General *modus operandi* for responding to Reviewers’ comments

They say jump!

You say, how high?
Two components to responding to reviewers’ comments:

A. Introduction section
   i. Response to specific comments

B. Main section of application
   i. New text
   ii. Deleted text
2 - Research Training Program Plan

1. Introduction to Application (for Resubmission)
   May not exceed 3 pages
As per NIH Guidelines - 1


- Summarize substantial additions, deletions, and changes
- Include a response to the issues and criticism raised in the Summary Statement
Responding to Reviewers Comments:

- “Cut and Paste” all Weaknesses from Summary Statement into word document

- Respond to comments:
  - Each reviewer’s “Weaknesses”, or
  - Group together similar “Weaknesses”

- This way you can feel confident that all “Weaknesses” are addressed
As per NIH Guidelines - 2


- Main section of application - Changes must be marked in the text
  - Bracketing, indenting, or change of typography
  - Do not underline or shade the changes.
  - Deleted sections should be described but not marked as deletions. If the changes are so extensive that essentially all of the text would be marked, explain this in the Introduction.
As per NIH Guidelines - 3


- The Preliminary Studies/Progress Report section should incorporate work completed since the prior version of the application was submitted.
NIH Training Grant Specific Review Information

- Guidelines for Reviewers

- Review Critique Fill-able Templates
  http://grants.nih.gov/grants/peer/critiques/t32_critique_template.doc

- Review Criteria and Considerations
  http://grants.nih.gov/grants/peer/critiques/t32.htm
NIH Resources for Training Grant Applications

- NRSA Institutional Training Grant Kiosk
  [http://grants.nih.gov/training/T_Table.htm](http://grants.nih.gov/training/T_Table.htm)

- Specific Institute Contacts, Interests and Instructions

- Funded Training Grants – NIH Reporter

- Application and Award Information-Funding Facts
NIH Training Grants

- Didactics, career development, other activities
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<table>
<thead>
<tr>
<th>Contact PI / Project Leader Information</th>
<th>Program Official Information</th>
<th>Other PI Information</th>
</tr>
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<tbody>
<tr>
<td>Name: HARDY, MARK A</td>
<td>Name: CARLSON, DREW E</td>
<td>MARX, STEVEN Q</td>
</tr>
<tr>
<td>Email: Click to view Contact PI / Project Leader email address</td>
<td>Email: Click to view PO email address</td>
<td></td>
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<tr>
<td>Title: POSTDOCTORAL TRAINING IN CARDIOVASCULAR DISEASE</td>
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| Organization: COLUMBIA UNIVERSITY HEALTH SCIENCES | Department/ Educational Institution Type: SURGERY | Congressional District: State Code: NY District: 15 |
| City: NEW YORK Country: UNITED STATES (US) | SCHOOL OF MEDICINE | |
| Other Information: | DUNS Number: 621889815 | CFDA Code: 837 |
| FOA: PA-10-036 | Project Start Date: 1-JUL-1996 | Project End Date: 30-JUN-2016 |
| Study Section: NHLBI Institutional Training Mechanism Review Committee (NITM) | Budget Start Date: 1-JUL-2012 | Budget End Date: 30-JUN-2013 |
| Fiscal Year: 2012 Award Notice Date: 20-JUN-2012 | Administering Institutes or Centers: NATIONAL HEART, LUNG, AND BLOOD INSTITUTE |
| Project Funding Information for 2012: | |
| Total Funding: $602,238 | Year | Funding IC | FY Total Cost by IC |
| 2012 | NATIONAL HEART, LUNG, AND BLOOD INSTITUTE | $602,238 |

http://projectreporter.nih.gov/reporter.cfm

NCURA 6th Annual Pre-Award Research Administration Conference
### Abstract Text:

DESCRIPTION (provided by applicant): This application requests funding for the third competitive renewal of a postdoctoral training program in Cardiovascular Diseases. The program is designed to provide opportunities for Cardiology, Surgical and Pediatrics-based physician-scientist trainees to become independent investigators in Cardiovascular research. Trainees will be exposed to a diverse group of faculty, ranging from junior faculty to full-professor, each well-funded, with outstanding training and publication records. Trainees are encouraged to choose co-mentors, to enhance their multi-disciplinary training. Faculty mentors will direct research training in four primary areas: 1) Vascular Biology including atherosclerosis, angiogenesis and stem cells; 2) Cardiomyocyte biology, including ion channels, pharmacology and tissue- and biomedical-engineering, 3) Immunology and Genomics, including transplantation and disease markers, and 4) Translational, Outcomes and Clinical Research, including population disparity in cardiovascular diseases, access to cardiac care and selective therapy. Strong emphasis is given to training physician-scientists with broadly-based, interdisciplinary knowledge and unique skill sets, with a strong fundamental understanding of cardiovascular biology and physiology. The usual duration of the program is two years and depending upon the individual trainees' selected area of research focus may be extended to three years. Candidates are selected from a very large pool of outstanding applicants to our clinical training programs in Surgery, Cardiothoracic Surgery, Adult and Pediatric Cardiology, Neonatology and Pediatric Critical Care, as well as through direct applications to the training program. Special efforts are undertaken to enhance our recruitment of women and minorities, in part through affiliation with Harlem Hospital's Surgical Residency program. The training program and the core departments have well-established cardiovascular seminar series and journal clubs, joint laboratory meetings and retreats that are designed to foster collaborations and interdisciplinary research. In addition, the training program itself sponsors an annual retreat, seminars and work-in-progress sessions to assess trainee progress. The training program has an efficient evaluation and feedback system to ensure appropriate training of our fellows. Throughout the program and afterwards, trainees are advised on research and career development, individually and through a mentoring program headed by an Associate Director for Trainee Development. The program is designed to take advantage of the many existing strengths of Columbia University, including the Irving Center for Clinical and Translational Research (CTSA), Mailman School of Public Health, Genome Center, Bioinformatics, Tissue and Biomedical Engineering and numerous basic science departments and strong clinical programs, as well as the established track record of research training of physician-scientists in this program for the past 15 years.

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NOTE: The figures in Funding Facts may differ from information appearing in official NIH Office of Budget and Institute/Center (IC) budget mechanism tables. In Funding Facts, the cost of each award is attributed to the IC administering the grant or contract even though funding for the award may have been provided by the NIH Office of the Director, another IC, or another source. Also, funding provided by the American Recovery and Reinvestment Act of 2009 is not included. For official budget information, see the NIH Office of Budget website at officeofbudget.od.nih.gov or individual IC websites. To use this tool, please make sure your browser's pop-up blocker is disabled.
## NIH Funding Facts – FY2011

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Good Luck!