

Understanding NIH: Drinking from the Fire-hose



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National Institutes of Health (NIH)



hunzikerr@mail.nih.gov

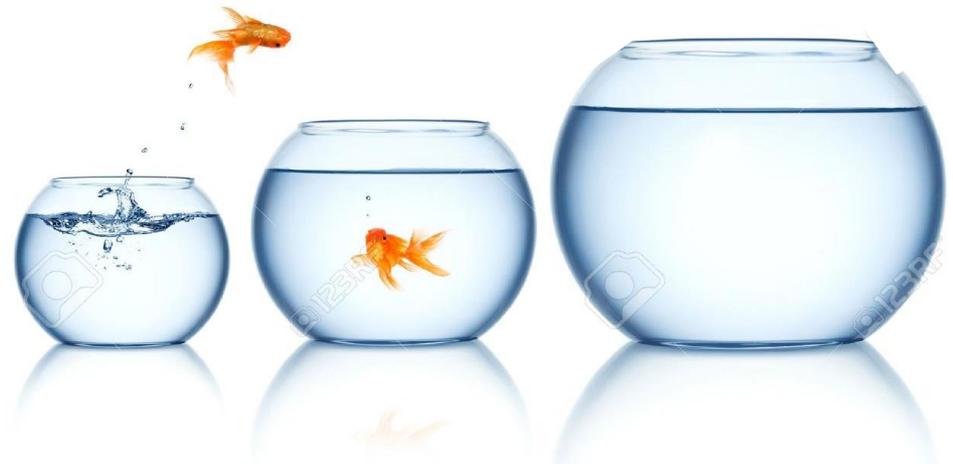
301-451-1609

TODAY'S AGENDA: THE DEEP DIVE INTO NIH GRANTS

- **Plan Ahead, Get Prepared**
 - What's New in the Zoo?
 - Get Help from the Inside
 - Discover NIH's Footprint in Your Area
 - Organize Your Team
 - Match Your Application to Mechanism and Institute
- **Elements of the Grant Application**
 - Specific Aims: your key to success
 - Research Strategy: helpful hints
 - Other Considerations
 - Funding Emerging Science, Technology Development
- **Just Send It**
- **Now it's our turn: The Review Process**
 - Find the Best Review Committee
 - Understand the Assessment
 - Respond to the Evaluation

Plan Ahead, Get Prepared

- What's new in the Zoo?
- Get Help from the Inside
- Discover NIH's Footprint in Your Area
- Organize Your Team
- Match Your Application to Mechanism and Institute



Know Your Target

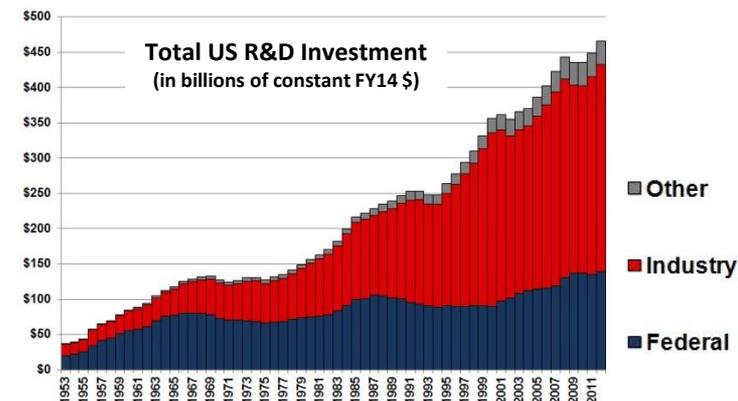
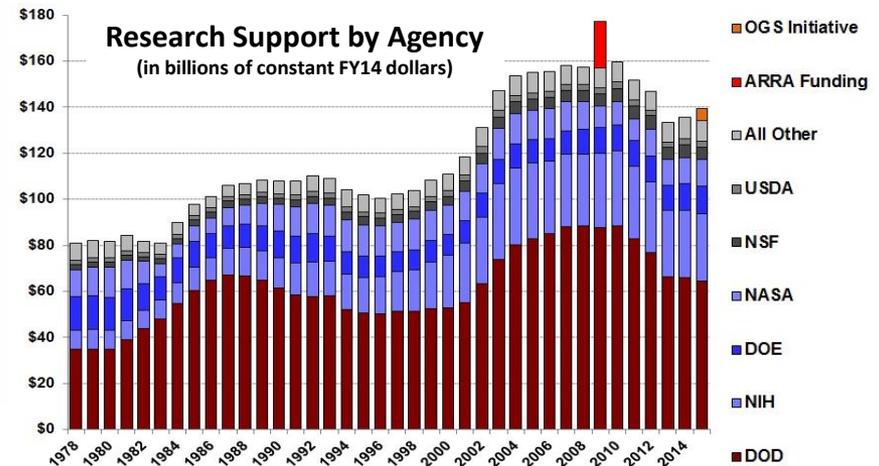
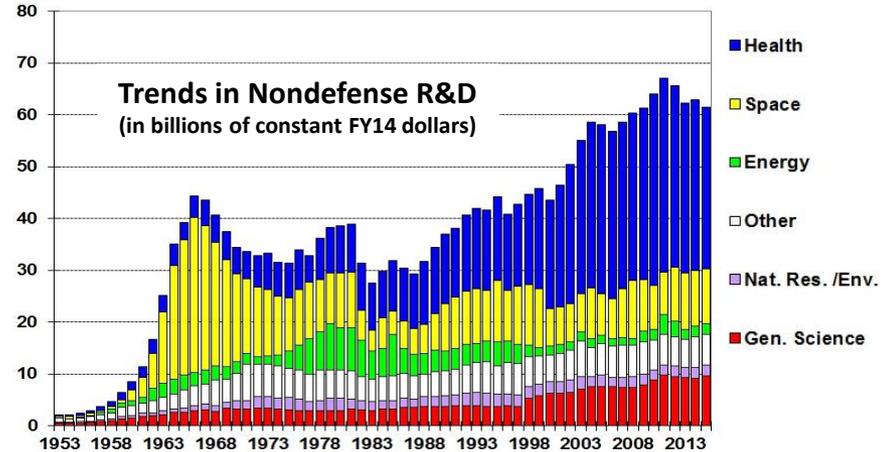
Federal Agencies in Science and Technology have **different**

- ✓ missions
- ✓ cultures
- ✓ rules
- ✓ levels of support
- ✓ expectations

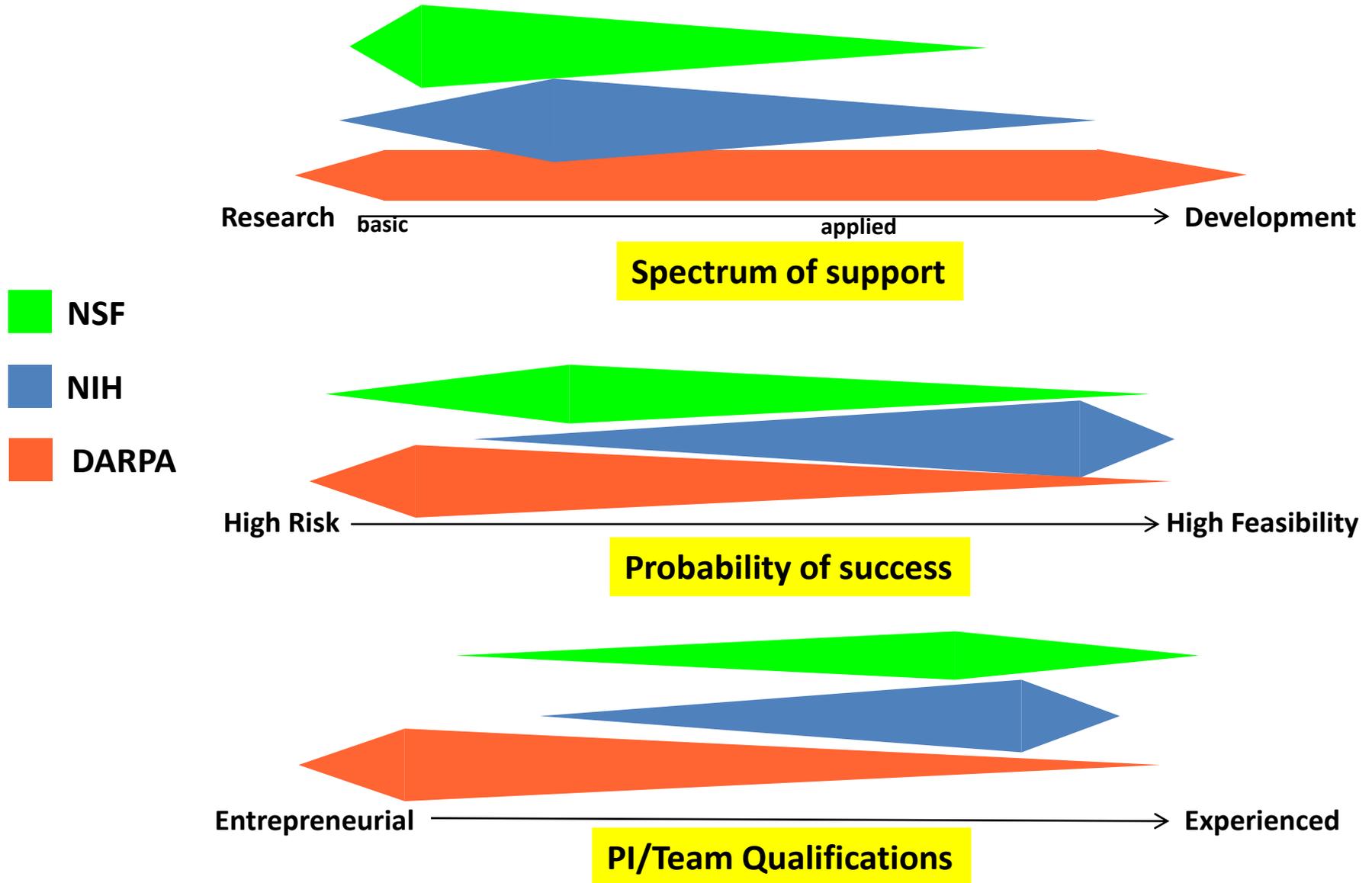


But the **same** overall goal

- ✓ protect the security, health, and well being of Americans
- ✓ maintain knowledge and application superiority
- ✓ fuel the engine of US economic growth

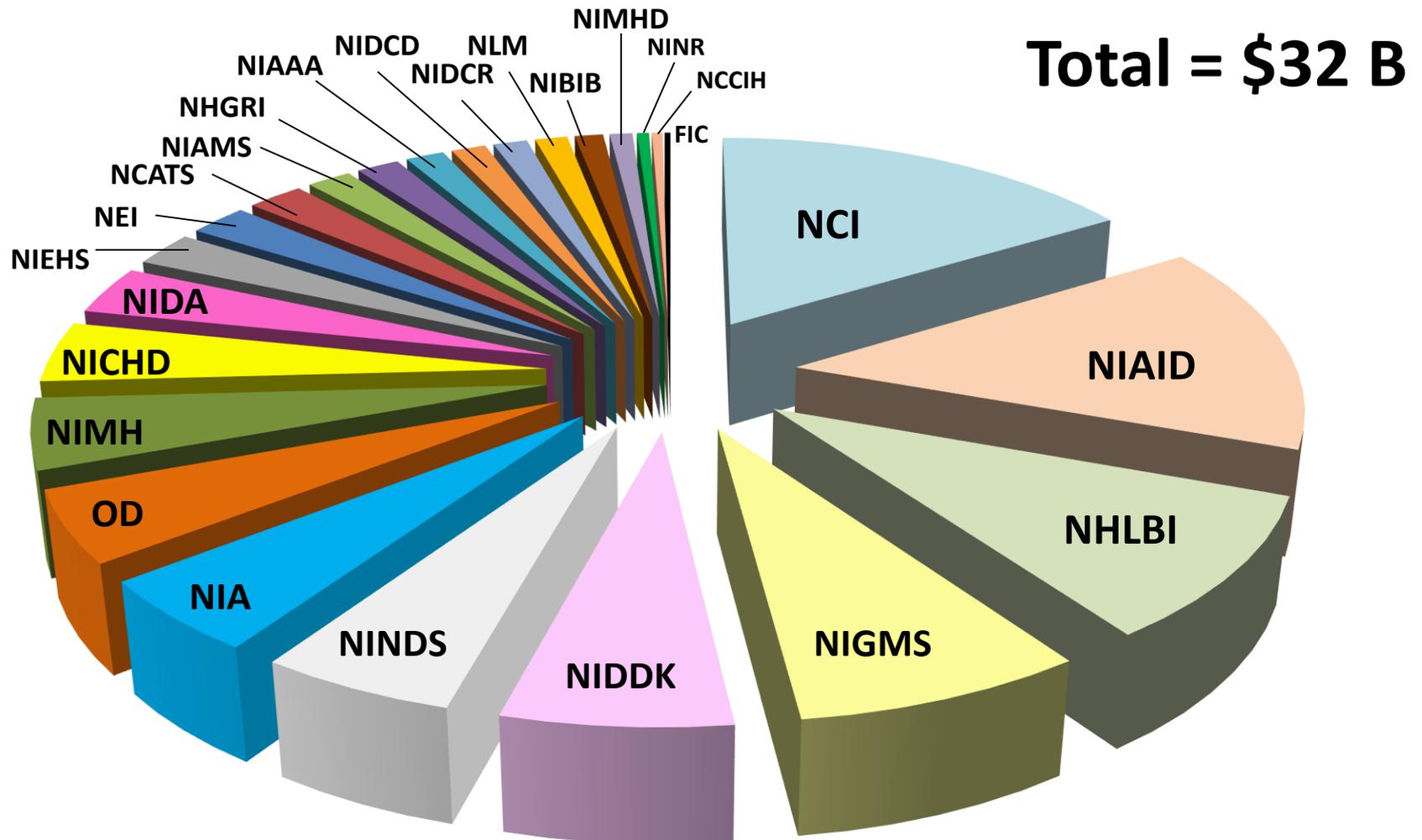


Different Agencies: Different Cultures



NIH FY16 Budget

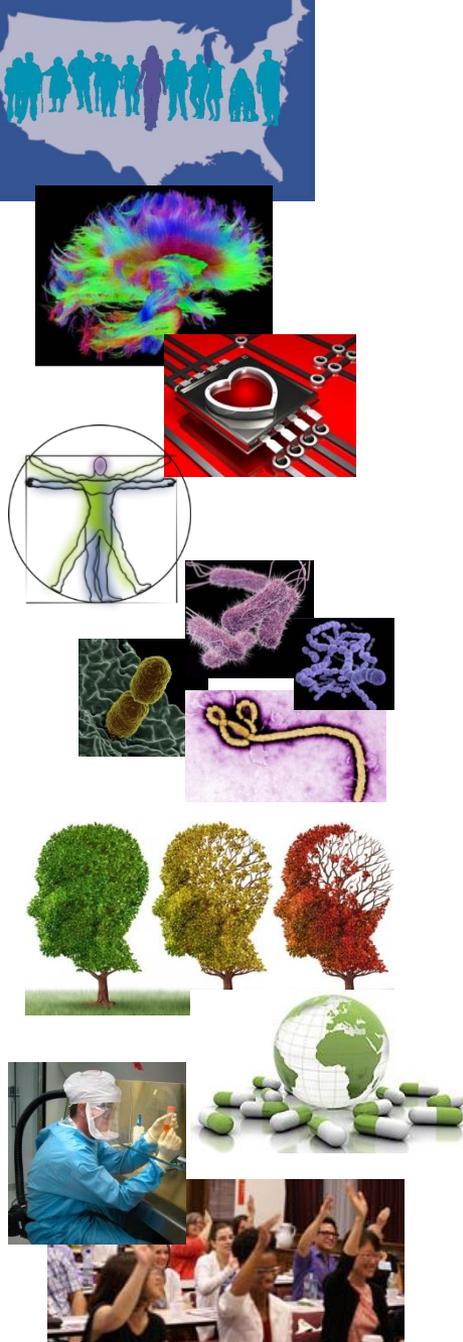
NIH Divides most of its investment according to the interests of the component parts (i.e. Institutes or Centers), with 5% allocated to trans-NIH initiatives.



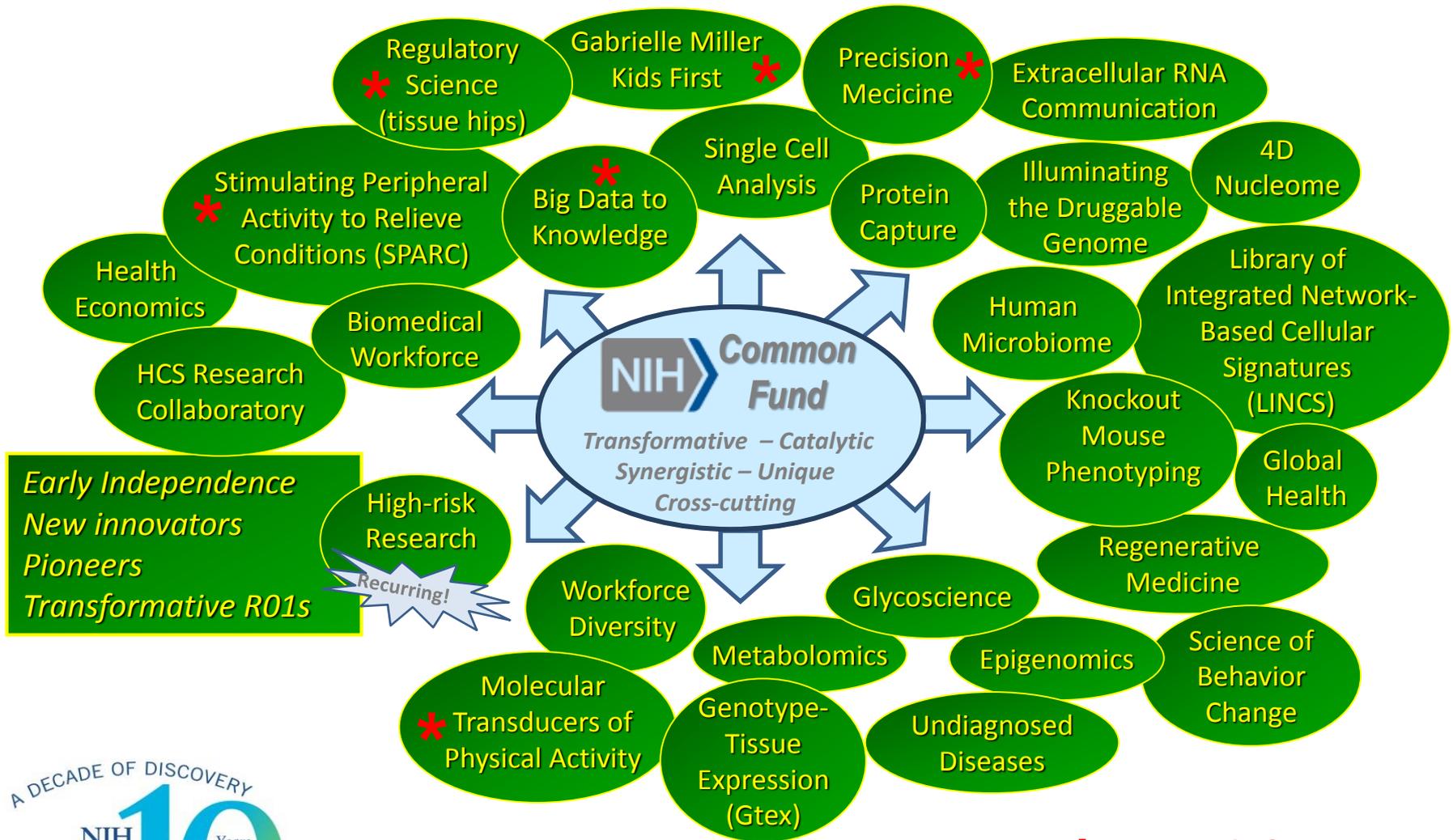
About 85% distributed via Extramural grants, contracts, cooperative agreements

NIH “hot topics”

- **Precision Medicine Initiative**
- **Discovery Science**
 - BRAIN Initiative
 - Microbiome and health
 - Stem Cell Technology (tissue chips, regenerative medicine)
 - New Vaccines (Zika, Ebola, Flu, HIV...)
- **Translating discovery into health**
 - Antimicrobial Resistance
 - national database of germ genomes
 - prize for better diagnostics (w/BARDA)
 - antibiotics and vaccines
 - Alzheimer’s Disease
 - basic research
 - epidemiology for risk/protective genes
 - early diagnosis and progression
 - Accelerating Medicines Partnership (Alzheimer’s, type 2 diabetes, lupus, rheumatoid arthritis)
- **Preparing a diverse and talented biomedical research workforce**



Trans-NIH Programs



* = watch for new initiatives



<http://commonfund.nih.gov/>

How Does NIH Solicit Applications?

- **Federal Opportunity Announcements (FOA) published through**
 - the NIH Guide (<http://grants.nih.gov/grants/guide/>)
 - grants.gov
- **Parent Announcements cover basic activity codes**
 - investigator-initiated applications
- **Special Opportunities to fill gaps**
 - **Requests for Applications (RFA)**, a one-time call with set aside funds
 - **Program Announcement (PA)** highlights areas of focus
 - **Program Announcement with Special Review (PAR)** for special consideration and “protected” review
 - **Program Announcement with Set Aside (PAS)** essentially, an RFA with multiple receipt dates



Need Help with Your Proposal...

Who Ya' Gonna' Call?

✓ about the scientific and technical aspects of your application...

- Find them on the solicitation
- See also the IC's programmatic descriptions (<http://www.nih.gov/icd/index.html>).

✓ for questions during the review...

- Listed on the eRA Commons link to your submitted proposal
- See also the review group rosters at the CSR web site

✓ for help with the business aspects of a proposal...

- Listed on the eRA Commons link to your submitted proposal
- See also the IC's programmatic descriptions (<http://www.nih.gov/icd/index.html>).



**Program
Director**

**Scientific
Review
Officer**

**Grants
Specialist**

NIH Program Officials: your primary contact

Pre-Application

- Assess the “fit” to the IC, Program(s)
- Start the conversation early: develop your ideas together
- Choose the right activity/mechanism
- Brief on Review Issues: Dos/Don'ts

Post Review

- Analyze the Summary Statement: deeper insights from the Review
- Understand the rating and assess the likelihood of funding
- BEWARE! Nothing is certain until you have it in writing



During the Award

- Discuss problems in execution (rebuting, rescoping, extensions...)
- Find an administrator to address unusual issues
- Brag about important discoveries

Anytime

- Arrange introductions so you can serve on advisory boards workshop panels, etc. to help set the research agenda
- Discover what's New and Coming Soon in Funding Opportunities



Application

Review



Award

NIH Institute/Center Web Sites



[For Employees](#) | [Staff Directory](#) | [En Español](#)

[Health Information](#)

[Grants & Funding](#)

[News & Events](#)

[Research & Training](#)

[Institutes at NIH](#)

[About NIH](#)

[NIH Home](#)

INSTITUTES, CENTERS & OFFICES

NIH is made up of **27 Institutes and Centers**, each with a specific research agenda, often focusing on particular diseases or body systems. [NIH leadership](#) plays an active role in shaping the agency's activities and outlook. [Learn more about NIH](#) ▶

NIH OFFICES

NIH Office of the Director (OD)

The Office of the Director is the central office at NIH for its 27 Institutes and Centers. The OD is responsible for setting policy for NIH and for planning, managing, and coordinating the programs and activities of all the NIH components. OD's program offices include the Office of AIDS Research and the Office of Research on Women's Health, among others.

Quick Links

NCI	NIAMS	NIEHS	CIT
NEI	NIBIB	NIGMS	CSR
NHLBI	NICHD	NIMH	FIC
NHGRI	NIDCD	NIMHD	NCCAM
NIA	NIDCR	NINDS	NCATS
NIAAA	NIDDK	NINR	CC
NIAID	NIDA	NLM	OD

www.nih.gov/icd/

Each NIH Institute/Center has a HOME PAGE

NIBIB National Institute of Biomedical Imaging and Bioengineering
National Institutes of Health
ENGINEERING & IMAGING FOR THE FUTURE

En Español | Quick Links

HOME | ABOUT NIBIB | **RESEARCH** | FUNDING | TRAINING & CAREERS | NEWS & EVENTS



CTC Microchip: A One-in-a-Billion Technology

With enough sensitivity to detect and trap a single at-large cancer cell from among a billion blood cells, the impressive new Circulating Tumor Cell (CTC) microchip is showing much promise as it points the way to a new era in the fight against cancer.

Learn More ▶

Technology Focus

Health Information

Multimedia Gallery

Science Education

Research News



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Philodina roseola,



Model: <http://www.xxxxx.nih.gov>

<http://www.nibib.nih.gov/>

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Research

+ Labs At NIBIB (Intramural)

Scientific Program Areas
(Extramural)

Biotechnology Resource Centers

Quantum Grants

Resources for Researchers



SIGN UP FOR OUR LISTSERV

Home > Research > Scientific Program Areas (Extramural) > Biomaterials Program Area

Biomaterials Program Area

Staff Contact

Rosemarie Hunziker, Ph.D. 

Description

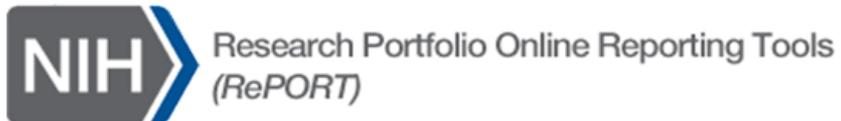
This program supports the research and development of new or novel biomaterials that can be used for a broad spectrum of biomedical applications such as implantable devices; tissue engineering; imaging agents; and biosensors and actuators.

Research that is supported includes the design, synthesis, characterization, processing and manufacturing of these materials as well as the design and development of devices constructed of these materials and their clinical performance.

Relevant Study Sections

Biomaterials and Biointerfaces (BMBI)

Does NIH Already Support My Interest Area?



Search

- QUICK LINKS
- RESEARCH
- ORGANIZATIONS
- WORKFORCE
- FUNDING
- REPORTS
- LINKS & DATA

QUICK LINKS

Home > Quick Links



 **RePORTER**

The Report Expenditures and Results tool allows users to search a repository of NIH-funded research projects and access publications and patents resulting from NIH funding.

[More Details](#)

 **NIH Data Book**

The NIH Data Book (NDB) provides basic summary statistics on extramural grants and contract awards, grant applications, the organizations that NIH supports, the trainees and fellows supported through NIH programs, and the national biomedical workforce.

[More Details](#)

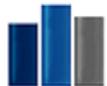
 **Report Catalog**

The Report Catalog is a menu driven interface geared for the NIH familiar user to provide customized reporting. A graphic depiction of some major funding mechanisms, and activity codes gives a hierarchical view of project organization.

[More Details](#)

 **Success Rates**

Computed on a FY basis, success rates are defined by the percentage of

 **Funding Facts**

Quick access to statistics from the NIH Data Book and annual reports produced

 **The Research, Condition, and Disease Categorization**

NIH Searchable Databases Contain Abstracts of All Funded Projects



NIH RePORTER

Version: 5.4.0

04/11/2013 Release Note: New enhancements now available.

View [Release Notes](#) for more information.

About Re
DATA

QUERY

BROWSE NIH BETA NEW

SUBMIT QUERY

CLEAR Q

NIH (non) ARRA Selection:



SELECT

Text Search (Logic):



And Or Advanced

Search in

Projects Publications
 Projects & Publications

Limit to

Project Title Project Terms
 Project Abstracts

Limit Publication search to

Start Year End Year

2012

2013

Project Number:

Format: 5R01CA012345-04



Use '%' for wildcard, e.g. %R21%

[Enter multiple project numbers](#)

OR

NIH Sp

Agency

Fun

Search by

- MESH terms
- Key words
- Organizations
- States
- Investigators
- Mechanisms
- Solicitations
- Institutes
- Investigators
- ...

Activity Code:



SELECT

Exclude Subprojects:



SELECT



RePORter Delivers a Treasure Trove...

There were 10 results matching your search criteria.

Show/Hide Search Criteria 

Click on the column header to sort the results

T: Application Type; Act: Activity Code; Project: Admin IC,Serial No.; Year: Support Year/Supplement/Amendment

	T	Act	Project	Year	Sub #	Project Title	Contact PI/ Project Leader	Organization	FY	Admin IC	Funding IC	FY Total Cost by IC	Similar Projects
	1	R01	CA166111	01A1		TUMOR ANTIGEN-SPECIFIC T-CELLS AND HEPATOCELLULAR CARCINOMA	KAPLAN, DAVID E	UNIVERSITY OF PENNSYLVANIA	2013	NCI	NCI	\$249,000	
	5	R01	AR055993	03		TISSUE REGENERATION BY BIOPHYSICAL SIGNALING	KAPLAN, DAVID L et al.	TUFTS UNIVERSITY MEDFORD	2012	NIAMS	NIAMS	\$323,395	
	5	R01	AR061988	02		ELECTROTHERAPEUTIC STRATEGIES FOR CONNECTIVE TISSUE REPAIR	KAPLAN, DAVID L et al.	TUFTS UNIVERSITY MEDFORD	2012	NIAMS	NIAMS	\$645,728	
	3	P41	EB002520	09S1		TISSUE ENGINEERING RESOURCE CENTER	KAPLAN, DAVID L	TUFTS UNIVERSITY MEDFORD	2013	NIBIB	NIBIB	\$40,625	
	5	P41	EB002520	09		TISSUE ENGINEERING RESOURCE CENTER	KAPLAN, DAVID L	TUFTS UNIVERSITY MEDFORD	2012	NIBIB	NIBIB	\$1,152,600	
	5	R01	EB011620	03		BIOMATERIAL APPLICATIONS OF RECOMBINANT BACTERIAL COLLAGENS	KAPLAN, DAVID L et al.	TUFTS UNIVERSITY MEDFORD	2012	NIBIB	NIBIB	\$324,245	
	1	R01	EB014283	01A1		MULTIFUNCTIONAL TROPOELASTIN-SILK BIOMATERIAL SYSTEMS	KAPLAN, DAVID L	TUFTS UNIVERSITY MEDFORD	2012	NIBIB	NIBIB	\$305,288	
	1	U01	EB014976	01		MODELS TO PREDICT PROTEIN BIOMATERIAL PERFORMANCE	KAPLAN, DAVID L et al.	TUFTS UNIVERSITY MEDFORD	2012	NIBIB	NIBIB	\$646,995	
	1	R01	EB016041	01		IN VITRO BIOREACTOR SYS FOR PLATELET FORMATION	KAPLAN, DAVID L	TUFTS UNIVERSITY MEDFORD	2012	NIBIB	NIBIB	\$337,137	
	5	R01	EY020856	03		TISSUE ENGINEERING CORNEA REPLACEMENTS	KAPLAN, DAVID L	TUFTS UNIVERSITY MEDFORD	2012	NEI	NEI	\$369,557	

Click for Abstract

... of Useful Information.

QUICK LINKS RESEARCH ORGANIZATIONS WORKFORCE FUNDING REPORTS LINKS & DATA

Home > RePORTER > Project Information MyRePORTER Login | Register System Health: GREEN

Project Information?

5R01EB014283-02 Back to Query Form Back to Search Results Print Version

PREVIOUS Project 9 of 12 NEXT

PI PROFILE LINKS
MORE INFO

DESCRIPTION DETAILS RESULTS HISTORY SUBPROJECTS SIMILAR PROJECTS NEARBY PROJECTS BETA LINKS NEWS AND MORE

Project Number: 5R01EB014283-02		Contact PI / Project Leader: KAPLAN, DAVID L	
Title: MULTIFUNCTIONAL TROPOELASTIN-SILK BIOMATERIAL SYSTEMS		Awardee Organization: TUFTS UNIVERSITY MEDFORD	
Contact PI / Project Leader Information:	Program Official Information:	Other PI Information:	Profile Exists No Profile
Name: KAPLAN, DAVID L	Name: HUNZIKER, ROSEMARIE	Not Applicable	
Email: Click to view Contact PI / Project Leader email address	Email: Click to view PO email address		
Title:			
Organization:	Department/ Organization Type:	Congressional District:	
Name: TUFTS UNIVERSITY MEDFORD	ENGINEERING (ALL TYPES)	State Code: MA	
City: MEDFORD Country: UNITED STATES (US)	BIOMED ENGR/COL ENGR/ENGR STA	District: 07	
Other Information:			
FOA: FA-11-260	DUNS Number: 073134835	CFDA Code: 286	
Study Section: Gene and Drug Delivery Systems Study Section (GDD)	Project Start Date: 1-AUG-2012	Project End Date: 31-JUL-2016	
Fiscal Year: 2013 Award Notice Date: 25 JUL-2013	Budget Start Date: 1-AUG-2013	Budget End Date: 31-JUL-2014	



Even broader functionality from Federal RePORTER



FAQ Contact Help LOGIN A A



HOME SEARCH ABOUT PARTICIPATE NEWS RESOURCES

Federal RePORTER FAQ System Health: GREEN

Federal RePORTER

Version: 2.6.0

07/15/2015 Release Note: New enhancements now available.

[View Release Notes for more information.](#)

Federal ExPORTER

Please try the new STAR METRICS ALPHA Federal RePORTER query form. Your feedback is greatly appreciated.

SEND FEEDBACK

SUBMIT QUERY

CLEAR QUERY

Fiscal Year (FY): 2014 SELECT

Agency: SELECT

RESEARCHER AND ORGANIZATION

Principal Investigator (PI) / Project Leader:
(Last Name, First Name)
Use '%' for wildcard
[Enter several PI/Project Leader names](#)

City:

Use '%' for wildcard

Organization: LOOK UP

State: SELECT

Country: SELECT

<http://federalreporter.nih.gov/>



How to Use RePORTER When Preparing New Grant Applications



Posted by [Dr. James Onken](#) on December 3, 2012

[Post a Comment](#) | [View Comments \(1\) ↓](#)

NIH offers two tools that can help you search for projects similar to the one you're thinking about. In this post, I'll take you on a quick tour of the [NIH RePORTER](#) tool, a repository of information about NIH-funded research projects, and show you how to find information that may be useful to know before you start writing a grant application. A future *Feedback Loop* post will cover the thesaurus-based search tool called [Like This](#).

Main Query Form

From RePORTER's [Main Query Form](#), you can search by principal investigator name, project number, organization, text term(s) and many other criteria.



[View larger image](#)

If you want to know which NIH institutes or centers fund projects like yours, or which study section would be most appropriate to review your application, then searching by text term(s) would probably be the best approach.

<https://loop.nigms.nih.gov/index.php/2012/12/03/how-to-use-reporter-when-preparing-new-grant-applications/>

Grants: A to Z

Grant Basics

Funding Initiatives

Due Dates, Templates



Search this Site



Glossary & Acronyms

HOME ABOUT GRANTS FUNDING FORMS & DEADLINES GRANTS POLICY eRA NEWS & EVENTS ABOUT OER

Grants & Funding



About Grants

- Grants Process Overview
- Grant Application Basics
- Types of Grant Programs
- How to Apply
- Peer Review Process
- Award Management
- Foreign Grants Information
- Funding Strategies
- Avoid Grant Scams

Electronic Grants

- Electronic Research Admin (eRA)



New to NIH Grants?



FUNDING

Search NIH Guide for Grants and Contracts



- Funding Opportunities & Notices
- Unsolicited Applications (Parent Announcements)
- Advanced Search



Rock Talk

Follow @RockTalking

Get To Know OER

NIH Regional Seminar Heads West to San Diego in October 2015

What are the Chances of Getting Funded?

Latest News

Application Submission News - June 10, 2015

Application Submission News - April 15, 2015

Potential Award Delays in May 2015

Upcoming Events

<http://grants.nih.gov/grants/oer.htm>

Get the Team Organized!





**Plan Ahead...
Seriously!**

TWO ROADS DIVERGED IN A WOOD, AND I—
I TOOK THE ONE LESS TRAVELED BY,
AND THAT HAS MADE ALL THE DIFFERENCE.

– ROBERT FROST



R21 (\$275K spread over 2 yrs, non-renewable)

- High(er) risk and reward
- Little/no supporting data

R03 (2 yrs, \$50K per year, non-renewal)

- Little/no supporting data
- succinct task(s)

R01 (4-5 yrs, \$250 - 400K+, renewable, a “real” grant)

- Convincing preliminary data for each aim
- Longer term questions
- Multiple complexities

Targeting IC Priorities: an example

NIBIB mission

accelerating the **application of biomedical technologies...**
[via] integrating the physical and engineering sciences with the life sciences to advance basic research and medical care.

NINDS mission

seek **fundamental knowledge about the brain and nervous system** and to use that knowledge to reduce the burden of neurological disease.

Novel polymer scaffold for tissue regeneration

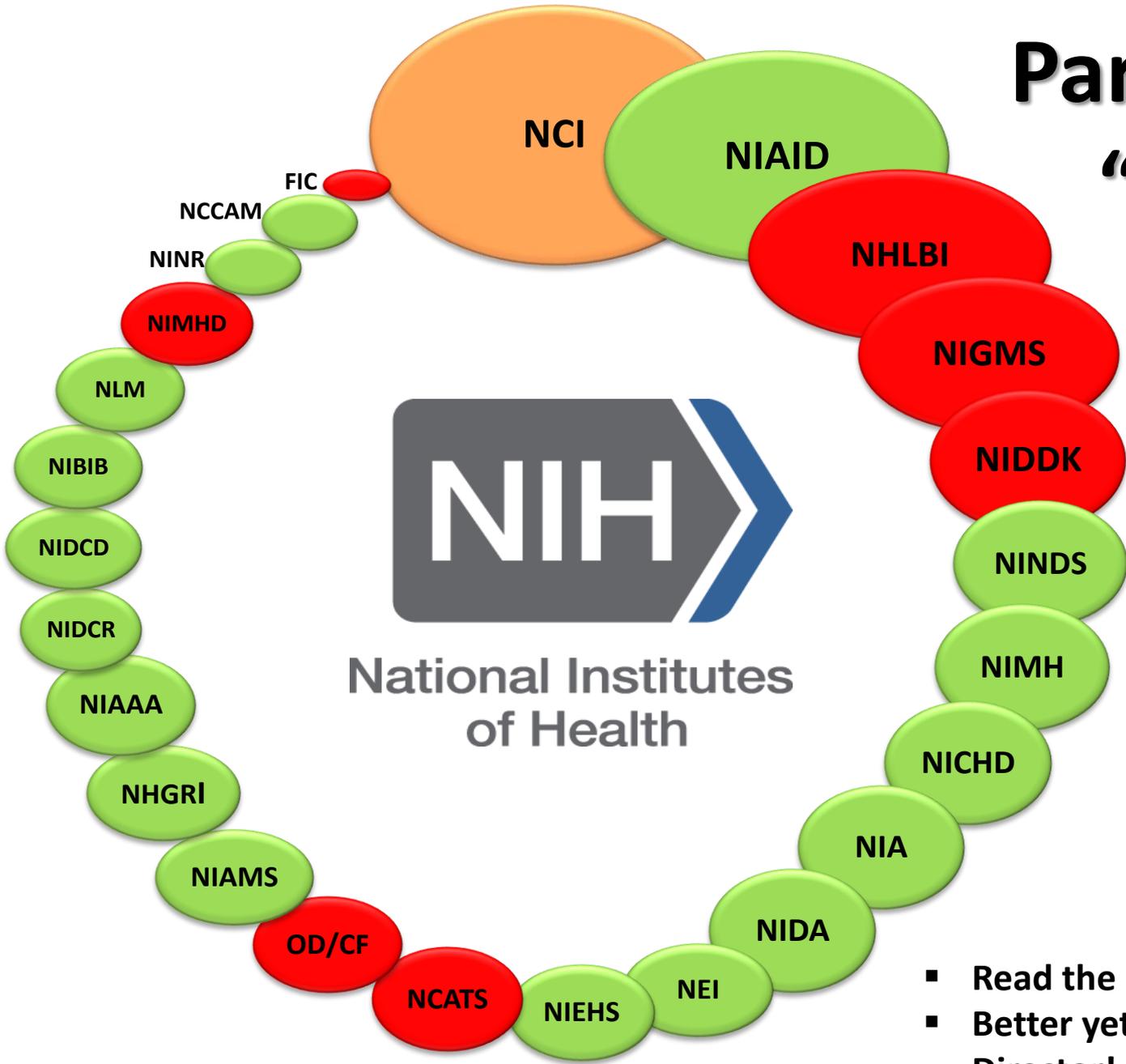
Neural progenitor cells in biomimetic matrix in rat brain

Pivotal large animal studies for stroke therapy

Neural differentiation of stem cells

Imaging cells transplanted to the brain

Parent R21 “Players”



- Read the IC Mission Statement
- Better yet: contact the Program Director!

Research Training and Career Awards



- **Training Grants – T**
 - Institutional
 - Predoctoral and Postdoctoral



- **Fellowships – F**
 - Individual
 - Predoctoral – F31
 - Postdoctoral – F32



- **Career Development Awards – K**

Elements of the Grant Application

- **Specific Aims: your key to success**
- **Research Strategy: helpful hints**
- **Other Considerations**
- **Funding Emerging Science, Technology Development**



Planning Meeting Output: Blueprint for Successful Research

Project Title: *really a quick summary*

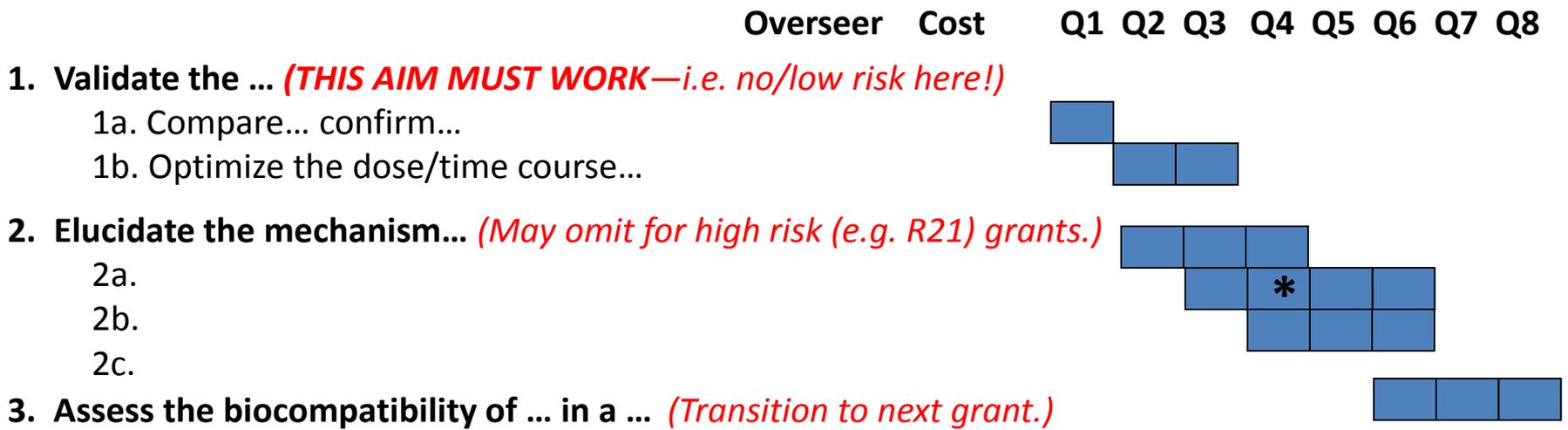
Principal Investigator(s) and Key Personnel: *defines role, commitment*

Overall goal: *resolve an important issue in a timely manner*

Specific goal: *best stated as a hypothesis (a boastful claim, substantiated by data)*

Impact: *2-3 sentences, define success, distill innovation and significance*

RESEARCH Responsibilities, Costs, Milestones and Timeline



* *High-risk element. Propose and discuss alternatives. Decision point.*



**Your Grant Application should reflect
your best thinking.**

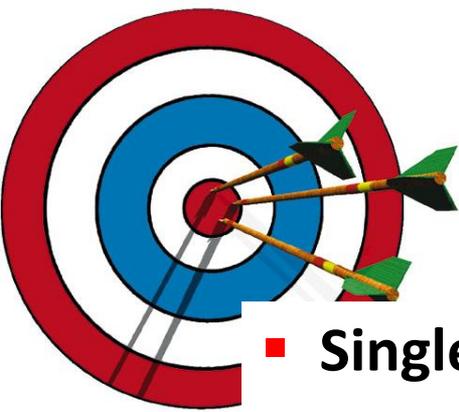
NIH Applications

Key Elements

- Cover Letter and Title Pages
- Abstract (1 page synopsis)
- Budget with Justifications
- Biosketches of Investigators
- Resources and Facilities
- Introduction (resubmissions/revision only!)
- Specific Aims (1 page)
- Research Strategy (6 or 12 pages)
 - Significance
 - Innovation
 - Approach
 - Preliminary Studies/Progress Report
 - Experimental Design and Methods
- Bibliography and References
- Resource Authentication Appendix 
- Human Subjects
- Other (animals, consortium, multi-PI, select agents, other support, resource sharing)
- Commercialization Plan (Phase II SBIR/STTR only!)

Review Criteria

- Significance
- Investigator(s)
- Innovation
- Approach
- Environment
- Human/Animal Studies
- Commercialization Plan Quality (SBIR/STTR Phase II)



SPECIFIC AIMS:

What do you intend to do?

- **Single and most important page of application**
- **Introductory paragraph should**
 - Capture the vision with a broad goal justifying the research question
 - Describe your unique and innovative solution
 - Engage the reader with
 - strong, solid, testable hypotheses, or
 - discrete, finite technology development goal
 - Summarize relevance and feasibility of the approach(es)
- **Succinctly state each research objective in a topic phrase or sentence**
 - Aims independent yet related to overall goal
 - Add sub-aims as needed: experiments support aims, aims test hypotheses
 - Avoid dense text and acronym overload
- **End with impact: define success and point to the future**

Conversation at the Study Section's Mid-Morning Break

Me: I think I have this figured out. You guys have pretty much decided on an impact score by the time you finish reading the Specific Aims page, right?

Reviewer #1 (hesitantly): Well... yes, that's right.

Me: And the rest is filling in the details, looking for confirmation of your opinion, scanning for fatal flaws...

Reviewer #2: That about sums it up, yes.





$$\beta + \alpha(z^2 - i)n \times g_3 = a!$$

SPECIFIC AIMS Page: Formula for Success

Tell your story in five compelling, concise, plain-language paragraphs!

- 1. Outline an **important medical problem** and your timely, **innovative solution**.** Describe the big picture quantitatively. How can science/engineering help? Does this push the edge of the possible in a new way?
- 2. Define the challenge for this application.** What is your specific target and hypothesis? How will you get there? How do you know?
- 3. State each of your **(three) Specific Aims** in a single sentence in bold face.** Then, identify strategies, methods, assays to be used, and data expected.
- 4. Overview the competencies of the **team** and the **resources**.** Why is this the right group at the right place and time? Outline your specific skill sets.
- 5. What happens when you succeed? What are the next steps?** How will paradigms shift or treatment change, and what will this project contribute?

Significance – **Innovation** – **Investigator(s)** – **Approach** – Environment

A photograph of two divers underwater in a blue environment. They are both wearing scuba gear, including tanks and masks. The diver on the right has 'ABUSS' written on their tank. They appear to be working together, possibly on a task involving a rope or equipment. The text 'Research Strategy - A Deeper Dive' is overlaid in red on the lower half of the image.

Research Strategy - A Deeper Dive

- **Significance** (10% of available space)
- **Innovation** (5% of available space)
- **Approach**
 - Preliminary Studies/Progress Report
 - Experimental Design and Methods

Significance is About CONTEXT



Joshua Bell, in performance
Tickets: \$50 -\$250 each



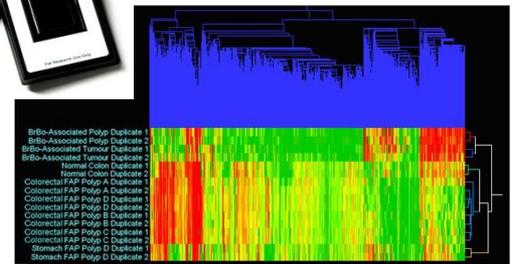
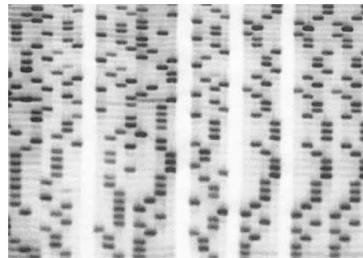
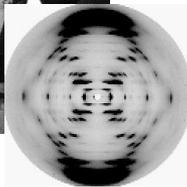
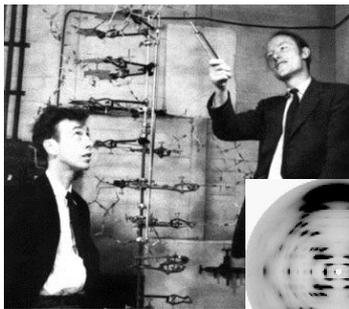
Joshua Bell, in the DC Metro
Total receipts: \$32



- Reviewers will not hunt for the value in your application
- Stand out in your ideas and execution plans, not in your presentation style
- Do your homework and know your audience: find and target the best Study Section

Novelty Can Be Difficult to Define

- Innovative aspects must be obvious
- Succinct analysis of the literature is key
- Moving from Invention to Innovation is a good strategy: balance feasibility with bold research



Inspiration



Invention



Innovation

RESEARCH STRATEGY – Approach:

Prior Work: What has already been done?

Human Induced Pluripotent Stem Cells Free of Vector and Transgene Sequences

Jinying Yu,^{1,2,3,4} Xujin Hu,¹ Bin Song,^{1,2,3,4} Zhen Tian,^{1,2} Ben Stewart,^{1,2} Igor I. Skibin,^{1,2} James A. Thomson,^{1,2,3,4}

Reprogramming differentiated human cells to induce pluripotency over iPS cells has applications in basic biology, drug development, and transplantation. Human iPS cell derivation previously required exposure to retroviruses, lentiviruses, or exogenous factors, which are associated with the ability of the human iPS cell to integrate exogenous DNA into the genome.

Induction of Pluripotent Stem Cells from Adult Human Fibroblasts by Defined Factors

Kazutoshi Takahashi,¹ Koji Tanabe,¹ Masaki Ohkawa,¹ Masumi Nishida,^{1,2} Tomoko Ichikawa,^{1,2} Kiyohiko Tomoda,¹ Yusaku Saito,¹ and Shinya Yamanaka,^{1,2,3,4}

¹Department of Cell Biology, Institute for Frontier Medical Science, Kyoto University, Kyoto 606-8507, Japan



Generation of germline-competent induced pluripotent stem cells

Kiyoko Otoi,¹ Tomoko Ichikawa,^{1,2} & Shinya Yamanaka^{1,2}

We have previously shown that pluripotent stem cells can be induced from mouse Oct4/Cdx2 cells that express Oct4, Sox2, MyoD/Klf4, and subsequent factors for induced pluripotency (iPS) cells. However, called iPS cells, these cells are not germline-competent and cannot be used for germline transmission.

Directly Reprogrammed Fibroblasts Show Global Epigenetic Remodeling and Widespread Tissue Contribution

Nehal Mahesh,^{1,2} Rupa Srikumar,^{1,2} Shu Xia,¹ Joshua Urbak,¹ Sarah Espar,¹ Kaitlin Anzick,¹ Matthias Stadler,¹ Tamas Tschopp,¹ Jason Chan,¹ Rudolf Jaenisch,¹ Katrin Plath,^{1,2} and Konrad Hochedlinger^{1,2}

¹Department of Stem Cell Biology and Center for Regenerative Medicine, Harvard Stem Cell Institute, 77 Avenue Louis Pasteur, Boston, MA 02114, USA

²Department of Molecular and Cellular Biology, Harvard University, 7 Divinity Avenue, Cambridge, MA 02138, USA

³Department of Biological Chemistry, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, MA 02139, USA

⁴Johnson Comprehensive Cancer Center and Institute for Stem Cell Biology and Medicine, UCLA School of Medicine, Los Angeles, CA 90095, USA

⁵Reproductive Institute and Department of Biology, Massachusetts Institute of Technology, 9 Cambridge Center, Cambridge, MA 02139, USA

⁶These authors contributed equally to this work.

Correspondence: kshindler@mit.edu (K.H.), kshindler@hsa.harvard.edu (K.H.) DOI: 10.1038/nature08204

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Reprogramming of murine and using a single polycistronic vector

Deyou W. Carey,¹ Shikhar Mehta,^{1,2} Jacob Hanna,¹ Kim Saha,¹ Qingyong Wang,¹ and Rudolf Jaenisch^{1,2}

¹Department of Molecular Biology and Genetics, Harvard Medical School, Boston, Massachusetts 02115, USA

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¹²Department of Cell Biology, Harvard Medical School, Boston, Massachusetts 02115, USA

¹³Department of Cell Biology, Harvard Medical School, Boston, Massachusetts 02115, USA

Human iPS Cell Derivation/Reprogramming

Jaehyun Park¹ and George Q. Daley^{1,2}

¹Children's Hospital Boston and Dana-Farber Cancer Institute, Harvard Medical School, Boston, Massachusetts 02115, USA

²Stem Cell and Tissue Biology, Harvard Medical School, Boston, Massachusetts 02115, USA

³Department of Cell Biology, Harvard Medical School, Boston, Massachusetts 02115, USA

⁴Department of Cell Biology, Harvard Medical School, Boston, Massachusetts 02115, USA

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¹⁶Department of Cell Biology, Harvard Medical School, Boston, Massachusetts 02115, USA

¹⁷Department of Cell Biology, Harvard Medical School, Boston, Massachusetts 02115, USA

Virus-free induction of pluripotency and excision of reprogramming factors

■ Data must lead to the current proposal, supporting the feasibility of the proposed work

■ Demonstrate that the investigator has:

- mastery of (and/or access to) the required techniques
- ability to manage and work with collaborators/partners
- sufficient attention to important details (i.e. accurate, carefully assembled figures, tables, graphs)

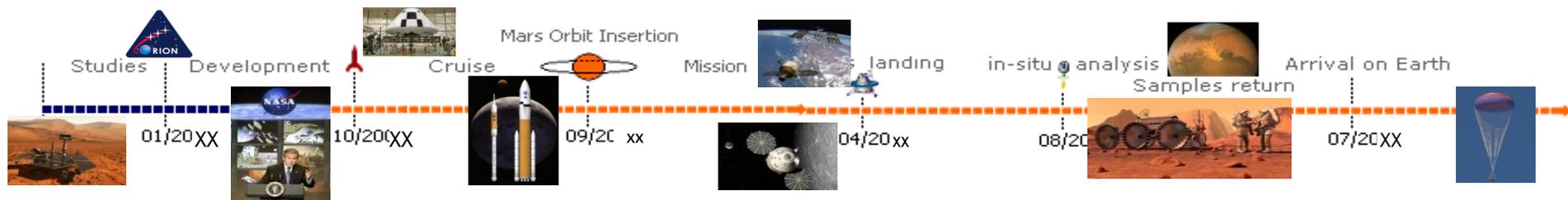
■ Reviewers will NOT look anything up!
Provide sufficient, *relevant* details for an informed judgment



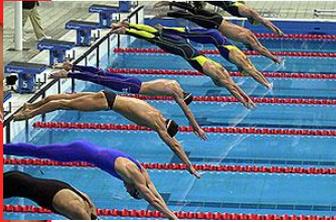
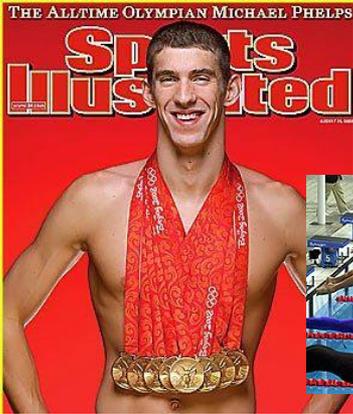
RESEARCH STRATEGY - Approach:

Methods: How will it be done?

- **Do tasks relate to the Specific Aims?**
 - Provide an overview and conceptual framework. Connect all the dots.
- **Are the experiments logical, grounded, and well-integrated?**
 - Why are the proposed methods the best way to go? Be sure this study is not “a technology looking for a problem”
 - Less detail needed for established techniques
 - Alternatives for high risk elements add to the feasibility
 - Biohazards identified here, then fully discussed in a subsequent section
- **Are end-points/milestones clearly defined, with appropriate benchmarks? Is there a sensible timeline?**
- **Is the appropriate statistical analysis included?**

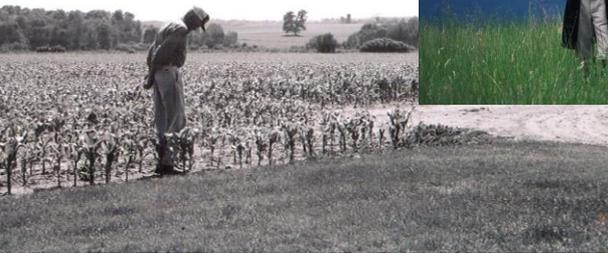


Be OUTSTANDING in your field...



- Cite *relevant* data, especially yours!
- Integrate observations from other fields: be disruptive BUT...
- Connect the dots
- Propose alternatives for the riskier aspects

... not OUTSTANDING in your field.



- Avoid jargon and uncommon usage
- Repeat and reinforce concepts, not language
- Follow the format
- Be concise yet clear

Enhancing Reproducibility: Rigor and Transparency in Research Grants



Element	Definition	Placement in Application	Notes
Scientific Premise	Key data justifying project	Significance	Exploratory science may need more explanation
Scientific Rigor	Robust, unbiased experimental design, methodology, analysis, interpretation, results reporting	Approach	Transparency establishes firm research foundation, supports innovation
Relevant Biological Variables	Critical factors affecting health or disease (e.g. sex, age, source, weight, genetic strain)	Approach	Consideration of sex <i>required</i> for human/animal studies
Key Resource Authentication	Integral components with inherent variability or unique characteristics (e.g. cell lines, biologics, speciality chemicals)	Attach plan (single page) as appendix	Not factored into scoring, but required prior to funding



Human and Animal Subjects

Important considerations in overall application scoring (feasibility of the work) and as pre-award administrative issues.

- ✓ Safeguarding the rights and welfare of individuals as subjects in research based on DHHS regulations and established, internationally recognized ethical principles.

www.hhs.gov/ohrp



- ✓ Grantees are responsible for the humane care and treatment of animals under NIH-supported activities.

grants.nih.gov/grants/olaw



Biosketches

- **Required for all investigators**
 - Each participant in a Multiple-PI application must show complementary and integrated expertise
- **List degrees chronologically**
- **A. Personal statement: your experience, qualifications needed for *this* project**, with up to four publications as evidence
- **B. List positions, honors**, concluding with current position
- **C. Contributions to Science**
 - Brief description of five areas: historical background, findings and impact
 - May include up to four publications (or other data, e.g. patents) as evidence
 - Include a link to complete publication list in PubMed
- **D. Research Support: overview, distinguish from proposed**
 - Ongoing and completed projects over past three years
 - Listed by relevance to the proposed work



Resources and Facilities

Identify and justify

■ Facilities

- Laboratory and offices, clinical sites, animal housing/handling, machine/electronics shops - if applicable

■ Multiple performance sites, as applicable

■ Equipment (especially if unusual)

■ How the environment will contribute to success

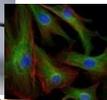
- institutional support, intellectual rapport, access to subject populations

■ For Early Stage Investigators: institutional investment in your success

- classes, training, collegial support, mentorship programs, logistical support, protected time for research with salary support, etc.

■ Handling of biohazards

- Consider safety of research personnel and/or environment



Budgetary Issues



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Developing Your Budget

On This Page:

- [Cost Considerations](#)
- [Budgets: Getting Started](#)
- [Allowable direct vs. allowable F&A costs](#)
- [Modular vs. Detailed Budgets](#)
- [Modular Budgets](#)
- [Detailed Budget: Personnel \(Sec A & B\)](#)
- [Detailed Budget: Equipment, Travel, and Trainee Costs \(Sec C, D, and E\)](#)
- [Detailed Budget: Other Direct Costs \(Sec F\)](#)
- [Consortiums/Subawards](#)
- [Understanding the Out Years](#)
- [Other resources](#)

As you begin to develop a budget for your research grant application and put all of the relevant costs down on paper, many questions may arise. Your best resources for answering these questions are the grants or sponsored programs office within your own institution, your departmental administrative officials, and your peers. They can answer questions such as:

- What should be considered a direct cost or indirect cost?
- What is the fringe benefit rate?
- What is the graduate student stipend rate?
- What Facilities and Administrative (F&A) costs rate should I use?

Below are some additional tips and reminders we have found to be helpful for preparing a research grant

http://grants.nih.gov/grants/developing_budget.htm

Getting Funded in an Emerging Field

NIH funds **high risk/high reward** research if there is

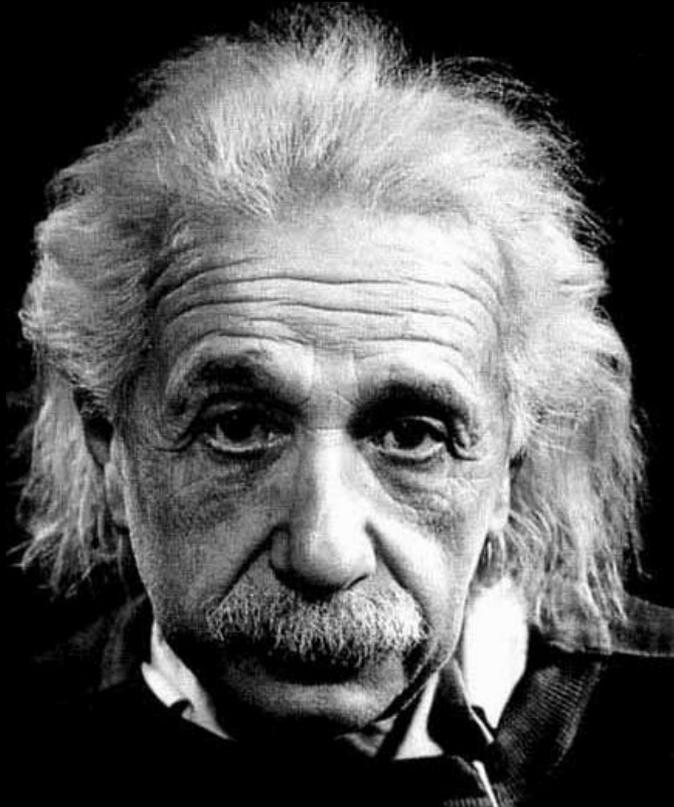
- Potential for high impact
- Novel approach, not necessarily a new idea (a fundamental publication builds credibility)
- Deep expertise in the general area on the team (confidence in capability is key)
- A compelling research plan—anticipate obstacles and propose alternatives
- **BONUS POINTS:** reviewer familiarity with the basics



... improving health by leading the development and accelerating the application of biomedical technologies



"Simple can be harder than complex. You have to work hard to get your thinking clean to make it simple. But it's worth it in the end, because once you get there, you can move mountains."

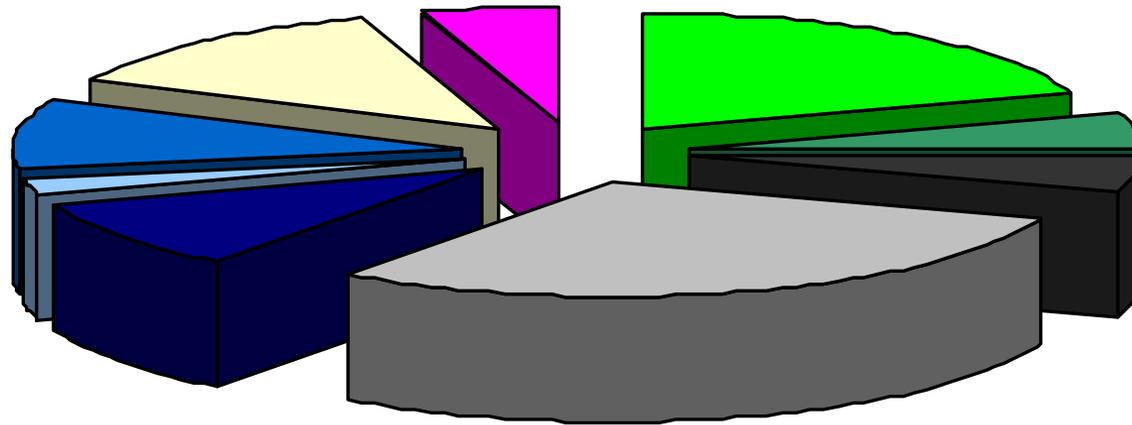


"Everything should be made as simple as possible, but not simpler."



NIH Grant Application?

Read your completed draft
with a reviewers eye!



- “Significance”
- Actual Significance
- Axe Grinding
- Quality Science
- “Translation”
- Actual Translation
- Bragging
- Handwaving
- Begging for Spare Change

Realistically revise.

Do I Contact NIH *Before* Applying?

Mandatory:

- Application with budget \geq \$500,000 direct costs for any single year
- R13 Conference Grants

Optional:

- When RFA's request a Letter of Intent

Recommended:

- When you think about applying for *any* grant



The Application is Complete...You're Done!



Well, actually, now you are ready to start the submission process.

- **Grants.gov is the portal for NIH applications**
- **eRA Commons is the doorway to the NIH system**



Just Send it



Submit Through grants.gov...



Key Take-Aways:

- Only the [Authorized Organizational Representative](#) (AOR) has the authority to submit applications.
- You are responsible for verifying that the application is viewable in the eRA Commons. If you cannot view the application in the Commons, we can't review it.
- You must correct all errors before the eRA system will assemble an application image.
- If you experience a [system issue](#) that you believe threatens your ability to submit on time, carefully follow these [guidelines](#) to document your problems and continue working to resolve your issues.

Now It's Our Turn: The Review Process

- Find the Best Review Committee
- Understand the Assessment
- Responding to the Evaluation



Once You've Successfully Submitted...

Receipt and Referral,

Center for Scientific Review (CSR)

Electronic SF424 R&R
submitted through grant.gov
and the eRA Commons

Error free, warnings addressed

CSR Referral Office
assigns the
application...

Application assessed for
completeness & eligibility

to an NIH Institute (IC)

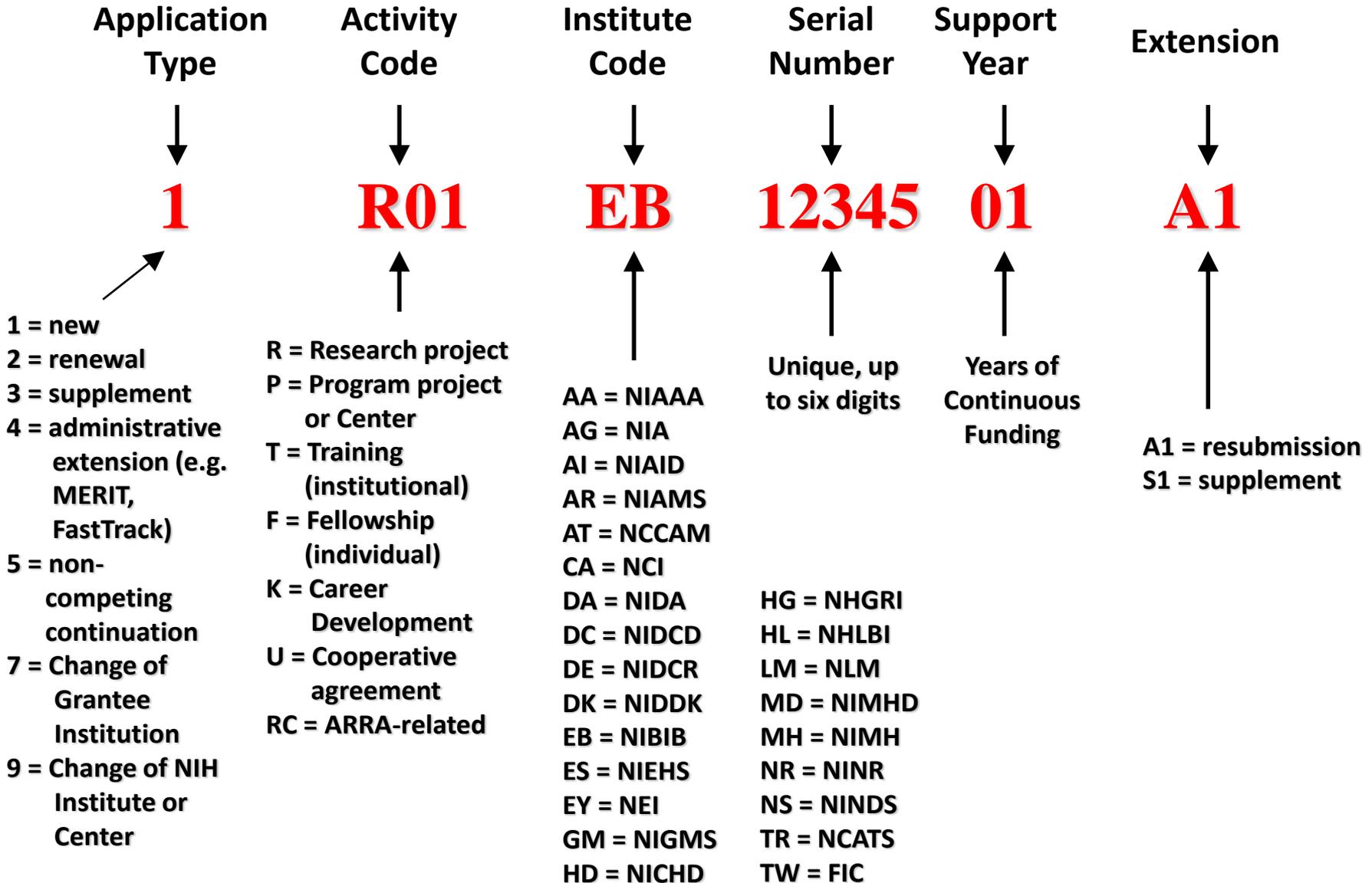
to Integrated Review
Group (IRG) and then a
study section (SRG)

a unique identifier
(application number)

Notice of assignment available in
eRA Commons in 4 weeks.

Check your eRA Commons account for updates!

Decoding Your NIH Grant Number



What happens to your grant application?

NIH
Peer Review?

Your proposals?



It's an orderly universe.

Your application is reviewed by either ...

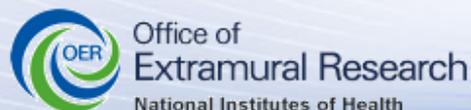
- **Chartered (Standing) Scientific Review Group (SRG), or “Study Section”**
- **Special Emphasis Panel (SEP)**
 - **organized by the Center for Scientific Review (CSR)**
 - **Conflicts on the panel (e.g. reviewer is a PI on the grant application)**
 - **Special review for a unique solicitation (e.g. PAR)**
 - **convened within a home IC of a highly specific initiative (e.g. RFA)**

Peer Review and You



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[Frequently Asked Questions](#)

Peer Review Policies & Practices

- On This Page:**
- [What's New in Peer Review](#)
 - [Peer Review Archive](#)
 - [Information for Reviewers](#)
 - [Peer Review Practices and Policies](#)

Overview of Peer Review Process

- This page provides detailed information about Peer Review Policies and Practices. For an overview of general information about Peer Review, visit [Peer Review Process](#).

What's New in Peer Review

- [NOT-OD-11-101](#) Resubmission of Applications with Pending Appeals of NIH Initial Peer Review
- [NOT-OD-11-064](#) Appeals of NIH Initial Peer Review
- [NOT-OD-11-047](#) Notice of Change in Policy on the Submission of Reference Forms for Kirschstein-NRSA Fellowships
- [NOT-OD-11-035](#) NIH Policy on Late Submission of Grant Applications
- [NOT-OD-11-023](#) Reminder of Policies Affecting Submission of NIH Grant Applications

Related Resources

- [Related Archives](#)
- [NIH Peer Review Policies and Practices \(NIH Staff Only\)](#)
- [Rosters of NIH Scientific Review Groups](#)
- [Office of Federal Advisory Committee Policy](#)
 - [Meeting Schedule for all Advisory Councils](#)
 - [More Information about each Council available on IC websites](#)
- [Enhancing Peer Review](#)
- [Peer Review Advisory Council \(PRAC\)](#)
- [Peer Review Notes](#)

<http://grants.nih.gov/grants/peer/peer.htm>

Your application may be **REVIEWED** by one of:

Bioengineering Sciences and Technology (BST)

BDMA, BMBI, GDD, ISD, MABS, NANO

Healthcare Delivery and Methodologies (HDM)

BCHI, BMRD, CIHB, CLHP, DIRH, HDEP, HSOD, NRCS

Surgical Sciences and Biomedical Imaging and Bioengineering (SBIB)

BMIT-A/B, BTSS, CMIP, MEDI, SAT, F15

Endocrinology, Metabolism, Nutrition and Reproductive Systems (EMNR)

MCE, ICER, CMIR, PN, CADO, IPOD, CIDO, INMP, F06

Immunology (IMM)

CMIA/B, HAI, IHD, III, IMM-M, TTT, VMD, F07

Interdisciplinary Medical Sciences and Training (IMST)

EBIT, various training

Emerging Technologies and Training in Neuroscience (ETTN)

MNG, BNVT, NOIT, F01/2/3

Cell Biology (CB)

BVS, NCSD, CMAD, CSRS, DEV1/2, ICI, MBPP, MIST

Musculoskeletal Oral and Skin Diseases (MOSS)

ACTS, MRS, MTE, ODCS, SBDD, SBSR, SMEP

Cardiovascular and Respiratory Sciences (CVRS)

CCHF, CDD, CICS, ESTA, LCMI, LIRR, MIM, RIBT, F10A

Integrative, Functional and Cognitive Neuroscience (IFCN)

AUD, LAM, NAL, NMB, NNRS, SCS, SMI, SPC

Vascular and Hematology (VH)

AICS, ELB, HM, HP, MCH, VCMB, F10B

Biology of Development and Aging (BDA)

International/Cooperative Projects

Behavior and Behavioral Processes (BBBP)

APDA, BRLE, CP, CPDD, LCOM, MESH, MFSR

Infectious Diseases and Microbiology (IDM)

BACP, CRFS, DDR, HIBP, PTHE, VB, VIRA/B, F13

Risk Prevention and Health Behavior (RPHB)

BMIO, PDRP, PRDP, RPIA, SPIP, F16

Digestive, Kidney and Urological Systems (DKUS)

CIMG, GMPB, HBPP, KMBD, PBKD, UGPP, XNDA

Population Science and Epidemiology (PSE)

BGES, CASE, EPIC, IRAP, KNOD, NAME, SSPA/B

Molecular, Cellular and Developmental Neuroscience (MDCN)

BPNS, CMBG, CMND, DDNS, MNPS, NCF, NDPR, NOMD, NTRC, SYN

AIDS and AIDS Related Research (AARR)

ACE, ADDT, AIP, AMCB, AOIC, BSCH, BSPH, NAED, VACC

Brain Disorders and Clinical Neuroscience (BDCN)

ANIE, ASG, BINP, CDIN, CNBT, CNN, CNNT, DBD, DPVS, NPAS, PMDA

Biological Chemistry and Molecular Biophysics (BCMB)

BBM, MSFA/B/D/C/D, SBCA/B

Genes, Genomes and Genetics (GGG)

MGA/B, GCAT, GVE, GHD, PCMB, TAG

Oncology 1 – Basic Translational (OBT)

CAMP, CE, CG, MONC, TCB, TME, TPM

Oncology 2 – Translational and Clinical (OTC)

BMCT, CBSS, CDP, CII, CONC, DMP, DT, RTB

>200 Standing Scientific Review Groups (SRGs or Study Sections) housed in 25 Integrated Review Groups at CSR

How to Identify the Best Study Section

[CSR Home](#) > [Study Sections](#)

Study Sections

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Find a Study Section

Applications are reviewed in Study Sections (Scientific Review Group, SRG). Integrated Review Groups (IRGs) are clusters of Study Sections based on scientific discipline.

[Go](#)

Type Review Committee acronym here, or...

[Integrated Review Groups \(IRGs\)](#)

Review activities of the Center for Scientific Review (CSR) are organized into Integrated Review Groups (IRGs). Each IRG represents a cluster of study sections around a general scientific area. Applications generally are assigned first to an IRG, and then to a specific study section within that IRG for evaluation of scientific merit.

Policy Changes

- » [Reminder: NIH Policy on Application Compliance](#)
- » [New Due Dates for SBIR/STTR Grant](#)
- » [New Bio-Sketch Format for Applications Submitted for Due Dates on or After May 25, 2015](#)
- » [More ...](#)

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 - [Small Business and Technology Transfer](#)
 - [Fellowship](#)
 - [Special Emphasis](#)

[CSR Home](#) > [Study Sections](#) > [Integrated Review Groups](#)

CSR Integrated Review Groups

- [AIDS and Related Research IRG \[AARR\]](#)
- [Biobehavioral and Behavioral Processes IRG \[BBBP\]](#)
- [Biological Chemistry and Macromolecular Biophysics IRG \[BCMB\]](#)
- [Biology of Development and Aging IRG \[BDA\]](#)
- [Brain Disorders and Clinical Neuroscience IRG \[BDCN\]](#)
- [Bioengineering Sciences and Technologies IRG \[BST\]](#)
- [Cell Biology IRG \[CB\]](#)
- [Cardiovascular and Respiratory Sciences IRG \[CVRS\]](#)
- [Digestive, Kidney and Urological Systems IRG \[DKUS\]](#)
- [Emerging Technologies and Training Neurosciences IRG \[ETTN\]](#)
- [Endocrinology, Metabolism, Nutrition and Reproductive Sciences IRG \[EMNR\]](#)
- [Genes, Genomes, and Genetics IRG \[GGG\]](#)
- [Healthcare Delivery and Methodologies IRG \[HDM\]](#)
- [Infectious Diseases and Microbiology IRG \[IDM\]](#)
- [Integrative, Functional and Cognitive Neuroscience IRG \[IFCN\]](#)
- [Immunology IRG \[IMM\]](#)
- [Interdisciplinary Molecular Sciences and Training IRG \[IMST\]](#)
- [Molecular, Cellular and Developmental Neuroscience IRG \[MCDN\]](#)

- » [NIH Research Involving Chimpanzee](#)
- » [New Dates Investigator R01 Applications Submitted for Standard D](#)
- » [More ...](#)

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Bioengineering Sciences and Technologies IRG [BST]

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The Bioengineering Sciences and Technologies [BST] IRG reviews grant applications that focus on fundamental aspects of bioengineering and technology development in the following areas: gene and drug delivery systems, imaging principles for molecules and cells, modeling of biological systems, bioinformatics and computer science, statistics and data management, instrumentation, chips and microarrays, biosensors, and biomaterials. Biological context is important in bioengineering, and a central premise in organization of this IRG is the need for effective review of bioengineering and technology development in early stages before specific practical uses are proven.

Study Sections

- » [Biodata Management and Analysis Study Section \[BDMA\]](#)
- » [Biomaterials and Biointerfaces Study Section \[BMBI\]](#)
- » [Gene and Drug Delivery Systems Study Section \[GDD\]](#)
- » [Instrumentation and Systems Development Study Section \[ISD\]](#)
- » [Modeling and Analysis of Biological Systems Study Section \[MABS\]](#)
- » [Nanotechnology Study Section \[NANO\]](#)

Applications

Research grants (R01, R21, R15, etc.), Program Project and Center Grants (P01, P41 etc.), and Cooperative Agreements (U01, U54 etc.) are reviewed in the BST IRG.

Policy Changes

- » [Reminder: NIH Policy on Application Compliance](#)
- » [New Due Dates for SBIR/STTR Grant Applications](#)
- » [Simplifying the NIH Policy for Late Application Submission](#)
- » [New Bio-Sketch Format for Applications Submitted for Due Dates on or After May 25, 2015](#)
- » [More ...](#)

FAQs

- » [For Applicants](#)
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Biomaterials and Biointerfaces Study Section [BMBI]

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**Review Group Description:
What is the science focus?**

The Biomaterials and Biointerfaces Study Section (BMBI) reviews applications concerned with biologically relevant research in materials science and the interaction of materials surfaces with biological systems. Applications driven by bioengineering principles are typical. Areas of interest include the theory, principles, design and synthesis of biomaterials as well as characterization of new or existing materials. BMBI has related interests in the interactions of biomaterials with proteins, membranes, cells, and tissues.

Rosters

BMBI Membership Roster

[BMBI Meeting Rosters](#)

Topics

- » Development and characterization of biomaterials; Self-assembled materials; Design principles, material processing, and combinatorial approaches to the synthesis of new biomaterials; Biocompatibility, toxicity, structure/property relationships, and biodurability.
- » New biomaterials and fabrication techniques for tissue engineering, transport and perfusion aspects of tissue engineering, and bioreactors.
- » Molecular/cellular interfacial interactions; Non-fouling and bioactive surfaces; Improved understanding of the biology-biomaterials interface; Biosurface characterization and technology; Patterning; Surface characterization at the nano-scale.
- » Chip- and micro-array-based microtechnologies and biosensors, with a focus on biorecognition, biocompatibility, nonfouling surfaces, and fouling mechanisms; Includes MEMS (micro-electro-mechanical-systems), lithographic and microfluidic elements.
- » Drug and gene delivery systems and nanoparticles, with a focus on the carrier material, fabrication, biocompatibility, and toxicity.

- » [New Due Dates for SBIR/STTR Grant Applications](#)
- » [Simplifying the NIH Policy for Late Application Submission](#)
- » [New Bio-Sketch Format for Applications Submitted for Due Dates on or After May 25, 2015](#)
- » [More ...](#)

- ### FAQs
- » [For Applicants](#)
 - » [For Reviewers](#)

Closely Related

Science Focus of "nearest neighbor" study sections

- [Gene and Drug Delivery Systems \(GDD\)](#)
- [Nanotechnology \(NANO\)](#)
- [Bioengineering, Technology, and Surgical Sciences \(BTSS\)](#)
- [Enabling Bioanalytical and Biophysical Technologies \(EBT\)](#)
- [Instrumentation and Systems Development \(ISD\)](#)

Cover Letters Help Target Your Review

Applicants can suggest

- Review Group assignment
- Expertise necessary for a full and fair review
- Primary (and secondary) Institute or Center (IC) assignment
- Reviewers with potential conflicts
- **Do not suggest possible reviewers, they will be disqualified.**

Other Important Information

- Reasons for a late submission
- Note eligibility for continuous submission
- Highlight this application as one of a set, if applicable
- Acknowledge NIH approval for acceptance of
 - A budget >\$500K/yr
 - Conference grant



Suggested format and other information at

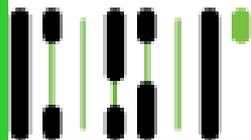
<http://cms.csr.nih.gov/ResourcesforApplicants/CoverLet.htm>



NIH Peer Review Revealed...



national institutes of health

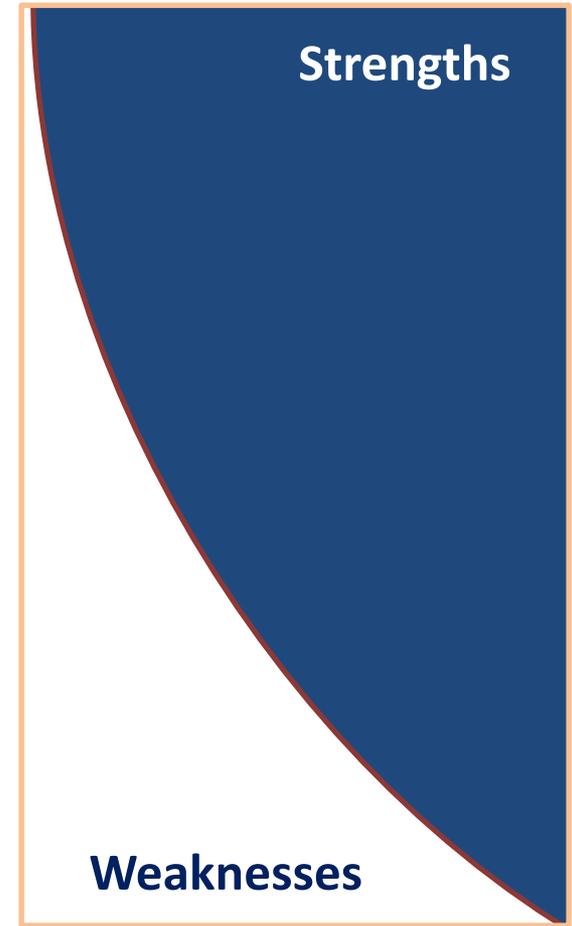


center for
scientific review

<http://cms.csr.nih.gov/ResourcesforApplicants/InsidetheNIHGrantReviewProcessVideo.htm>

NIH Scoring System

Impact	Full Description	Score	Descriptor
High	Exceptionally strong with essentially no weaknesses	1	Exceptional
	Extremely strong with negligible weaknesses	2	Outstanding
	Very strong with only some minor weaknesses	3	Excellent
Medium	Strong but with numerous minor weaknesses	4	Very Good
	Strong but with at least one moderate weakness	5	Good
	Some strengths but also some moderate weaknesses	6	Satisfactory
Low	Some strength but with at least one major weaknesses	7	Fair
	A few strengths and a few major weaknesses	8	Marginal
	Very few strengths and numerous major weaknesses	9	Poor



Minor weakness: Easily addressable weakness that does not substantially lessen impact.

Moderate Weakness: Impact lessened.

Major Weakness: Impact severely limited.

overall impact score = panel average x 10.

Most scores are then percentiled for comparison across review groups.

What Goes Into the Impact Score?

Evaluation Criteria

- ✓ Significance
- ✓ Investigator(s)
- ✓ Innovation
- ✓ Approach
- ✓ Environment

Impact = likelihood of a sustained, powerful influence on the field

Each gets a score.
The overall **Impact Score** is **NOT AN AVERAGE OF THESE**, because reviewers rate criteria differently.

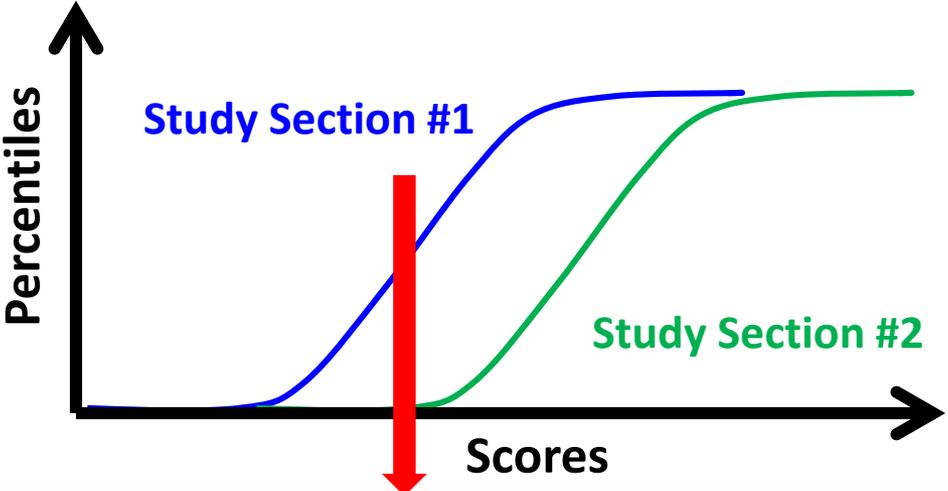
Other Elements Affecting Score

- ✓ Human/Animal Subjects Protections
- ✓ Biohazards

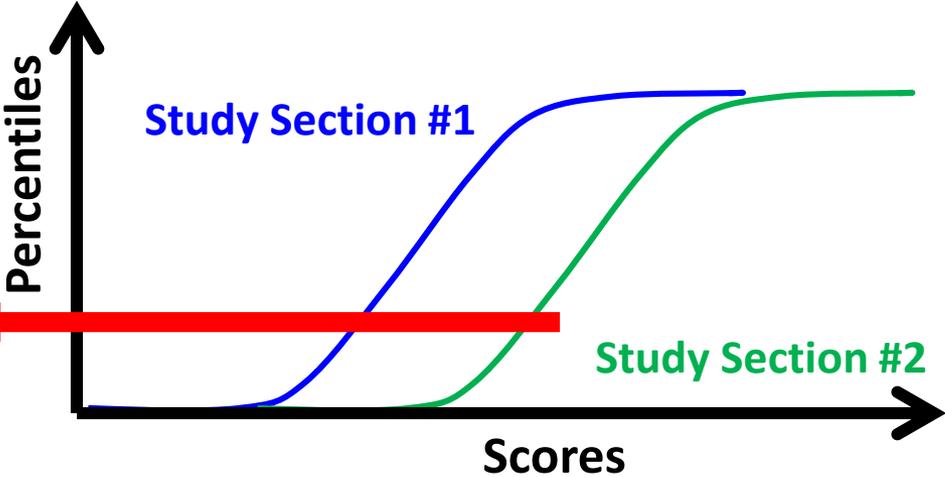
Administrative Concerns (not scorable)

- ✓ Time and Budget
- ✓ Commitment/Technical Overlap
- ✓ Resource Sharing
- ✓ Other?

Why Percentiles?

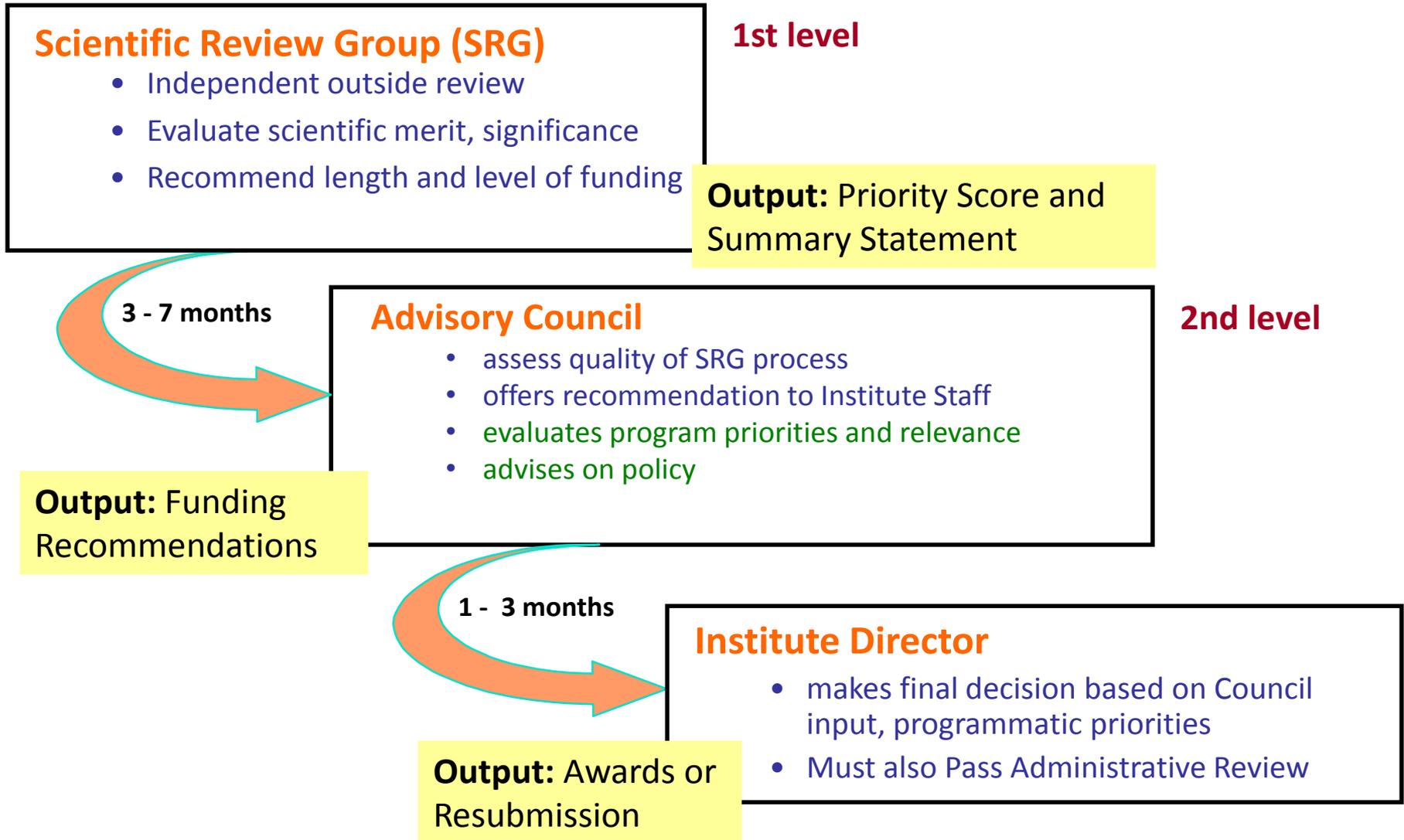


Discrimination by score favors Study Section #1



Discrimination by percentile shows no favor

NIH's Review System for Grants



Who Makes Actual Funding Decisions?



The Institute Director!

Factors Considered:

- Scientific Merit
- Contribution to Institute Mission
- Program Balance
- Availability of Funds



Close, but no cigar?

You get one more try.

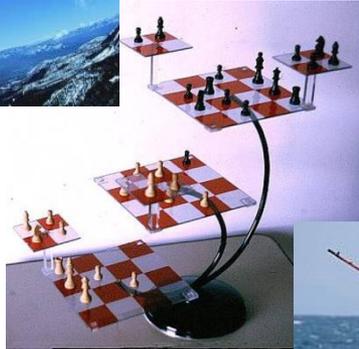


- **Revise and Resubmit**
- **It's not personal**
- **Absorb the critiques**
 - make suggested changes
 - provide additional justification for your original approach
- **Explain the changes in a one page "Introduction"**

**If at first
you don't
succeed,
redefine
SUCCESS**



... or, Submit a NEW APPLICATION



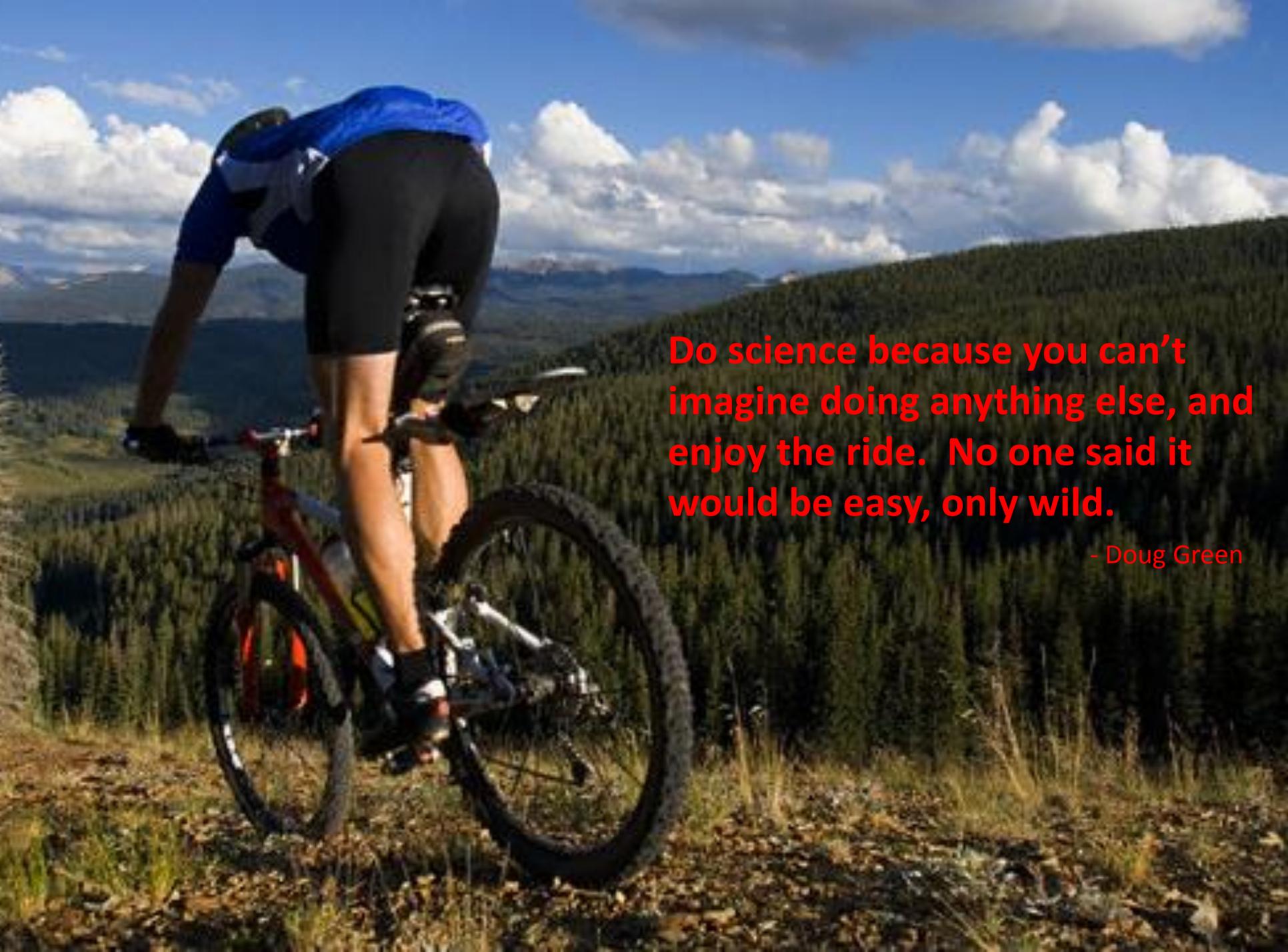
The Program Official can
help you plow new ground.



Common Problems

- **Low/No significance**
 - Unimportant problem limits significance
 - Unconvincing case limits impact; feasibility questionable
 - Irrelevant, inconsistent, or insufficient reference to published work
- **Weak PI/Research team:** Insufficient experience with essential methodologies
- **Lack of innovation:** evolutionary not revolutionary
- **Questionable reasoning in experimental approach**
 - Errors in design = FATAL FLAW
 - Failure to consider potential pitfalls and alternatives
- **Diffuse, superficial, or unfocused research plan**
 - Lack of critical experimental detail
 - Unrealistically large amount of work proposed
 - No clear milestones, decision points
- **Poor environment:** weakly documented institutional support
- **Serious/unresolvable human/animal subjects or biohazard concerns**

See also: <http://www.principalinvestigators.org/article.php>



**Do science because you can't
imagine doing anything else, and
enjoy the ride. No one said it
would be easy, only wild.**

- Doug Green



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National Institutes of Health (NIH)

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**Are you ready to run
with the big dogs?**