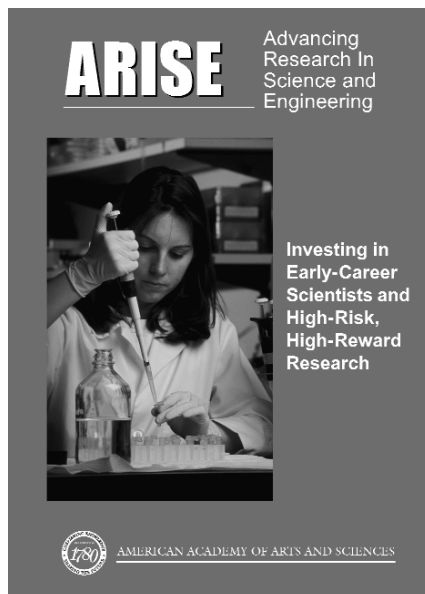


# Academy News and Projects

## Academy Report Recommends Changes in Federal Science Funding



A new Academy white paper, titled *ARISE – Advancing Research In Science and Engineering: Investing in Early-Career Scientists and High-Risk, High-Reward Research*, argues that for America to remain competitive in the new global environment, it must develop funding policies and grant programs specifically dedicated to support early-career scientists and stimulate high-risk, high-reward research. Over the past year, a blue-ribbon panel of leaders from science, industry, and the public policy sector, chaired by Nobel laureate and Howard Hughes Medical Institute President Thomas Cech, analyzed current science-funding mechanisms and devised strategies to maximize the impact of federal science dollars.

“The Academy asked this committee to examine the impact and best uses of federal science funding for the long-term benefit of the nation,” notes Cech. “Our study calls on federal agencies, research institutions, universities, and private foundations to provide secure funding for the best and brightest young scientists and to bolster innovative, breakthrough research that could potentially transform our approaches to some of the world’s gravest problems.”

Today’s early-career faculty will be responsible for our nation’s future scientific and technological discoveries and for the education of new Ph.D.-level scientists and engineers. Yet, as this report demonstrates, they are disproportionately disadvantaged by intensified competition for research funds. Data indicate that the average age of those receiving individual (RO1) research grants from the National Institutes of Health is 51.7; and the average age for first-time awards has risen to 42.9. To address this issue, federal agencies should:

- Create or strengthen existing large, multi-year award programs for early-career faculty.
- Adopt career-stage-appropriate expectations for mainstream grant funding, with merit-review processes tailored for beginning independent researchers.
- Initiate policies responsive to the needs of primary caregivers, primarily women, such as grant extensions or other support mechanisms to enable them to advance in science and engineering.

Universities need to contribute as well by actively mentoring young faculty and reviewing tenure and promotion criteria to ensure that those who participate in collaborative, team-based research projects receive appropriate credit for their work.

To expand and encourage high-risk, high-reward investigations, the Academy report advocates the development of both specialized federal programs to foster potentially transformational research and initiatives within established award programs that boost more creative proposals. It also maintains that the overburdened peer-review system and the relatively low investment in administrative support for agency program officers are additional obstacles to the funding of risky research.

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### Project Committee Members

Thomas Cech, *Chair* (Howard Hughes Medical Institute)

David Baltimore (California Institute of Technology)

Steven Chu (Lawrence Berkeley National Laboratory)

France Córdova (Purdue University)

Thomas Everhart (California Institute of Technology)

Richard Freeman (Harvard University)

David Goldston (former Staff Director, House Science Committee)

Susan Graham (University of California at Berkeley)

Robert Horvitz (Massachusetts Institute of Technology)

Linda Katehi (University of Illinois at Urbana-Champaign)

Peter Kim (Merck Research Laboratories)

Neal Lane (Rice University)

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Daphne Preuss (University of Chicago/Chromatin, Inc.)

David Sabatini (New York University)

Randy Schekman (University of California at Berkeley)

Richard Scheller (Genentech)

Albert Teich (American Association for the Advancement of Science)

Mark Wrighton (Washington University in St. Louis)

Keith Yamamoto (University of California at San Francisco)

Huda Zoghbi (Baylor College of Medicine)

Leslie C. Berlowitz, *ex officio* (American Academy of Arts and Sciences)

## Lounsbery Foundation Grant Promotes Report's Findings

The Richard Lounsbery Foundation has awarded the Academy support to promote *ARISE – Advancing Research In Science and Engineering: Investing in Early-Career Scientists and High-Risk, High-Reward Research* to a broad scientific audience, as well as to policymakers in Washington, D.C. The grant supports the design and printing of the *ARISE* report, as well as its broad dissemination among target audiences.

The Academy will widely circulate the report's findings to senior policy officials at the major federal funding agencies, industry executives, congressional leaders, university administrators, and members of national academic and scientific societies. Committee members and Academy staff presented the study's recommendations at recent meetings of the Association of American Universities, the American Association for the Advancement of Science, and the National Postdoctoral Association, among others. Several national scientific membership organizations are collaborating with the Academy to publicize the report in their publications and on their websites.

*ARISE* report continued from page 1

Other aspects of the current federal funding environment impede the research of early-career faculty and stifle transformative research. One of the key recommendations of the report is the systematic tracking of demographic data about grant applicants on a government-wide basis. Only a few federal funding agencies collect demographic information about applicants, and no agency follows the funding success of individuals over time. The current nonstandardized tracking among funding agencies hinders efforts to assess how well we are supporting early-career scientists.

Here again, universities need to accept their share of responsibility for advancing path-breaking research. Charging a portion of faculty salaries to grants is necessary and appropriate, but the extreme model of expecting faculty to raise all of the funds for their own salaries, their students' stipends and tuition, and their research space discourages risk-taking by younger and well-established scientists alike. As funds are raised to construct research buildings, campaign goals should include a continuing responsibility to maintain the facility and to support programmatic activities.

*ARISE* was released at the National Press Club in Washington, D.C., on June 3. Thomas Cech, Neal Lane, and Keith Yamamoto highlighted the committee's findings and recommendations. The audience included senior representatives from government agencies, research universities, and science organizations, as well as early-career scientists, congressional staff, and members of the press.

The report was conducted by the Academy's Initiative for Science, Engineering, and Technology, cochaired by Charles Vest (National Academy of Engineering) and Neal Lane (Rice University). Its purpose is to examine the role that science and technology play in society today, how that role has changed, and how we can better prepare for the future. The full report may be downloaded from the Academy website at <http://www.amacad.org/ARISE>.

The Academy is grateful to the S. D. Bechtel, Jr. Foundation; Stephen D. Bechtel, Jr.; the Howard Hughes Medical Institute; the Richard Lounsbery Foundation; and the Merck Company Foundation for supporting this work. ■

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## Statements of Support

"Among the greatest risks America can take in its science and engineering research enterprise is to become risk averse or to overlook the immense contributions that have historically been made in these fields by younger researchers. The American Academy's *ARISE* report points the way to address the opportunities implicit in these considerations."

– Norman R. Augustine, Retired Chairman and Chief Executive Officer, Lockheed Martin Corporation

"Faculty in science and engineering are the idea engines that drive technological progress in America. The American Academy's *ARISE* report provides a frank assessment of the danger we face if, due to increasingly constrained funding, we lose our most promising scientists from the basic science arena."

– Bonnie L. Bassler, Squibb Professor and Director of Graduate Studies in the Department of Molecular Biology, Princeton University; Howard Hughes Medical Institute Investigator

"Focused, sensible, realistic, well-researched, and well-documented, this report addresses two primary weaknesses in federal research strategy. Our national ability to innovate and compete ultimately depends on attracting the best and brightest young men and women to research careers and enabling them to pursue bold new ideas. Hence, the guidance in this report is critically important."

– Charles M. Vest, President, National Academy of Engineering

"Tom Cech and his colleagues address two of the most significant problems in today's research environment: the delays in establishing the independence of new investigators and the reluctance to support research that can fundamentally change the way we think. The recommendations will be of interest to those in government, other funding agencies, and universities who have the potential to change current practices."

– Harold Varmus, President, Memorial Sloan-Kettering Cancer Center