

Shared Instrumentation & High End Instrumentation Grant Programs

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Division of Construction and Instruments (DCI)
Office of Research Infrastructure Programs (ORIP)
Division of Coordination Planning and Strategic
Initiatives (DPCPSI/ OD)
National Institutes of Health



Unique and critical programs to NIH mission

Shared Instrumentation Grant (SIG) : \$100K → \$600K

A new PAR with a single due date is posted annually

High End Instrumentation (HEI) Grant: \$750K → \$2.0M

A new PAR with a single due date is posted biennially

Requirements

- Eligibility: Major User group of 3 or more NIH-supported grantees (15 NIH-funded users on average)
- Demonstrated need for the new instrument
- Enhancement of the NIH-funded research projects
- Appropriate technical expertise
- Plan to administer the grant and assure equitable use
- Institutional commitment

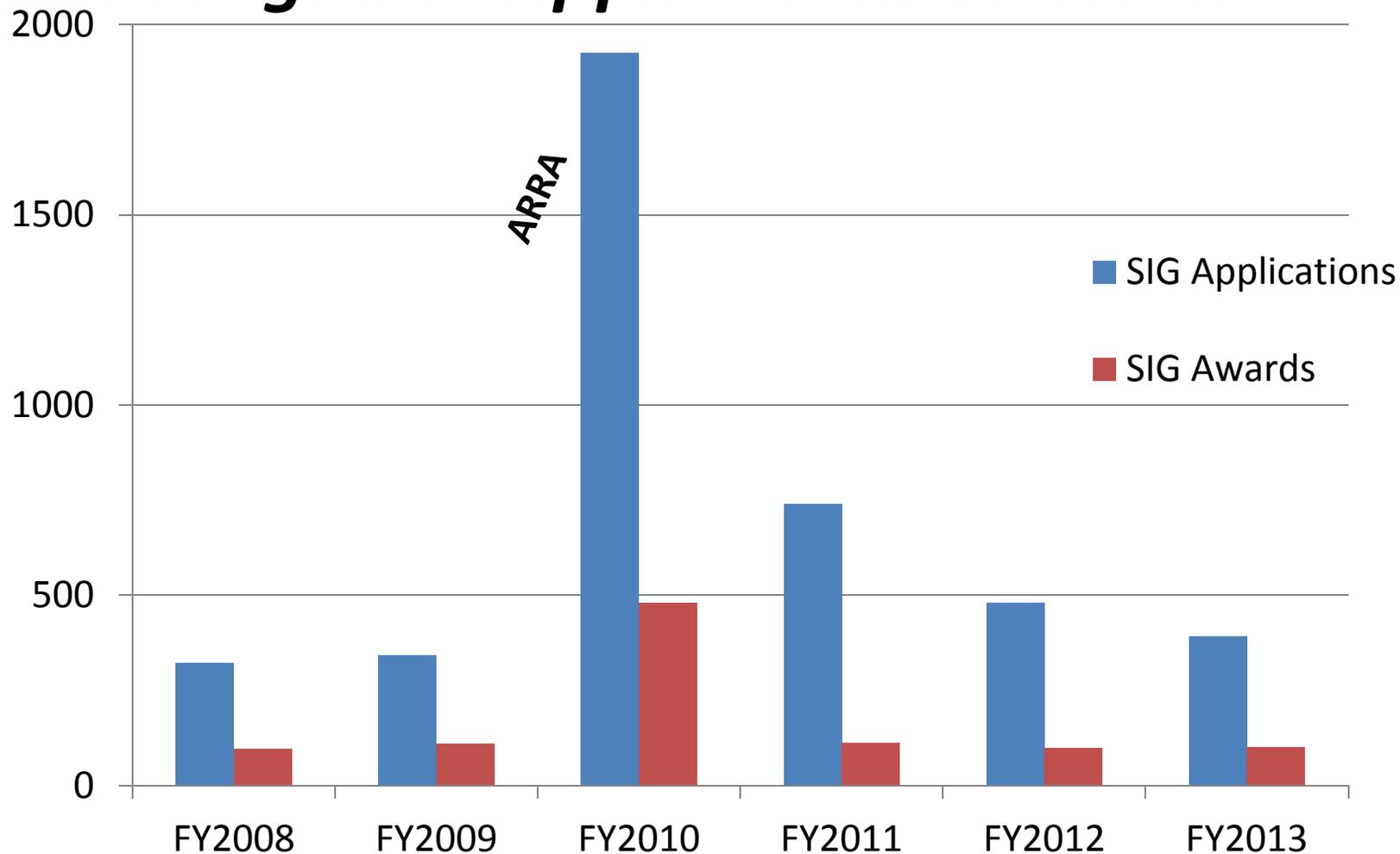
Other features

- Commercially available, specialized instruments
- Funding for the purchase of the instrument (not for service contract, personnel)
- No limitation on the # of applications per institution
- Co-funding not required
- Frequently placed in core facilities
- Review conducted by CSR

Major challenges

- New science requires advanced technologies
- Fast obsolescence of instruments
- Novel costly technologies/ instrumentation
- More complex operation

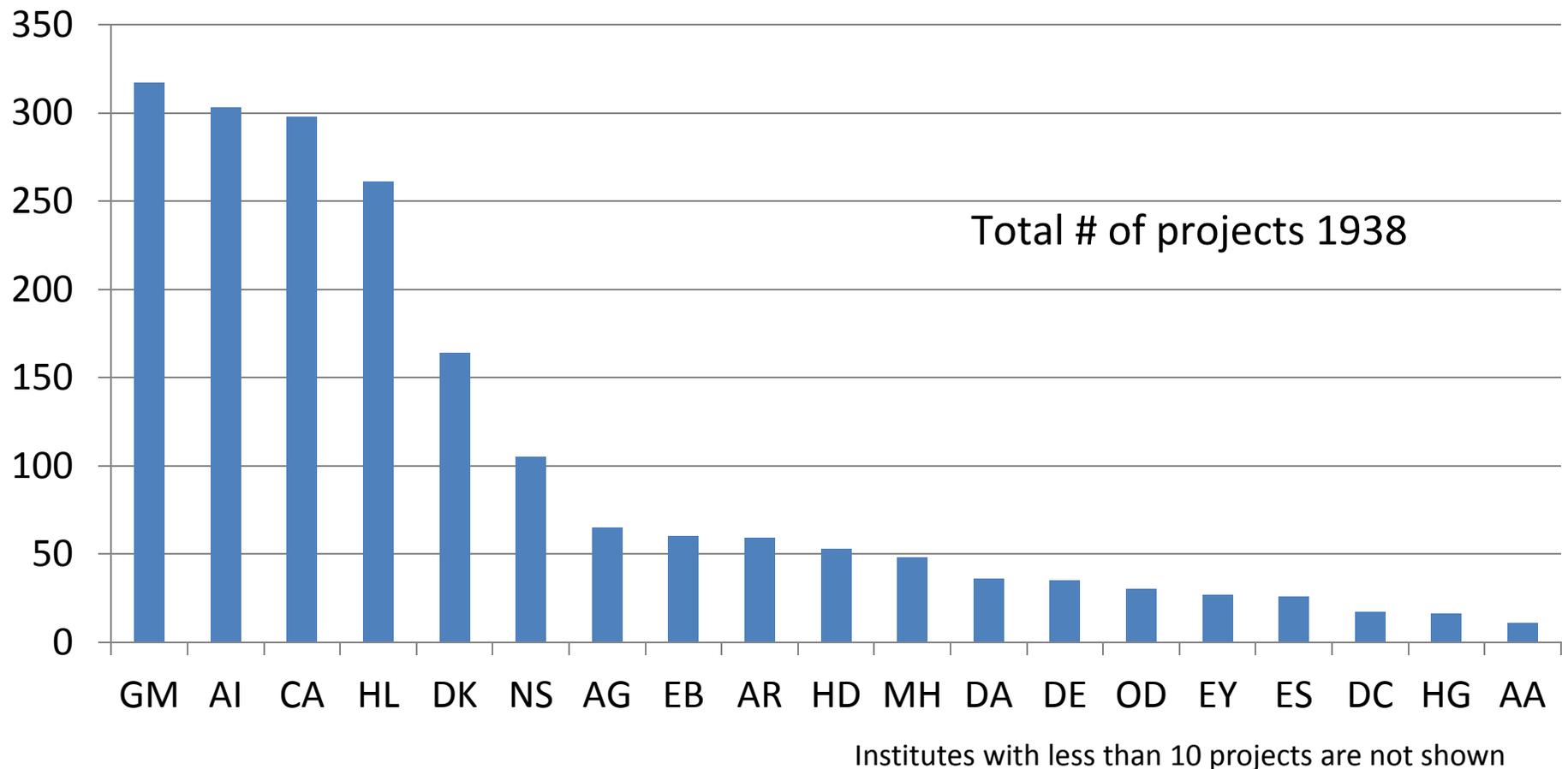
SIG Program : Applications vs. Awards



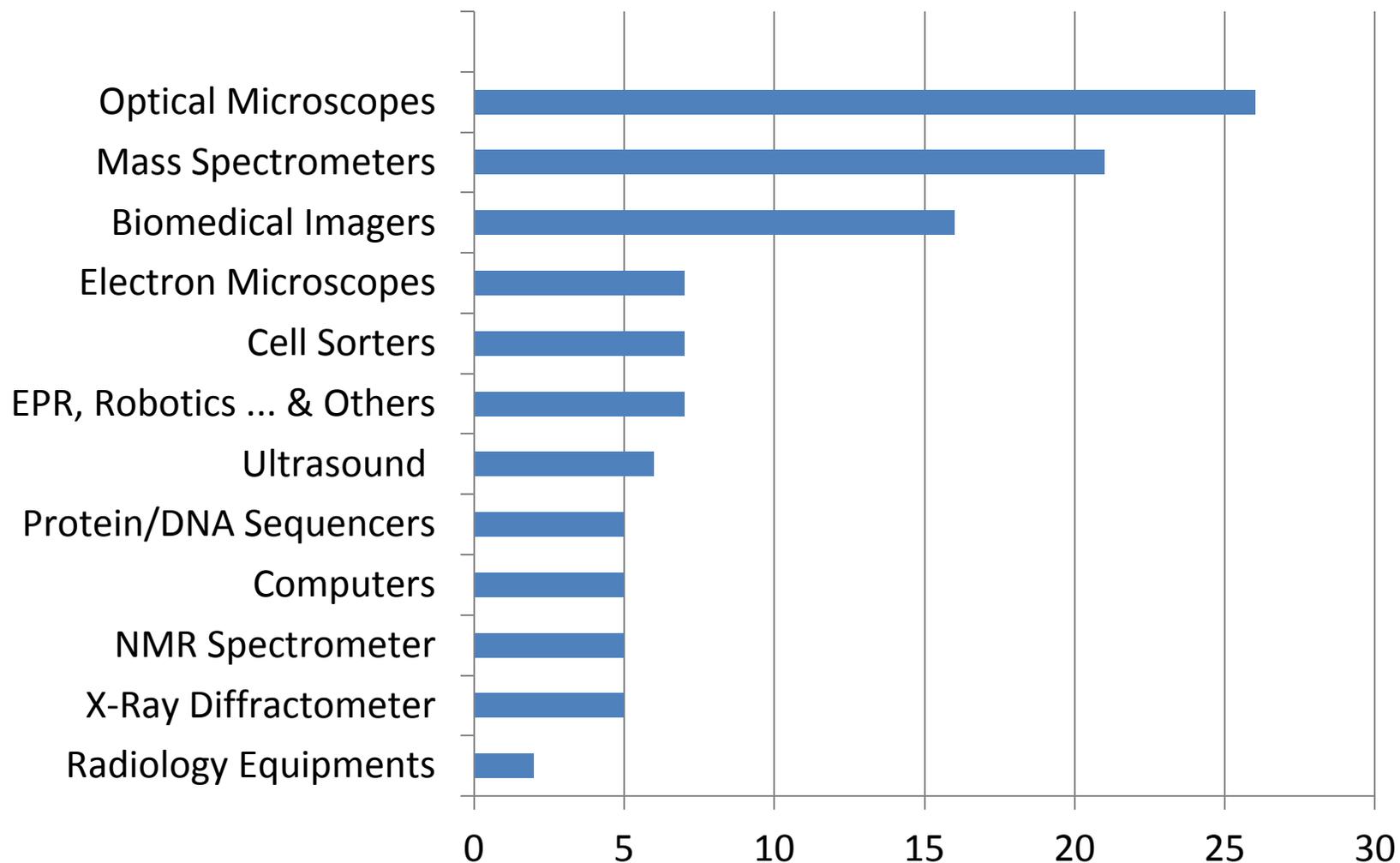
FY 2013 Budget/Awards

Program	Budget in \$ M	Awards
SIG	44.4	102
HEI	23.1	16
Total	67.2	118

Instruments impact on Institutes' projects (FY 2013)



SIG & HEI Awards by Instrument Type



D.W. TANK, S. OGAWA AND K. UGURBIL

BRAIN IMAGING

Mapping the brain with MRI

Magnetic resonance imaging can provide maps of human mental operations with unprecedented spatial resolution.



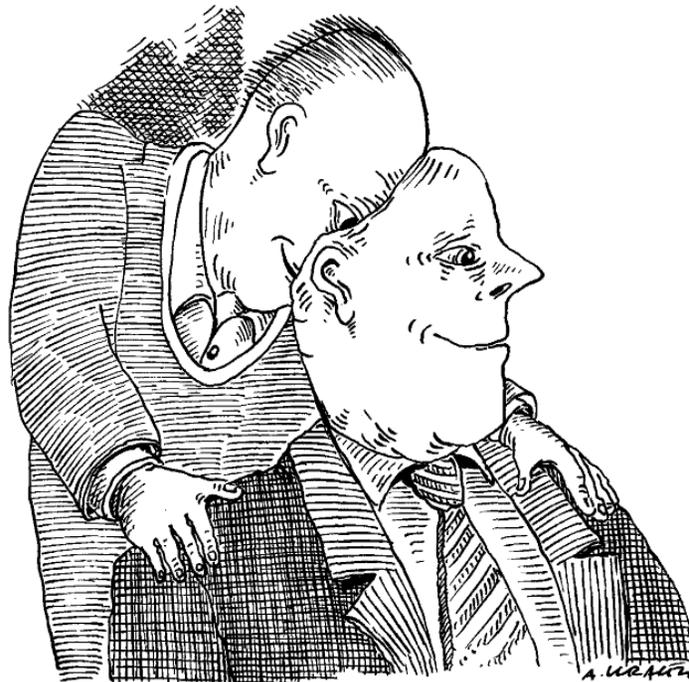
Unraveling the mysteries of the human brain represents one of the great challenges of modern biology. Although animal experiments provide basic insights into human brain function, some human behaviors and abilities, such as language and mathematics, appear enormously developed or unique. The study of these functions requires ways of seeing the activity of the human brain during cognitive tasks. The anatomical structure of the living human brain can be visualized in great detail using magnetic resonance imaging (MRI). Now, a new variant of MRI is being used to provide functional maps of the human brain. These MRI-based maps have unprecedented spatial resolution and can be rapidly acquired, providing movies of brain activity.

The new MRI method ⁵²⁸ provides a direct pathway to the brain that accompany sensory stimulation or

flow and oxygen utilization [3]. Physiologically-induced changes were also observed in bulk brain tissue where individual vessels were not resolved, in both rat and cat brain experiments [4].

These animal experiments suggested that BOLD contrast imaging could be used to measure cerebral blood oxygenation non-invasively in humans. This was of particular interest as several different lines of evidence suggested that the oxygenation state of venous blood could be used to map human cognitive operations. First, it is well established that changes in neural activity are accompanied by changes in energy metabolism, and that increased metabolic rate is correlated in many mammalian species, including humans, with an increase in blood flow that ^{© 1992 Current Biology} [1]. If the increased supply of oxygen exceeds any increased metabolic demand,

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