

**DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH**

**NATIONAL ADVISORY COUNCIL FOR
BIOMEDICAL IMAGING AND BIOENGINEERING**

Summary of Meeting¹

January 22, 2014

The National Advisory Council for Biomedical Imaging and Bioengineering (NACBIB) was convened for its 34th meeting on January 22, 2014, via Adobe Connect, in Bethesda, Maryland. Dr. Roderic I. Pettigrew, Director of the National Institute of Biomedical Imaging and Bioengineering (NIBIB), presided as Council chairperson. In accordance with Public Law 92-463, the meeting was open to the public from 11:00 a.m. to 11:55 a.m. for review and discussion of program development, needs, and policy. The meeting was closed to the public from 11:55 a.m. to 12:15 p.m. for the consideration of grant applications.

Council members present:

Dr. John C. Gore, Vanderbilt University Medical Center, Nashville, TN
Dr. Nola M. Hylton, University of California, San Francisco, CA
Dr. Cato T. Laurencin, University of Connecticut, Farmington, CT
Dr. Raphael Lee, University of Chicago, Chicago, IL
Dr. Mark Musen, Stanford University, Stanford, CA
Dr. Etta D. Pisano, Medical University of South Carolina, Charleston, SC
Dr. Bruce Tromberg, University of California, Irvine, CA

Ex officio members present:

Dr. P. Hunter Peckham, U.S. Department of Veterans Affairs, Cleveland, OH
Dr. James G. Smirniotopoulos, Uniformed Services University of the Health Sciences, Bethesda, MD

Council members absent:

Dr. W. Eric L. Grimson, Massachusetts Institute of Technology, Cambridge, MA
Dr. James H. Thrall, Massachusetts General Hospital, Harvard Medical School, Boston, MA
Dr. Sheldon Weinbaum, The City College of New York, New York, NY
Dr. Michael Yaszemski, Mayo Clinic College of Medicine, Rochester, MN

Ex officio members absent:

Dr. Francis Collins, National Institutes of Health, Bethesda, MD
Dr. Anne Plant, National Institute of Standards and Technology, Gaithersburg, MD
Dr. Sohi Rastegar, National Science Foundation, Arlington, VA
Ms. Kathleen Sebelius, U.S. Department of Health and Human Services, Washington, DC

Chairperson:

Dr. Roderic I. Pettigrew

Executive Secretary:

Dr. Anthony Demsey

¹ For the record, it is noted that members absent themselves from the meeting when the Council is discussing applications (a) from their respective institutions or (b) in which a conflict of interest may occur. This procedure only applies to applications that are discussed individually, not to “en bloc” actions.

Also present:

NIBIB staff present for portions of the meeting:

Mr. Angelos Bacas	Ms. Margot Kern
Dr. Richard A. Baird	Dr. Brenda Korte
Ms. Shirley Coney-Johnson	Dr. Steven Krosnick
Dr. Richard Conroy	Ms. Kai Lakeman
Ms. Desi Conway	Ms. True Le
Ms. Christine Cooper	Ms. Karin Lee
Ms. Zoe Ann Copeland	Dr. Christina Liu
Ms. Nancy Curling	Dr. Guoying Liu
Ms. Monique Day	Dr. Hector Lopez
Mr. Jeff Domanski	Dr. Xiao-Zhong (James) Luo
Mr. Anthony Dorion	Dr. Shadi Mamaghani
Ms. Kate Egan	Ms. Jessica Meade
Ms. Angela Eldridge	Mr. Todd Merchak
Ms. Kathryn Ellis	Mr. Larry Morton
Dr. Zeynep Erim	Mr. Joe Mosimann
Mr. Anthony Fransella	Dr. Peter Moy
Dr. David George	Dr. Karen Peterson
Ms. Marie Gill	Dr. Mary Rodgers
Ms. Pam Glikman	Mr. Rolando Romero
Ms. Inna Gorshkova	Ms. Stephanie Sabourin
Dr. Ruth Grossman	Dr. Antonio Sastre
Ms. Felice Harper	Dr. Belinda P. Seto
Dr. John Hayes	Mr. Shaun Sims
Ms. Eunica Haynes	Ms. Jessica Tucker
Dr. William Heetderks	Ms. Florence Turska
Mr. James Huff	Ms. Rachael Vizzi
Dr. Rosemarie Hunziker	Ms. Li-Yin Xi
Dr. Thomas Johnson	Dr. Ruixia Zhou
Dr. Chris Kelley	Dr. Steven Zullo

Non-NIBIB Attendees:

Ms. Sarah Mandell
Ms. Virginia Meehan

I. Call to Order: Dr. Anthony Demsey

Dr. Anthony Demsey called to order the 34th meeting of the National Advisory Council for Biomedical Imaging and Bioengineering. He reminded attendees that the first session of the meeting was open to the public, welcomed attendees, and introduced Dr. Roderic Pettigrew, who formally welcomed all participants.

II. Director's Remarks: Dr. Roderic I. Pettigrew

A. In Memoriam

Dr. Pettigrew noted the recent passing of Dr. Charles Vest, who had been a strong supporter of NIBIB and NIBIB-funded research. Dr. Vest served as the immediate past president of the National Academy of Engineering (NAE), was a previous president at MIT, and also participated in NIBIB's 10th anniversary celebration in 2011. Memorial services are scheduled for January 25, 2014, in Ann Arbor, Michigan; February 20, 2014, in Washington, DC; and in early March at MIT.

B. Awards

Several past and present NIBIB grantees received notable honors. Dr. Quyen Nguyen, who previously

worked with Nobel laureate Dr. Roger Tsien, received a Presidential Early Career Award for Scientists and Engineers (PECASE). Dr. Raphael Lee was formally inducted into the National Academy of Engineering. Dr. Norbert Pelc, who served on the first NACBIB, was named RSNA's Outstanding Researcher of 2013. Dr. Robert Langer was one of six recipients of a Life Sciences Breakthrough Prize from the Breakthrough Prizes in Life Sciences Foundation, a relatively new philanthropic organization that awards \$3 million prizes to outstanding scientists in support of forward-thinking research and the pursuit of bold projects.

C. NIH Budget for FY 2014

In the previous week, Congress passed a \$1.1 trillion budget that included an approximately 3 percent increase across the NIH. Likewise, the projected budget of \$329 million for NIBIB represents a roughly 3 percent increase over last year's budget, which in itself was 5.6 percent lower than the preceding year. Due to a remaining possibility of transfers, to be delineated over the next month, final budget numbers are not yet available.

Dr. Pettigrew also noted a steady year-over-year increase in the number of high percentile R01 and R21 grant applications between FY 2009–2013. However, over the same period of time, the NIBIB budget has not kept pace with inflation, translating to falling paylines and success rates.

D. NIH Activities Update

BRAIN Initiative

In December 2013, NIH announced six new funding opportunities related to the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, all of which call for technology development, making them highly appropriate for the NIBIB community. Dr. Pettigrew highlighted one opportunity in particular, "Planning for Next Generation Human Brain Imaging," as the only announcement specifically calling for research activities on humans to develop novel, non-invasive imaging technologies. The 3-year planning grants are intended to support new, transdisciplinary groups doing early experimentation and represent a substantial opportunity for engineering and imaging researchers. Public interest in the BRAIN Initiative and brain research in general is reflected in the February 2014 issue of National Geographic magazine, which focuses on "The New Science of the Brain" and features a diffusion spectral image from the Human Connectome Project on the magazine cover.

Big Data to Knowledge (BD2K)

Dr. Philip Bourne of the University of California San Diego has been selected as the first Associate Director for Data Science, a senior position at NIH created last year to lead the BD2K initiative and other activities related to biomedical data storage and use. NHGRI director Dr. Eric Green had been serving as acting associate director during the search to fill this position.

Workforce Diversity Initiatives

Dr. Pettigrew continues to serve as Acting Chief Officer for Scientific Workforce Diversity, another senior position at NIH created last year focusing on efforts to diversify the biomedical research workforce within NIH as well as among the wider research community. In December 2013, three initiatives were announced with a total funding amount of \$50 million per year over 10 years. These initiatives include Building Infrastructure Leading to Diversity (BUILD), which aims to support innovative new programs, faculty, students, and institutional partnerships; a National Research Mentoring Network (NRMN), which will focus on the national pairing of established mentors with mentees; and the Coordination and Evaluation Center for Enhancing the Diversity of the NIH-funded Workforce Program, which will facilitate BUILD and NRMN activities and examine the impact of both initiatives.

Bill Gates Visits NIH

Also in December 2013, Bill Gates visited NIH and gave a presentation on "Why the Future Needs Biomedical Innovation" to a standing-room-only audience in Masur Auditorium, the largest auditorium on the NIH campus. Prior to the event, several NIH directors were invited to small group discussions with Mr.

Gates on issues such as child health, AIDS, and cancer in the developing world. Dr. Pettigrew led a discussion on point of care for neglected diseases.

NIH Leadership Forum

At this annual meeting to discuss trans-NIH issues, the Institute and Center directors and Dr. Francis Collins discussed the Analysis of Review Group Outputs, which identified specific challenges with NIH's peer review system and directions to improve the identification, selection, and funding of projects. Among the current issues are the unequal distribution of high-quality applications and uneven prioritization of applications among different study sections, which may end up overvaluing lower quality applications and undervaluing higher quality ones when the same payline is applied across study sections. Potential ways to address these issues may include adopting program-based or modulated paylines, also known as "select pay"; encouraging grantees to serve as reviewers; adopting enhanced approaches to support science, such as the promotion of risk-taking or providing longer durations of support; and soliciting enhanced NIH biosketches to counteract the overemphasis on publishing in journals with high impact factors.

E. NIBIB Activities Update

NCI-NIBIB Conference on Point of Care Technologies for Cancer

In January 2014, NIBIB participated in its first joint conference with NCI. This two-day conference featured 30 invited presentations, 78 poster sessions, and 33 hands-on technology demonstrations focused around clinical challenges, basic science underlying technologies, and translation and early field experience. Originally scheduled for early October 2013, the organizing teams from both Institutes worked hard to reschedule speakers and activities, and achieved full registration of 500 people. The joint conference was part of a new collaboration to enhance the alignment between clinical needs and the development of translational technologies for cancer.

Design by Bioengineering Undergraduate Teams (DEBUT) Challenge 2014

In December 2013, NIBIB announced the 2014 DEBUT challenge, with some key changes from the previous years' competitions. Namely, the 2014 contest is being hosted on contests.dobt.co/debut2014/ rather than Challenge.gov in order to allow foreign students to participate without monetary awards, as suggested at the May 2013 NACBIB meeting. Also, there will be three awarded prizes without regard to categories, as opposed to a winning prize for each category; and undergraduates who are full-time students for only one semester or academic quarter are still eligible.

Meeting on Technology-based Strategies for the Management of Diabetes

To be held on March 3–4 in Mexico City, this meeting represents a collaborative effort by NIBIB, NIDDK, and the National Institute of Medical Science and Nutrition Salvador Zubiran of Mexico. In line with the Global Alliance for Chronic Disease's selection of type 2 diabetes as a research target for 2014, meeting activities will emphasize glucose control, retinopathy, renal disease, and neuropathy and diabetic foot. Among the meeting supporters is the Carlos Slim Foundation, named for the noted Mexican businessman, philanthropist, and fiscal peer of Bill Gates.

F. Science Highlight

Cloud Computing Facilitates Key Advance in GPCR Simulation

Dr. Vijay Pande at Stanford University has demonstrated the advantage of using cloud computing to solve an otherwise intractable data analysis and biological modeling problem. The 2012 Nobel Prize in Chemistry was awarded to Drs. Lefkowitz and Kobilka for their work revealing the structure and function of G-protein coupled receptors (GPCRs), which are targeted by 30–50 percent of all medications today. This knowledge ushered in greater promise of intelligently designing drugs to better target GPCRs, but challenges remained in accounting for the transition from resting GPCR to its active state, a process that occurs within milliseconds. Computational models typically took an entire computer day to map one-billionth of a second

of this transition, but using Google Cloud to compute in parallel, Pande and colleagues were able to “stitch” together 2.5 milliseconds of transition history. Their finding expands the knowledge of the dynamics of target receptor structure and indicates that different classes of drugs may dock better with different intermediate states, which may in turn lead to improved drug design for a large percentage of medications.

III. Review of Council Procedures and Regulations: Dr. Anthony Demsey

A. Council Regulations, Policies, and Procedures

Dr. Demsey reminded Council members of the importance of adhering to the principles related to conflict of interest, confidentiality, and lobbying during Council activities, and to contact him immediately for clearance if approached by a foreign institution to engage in any activities.

B. Future NACBIB Meeting Dates

The next NACBIB meeting is scheduled for May 20, 2014, and future Council dates are listed in the Electronic Council Book. Dr. Demsey requested that Council members notify him of conflicts with future meeting dates.

C. Approval of the September 12, 2013, NACBIB Meeting Minutes

A motion to approve minutes of the September 12, 2013, NACBIB meeting was forwarded, seconded, and approved unanimously.

D. Reaffirmation of Council Procedures

A motion was forwarded and seconded to reaffirm Council operating procedures, with no modifications. The Council operating procedures were reaffirmed unanimously.

IV. Adjournment

The open session of the NACBIB meeting was adjourned at 11:55 a.m.

V. Closed Session

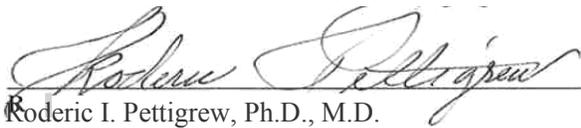
The grant application review portion of the meeting was closed to the public in accordance with provisions set forth in Section 552b(c)(4) and 552b(c)(6), Title 5, U.S. Code, and 10(d) of the Federal Advisory Committee Act, as amended (5 U.S.C. appendix 2). The closed session was adjourned at 12:15 p.m.

Certification:

We certify that, to the best of our knowledge, the foregoing minutes are accurate and complete.²



Anthony Demsey, Ph.D.
Executive Secretary,
National Advisory Council for Biomedical Imaging and Bioengineering
Director,
Office of Research Administration
National Institute of Biomedical Imaging and Bioengineering



Roderic I. Pettigrew, Ph.D., M.D.
Chairperson
National Advisory Council for Biomedical Imaging and Bioengineering
Director,
National Institute of Biomedical Imaging and Bioengineering

² These minutes will be approved formally by the Council at the next meeting on May 20, 2014, and corrections or notations will be stated in the minutes of that meeting.