

**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 16, 2003**

The National Advisory Council for Biomedical Imaging and Bioengineering (NACBIB) was convened for its inaugural meeting on January 16, 2003, in building 31, conference room 6, National Institutes of Health, Bethesda, Maryland. Dr. Roderic I. Pettigrew, Director of the National Institute of Biomedical Imaging and Bioengineering (NIBIB), served as Chairperson.

In accordance with Public Law 92-463, the meeting was open from 8:35 A.M. until 3:30 P.M. for the review and discussion of program development, needs and policy, and closed to the public from 3:30 P.M. until 5:45 P.M. for discussion and consideration of individual grant applications.

Council members present:

Dr. Linda C. Lucas	Dr. Janie M. Fouke
Dr. Rebecca R. Richards-Kortum	Dr. Stephen A. Williams
Dr. Shirley A. Jackson	Dr. James A. Zagzebski
Dr. Frank C. Yin	Dr. Carlo J. De Luca
Dr. C. Douglas Maynard	Dr. R. Brent Harrison

Ex officio members present:

Dr. John R. Livengood, Centers for Disease Control and Prevention, substituting for Dr. Julie Gerberding
Dr. Arden L. Bement, National Institute of Standards and Technology
Dr. Esin Gulari, National Science Foundation
Capt. Jack W. Smith, Department of Defense, substituting for Dr. Robert Roswell

Ex officio member absent:

Dr. Michael Weiner, Department of Veterans Affairs

Ad hoc participants present:

Dr. Norbert J. Pelc, Stanford University
Dr. Shu Chien, University of California, San Diego

Members of the public present for portions of the open meeting included:

Mr. Scott Jenkins, The Blue Sheet
Mr. Ed Nagy, Academy of Radiology Research
Mr. Nathaniel Polster, HLB Newsletter
Ms. Vicki Conte, Equals Three Communication
Mr. Steven Stocker, Equals Three Communication
Dr. Kenneth Wong, Georgetown University

¹For 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 real or apparent conflict of interest might occur.

Ms. Melissa Murray, American Society of Mechanical Engineers International
Dr. Scott Williams, Los Alamos National Lab
Ms. Roshunda Drummond, American Society for Therapeutic Radiology and
Oncology
Mr. Rupert Ambrose, Masimax
Dr. Jianchao Zeng, Georgetown University
Ms. Angela Lee, American Association of Physicists in Medicine
Mr. Chris Peterson, SRI
Dr. David Lindisch, Georgetown University
Dr. Gabor Fichtinger, Johns Hopkins University
Dr. Philip Williams, Lawrence Berkeley National Lab

NIBIB employees present for portions of the meeting:

Dr. Roderic Pettigrew	Dr. John Haller
Dr. Donna Dean	Dr. Brenda Korte
Dr. Joan Harmon	Dr. Alan McLaughlin
Mr. Charles Best	Dr. Peter Kirchner
Ms. Yvette Gordon	Mr. Mario Carranza
Ms. Lillian Ashley	Dr. Christine Kelley
Ms. Colleen Guay-Broder	Dr. Grace Peng
Ms. Cheryl Fee	Dr. Peter Moy
Ms. Stacy Wallick	Dr. William Heetderks
Ms. Christine Hollingsworth	Ms. Anna Retzke
Ms. Donna Pearman	Mr. Todd Merchak
Ms. Pamela Clatterbuck	Dr. Richard Swaja
Ms. Ruby Akomeah	Ms. Mollie Sourwine
Mr. Chip Groh	Ms. Jennifer Vyskocil
Ms. Sandra Talley	Ms. Annette Hanopole
Dr. Meredith Temple-O'Connor	Ms. Lisa Moeller
Ms. Yinka Abu	Ms. Nancy Curling
Mr. Stephen Green	Ms. Florence Turska
Ms. Kina Forrest	Ms. Pamela Mayer
Dr. David George	Mr. Nicholas Mitrano
Mr. Huy Ho	Ms. Dona Mazzara
Dr. Mary Pastel	Dr. Robert Nerem

Other Federal employees present for portions of the meeting included:

Dr. Ruth Kirschstein, OD
Dr. Eileen Bradley, CSR
Dr. Robert Nordstrum, CSR
Dr. Fei Wang, NHLBI
Dr. Ed Monachino, NCI
Dr. Travis Earles, NIH/OD/OSP
Dr. Tom Aigner, NIDA
Dr. Abraham Levy, NCRR
Dr. Ramesh K. Nayak, CSR
Dr. Ellen Feigal, CSR
Dr. Dan Sullivan, NCI
Mr. Lew Bass, ORS
Ms. Verlyn Francisco, CSR
Dr. Greg Farber, NCRR
Dr. Amy Swain, NCRR
Dr. Johnnie Smith, NCI

I. Call to Order and Opening Remarks – Dr. Roderic I. Pettigrew

Dr. Pettigrew welcomed Council members, guests, and staff to the inaugural Council meeting. He remarked on the opportunity for all involved to participate in the historic initial meeting of the Council. He expressed particular appreciation for the participation of Drs. Norbert Pelc of Stanford and Shu Chien of the University of California at San Diego as ad hoc participants. With regret, Dr. Pettigrew announced that Council member Dr. Michael Weiner, Department of Veterans Affairs would not participate in this meeting due to a death in his family. Dr. Pettigrew also announced that Dr. Zerhouni, Director, National Institutes of Health (NIH), may visit Council the following day. Dr. Pettigrew then introduced key staff members who had contributed to the planning of the meeting.

Dr. Pettigrew welcomed as a special guest, Dr. Ruth Kirschstein. He made note of the fact that Dr. Kirschstein has a long and distinguished career at the NIH, serving as Acting Director twice and mentoring many in the scientific community, including several NIH Institute Directors. Council member introductions followed.

Turning to future meeting dates, Dr. Pettigrew announced the change in the date for the May meeting to May 29-30, 2003 and received concurrence of Council to move the fall meeting dates to September 11-12, 2003.

II. Review of Regulations – Dr. Joan T. Harmon

Dr. Harmon summarized the requirements under the Government in the Sunshine Act and the Federal Advisory Committee Act. These Acts require the Department of Health and Human Services (DHHS) to open to public observation as many advisory committee meetings as possible, including the meetings of the National Advisory Councils. The Council meeting, therefore, would be open to public observation except during grant application review, scheduled from 3:30 P.M. until adjournment. The meeting would reopen for Dr. Zerhouni's visit. Notice of the Council meeting was published in the *Federal Register* thirty days prior to the meeting.

Dr. Harmon also reviewed regulations concerning conflict of interest, and Council members were reminded that materials furnished for review purposes and discussion during the closed portions of the meeting are considered privileged information. All Council members present signed a statement certifying that they did not participate in the discussion of, or vote on, an application from any organization, institution, or any part of a university system, except for those which have multi-campus institution waivers or are specifically designated as separate organizations under 18 U.S.C. 208(a), of which they are an employee, consultant, officer, director or trustee, or in which they have a financial interest.

III. Director's Report – Dr. Roderic I. Pettigrew

Dr. Pettigrew opened his report with a summary of the history and current state of the NIBIB.

Signed into law by then President William Clinton in December 2000 after extensive efforts by members of the biomedical imaging and bioengineering community, the NIBIB has developed very rapidly with a current portfolio of approximately 300 grants. For fiscal year 2003, the Institute has issued ten Requests for Applications (RFAs) and anticipates receiving \$150 million in transferred grants and uncommitted funds from other Institutes.

The fiscal year 2002 budget for the Institute of \$112 million allocated approximately 84 percent to research project grants. Under the current continuing resolution, the Institute has authority to operate at fiscal year 2002 levels until approval of the President's budget. Of the \$270 million proposed in the President's fiscal year 2003 budget, 81 percent is designated for research project grants and one percent for training, defined by NIH as funding through the training (T series) and fellowship (F series) mechanisms. Adding allocations for career grants (K series) and training funded through contracts increases training to two percent of the budget. Funding for a collaboration with the National Science Foundation (NSF) to provide summer training in interdisciplinary science to approximately 150 undergraduate students is included in the contracts amount. He underscored that NIBIB's emphasis on training complemented a similar NIH-wide focus on this critical program area. The fiscal year 2003 total includes \$150 million in transfers from six NIH Institutes. Dr. Pettigrew has met with the Directors of all of these Institutes to discuss strategies for accomplishing overlapping goals. In the spring, Dr. Pettigrew and other new Institute Directors will have courtesy visits with members of the House Labor, Health and Human Services, and Education Appropriations Subcommittee.

Dr. Pettigrew presented the current organizational chart for NIBIB and introduced senior staff members. He announced that he plans to restructure the scientific programs of the Institute to better reflect the landscape of biomedical research. He will replace the current program divisions of Biomedical Imaging, Bioengineering, and Technology Integration with three divisions entitled Discovery, Applied and Training. Planning for this structural change is already underway.

To introduce an overview of NIBIB's current portfolio, Dr. Pettigrew stated his view on when applications should be referred to the NIBIB versus other Institutes within NIH. Applications with science focused on the discovery, development or application of technology should be placed with the NIBIB, even when the technology targets a specific disease process. The Director, NIH and the Directors of other NIH Institutes all agreed with this view. Dr. Pettigrew then shared a listing of fiscal year 2002 and 2003 initiatives either led by the NIBIB or developed by other Institutes and supported by the NIBIB. He commended the staff for issuing ten new RFAs for fiscal year 2003.

Many of these initiatives result from discussions at workshops sponsored by the NIBIB. Dr. Pettigrew provided a listing of recent workshops and announced others planned for the spring. He highlighted the upcoming workshop on imaging of pancreatic β cells to be jointly sponsored with the National Institute of Diabetes and Digestive and Kidney Diseases as prototypical of the type of collaborative efforts he expects NIBIB to lead at the NIH. The June 2003 NIH Bioengineering Consortium (BECON) symposium, Catalyzing Team Science underscores NIBIB's commitment to training.

Dr. Pettigrew provided Council with a brief update on some immediate priority issues for the NIBIB. The development of a five-year strategic plan is underway. Dr. Pettigrew announced that a December 2002 workshop on Strategic Research Directions had provided a list of priority areas for NIBIB to consider. Program staff will review these materials at an upcoming staff retreat. Short-term plans for the Institute also include the establishment of an intramural division. Dr. Peter Kirchner is investigating ways that the NIBIB can work with other agencies such as the National Institute of Standards and Technology and the Department of Energy in creating such a division. In all program areas, the NIBIB will support DHHS's emphasis on health disparities addressing issues such as equal access to technologies supported by the NIBIB. The NIBIB will also encourage the success of new investigators, possibly through targeted outreach and review.

Dr. Pettigrew closed his report with a summary of Dr. Zerhouni's Roadmap meetings held last summer. These meetings with staff of the NIH and members of the extramural community concluded with the definition of four priority areas for the NIH, all of which involve technology. The NIBIB will incorporate these goals in the future directions of the Institute.

IV. Council Operating Procedures – Ms. Sandra Talley

Ms. Talley presented the proposed operating procedures for the NACBIB. In accordance with NIH policy, each advisory council must establish a set of operating procedures and review them annually. Ms. Talley noted that Council members had access to the procedures document at the Council website.

Ms. Talley began with a description of the Council structure. There are twelve appointed members and eight ex officio members, including three from DHHS. Members serve four-year overlapping terms. The Institute plans to request a legislative change to the structure of the NACBIB to balance the membership to include representatives from the general public, to align the membership structure more closely with those of other NIH advisory councils. The proposed new structure will consist of eighteen members appointed by the Secretary, DHHS. Of the eighteen members, twelve shall be appointed from the health and scientific disciplines relevant to the areas of biomedical imaging and bioengineering (including no fewer than two individuals who are leaders in the fields of public health and the behavioral or social sciences), and six shall be appointed from the general public and include leaders in the fields of public policy, law, health policy, economics, and management.

The Director, NIBIB, as the Chairperson, calls all meetings, and sets the agenda. The NACBIB will meet at least three times per year, usually in January, May, and September. A quorum to conduct business will be a majority of the appointed members. Meetings will be announced to the public through the *Federal Register*. The public portion of the meeting will be devoted to program advisory business. As one of the primary functions of the NACBIB is to provide the second level of review of grant applications, the meetings will close to review these applications to protect the privacy of applicants.

Ms. Talley stated that the NACBIB will review applications with a primary or secondary assignment to the NIBIB. Materials will be available through the Electronic Council Book or the

Council website. Although most voting will be en bloc, the NACBIB will consider items in several categories individually:

- Applicant appeals
- MERIT awards or extensions
- Foreign grant applications
- Special policy concerns
- Council initiated items
- Applications in response to RFAs, PARs, and PASs

These items will each be assigned to two Council members for presentation at the meeting. Ms. Talley summarized guidelines for review of applications within these categories and the actions required by the NACBIB.

During the review of special policy concerns, Ms. Talley drew Council's attention to the NIBIB Report on NIBIB Activities to Include Women and Minorities in Clinical Research and requested that Council formally endorse this report at the conclusion of the presentation. Completed biennially, this report documents NIBIB's compliance with NIH policies on inclusion.

All remaining applications will be considered en bloc. The en bloc listings that will be presented to Council during the closed portion of the meeting will denote those applications within the program plan that are recommended for support by NIBIB staff. Staff may also select applications beyond the program plan for special considerations. NACBIB will vote on both groups of applications en bloc.

Although not used for this Council round, the proposed procedures document also recommends early en bloc concurrence to expedite the review of the most meritorious applications. In this process, a group of four Council members will provide concurrence on behalf of the Council for applications selected by the NIBIB Division of Extramural Activities Director. These applications must be well within the program plan and without policy concerns. Any Council member may request full discussion of any application included within this group. A report on early concurrence will be provided at each NACBIB meeting.

Ms. Talley concluded with a review of delegated authorities or actions that staff may take without prior approval by the NACBIB.

Council unanimously approved the Report on NIBIB Activities to Include Women and Minorities in Clinical Research. There was a brief discussion of Council procedures. Council asked for clarification on the option to designate applications as not recommended for further action (NRFA). Council requested that the procedures document be amended to include the following:

- Administrative actions will be reported to Council at each meeting
- Staff will provide materials to Council for an annual discussion and review of grant applications involving human subjects and animal subjects.
- Operating procedures will be reviewed annually

V. Scientific Programs Overview– Dr. William Heetderks

Dr. Heetderks introduced the three presentations on scientific programs. He noted that training would be first in keeping with the very high priority that these programs had within the NIBIB. Dr. Swaja would discuss interdisciplinary training with a particular focus on radiologists and engineers. The presentations on the scientific programs by Dr. Kelley and Dr. Pastel would provide an overview of areas within the NIBIB's current portfolio.

VI. Training Programs – Dr. Richard Swaja

Dr. Swaja described three workshops that had provided the basis for NIBIB's current training programs:

- Whitaker Bioengineering Education Summit – December 2000
- NSF/NIBIB Workshop on Bioengineering and Bioinformatics Training – June 2001
- NIBIB Workshop on Bioengineering and Biomedical Imaging Training – August 2002

Emerging from these meetings were several themes:

- NIBIB should draw upon current efforts to support multidisciplinary training.
- NIBIB should communicate research opportunities to all appropriate communities, including quantitative scientists who do not have a history of involvement with the NIH.
- NIBIB should address gaps in the training pipeline, particularly attracting undergraduates into graduate programs and supporting new investigators.
- Institutions need support in curriculum development, infrastructure development, vertical integration and interdepartmental collaboration.
- NIBIB should lead collaborations among academic, industry, federal agencies and professional societies to most effectively accomplish improvements in training efforts.
- NIBIB should address the reduction in funding that will result from the dissolution of the Whitaker Institute in 2006.
- NIBIB's commitment to training should be reflected in the structure of the Institute.

During fiscal year 2002, the NIBIB made an effort to begin work in some of these areas. The NIBIB joined existing NIH initiatives providing postdoctoral fellowships (F32), institutional training (T32), and mentored quantitative scientist development awards (K25), and research supplements to train more minorities and individuals with disabilities in scientific research. In conjunction with NSF, the NIBIB developed a web-based database of biomedical imaging, bioinformatics, and bioengineering training opportunities. Also in collaboration with the NSF, the NIBIB funded nine programs to provide research experiences to undergraduates and early graduate students to attract them to careers in bioengineering or bioinformatics.

In the immediate future, Dr. Swaja indicated that NIBIB would join other existing NIH initiatives, including those that provide pre and postdoctoral fellowships and career awards for new or established investigators. NIBIB also plans to introduce an institutional training award that will address curriculum development, and the interdepartmental integration that will be needed for the kind of training that NIBIB hopes to support. To encourage physicians to consider research careers, the NIBIB will establish a research training program for medical

residents with a particular focus on radiologists. NIBIB also has plans to initiate a needs assessment for interdisciplinary training and to begin an outreach program to quantitative scientists to increase awareness of NIBIB research opportunities.

In the discussion that followed, Council members raised questions about the capacity of institutions to accommodate the large numbers of undergraduates who have an interest in biomedical engineering and retention of undergraduates beyond the sophomore year. They also expressed concerns about the composition of review panels for future NIBIB training applications and an allocation of sufficient training slots to NIBIB to address the demand for training. Reiterating the need to encourage new, young investigators, Council discussed factors that NIBIB should consider in addressing this issue. To underscore NIBIB's commitment to training, it was suggested that the NACBIB establish a subcommittee on training and that NIBIB consider increasing the percentage of the budget devoted to training.

VII. Scientific Programs Part I – Dr. Christine Kelley

Dr. Kelley provided a summary of NIBIB program activity in bioengineering. She noted that NIBIB is active in eleven areas, with nine of these being well underway. For the nine highly active areas, Dr. Kelley described the type of projects that are being supported, with several specific examples from NIBIB's portfolio. For some of these areas, Dr. Kelley described additional NIBIB program activities:

- Sensors: NIBIB issued an RFA in this area in both fiscal year 2002 and 2003, the latter entitled *Operation of Sensors in Vivo*. NIBIB is also involved in a global evaluation of sensors research in collaboration with the NSF, U.S. Department of Agriculture, the Army Research Office and NASA, involving research in the U.S., Japan, and Europe. Sensors were also the focus of the 2002 BECON symposium.
- Biomaterials: NIBIB has an active RFA, *Development of Advanced Biomaterials*.
- Tissue engineering: NIBIB has an active RFA in tissue engineering, *Research Opportunities in Tissue Engineering*. NIBIB also participates in the Multi-Agency Tissue Engineering Science working group, (MATES) which includes members from several government agencies and seeks to increase collaboration across member agencies. The MATES group is involved in a global evaluation of tissue engineering research that should lead to a joint initiative in the near future.
- Drug and Gene Delivery: NIBIB has an active RFA, *Development of Novel Drug and Gene Delivery Systems and Devices*.
- Medical Devices and Implant Sciences: NIBIB participates in a multi-agency federal group, Biomaterials and Medical Implant Sciences (BMIS) that has focused recent efforts on implant retrieval and analysis. This group held a workshop in September of last year to discuss the Government's role in research and information dissemination on medical implants.

- Nanotechnology: NIBIB participates in two trans-NIH initiatives on nanotechnology developed by BECON.
- Platform technologies
- Computational biology: NIBIB is a member of the trans-NIH group that focuses on bioinformatics, Biomedical and Information Science and Technology Initiative (BISTI). NIBIB has joined with BISTI in several initiatives to stimulate research in this area.
- Rehabilitation Engineering: NIBIB does not support much research in this area, but has joined two initiatives in this area sponsored by other Institutes.

In the discussion that followed, Council expressed concern about the potentially large number of applications that would be submitted in response to the numerous initiatives listed by Dr. Kelley and NIBIB's ability to fund a significant number of these. NIBIB staff provided clarification on percentile rankings and success rates and noted the difficulty in fiscal year 2002 in identifying sufficient meritorious applications. Dr. Pettigrew indicated that the fiscal year 2002 success rate for NIBIB was around 40 percent and the projected rate for fiscal year 2003 would probably be a percentage in the high twenties.

VIII. Scientific Programs Part II – Dr. Mary Pastel

Dr. Pastel provided a list of the research areas in imaging currently supported by NIBIB. She noted that the portfolio has been defined largely through the grants received by NIBIB in the transfer from other Institutes at the NIH. She described research being supported in the following areas and provided examples from the NIBIB portfolio, noting any special activity:

- Ultrasound
- Nuclear Medicine: NIBIB has an active RFA, *Systems and Methods for Small Animal Imaging*.
- Imaging Agents and Molecular Probes: NIBIB has an active RFA, *Research and Development of Systems and Methods for Cellular and Molecular Imaging*.
- X-ray, Electron Microscopy, and Ion Beam Technologies: NIBIB has an active RFA, *Low-Cost Medical Imaging Devices*.
- Image-Guided Therapies and Interventions: NIBIB joined with The National Cancer Institute and NSF to sponsor a workshop on Image-Guided Interventions in September 2002. NIBIB also issued an RFA, *Image-Guided Interventions*.
- Optical Imaging: NIBIB participated in the third Inter-Institute Workshop on Diagnostic Imaging and Spectroscopy in September 2002.

- MRI, MRS and other Electromagnetics: NIBIB has an active RFA, *Improvements in Imaging Methods and Technologies*.
- Bioinformatics: NIBIB has an active RFA, *Telehealth Technologies Development*.

In the discussion following this presentation, Council expressed concern about the amount of the fiscal year 2003 budget that may potentially be committed through the large number of NIBIB initiatives discussed in the presentations and the amount that would remain for investigator-initiated projects and questioned whether the proportion of funds devoted to the latter would remain unaffected. Staff responded that sufficient funding for investigator-initiated research would be provided through the uncommitted funds that would be part of the \$150 million transfer to NIBIB and the ending of many transferred projects. Staff also reassured Council that collaboration among Institutes would ensure that highly meritorious applications received funding.

NIBIB has issued a large number of RFAs in fiscal year 2003 in response to the limited number of meritorious applications received in fiscal year 2002. Strategies for managing the portfolio and ensuring consistency in the success rate from year to year would be an area of discussion at the upcoming staff retreat on the five-year plan. It was also noted that a number of these RFAs will support a mix of R01 and two-year R21 applications that would limit long term NIBIB fiscal commitments. Council suggested that NIBIB consider the priority of a particular program area to the immediate goals of the Institute in determining a funding level for NIBIB initiatives.

IX. Future Directions – Dr. William Heetderks

Dr. Heetderks indicated that in the immediate future NIBIB is considering initiatives in four program areas:

- Interdisciplinary research training in bioengineering and biomedical imaging research (contact: Dr. Swaja)
- Tissue engineering and regenerative medicine (contact: Dr. Kelley)
- Functional cell imaging (contact: Dr. Korte)
- Biomedical optics (contact: Dr. Korte)

X. Report – August 2002 Training Workshop – Drs. C. Douglas Maynard and Linda Lucas

Dr. Maynard and Dr. Lucas collaborated in the development of the materials presented by Dr. Maynard. Dr. Maynard reported that representatives from the imaging and engineering communities had gathered with staff from NIH in Bethesda in August to discuss some of the challenges in developing multidisciplinary training and to provide recommendations to address these issues. He reiterated most of the program considerations and recommendations previously mentioned by Dr. Swaja. Dr. Maynard stated that the group had extensive discussions of the idea of Centers that would bring together several institutions and possible founding sources to provide training. To have an impact, he suggested that NIBIB may need to increase the percentage of the budget devoted to training beyond the current one to two percent. The group

also recommended that NIBIB demonstrate its commitment to this high priority area by appointing a NACBIB subcommittee on training.

Council members discussed uses of administrative supplements to support training. The view was expressed that current targeted supplement programs should be expanded to include all students seeking training. Citizenship requirements also limit the usefulness of these mechanisms. It was also suggested that NIBIB consider a program such as the NSF's Research Experience for Undergraduates (REU) that has been very successful in attracting college students to research careers. Council requested that staff provide an update on progress in implementing some of these recommendations at the next meeting.

XI. Report – Future Research Directions Workshop – Drs. Carlo De Luca and Norbert Pelc

Dr. De Luca stated that the purpose of the meeting was to recommend research areas where NIBIB could have a high impact within the next five to ten years. The group recommended that NIBIB give priority to research in several aspects of ten broad areas:

- New imaging modalities and new imaging instruments
- Sensors
- Optical technologies
- Systems approaches: Engineering and integration
- Cellular and molecular imaging
- Image-guided therapies
- Prosthetics and artificial organs
- Regenerative medicine
- Computational biology and predictive models
- Minimally invasive technologies

After Dr. De Luca and Dr. Pelc discussed these areas in detail, Dr. Pelc provided the group's general recommendations that the NIBIB promote innovation, collaborate with other Institutes and agencies, address the need for research infrastructure improvements, and consider the potential of technologies to offer low-cost improvements in medicine.

Dr. Pettigrew offered Council the opportunity to suggest issues for consideration at the next meeting. It was announced that Dr. Zerhouni's visit, scheduled for the following day, would be cancelled, if the Council concluded all business by the end of the day.

XII. Closed Session – Review of Applications

This portion of the meeting, involving specific grant review, was closed to the public in accordance with the provisions set forth in Section 552b©(6), Title 5 U.S. Code and 10(d) of the Federal Advisory Committee Act, as amended (5 U.S.C. appendix 2).

X. ADJOURNMENT

The meeting was adjourned at 5:45 p.m.

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

Joan T. Harmon, Ph.D.
Executive Secretary
National Advisory Council for Biomedical
Imaging and Bioengineering

Director, Division of Extramural Activities
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

The Council will consider these minutes at its next meeting. Corrections or notations will be incorporated in the minutes of that meeting.