

The American Chemical Society Petroleum Research Fund

53rd Annual Report on Research

Year Ending August 31, 2008

**American Chemical Society
Petroleum Research Fund
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Washington, DC 20036
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The reports and bibliographic information in this compilation were submitted by principal investigators and organizing chairs for the year ending August 31, 2008. Reports and bibliographic entries not received in time for inclusion in this volume will appear in the 54th PRF Annual Report on Research. No reports were requested for research grants which had not been in effect for a full year.

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Establishment of the Fund

On October 26, 1944, through the execution of an agreement among Shell Oil Company, Incorporated; Standard Oil Company of California; Standard Oil Company (Indiana); Standard Oil Company (New Jersey); The Texas Company; and N. V. de Bataafsche Petroleum Maatschappij and Guaranty Trust Company of New York, The Petroleum Research Fund was established as an advanced educational and scientific Trust with the American Chemical Society named as the qualified recipient of the net income therefrom. The use of funds from the Trust was prescribed in Article Second of the 1944 Agreement.

Subsequently, the Phillips Petroleum Company made a substantial contribution to the Trust. The original contributions of the donors, including that of the Phillips Petroleum Company, transferred to the Trust Fund all of the outstanding capital stock of Universal Oil Products Company. On February 4, 1959, the Supreme Court of the State of New York in an order entered by Mr. Justice Jacob Markowitz approved an application by the Trustee for authority to sell all of the securities of Universal Oil Products Company then held by the Trustee and to invest the proceeds of the sale in a diversified portfolio. The sale was made promptly thereafter. On March 17, 1960, the litigation flowing from the Trustee's application for authority to sell the securities of Universal Oil Products Company was terminated by the entry of a final nonappealable order in the Supreme Court of New York. All costs of litigation have since been paid and the fund in the hands of the Trustee at that time was slightly in excess of \$70,000,000. By reason of the sale the Trust is no longer dependent upon Universal Oil Products Company for the receipt of income.

Shortly after the sale, Guaranty Trust Company was merged with J. P. Morgan & Company. The merged firm, Morgan Guaranty Trust Company of New York, continued as Trustee. Immediately, the Trustee requested conferences with the Finance Committee of the Society and at these conferences worked out an investment program designed to encompass a diversified portfolio so as to produce not only a larger income but a more regular income for the purposes of the Trust. A larger portion of the funds was promptly invested in short-term government notes so that there would be no loss of income while long-term investments were being considered.

Transfer of Trust

In 1998, the ACS Committee on Pensions and Investments recommended that a Study Group be formed to look into the adequacy of the funds available

for the PRF grant program. In 1999, following a recommendation of the Study Group, ACS began discussions with the Trustee to explore changing the terms of the Trust to allow ACS to receive a fixed percentage of the Fund value as income each year rather than simply the "net income" as specified in the 1944 agreement. In January 2000, counsel for the Trustee filed a Petition in the Supreme Court of New York to amend the terms of the Trust to allow for a payout of 5% of the year-end market value of the Fund. The New York Attorney General, who is a necessary party to any Petition affecting the Trust, announced his office's objection to altering the terms of the Trust. However, in its review of the Trust, the New York Attorney General recognized that the Trust could be dissolved under its own terms and suggested that route to obtain the goal of the Petition. In a meeting in July 2000, representatives of ACS, the Trustee, and the New York Attorney General confirmed that the Trust could be dissolved and moved from New York to Washington, DC, as long as the purposes of the original Trust instrument were maintained and the administration of the funds from the Trust were subject to acceptable oversight authority.

On October 25, 2000 an Agreement of Transfer of Trust creating The American Chemical Society Petroleum Research Fund was signed by Morgan Guaranty Trust Company of New York, the American Chemical Society, and the Attorney General for the state of New York, and "so ordered" by the Supreme Court of the State of New York. The new agreement allows for a payout of up to 5% of the three-year average year-end market value of the Fund in place of the net income provision contained in the original agreement. The Transfer Agreement retains the same purpose as the original 1944 Trust Agreement. The use of monies derived from this Fund is prescribed in Article Second of the Agreement of Transfer of Trust which reads as follows:

The purposes for which the Annual Amount (as hereinafter defined), or any part thereof, shall be used by any Recipient thereof, and the conditions subject to which any such payment or distribution is made, are as follows:

(a) The Recipient shall use all funds so paid or distributed to it exclusively for advanced scientific education and fundamental research in the "petroleum field," which may include any field of pure science which in the judgment of the Transferee may afford a basis for subsequent research directly connected with the petroleum field. Without limiting the generality of the foregoing, such education and research may include the exchange of scientists and university scientific students between American and foreign non-profit scientific or educational institutions, such as universities, and services incidental to fundamental research such as the translation of scientific literature relating to the petroleum field. The term "petroleum field" as used herein embraces (1) exploration for, and the production, transportation and refining of,

petroleum, petroleum products and natural gas, and (2) the production and refining of substitutes for petroleum and petroleum products from natural gas, coal, shale, tar sands and like materials.

(b) Such advanced scientific education shall be carried on by or under the direction of the Transferee or may be delegated by the Transferee to other non-profit scientific or educational institutions, such as universities, to be selected by the Transferee.

(c) Such research shall be conducted by or under the direction of the Transferee or the conduct of particular research projects may be delegated by the Transferee to other non-profit scientific or educational institutions, such as universities, to be selected by the Transferee, but none of the results of any such research shall be turned into profit by the Transferee or any Recipient or any such institution to which the conduct of any project shall be so delegated.

(d) Comprehensive reports of such research shall be made available by the Transferee periodically, at least once in each year, to the public at large.

(e) All publications of the results of such research shall give credit to the original Donors who created the 1944 Fund.

(f) Every patent, United States or foreign, that shall be taken out by or on behalf of the Transferee, any Recipient or by or on behalf of any individual or institution acting at the direction of or on behalf of the Transferee or any Recipient in carrying out such research shall be immediately dedicated to the public, royalty free.

(g) The Transferee may invite proposals for research projects, or for educational or scientific work connected therewith, including proposals for fellowships.

(h) All direct or indirect expenses in connection with the above mentioned scientific education and research may be paid or reimbursed to the Transferee or Recipient out of any funds distributed or becoming distributable by the Transferee, but the Transferee or Recipient shall not devote any such funds to its ordinary expenses or any other purpose not expressly authorized by this Agreement.

The object of this Agreement is to create a fund to advance the public welfare in accordance with the laws of the District of Columbia relating to endowment funds, and no part of the principal or income of the Fund Account shall at any time inure to the benefit of any private shareholder or individual, nor shall it be used to carry on propaganda or otherwise attempt to influence legislation. The detailed purposes hereinabove stated shall be construed and given effect accordingly.

Nothing herein shall be deemed to prevent the Transferee, in its discretion, from investing any part of the Annual Amount (as hereinafter defined) pending determination by it of the best application to be made of such funds.

The PRF Program of the American Chemical Society

Between 1944 and 1953 income received from the operations of Universal was insufficient to justify the implementation of any program as contemplated by Article Second of the Trust Agreement. No dividends were paid by Universal in any of those years, and such income as was received came principally from interest on debentures issued after a recapitalization of the company effected with court approval in 1946. Pursuant to the authority expressed in Article Second, this income was invested by the Society.

In 1953, the Board of Directors of the Society initiated plans for putting the money thus accumulated to work. A 13-member Advisory Board was appointed to assist in the development of the program and to make recommendations on specific allocation of funds. In accord with paragraphs (b), (c) and (g) of Article Second of the Trust Agreement it was decided to delegate the conduct of advanced scientific education and fundamental research to educational institutions, such as universities and colleges, and to invite proposals for research programs as a basis for making grants for advanced scientific education and fundamental research in the "petroleum field." In December 1970, the Board recommended that institutions eligible to receive PRF grants include nonprofit scientific and educational institutions that do not have formal degree granting programs. Proposals for research support for scientists at such institutions would be considered by the Advisory Board in accordance with existing criteria.

On March 26, 1954, at a joint meeting of the Executive Committee of the Board of Directors and the Petroleum Research Fund Advisory Board some general criteria were adopted which would be used in judging proposals. These criteria were modified in 2000 and are listed beginning on page 5.

The first PRF grants and fellowships were awarded in 1954. For the next two years the program was under active review and with the substantial increase of income in 1955, 1956, and 1957 the grants program was expanded.

By 1957 six types of grants had been approved by the Board of Directors (Types A, B, C, D, E, F). The Type F program was discontinued by action of the Board in 1962. In 1963 the program of "Starter Grants" (Type G) for new faculty investigators was started. In mid-1968, the Board of Directors approved replacement of the Type A and Type C programs by the Type AC grant program, which contained some features of both former programs. Effective in the fall of 1970, the Board suspended the small programs of assistance for faculty sabbatical research and study (Types D and E) until such time as there arises a compelling need for reinstating them.

PRF programs operated for limited periods include PRF Graduate Fellowships and PRF Postdoctoral Fellowship Supplements. Two hundred PRF Graduate

Fellowships were authorized for the academic years 1968–69 and 1969–70, funded by a onetime authorization of \$1,000,000. PRF Postdoctoral Fellowship Supplements were authorized in December 1971 for the conversion of budgeted but unfilled graduate fellowships to postdoctoral fellowships in certain PRF Type AC grants. This program was carried out with \$200,000 authorized for payment in 1972.

Eight PRF Grants for New Directions in Fundamental Research with a total value of \$651,426 were made in 1978 and 1979. This program was discontinued by the Board of Directors in June 1979.

In June 1972 the Board of Directors approved a program of PRF Special Educational Opportunities Grants to assist with activities not comprised within already approved PRF programs but which represent significant contributions to “advanced scientific education and fundamental research in the ‘petroleum field’”. This program is similar to an earlier “special” program for which the last grant activity was in 1970. In August 1975, further action of the Board of Directors was intended to encourage use of the PRF SEO grants to support a greater diversity of activities, particularly science education projects of a more innovative or experimental character. In June of 1981, the name of the SEO program was changed to PRF Type SE grants. All activities which received SEO funding remained eligible for consideration.

In grant year 2008, 49 new Type SE grants were approved, providing assistance for scientific symposia, special conferences, and programs directed toward disadvantaged students. This included a grant of \$50,000 to Project SEED, for disadvantaged high school students to participate in research projects at colleges or universities, and a grant in the amount of \$10,000 for *Future Faculty Workshop: Diverse Leaders of Tomorrow* to assist underrepresented minority students and postdocs prepare for careers in academia. Forty seven Type SE grants, totaling \$214,400 were made in partial support of travel expenses of key invited foreign speakers in symposia at ACS National and Regional Meetings, and at meetings sponsored by other organizations.

In 1981, a competition was authorized to provide supplements to ongoing PRF grant projects for Summer Research Fellowships (SRF) to enable faculty and students from undergraduate colleges to participate in PRF-assisted research. The student portion of this program concluded in 1991. The fellowships for faculty continue and eighteen grant supplements of \$8,000 were awarded to support faculty visitors for the summer of 2008.

In 1991 the Undergraduate Research Supplement program was instituted as a replacement to the SRF program for students. Any eligible AC or G applicant from a doctoral department of a United States institution could apply at the time of submission of the AC or G grant application for an additional \$3,000 for the sole

purpose of including an undergraduate researcher in the proposed research program. This program was discontinued in 1993.

The transfer of the Trust in 2000 to the American Chemical Society and the concurrent change in the payout formula resulted in the availability of additional funds, and the Board of Directors approved three new Pilot Programs: ACS PRF Alternative Energy Postdoctoral Fellowships (Type AEF) with a value of \$50,000 per year for two years; ACS PRF Summer Schools (Type H) in topics on the cutting edge of science with a value up to \$125,000; and ACS PRF Undergraduate Faculty Sabbaticals (Type UFS), a matching grant program for research sabbaticals of one year with a value up to \$50,000. The first grants for these programs were awarded in 2003. In 2004 a fourth pilot program was approved, ACS PRF Supplements for Underrepresented Minority Research (Type SUMR). SUMR awards are supplements of up to \$5,000 for the support of a minority undergraduate to an active ACS PRF scientific grant. Sixty four SUMR awards totaling \$312,114 were approved for summer 2008. Three Type UFS grants were awarded in 2008. The AEF program was discontinued in 2006 and the Type H program was discontinued in 2007.

Table I shows the total amount committed annually for grants over the last 20 years, and Table II shows activity in the various grant programs for the past 10 years.

Table I
Amounts Committed Annually as Grants
by The ACS Petroleum Research Fund

<i>Year</i>	<i>Amount</i>
1989	12,683,447
1990	14,001,831
1991	14,689,884
1992	14,413,529
1993	12,917,421
1994	12,323,941
1995	11,510,226
1996	12,158,687
1997	13,052,025
1998	15,662,668
1999	16,950,205
2000	17,027,331
2001	18,058,555
2002	25,048,764
2003	24,467,201
2004	20,973,979
2005	22,288,640
2006	22,122,947
2007	25,250,919
2008	23,021,246

Table II
Number of Grants Active during Year

(These figures will be higher than number of grants paid since some are extended from prior years without additional funds.)

<i>Type of Grants</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>
AC	597	624	664	713	674	633	625	616	584	558
B	203	204	187	195	177	168	168	185	172	173
C	1	1	1	1	1	0	0	0	0	0
G/GB	351	333	346	398	448	401	406	407	446	454
SE	103	104	120	107	142	130	117	128	108	89
AEF					6	14	23	17	11	1
H					4	6	8	3	0	0
UFS					10	13	19	10	4	7
Total	1255	1266	1318	1414	1462	1365	1366	1366	1325	1282

During the year ending August 31, 2008, there were active research grants at over 400 colleges and universities in the United States, with others in Australia, Canada, France, Germany, Israel, Italy, Lebanon, Mexico, The Netherlands, Portugal, Spain, and the United Kingdom.

During the same period, actions of the PRF Advisory Board in considering proposals for new and continuing grants led to recommendations subsequently approved by the ACS Board of Directors as summarized in Table III.

Table III
Distribution of 2008 Funds Authorized for ACS PRF Grants

<i>Type of Grant</i>	<i>Number of Proposals Submitted</i>	<i>Number of Grants Recommended*</i>	<i>Amount Recommended</i>	<i>Percent of Total Funds</i>
AC	518	130	12,940,247	56.2
B	105	36	2,300,537	10.0
G	354	105	5,250,000	22.8
GB	105	33	1,649,948	7.2
SE	62	49	274,400	1.2
SRF	43	18	144,000	.6
SUMR	88	64	312,114	1.4
UFS	10	3	150,000	.7
TOTAL	1,285	438	\$23,021,246	100.0

*Listed in C&EN Online for: September 15, 2008

Types of Grants:

The following types of ACS PRF grants were authorized for the period covered by this report:

(AC) ACS PRF Grants for Fundamental Research in the Petroleum Field—Grants to academic institutions for regularly appointed faculty scientists to assist advanced scientific education and fundamental research in areas appropriate to support by PRF.

(B) ACS PRF Grants for Fundamental Research in the Petroleum Field at the Undergraduate Level—Educational grants to academic institutions on behalf of faculty members in departments not offering a doctoral degree, to support their research, with participation by undergraduates.

(G/GB) ACS PRF Grants for Fundamental Research in the Petroleum Field by New Faculty—Starter grants to assist the research of young faculty

members who are within their first three years of appointment as regular faculty members of colleges and universities in the United States.

(SE) ACS PRF Scientific Education Grants—for projects designed to enhance “...advanced scientific education and fundamental research in the ‘petroleum field’...”. Most awards provide partial funding for foreign speakers at major symposia in the United States or Canada.

(UFS) ACS PRF Undergraduate Faculty Sabbaticals – A matching grant program for year-long, full-time, research sabbaticals for faculty at undergraduate institutions and non-PhD granting departments.

(SRF) ACS PRF Summer Research Fellowships—Supplements for active ACS PRF research grants for summer support of a visiting faculty member from a primarily undergraduate institution.

(SUMR) ACS PRF Supplements for Underrepresented Minority Research—Supplements for active ACS PRF research grants for summer support of a minority undergraduate (scholar), which consists of a stipend for the SUMR scholar and may include a small contribution for research expenses.

Policies and Ground Rules

Starting with the considerations at the joint meeting of the Executive Committee of the Board of Directors and the Petroleum Research Fund Advisory Board on March 26, 1954, criteria for the evaluation of proposals and program policies have been constantly reviewed by the Advisory Board and the Committee on Grants and Awards of the ACS Board of Directors to provide the best possible grants program in accord with the objectives of the Trust and Transfer Agreements. In 2000, these criteria were reviewed by the American Chemical Society Petroleum Research Fund Advisory Board and the following statement was adopted:

Nature and Scope of the Research: ACS PRF Research Grants are made to non-profit institutions for regularly appointed scientists whose research may be sponsored in accordance with the PRF Transfer Agreement:

“ACS shall use all funds exclusively for advanced scientific education and fundamental research in the ‘petroleum field,’ which may include any field of pure science which in the judgment of (ACS) may afford a basis for subsequent research directly connected with the petroleum field.”

Note that *fundamental research* is required as opposed to applied research or methods development.

Funding Criteria: The ACS PRF Advisory Board makes relative rankings of proposals, and recommendations for funding, on the basis of the following criteria:

(1) The overall quality, significance, and scientific merit of the proposed research, including the extent to which it will increase basic knowledge and/or stimulate additional research.

(2) The extent to which the proposed research represents a new or independent area of investigation for the principal investigator(s).

(3) The impact of PRF funding the research, including the effect on the principal investigator’s overall research program.

(4) The qualifications or potential of the principal investigator(s) and adequacy of the facilities to conduct the research.

(5) The extent to which advanced scientific education will be enhanced through the involvement of students in the research.

To provide the best possible atmosphere for imaginative fundamental research in the petroleum field, the following program and administrative policies were in effect during the period covered by this report:

(1) The principal investigator is encouraged to present venturesome programs and to avoid the “sure-fire” neat little problems which can always be solved.

(2) Most ACS PRF research grants are made originally for two- or three-year periods. Continued support for research on the same or a different topic may be requested by presenting a new proposal which will be evaluated in competition with all other proposals. Because of limited available funds each principal investigator is limited to one ACS PRF research grant at a time.

(3) Each principal investigator is informed that he or she is not required to follow the specific details of the research plan as proposed, particularly if promising leads develop that seem likely to be more productive than the project proposed originally. The Advisory Board requests, however, that the principal investigator inform it of such new plan if it deviates markedly from that described in the original proposal and get prior approval to switch topics before conducting the revised research.

(4) Fellowship or graduate assistantship stipends paid from ACS PRF grants shall not exceed the amount which regular graduate teaching assistants receive for the academic year from the department after payment of tuition and fees, if any. In addition to stipends, regularly required tuition may be added in accord with institutional policy. Such tuition requests shall be itemized separately.

(5) To encourage further research activities and instill a desire to pursue graduate studies, undergraduate students are encouraged to participate in research programs with faculty members and graduate students.

(6) To provide the opportunity for full-time research during the summer months, principal investigators at institutions in the United States only may request contributions to summer salary and related benefits. Under guidelines effective in the period of this

report, the maximum contribution under new grants was \$7,500 per summer for Types AC, B, G, and GB grants.

(7) ACS PRF Types AC and G grants may be used to support postdoctoral fellows, graduate students, and/or undergraduates.

(8) ACS PRF Type B grants may not be used to support postdoctoral fellows or graduate students.

(9) The need for adequate equipment to perform the proposed research is recognized, and will be considered when properly justified. The cost of major items of equipment should usually be shared by the institution at which the research is to be done.

(10) Investigators whose research is supported by ACS PRF grants are required annually to submit reports on research progress, expenditures, and participation in grant projects by students and/or postdoctoral fellows, as well as to provide complete bibliographical information on all articles, books, reviews and reports in which full or partial ACS PRF support is acknowledged.

(11) Social security, retirement, workers' compensation, and other similar payments based on salaries budgeted in an ACS PRF grant may be charged as direct expenses.

(12) When a principal investigator moves from one university to another the grant may be transferred to the new institution upon prior approval by both the Program Manager and the institution of the original grant.

(13) In the interest of using granted funds most efficiently, unexpended funds at the end of an annual grant period may be carried forward into the next period. An extension of time without additional funds may be granted on request at the termination of the current grant agreement, for a maximum of two years of time extension.

Even though these approved program policies serve as guidance standards, the need for flexibility was realized. None of the procedures or rules established at the beginning of the program or since has been permitted to act as a straitjacket in the consideration of proposals. The criteria and policies of the program remain under constant review by the Advisory Board and the Committee on Grants and Awards. Information on current policies as well as deadlines and submission instructions are available on the ACS PRF website: www.acsprf.org.

To achieve some uniformity in handling proposals and existing grants it was decided to adopt the school year, and all grant budgets are set up so as to end on the 31st of August. Normally the Advisory Board meets three times a year, in September, January, and May. Deadlines for receipt of proposals are set approximately five months prior to the meeting date. Current ACS PRF regulations require an applicant whose Type AC proposal is not recommended for funding to wait twelve months before the Advisory Board will consider another AC proposal. Further, principal investigators cannot apply if they currently have an active grant. Each grant application must be approved by an administrative officer of the institution employing the applicant and

must be submitted electronically through the PRF website: www.acsprf.org.

The proposal with the budget as modified by recommendations from the Advisory Board becomes a part of an agreement between the Society and the grantee institution. The agreement sets forth details and the conditions under which the ACS PRF grants are made. If the principal investigator subsequently wishes to make a change from the approved budget, prior approval must be obtained from the ACS PRF Program Officer. An annual financial statement of expenditures of ACS PRF grant funds is required.

Subparagraphs (b) and (c) of Article Second of the Transfer Agreement require that the advanced scientific education and fundamental research contemplated by the Agreement shall be carried on either under the immediate direction of the Society or delegated by it to other nonprofit scientific and educational institutions such as universities. Except for a relatively small number of grants to assist with special meetings and symposia, all grants to date have been made to academic or scientific institutions in support of a faculty or staff member's research program which has been selected on the recommendation of the Advisory Board.

ACS Committee on Grants and Awards

The ACS Board of Directors in 1957 created a special standing Committee of the Board of Directors on Petroleum Research which in 1959 became the standing Committee on Grants and Fellowships. In 1971 the responsibilities of the Committee were transferred to the new Board Committee on Grants and Awards. The assignment of the Committee, relative to The Petroleum Research Fund, is given in Regulation III, 8 of the Constitution, Bylaws, and Regulations of the ACS as follows:

The Committee on Grants and Awards shall be responsible for the proper discharge by the ACS of its responsibilities as the recipient of money from The Petroleum Research Fund Trust. The Committee also is authorized to set up an Advisory Board and such other committees as it deems necessary, determine the size of such bodies and terms of appointment thereto, and recommend necessary appointments to the Chair of the Board. The Committee shall act on behalf of the Board in determining types of grants and in approving standards and conditions thereof. It may authorize specific grants within the amounts made available for such purposes, on recommendation of The Petroleum Research Fund Advisory Board.

The following Directors of the ACS served during the period covered by this report or are to be members of the Committee on Grants and Awards:

For 2008

Dr. Eric C. Bigham, Chair, *GlaxoSmithKline*
Dr. Janan M. Hayes, *Retired*
Dr. Madeleine M. Joullie, *University of Pennsylvania*
Ms. Valerie J. Kuck, *Retired*
Dr. Thomas H. Lane, *Dow Corning Corp.*
Dr. C. Gordon McCarty, *Retired*
Dr. Anne T. O'Brien, *Consultant*
Dr. Marinda Li Wu, *Science is Fun! Company*

For 2009

Dr. Eric C. Bigham, Chair, *GlaxoSmithKline*
Dr. Bruce E. Bursten, *University of Tennessee, Knoxville*
Dr. Joseph S. Francisco, *Purdue University*
Dr. Janan M. Hayes, *Retired*
Ms. Valerie J. Kuck, *Retired*
Dr. Anne T. O'Brien, *Consultant*
Dr. Kent J. Voorhees, *Colorado School of Mines*
Dr. Marinda Li Wu, *Science is Fun! Company*

The PRF Advisory Board

In 1954 the Board of Directors appointed the Petroleum Research Fund Advisory Board consisting of 13 members.

The periodic public announcements of grants made and other publicity, resulting in a more widely spread knowledge about the PRF program, greatly increased the number of applications for support. At each meeting the Advisory Board considers more than 500 proposals, which makes it impossible for each member to study in detail all proposals. To meet the needs of this situation, the Board of Directors in 1958 authorized an increase in the number of members on the Advisory Board to 18. In 1962 it was increased to 21, in 1978 to 24, in 1985 to 25, in 1988 to 27, in 1993 to 29, and in 2003 to 30, to deal with significant growth in the number of proposals. The enlarged Advisory Board is split into a number of smaller committees, each of which has assigned to it research proposals falling within certain fields. This plan of committee assignment reduces considerably the number of proposals requiring intensive study by the Advisory Board as a whole and facilitates the administration of the program.

Benjamin S. Hsiao, *State University of New York at Stony Brook*
Maitland Jones, Jr., *Princeton University*
Miriam Kastner, *University of California, San Diego*
Moses N.F. Lee, *Hope College*
Craig C. Martens, *University of California, Irvine*
Donald W. Murphy, *Bell Laboratories, Lucent Technologies*
David J. Norris, *University of Minnesota*
Ralph G. Nuzzo, *University of Illinois at Urbana-Champaign*
Christopher K. Ober, *Cornell University*
Anthony J. Pearson, *Case Western Reserve University*
Dale S. Sawyer, *Rice University*
Donald N. Schulz, *ExxonMobil Research and Engineering Co.*
John W. Scott, *Bristol Myers Squibb*
Pamela J. Shapiro, *University of Idaho*
Jack P. Simons, *University of Utah*
Hal Van Ryswyk, *Harvey Mudd College*
M. Stanley Whittingham, *State University of New York at Binghamton*
G. Paul Willhite, *University of Kansas*
B. Erik Ydstie, *Carnegie Mellon University*

Petroleum Research Fund Advisory Board, 2008

Chair: Edward J.J. Grabowski, *Merck & Co. Inc.*

Members:

Susan Agar, *ExxonMobil Upstream Research Company*
Donna Amenta, *James Madison University*
John E. Baldwin, *Syracuse University*
R. Morris Bullock, *Pacific Northwest National Laboratory*
Jennifer S. Curtis, *University of Florida*
Paul J. Dagdigian, *Johns Hopkins University*
Marcetta Y. Darensbourg, *Texas A&M University*
James I. Drever, *University of Wyoming*
Eric Garfunkel, *Rutgers University*
Katherine A. Giles, *New Mexico State University*
Patrick G. Hatcher, *Old Dominion University*

Designated for the Year 2009

Chair: Rebecca Cowan Hoye, *Macalester College*

Members:

Susan Agar, *ExxonMobil Upstream Research Company*

John E. Baldwin, *Syracuse University*

Joan Brennecke, *University of Notre Dame*

R. Morris Bullock, *Pacific Northwest National Laboratory*

Paul J. Dagdigan, *Johns Hopkins University*

Marcetta Y. Darensbourg, *Texas A&M University*

Ian Davies, *Merck and Co., Inc.*

James I. Drever, *University of Wyoming*

Michael H. Engel, *University of Oklahoma*

John Falconer, *University of Colorado*

Rodney Fox, *Iowa State University*

Katherine A. Giles, *New Mexico State University*

Benjamin S. Hsiao, *State University of New York at Stony Brook*

Timothy Jamison, *Massachusetts Institute of Technology*

Maitland Jones, Jr., *Princeton University*

Miriam Kastner, *University of California, San Diego*

Craig C. Martens, *University of California, Irvine*

Donald W. Murphy, *Bell Laboratories, Lucent Technologies*

David J. Norris, *University of Minnesota*

Ralph G. Nuzzo, *University of Illinois at Urbana-Champaign*

Christopher K. Ober, *Cornell University*

Dale S. Sawyer, *Rice University*

Donald N. Schulz, *ExxonMobil Research and Engineering Co.*

C. David Sherrill, *Georgia Institute of Technology*

Joseph L. Templeton, *University of North Carolina, Chapel Hill*

Hal Van Ryswyk, *Harvey Mudd College*

M. Stanley Whittingham, *State University of New York at Binghamton*

G. Paul Willhite, *University of Kansas*

Jeffrey Winkler, *University of Pennsylvania*

B. Erik Ydstie, *Carnegie Mellon University*

Strategic Review

In January 2006, discussions began regarding completing a thorough review of the strategies and structure governing the ACS Petroleum Research Fund. An external consultant with experience in the funding community was engaged and approval was received from both the ACS Board Standing Committee on Grants & Awards as well as from the Petroleum Research Fund Advisory Board. Staff, ACS Board members, ACS PRF Advisory Board members and our counterparts with experience at other funding agencies were interviewed in an attempt to understand what the fund was known for and what the fund should aspire to be in the future.

It became rapidly clear that Petroleum Research Fund was well known for its support of young faculty but less known for its support of research. It became clear very quickly that support for the careers of scientists was important but that it was also very important that the fund have a clear impact on fundamental research in the energy field.

A Steering Committee was assembled comprised of members from both the Committee on Grants & Awards and the Petroleum Research Fund Advisory Board. In January 2007 an External Review Workshop was held in which stakeholders and thought leaders from the research and education communities were brought together to help guide the potential changes. After several months of difficult and contentious work, the Steering Committee in concert with the Planning

Committee of the Advisory Board developed the following vision statement for the fund:

The ACS Petroleum Research Fund will support innovative fundamental research, advanced scientific education, and the careers of scientists, to aid in significantly increasing the world's energy options.

Based on this vision statement and extensive discussions with the PRFAB Planning Committee, the following proposal for change was developed and approved for implementation by both the PRF Advisory Board and the ACS Board of Directors:

Overview of the Proposal

The proposal consists of several programs in support of the agreed upon vision/mission and direction of the fund to support:

- Research Impact
- Advanced Scientific Education
- Career Development

The three major programs are:

- New Investigator Grants
- New Directions Grants
- Undergraduate Research Grants

Initial program changes are planned to take effect for the 2009 grant cycle (submissions starting in 2008).

Two additional grant programs have been approved, and may be implemented during the 2009 grant year for funding in 2010:

- Exceptional Innovation Grants
- Strategic and Multidisciplinary Research Grants

Program Administration

Day to day administration of the ACS Petroleum Research Fund grant program is carried out in the ACS Research Grants Office. Dr. W. Christopher Hollinsed was the 2008 Director (Administrator). Program Administrators since the position was created by the Board of Directors were Dr. Karl Dittmer, 1958–64, Dr. Robert E. Henze, 1964–70, Dr. Justin W. Collat, 1970–

81, Dr. Joseph E. Rogers, Jr., 1981–1998, and Dr. Lawrence A. Funke, 1998–2004. During 2007–2008, Dr. Ronald E. Siatkowski, Manager, PRF Operations; and Drs. Robert Botto, Dean Dunn, Kenny Lipkowitz, and Jeffrey Smiley, Program Officers; assisted with administration of the ACS PRF grant program.

Directions and Application Forms

Requests for directions on the preparation of proposals and questions about the ACS PRF program should be addressed to The American Chemical Society Petroleum Research Fund, 1155 Sixteenth Street, NW, Washington, DC 20036. Telephone: (202) 872-4481, Email: prfinfo@acs.org, and website: www.acsprf.org.