The Marine Biological Laboratory Woods Hole Massachusetts

Ninety-Fifth Report for the Year 1992 One-Hundred and Fourth Year

Officers of the Corporation

Denis M. Robinson, Honorary Chairman of the Board of Trustees
Sheldon J. Segal, Chairman of the Board of Trustees
Robert E. Mainier, Vice Chairman of the Board of Trustees
James D. Ebert, President of the Corporation
John E. Burris, Director and Chief Executive Officer
Robert D. Manz, Treasurer
Neil Jacobs, Clerk of the Corporation
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report of the Chairman</td>
<td>R1</td>
</tr>
<tr>
<td>Report of the Director</td>
<td>R2</td>
</tr>
<tr>
<td>Report of the Treasurer</td>
<td>R6</td>
</tr>
<tr>
<td>Financial Statements</td>
<td>R8</td>
</tr>
<tr>
<td>Report of the Library Director</td>
<td>R18</td>
</tr>
<tr>
<td>Educational Programs</td>
<td></td>
</tr>
<tr>
<td>Summer Courses</td>
<td>R21</td>
</tr>
<tr>
<td>Short Courses</td>
<td>R25</td>
</tr>
<tr>
<td>Summer Research Programs</td>
<td></td>
</tr>
<tr>
<td>Principal Investigators</td>
<td>R30</td>
</tr>
<tr>
<td>Other Research Personnel</td>
<td>R31</td>
</tr>
<tr>
<td>Library Readers</td>
<td>R33</td>
</tr>
<tr>
<td>Institutions Represented</td>
<td>R34</td>
</tr>
<tr>
<td>Year-Round Research Programs</td>
<td>R38</td>
</tr>
<tr>
<td>Honors</td>
<td>R45</td>
</tr>
<tr>
<td>Board of Trustees and Committees</td>
<td>R48</td>
</tr>
<tr>
<td>Laboratory Support Staff</td>
<td>R51</td>
</tr>
<tr>
<td>Members of the Corporation</td>
<td></td>
</tr>
<tr>
<td>Life Members</td>
<td>R53</td>
</tr>
<tr>
<td>Regular Members</td>
<td>R54</td>
</tr>
<tr>
<td>Associate Members</td>
<td>R65</td>
</tr>
<tr>
<td>Certificate of Organization</td>
<td>R68</td>
</tr>
<tr>
<td>Articles of Amendment</td>
<td>R68</td>
</tr>
<tr>
<td>Bylaws</td>
<td>R68</td>
</tr>
</tbody>
</table>
The year 1992 was one of historic and exciting change for the Marine Biological Laboratory. In August, the MBL’s Board of Trustees voted to adopt major changes in the governance of the Laboratory, and in September we welcomed the Laboratory’s newest director and CEO, John E. Burris.

New Governance Structure

The decision to modify the governance of the MBL came after discussions at a Trustees retreat in 1991 and a year of careful study and work by members of an Ad Hoc Committee on Governance, in consultation with the MBL community. When fully constituted, the MBL’s new Board of Trustees will be composed of 18 members drawn from a wide community of distinguished, influential, and experienced individuals. The Board will be a fiduciary body, the guardian of the MBL mission. It will have strong fundraising capabilities, be independent and self-regenerating, set policies, and appoint and evaluate the CEO. Board members provide to the laboratory a broad range of valuable experience and will be able to address the institution’s challenges with wisdom and objectivity.

A Nominating Committee of the Board will seek eligible candidates for Board membership and the candidates will be elected by the full Board. Six of the Trustees will be selected by the Board from a list of nominees—all scientists and MBL Corporation members—compiled by the MBL Corporation. Other members of the Board may also be chosen from the scientific community at large.

The Corporation will continue to play the crucial role of providing governance on the scientific direction of the MBL. Drawing from its membership, the Corporation will establish a Science Council that will provide advice and counsel on scientific affairs to the MBL’s director and to the Board of Trustees. Members of the Science Council will represent all aspects of scientific life at the MBL.

Finally, an independent Board of Overseers will be established. This group will consist of distinguished scientists—not necessarily members of the MBL Corporation—who will serve as advisors to the Director and to the Board.

New Director Appointed

After a year-long search, I was pleased to announce in July the appointment of John E. Burris to serve as Director and CEO of the Marine Biological Laboratory. Dr. Burris received his Ph.D. in marine biology from Scripps Institution of Oceanography in 1976. He came to the MBL from the National Research Council of the National Academy of Sciences where he served most recently as Executive Director of the Commission on Life Sciences. He brings to his new role as MBL’s Director a broad range of experience in science policy and administration, and as a university faculty member and researcher in marine biology and physiological ecology.

While welcoming John to his new position, I’d also like to pay tribute and offer thanks on behalf of the Laboratory to John’s predecessor, Harlyn Halvorson. He served with distinction as Director of the MBL from September 1987 to July 1992. Under Harlyn’s leadership the laboratory celebrated a milestone event of June 20, 1992, with the opening of the new Marine Resources Center. Harlyn’s dedication and commitment to the Marine Resources project never faltered. He worked all over the country, indeed around the world, garnering support for this effort. We owe Harlyn great thanks as our Director and as the visionary who made this new building possible.

—Sheldon J. Segal
Report of the Director
and Chief Executive Officer

It is with great pleasure that I recount the past year at the Marine Biological Laboratory and contemplate its future, for in my first nine months at the Laboratory I have come to appreciate its many resources and its potential. The greatest of these resources is the human one—the staff, the scientists, the students, and the community. Next is the environment of the MBL—an institution composed of a variety of well-run research laboratories surrounded by waters rich in biological diversity.

What did 1992 bring to the Marine Biological Laboratory?

Marine Resources Center

Our most visible achievement of 1992 was the June 20th opening of the MBL's new Marine Resources Center. Senators Edward M. Kennedy and John Kerry, Congressman Gerry Studds, and NIH Deputy Director Jay Moskowitz participated in the opening ceremonies, which were attended by more than 500 members of the MBL and Woods Hole communities. We owe a great debt of gratitude to Harlyn Halvorson, for his tireless efforts towards making this milestone project a reality.

The new Marine Resources Center provides state-of-the-art engineering systems and advanced laboratory and mariculture facilities, as well as a collaborative veterinary program through the University of Pennsylvania's Laboratory for Marine Animal Health, directed by Donald Abt. Dr. Alan M. Kuzirian has been appointed Acting Director of the new Center. The MRC is reporting early successes in maintaining a healthier and more reliable supply of marine organisms. For example, a new generation of dogfish has been born and is thriving in our circulating seawater tanks. Species requiring cold seawater are now available to researchers into the summer months as a result of improved chilled seawater holding facilities. Warmer-water species such as toadfish and scup are being maintained in the facility well past the time when they would have departed Woods Hole waters for warmer climes. A colony of sea worms is also being raised under uniform conditions to produce reliable, standardized bioassays in environmental monitoring.

The challenge facing the MBL is to maximize the use of this wonderful facility. We need to use it not only to
maintain organisms caught locally, but also to culture organisms from egg to egg to assure a reliable and genetically and nutritionally defined set of experimental organisms. The facility has extensive capabilities for mariculture and biomedical research, providing exciting potential for expanding the Laboratory’s research and educational programs.

**Year-Round Research**

The MBL’s year-round community remains a strong group of investigators, as evidenced by their continued ability to obtain funding through peer-reviewed grants even in these tight times. Some examples of these successes include:

- The Ecosystems Center, jointly directed by John Hobbie and Jerry Melillo, won a large, multi-year award from the National Science Foundation to support a Land-Margin Ecosystems Research program. This research measures the effects of human habitation on fragile coastal zone ecosystems by studying changes in food webs and water quality. The Center is also continuing its research in tropical forests to evaluate the effects of deforestation and air pollution on these rapidly changing environments with grants from the Texaco and Exxon corporations.
- Investigators in the Center for Architectural Dynamics in Living Cells continue to explore the mechanisms and structural dynamics of cell division, differentiation, and motility in living cells. Center scientists are developing an automated polarized light microscope that will document cell architecture on the molecular level. Dr. Shinya Inoué, the Director of the Center, was awarded the E.B. Wilson Award in November, the American Society for Cell Biology’s highest honor. As this report goes to press, we have learned that Dr. Inoué was also elected to membership in the National Academy of Sciences.
- The Center for Molecular Evolution, directed by Mitchell Sogin, received national media coverage recently for a dramatic discovery made there in 1992: that the fungi are more closely related to animals than they are to plants. This is a radical departure from accepted classification systems where the fungi have either been grouped with plants or given separate kingdom status. Work at the Center is funded by the NIH and the G. Unger Vetlesen Foundation.
- Lionel Jaffe and his colleagues Peter Smith and Andrew Miller have expanded and diversified funding for the National Vibrating Probe Facility and the Calcium Aequorin Imaging Laboratory. Recent exciting results in these two facilities have provided new insights on the blood-brain barrier, as well as the movement of calcium in newly fertilized eggs.

**Summer Research at the MBL**

In 1992, more than 300 scientists from around the world came to the MBL to perform research and collaborate with their peers. Using the latest biomedical technologies, their work has implications on studies of aging, diabetes, cognition and memory, mariculture, pollution, vision, and tissue bioadhesives. A series of evening lectures, including the traditional Friday Evening Lecture Series, symposia, and brown bag lunches facilitated the exchange of ideas among our eminent researchers.

Of particular note, summer researchers Sergei Kuznetzov, George Langford, and Dieter Weiss found evidence that a myosin-like motor is responsible for the actin-dependent movement of organelles in squid giant axons. These investigators propose a “dual filament system” to account for the movement of organelles during fast axonal transport. According to their hypothesis, both actin filament-based and microtubule-based motility systems work together to produce and regulate the movement of organelles within the axon. The breakdown of these kinds of transport systems in nerve cells is thought to be involved in various degenerative diseases such as amyotrophic lateral sclerosis.

**Educational Program**

The MBL’s exceptional educational program continued its strong tradition of providing graduate students and postdoctoral fellows with innovative courses in the life sciences. In 1992, 347 students and 200 faculty and lecturers from more than 200 universities and research institutions participated.

In addition to the wide range of core courses at the MBL, 1992 marked the return of the Mariculture course. The course now uses a basic science approach to address the problems of maintaining and culturing marine organisms used in biological research.

The MBL’s Information Systems Division teamed up with the National Library of Medicine to provide a one-week course for 30 students in Medical Informatics. Workshops were also designed to teach the MBL community how to use the NLM software. These programs will continue for the next three years.

The MBL was also chosen to host the first course in Fundamental Issues in Vision Research: Molecular and Biological Approaches. This two-week laboratory and lecture course, sponsored by the NIH’s National Eye Institute, demonstrated the challenging problems in vision research available to graduate students. Several
MBL summer investigators participated in planning and teaching this course.

**Fellowship Programs**

The MBL's Fellowship and Scholarship programs received strong support in 1992. More than $103,000 was available, enabling 16 young investigators and students to participate in the MBL’s research and educational programs. The fellowship program was enhanced again this year by a weekly luncheon seminar series in which our young scholars shared their research with the MBL community. Our fellows were also honored at the annual Chamber Music Concert, which in 1992 featured the renowned Tokyo String Quartet.

Ten journalists participated in the 7th annual Science Writing Fellowships Program at the MBL. The one-week hands-on laboratory in cell and molecular biology techniques was again a great success. For the second year, a journalist was sent to the Toolik Lake research site on the north slope of Alaska’s Brooks Range, to work with scientists from the MBL’s Ecosystems Center.

**Library**

The MBL/WHOI Library has made significant progress towards its goal of serving as a conduit for, rather than being exclusively a repository of, scientific knowledge. Thanks largely to support from the Andrew Mellon Foundation and the Howard Hughes Medical Institute, a fiber optic data network has been installed, which will provide access to the Internet, electronic mail and bulletin boards, and limited access to our journal collection to scientists working around the world. The U.S. Department of Education included the MBL/WHOI Library in its constellation of officially designated research libraries.

**Construction**

As I write this report, work has begun on a number of construction and renovation projects at the Laboratory. The Lillie research laboratory is in the early stages of being renovated, the result of a $575,000 matching grant from the National Science Foundation. Although major components of the project won't begin until the fall of 1993, the first phases of the project—the removal of asbestos from some of the research laboratories—is underway. Included in the renovations are a central air conditioning system, forced ventilation into the labs, a new freight elevator, and a larger-capacity standby electrical power generator.

The Brick Apartment Dormitory is undergoing its first major renovations since it was constructed in 1923. When completed in the summer of 1993, the building will be more energy-efficient and modern. Asbestos will have been removed and a new boiler and bathroom facilities in the dorm wing installed.

December 22, 1992 marked the end of an era for the MBL's Supply Department, when the old shingled supply building was razed to make room for the Lab's new Collection Support Facility. The CSF will occupy basically the same footprint as the old supply building. It will contain a small boat maintenance facility and a diving support facility on the first floor, and a $103,000 500 kWatt emergency generator for the new MRC on the second.

**Special Events and Public Programs**

In 1992, the MBL continued to offer outreach programs to the general public. Three weeks of ELDERHOSTEL programming was offered, and the sessions, which included courses on evolution, ichthyology, biochemistry, and genetics, were met with great enthusiasm by the students. The MBL also continued its acclaimed Falmouth Forum winter series of lectures, presentations, and concerts. Among our 1992 Forum participants was Pulitzer Prize winning author, David McCullough.

**The Future**

The preceding chronicles the recent concrete achievements of the Laboratory, but it doesn't capture adequately the excitement we all feel about the future. As the times change in biomedical and biological research, the MBL is well-positioned to take advantage of the changes. In education, for instance, where everyone is bemoaning the expense of equipment and laboratories, and where institutions are closing down laboratory courses, we continue to be able to offer modern courses with state-of-the-art equipment. Our rotating faculty and the generous loans of equipment from scores of different vendors are crucial in our ability to do this, as is the generous support we receive from the federal government and private organizations such as the Howard Hughes Medical Institute, the MacArthur Foundation, and the Burroughs Wellcome Fund. We know that our courses are filling a need, as indicated by the increased number of applications for all of them in the summer of 1993.
In an era when young scientists are finding it progressively more difficult to get started and to obtain funding, we have expanded our fellowship program. Again we see the demand for such programs; applications for fellowships more than doubled in 1993 from 1992.

The future of the MBL is indeed bright for our researchers as well. Our new Marine Resources Center and the soon-to-be renovated Lillie research laboratory will provide an improved physical setting where our scientists may pursue a variety of new research opportunities.

I feel fortunate to have assumed the directorship of the Marine Biological Laboratory, long recognized as one of the world's most important biological laboratories, at this propitious moment. I look forward to working will all of you in the years to come.

—John E. Burris
Report of the Treasurer

Financially, 1992 will be remembered as the year of transition. With the “changing of the guard” in leadership and the change in governance comes the challenge and opportunity for strengthening the financial future of the MBL.

We finished 1992 with an excess of support and revenues over expenses in the unrestricted current funds of $275,968. After mandatory and non-mandatory transfers, the net result was a decrease in our unrestricted current fund balance of $8,451.

This modestly successful result meant that for the first time in a number of years we did not have to use unrestricted quasi-endowment funds to support current operations.

This is a heartening result, but it must be tempered by the observation that this is before a depreciation expense of $722,959. Like most other not-for-profit organizations, the MBL does not charge depreciation expense to operations. Until the MBL funds depreciation of operations, there can be no use of the word “surplus.”

1992 saw the completion of the Marine Resources Center, and the growth of our plant fund balances from about $10 million in at the end of 1991 to almost $20 million at the end of 1992.

Our endowment funds (Figs. 1 and 2) increased slightly from $15.9 million to $16.3 million, almost all of this increase resulting from gifts. The total return before fees on our portfolios in 1992 ranged between 5% and 5.8%; clearly, we need to improve on this performance, and we shall endeavor to do so through the efforts of the Investment Committee.

Support and Revenues increased from $20.8 million in 1991 to $21.1 million in 1992, due primarily to increasing grant support of research and education. Private gift support decreased due primarily to a lull in receipt of major multi-year grants. This decrease masks
the robust success of the Annual Campaign (Fig. 3),
and other unrestricted gift support. These grew by
$110,000 in 1992, an increase of 34% over the previous
year. Revenue from deferred support—drawdowns on
previously received gifts—increased by $436,000 from
1991. This reflects the continuing spend-down of
monies received primarily from the Howard Hughes
Medical Institute to support the educational and library
programs.

Our expenditures increased by $900,000 with most of
the increase coming in the research and education
programs as well as administration.

Housing and Dining operations continue to do well,
contributing $158,000 of depreciation expense to the
Housing Renewals and Replacements fund. This has
allowed us to undertake major upgrades of our housing
plant, both through capital expenditures from our
Repairs and Replacement fund, and through
borrowing.

In 1992 the MBL borrowed $2,600,000 at favorable
tax-exempt rates through the Massachusetts Industrial
Finance Agency (MIFA). We use this money to
refinance existing debt on our cottages, to renovate the
Brick Apartments, and to modernize research facilities
in the Crane wing of the Lillie/Crane building. Through
this borrowing, and the generous support of donors, we
were able to match a $575,000 award from the
National Science Foundation to undertake a
$1,800,000 project for the renovation of scientific
facilities.

Looking to 1993 we have a realistically balanced
budget that reflects the continued determination to
maintain the current level of services at the Laboratory
in the most cost-effective manner possible. We can
expect the financial stabilization witnessed in 1992 to
continue while we take advantage of new funding
opportunities. The MBL’s long tradition of innovation
in fostering the development of scientists and the
stimulation of intellectual breakthroughs means that an
investment here will yield superior returns.

—Robert D. Manz
REPORT OF INDEPENDENT ACCOUNTANTS

To the Trustees of
Marine Biological Laboratory
Woods Hole, Massachusetts

We have audited the accompanying balance sheet of Marine Biological Laboratory as of December 31, 1992 and the related statement of support, revenues, expenses and changes in fund balances for the year then ended. We previously examined and reported upon the financial statements of the Laboratory for the year ended December 31, 1991, for which condensed statements are presented for comparative purposes only. These financial statements are the responsibility of the Laboratory’s management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Marine Biological Laboratory at December 31, 1992, and its support, revenues, expenses and changes in fund balances for the year then ended in conformity with generally accepted accounting principles.

Our audit was conducted for the purpose of forming an opinion on the basic financial statements taken as a whole. The supplemental schedules of support, revenues, expenses and changes in fund balances for current funds (Schedule I), endowment funds (Schedule II) and plant funds (Schedule III) as of December 31, 1992 are presented for purposes of additional analysis and are not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated, in all material respects, in relation to the basic financial statements taken as a whole.

Boston, Massachusetts
April 16, 1993
## MARINE BIOLOGICAL LABORATORY

### BALANCE SHEETS

**December 31, 1992**

(with comparative totals for 1991)

<table>
<thead>
<tr>
<th><strong>ASSETS</strong></th>
<th><strong>1992</strong></th>
<th><strong>1991</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$499,514</td>
<td>$373,365</td>
</tr>
<tr>
<td>Restricted cash</td>
<td>6,667</td>
<td>6,994</td>
</tr>
<tr>
<td>Investments, at market (Note C)</td>
<td>1,628,270</td>
<td>1,778,770</td>
</tr>
<tr>
<td>Accounts receivable, net of allowance for doubtful accounts of $8,000 and $6,000</td>
<td>541,546</td>
<td>458,275</td>
</tr>
<tr>
<td>Receivables due for costs incurred on grants and contracts</td>
<td>625,857</td>
<td>691,118</td>
</tr>
<tr>
<td>Other assets</td>
<td>180,927</td>
<td>239,970</td>
</tr>
<tr>
<td><strong>Total current assets</strong></td>
<td><strong>3,482,781</strong></td>
<td><strong>3,548,492</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>LIABILITIES AND FUND BALANCES</strong></th>
<th><strong>1992</strong></th>
<th><strong>1991</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current portion of long-term debt (Note F)</td>
<td>$65,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>Accounts payable and accrued expenses</td>
<td>1,278,535</td>
<td>822,084</td>
</tr>
<tr>
<td>Deferred income</td>
<td>250,490</td>
<td>308,019</td>
</tr>
<tr>
<td><strong>Total current liabilities</strong></td>
<td><strong>1,594,025</strong></td>
<td><strong>1,190,103</strong></td>
</tr>
<tr>
<td>Accounts payable (Note E)</td>
<td>208,167</td>
<td>587,579</td>
</tr>
<tr>
<td>Long-term debt (Note F)</td>
<td>2,535,000</td>
<td>1,140,000</td>
</tr>
<tr>
<td>Deferred support (Note G)</td>
<td>3,663,698</td>
<td>4,437,140</td>
</tr>
<tr>
<td>Annuities payable</td>
<td>184,553</td>
<td>152,416</td>
</tr>
<tr>
<td><strong>Total long-term liabilities</strong></td>
<td><strong>6,591,418</strong></td>
<td><strong>6,317,135</strong></td>
</tr>
<tr>
<td>Commitments (Note E)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
<td><strong>8,185,443</strong></td>
<td><strong>7,507,238</strong></td>
</tr>
<tr>
<td>Current unrestricted fund balances</td>
<td>12,857</td>
<td>21,398</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Endowment fund balances:</strong></th>
<th><strong>1992</strong></th>
<th><strong>1991</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quasi-endowment unrestricted</td>
<td>548,061</td>
<td>543,049</td>
</tr>
<tr>
<td>Endowment, income for unrestricted purposes</td>
<td>3,884,134</td>
<td>3,735,253</td>
</tr>
<tr>
<td>Endowment, income for restricted purposes</td>
<td>6,219,233</td>
<td>6,049,007</td>
</tr>
<tr>
<td>Quasi-endowment restricted</td>
<td>5,629,395</td>
<td>5,590,516</td>
</tr>
<tr>
<td><strong>Total endowment funds</strong></td>
<td><strong>16,280,823</strong></td>
<td><strong>15,917,825</strong></td>
</tr>
<tr>
<td><strong>Plant fund balances:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrestricted</td>
<td>19,708,718</td>
<td>10,034,642</td>
</tr>
<tr>
<td>Repairs and replacement reserve</td>
<td>196,470</td>
<td>188,289</td>
</tr>
<tr>
<td>Restricted</td>
<td>22,898</td>
<td>6,214,181</td>
</tr>
<tr>
<td><strong>Total plant funds</strong></td>
<td><strong>19,928,086</strong></td>
<td><strong>16,437,112</strong></td>
</tr>
</tbody>
</table>

| **Total assets** | **$44,407,209** | **$39,883,573** |

The accompanying notes are an integral part of the financial statements.
MARINE BIOLOGICAL LABORATORY

STATEMENT OF SUPPORT, REVENUES, EXPENSES AND CHANGES IN FUND BALANCES

for the year ended December 31, 1992
(with comparative totals for 1991)

<table>
<thead>
<tr>
<th>Current Funds</th>
<th>Unrestricted</th>
<th>Restricted</th>
<th>Unrestricted</th>
<th>Restricted</th>
<th>Unrestricted</th>
<th>Restricted</th>
<th>1992 Total</th>
<th>1991 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Fund</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>All Funds</td>
<td>All Funds</td>
</tr>
<tr>
<td>Grant reimbursements of direct costs</td>
<td>$5,982,265</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$ 5,982,265</td>
<td>$ 5,129,580</td>
</tr>
<tr>
<td>Grant for capital additions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4,032,660</td>
<td>4,835,681</td>
</tr>
<tr>
<td>Recovery of indirect costs</td>
<td>$3,530,621</td>
<td>$3,530,621</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,530,621</td>
<td>3,319,506</td>
</tr>
<tr>
<td>Tuition</td>
<td>485,247</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>485,247</td>
<td>564,144</td>
</tr>
<tr>
<td>Fee for services</td>
<td>3,101,198</td>
<td>173,733</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,274,931</td>
<td>3,212,777</td>
</tr>
<tr>
<td>Investment income</td>
<td>406,212</td>
<td>521,698</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>927,910</td>
<td>982,246</td>
</tr>
<tr>
<td>Gifts (Note G)</td>
<td>428,711</td>
<td>954,248</td>
<td></td>
<td></td>
<td>$ 280,320</td>
<td>15,000</td>
<td>1,678,279</td>
<td>2,144,649</td>
</tr>
<tr>
<td>Change in deferred support (Note G)</td>
<td>453,970</td>
<td>319,472</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>773,442</td>
<td>337,478</td>
</tr>
<tr>
<td>Miscellaneous revenue</td>
<td>882,681</td>
<td>1,273,720</td>
<td></td>
<td></td>
<td>280,320</td>
<td>15,000</td>
<td>2,451,721</td>
<td>2,482,127</td>
</tr>
<tr>
<td>Total support and revenues</td>
<td>6,219,738</td>
<td>8,771,144</td>
<td>280,320</td>
<td>4,062,133</td>
<td>21,131,738</td>
<td>20,794,564</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EXPENSES:**

| Research | 6,019,891 | 6,019,891 | 5,685,198 |
| Instruction | 1,526,154 | 1,526,154 | 1,249,298 |
| Scholarships, fellowships and stipends | 394,544 | 394,544 | 529,044 |
| Services | 1,982,001 | 1,422,736 | 3,404,737 | 487,886 |
| Administration | 2,606,112 | 145,641 | 2,751,753 | 10,000 |
| Plant operations | 1,585,953 | 1,585,953 | 40,805 | 158,901 | 722,959 | 608,327 |
| Depreciation | 3,410 | 246,981 | 267,145 |
| Other | 243,571 | 885,270 | 17,350,564 | 16,403,996 |
| Total expenses | 6,174,066 | 1,568,377 | 7,742,443 | 8,722,851 | 885,270 | 17,350,564 | 16,403,996 |
| Excess (deficit) of support and revenues over expenses | 45,672 | 230,026 | 275,698 | 48,293 | 280,320 | (885,270) | 4,062,133 | 3,781,174 | 4,390,568 |
| Net realized gain on investments | 78,636 | 23,038 | 898,719 | 1,000,393 | 789,406 |
| Net unrealized gain (loss) on investments | (77,518) | (23,216) | (853,402) | (936,136) | 1,631,086 |
| Net gain (loss) on investments | (1,118) | (178) | 63,317 | 64,257 | 2,420,492 |
| Transfers | (54,213) | (230,026) | (284,239) | (49,411) | 5,190 | 14,349 | 10,567,527 | (10,253,416) |
| Net change in fund balances | (8,541) | (8,541) | 5,012 | 357,986 | 9,682,257 | (6,191,283) | 3,845,431 | 6,811,060 |
| Fund balances, beginning of year | 21,398 | 21,398 | 543,049 | 15,374,776 | 10,222,931 | 6,214,181 | 32,376,335 | 25,565,275 |
| Fund balances, end of year | $ 12,857 | $ 12,857 | $ 548,061 | $ 15,732,762 | $19,905,188 | $22,898 | $36,221,766 | $32,376,335 |

The accompanying notes are an integral part of the financial statements.
Marine Biological Laboratory

Notes to Financial Statements

A. Purpose of the Laboratory:

The purpose of Marine Biological Laboratory (the "Laboratory") is to establish and maintain a laboratory or station for scientific study and investigations, and a school for instruction in biology and natural history.

B. Significant Accounting Policies:

Basis of Presentation—Fund Accounting

In order to ensure observance of limitations and restrictions placed on the use of resources available to the Laboratory, the accounts of the Laboratory are maintained in accordance with the principles of fund accounting. This is the procedure by which resources are classified into separate funds in accordance with specified activities or objectives. Separate accounts are maintained for each fund; however, in the accompanying financial statements, funds that have similar characteristics have been combined into fund groups. Accordingly, all financial transactions have been recorded and reported by fund group.

Externally restricted funds may only be utilized in accordance with the purposes established by the donor or grantor of such funds. However, the Laboratory has full control over the utilization of unrestricted funds. Restricted gifts, grants, and other restricted support are accounted for in the appropriate restricted funds. Restricted current funds are reported as revenue as the related costs are incurred (see Note G).

Endowment funds are subject to restrictions which require that the principal be invested in perpetuity. Related investment income is available for use for restricted or unrestricted purposes by the Laboratory depending on donor restrictions. Quasi-endowment funds have been established by the Laboratory for the same purposes as endowment funds; however, the principal of these funds may be expended for various restricted and unrestricted purposes.

Fixed Assets

Land, buildings and equipment purchased by the Laboratory are recorded at cost. Donated fixed assets are recorded at fair market value at the date of the gift. Depreciation is computed using the straight-line method, beginning the month after the asset is placed in service, over the asset's estimated useful life. Estimated useful lives are generally three to five years for equipment and 20 to 40 years for buildings and improvements. When assets are sold or retired, the cost and accumulated depreciation are removed from the accounts and any resulting gain or loss is included in income for the period.

Contracts and Grants

Revenues associated with contracts and grants are recognized in the statement of support, revenues, expenses and changes in fund balances as the related costs are incurred (see Note G). Reimbursement of indirect costs relating to government contracts and grants is based on negotiated indirect cost rates. Any over or underrecovery of indirect costs is recognized through future adjustments of indirect cost rates.

Investments

Investments purchased by the Laboratory are carried at market value. Money market securities are carried at cost plus accrued interest, which approximates market value. Donated investments are recorded at fair market value at the date of the gift. Land held for sale included in investments is carried at the initially recorded market value of $330,000. For determination of gain or loss upon disposal of investments, cost is determined based on the first-in, first-out method.

The Laboratory is the beneficiary of certain investments reported in the endowment funds which are held in trust by others. The Laboratory's remaining right to these funds is subject to review every ten years by an independent committee. The market values of such investments are $4,743,257 and $4,717,315 at December 31, 1992 and 1991, respectively.

Investment Income and Distribution

The Laboratory follows the accrual basis of accounting except that investment income is recorded on a cash basis. The difference between such basis and the accrual basis does not have a material effect on the determination of investment income earned on a year-to-year basis.

Investment income includes income from a pooled investment account, which income is allocated to the participating funds on the market value unit basis (Note D).

Annuities Payable

Amounts due to donors in connection with gift annuities are determined based on remainder value calculations which at December 31, 1992 assumed a rate of return of 10%, maximum payout terms of 18 years, and an interest payout rate of 8%.

Tax-Exempt Status

The Laboratory is exempt from federal income tax under Section 501(c)(3) of the Internal Revenue Code.
C. Investments:
The following is a summary of the cost and market value of investments at December 31, 1992 and 1991:

<table>
<thead>
<tr>
<th></th>
<th>Market</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificates of deposit</td>
<td>$ 47,700</td>
<td>$ 258,351</td>
</tr>
<tr>
<td>Money market securities</td>
<td>1,952,867</td>
<td>1,767,300</td>
</tr>
<tr>
<td>U.S. Government securities</td>
<td>1,788,066</td>
<td>1,456,944</td>
</tr>
<tr>
<td>Corporate fixed income</td>
<td>8,968,745</td>
<td>8,387,547</td>
</tr>
<tr>
<td>Common stocks</td>
<td>6,764,488</td>
<td>7,864,060</td>
</tr>
<tr>
<td>Real estate</td>
<td>343,247</td>
<td>343,247</td>
</tr>
<tr>
<td>Total investments</td>
<td>$19,865,113</td>
<td>$20,077,449</td>
</tr>
</tbody>
</table>

Investments by fund group and related portfolios for the years ended December 31, 1992 and 1991 are as follows:

<table>
<thead>
<tr>
<th>Current Funds</th>
<th>Market</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificates of deposit</td>
<td>$ 47,700</td>
<td>$ 258,351</td>
</tr>
<tr>
<td>Money market securities</td>
<td>1,400,000</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Library funds</td>
<td>180,570</td>
<td>320,419</td>
</tr>
<tr>
<td>Total</td>
<td>$1,628,270</td>
<td>$1,778,770</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Endowment and Quasi-Endowment</th>
<th>Market</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>General endowment trust fund</td>
<td>3,755,124</td>
<td>3,735,252</td>
</tr>
<tr>
<td>Library endowment trust fund</td>
<td>988,133</td>
<td>982,063</td>
</tr>
<tr>
<td>Ecosystem funds</td>
<td>4,597,857</td>
<td>4,488,315</td>
</tr>
<tr>
<td>Pooled funds</td>
<td>6,910,904</td>
<td>6,608,044</td>
</tr>
<tr>
<td>Instruction fund</td>
<td>1,731,578</td>
<td>2,141,758</td>
</tr>
<tr>
<td>Real estate</td>
<td>343,247</td>
<td>343,247</td>
</tr>
<tr>
<td>Total</td>
<td>18,236,843</td>
<td>18,298,679</td>
</tr>
<tr>
<td>Total investments</td>
<td>$19,865,113</td>
<td>$20,077,449</td>
</tr>
</tbody>
</table>

D. Accounting for Pooled Investments:
Certain endowment fund assets are pooled for investment purposes. Investment income from the pooled investment account is allocated on the market value unit basis, and each endowment fund subscribes to or disposes of units on the basis of the market value per unit at the beginning of the calendar quarter within which the transaction takes place. The unit participation of the funds at December 31, 1992 and 1991 is as follows:

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quasi-endowment unrestricted</td>
<td>4,260</td>
<td>4,618</td>
</tr>
<tr>
<td>Quasi-endowment restricted</td>
<td>8,717</td>
<td>8,644</td>
</tr>
<tr>
<td>Endowment, income for restricted purposes</td>
<td>40,345</td>
<td>39,458</td>
</tr>
<tr>
<td>Endowment, income for unrestricted purposes</td>
<td>79</td>
<td>—</td>
</tr>
<tr>
<td>Total</td>
<td>53,401</td>
<td>52,720</td>
</tr>
</tbody>
</table>

Pooled investment activity on a per-unit basis was as follows:

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit value at beginning of year</td>
<td>$128.42</td>
<td>$108.90</td>
</tr>
<tr>
<td>Unit value at end of year</td>
<td>128.66</td>
<td>128.42</td>
</tr>
<tr>
<td>Increase in realized and unrealized appreciation</td>
<td>.24</td>
<td>19.52</td>
</tr>
<tr>
<td>Net income earned on pooled investments</td>
<td>5.71</td>
<td>5.15</td>
</tr>
<tr>
<td>Total return on pooled investments</td>
<td>$ 5.95</td>
<td>$ 24.67</td>
</tr>
</tbody>
</table>
E. Deposits and Commitments for Construction Programs:

As of December 31, 1992, the Laboratory has $285,094 in restricted cash for the construction of the new Collection Support Facility and $1,548,810 in Deposit with Trustees for the renovations of laboratories and housing facilities. On December 31, 1992, the Laboratory was contractually obligated for approximately $1,616,288 of additional expenditures in connection with its current building program. The expenditures are covered by funding commitments.

F. Long-Term Debt:

Long-term debt at December 31, 1992 amounted to $2,600,000. The aggregate amount of principal due for each of the next five fiscal years is as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>$65,000</td>
</tr>
<tr>
<td>1994</td>
<td>65,000</td>
</tr>
<tr>
<td>1995</td>
<td>75,000</td>
</tr>
<tr>
<td>1996</td>
<td>75,000</td>
</tr>
<tr>
<td>1997</td>
<td>80,000</td>
</tr>
<tr>
<td>Thereafter</td>
<td>2,240,000</td>
</tr>
<tr>
<td>Less current portion</td>
<td>65,000</td>
</tr>
<tr>
<td>Total</td>
<td>$2,355,000</td>
</tr>
</tbody>
</table>

In 1992, the Laboratory issued $1,100,000 Massachusetts Industrial Finance Authority (MIFA) Series 1992A Bonds and $1,500,000 MIFA Series 1992B. These bonds pay varying annual interest rates and Series 1992 A and B Bonds mature on December 1, 2012. The Series 1992 A and B Bonds are collateralized by a first mortgage on certain Laboratory property.

A portion of Series 1992B Bonds were issued for the purpose of refunding the $1,330,000 MIFA Series 1989 Bonds, which pay varying annual interest rates and mature on October 31, 2011. The amount of Series 1989 principal outstanding at December 31, 1992 was $1,140,000. The Laboratory has on deposit investments of $1,306,172 with Shawmut Bank N.A., as trustee for the MIFA Series 1989 Bonds, for redemption February 1993.

In compliance with the 1992 MIFA bond indentures, the Laboratory has on deposit with State Street Bank and Trust, as trustee for Series 1992 Bonds, investments for construction projects in the amount of $1,548,810. In 1991, the Laboratory was required to have on deposit $126,116 for a debt service reserve fund.

Under the most restrictive covenant of long-term debt, the Laboratory’s operating surplus (before transfers), interest, expense and transfers from the quasi-endowment for debt service must equal or exceed all debt service payments.

G. Restricted Current Funds Deferred Support:

The Laboratory defers revenue on current restricted funds until the related costs are incurred. Amounts received in excess of expenses are recorded as deferred support. The following summarizes the activity of the deferred support account:

<table>
<thead>
<tr>
<th>1992</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning of year</td>
<td>$4,437,140</td>
</tr>
<tr>
<td>Additions:</td>
<td></td>
</tr>
<tr>
<td>Gifts, endowment income and grants received</td>
<td>7,997,702</td>
</tr>
<tr>
<td>Net unrealized gains (losses)</td>
<td>(77,518)</td>
</tr>
<tr>
<td>Net realized gains</td>
<td>78,636</td>
</tr>
<tr>
<td>Transfers</td>
<td>—</td>
</tr>
<tr>
<td>Deductions:</td>
<td></td>
</tr>
<tr>
<td>Funds expended under gifts and grants</td>
<td>8,722,851</td>
</tr>
<tr>
<td>Transfers</td>
<td>49,411</td>
</tr>
<tr>
<td>Balance at end of year</td>
<td>$3,663,698</td>
</tr>
</tbody>
</table>

Deferred restricted gifts of $453,970 and $475,874 were expended in 1992 and 1991, respectively, for the support of indirect costs attributable to the Laboratory’s instruction programs.

H. Retirement Plan:

The Laboratory participates in the defined contribution pension plan of TIAA-CREF (the “Plan”). The Plan is available to permanent employees that have completed two years of service. Under the Plan, the Laboratory contributes 10% of total compensation for each participant. Contributions amounted to $502,215 in 1992 and $495,848 in 1991.
1. **Pledges:**

As of December 31, 1992, the Laboratory has outstanding pledges of $737,146 of which $681,728 is restricted (unaudited). Pledges are not included in the financial statements since it is not practicable to estimate the net realizable value of such pledges. These pledges are scheduled to be paid over the next three years in the amounts of $509,969, $169,177, and $58,000, respectively.

J. **Interfund Borrowings:**

Current unrestricted fund interfund borrowings at December 31 are as follows:

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to restricted endowment fund</td>
<td>$(118,755)</td>
<td>$(4,150)</td>
</tr>
<tr>
<td>Due to restricted quasi-endowment funds</td>
<td>(50)</td>
<td>(150,000)</td>
</tr>
<tr>
<td>Total</td>
<td>$(118,805)</td>
<td>$(154,150)</td>
</tr>
</tbody>
</table>

K. **Financial Accounting Standard No. 106:**

In December 1990, the Financial Accounting Standards Board (FASB) released Statement No. 106, “Employers’ Accounting for Postretirement Benefits Other Than Pensions.” This new standard requires employers to accrue, during the years that the employee renders the necessary service, the expected cost of benefits to be provided during retirement, and will apply to years beginning after December 15, 1994. The Laboratory is currently analyzing and interpreting the provisions of the Statement as it relates to its current and planned benefits program and its funding options. It is anticipated that adoption of this accounting standard will result in the Laboratory recording a significant liability.
### SCHEDULE I

**STATEMENT OF SUPPORT, REVENUES, EXPENSES AND CHANGES IN FUND BALANCES**

**CURRENT FUNDS**
for the year ended December 31, 1992

<table>
<thead>
<tr>
<th>Current Unrestricted Funds</th>
<th>Operating Fund</th>
<th>Auxiliary Enterprises Fund</th>
<th>Total</th>
<th>Current Restricted Fund</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUPPORT AND REVENUES:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant reimbursements of direct costs</td>
<td>$3,530,621</td>
<td>$3,530,621</td>
<td>$5,982,286</td>
<td>$5,982,286</td>
<td>$3,530,621</td>
</tr>
<tr>
<td>Recovery of indirect costs</td>
<td>$3,530,621</td>
<td>$3,530,621</td>
<td>$5,982,286</td>
<td>$5,982,286</td>
<td>$3,530,621</td>
</tr>
<tr>
<td>Tuition</td>
<td>$485,247</td>
<td>$485,247</td>
<td>974,076</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees for services:</td>
<td>974,076</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dormitories</td>
<td>$974,076</td>
<td>974,076</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dining hall</td>
<td>824,327</td>
<td>824,327</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>439,822</td>
<td>439,822</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Biological Bulletin</strong></td>
<td>223,811</td>
<td>223,811</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research services</td>
<td>459,233</td>
<td>459,233</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marine resources</td>
<td>179,929</td>
<td>179,929</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment income</td>
<td>406,212</td>
<td>406,212</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gifts</strong></td>
<td>428,711</td>
<td>428,711</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in deferred support</td>
<td>453,970</td>
<td>453,970</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous revenue</td>
<td>882,681</td>
<td>882,681</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total revenue</strong></td>
<td>974,076</td>
<td>974,076</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8,771,144</td>
<td>8,771,144</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EXPENSES:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td>6,019,891</td>
<td>6,019,891</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruction</td>
<td>1,526,154</td>
<td>1,526,154</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholarships, fellowships and stipends</td>
<td>394,544</td>
<td>394,544</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dormitories</td>
<td>745,787</td>
<td>745,787</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dining hall</td>
<td>676,949</td>
<td>676,949</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>736,347</td>
<td>736,347</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Biological Bulletin</strong></td>
<td>189,098</td>
<td>189,098</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research services</td>
<td>622,731</td>
<td>622,731</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marine resources</td>
<td>433,825</td>
<td>433,825</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>2,254,935</td>
<td>145,641</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sponsored projects administration</td>
<td>351,177</td>
<td>351,177</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant operations</td>
<td>1,585,953</td>
<td>1,585,953</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>243,571</td>
<td>243,571</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td>6,174,066</td>
<td>1,568,377</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Excess of support and revenues over expenses</strong></td>
<td>45,672</td>
<td>230,026</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net unrealized gain on investments</strong></td>
<td>78,636</td>
<td>78,636</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net realized (loss) on investments</strong></td>
<td>(77,518)</td>
<td>(77,518)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net gain on investments</strong></td>
<td>1,118</td>
<td>1,118</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRANSFERS AMONG FUNDS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt service</td>
<td>(60,000)</td>
<td>(60,000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisition of fixed assets</td>
<td>(91,313)</td>
<td>(12,026)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repairs and replacement</td>
<td>(158,000)</td>
<td>(158,000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endowment transfer</td>
<td>200,000</td>
<td>200,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capitalization of income</td>
<td>(219,539)</td>
<td>(219,539)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>37,100</td>
<td>37,100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total transfers among funds</strong></td>
<td>(54,213)</td>
<td>(230,026)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net change in fund balances</strong></td>
<td>(8,541)</td>
<td>(8,541)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fund balances, beginning of year</strong></td>
<td>21,398</td>
<td>21,398</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fund balances, end of year</strong></td>
<td>12,857</td>
<td>12,857</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Marine Biological Laboratory
### Statement of Support, Revenues, Expenses and Changes in Fund Balances
#### Endowment Funds
for the year ended December 31, 1992

### SUPPORT AND REVENUES:

<table>
<thead>
<tr>
<th></th>
<th>Quasi-Endowment</th>
<th>Restricted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUPPORT AND REVENUES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifts</td>
<td>$ 128,755</td>
<td>$ 151,140</td>
</tr>
<tr>
<td>Total support and revenues</td>
<td>$ 128,755</td>
<td>$ 151,140</td>
</tr>
<tr>
<td>Net realized gain on investments</td>
<td>$ 23,038</td>
<td>$ 189,911</td>
</tr>
<tr>
<td>Net unrealized (loss) on investments</td>
<td>(23,216)</td>
<td>(169,785)</td>
</tr>
<tr>
<td>Net gain (loss) on investments</td>
<td>(178)</td>
<td>20,126</td>
</tr>
</tbody>
</table>

### TRANSFERS AMONG FUNDS:

<table>
<thead>
<tr>
<th></th>
<th>Quasi-Endowment</th>
<th>Restricted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capitalization of income</td>
<td>5,190</td>
<td></td>
</tr>
<tr>
<td>Endowment transfers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total transfers among funds</td>
<td>5,190</td>
<td></td>
</tr>
<tr>
<td>Net change in fund balances</td>
<td>5,012</td>
<td>148,881</td>
</tr>
<tr>
<td>Fund balances, beginning of year</td>
<td>543,049</td>
<td>3,735,253</td>
</tr>
<tr>
<td>Fund balances, end of year</td>
<td>$ 548,061</td>
<td>$ 3,884,134</td>
</tr>
</tbody>
</table>

### Unrestricted Income for Unrestricted Purposes | Restricted Income for Restricted Purposes

- Net realized gain on investments: $23,038
- Net unrealized (loss) on investments: (23,216)
- Net gain (loss) on investments: (178)

### Unrestricted Transfers Among Funds:

- Capitalization of income: 5,190

### Endowment Transfers:

- Total transfers among funds: 5,190

### Net change in fund balances:

- Fund balances, beginning of year: 543,049
- Fund balances, end of year: $548,061

### Unrestricted Total

Price: $548,061

Price: $3,884,134

Price: $6,219,233

Price: $5,629,395

Price: $15,732,762

Price: $16,280,823
### Marine Biological Laboratory

**Statement of Support, Revenues, Expenses and Changes in Fund Balances**

**Plant Funds**

For the year ended December 31, 1992

<table>
<thead>
<tr>
<th></th>
<th>Unrestricted</th>
<th>Repairs and Replacements</th>
<th>Total Unrestricted</th>
<th>Restricted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Support and Revenues:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant for capital additions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other revenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total support and revenues</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXPENSES:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>$ 722,959</td>
<td>$ 158,901</td>
<td>158,901</td>
<td>158,901</td>
<td>722,959</td>
</tr>
<tr>
<td>Plant operations</td>
<td>3,410</td>
<td>3,410</td>
<td>3,410</td>
<td>3,410</td>
<td></td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td>726,369</td>
<td>158,901</td>
<td>885,270</td>
<td></td>
<td>885,270</td>
</tr>
<tr>
<td><strong>Excess (deficit) of support and revenues over expenses</strong></td>
<td>(726,369)</td>
<td>(158,901)</td>
<td>(885,270)</td>
<td>4,062,133</td>
<td>3,176,863</td>
</tr>
</tbody>
</table>

**Transfers Among Funds:**

- Debt service: $60,000
- Acquisition of fixed assets: $107,495
- Capital additions, net of disposals: $10,232,950
- Repairs and replacements: $158,000
- Other transfers: $9,082

**Total transfers among funds:** $10,400,445

**Net change in fund balances:** $9,674,076

**Fund balances, beginning of year:** $10,034,642

**Fund balances, end of year:** $19,708,718

**Unrestricted Reserve:**

- $158,901
- $(158,901)

**Restricted Reserve:**

- $4,032,660
- $(4,032,660)
- $15,000
- $(15,000)
- $14,473
- $(14,473)
- $4,062,133
- $(4,062,133)

**Restricted Reserve Total:** $4,062,133

**Total:** $3,176,863
Report of the Library Director

The Library

The Library's work during 1992 concentrated on the journal collection, the book collection, the rare book room, cataloging, and cooperative relationships.

The journal collection

The journal collection is the heart of the Library's service. The MBL/WHOI Library, in common with all academic research libraries, is working to sustain the collection as far as possible, despite a 12% annual escalation in scientific journal prices over the past decade. Given present national trends in research funding, sustaining the collection calls for innovative cooperation with the publishing industry. Working with Elsevier publishers, the Library was successful in restoring an important journal, Brain Research, that was discontinued in 1991.

However, the spiraling cost of the journal collection is a long-term problem, and each year the Library is faced with difficult choices. After extensive review by a panel of 50 scientists, the journal collection was reduced by 32 titles in 1992. Most of the discontinued journals were in clinical and medical areas. These reductions were partially offset by the addition of seven other journals: Molecular Microbiology, Physical Review E, Water Environment Research, the Canadian Journal of Fisheries and Aquatic Sciences, Perspectives on Science, Issues in Science and Technology, and Serial Sources for the Biosis Previews.

The book collection

The MBL/WHOI book collection was reviewed to strengthen it and to increase its utility. The Joint MBL/WHOI Library Advisory Committee defined the role of the collection as follows: "...to collect, for general use, those volumes of seminal and enduring value supporting the major scientific fields in which the scientific community is active. The collection should provide a scientist who is proficient in a given field with entry to other disciplines and with broad reviews of techniques and current directions supporting his or her own work."

To meet this purpose, the book collection should be developed with care and should become more available. Some 19% of the collection—7000 books or roughly 30 for every scientist in Woods Hole—are in circulation, including half of the books acquired in the last 3 years. The books are withdrawn for an average of two and a half years, and one book has been taken out for twenty-one.

To remedy this situation, the Joint MBL/WHOI Library Advisory Committee has approved a one-year checkout policy to improve the accessibility of the book collection. A project was started in the fall of 1992 to recall all Library books and check out those that scientists still needed for a one-year period. This project has allowed us to locate and catalog many books that had been held indefinitely in laboratories and offices. The recall project has a long way to go, but it is progressing steadily and will be completed by the end of 1993.
The early winter months brought severe storms to Woods Hole. Strong winds drove rain under the roof of the Lillie building, causing leaks onto the book collection. The wet books, 100 volumes, were frozen and dried; all but two were returned in good condition to the shelves. All books have been moved from the area under the leaks, and a capital project has been approved, subject to funding, for repair of the roof.

The Rare Book Room

The Library’s Rare Book Room is an MBL treasure. This year the collection has been enhanced by the donation of a number of old and rare volumes. Through a gift from Cambridge Scientific Abstracts, we have photographed over 100 Leuckart charts, which have also been made into 35-mm slides that can be useful teaching aids. The slides are currently being digitized for easy transfer in electronic format. Our complete collection of these rare wall charts is now maintained in a specially constructed cabinet that preserves them in a acid-free environment in the Rare Book Room.

The rare book collection is currently being placed in the Library catalog. The audio tapes of Friday Evening Lectures, Falmouth Forum, and other lectures have been cataloged and filed. Furniture in the Agassiz Room has been restored, and the framed photographic collection has been identified, covered with UV paper, and hung in related groups in the Agassiz Room and the Rare Book Room. A new cherry filing cabinet has been added to the Agassiz Room to house the biographical files of scientists who have worked at the MBL. The off-season displays in the Lillie Building lobby are maintained by the staff of the Rare Book Room.

Cataloging

The Library worked to make electronically available information more complete and accurate. The catalogs in the Library’s computer, the CLAMS system, have been brought up-to-date. The currently subscribed-to serials have been added to the serials catalog, and those journals acquired through the exchange of The Biological Bulletin with other institutions are being added. The book collection has been entered into the system, with the exception of expeditions and a few difficult monographic series that require specialized cataloging. The Library began automation of the book circulation process in the fall. Year-round patrons now have a book card, and circulation has been transferred to the automated system.

Cooperative relationships

The Library’s membership in the Boston Library Consortium flourished during the year. Among other benefits, this membership provides us with no-cost access to the journal collections of 12 academic libraries in the Boston area. This access privilege is in active use, saving Woods Hole scientists $20,000 annually in direct charges for articles obtained from other libraries. The addition of a networked document scanning station (ARIEL), financed in part by a grant, has added interlibrary document delivery over the Internet to our services. This station makes it possible electronically to obtain high resolution document images from Boston libraries.

The lowered cost and improved response of these agreements and systems have made it possible to fashion a reciprocal agreement with Brandeis University to develop our collections in concert. Under this agreement, the institutions each agree to retain certain journals. Tables of contents of these journals will be sent monthly to the partner library, and documents from these journals will be delivered with the goal of 24-hour response time.

Other Library activities included the successful September open house, publication of a handy booklet for users of electronic services, and a new program of presentations by Woods Hole scientists that give the Library staff insight into research in the institutions they serve.

The Information Systems Division

The Information Systems Division (ISD) has been extremely productive over the past year, completing projects in Library systems, data networks, classroom and laboratory support, and instruction in Medical Informatics.

Library systems

The bibliographic search system, based on CD-ROM technology, was upgraded and made reliable. The system now makes five bibliographical data bases available, including Aquatic Sciences and Fisheries Abstracts; Life Sciences Abstracts; National Library of Medicine’s Medline Service; and The Wilson Disc General Science Index. The fifth and latest is GeoRef, a bibliographic compendium of geological literature from 1785 to the present. The system can now send selected abstracts to scientists’ desks by e-mail, or it can directly download the abstracts onto floppy discs on office.
computers. All of these services are available over the Internet to Woods Hole scientists anywhere in the world as part of the Library's basic, no-cost service. The majority of bibliographic searches now come to the Library's systems over the Internet rather than from the local terminals in the Library lobby.

The Information Systems Division has gone beyond these services to develop an electronic menu presenting a variety of services at MBL and at other institutions. It is possible to order specimens, equipment, or Chemistry Room supplies; to directly access grant programs at NSF, NIH, NASA, and DOD; to access catalogs of libraries around the world; or to learn about MBL's course offerings, services, and rates through this Library "front end." All Library patrons can have access to this service by talking with the Librarian.

The data network

The MBL data network has been extended to all campus buildings, including the Marine Resources Center. A new computer was procured to handle increased electronic mail traffic. Equipment to isolate data transmissions is being installed so that laboratories and classrooms do not load the MBL network with their internal traffic. The network was available with 99.8% reliability during 1992.

Classroom and laboratory support

In 1992, the Information Systems Division became responsible for MBL computing support to courses, wherever that was needed. This involved the installation, and subsequent removal, of 80 networked computers for four courses. As part of the grant from the National Library of Medicine (NLM) for Medical Informatics training, ISD was called on for selection and installation of 30 personal computers, and for full technical support of a one-week course taught by NLM in early June. More recently the Ecosystems Center has asked the ISD to take care of the computer network in their laboratories.

Instruction in medical informatics

This year was the first of a grant from the National Library of Medicine to support instruction in Medical Informatics. Following the formal course given by the NLM, the Information Systems Division continued to teach medical informatics to summer course sessions and to audiences at special short courses. These Medical Informatics sessions attracted 150 individuals.

Loeb 308 is being prepared for use as a computer-ready classroom. The computers and software, network connections, and special air handling equipment will assist several courses during the summer as well as the Medical Informatics program.

The Coming Year

The Library is grateful for the support of the MBL science community and for the help of its many friends. Our goals for the coming year include sustaining the journal collection, improving its housing, and developing electronic delivery of articles from the collection directly to scientists’ desks. We look forward to 1993–1994 as another active and productive year.

—David L. Stonehill
Educational Programs

Summer Courses

Biology of Parasitism: Modern Approaches
(June 14–August 15)

Course Director
John Boothroyd, Stanford University School of Medicine

Associate Director
Richard Komuniecki, University of Toledo

Faculty
Jean-Francois Dubremetz, INSERM, France
Alan Fairlam, London School of Hygiene and Tropical Medicine, UK
Fred Finkelman, USUHS/Herbert School of Medicine
Kasturi Haldar, Stanford University School of Medicine
Joe Urban, United States Department of Agriculture

Instructor
Richard E. Davis, San Francisco State University

Teaching Assistants
Patricia Dorn, Stanford University School of Medicine
Emilio Duran, University of Toledo
Ashraf El Meanawy, University of Cairo Medical School, Egypt
Hedi Elmendorf, Stanford University School of Medicine
Suzanne Morris, USUHS/Herbert School of Medicine
Steven L. Reiner, University of California, San Francisco
Keith Smith, London School of Hygiene & Tropical Medicine, UK
Martine Soete, INSERM, France

Course Assistants
Michele Klingbeil, University of Toledo
Michelle Rathman, Stanford University

Students
Thomas Allen, Oregon Health Science University
Prasanta Chakraborty, Washington University
Claire Chougnet, INSERM, France
Johanna Daily, Beth Israel Hospital

Hans Hagen, Keele University, UK
Norton Heise, Escola Paulista de Medicina, Brazil
Hans-Juergen Hoppe, Oxford University, UK
Kuo-Yuan Hwa, Johns Hopkins University
Aslog Jansson, Uppsala University, Sweden
Assan Jaye, ILRAD, Kenya
Adrian Lawrence, Albert Einstein College of Medicine
Jose Lima Filho, Harvard School of Public Health
Ingrid Loeffler, Michigan State University
Michael McIntosh, Hahnemann University
Fernando Monroy, University of New Mexico
Carlos Moreno, New York University Medical Center
Sharon Moshitch, Weizmann Institute of Science, Israel
Hajir Suliman, Virginia Tech
Lakshmi Venkatakrishnaiah, Medical University of South Carolina
Ying-zi Yang, CUNY Medical School

Embryology: Cell Differentiation and Gene Expression in Early Development
(June 20–July 31)

Course Directors
Eric H. Davidson, California Institute of Technology
Michael Levine, University of California, San Diego
David R. McClay, Duke University

Faculty
Marianne Bronner-Fraser, University of California, Irvine
Andrew R. Cameron, California Institute of Technology
Scott E. Fraser, California Institute of Technology
Janet Heasman, Wellcome/CRC Institute, UK
Steven L. McKnight, Carnegie Institution of Washington
Noriyuki Satoh, Kyoto University, Japan
Paul Sternberg, California Institute of Technology
Christopher C. Wylie, Wellcome/CRC Institute, UK

Faculty Adjunct
David Epel, Stanford University

Teaching Assistants
Mary K. Anderson, Johns Hopkins University/Carnegie Institute of Washington
Microbial Diversity (June 14-July 30)

Course Directors
John Breznak, Michigan State University
Martin Dworkin, University of Minnesota

Course Coordinator
Richard M. Behmlander, University of Minnesota

Course Assistant
Pamela Contag, Stanford University Medical School

Teaching Assistants
Joseph P. Calabrese, West Virginia University
S. Courtney Frasch, University of Minnesota
Jorg Overmann, University of British Columbia, Canada
Daniel R. Smith, University of Minnesota

Instructor
Howard Gest, Indiana University

Lecturers
Steve Block, Rowland Institute for Science
Colleen Cavanaugh, Harvard University
Paul Dunlap, Woods Hole Oceanographic Institution
Dale Gebringer, Woods Hole Oceanographic Institution
Steve Goodwin, University of Massachusetts, Amherst
Brian Howe, Woods Hole Oceanographic Institution
Holger Jannasch, Woods Hole Oceanographic Institution
Shadid Khan, Albert Einsehn School of Medicine
Edward Leadbetter, University of Connecticut, Storrs
Michael Madigan, University of Southern Illinois
Sandra Nierzwicki-Bauer, Rensselaer Polytechnic Institute
Bernhard Schink, University of Konstanz, Germany
Mitchell Sogin, Marine Biological Laboratory
Kari Stetter, University of Regensburg, Germany
Sidney Tamm, Boston University Marine Program, MBL
John Waterbury, Woods Hole Oceanographic Institution
Carl Woese, University of Illinois

Students
Valerie Bernan, Lederle Labs
Jennifer Byrne, Harvard University
Francesco Cangiano, University of Tuscany, Italy
Susan Childs, University of Connecticut, Storrs
Maria Ganeva, Sofia University, Bulgaria
John Gibson, Florida State University
Antje Hofmeister, Philips-University—Marburg, Germany
Scott Kroken, University of Wisconsin
Ariel Kusmaro, Tel Aviv University, Israel
Edouard Miambi, Center ORSTOM/DGRST, Congo
Margaret Miroshnichenko, Moscow State University, Russia
Tommy Nielsen, Aarhus University, Denmark
Lars-Olaf Olendzenski, University of Massachusetts, Amherst
Martin Polz, Harvard University
Michael Renner, Michigan State University
Karl Rusterholtz, Merck Sharp & Dohme Research Lab
Heinrich Sandmeier, University of Basel, Switzerland
Dirk Schuler, Max-Planck Institute, Germany
Angelica Seitz, University of Connecticut, Storrs
Robert Shannon, Indiana University

Helen Chamberlin, California Institute of Technology
Michael Dunn, Massachusetts General Hospital
Michael Figdor, California Institute of Technology
Suresh J. Jesuthasan, Oxford University, UK
Carole LaBonnie, Harvard University
Jeffrey R. Miller, Duke University
Talma Y. Scherson, University of California, Irvine
John Shih, California Institute of Technology
Stephen Small, University of California, San Diego
Sergei Sokol, Harvard University
Tanya Whitfield, Wellcome/CRC Institute, UK
Robert W. Zeller, California Institute of Technology

Lecturers
William McGinnis, Yale University
Randy Moon, University of Washington

Speakers
Don Fischman, Cornell University Medical College
Nancy Hopkins, Massachusetts Institute of Technology
Alexander Johnson, University of California, San Francisco
Andrew P. McMahon, Roche Institute
James Posakony, University of California, San Diego
Claudio Stern, Oxford University, UK

Course Administrator
Jane Rigg, California Institute of Technology

Course Coordinator
Linda Hulser, Marine Biological Laboratory

Course Assistants
Cheryl Booth, University of Wisconsin
Alex Goldberg, Washington University

Students
Yaping Cai, Michigan State University
Isabelle Desjoux, Edinburgh University, Scotland
Corrella Dietweiler, Max-Planck Institute, Germany
Carmen Domingo, University of California, Berkeley
Marie-Anne Felix, Institut Jacques Monod, France
Gabor Forgacs, Clarkson University
Rudiger Fritsch, Max-Planck Institute, Germany
Tony Frudakis, University of California, Berkeley
Eleonore Fusco, Massachusetts Institute of Technology
Maureen Gannon, Cornell University Medical College
Uta Grieshammer, Boston University
Cathiona Logan, Duke University
Lily Lou, Yale University
John Mateec, Duke University
Anna Myat, Imperial Cancer Research Fund, UK
Lesley Narburgh, St. George's Hospital Medical School, UK
Zoe Pettway, University of California, Irvine
David Pleasure, Children's Hospital of Philadelphia
Paola Polosa, University of Bari, Italy
Reinhard Schroder, Freiburg University, Germany
Mark Van Doren, University of California, San Diego
Paul Vranes, American Museum of Natural History
Daniel Wagner, University of Texas Anderson Cancer Center
Cindy Wilson, University of California, Irvine
Stella Zambon, Stazione Zoologica "A. Dohrn", Italy
Hong Zhang, Case Western Reserve University

Students
Valerie Bernan, Lederle Labs
Jennifer Byrne, Harvard University
Francesco Cangiano, University of Tuscany, Italy
Susan Childs, University of Connecticut, Storrs
Maria Ganeva, Sofia University, Bulgaria
John Gibson, Florida State University
Antje Hofmeister, Philips-University—Marburg, Germany
Scott Kroken, University of Wisconsin
Ariel Kusmaro, Tel Aviv University, Israel
Edouard Miambi, Center ORSTOM/DGRST, Congo
Margaret Miroshnichenko, Moscow State University, Russia
Tommy Nielsen, Aarhus University, Denmark
Lars-Olaf Olendzenski, University of Massachusetts, Amherst
Martin Polz, Harvard University
Michael Renner, Michigan State University
Karl Rusterholtz, Merck Sharp & Dohme Research Lab
Heinrich Sandmeier, University of Basel, Switzerland
Dirk Schuler, Max-Planck Institute, Germany
Angelica Seitz, University of Connecticut, Storrs
Robert Shannon, Indiana University
Neural Systems & Behavior (June 14–August 7)

**Course Directors**
Ronald L. Calabrese, Emory University
Martha Constantine-Paton, Yale University

**Faculty**
Thomas Abrams, University of Pennsylvania
Robert Douglas, University of British Columbia, Canada

**Scholars-in-Residence**
Larry Abbott, Brandeis University
Mary E. Hatten, College of Physicians & Surgeons at Columbia University
William T. Newsome, Stanford University

**Instructors**
Alexander Borst, Max-Planck-Institut für Biologische Kybernetik, Germany
Holly Chine, University of Iowa
Sally Hoskins, City College of New York
Alan Kay, University of Iowa
John Koester, Columbia University
Richard B. Levine, University of Arizona
Eduardo Macagno, Columbia University
Robert Malinow, University of Iowa
Michael Nusbaum, University of Alabama, Birmingham
Mu-Ming Poo, Columbia University
Leslie Stevens, Albert Einstein College of Medicine
Janis C. Weeks, University of Oregon
Angela Wenning, Universität Konstanz, Germany

**Lecturers**
Gwenda Le Masson, Brandeis University
William M. Roberts, University of Oregon
Edgar T. Walters, University of Texas Medical School

**Guest Lecturers**
Robert Barlow, Jr., Syracuse University
John Dowling, Harvard University

**Teaching Assistants**
Yolanda Alston, Benedict College
Melissa J. Coleman, University of Alabama, Birmingham
Yang Dan, Columbia University
Lisa Elliot, Baylor College of Medicine
Cole Gilbert, Cornell University
Juergen Haag, Max-Planck-Institut für Biologische Kybernetik, Germany
Dawn Lewis, Albert Einstein College of Medicine
Ann Lohof, Columbia University
Brian J. Norris, University of Alabama, Birmingham
Andrea Novicki, University of Oregon
Glen Prusky, Yale University
David J. Sandstrom, University of Oregon
Laura Wolszon, Columbia University

**Course Coordinator**
Miriam Ashley, University of California, Irvine

**Course Assistant**
Kyle Lennon, Atlanta, GA

**Students**
Lisa Boulanger, Wesleyan University
Mary Boyle, University of California, San Diego
Beatrice Casasnovas, University of Bordeaux, France
Peter Dayan, Salk Institute
Joseph Erlichman, Dartmouth Medical School
Daniel Feldman, Stanford University School of Medicine
Maribel Feliciano, University of Connecticut, Storrs
Mara Feller, AT&T Bell Laboratories
Lisa Foa, Deakin University, Australia
Timothy Gershon, Columbia University
Erin Jacobs, University of California, Los Angeles
Juan Jorge-Rivera, Brandeis University
Lisa Kelly, University of Ottawa, Canada
Carole Landsman, Rockefeller University
Stephen Macknik, Harvard Medical School
Zachary Mainen, University of California, San Diego
David Raizen, University of Texas Southwestern Medical School
Jeffrey Reznick, New York University
Christine Rose, University of Kaiserslautern, Germany
Stephan Wurden, University of Konstanz, Germany

Neurobiology (June 14–August 15)

**Course Directors**
Leonard K. Kaczmarek, Yale University School of Medicine
Irwin B. Levitan, Brandeis University

**Faculty**
Hana Asmussen, University of Virginia Medical School
Gary Banker, University of Virginia
Arlene Chiu, Beckman Research Institute
Judith A. Drazba, NIH/NINDS
Keith Elmslie, Case Western Reserve University
Steve Goldstein, HHMI/Brandeis University
Richard Horn, Jefferson Medical College
Stephen Jones, Case Western Reserve University
Bechara Kachar, NIH/NINDC
Julie A. Kauer, Duke University Medical School
Richard Kramer, Columbia University
Lonny Levin, Johns Hopkins University
John Marshall, Yale University School of Medicine
Andrew L. Matus, Friedrich Miescher Institute, Switzerland
Sally Moody, University of Virginia School of Medicine
Angus C. Nairn, Rockefeller University
Marina Picciotto, The Pasteur Institute, France
Randall Reed, HHMI/Johns Hopkins Medical School
Thomas Reese, NIH/NINDS
Peter H. Reinhardt, Duke University Medical Center
Talvinder Sihra, University of Dundee, Scotland
Carolyn Smith, NIH/NINDS

**Lecturers**
George Augustine, University of Southern California
David Brautigan, Brown University
Xandra Breakefield, Massachusetts General Hospital
William Catterall, University of Washington
Pietro DeCamilli, Yale University
Michael Greenberg, Harvard University
Lloyd Greene, New York University
Michael R. Hanley, University of California, Davis
Ed Hawrot, Brown University
Robert Horvitz, Massachusetts Institute of Technology
Richard Huganir, Johns Hopkins School of Medicine
Christopher Miller, Brandeis University
Linda Nowak, Cornell University
Dale Purves, Duke University
Edward D. Salmon, University of North Carolina, Chapel Hill
Chris Walsh, Harvard University

Course Assistants
Ethan Trestman, University of North Carolina, Chapel Hill
Cecilia Armstrong, University of Pennsylvania

Students
Pavl Andjus, University of Belgrade, Yugoslavia
Cynthia Cowden, University of Wisconsin
Ann Marie Craig, University of Virginia
Matthew Dalva, Duke University
Atsushi Miyawaki, University of Tokyo, Japan
Klaus Raming, Hohenheim University, Germany
Enrique Saldana, University of Salamanca, Spain
Hilary Smith, University of North Carolina, Chapel Hill
Camilla Tornoe, Cambridge University, UK
Ferdinand Vilum, Columbia University
Elisabeth Walcott, University of California, Irvine
Kevin Wickman, Mayo Foundation

Physiology: Cellular and Molecular Biology
(June 13–July 25)

Course Director
Thomas D. Pollard, Johns Hopkins Medical School

Faculty
Robert Jensen, Johns Hopkins Medical School
Michael E. Mendelsohn, Harvard Medical School/Brigham & Women’s Hospital
Andrew Murray, University of California, San Francisco
Edward D. Salmon, University of North Carolina, Chapel Hill
Cynthia Stautler, Purdue University
Murray Stewart, Medical Research Council, UK
Katherine Swenson, Duke University Medical School
Edwin Taylor, University of Chicago
Ron Vale, University of California, San Francisco
Katherine L. Wilson, Johns Hopkins University School of Medicine

Instructors
William B. Busa, Johns Hopkins University
Margaret A. Titus, Duke University Medical Center

Teaching Assistants
Michael Glotzer, University of California, San Francisco
John R. Jordan, University of Utah, Salt Lake City
Jennifer Kalish, Johns Hopkins Medical School
Helen Kent, Medical Research Council, UK
C. Martin Lawrence, Purdue University
Sarah O’Neill, Brigham & Women’s Hospital/Brigham Medical School
Stephen E. Parsons, University of North Carolina, Chapel Hill

Homero L. Rey, University of California, Berkeley
Yan Zhu, Brigham & Women’s Hospital/Harvard Medical School

Lecturers
Paula Fitzgerald, Merck Corporation
William Garrard, University of Texas, Dallas
Don Gill, University of Maryland, College Park
Reid Gilmore, University of Massachusetts Medical School
Pascal Goldschmidt-Clermont, Johns Hopkins University
Jonathan Horowitz, Duke University
Laurinda Jaffe, University of Connecticut, Storrs
Jack Johnson, Purdue University
Paul Lazarow, Mt. Sinai Medical
Jennifer Lippencott-Schwartz, National Institutes of Health
Lee Makowski, Boston University
Peter Novak, Yale University
Robert Palazzo, Marine Biological Laboratory
Howard Schachman, University of California, Berkeley
Pam Silver, Princeton University
Rick Steinhart, University of California, Berkeley

Course Assistants
Daniel Pollard, Baltimore, MD
Katie Pollard, Baltimore, MD
Michael Salmon, Chapel Hill, NC

Students
Carol Bascom, Tufts University
Ellen Brisch, University of Kansas, Lawrence
Daren Cohen, Dartmouth College
Hugh Crenshaw, Duke University
Mario Delmar, SUNY, Syracuse
Haiyan Deng, Harvard University
Matthew Freking, University of California, Davis
Vicki Goodman, Duke University
Robin Hammell, Robert Wood Medical School
Edward Hinchcliffe, University of Minnesota, Minneapolis
Joseph Kelleher, Johns Hopkins Medical School
Errol Kolen, University of Missouri, Columbia
Bodo Lange, University of Manchester, UK
Annick Le Gall, Cornell University Medical College
Edward Leonard, University of Pittsburgh Medical School
Eileen Luque, SUNY, Syracuse
Deborah Miller, University of Massachusetts, Amherst
John Murray, Albert Einstein Medical College
Dana Nojima, University of Minnesota, Minneapolis
Valerie Pierce, University of Chicago
Frances Reis, University of Idaho, Moscow
Normand Richard, University of California, Riverside
William Robinson, New England Aquarium
Bacbel Rohrer, University of Calgary, Canada
Beth Schomer, Stanford University
Jing Shang, Yale University
Sidney Shaw, University of North Carolina, Chapel Hill
Elspeth Stewart, ICRF Clare Hall Laboratories, UK
Douglas Swank, University of Pennsylvania
Penny Tavormina, University of Virginia
Kenan Turnacoglu, University of Pennsylvania
James Whaley, University of Illinois, Urbana
Ben Whitlock, Ohio State University
Lily Wong, University of Virginia
Lin Wu, Scripps Research Institute
Jane Ye, Dartmouth College
Short Courses

Advanced Workshop on Recombinant DNA Methodology (July 6–July 10)

Instructors
Robert E. Farrell, Jr., Exon-Intron, Inc.
Greg Leppert, Exon-Intron, Inc.
Charles Vaslet, CAV Consulting

Students
Isabel Banaante, University of Barcelona, Spain
Thomas Borgese, City University of New York
Meredith Hullar, Marine Biological Laboratory
Robert Launzen, Albany Medical College
Tim Makoda, United States Air Force
Annie Pardo, Universidad Nacional Autonoma, Mexico
Karen Ridge, Humana Hospital-Michael Reese
Gary Schneider, Loyola University Medical School
Earl Weidner, Louisiana State University, Baton Rouge
Zhaoxui Yang, Marine Biological Laboratory

Advances in Mariculture: Techniques and Future Directions for Providing Marine Organisms for Biological Research (May 17–29)

Course Director
Roger Hanlon, Marine Biomedical Institute

Course Manager
Philip Alatalo, Woods Hole Oceanographic Institution

Faculty
Jelle Atema, Boston University Marine Program, MBL
David Bengston, University of Rhode Island, Kingston
Patricia Bubucis, Sea Research Foundation
Robert Bullis, Marine Biological Laboratory
Elizabeth Clarke, University of Miami
Linda Davis, Woods Hole Oceanographic Institution
Michael Feldgarden, Yale University
Patrick Gaffney, University of Delaware, Lewes
Scott M. Gallagher, Woods Hole Oceanographic Institution
Dian Gifford, University of Rhode Island, Narragansett
Robert Guillard, Bigelow Laboratory for Ocean Sciences
Herb Hidu, Wiscasset, ME
Holger Jannasch, Woods Hole Oceanographic Institution
Rick Karney, Martha Vineyard Shellfish Group, Inc.
Alan Kuzirian, Marine Biological Laboratory
Donal Manahan, University of Southern California, Los Angeles
Judy McDowell, Woods Hole Oceanographic Institution
Phil Presley, Carl Zeiss, Inc.
Stephen Spotte, Sea Research Foundation
Michael Sylos, State Lobster Hatchery & Research Station
Stephen Ward, U.S. Fish and Wildlife Service

Students
Imad Ghossoub, University of Southern Mississippi
Dana Krueger, Harvard University
Carole Lanteigne, Aquarium & Marine Center, Canada

Amoy Lum Kong, Institute of Marine Affairs, Trinidad and Tobago
Darlene Manning, Dalhousie University, Canada
Joan Manuel, Dalhousie University, Canada
David Remsen, Marine Biological Laboratory
Nicholas Roden, Exxon Biomedical Sciences, Inc.
Mark Rosengqvist, Aquatic Research Organisms
Tina Schappach, MCI Telecommunications
Beneditka Vercaemer, Dalhousie University, Canada

Analytical and Quantitative Light Microscopy in Biology, Medicine, and Materials Science (May 14–22)

Course Directors
Edward D. Salmon, University of North Carolina, Chapel Hill
Greenfield Sluder, Worcester Foundation for Experimental Biology
David E. Wolf, Worcester Foundation for Experimental Biology

Faculty
Brad Amos, Medical Research Council, UK
Steven M. Block, Rowland Institute for Science
Richard Cardullo, University of California, Riverside
Gordon Ellis, University of Pennsylvania
Harvey Florman, Worcester Foundation for Experimental Biology
Jeff Gelles, Brandeis University
Anthony Moss, Worcester Foundation for Experimental Biology
Rudolf Oldenbourg, Marine Biological Laboratory
Kenneth R. Spring, National Institutes of Health

Lecturer
Shinya Inoué, Marine Biological Laboratory

Teaching Assistants
Neil Glicksman, University of North Carolina, Chapel Hill
Christine McKinnon, Worcester Foundation for Experimental Biology

Course Coordinator
Frederick Miller, Worcester Foundation for Experimental Biology

Course Assistants
Robert Knudson, Marine Biological Laboratory
Phong Tran, University of North Carolina, Chapel Hill

Students
John Axelson, Holy Cross College
Sandy Chang, Rockefeller University
Jean-Yves Chatton, National Institutes of Health
Ronald Cohn, Syntex, Research
William Crowe, University of Texas, Galveston
Fernando Delaville, Thomas Jefferson University
Dimter Dimitrov, National Institutes of Health
Stephen Doty, Hospital for Special Surgery
Deborah Evenson, Princeton University
Peder Gasbjerg, Panum Institute, Denmark
Craig Giroux, Wayne State University
Norman Harris, Louisiana State University
Ulrich Kersting, National Institutes of Health
Kimberly Kotz, Mayo Clinic
Donald O’Malley, SUNY, Stony Brook
Basic Workshop on Recombinant DNA Methodology (June 29–July 3)

Instructors
Robert E. Farrell, Jr., Exon-Intron, Inc.
Greg Leppert, Exon-Intron, Inc.
Charles Vaslet, CAV Consulting

Students
Isabel Baanante, University of Barcelona, Spain
David Beggs, Northern Ireland Horticultural and Plant Breeding Station, Armagh
Thomas Boruge, City University of New York
Lotta Chi, CP Li Biomedical Research Corp.
Judith Grasle, Rutgers University
Connie Hart, Woods Hole Oceanographic Institution
Meredithe Hullar, Marine Biological Laboratory
Daniel Johnson, Bowman Gray School of Medicine
Alan Kuzirian, Marine Biological Laboratory
Tim Makoda, United States Air Force
Annie Pardo, Universidad Nacional Autonoma, Mexico
Gary Schneider, Loyola University Medical School
Dean Schraufnagel, University of Illinois, Chicago
Jacob Sznajder, Humana Hospital-Michael Reese
Lewis Tilney, Marine Biological Laboratory
Michael Tytell, Bowman Gray School of Medicine
Earl Weidner, Louisiana State University
Zhaozhong Yang, Marine Biological Laboratory

Fundamental Issues in Vision Research (August 16–29)

Course Directors
David S. Papermaster, University of Texas Health Science Center
John N. Dowling, Harvard University

Faculty
Robert Barlow, Syracuse University
Robert W. Baughman, Harvard Medical School
George B. Benedek, Massachusetts Institute of Technology
Eliot L. Berson, Massachusetts Eye and Ear Infirmary
Martin Breitman, Mt. Sinai Hospital, Canada
Debra Carper, NEI/NIH
Judah Folkman, Children’s Hospital Medical Center
Ilene K. Gipson, Schepens Eye Research Institute
Paul A. Hargrave, University of Florida, Gainesville
John R. Hassell, The Eye & Ear Institute of Pittsburgh
Fielding Heitman, National Institutes of Health
Paul N. Hoffman, The Johns Hopkins Hospital

Ehud Kaplan, Rockefeller University
Jerry R. Kuszak, Rush Presbyterian St. Luke’s Medical Center
Wen Hwa Lee, Institute of Biotechnology
Ellen Liberman, NEI/NIH
Thomas F. Linsenmayer, Tufts University Medical School
Robert Paul Malcho, University of Illinois College of Medicine
Richard H. Masland, Massachusetts General Hospital
Robert S. Molday, University of British Columbia, Canada
Jeremy Nathans, Johns Hopkins University School of Medicine
Harry A. Quigley, Johns Hopkins Hospital
James Rac, Mayo Foundation
Robert R. Rando, Harvard Medical School
Elia Raviola, Harvard Medical School
Harris Ripp, University of Illinois College of Medicine
Paul Russell, NEI/NIH
Barbara G. Schneider, University of Texas Health Science Center
Abe Spector, Columbia University
Tung-Tien Sun, New York University Medical Center
Guo-Ming Wang, Columbia University
Charles Ziker, University of California, San Diego

Medical Informatics (May 31–June 6)

Course Director
Homer Warner, University of Utah

Faculty
Paul Clayton, Columbia University
Peter Haug, University of Utah
David J. Lipman, National Library of Medicine
Donald A. B. Lindberg, National Library of Medicine
Daniel R. Masys, National Library of Medicine
Robert Sideli, Columbia University

Course Assistant
Sylvia Jessen, University of Utah

Students
James Baggett, Hahnemann University
Gerald Bashin, University of Washington, Seattle
Gary Berman, Albert Einstein College of Medicine
Janine Blackman, University of Maryland, Baltimore
Athos Bousvaros, Children's Hospital
Mona Couts, University of North Carolina, Chapel Hill
Stephen Dubin, Drexel University
Peter Ellis, Brown University
Michael Fisher, University of Maryland, Baltimore
Peter Fleming, Cleveland Clinic Foundation
Cathy Harbert, Howard Hughes Medical Institute
Linda Jackowitz, West Virginia University
John Kelly, America Medical Association
Michael Kessler, American Board of Quality Assurance
Michael Kral, Oregon Health Sciences University
Lisa Kregel, Case Western Reserve University
Rosanne Labree, McLean Hospital
Carol Lelonek, University of Buffalo
Saúl Maloufow, Food & Drug Administration
Karen Martinez, Catawa Memorial Hospital
Peter Mathews, Kaiser Permanente
Julie McGowan, University of Vermont, Burlington
Ana Nunez, Hahnemann University
Michael Rassinger, New York University
Barbara Schultz, VA Medical Center
Anthony So, University of California, San Francisco
Zoe Stavri, Massachusetts General Hospital
Bryan Thompson, Lovelace Medical Foundation
Monica Unger, Northeastern Ohio University
George Wesley, Office of the Inspector General, Washington, DC

Computer Managers
Manceesh Sahani, California Institute of Technology
Charles F. Stevens, Salk Institute
John Uhley, California Institute of Technology

Students
Erik Cook, Baylor University
Adelle Coster, University of New South Wales, Australia
Sharon Crook, University of Maryland, College Park
Winrich Freiwald, Tubingen University, Germany
Alberto Herrera-Becerra, Universidad Nacional Autonoma, Mexico
Martin Huber, Phillips-University-Marburg, Germany
Michael Inzarry, Massachusetts General Hospital
Ranu Jung, Case Western Reserve University
Brandi Kehoe, California State University
Ilan Lampl, Hebrew University, Israel
Mitchell Maltenfort, Rehabilitation Institute of Chicago
Ference Mechner, New York University
Jill Nicolaus, University of Chicago
Harmon Nine, University of Michigan, Ann Arbor
Monica Paolino, University of California, San Diego
Yifat Prat, Hebrew University, Israel
Irit Reuveni, Ben Gurion University of the Negev, Israel
Emilio Salinas, National University, Mexico
Eyal Seidemann, Tel Aviv University, Israel
Nangavaram Sekar, University of Iowa, Iowa City
Micah Siegel, Yale University
Mark Tommerdahl, University of North Carolina, Chapel Hill
Yi-Xiong Zhou, McGill Vision Research Center, Canada

Methods in Computational Neuroscience
(August 2-29)

Course Directors
James M. Bower, California Institute of Technology
Christof Koch, California Institute of Technology

Faculty
Paul R. Adams, HHMI, SUNY, Stony Brook
Richard Andersen, Massachusetts Institute of Technology
Joseph J. Atick, Rockefeller University
William Bialek, NEC Research Institute
Avis Cohen, University of California, University Park
Rodney James Douglas, MRC Anatomical Neuropharmacology Unit, UK
Nancy Kopell, Boston University
Rodolfo R. Llinás, New York University Medical Center
Eve Marder, Brandeis University
Michael V. Mascagni, Supercomputing Research Center
Kenneth D. Miller, California Institute of Technology
John Rinzel, National Institutes of Health
Idan Segev, Hebrew University, Israel
Terrence Sejnowski, The Salk Institute

Teaching Assistants
David Beeman, University of Colorado, Boulder
David Berkowicz, Yale University Medical School
Ojvind Bernander, California Institute of Technology
Dieter Jaeger, California Institute of Technology
Maurice Lee, California Institute of Technology

Microinjection Techniques in Cell Biology
(May 26–June 1)

Course Director
Robert Silver, Cornell University

Faculty
Suzanne Chandler, Cornell University
Donald Chang, Hong Kong University of Science & Technology, Hong Kong
Douglas Kline, Kent State University
Joanne Kline, Kent State University
Patricia Wadsworth, University of Massachusetts, Amherst

Students
David Brauer, United States Department of Agriculture
Roger Buchanan, National Institutes of Health
Thomas Burke, Ohio State University
Hattie Gresham, University of Missouri, Columbia
Gupta Kalpana, University of Ottawa, Canada
Karen Hedberg, University of Oregon, Eugene
Lynne Lucher, Illinois State University
Katrina Marsh, Queen's Medical Centre, UK
Thomas Martin, University of Wisconsin, Madison
James McGill, Duke University
Thomas Reese, National Institutes of Health
Frieda Reichman, University of Massachusetts, Amherst
Paulo Serodio, New York University
Donald Siwek, VA Hospital
Rapid Measurement of Neurotransmitter Signals in the Central Nervous System Using In Vivo Electrochemistry (August 19-24)

Course Directors
Greg Gerhardt, University of Colorado, Denver
Paul Moore, University of Colorado, Denver

Faculty
Alan Granton, Douglas Research Hospital, Canada
Michael Palmer, University of Colorado, Denver
William Proctor, University of Colorado, Denver

Technicians
Paula Bickford, University of Colorado, Denver
Scott Brock, University of Colorado, Denver
Mike Doherty, McGill University, Canada
Marilyn Friedemann, University of Colorado, Denver
Ron Maloney, University of Colorado, Denver
Mike Parrish, University of Colorado, Denver
Steve Robinson, University of Colorado, Denver
Scott Robinson, University of Colorado, Denver

Students
Abdel Abdel-Rahman, East Carolina University
Juan Advis, Rutgers University
Kurt Batsche, SUNY, Stony Brook
Thomas Clark, U.S. Army Aeromedical Research
Dennis Dahl, University of Texas, Dallas
Audrey Davis, George Washington University
Matthew Davidson, University of Oregon, Eugene
Michele Dwyer, Smith College
Siegward Eksa, University of California, Berkeley
Michael Hörner, I. Zoologisches Institut, Germany
Robert Huber, Karl-Franzens-Universität Graz, Austria
Robert Lepinheimer, Youngstown State University
Tamala Mallett, Meharry Medical College
Dorothy Pocock, Concordia University, Canada
David Rothblat, Hahnemann University
Claude Rouillier, Hopital de l'Enfant-Jesus, Canada
Charles Stewart, Franklin & Marshall College
James Suojanen, New England Deaconess Hospital
Tina Thompson, University of Texas Southwestern
Ruth Weissenborn, University of St. Andrews, Scotland

Workshop on Molecular Evolution
(August 2-14)

Director
Mitchell L. Sogin, Marine Biological Laboratory

Faculty
Marlene Belfort, New York State Department of Health
Daniel Davison, University of Houston
Michael Donoghue, University of Arizona, Tucson
Doug Ernisse, University of Michigan, Ann Arbor
Joseph Felsenstein, University of Washington, Seattle
Walter Gilbert, Harvard University
Martin Kreitman, University of Chicago
Laura Landweber, Harvard University
Bernd Franz Lang, University of Montreal, Canada
David Maddison, University of Arizona, Tucson
Marcella McClure, University of California, Irvine
Roger Milkman, University of Iowa, Iowa City
Gary Olsen, University of Illinois, Urbana
Monica Riley, Marine Biological Laboratory
Terry Speed, University of California, Berkeley
David Swoford, Smithsonian Museum Support Center
Bruce Walsh, University of Arizona, Tucson

Course Assistant
Brendan Reilly, Software Editing Corporation

Students
Rashid Aman, National Museums of Kenya, Nairobi
Linda Amaral, Woods Hole Oceanographic Institution
Wendy Bailey, Yale University
Charles Baker, Kewalo Marine Laboratory
Ulrike Beemelmanns, University of Cologne, Germany
Joy Bergelson, Washington University
David Bermudes, Yale University
Nancy Bowers, Pennsylvania State University
Barry Campbell, Queen's University, Canada
David Carmean, University of California, Davis
Carlos Cerpa, University of Montreal, Canada
Belinda Chang, Harvard University
Bernard Cohen, University of Glasgow, Scotland
Julio Collado-Vides, Massachusetts Institute of Technology
Jon Conn, University of Florida, Gainesville
Eric Delwart, Stanford University Medical Center
Floyd Dewhurst, Forsyth Dental Center
Megan Eskey, NASA Ames Research Center
David Faguy, Queen's University, Canada
Thomas Friedi, University of Bayreuth, Germany
Manohar Furtado, Northwestern University Cancer Center
Steven Gagnon, Laval University, France
Anne Gerber, Washington University
Manuel Glynnas, Cleveland Clinic Research Institute
John Gosink, University of Washington, Seattle
Jotun Hein, Aarhus University, Denmark
Stephen Hinton, Exxon Corporate Research Laboratories
Wen-Yen Kao, University of Wisconsin, Milwaukee
Laura Katz, Cornell University
Michelle Kelly-Borges, Harbor Branch Oceanographic Institute
Hans-Peter Klenk, Max-Planck-Institut, Germany
Richard Kliman, Rutgers University
Stuart Kuhlthoff, Lilly Research Laboratories
Bernard Labedan, University of Paris-Sud, France
Damian Labuda, University of Montreal, Canada
Béniédicte Lafay, Station Zoologique, France
Joyce Lewis, Colorado State University
Ee Lin Lim, Woods Hole Oceanographic Institution
François Lutzoni, Duke University
Kersti Machnes, Los Alamos National Laboratory
Katrina Mangin, University of California, Santa Cruz
Gerogiana May, University of Minnesota, St. Paul
James McLaughlin, Massachusetts General Hospital
Helen McVeigh, Natural History Museum, UK
Annabel Miles, James Cook University of North Queensland, Australia
Christine Miller, University of Cincinnati
Yue Ming, Michigan State University
Sharon Mitchell, USDA/ARS
Miklos Muller, Rockefeller University
Jan Pawlowski, University of Geneva, Switzerland
Marian Peris, University of California, Los Angeles
William Piel, Harvard University
Norman Pieniazek, Centers for Disease Control
James Pierce, Dupont Merck Pharmaceutical Company

Frank Robert, Idaho National Engineering Laboratory
Andres Ruiz-Linares, Stanford University
Robert Setterquist, University of Houston
Robert Sheehy, University of Arizona, Tucson
Emmanuel Skoufos, University of Minnesota, Minneapolis
Ralph Tanner, University of Oklahoma, Norman
Steven Thompson, Washington State University
Moira van Staaden, Karl-Franzens-University Graz, Austria
Todd Wareham, Memorial University of Newfoundland, Canada
Lee Weigt, Smithsonian Tropical Research Institute, Panama
Lisa White, University of Houston
Hong Xie, Smith College
Summer Research Programs

Principal Investigators

Adams, James A., University of Maryland Eastern Shore
Akeson, R., University of Cincinnati
Alkon, Daniel L., National Institutes of Health
Allen, Nina S., Wake Forest University
Armstrong, Clay, University of Pennsylvania
Armstrong, Peter B., University of California, Davis
Arnold, John M., University of Hawai'i
Augustine, George J., Duke University Medical Center
Baker, Robert, New York University Medical Center
Baldridge, William H., McMaster University Medical School, Canada
Barlow, Jr., Robert B., Syracuse University
Bearer, Elaine, Brown University
Beauge, Luis, Instituto M. y M. Ferreyra, Argentina
Bennett, M. V. L., Albert Einstein College of Medicine
Bezanilla, Francisco, University of California, Los Angeles
Bezprozvanny, Ilya, University of Connecticut Health Center
Bingham, Eula, University of Cincinnati
Bloom, George S., The University of Texas Southwestern Medical Center, Dallas
Bodznick, David, Wesleyan University
Borgese, Thomas A., Lehman College, City University of New York
Boron, Walter, Yale University School of Medicine
Borst, David, Illinois State University
Bowlby, Mark R., Harvard Medical School
Boyer, Barbara C., Union College
Brady, Scott T., The University of Texas Southwestern Medical Center, Dallas
Brown, Joel, Albert Einstein College of Medicine
Buchanan, Roger A., National Institutes of Health
Burdick, Carolyn J., Brooklyn College of the City University of New York
Burger, Max M., Friedrich Miescher Institut, Switzerland
Chaet, A. B., University of West Florida
Chang, Donald C., Baylor College of Medicine
Chanson, Marc, Albert Einstein College of Medicine
Chappell, Richard L., Hunter College of the City University of New York
Charlton, Milton, University of Toronto, Canada
Clay, John, National Institutes of Health
Cohen, Lawrence B., Yale University School of Medicine
Cohen, William D., Hunter College of the City University of New York
Cooperstein, Sherwin J., The University of Connecticut Health Center
Cupoletti, John, University of Cincinnati College of Medicine
D’Avanzo, Charlene, Hampshire College
De Weer, Paul, University of Pennsylvania
Di Polo, Reinaldo, IVIC, Venezuela
Doroshenko, Peter, Duke Medical Center
Dowling, John E., Harvard University
Eckberg, William R., Howard University
Einhorn, Barbara E., University of Connecticut Health Center
Eisthen, Heather L., Indiana University
Farbman, Albert, Northwestern University
Fein, Alan, University of Connecticut Health Center
Fink, Rachel, Mount Holyoke College
Fishman, Harvey M., The University of Texas Medical Branch, Galveston
Florin-Christensen, Jorge, University of Cincinnati
Gadsby, David, The Rockefeller University
Gainer, Harold, National Institutes of Health
Garber, Sarah S., University of Alabama, Birmingham
Garrick, Rita Anne, Fordham University College at Lincoln Center
Gesteland, Robert C., University of Cincinnati College of Medicine
Gilland, Edwin H., Harvard University
Giuditta, Antonio, University of Naples, Italy
Goldman, Robert D., Northwestern University Medical School
Grant, Philip, National Institutes of Health
Griff, Edwin R., University of Cincinnati
Gyoeva, Fatma, Institute of Protein Research, Russia
Haimo, Leah, University of California, Riverside
Hans, Michael, Max-Planck-Institut für Biophysikalische Chemie, Germany
Hegde, Ashok N., Columbia University
Helluy, Simone, Wellesley College
Hernandez-Cruz, Arturo, Instituto de Fisiología Celular, UNAM, Mexico
Highstein, Steven M., Washington University School of Medicine
Hill, Susan D., Michigan State University
Holz, George G., IV, Howard Hughes Medical Institution, Massachusetts General Hospital
Hoskin, Francis C. G., Illinois Institute of Technology
Ip, Wallace, University of Cincinnati College of Medicine
Johnston, Daniel, Baylor College of Medicine
Josephson, Robert K., University of California, Irvine
Kaneshiro, Edna, University of Cincinnati
Kaplan, Barry B., Western Psychiatric Institute and Clinic
Kaplan, Ilene M., Union College
Khan, Shahid, Albert Einstein College of Medicine/National Institutes of Health
Khan, Sohaib, University of Cincinnati College of Medicine
Knowlton, Robert, Jefferson Medical College
Koide, Samuel S., The Population Council
Kraivitz, Edward, Harvard Medical School
Kremer, James N., University of Southern California
Kumar, Ajit, George Washington University School of Medicine
Kuznetsov, Sergei, Moscow State University, Russia
Landowne, David, University of Miami
Langford, George, Dartmouth College
Laufier, Hans, The University of Connecticut
Lauzon, Robert J., Albany Medical College
Liman, Emily R., Harvard Medical School
Lipicky, Raymond J., Food & Drug Administration
Lisman, John, Brandeis University
Linás, Rodolfo R., New York University Medical Center
Malchow, Robert Paul, University of Illinois at Chicago College of Medicine
Martin, Rainer, University of Ulm, Germany
Metzals, Janis, University of Ottawa, Canada
Misevic, Gradimir, University Hospital of Basel, Switzerland
Nagle, Ronald L., Albert Einstein College of Medicine
Nasi, Enrico, Boston University School of Medicine
Nelson, Leonard, Medical College of Ohio
Noe, Bryan D., Emory University School of Medicine
Obaid, Ana Lila, University of Pennsylvania School of Medicine
Pant, Harish, NINDS, National Institutes of Health
Parysek, Linda, University of Cincinnati Medical School
Patterson, David J., University of Bristol, UK
Quigley, James P., SUNY, Stony Brook
Segal, Sheldon, The Population Council
Severin, Fedor F., Institute of Protein Research, Russia
Shipley, Michael T., University of Cincinnati College of Medicine
Silver, Robert B., Cornell University, N.Y. State College of Veterinary Medicine
Swicki, Kathleen K., Swarthmore College
Sloboda, Roger D., Dartmouth College
Smith, David V., University of Cincinnati College of Medicine
Sprandelakis, Nicholas, University of Cincinnati College of Medicine
Sprin, Alexander S., Academy of Sciences of Russia
Spray, David C., Albert Einstein College of Medicine
Steinacker, A., Washington University School of Medicine
Stemmer, Andreas, Medical Research Council, UK
Sweeney, H. Lee, University of Pennsylvania School of Medicine
Tanguy, Joelle, Northwestern University
Telzer, Bruce, Pomona College
Trestman, Steven N., Worcester Foundation for Experimental Biology
Trojo-Borowski, Amy V., Northwestern University
Trinkaus, John P., Yale University
Troll, Walter, New York University Medical Center
Tytell, Michael, Bowman Gray School of Medicine of Wake Forest University
Ueno, Hiroshi, Osaka Medical College, Japan
Vallee, Richard, Worcester Foundation for Experimental Biology
Wadsworth, Patricia, University of Massachusetts
Watson, Win, University of New Hampshire
Wehner, Rudiger, University of Zurich, Switzerland
Weidner, Earl, Louisiana State University
Weiss, Dieter, Technical University, Munich, Germany
Wonderlin, William F., West Virginia University
Wood, Emma R., University of British Columbia, Canada
Yeh, Jay Z., Northwestern University Medical School
Yoshioka, Tohru, Waseda University, Japan
Zigman, Seymour, University of Rochester School of Medicine & Dentistry
Zottoli, Steven J., Williams College
Zou, Dong-Jing, Biocenter, Basel University, Switzerland
Zuazaga de Ortiz, Conchita, University of Puerto Rico
Zukin, R. Suzanne, Albert Einstein College of Medicine

Other Research Personnel

Ahl, Jonna, University of Hartford
Altson, Yolonda, Benedict College
Altamirano, Anibal A., University of Texas Medical Branch, Galveston
Andrews, S. Brian, National Institutes of Health
Araneda, Ricardo, Albert Einstein College of Medicine
Ascher, Phillipe, Ecole Normale Superieure, France
Bartley, Annette, Hunter College of CUNY
Benech, Juan Claudio, Instituto de Investigaciones Biologicas Clemente Estable, Uruguay
Bezprozvannaya, Svetlana, University of Connecticut Health Center
Bhattacharyya, Anita, University of Cincinnati
Bittner, George D., University of Texas, Austin
Bommer, Kurt, Max-Planck-Institute for Brain Research, Germany
Bouhassira, Eric, Albert Einstein College of Medicine
Brackenbury, Robert, University of Cincinnati Medical Center
Breitwieser, Gerda E., Johns Hopkins University School of Medicine
Buell, Neal, Syracuse University
Bullock, Luce, University of Rochester

Callaway, Joseph C., New York Medical College
Chludzinski, John, NINDS, National Institutes of Health
Chun, Jong Tai, Western Institute and Psychiatric Clinic
Clare, Everton, City College of New York
Cohen, Avrum, Yale University School of Medicine
Cohen, Danen L., Dartmouth College
Cohen, Matthew, Yale University
Collin, Carlos, NINDS, National Institutes of Health
Corda, David, University of Pennsylvania
Correa, Ana H., University of California, Los Angeles
Couch, Ernest, Texas Christian University
Cox, Daniel, Wake Forest University
Crispino, Marianna, University of Naples, Italy
Crucher, Keith, University of Cincinnati
Cruz, Rene, Lehman College, CUNY

Danac, Hadi, University of Connecticut
Davis, Adam, Yale University
DeBello, William, Duke University Medical Center
Deffenbaugh, Max, Massachusetts Institute of Technology
Dermietzel, Rolf, Universitat Regensburg, Germany
Drazba, Judith, NINDS, National Institutes of Health
Dudley, Nathaniel, Hampshire College

Edwards, M. Kaye, Haverford College
Ehrrich, Michelle, Princeton University
Engman, James A., University of Cincinnati

Falk, Chun Xiao, Yale University School of Medicine
Felle, Hubert, Botanical Institute I, University Giessen, Germany
Florin-Chrestenso, Monica, University of Cincinnati
Flucher, Bernhard F., National Institutes of Health
Folwell, Mary Grace, Swarthmore College
French, Robert J., University of Calgary, Canada
Frenkel, Kryszfina, New York University Medical Center

Gallant, Paul, NINDS, National Institutes of Health
Gersso, Daniela, Friedrich Miescher-Institut, Switzerland
Gill-Kumar, Pratim, Food & Drug Administration
Goldman, Anne E., Northwestern University
Gomez, Maria, Boston University School of Medicine
Gomez Lagunas, Froylan, University of Pennsylvania
Gould, Robert, New York State Institute of Basic Research
Grassi, Daniel, Ft. Lauderdale, Florida
Greenblatt, Daniel, Brandeis University

Hammar, Kassia, NINDS, National Institutes of Health
Harper, David, University of British Columbia, Canada
Hershko, Avram, Technion, Israel
Herzog, Erik, Syracuse University
Hitt, Austin, University of West Florida
Hogan, Emilia, Yale University School of Medicine
Holmgren, Miguel, University of Health Sciences/The Chicago Medical School
Hunt, James, Duke Medical Center

Ito, Etsuro, NINDS, National Institutes of Health

Johnson, Michelle R., Howard University
Johnston, Jennifer, Dartmouth College
Juneja, Renu, The Population Council

Kaftan, Edward, University of Connecticut Health Center
Kammerer, Richard, Friedrich Miescher-Institut, Switzerland
Kehoc, Jacque, Ecole Normale Superieure, France
Kelly, Mary E., Syracuse University
Kirimu, Yutaka, Kyusyu University, Japan
Klein, Kathryn, Emory University School of Medicine
Knudsen, Knud D., Food & Drug Administration
Konneith, Arthur, Max-Planck-Institute, Germany
Krause, Todd L., University of Texas, Austin
Kudo, Yoshihisa, Mitsubisi Kasei Life Sciences Institute, Japan
Kuhns, William, Hospital for Sick Children, Canada

Lasser-Ross, Nechama, New York Medical College
Laurzon, Cindy, Albany Medical College
Leidigh, Christopher, Albert Einstein College of Medicine
Leopold, Philip L., University of Texas Southwestern Medical Center
Leung, Doreen Su Yi, Hong Kong University of Science & Technology, Hong Kong
Lim, Jong, New York University Medical Center
Lin, Jen-Wei, New York University Medical Center
Liu, lei, University of Connecticut

Locke, Rachel, Washington University School of Medicine
Lorenzoni, Patrizia, Friedrich Miescher Institut, Switzerland
Lu, Jin, University of Texas Medical Branch
Luca, Frank, Harvard Medical School

Mangel, Stuart, University of Alabama School of Medicine
McCarr, Brooke, Duke University
McPhie, Donna, National Institutes of Health/Georgetown University
Moir, Robert, Northwestern University
Montejurro, Jose, University of Puerto Rico
Moreira, Jorge, NINDS, National Institutes of Health
Morrell, Candy M., University of Maryland Eastern Shore
Morrison, Paul, University of Glasgow, Scotland

Noe, Jennifer R., Emory University
O'Neil, Peggy, Illinois State University
Oka, Kotaro, NINDS, National Institutes of Health
Olds, James L., National Institutes of Health

Perez, Reynaldo, University of Puerto Rico
Perozo, Eduardo, Jules Stein Eye Institute, University of California, Los Angeles
Pethig, Ronald, University of Wales, UK
Petri, Victoria, Albert Einstein College of Medicine
Plotner, Robert, University of Texas Medical Branch, Galveston
Powers, Maureen, Vanderbilt University
Pumpkin, David W., University of Maryland, Baltimore

Rayos, Nancy, Hunter College
Reese, Barbara, NINDS, National Institutes of Health
Regehr, Wade, University of Pennsylvania
Richards, Kathryn S., Emory University
Rook, Martin B., Albert Einstein College of Medicine
Rothenberg, Mark, Emory University
Rusciano, Dario, Friedrich Miescher Institute, Switzerland

Sakakibara, Manabu, Toyohashi University of Technology
Salyapongse, Aim, Wesleyan University
Sanchez, Ivelisse, Hunter College of CUNY
Sartain, Julie Ann, Illinois State University
Schiffmann, Dietmar, University of Wurzburg, Germany
Shaffer, Rebecca, University of Texas
Shibuya, Ellen, Harvard Medical School
Shrier, Alvin, McGill University, Canada
Sigg, Daniel, University of California, Los Angeles
Slater, N. Travis, Northwestern University
Stanley, Elis, NINDS, National Institutes of Health
Stockbridge, Lisa, National Institutes of Health
Stockbridge, Norman, Food & Drug Administration
Stokes, Darrell R., Emory University
Stoyanovsky, Detcho, University of Connecticut Health Center
Sugimori, Mutsuyuki, New York University Medical Center
Sumanovski, Lazar, University Hospital of Basel, Switzerland
Swandulla, Dieter, Max-Planck-Institut, Germany
Swank, Douglas, University of Pennsylvania

Tsukimura, Zagan, University of Amsterdam
Tseng, Terasaki, McGill University
Vargas, Takanishi, Waseda University, Japan
Vargas, Fernando, Food & Drug Administration
Weiler, Reto, University of Oldenburg, Germany
Werman, Robert, Hebrew University, Israel
Wu, Jian-Young, Yale University School of Medicine
Yang, Zhaohui, University of Pennsylvania School of Medicine

Zakevicius, Jane, University of Illinois at Chicago College of Medicine
Zavilowitsch, Joseph, Albert Einstein College of Medicine
Zigman, Bunnir R., University of Rochester School of Medicine & Dentistry

Farmanfarmaian, A., Rutgers University
Frenkel, Krystyna, New York University Medical Center
Friedler, Gladys, Bunting Institute
Fussell, Catherine, University of Pennsylvania

Gabriel, Mordczai L., Brooklyn College
German, James, The New York Blood Center
Gilbert, Daniel L., National Institutes of Health
Goldfarb, Ronald H., Pittsburgh Cancer Institute
Goldstein, Moise H., The Johns Hopkins University
Goward, Samuel N., University of Maryland
Grossman, Albert, New York University Medical Center
Guttenplan, Joseph, New York University Dental Center

Harrington, John P., University of South Alabama
Hill, Richard W., Michigan State University
Humphreys, Tom, University of Hawaii

Inoue, Sadyuki, McGill University, Canada
Kalenchuk, Jane, Mount Holyoke College
Kaminer, Benjamin, Boston University School of Medicine
Klemow, Kenneth, Wilkes University
Kline, Richard Paul, Columbia University

Lee, John J., City College of CUNY
Levitz, Mortimer, NYU Medical Center

Marine Biocontrol Co., Sandwich, MA
Marine Research, Falmouth, MA
Martin, Donald Cregg, Conrad Jobst Tower
McCoy, Floyd, Associated Scientists of Woods Hole
Michaelson, James, MGH Cancer Center
Moosiker, Mark S., Yale University
Morrell, Leyla DeToledo, Rush Medical College

Olins, Ada L., University of Tennessee
Olins, Donald E., University of Tennessee
Ostrer, Harry, NYU Medical Center

Prosser, C. Ladd, University of Chicago
Pruusch, Robert D., Gonzaga University

Ramamurthy, Baskar, Indian Institute of Science
Robinson, Denis, Marine Biological Laboratory
Rose, Birgit, University of Miami School of Medicine
Rosenbluth, Jack, NYU School of Medicine
Rosenfeld, Allan, Columbia University School of Medicine
Roth, Lorraine, Brookline, MA
Russell-Hunter, W. D., Syracuse University

Schippers, Jay, New York, NY
Schweitzer, Nicola, Imperial College, UK
Scott-Connor, Harry, Madison, MS
Selby, Cecil, Canann, NYU
Shepro, David, Boston University
Shr Itman, Mollie Starr, N. Nassau Health Center
Silva, Robert, Marine Research
Spiegel, Evelyn, Dartmouth College
Stephenson, William K., Earhart College
Sweet, Frederick, Washington University School of Medicine
Szent-Györgyi, Andrew, Brandeis University
Trager, William, The Rockefeller University
Van Holde, Kensal E., Oregon State University
Warren, Leonard, Wistar Institute
Weir, Gray E., Naval Historical
Wilbur, Charles G., Colorado University
Wittenberg, Beatrice, Albert Einstein College of Medicine
Wittenberg, Jonathan, Albert Einstein College of Medicine

Library Readers: Desks

Anderson, Everett, Harvard Medical School
Boyce, John, Union College
Chambers, Edward L., University of Miami
Collier, Marjorie McCann, Saint Peters College
Clark, Arnold M., Woods Hole, MA
Copeland, Eugene, Woods Hole, MA
Cohen, Seymour, Woods Hole, MA

Edds, Louise L., Ohio University
Ellington, Athleen, University of Massachusetts

Fussell, Catherine P., Pennsylvania School of Medicine

Gehrke, Lee, Massachusetts Institute of Technology
Gray, Richard A., Baylor College of Medicine

Haubrich, Robert, Denison University
Herskovits, Theodore T., Fordham University

Johnston, Dan, Baylor College of Medicine

Kelly, Robert E., University of Illinois, Chicago
King, Kenneth, Woods Hole, MA
Korf, Bruce R., Boston, MA
Kranz, Stephen, Massachusetts General Hospital

Laderman, Aimlee D., Yale University
Leighton, Joseph, Peralta Cancer Research Institute
Lorand, Laszlo, Northwestern University

Mauzerall, David, Rockefeller University
Mizell, Merle, Tulane University
Morrell, Frank, Rush Medical Center

Narahashi, Toshio, Northwestern University
Nickerson, Peter A., SUNY, Buffalo

Pappas, George D., University of Illinois, Chicago
Person, Philip, Flushing, NY

Rao, T. S., Donapaula, Gao-India
Rickes, Frederick R., University of Connecticut Health
Rosati, Floriana, Siena, Italy
Roth, Jay, Woods Hole, MA

Shepard, Frank, Falmouth, MA
Sonnenblick, Benjamin, Rutgers University
Spector, Abraham, Columbia University
Spiegel, Evelyn, Dartmouth College
Spiegel, Melvin, Dartmouth College
Sundquist, Eric, United States Geological Survey
Sydlik, Mary Ann, SUNY, Geneseo

Tilney, Louis, University of Pennsylvania
Tilney, Molly, University of Pennsylvania
Tsui, Frederick, Scripps Institute
Tweedell, Kenyon S., University of Notre Dame

Webb, H. Marguerite, Woods Hole, MA
Weir, Gary E., U.S. Naval Historical Center

Library Readers: Rooms

Cariello, Lucio, Stazione Zoologica, Italy
D'Alessio, Giuseppe, Via Mezzocannone, Italy
Filtle, O. D., Filtle & Co.
Goldman, Robert, Northwestern University Medical School
Hines, Michael, Duke University
Han, Joseph, Case Western Reserve University
Han, Judith, Case Western Reserve University
Moore, John W., Duke University
Patterson, David, University of Sydney, Australia
Rabinowitz, Michael, MBL/Harvard Medical School
Reynolds, George T., Princeton University
Sheetz, Michael P., Duke University
Speck, William, Case Western Reserve University
Sprint, Alexander, Academy of Sciences, Russia
Stuart, Ann E., University of North Carolina, Chapel Hill
Tykocinski, Mark L., Case Western Reserve University
Weissmann, Gerald, NYU Medical Center
Yoshioka, Tohru, Waseda University, Japan
Zweig, Ron, Ecologie

Domestic Institutions Represented

Alabama, University of, Birmingham
Alabama, University of, School of Medicine
Albany Medical College
Albert Einstein College of Medicine
American Board of Quality Assurance
American Medical Association
American Museum of Natural History
Aquatic Research Organisms
Arizona State University
Arizona, University of

AT&T Bell Laboratories
Axon Instruments, Inc.
Barry Controls
Baylor College of Medicine
Beckman Instruments, Inc.
Becton Dickinson IS
Benedict College
Bigelow Laboratories for Ocean Studies
Bio-Rad Laboratories

Boston University
Boston University Marine Program
Boston University School of Medicine
Bowman Gray School of Medicine of Wake Forest University
Brandeis University
Brandeis University, HHMI
Brinkman Instruments, Inc.
Brooklyn College of the City University of New York
<table>
<thead>
<tr>
<th>University/Organization</th>
<th>University/Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown University</td>
<td>hummingbird Orthopaedics</td>
</tr>
<tr>
<td>Brown University School of Medicine</td>
<td>Humana Hospital</td>
</tr>
<tr>
<td>BTX</td>
<td>Hunter College</td>
</tr>
<tr>
<td>Buffalo, University of</td>
<td>Hunter College of the City University of New York</td>
</tr>
<tr>
<td>C. P. Li Biomedical Research Corp.</td>
<td>ICN Radiochemicals (Division of ICN Biomedicals, Inc.)</td>
</tr>
<tr>
<td>California Institute of Technology</td>
<td>Idaho National Engineering Laboratory</td>
</tr>
<tr>
<td>California Institute of Technology, Beckman Institute</td>
<td>Idaho, University of</td>
</tr>
<tr>
<td>California State University, Fresno</td>
<td>Illinois Institute of Technology</td>
</tr>
<tr>
<td>California, University of Berkeley</td>
<td>Illinois State University</td>
</tr>
<tr>
<td>California, University of Davis</td>
<td>Illinois, University of</td>
</tr>
<tr>
<td>California, University of Irvine</td>
<td>Illinois, University of College of Medicine</td>
</tr>
<tr>
<td>California, University of Los Angeles</td>
<td>Indec Systems Corporation</td>
</tr>
<tr>
<td>California, University of, Riverside</td>
<td>Indiana University</td>
</tr>
<tr>
<td>California, University of, San Diego, HHMI</td>
<td>Indiana University Medical Center</td>
</tr>
<tr>
<td>California, University of, San Francisco</td>
<td>Innovation Corporation</td>
</tr>
<tr>
<td>Cambridge Technology</td>
<td>Institute of Biotechnology</td>
</tr>
<tr>
<td>Carnegie Mellon University</td>
<td>International Equipment Company</td>
</tr>
<tr>
<td>Case Western Reserve University</td>
<td>Iowa, University of</td>
</tr>
<tr>
<td>Catawba Memorial Hospital</td>
<td>ISCO, Inc.</td>
</tr>
<tr>
<td>CAV Consulting</td>
<td>James Madison University</td>
</tr>
<tr>
<td>Center for Disease Control</td>
<td>Jefferson Medical College</td>
</tr>
<tr>
<td>Chicago Medical School, University of Health Sciences</td>
<td>JEOL</td>
</tr>
<tr>
<td>Chicago, Rehabilitation Institute of Chicago, University of</td>
<td>Johns Hopkins Hospital</td>
</tr>
<tr>
<td>Children’s Hospital, Boston</td>
<td>Johns Hopkins University</td>
</tr>
<tr>
<td>Children’s Hospital, Philadelphia</td>
<td>John A. Hartford Foundation, Inc.</td>
</tr>
<tr>
<td>Children’s Hospital Medical Center</td>
<td>Jules Stein Eye Institute, University of California, Los Angeles</td>
</tr>
<tr>
<td>Cincinnati, University of</td>
<td>Kansas, University of</td>
</tr>
<tr>
<td>Cincinnati, University of, College of Medicine</td>
<td>Kent State University</td>
</tr>
<tr>
<td>Cincinnati, University of, Medical Center</td>
<td>Kewalo Marine Laboratories</td>
</tr>
<tr>
<td>City College of New York</td>
<td>Kramer Scientific Corporation</td>
</tr>
<tr>
<td>Clarkson University</td>
<td>Lab Line Instruments, Inc.</td>
</tr>
<tr>
<td>Cleveland Clinic</td>
<td>Lab Products</td>
</tr>
<tr>
<td>Cleveland Clinic Foundation</td>
<td>La Jolla Cancer Research Foundation</td>
</tr>
<tr>
<td>Cleveland Clinic Research Institute</td>
<td>Laser Science</td>
</tr>
<tr>
<td>Codonics</td>
<td>Lederle Laboratories</td>
</tr>
<tr>
<td>Colorado, University of, Boulder</td>
<td>Lehman College, City University of New York</td>
</tr>
<tr>
<td>Colorado, University of, Health Science Center</td>
<td>Leica, Inc.</td>
</tr>
<tr>
<td>Columbia Graduate School of Arts &amp; Sciences</td>
<td>Lilly Research Laboratories</td>
</tr>
<tr>
<td>Columbia University</td>
<td>Lister Hill National Center for Biomedical Communications</td>
</tr>
<tr>
<td>Columbia University, College of Physicians &amp; Surgeons</td>
<td>Los Alamos National Laboratory</td>
</tr>
<tr>
<td>Columbia University for Medical Informatics</td>
<td>Louisiana State University</td>
</tr>
<tr>
<td>Connecticut, University of, Health Center</td>
<td>Louisiana State University Medical College</td>
</tr>
<tr>
<td>Connecticut, University of, Storrs</td>
<td>Lovelace Medical Foundation</td>
</tr>
<tr>
<td>Cornell University</td>
<td>Loyola University Medical School</td>
</tr>
<tr>
<td>Cornell University Medical College</td>
<td>Ludlum Measurements, Inc.</td>
</tr>
<tr>
<td>Cornell University, N.Y. State College of Veterinary Medicine</td>
<td>M. D. Anderson Cancer Center</td>
</tr>
<tr>
<td>Costar Corporation</td>
<td>MCI Telecommunications</td>
</tr>
<tr>
<td>Coy Laboratory Products</td>
<td>Maryland, University of, Baltimore</td>
</tr>
<tr>
<td>CUNY Medical School</td>
<td>Maryland, University of, Eastern Shore</td>
</tr>
<tr>
<td>Dage MTI, Inc.</td>
<td>Maryland, University of, Medical School</td>
</tr>
<tr>
<td>Dartmouth College</td>
<td>Massachusetts Eye and Ear Infirmary, Berman-Gund Laboratory</td>
</tr>
<tr>
<td>Dartmouth Medical School</td>
<td>Massachusetts General Hospital</td>
</tr>
<tr>
<td>David Kopf Instruments</td>
<td>Massachusetts General Hospital</td>
</tr>
<tr>
<td>Delaware, University of</td>
<td>Digital Equipment Corporation</td>
</tr>
<tr>
<td>Foreign Institutions Represented</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td></td>
</tr>
<tr>
<td>Aarhus University, Denmark</td>
<td></td>
</tr>
<tr>
<td>Academy of Sciences, Russia</td>
<td></td>
</tr>
<tr>
<td>Academy of Sciences, Institute of Protein Research, Russia</td>
<td></td>
</tr>
<tr>
<td>Aquarium &amp; Marine Center, Canada</td>
<td></td>
</tr>
<tr>
<td>Barcelona, University of Spain</td>
<td></td>
</tr>
<tr>
<td>Barl, Universita di, Italy</td>
<td></td>
</tr>
<tr>
<td>Basel, University of Switzerland</td>
<td></td>
</tr>
<tr>
<td>Basel, University of Biocenter, Switzerland</td>
<td></td>
</tr>
<tr>
<td>Bayreuth, Universitaet, Germany</td>
<td></td>
</tr>
<tr>
<td>Belgrade, University of, Yugoslavia</td>
<td></td>
</tr>
<tr>
<td>Ben Gurion, University of, Israel</td>
<td></td>
</tr>
<tr>
<td>Bordeaux, University of, France</td>
<td></td>
</tr>
<tr>
<td>Botanical Institute I, University Giessen, Germany</td>
<td></td>
</tr>
<tr>
<td>Bristol, University of, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>British Columbia, University of, Canada</td>
<td></td>
</tr>
<tr>
<td>Cairo, University of, Medical School, Egypt</td>
<td></td>
</tr>
<tr>
<td>Calgary, University of, Canada</td>
<td></td>
</tr>
<tr>
<td>CINEVESTAV-IPS, Mexico City, Mexico</td>
<td></td>
</tr>
<tr>
<td>CNRS, Station Zoologique, France</td>
<td></td>
</tr>
<tr>
<td>Concordia University, Canada</td>
<td></td>
</tr>
<tr>
<td>Dalhousie University, Canada</td>
<td></td>
</tr>
<tr>
<td>Deakin University, Australia</td>
<td></td>
</tr>
<tr>
<td>Douglas Research Hospital, Canada</td>
<td></td>
</tr>
<tr>
<td>Ecole Normale Superieure, France</td>
<td></td>
</tr>
<tr>
<td>Edinburgh University, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Escola Paulista de Medicina, Brasil</td>
<td></td>
</tr>
<tr>
<td>Freiburg Institut fur Biologie, Germany</td>
<td></td>
</tr>
<tr>
<td>Friedrich Miescher Institut, Switzerland</td>
<td></td>
</tr>
<tr>
<td>Geneve, Universite de, Switzerland</td>
<td></td>
</tr>
<tr>
<td>Glasgow, University of, Scotland</td>
<td></td>
</tr>
<tr>
<td>Hebrew University, Israel</td>
<td></td>
</tr>
<tr>
<td>Hong Kong University of Science &amp; Technology, Hong Kong</td>
<td></td>
</tr>
<tr>
<td>Hospital de l'Enfant-Jesus, Canada</td>
<td></td>
</tr>
<tr>
<td>Hospital for Sick, Children, Canada</td>
<td></td>
</tr>
<tr>
<td>ILRAD, Kenya</td>
<td></td>
</tr>
<tr>
<td>Imperial Cancer Research Fund, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>INSERM, France</td>
<td></td>
</tr>
<tr>
<td>Institut fuer Zoologie, Germany</td>
<td></td>
</tr>
<tr>
<td>Institut J. Monod, France</td>
<td></td>
</tr>
<tr>
<td>Institute of Marine Affairs, West Indies</td>
<td></td>
</tr>
<tr>
<td>Institute of Zoophysiology, Germany</td>
<td></td>
</tr>
<tr>
<td>Instituto de Fisologia Celular, UNAM, Mexico</td>
<td></td>
</tr>
<tr>
<td>Instituto de Investigaciones Biologicas</td>
<td></td>
</tr>
<tr>
<td>Clemente Estable, Uruguay</td>
<td></td>
</tr>
<tr>
<td>Instituto M.y.M. Ferreyra, Argentina</td>
<td></td>
</tr>
<tr>
<td>I.V.I.C., Venezuela</td>
<td></td>
</tr>
<tr>
<td>I. Zoologishes Institut, Germany</td>
<td></td>
</tr>
<tr>
<td>James Cook University of North Queensland, Australia</td>
<td></td>
</tr>
<tr>
<td>Kaiserlautern, University of, Germany</td>
<td></td>
</tr>
<tr>
<td>Karl-Franzens-Universitat, Austria</td>
<td></td>
</tr>
<tr>
<td>Keele University, UK Institut for Tropical Medicine, Germany</td>
<td></td>
</tr>
<tr>
<td>Koln, University of, Germany</td>
<td></td>
</tr>
<tr>
<td>Konstanz, University of, Germany</td>
<td></td>
</tr>
<tr>
<td>Kyoto University, Japan</td>
<td></td>
</tr>
<tr>
<td>Laval, Universite dek, Canada</td>
<td></td>
</tr>
<tr>
<td>Manchester, University of, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Max-Planck-Institut, Germany</td>
<td></td>
</tr>
<tr>
<td>Max-Planck-Institut fur Biologische Kybernetik, Germany</td>
<td></td>
</tr>
<tr>
<td>Max-Planck-Institut fur Biophysikalische Chemie, Nikolausberg, Germany</td>
<td></td>
</tr>
<tr>
<td>Max-Planck-Institut fur Brain Research, Germany</td>
<td></td>
</tr>
<tr>
<td>Max-Planck-Institut fur Entwicklungsbiologie, Germany</td>
<td></td>
</tr>
<tr>
<td>McGill University, Canada</td>
<td></td>
</tr>
<tr>
<td>McGill Vision Research Center, Canada</td>
<td></td>
</tr>
<tr>
<td>McMaster University Medical School, Canada</td>
<td></td>
</tr>
<tr>
<td>Medical Research Council, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Mexico, University of, Mexico</td>
<td></td>
</tr>
<tr>
<td>Montreal, University of, Canada</td>
<td></td>
</tr>
<tr>
<td>Moscow State University, Russia</td>
<td></td>
</tr>
<tr>
<td>MRC Anatomical Neuropharmacology Unit</td>
<td></td>
</tr>
<tr>
<td>MRC Laboratory of Molecular Biology, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Naples, University of, Italy</td>
<td></td>
</tr>
<tr>
<td>National Museums, Kenya</td>
<td></td>
</tr>
<tr>
<td>National University, Mexico</td>
<td></td>
</tr>
<tr>
<td>Newfoundland, Memorial University of, Canada</td>
<td></td>
</tr>
<tr>
<td>New South Wales, University of, Australia</td>
<td></td>
</tr>
<tr>
<td>Northern Ireland Department of Agriculture, Ireland</td>
<td></td>
</tr>
<tr>
<td>Oldenburg, University of, Germany</td>
<td></td>
</tr>
<tr>
<td>ORSTOM/DGRST Center, Congo</td>
<td></td>
</tr>
<tr>
<td>Osaka Medical College, Japan</td>
<td></td>
</tr>
<tr>
<td>Ottawa, University of, Canada</td>
<td></td>
</tr>
<tr>
<td>Oxford University, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Panum Institute, Denmark</td>
<td></td>
</tr>
<tr>
<td>Paris-Sud, Universite, France</td>
<td></td>
</tr>
<tr>
<td>Pasteur Institute, France</td>
<td></td>
</tr>
<tr>
<td>Pembroke College, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Philippus-Universitat, Germany</td>
<td></td>
</tr>
<tr>
<td>Queen's Medical Centre, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Queens University, Canada</td>
<td></td>
</tr>
<tr>
<td>Regensburg, Universitat, Germany</td>
<td></td>
</tr>
<tr>
<td>St. Andrews University, Scotland</td>
<td></td>
</tr>
<tr>
<td>St. George's Hospital Medical School, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Salamanca, University of, Spain</td>
<td></td>
</tr>
<tr>
<td>Sofia University, Bulgaria</td>
<td></td>
</tr>
<tr>
<td>Stazione Zoologica, Italy</td>
<td></td>
</tr>
<tr>
<td>Sydney, University of, Australia</td>
<td></td>
</tr>
<tr>
<td>Technion, Israel</td>
<td></td>
</tr>
<tr>
<td>Tel Aviv University, Israel</td>
<td></td>
</tr>
<tr>
<td>Tokyo, University of, Japan</td>
<td></td>
</tr>
<tr>
<td>Toronto, University of, Canada</td>
<td></td>
</tr>
<tr>
<td>Toyohashi University of Technology</td>
<td></td>
</tr>
<tr>
<td>Tubingen, University of, Germany</td>
<td></td>
</tr>
<tr>
<td>Tuscia, University of, Italy</td>
<td></td>
</tr>
<tr>
<td>Ulm, University of, Germany</td>
<td></td>
</tr>
<tr>
<td>University Hospital of Basel, Switzerland</td>
<td></td>
</tr>
<tr>
<td>Uppsala Biomedical Center, Sweden</td>
<td></td>
</tr>
<tr>
<td>Wales, University of, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Waseda University, Japan</td>
<td></td>
</tr>
<tr>
<td>Weizmann Institute of Science, Israel</td>
<td></td>
</tr>
<tr>
<td>Wellcome Research Laboratories, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>Wurzburg, University of, Germany</td>
<td></td>
</tr>
<tr>
<td>Zurich, University of, Switzerland</td>
<td></td>
</tr>
</tbody>
</table>
Year-Round Research Programs

Architectural Dynamics in Living Cells Program

Established in 1992 this program focuses on architectural dynamics in living cells—the timely and coordinated assembly and disassembly of macromolecular structures essential for the proper functioning, division, motility, and differentiation of cells; the spatial and temporal organization of these structures; and their physiological and genetic control. The program is also devoted to the development and application of powerful new imaging and manipulation devices that permit such studies directly in living cells and functional cell-free extracts. The Architectural Dynamics in Living Cells Program promotes interdisciplinary research and consists of resident core investigators and a cadre of adjunct members.

Staff

Inoué, Shinya, Distinguished Scientist
Oldenbourg, Rudolf, Associate Scientist
Stemmer, Andreas, Visiting Assistant Scientist

Boston University Marine Program

Faculty

Atema, Jelle, Professor of Biology, Program Director
Humes, Arthur G., Professor of Biology Emeritus
Tamm, Sidney L., Professor of Biology
Valiela, Ivan, Professor of Biology

Staff

Hahn, Dorothy, Senior Administrative Secretary
Kean, Kristen, Program Assistant
Schilizzi, Cynthia, Program Manager

Visiting Faculty and Investigators

Collette, Bruce, NMFS National Museum of Natural History, Washington, DC
Cuomo, Carmela, Yale University
D’Avanzo, Charlene, Hampshire College

Research Staff

Basil, Jennifer, Postdoctoral Investigator
Breithaupt, Thomas, Postdoctoral Investigator
Chang, Patnque, Visiting Investigator
Dudley, Judy, Visiting Research Assistant
Eishten, Heather, Grass Fellow
Deiner, Michael, Visiting Research Assistant
Foreman, Kenneth, Research Associate
Hammes, Michelle, Research Assistant
Langton, Lori, Research Assistant
MacDonald, Robin, Research Assistant
Miller, Caroline, Visiting Lab Assistant
Seely, Brad, Visiting Research Assistant
Tamm, Signhild, Senior Research Associate
Voigt, Rainer, Research Associate

Teaching Assistants

Asmuis, Regina, Course Assistant
Bushman, Paul, Woods Hole Marine Semester Coordinator
Farley, Lynda, Course Assistant
Gomez, George, Course Assistant
Karavanich, Christy, Course Assistant
Lowe, Brian, Course Assistant
O’Brien, Todd, Course Assistant
Schlezingger, David, Course Assistant

Hinga, Kenneth, University of Rhode Island
Kaufman, Les, Edgerton Research Lab, New England Aquarium
Kremer, James, University of Southern California
McFall-Ngai, Margaret, Scripps Institute of Oceanography
McPhee, Linda, postgraduate WHMS student from Ontario
Muscatine, Leonard, University of California, Los Angeles
Peckol, Paulette, Smith College
Rietsma, Carol, SUNY, New Paltz
Sardet, Christian, Villefranche-sur-Mer, France
Seeler, Jacob, University of Texas Southwestern Medical Center
Simmons, William, Visiting Lecturer, Boston University
Wainright, Sam, Rutgers University
Ward, Nathalie, Center for Coastal Studies
Graduate Students

Alber, Merryl
Anderson, John
Bohachevsky, Boris
Bryden, Cynthia
Bushmann, Paul
Cowan, Diane
Farley, Lynda
Gomez, George
Hersh, Douglas
Joy, Jennifer
Karavanich, Christy
LaMontagne, Michael
Lavalli, Kari
Lindner, Kate
Lowe, Brian
McPhee, Linda (postgrad. Ontario)
Mosiach, Simon
O’Brien, Todd
Portnoy, John
Schleinger, David
Tamse, Armando
Usup, Gires
White, David

Undergraduate Students Fall 1992

Alterman, Randy
Bayha, Keith
Bechtel, Jamla
Benning, Linda
Brown, Timothy (Wesleyan)
Bowman, Liza
Castro, Natalia
Conlon, Jeffrey
Crooks, Wendy
Davidson, Stacie
DeSantis, Krystal
DePalma, James
Ellison, Rob
Emerson, Lyndal
Esham, Kristina
Ettinger, Brian
Fox, Ellen
Harding, Jennifer
Harmer, Tara
Hofner, Jude (Wesleyan)
Horgan, Edward
Kachra, Tasleem (Brandeis)
Keyser, Alisa
Kim, Hong
Kotwas, Kristin
Lentine, Maria
Lombard, Benjamin
Maron, Christopher
Pedersen, Jennifer
Peralta, Michelle
Pimental, Helena
Pretto, Christopher
Rader, Lauren
Rulison, Steve
Suarez, Mark
Szczechakiewicz, Peter
Vanmarke, Kristien

Vavpetic, Lisa
Wanger, Jolle
Wingertner, Scott
Yang, Grace

Summer Undergraduate Interns

Barak, Jeri
Berg, Kathleen
Collins, Glynnis
Cordray, Diane
Flick, Kevin
Guilloye, Kerry Jo
Harrison, John
Herr, Barbara
Kirkendall, Ellen
Owen, Jennifer
Rollenhagen, Julianne
Watt, Melissa

Laboratory of Jelle Atema

Organisms use chemical signals as their main channel of information about the environment. These signals are transported in the marine environment by turbulent currents, viscous flow, and molecular diffusion. Receptor cells extract signals through various filtering processes. Currently, the lobster with its exquisite sense of taste and smell, is our major model to study the signal filtering capabilities of the whole animal and its narrowly tuned receptor cells. Research focuses on amino acids (food signals) and pheromones (courtship and dominance), neurophysiology of receptor cells, behavior guided or modulated by chemical signals, and computational models of odor plumes and neural filters.

Laboratory of Arthur G. Humes

Research interests include systematics, development, host specificity, and geographical distribution of copepods associated with marine invertebrates. Current research is on taxonomic studies of copepods from invertebrates in the tropical Indo-Pacific area, and pycnozoontomoiid and siphonostomoid copepods from deep-sea hydrothermal vents and cold seeps.

Laboratory of Sidney Tamnn

Research interests include cell physiology and motility, cytoskeleton, ciliary and flagellar motion, and trophic ecology of gelatinous zooplankton. Current research is on neural and ionic control of ciliary feeding and escape behaviors of marine invertebrates, distribution of calcium channels and calcium sensors in ctenophore cilia, geotactic mechanisms and sensory receptors in ctenophores, jellies with jaws (macroflagellate and actin bundles in Beröe), and rotary motors and fluid membranes in symbiotic protozoa.

Laboratory of Ivan Valiela

Our major research activity involves the Waquoit Bay Land Margin Ecosystems Research Project. This work examines how human activity in coastal watersheds (including landscape use and urbanization) increases nutrient loading to groundwater and streams. Nutrients in groundwater are transported to the sea, and, after biogeochemical transformation, enter coastal waters. There, increased nutrients bring about a series of changes. The Waquoit Bay LMER is designed to help us to understand and model the coupling of land use...
and consequences to receiving waters, and to study the processes involved.

A second long-term research topic is the structure and function of salt marsh ecosystems, including the processes of predation, herbivory, decomposition, and nutrient cycling.

Center for Molecular Evolution

The major research effort of this laboratory is the structure analysis of ribosomal RNA. Similarities between small subunit ribosomal RNA sequences are used to infer the evolutionary history of eukaryotic microorganisms and to design molecular probes for studies in marine ecology.

Staff

Sogin, Mitchell L., Director and Senior Scientist
Gunderson, John, Research Associate
Hinkle, Greg, Postdoctoral Fellow
Leipe, Detlev, Postdoctoral Fellow
Morrison, Hillary, Research Associate/Postdoctoral fellow

The Ecosystems Center

The Center was established in 1975 to promote research and education in ecosystems ecology. Twelve senior scientific staff and 43 research assistants and support staff study the terrestrial and aquatic ecology of a wide variety of ecosystems ranging from Brazil (carbon cycling and trace gas emissions from tropical forests and pastures) to the Alaskan Arctic (long-term studies of the response of tundra, lake, and stream biota to change) to the Harvard Forest (long-term studies of the effects of disturbance in forest ecosystems) to Massachusetts Bay (rates of denitrification). Many projects, such as those dealing with sulfur transformations in lakes and nitrogen cycling in the forest floor, investigate the movements of nutrients and make use of the Center's mass spectrometry laboratory (directed by Brian Fry) to measure the stable isotopes of carbon, nitrogen, and sulfur. The research results are applied wherever possible to questions of the successful management of the natural resources of the earth. In addition, the ecological expertise of the staff is made available to public affairs groups and government agencies who deal with such problems in acid rain, ground water contamination, and possible carbon dioxide-caused climate change.

Staff

Hobbie, John E., Co-Director
Melillo, Jerry M., Co-Director
Bahr, Michele
Castro, Mark
Chapman, Jonathan
Deegan, Linda
Donovan, Suzanne
Donniblaser, Mark
Downs, Martha
Drummey, Todd
Fry, Brian
Garrity, Robert
Geyer, Heidi
Giblin, Anne
Griffin, Elisabeth
Helfrich, John
Hopkinson, Charles
Hullar, Meredith
Jesse, Martha
Jones, David
Kicklighter, David
Laundra, James
Martin, Daniel
McGuire, A. David
Milošký, Michle
Murray, Georgia
Nadelhoffer, Knute
Newkirk, Kathleen
O'Hara, Patricia
Padjen, Daniel
Pallant, Julie
Parmentier, Nancy
Peterson, Bruce
Rastetter, Edward
Redmond, Leslie
Regan, Kathleen
Rogel, Deborah
Ricca, Andrea
Scanlon, Deborah
Schwamb, Carol
Shaver, Gaus
Tholke, Kristin
Tucker, Jane

Postdoctorals

Johnson, Loretta
McKane, Robert
Neill, Christopher
Peterjohn, William

Visiting Scholars

Normann, Bosse, University of Umeå, Sweden

Consultants

Bowles, Francis
Bowles, Margaret
Schwarzman, Elisabeth

Laboratory for Marine Animal Health

The laboratory provides diagnostic, consultative research, and educational services to the institutions and scientists of the Woods Hole community concerned with marine animal health. Diseases of wild, captive, and cultured animals are investigated.

Staff

Abt, Donald A., Director and The Robert R. Marshak Term Professor of Aquatic Animal Medicine and Pathology, School of Veterinary Medicine, University of Pennsylvania
Bullis, Robert A., Research Assistant Professor of Microbiology, University of Pennsylvania
Lawrence, Wade B., Research Assistant Professor of Pathology, University of Pennsylvania
Leibovitz, Louis, Director Emeritus
McCafferty, Michelle, Histology Technician, University of Pennsylvania
Moniz, Priscilla C., Secretary
Smolowitz, Roxanna M., Research Associate in Pathology, University of Pennsylvania
Wadman, Elizabeth A., Microbiology Technician, University of Pennsylvania

Laboratory of Aquatic Biomedicine

This laboratory investigates leukemias of soft shell clams. Monoclonal antibodies developed by this laboratory and techniques in molecular biology are used to investigate the differences between normal and leukemic cells and their ontogeny. The impact of pollutants on leukemogenesis is currently being studied with an emphasis on regional superfund sites.

Staff

Reinsch, Carol L., Investigator, MBL, and Chairperson Department of Comparative Medicine, Tufts University School of Veterinary Medicine
Leland, Christian, Laboratory Assistant

Laboratory of Cell Biochemistry

This laboratory uses cell and molecular biological methods to study the regulation of gene expression in marine fish. Current emphasis is on gene products involved in hepatic heme biosynthesis and
utilization. These processes are affected by hormonal, nutritional, and pharmacological agents as well as xenobiotics, and carcinogens. In addition, free heme is a feedback regulator of its biosynthesis. The principal site at which these agents act to control the rate of heme production is 5-aminolevulinate synthase (ALS), the first enzyme of the pathway. However, it has not been possible to define the mechanisms that lead to enzyme induction or repression. Marine fish are attractive for that purpose because they have similar regulatory features for heme biosynthesis but lack some of the hepatic processes that have confounded studies in mammals. Evidence to date strongly indicates that expression of fish ALS is regulated at a post-transcriptional stage. Cloned cDNAs have been isolated for both the housekeeping and erythroid forms of ALS, and the sequence of the type cDNA encodes an iron regulatory element that controls the rate of mRNA translation. It is expected that these studies of the fish ALS system will give new insights into the control of heme biosynthesis in vertebrate organisms, including man. Primary cultures of fish hepatocytes provide the experimental material for this work, and an additional interest of this laboratory is in establishing these cell cultures as a nonmammalian model for biomedical research.

**Staff**

Cornell, Neal W., Senior Scientist
Ablock, Rigele, Research Assistant
Bruning, Grace, Research Assistant
Stukey, Jetley, Laboratory Assistant

**Visiting Scientist**

Fox, T. O., Harvard Medical School

**Laboratory of Developmental Genetics**

This research group studies the early gene control of cellular differentiation pathways (cell lineage determination) in the embryos of tunicates and other marine invertebrate species.

**Staff**

Whittaker, J. Richard, Senior Scientist
Crowther, Robert, Research Associate
Loeschel, Jane L., Research Assistant
Meechel, Thomas H., Assistant Scientist

**Visiting Investigators**

Collier, J. R., Brooklyn College
Lee, James J., Columbia University, College of Physicians & Surgeons

**Laboratory of Judith P. Grassle**

Studies on the population genetics and ecology of marine invertebrates living in disturbed environments, especially of sibling species in the genus *Cupitella* (Polycheata). Flume studies on bivalve and polychaete larval habitat selection.

**Staff**

Grassle, Judith P., Senior Scientist
Mills, Susan W., Research Assistant

**Laboratory of Harlyn O. Halvorson**

Over the past year, we have isolated a large number of actinomycetes and sporeformers from various marine environments like deep sea cores and sediments. Our intention is to characterize these bacteria at the molecular level and to look for biologically active components. Protocols based on DNA fingerprinting and quantitative hybridizations have been developed to differentiate marine sporeformers from one another, as well as from terrestrial sporeformers. The hybridization data has shown that the bacterial isolates are not closely related to one another.

Numerical taxonomic methods are also being used to cluster the various isolates. The physiologically interesting sporeformers will also be characterized by physical mapping using rare-cutting restriction endonucleases.

**Staff**

Halvorson, Harlyn O., Principal Investigator
Chikarmane, Hemant, Assistant Scientist
VanLooy, Lori, Research Assistant

**Visiting Investigators**

Anderson, Porter, University of Rochester
Keynan, Alex, Hebrew University, Jerusalem, Israel
Kornberg, Hans, Christ's College, Cambridge, UK
Vincent, Walter, University of Delaware
Yashpche, Jacob, Hebrew University, Jerusalem, Israel
Wainwright, Norman

**Laboratory of Shinya Inoué**

Study of the molecular mechanism and control of mitosis, cell division, cell motility, and cell morphogenesis, with emphasis on biophysical studies made directly on single living cells, especially developing eggs in marine invertebrates. Development of biophysical instrumentation and methodology, such as polarization optical and video microscopy and digital image processing techniques, and exploration of their underlying theory are an integral part of the laboratory's effort.

**Staff**

Inoué, Shinya, Distinguished Scientist
Knudson, Robert, Instrument Development Engineer
Oldenbourg, Rudolf, Assistant Scientist
Stemmer, Andreas, Visiting Assistant Scientist
Stukey, Jetly, Research Assistant
Woodward, Bertha M., Laboratory Manager

**Visiting Investigators**

Bajer, Andrew, University of Oregon
Burgos, Mario, Universidad Nacional de Cuyo—Conicet
Febvre, Colette, Station Zoologique, Villefranche-sur-Mer, France
Febvre, Jean, Station Zoologique, Villefranche-sur-Mer, France
Sardet, Christian, Station Zoologique, Villefranche-sur-Mer, France

**Laboratory of Alan M. Kuzirian**

Research in this laboratory explores the functional morphology and ultrastructure of various organ systems present in opisthobranch mollusks. The program includes mariculture of the nudibranch, *Hermisenda crassicornis*, with emphasis on developing reliable culture methods for rearing and maintaining this animal as a research resource. Studies include optimization of adult and larval nutrition, control of facultative pathogens and disease, development of morphologic criteria for staging larvae and juveniles, and
metamorphic induction. Morphologic studies stress the ontogeny of neural and sensory structures, and neurochemicals associated with the photic and vestibular systems that have been used as models systems in learning and memory studies.

Concurrent with these studies is the development of a new technique to obtain and reconstruct serial block face images (SBFI) of epoxy-embedded or cryoprepared tissues sectioned or freeze-fractured/ freeze-etched inside an SEM by an in situ miniature ultramicrotome.

Additional collaborative research includes histochemical investigations on strontium's role in initiating calcification in molluscan embryos (shell and statoliths), as well as immunocytochemical labeling of cell-surface and secretory product antigens using monoclonal and polyclonal antibodies on Hermisenda sensory and neurosecretory neurons in cell culture. Systematic and taxonomic studies of nudibranch mollusks are also of interest.

Staff
Kuzirian, Alan M., Associate Scientist
Tamse, Catherine T., Research Assistant

Laboratory of Andrew L. Miller and Lionel F. Jaffe

This laboratory investigates the role played by calcium ions in a wide range of fundamental cell processes; in developing eggs, in differentiated tissues, and in cell extracts. This is possible through the use of aequorin, a bioluminescent protein complex. Aequorin can either be microinjected into cells or transgenically expressed without disturbing function or development. The pattern of luminescence that is emitted by an aequorin-loaded cell reveals changing patterns and levels of free calcium within the cell (or its progeny). Photons are collected and correlated with dynamic cellular events by an imaging system developed in our laboratory. This technique has some substantial advantages over other methods of imaging intracellular calcium and as a result supports an extensive collaborative research effort. The laboratory is currently studying cytokinesis in frog and fish eggs; cell cycle control in sea urchin and surf clam eggs; polarity expression in frog eggs; tip growth in pollen tubes; injury and degeneration in neurons; mechanisms of fertilization in sea urchins; differentiation in slime molds; and calcium release in cell extracts from frog eggs. The laboratory is supported by the NSF to both pursue biological questions and to develop the aequorin-based imaging technique.

Staff
Miller, Andrew L., Assistant Scientist
Karplus, Eric, Design Engineer
Jaffe, Lionel F., Senior Scientist

Visiting Investigators
Alexander, Steve, Wadsworth Center
Bearer, Elane, Brown University
Browne, Carole, Wake Forest University
Felle, Hubert, University of Giessen
Fishman, Harvey M., University of Texas Medical Branch
Fluck, Richard A., Franklin and Marshall College
Hepler, Peter, University of Massachusetts
Krause, Todd L., University of Texas
Metzuals, Jams, University of Ottawa, Canada
Sardet, Christian, Ville-Franche-sur-Mer, France
Swenson, Katherine, Duke University Medical School
Woodruff, Richard, Westchester University

Laboratory of Rudolf Oldenbourg

We study physical optics relevant to microscopic imaging and develop advanced instrumentation in light microscopy for the study of structural dynamics in cells and cell components. The current focus of this new laboratory is the development of a novel polarized light microscope that combines polarization optics with new electro-optical components, video, and digital image processing for a fast analysis of specimen anisotropies over the entire viewing field at the highest resolution of the light microscope. Biological mechanisms to be explored with this new instrument range from the emergence and functional role of filamentous structures in living cells, to the generation of ordered domains in liquid crystals and polymer solutions. The laboratory currently investigates the fine structure of myofilaments and the mechno-elastic properties of virus liquid crystals.

Staff
Oldenbourg, Rudolf, Associate Scientist

Laboratory of Robert E. Palazzo

This laboratory studies the biochemical regulation of cellular events during meiosis and mitosis. An integral part of the research effort is the design of reconstitution systems that faithfully execute cell cycle-dependent events under defined conditions. Current cell biological, immunochemical, biochemical, and microscopic methodologies are employed. Using marine eggs as a material source, assays have been developed that allow the study of germlinal vesicle breakdown, asters formation, and reactivation of isolated mitotic apparatus in vitro. Current focus of the laboratory is on the identification of cell cycle-dependent regulatory events with major emphasis on protein phosphorylation and other post-translational modifications. The ultimate goal is the identification of key enzymes and target substrates that are involved in the regulation of cell division and are highly conserved during evolution.

Staff
Palazzo, Robert E., Associate Scientist
Dawson, Tim, Undergraduate Research Assistant
Peng, Gang, Postdoctoral Associate
Przybyla, Beata, Graduate Research Assistant
Sun, Yong, Postdoctoral Associate
Vogel, Jacalyn, Research Assistant

Visiting Investigators
Eckberg, William, R., Howard University
Heins, Susanne, Maurice E. Muller Institute, Basel, Switzerland
Rieder, Conly, L., Wadsworth Center for Labs and Research

Laboratory of Nancy Rafferty

This laboratory investigates the role of the lens cytoskeleton and its associated proteins in maintenance of lens shape, in lens accommodation and development of cataract when the cytoskeleton is disrupted. Studies include an assessment of the role of cytosolic free calcium on homeostasis of the lens cytoskeleton, the localization of various cytoskeletal proteins in lens epithelium, and determination of the relative amounts of soluble actin to filamentous actin in lens cells during aging. Most of these studies employ a fish model using primary cultures of lens epithelium and electron and immunofluorescence microscopy.
Staff
Rafferty, Nancy S., Scientist, Northwestern University
Rafferty, Koen A., Research Associate

Laboratory of Monica Riley

Research in this laboratory focuses on the molecular evolution and gene expression in the bacterium Escherichia coli. In a collaborative effort, a database containing information on the intermediary metabolism and biochemical pathways of E. coli is being developed. When completed, this database is expected to contain information on each metabolic reaction, the enzyme, the reactants, products, cofactors, activators, inhibitors, kinetics, equilibrium constants, binding constants, etc.

Related research is on the evolution of the E. coli DNA and organization of the genes in the chromosome. Comparative nucleotide and amino acid sequence data provide information on the evolutionary relationships of E. coli genes to other genes in the E. coli genome and to homologous genes in related bacteria.

Staff
Riley, Monica, Senior Scientist
Farquhar, Karyn, Research Assistant

Laboratory of Sensory Physiology

Since 1973, the laboratory has conducted research on various aspects of vision. Current studies focus on photoreceptor cells, on their light-absorbing pigments, and on their biochemical reactions initiated by light stimulation. Microspectrophotometric and biochemical techniques are used to study the receptors of both vertebrates (amphibia, fish, and mammals) and invertebrates (horseshoe crab and squid).

Staff
Harosi, Ferenc, Director, Associate Scientist, MBL, and Boston University School of Medicine
Szuts, Etc, Associate Scientist, MBL, and Boston University School of Medicine

Visiting investigators
Erickson, Martha, Brandeis University
Evans, Barbara L., University of Oregon, Eugene
Greenblatt, Daniel, Brandeis University
Hawryshyn, Craig W., University of Victoria, B. C., Canada
Kleinschmidt, Jochen, NYU Medical Center
Singarajah, Kandar, V., Federal University of Paraiba, Brazil

Laboratory of Neuroendocrinology

This laboratory studies the molecular and cellular bases of two neural programs that regulate different important behaviors in the mollusk Aplysia. Research is conducted on the mechanisms of the neuronal circadian oscillators located in the eyes. These circadian oscillators drive the circadian activity rhythm of the animal, which is concerned with the daily timing of food gathering and of prolonged rest. Additional research is conducted on a group of neuroendocrine cells that produce a peptide, "egg-laying hormone," that initiates egg laying and associated behaviors. The laboratory is interested in how the three-dimensional shape of this peptide hormone allows a highly specific interaction with its receptor and the intracellular processes that are triggered by it. In another project, the laboratory has discovered and is continuing research on a novel second messenger enzyme, an NADase, in the oocytes of A. californica, that generates cyclic ADPR, a Ca2+-mobilizing product.

Staff
Strumwasser, Felix, Director
Cox, Rachel L., Senior Research Assistant
Elder, Peggy, Laboratory Assistant
Groelle, Holly, Postdoctoral Fellow
Heisermann, Gary, Postdoctoral Fellow
Hellmich, Mark, Postdoctoral Fellow
Lewis, Karen, Laboratory Assistant
Vogel, Jackie, Research Assistant

Laboratory of Osamu Shimomura

Biochemical studies of the various types of bioluminescent systems. Preparation of the improved forms of aequorin for measuring intracellular free calcium.

Staff
Shimomura, Osamu, Senior Scientist, MBL, and Boston University School of Medicine
Shimomura, Akemi, Research Assistant
Nakamura, Hideshi, Harvard University

Laboratory of Raquel Sussman

We investigate the molecular mechanism of DNA damage-inducible functions in E. coli. Present studies deal with novel genes that affect radiation-induced mutagenesis and analysis of RecA functions.

Staff
Sussman, Raquel, Associate Scientist

National Vibrating Probe Facility

The vibrating probe is an instrument that enables an investigator to explore, map, measure, and analyze the patterns of natural ionic currents through living cells, embryos, and even adult organisms. This is done—non-invasively—by measuring the very minute electrical voltage gradients or specific ion gradients generated by those currents within the external medium. Among the current collaborative projects are studies of currents through epithelial cells, Aplysia bag cells, cockroach nervous system, injured squid axons, growing pollen tubes, root hairs, and fungi. Investigators are welcome to conduct exploratory studies on their own systems during the summer months. Extensive investigations may be carried out at other times throughout the year. This facility is supported by the Biomedical Research Technology Program, National Center for Research Resources, NIH. Applications for research time should be made to P. Smith.

Staff
Jaffe, Lionel, Senior Scientist and Facility Co-Director
McLaughlin, Jane, Research Assistant
Sanger, Richard, Senior Electronics Technician
Shipley, Alan, Research Associate
Smith, Peter J. S., Co-Director
Visiting investigators

Allen, Nina, Wake Forest University
Backie, Iain, Robert Gordon University, Scotland
Bittner, George, University of Texas, Galveston
Cox, Daniel, Wake Forest University
Demarest, Jeff, University of Arkansas
Fay, Frederic, University of Massachusetts Medical School
Feijo, Jose, University of Lisbon, Portugal
Felle, Hubert, University of Gießen, Germany
Fishman, Harvey, University of Texas, Galveston
Ford, Timothy, Harvard University
Giblin, Anne, Ecosystems, MBL
Hill, Susan, Michigan State University
Hoch, Harvey, Cornell University
Karplus, Eric, MBL

Krause, Todd, University of Texas, Galveston
Leech, Colin, Howard Hughes Institute, Massachusetts General Hospital
Mitton, Bryce, Massachusetts Institute of Technology
Morgan, Jim, University of Arkansas
Nagel, Wolfram, University of Munich, Germany
Pierson, Elisabeth, University of Siena, Italy
Wright, Jonathan, McMaster University, Ontario, Canada

Other Year-Round Investigators and Staff

Stephens, Raymond E., Principal Investigator
Szent-Györgyi, Gwen, Research Assistant
Tilney, Lewis G., University of Pennsylvania
Tilney, Molly S., University of Pennsylvania
Honors

Friday Evening Lectures

Carl Woese, University of Illinois, 26 June “The Revolution in Evolution: Microbiology Comes Into Its Own”
Eric Lander, Whitehead Institute for Biomedical Research, Massachusetts Institute of Technology, 3 July “Dissecting Human Heredity”
Mary Woolley, Research!America, 10 July, “The Problem isn’t Science: . . . The Problem is Silence: When the People Lead, the Leaders Will Follow . . .”
Michael Bennett, Albert Einstein College of Medicine, 24 July “From Electric Fishes to Electric Synapses: Gap Junctions Into the Modern Era”
William Catterall, University of Washington, 7 August (Monsanto Lecture) “From Ionic Currents to Molecules: The Molecular Basis of Electrical Excitability in the Brain”
Peter Narins, University of California, Los Angeles, 14 August (Lang Lecture) “Biospectral Adaptations for Acoustic and Seismic Communication in Amphibians: Lessons From the Forest”
Carolyn Cohen, Brandeis University, 21 August “New Twists on an Old Protein Fold: The α-helical Coiled Coil”
Richard Rowe, The Faxon Company, 28 August “The Evolution of Scholarly Communications”

Fellowships

Robert Day Allen Fellowship
Sergei A. Kuznetsov, Technische Universität, Germany, and Moscow University, Russia

Frederik B. Bang Fellowship Fund
Robert J. Lauzon, Albany Medical College

Bakalar Fellowship
Fatima Gyoeva, Russian Academy of Sciences, Institute of Protein Research

Frank A. Brown Memorial Readership
Gary E. Weir, Naval Historical Center, Washington, DC

Bernard Davis Fellowship
David J. Patterson, University of Sydney, Australia

Frank R. Lillie Fellowship
Peter Doroshenko, Duke University Medical Center

William Randolph Hearst Fellowship
Eleanor Fusco, Massachusetts Institute of Technology

Stephen W. Kuffler Fellowship
Arturo Hernandez-Cruz, Universidad Nacional Atonoma de Mexico, Instituto de Fisiología Celular, Mexico

Jacques Loeb Fellowship
Christine R. Rose, University of Kaiserslautern, Germany

Nikon, Inc. Fellowship
Andreas Stemmer, MRC Laboratory of Molecular Biology, UK
H. Burr Steinbach Memorial Fellowship
Ilya Bezprozvanny, University of Connecticut Health Center

M. G. F. Fuortes Fellowship
Arturo Hernandez-Cruz, Instituto de Fisiologia Celular, UNAM, Mexico

MBL Summer Fellows
Roger Buchanan, NINDS, National Institutes of Health
Peter Doroschenko, Duke University Medical Center
Fedor Severin, Institute of Protein Research, Russia
Joelle Tanguy, Northwestern University
Amy V. Trejo, Northwestern University
Patricia Wadsworth, University of Massachusetts, Amherst
William Wonderlin, West Virginia University

Herbert W. Rand Fellowship
Alexander S. Sprin, Institute of Protein Research, Russia

Science Writing Fellowships
Stephen Braun, Freelance
Robert Cooke, Newsday
Elizabeth Culotta, Freelance
Heather Dewar, The Miami Herald
Donald Frederick, National Geographic Society News Service
David Graham, San Diego Union-Tribune
Jeff Hecht, New Scientist
Rebecca Perl, Atlanta Journal Constitution
John Scheszer, KPLR-TV, St. Louis, MO
Cindy Schreuder, Chicago Tribune
Joanne Schrotf, U.S. News & World Report

Steps Toward Independence—MBL Summer Fellowships
Ilya Bezprozvanny, University of Connecticut Health Center
Roger Buchanan, NINDS, National Institutes of Health
Fatima Gyoeva, Institute of Protein Research, Russia
Arturo Hernandez-Cruz, Instituto de Fisiologia Celular, UNAM, Mexico
Serge Kuznetsov, Technische University, Germany
Patricia Wadsworth, University of Massachusetts, Amherst

Scholarships

Alberto Monroy Fellow
Paola Loguercio Polosa, Universita di Bari, Italy

Bernard Davis Scholarship
Maria Ganeva, Sofia University, Bulgaria
Ariel Kusmaro, Tel Aviv University, Israel
Edouard Mamb, Center ORSTOM/DGRST, Congo
Margarita M. Miroshnichenko, Moscow State University, Russia

Biology Club of CUNY
Stefan Wurden, Universitat Konstanz, Germany

Father Arsenius Boyer Scholarship Fund
Atsushi Miyawaki, University of Tokyo, Japan

C. Lalor Burdick Scholarship
Beatrice Casasnovas, University of Bordeaux, France

Gary N. Calkins Memorial Scholarship
Lesley J. Narburgh, St. George's Hospital Medical School, UK

Frances S. Claff Memorial Scholarship
Atsushi Miyawaki, University of Tokyo, Japan

Edwin Grant Conklin Memorial Scholarship
Lisa C. Foa, Deakin University, Australia

Lucretia Crocker Endowment Fund
Isabelle M. Desjeux, Edinburgh University, UK
Marie-Anne Felix, Institut J. Monod, France
Anna M. Myat, Imperial Cancer Research Fund, UK

William F. and Irene Diller Scholarship Fund
Stefan Wurden, Universitat Konstanz, Germany

Caswell Grave Fellowship
Beatrice Casasnovas, University of Bordeaux, France
Peter S. Dayan, CNL, Salk Institute

Aline D. Gross Scholarship
Cindy A. Wilson, University of California, Irvine

Merkel H. Jacobs Scholarship
Lisa C. Foa, Deakin University, Australia
Christine R. Rose, University of Kaiserslautern, Germany

Arthur Klorfein Fund Scholarship
Pavel R. Andjus, University of Belgrade, Yugoslavia
Atsushi Miyawaki, University of Tokyo, Japan
Enrique Saldana, University of Salamanca, Spain
Camilla Tornoe, Pembroke College, UK
Elisabeth C. Walcott, University of California, Irvine

S. O. Mast Founders Scholarship
Lisa A. Kelly, University of Ottawa, Canada

Michigan State Scholarship Center for Microbial Ecology Fellow
Jennifer L. Byrnes, Harvard University

Faith Miller Scholarship
Sergei Kuznetsov, Technische University, Germany, and Moscow University, Russia
James S. Mountain Memorial Fund Scholarship
Joseph E. Kelleher, Johns Hopkins University School of Medicine
Annick H. Le Gall, Cornell University Medical College
Valerie A. Pierce, University of Chicago
Ben B. Whitlock, Ohio State University
Lin Wu, Scripps Research Institute

Planetary Biology Internship
Dirk Schuler, Max-Planck-Institut, Germany
Angelica P. Seitz, University of Connecticut, Storrs

William Townsend Porter Foundation Fellowship
Darien L. Cohen, Dartmouth College
Nathaniel Dudley, Hampshire College
Juan C. Jorge-Rivera, Brandeis University
Errol R. Kolen, University of Missouri, Columbia
Edward E. Leonard, University of Pittsburgh School of Medicine

Herbert W. Rand Scholarship
Stefan Wurden, Universitat Konstanz, Germany

Society for Developmental Biology Scholarship
Maureen A. Gannon, Cornell University Medical College
John C. Matise, Duke University

Society for General Physiologists Scholarships
Marie-Anne Felix, Institut J. Monod, France
Marla B. Feller, AT&T Bell Laboratories
Pavle Andjus, Institute of General & Physical Chemistry, Serbia, Yugoslavia
Matthew Frerking, University of California, Davis

Marjorie W. Stetten Fund
Lisa A. Kelly, University of Ottawa, Canada

Surdna Foundation Scholarship
Isabelle M. Desjeux, Edinburgh University, UK
Christine R. Rose, University of Kaiserslautern, Germany

William Morton Wheeler Family Founders' Scholarship
Beatrice Casasnovas, University of Bordeaux, France

American Society for Cell Biology
Carmen R. Domingo, University of California, Berkeley
Darien L. Cohen, Dartmouth College
Errol R. Kolen, University of Missouri, Columbia
Adrian C. Lawrence, Albert Einstein College of Medicine
Edward E. Leonard, University of Pittsburgh School of Medicine
Zoe Y. Petway, University of California, Irvine

American Psychological Association
Maribel Feliciano, University of Connecticut

Awards

Lewis Thomas Award
Richard Harris, National Public Radio
Larry Thompson, Freelance
Board of Trustees and Committees

Corporation Officers and Trustees

Ex officio

Honorary Chairman of the Board of Trustees, Denis M. Robinson, Key Biscayne, FL
Chairman of the Board of Trustees, Sheldon J. Segal, The Population Council, New York, NY
Vice Chairman of the Board of Trustees, Robert E. Mainer, The Boston Company, Boston, MA
President of the Corporation, James D. Ebert, Chesapeake Bay Institute, Baltimore, MD
Director of the Corporation, Harlyn O. Halvorson, Marine Biological Laboratory, Woods Hole, MA
Director and Chief Executive Officer, John E. Burris, Marine Biological Laboratory, Woods Hole, MA
Treasurer, Robert D. Manz, Helmer & Associates, Waltham, MA
Clerk of the Corporation, Kathleen Danlap, Tufts University School of Medicine, Boston, MA

Class of 1996

Eloise E. Clark, Bowling Green State University, Bowling Green, OH
Norman Bernstein, Diane and Norman Bernstein Foundation, Washington, DC
Martha W. Cox, Nantucket, MA
John E. Dowling, Harvard University, Boston, MA
Gerald Fischbach, Harvard University, Boston, MA
John G. Hildebrand, University of Arizona, Tucson, AR
Shinya Inoué, Marine Biological Laboratory, Woods Hole, MA
Neil Jacobs, Hale & Dorr, Boston, MA
Gerald Weisssmann, New York University Medical Center, New York, NY

Class of 1995

Clay M. Armstrong, University of Pennsylvania Medical School, Philadelphia, PA
Dieter Blument had, Carl Zeiss, Inc., Thornwood, NY
Dick Grace, The Brain Center, New Scubia, MA
Eric H. Davidson, California Institute of Technology, Pasadena, CA
Judith P. Grasse, Institute of Marine & Coastal Sciences, Rutgers University, New Brunswick, NJ
Mary J. Greer, Cambridge, MA
Franklin M. Loew, Tufts University School of Veterinary Medicine, North Grafton, MA
Robert B. Silver, Cornell University, Ithaca, NY
J. Philip Trinkaus, Yale University, New Haven, CT

Class of 1994

Frederick Bay, The Bay Foundation, New York, NY
Mary-Ellen Cunningham, Grose Pointe Farms, MI
Robert D. Goldman, Northwestern University Medical School, Chicago, IL
Rodolfo R. Limas, New York University Medical Center, New York, NY
Robert W. Pierce, Boca Grande, FL
Thomas D. Pollard, Johns Hopkins University, Baltimore, MD
Irving W. Rabb, University Place at Harvard Square, Cambridge, MA

Joan V. Ruderman, Harvard University School of Medicine, Boston, MA
Joseph Sanger, University of Pennsylvania School of Medicine, Philadelphia, PA
Ann E. Stuart, University of North Carolina, Chapel Hill, NC

Class of 1993

Garland E. Allen, Washington University, St. Louis, MO
Jelle Atema, Marine Biological Laboratory, Woods Hole, MA
William L. Brown, Weston, MA
Alexander W. Clowes, University of Washington School of Medicine, Seattle, WA
Barbara E. Ehrlich, University of Connecticut, Farmington, CT
Richard E. Kendall, East Falmouth, MA
Edward A. Kravitz, Harvard Medical School, Boston, MA
Jerry M. Melillo, Marine Biological Laboratory, Woods Hole, MA
Henry H. Schmidle, Neurosurgeon, Marion, MA
Roger D. Sloboda, Dartmouth College, Hanover, NH

Emeriti

Edward A. Adelberg, Yale University, New Haven, CT
John B. Buck, Sykesville, MD
Seymour S. Cohen, Woods Hole, MA
Arthur L. Colwin, Key Biscayne, FL
Laura Hunter Colwin, Key Biscayne, FL
D. Eugene Copeland, Marine Biological Laboratory, Woods Hole, MA
Sears Crowell, Indiana University, Bloomington, IN
Alexander T. Daingnault, Boston, MA
William T. Golden, New York, NY
Teru Hayashi, Woods Hole, MA
Ruth Hubbard, Cambridge, MA
Lewis Klenholz, Reed College, Portland, OR
Maurice E. Krahl, Tucson, AZ
Charles B. Metz, Miami, FL
Keith R. Porter, University of Pennsylvania, Philadelphia, PA
C. Ladd Prosser, University of Illinois, Urbana, IL
S. Meryl Rose, Waquoit, MA
W. D. Russell-Hunter, Syracuse University, Syracuse, NY
John W. Saunders, Jr., Waquoit, MA
Mary Sears, Woods Hole, MA
David Shepro, Boston University, Boston, MA
Homer P. Smith, Woods Hole, MA
D. Thomas Trigg, Wellesley, MA
Walter S. Vincent, Woods Hole, MA
George Wald, Cambridge, MA

Executive Committee of the Board of Trustees

Sheldon J. Segal, Chairman
Frederick Bay, 1994
John E. Burris* (effective 9/1/92)
Mary-Ellen Cunningham, 1994
James D. Ebert*
Ray L. Epstein*
Robert D. Goldman, 1994
Harlyn O. Halvorson* (through 8/31/92)
Robert E. Mainer, Vice Chairman
Robert Manz*
Jerry M. Melillo, 1993
Joseph W. Sanger, 1994
Roger D. Sloboda, 1993

* ex officio
1 to August 31, 1992
2 from September 1, 1992
## Trustees and Committees

### Trustee Committees

#### Audit
- Robert E. Mainer, Chairman
- Ray L. Epstein*
- Pamela Ghetti*
- Robert D. Manz*
- Jean V. Ruderman
- Gaius R. Seaver
- Andrew Szent-Gyorgyi
- D. Thomas Trigg
- Stanley W. Watson

#### Compensation
- Sheldon J. Segal, Chairman
- Robert E. Mainer
- Robert D. Manz

#### Development
- Frederick Baj
- Robert B. Barlow, Jr.
- John E. Burris* (effective 9/1/92)
- James D. Ebert*
- Harlyn O. Halvorson* (through 8/31/92)
- Rodolfo R. Limas
- Luigi Mastroppanni
- Robert Pierce
- Sheldon J. Segal*

#### Investment
- William L. Brown, Chairman
- Pamela Ghetti*
- William T. Golden
- Maurice Lazarus
- Werner R. Lowenstein
- Robert D. Manz
- Irving W. Rabb
- John Speer*
- W. Nicholas Trondike
- D. Thomas Trigg

#### Long-Range Planning
- Robert D. Manz, Chairman
- Dieter Blennemann
- Ray Epstein*
- Rodolfo R. Limas
- Robert Mainer
- John Speer*
- Andrew Szent-Gyorgyi

### Standing Committees

#### Buildings & Grounds
- Kenyon J. Tweedell, Chairman
- Barbara C. Boyer
- Alfred A. Chaet
- Lawrence B. Cohen
- Richard D. Cutler*
- William R. Eckberg
- Alan Fein
- Ferenc Harosi
- Donald B. Lehy*
- Thomas Meedel
- Evelyn Spiegel

#### Fellowships
- Thoru Pederson, Chairman
- Martha Constantine-Paton
- Ray L. Epstein*
- Leslie D. Garrick*
- Anne E. Giblin
- George M. Langford
- José Lemos
- Eduardo R. Macagno
- Carol L. Reinsch
- J. Richard Whittaker

#### Housing, Food Service, and Child Care
- Thomas S. Reese, Chairman
- Susan R. Barry
- Milton Charlton
- Richard Cutler*
- Robert Michael Gould
- Stephen H. Hightstein
- LouAnn King*
- Darrell R. Stokes

#### Institutional Animal Care and Use
- Leslie D. Garrick, Chairman
- Robert A. Bullis
- Alfred B. Chaet
- Ray L. Epstein
- Alan M. Kazarian
- Andrew Mattox

#### Instruction
- Roger D. Sloboda, Chairman
- George Augustine, Jr.
- Ray L. Epstein*
- Rachel D. Fink
- Leslie D. Garrick*
- Leah T. Haimo
- Susan Hill
- Ronald R. Hoy
- Hans Laufer
- Joan V. Ruderman
- Robert B. Silver
- Raymond Stephens
- John B. Waterbury

#### Library Joint Management
- John E. Burris, MBL
- Robert Gagossian, WHOI
- Larry Ladd, WHOI
- John Speer, MBL*
- David Stonehill, MBL/WHOI

#### Library Joint Advisory
- David Shepro, Chairman, MBL
- John E. Hobbie, MBL
- Gerald Weissmann, MBL
- Henry Dick, WHOI
- Werner Deuser, WHOI
- Page Valentine, USGS
- Kevin Friedland, NMFS

#### Marine Resources
- Robert D. Goldman, Chairman
- Donald A. Abt
- William D. Cohen
- Richard Cutler*
- Donald B. Lehy*
- Toshio Narahashi
- George D. Pappas
- Roger D. Sloboda
- Melvin Spiegel
- Antoinette Steinacher

#### Radiation Safety
- Etc. Z. Szutz, Chairman
- David W. Borst
- Richard L. Chappell
- Sherwin J. Cooperstein
- Louis M. Kerr
- Andrew Mattox*
- Robert Rakowski
- Walter S. Vincent

#### Research Services
- Peter B. Armstrong, Chairman
- Neal W. Cornell
- Richard Cutler*
- Barbara E. Ehrlich
- Kenneth H. Foreman
- Joseph Ilan
- Ehud Kaplan
- Samuel S. Koide
- Aimlee D. Laderman
- Jack Levin
- Andrew Mattox*
- Robert D. Palazzo
- James P. Quigley
- Peter J. S. Smith
- Paul A. Steudler
- Mark L. Tykocinski

* ex officio
Research Space
Joseph W. Sanger, Chairman
Paul J. De Weer
Ray L. Epstein*
Leslie D. Garrick*
David Landowne
Hans Laufer
Eduardo R. Macagno

* ex officio

Jerry M. Melillo
Joan V. Ruderman
Robert B. Silver
Steven N. Treistman
Ivan Vahlia
Richard Vallee

Safety
John E. Hobbe, Chairman
Lee Bourgoin

Richard Cutler*
Edward Enos*
Susan Goux
Louis M. Kerr
Alan Kuzirian
Donald B. Leby*
Andrew Mattox*
Paul A. Staudler
Laboratory Support Staff*

Biological Bulletin
Clapp, Pamela L., Managing Editor
McCaffrey, Karen
Ready, Beth
Showalter, Christine M.

Controller's Office
Speer, John W., Controller

Accounting Services
Afonso, Janis E.
Binda, Ellen F.
Campbell, Ruth B.
Davis, Doris C.
Ghettu, Pamela M.
Gilmore, Mary F.
Hobbs, Roger W., Jr.
Poravas, Maria

Client Room
Miller, Lisa A.
Schorer, Timothy M.
Mancevice, Denise M.

Purchasing
Hall, Lionel E., Jr.
Mancevice, Denise M.
Schorer, Timothy M.

Director's Office
Burris, John E., Director and CEO
Halvorson, Harlyn O., Director
Epstein, Ray L., Associate Director
Barrhus, I. Elaine
Catania, Dida

External Affairs
Carotenuto, Frank C., Director
Aspinwall, Duncan P.
Berthel, Dorothy
Faxon, Wendy P.
Lessard, Kelley J.

*Including persons who joined or left the staff during 1992.

Associates Program
Armstrong, Ellen P., Liaison
Diforio, Anne E.
Price, F. Carol
Scanlon, Deborah

Communications Office
Clapp, Pamela L., Director
Kaye-Peterson, Amy
Liles, George
Ready, Beth

Gray Museum
Backus, Richard H., Curator
Armstrong, Ellen P.
Montiero, Eva

Housing
King, Lou Ann D., Conference Center and Housing Manager
Johnson, Frances N.

Telephone Office
Baker, Ida M.
Geggatt, Agnes L.
Ridley, Alberta W.

Human Resources
Goux, Susan P., Manager
Donovan, Marcia H.

MBL/WHOI Library
Stonehill, David L., Director
MLB/WHOI Library Center
Ashmore, Judith A.
Costa, Marguerite E.
Mirra, Anthony J.
Monahan, A. Jean
Nelson, Heidi
Nickerson, Ruth L.
Pratson, Patricia G.
deVeer, Joseph M.

Copy Service Center
Mountford, Rebecca J., Supervisor
Jackson, Jacquelyn F.
Mancini, Mary
Ridley, Sheree

Information Systems Division
Norton, Catherine N., Director
Hamre, Lynne
Kogelnik, Andreas
Remsen, David
Space, David B.
Tollios, Constantine D.

Safety Services
Mattox, Andrew H., Safety Officer

Apparatus
Barnes, Franklin D.
Haskins, William A.
Martin, Lowell V.
Nichols, Francis H., Jr.

Shipping and Receiving
Geggatt, Richard E.
Ilgen, Robert F.

Services, Projects, and Facilities
Cutler, Richard D., Manager
Enos, Joyce B.
Kurland, Charles I.

Building Services and Grounds
Hayes, Joseph N., Superintendent
Allen, Wayne D.
Anderson, Lewis B.
Barnes, Susan M.
Beaudoin, Helen
Boucher, Richard L.
Bowing, Dara
Collins, Paul J.
Cori, Henry P.
Dorris, John J.
Dutra, Roger S., Jr.
Gibbons, Roberto G.
Gonsalves, Walter W., Jr.  
Krajewski, Viola I.  
Lynch, Henry L.  
Mancevice, Denise M.  
Mancini, Mary  
McNamara, Noreen  
Rattacasa, Frank D.  
Sabo, Linda P.  

Plant Operations and Maintenance  
Levy, Donald B., Superintendent  
Baldie, David P.  
Blunt, Hugh F.  
Bourgois, Lee E.  
Carini, Robert J.  
Fish, David L., Jr.  
Gonsalves, Paul J.  
Gonsalves, Walter W., Jr.  
Hathaway, Peter J.  
Justason, C. Scott  
Lochhead, William M.  
Lunn, Alan G.  
McAdams, Herbert M. III  
Mills, Stephen A.  
Olve, Charles W., Jr.  
Schoepf, Claude  
deVeer, Robert L.  

Instrument Development Lab  
Knudson, Robert A.  

Machine Shop  
Sylvia, Frank E.  

Marine Resources Center  
Enos, Edward G., Jr., Superintendent  
Cipoletta, Charles D.  
Fisher, H. Thomas, Jr.  
Hanley, Janice S.  
Moniz, Priscilla C.  
Monteiro, Dana  
Sayers, Scott  
Sullivan, Daniel A.  
Tassinari, Eugene  

Photolab  
Golder, Linda M.  
Golder, Robert J.  

Sponsored Programs  
Garrick, Leslie D., Administrator  
Chrysler, Dorianne  
Dwane, Florence  
Huller, Linda  
Lynch, Kathleen F.  
Price, F. Carol  

Electron Microscopy Lab  
Kerr, Louis M.  

Temporary Employees  
Cardoza, Laure A.  
Cserny, Mary  
Elder, Peggy  
Kaufmann, Sandra J.  
Laurençon, Colette  
Lyons, Elaine D.  

Summer Support Staff  
Amon, Tyler C.  
Andrews, Ethan  
Andrews, Mark  
Balmer, Ethan  
Boyer, Cynthia  
Cadicou, C. Brian  
Cardoza, Laurie A.  
Carpenter, Mark  
Chin, Hong  
Clark, Martina  
Cloherty, Sean  
Connor, John H.  
Cutler, Laura  
DeLancey, Aydrey  
DeLancey, Elizabeth  
Diachun, Peter  
Donovan, Jason P.  

Fiset, Christopher  
Funkhouser, Margaret  
Galvao, Anne Marie  
Hainfeld, David  
Hammond, Jeramie  
Hibbitt, Karen  
Hoerner, Pauline  
Johnson, Paul C.  
Just, Thomas  
Kessler, Anne P.  
Kilpatrick, Brian  
Kociemba, David  
Kovac, Marc  
Krajewski, Chester  
Langton, Lori  
Lovett, Lynne  
Mansfield, Darren  
McCartney, Tegan  
McDonald, Brian  
McLeish, Elizabeth  
McNeill, Jeffrey  
Moorhouse, Laura  
Neeley, Marie  
Nelson, Beth  
Northern, Marc  
O’Connor, Patricia M.  
Regan, John F.  
Renssen, Andrew S.  
Rickles, Andrew  
Rickles, Jason  
Santos, Marcelina  
Shenandoah, Denise  
Shepard, Jennifer  
Sloboda, Aaron  
Smith, Kelli M.  
Swan, Elizabeth  
Torres, Sophie J.  
Towle, Jennifer  
Ulbrich, Ciona  
Varao, John  
Vernaglia, David  
Vogel, Augustus  
Welenc, Karen  
Wetzel, Ernest D.  
Zakaria, Fauzi
Life Members

Adelberg, Edward A., Provost's Office, Yale University, 115 Hall of Graduate Studies, New Haven, CT 06520
Amitnick, Ernest, 4797 Boston Post Road, Pelham Manor, NY 10803
Bann, Betsy G., 76 F.R. Little Road, Woods Hole, MA 02543
Bartlett, James II, Department of Physics, University of Alabama, Box 870324, Tuscaloosa, AL 35487-0324
Beams, Harold W., Department of Biology, University of Iowa, Iowa City, IA 52242
Bernheimer, Alan W., Department of Microbiology, New York University Medical Center, 550 First Ave., New York, NY 10016
Bertoff, Lloyd M., Westminster Village #2114, 2025 E. Lincoln St., Bloomingon, IL 61701
Bodian, David, 4100 North Charles St., #13, Baltimore, MD 21218
Bridgman, A. Josephine, 715 Kirk Rd., Decatur, GA 30030
Buck, John B., 7200 Third Ave., #C020, Sykesville, MD 21784
Burbank, Madeline P., Box 15134, Baltimore, MD 21212
Burbank, William D., Box 15134, Baltimore, MD 21212
Clark, Arnold M., 53 Wilson Rd., Woods Hole, MA 02543
Cohen, Adolph L., Department of Ophthalmology, Washington University School of Medicine, St. Louis, MO 63110 (resigned)
Cohen, Seymour S., 10 Carrot Hill Rd., Woods Hole, MA 02543-1206
Colwin, Arthur, 320 Woodcrest Rd., Key Biscayne, FL 33149
Colwin, Laura Hunter, 320 Woodcrest, Key Biscayne, FL 33149
Copeland, D. J., 431 Fern Lane, Woods Hole, MA 02543
Corliss, John O., P. O. Box 53008, Albuquerque, NM 87153
Costello, Helen M., Carolina Meadows, Villa 137, Chapel Hill, NC 27514
Crouse, Helen, Address unknown
Dudley, Patricia L., Department of Biological Sciences, Barnard College, Columbia University, 3009 Broadway, New York, NY 10027
Edwards, Charles, 2244 Harbour Court Drive, Longboat Key, FL 34228
Failla, Patricia M., 2149 Lobolly Lane, Johns Island, SC 29455
Ferguson, James W., 56 Clarkehaven St., Thornhill, Ontario L4J 2B4 Canada


Members of the Corporation*

Glusman, Murray, 50 E. 72nd St., New York, NY 10021
Goldman, David, 63 Loop Rd., Falmouth, MA 02540
Graham, Heribert, 36 Wilson Rd., Woods Hole, MA 02543
Green, James W., 409 Grant Ave., Highland Park, NJ 08904
Grosch, Daniel S., 1222 Duplin Road, Raleigh, NC 27607

Hamburger, Viktor, Department of Biology, Washington University, St. Louis, MO 63130
Hamilton, Howard L., Department of Biology, University of Virginia, 238 Gilmer Hall, Charlottesville, VA 22901
Harding, Clifford V., Jr., Wayne State University School of Medicine, Department of Ophthalmology, Detroit, MI 48201
Haschmeyer, Andrei E. V., 21 Glendon Road, Woods Hole, MA 02543
Hauschka, Theodore S., F91, Box 781, Damariscotta, ME 04543
Hilsea, F. L., 5925 SW Plymouth Drive, Corvallis, OR 97330
Hubbard, Ruth, 21 Lakeview Avenue, Cambridge, MA 02138
Humes, Arthur G., Marine Biological Laboratory, Boston University Marine Program, Woods Hole, MA 02543
Hurwitz, Charles, Veterans Administration Hospital, Basic Science Research Laboratory, Albany, NY 12208

Jones, Meredith L., Division of Worms, Museum of Natural History, Smithsonian Institution, Washington, DC 20560

Karush, Fred, Department of Microbiology, University of Pennsylvania School of Medicine, Philadelphia, PA 19104-6076
Kille, Frank R., 1111 S. Lakemont Ave., #44, Winter Park, FL 32792
Kingsbury, John M., Department of Plant Biology, Cornell University, Ithaca, NY 14853
Kleinholz, Lewis, Department of Biology, Reed College, 3203 SE Woodstock Blvd., Portland, OR 97202

Laderman, Ezra, Yale University, School of Music, New Haven, CT 06520
Lauffer, Max A., Address unknown
LeFevere, Paul G., 15 Agassiz Road, Woods Hole, MA 02543
Levine, Rachmel, 2024 Canyon Rd., Arcadia, CA 91006
Lockhead, John H., 49 Woodlawn Rd., London SW6 6PS, England, UK
Loewus, Frank A., Washington State University, Institute of Biological Chemistry, Pullman, WA 99164
Loftheld, Robert B., Department of Chemistry, University of New Mexico School of Medicine, Albuquerque, NM 87131

Regular Members

Abt, Donald A., Marine Biological Laboratory, Laboratory for Marine Animal Health, Woods Hole, MA 02543

Acheson, George H., 25 Quissett Ave., Woods Hole, MA 02543

Adams, James A., Department of Natural Sciences, University of Maryland, Eastern Shore, Princess Anne, MD 21853

Adelberg, Edward A., Provost’s Office, 115 Hall of Graduate Studies, Yale University, New Haven, CT 06520

Adelman, William J., Jr., 160 Locust St., Falmouth, MA 02540

Afzelius, Bjorn, Address unknown

Alberte, Randall S., Department of Molecular Genetics and Cell Biology, University of Chicago, 1103 E. 57th Street, Chicago, IL 60637

Alkon, Daniel, NINCDS/NIH, Dept. LMNC, Bldg. Park. Rm. 431, Bethesda, MD 20852

Allen, Garland E., Department of Biology, Washington University, Box 1137, One Brookings Drive, St. Louis, MO 63101-4899

Allen, Nina S., Department of Biology, Wake Forest University, Box 7325, Winston-Salem, NC 27109

Amatnick, Ernest, 4797 Boston Post Rd., Pelham Manor, NY 10803

Anderson, Everett, Department of Anatomy & Cell Biology, LHRRB, Harvard Medical School, 45 Shattuck St., Boston, MA 02115

Anderson, J. M., 110 Roat St., Ithaca, NY 14850

Anderson, Porter W., Department of Pediatrics, University of Rochester Medical Center, Box 690, 601 Elmwood Ave., Rochester, NY 14642

Arnett-Kibel, Christine, Dean of Science Faculty, University of Massachusetts, Boston, MA 02125

Armstrong, Clay M., Department of Physiology, University of Pennsylvania Medical School, Philadelphia, PA 19104-8725

Armstrong, Peter B., Department of Zoology, University of California, Davis, CA 95616

Arnold, John M., Pacific Biomedical Research Center, 209A Snyder Hall, University of Hawaii, Honolulu, HI 96822

Arnold, William A., 102 Balsam Rd., Oak Ridge, TN 37830

Ashton, Robert W., Esq., Bay Foundation, Eikenberry and Schoolman, 99 Wall St., New York, NY 10005

Atena, Jelle, Boston University Marine Program, Marine Biological Laboratory, Woods Hole, MA 02543

Atwood, Kimball C., III, P. O. Box 673, Woods Hole, MA 02543

(deceased)

Augustine Jr., George J., Department of Neurobiology, Duke University Medical Center, Durham, NC 27710

Ayers, Donald F., 4607 1/2 MacArthur Blvd., NW #B, Washington, DC 20007-2533

Baccetti, Baccio, Institute of Zoology, University of Siena, 53100 Siena, Italy

Baker, Robert G., Department of Physiology and Biophysics, New York University Medical Center, 550 First Ave., New York, NY 10016

Baca, Robert, 31 Buzzards Bay Ave., Woods Hole, MA 02543

Wiercinski, Floyd J., 21 Glenview Road, Glenview, IL 60025

Wigley, Roland L., 35 Wilson Rd., Woods Hole, MA 02543

Wilber, Charles G., Department of Biology, Colorado State University, Fort Collins, CO 80523

Zinn, Donald J., Department of Zoology, University of Rhode Island, Kingston, RI 02881

Zottoli, Anita, 18 Wilbur Blvd., Poughkeepsie, NY 12603

Zweifach, Benjamin W., 8811 Nottingham Place, La Jolla, CA 92037

Nasatir, Maimon, P. O. Box 379, Opa, CA 93024-0379

Pollister, A. W., 8 Euclid Ave., Belle Mead, NJ 08502

Prosser, C. Ladd, Department of Physiology and Biophysics, Burrill Hall 524, University of Illinois, Urbana, IL 61801

Prouvost, Luigi, Via Stazione 43, 21025 Comerio (VA), Italy

Prytz, Margaret McDonald, Address unknown

Rainer, Sarah, Department of Biochemistry, Public Health Research Institute, 455 First Ave., New York, NY 10016

Renn, Charles E., Address unknown

Reynolds, George, Department of Physics, Princeton University, Jadwin Hall, Princeton, NJ 08544

Rice, Robert V., 30 Burnham Dr., Falmouth, MA 02540

Richards, A. Glenn, 942 Cromwell Ave., St. Paul, MN 55114

Rockstein, Morris, 600 Biltmore Way, Apt. 805, Coral Gables, FL 33134

Ronkin, Rafael R., 321 McKinley St., NW, Washington, DC 20015

Rose, S. Meryl, 32 Crosby Ln., E. Falmouth, MA 02536

Sanders, Howard, Woods Hole Oceanographic Institution, Woods Hole, MA 02543

Sato, Hidemi, Faculty of Social Science, Nagano University, Shimino, Ueda, Nagano 386-12, Japan

Scharer, Berta, Department of Anatomy, Albert Einstein College of Medicine, 1300 Morris Park Avenue, Bronx, NY 10461

Schlesinger, R. Walter, University of Medicine and Dentistry of New Jersey, Department of Molecular Genetics and Microbiology, Robert Wood Johnson Medical School, Piscataway, NJ 08854-5635

Schmitt, F. O., Room 16-512, Massachusetts Institute of Technology, Cambridge, MA 02139

Scott, Allan C., 1 Nudd St., Waterville, ME 04901

Silverstein, Arthur M., The Johns Hopkins Hospital Wilmer Institute, Baltimore, MD 21205

Smith, Homer P., 8 Quissett Ave., Woods Hole, MA 02543

Smith, Paul F., P. O. Box 264, Woods Hole, MA 02543

Sonnenschein, B. P., 515A Heritage Hill, Southbury, CT 06488

Steinhardt, Jacinto, 1508 Spruce St., Berkeley, CA 94709

Stephens, Grover C., Department of Ecology & Evolutionary Biology, School of Biological Sciences, University of California, Irvine, CA 92717

Taylor, Robert E., 20 Harbor Hill Rd., Woods Hole, MA 02543

Trager, William, The Rockefeller University, 1230 York Ave., New York, NY 10021

Villet, Claude A., Harvard Medical School, Parcel B/Room 122, 25 Shattuck Street, Boston, MA 02115

Vincent, Walter S., 16 F.R. Little Rd., Woods Hole, MA 02543

Wald, George, 21 Lakeview Ave., Cambridge, MA 02138

Waterman, T. H., Yale University, Biology Department, Box 6666, New Haven, CT 06511

Wichter, Ralph, 31 Buzzards Bay Ave., Woods Hole, MA 02543
DeToledo-Morrell, Leyla, Department of Neurological Sciences, Rush Medical College, Chicago, IL 60612
Dettbarn, Wolf-Dietrich, Department of Pharmacology, School of Medicine, Vanderbilt University, Nashville, TN 37127
De Weer, Paul J., Department of Physiology, University of Pennsylvania School of Medicine, Philadelphia, PA 19104-6085
Dixon, Keith E., School of Biological Sciences, Flinders University, Bedford Park, 5042, South Australia, Australia
Dowling, John E., The Biological Laboratories, Harvard University, 16 Divinity St., Cambridge, MA 02138
Dubois, Arthur Brooks, John B. Pierce Foundation Laboratory, 290 Congress Ave., New Haven, CT 06519
Duncan, Thomas K., Department of Environmental Sciences, Nichols College, Dudley, MA 01570
Dunham, Philip B., Department of Biology, Syracuse University, Syracuse, NY 13244
Dunlap, Kathleen, Department of Physiology, Tufts University School of Medicine, Boston, MA 02111
Dunlap, Paul V., Department of Biology, Woods Hole Oceanographic Institution, Redfield 316, Woods Hole, MA 02543
Dworkin, Martin, Department of Microbiology, University of Minnesota, 1460 Mayo Bldg., Box 196 UMHC, Minneapolis, MN 55455-0312

Ebert, James D., Department of Biology, The Johns Hopkins University, 213 Macaulay Hall, Baltimore, MD 21218
Eckberg, William R., Department of Zoology, Howard University, Washington, DC 20059
Edds, Kenneth T., Department of Anatomical Sciences, SUNY, Buffalo, NY 14214
Edler, Howard A., Albert Einstein College of Medicine, 1300 Morris Park Ave., Bronx, NY 10461
Edstrom, Joan, 2515 Milton Hills Dr., Charlottsville, VA 22901
Egydi, Laszlo G., 18 Skyview, Newton, MA 02150
Ehrlich, Barbara E., Division of Cardiology, University of Connecticut Health Center, 263 Farmington Avenue, Farmington, CT 06030
Eisen, Arthur Z., Division of Dermatology, Washington University, St. Louis, MO 63110
Eisen, Herman N., Massachusetts Institute of Technology, E17-128, 77 Massachusetts Ave., Cambridge, MA 02139
Elder, Hugh Young, Institute of Physiology, University of Glasgow, Glasgow, Scotland G12 8QQ
Elliott, Gerald F., The Open University Research Unit, Foxcombe Hall, Berkeley Rd., Boars Hill, Oxford, England OX1 5HR
England, Paul T., Department of Biological Chemistry, Johns Hopkins School of Medicine, Baltimore, MD 21205
Epel, David, Hopkins Marine Station, Pacific Grove, CA 93950
Epstein, Herman T., 18 Lawrence Farm Road, Woods Hole, MA 02543
Epstein, Ray L., 30 Coonamesset Circle, Falmouth, MA 02540
Erulkar, Solomon D., 318 Kent Rd., Bala Cynwyd, PA 19004
Essner, Edward S., Kresge Eye Institute, Wayne State University, 540 E. Canfield Ave., Detroit, MI 48201 (resigned)

Farb, David H., Department of Pharmacology L603, Boston University School of Medicine, Boston, MA 02118
Farmanfarmanian, A., Department of Biological Sciences, Nelson Biological Laboratory, Rutgers University, Piscataway, NJ 08855
Fein, Alan, Department of Physiology, University of Connecticut Health Center, Farmington, CT 06032
Feinman, Richard D., Box 8, Department of Biochemistry, SUNY Health Science Center, 450 Clarkson Avenue, Brooklyn, NY 11203

Feldman, Susan C., Department of Anatomy, University of Medicine and Dentistry of New Jersey, New Jersey Medical School, 100 Bergen St., Newark, NJ 07103
Fessenden, Jane, 225 Lakeview Ave., Falmouth, MA 02540
Festoff, Barry W., Neurology Service (127), Veterans Administration Medical Center, 4801 Linwood Blvd., Kansas City, MO 64128
Fink, Rachel D., Department of Biological Sciences, Clapp Laboratory, Mount Holyoke College, South Hadley, MA 01075
Finkelstein, Alan, Albert Einstein College of Medicine, 1300 Morris Park Ave., Bronx, NY 10461
Fischbach, Gerald, Department of Neurobiology, Harvard Medical School, 220 Longwood Ave., Boston, MA 02115
Fishman, Harvey M., Department of Physiology and Biophysics, University of Texas Medical Branch, Galveston, TX 77550
Flanagan, Dennis, 12 Gay St., New York, NY 10014
Fluck, Richard Allen, Department of Biology, Franklin & Marshall College, Box 3003, Lancaster, PA 17604-3003
Foreman, K. H., Boston University Marine Program, Marine Biological Laboratory, Woods Hole, MA 02543
Fox, Thomas Oren, Division of Medical Sciences, Harvard Medical School, 260 Longwood Ave., Boston, MA 02115
Franzini-Armstrong, Clara, School of Medicine, University of Pennsylvania, 330 S. 46th Street, Philadelphia, PA 19143
Frazier, Donald T., Department of Physiology and Biophysics, University of Kentucky Medical Center, Lexington, KY 40536
French, Robert J., Health Sciences Center, University of Calgary, Calgary, Alberta, T2N 4N1, Canada
Freygang, Walter J., Jr., 6247 29th St., NW, Washington, DC 20015 (resigned)
Friedler, Gladys, Boston University School of Medicine, 80 East Concord Street, Boston, MA 02118
Fry, Brian, Marine Biological Laboratory, Woods Hole, MA 02543
Fulton, Chandler M., Department of Biology, Brandeis University, Waltham, MA 02254
Furshpan, Edwin J., Department of Neurophysiology, Harvard Medical School, Boston, MA 02115
Futrelle, Robert P., College of Computer Science, Northeastern University, 360 Huntington Avenue, Boston, MA 02115

Gabriel, Mordecai, Department of Biology, Brooklyn College, Brooklyn, NY 11210
Gadsby, David C., Laboratory of Cardiac Physiology, The Rockefeller University, 1230 York Avenue, New York, NY 10021
Gainer, Harold, Lab of Functional Neurochemistry, NIH, Bldg. 36, Room 4D-20, Bethesda, MD 20892
Galatzer-Levy, Robert M., 180 N. Michigan Avenue, Chicago, IL 60601
Gall, Joseph G., Carnegie Institution, 115 West University Parkway, Baltimore, MD 21210
Gallant, Paul E., NIH, Bldg. 36, Rm. 2A-29, Bethesda, MD 20892
Garber, Sarah S., Department of Physiology, Medical College of Pennsylvania, 2900 Queen Ln., Philadelphia, PA 19129
Gascoyne, Peter, Box 85E, University of Texas, M. D. Anderson Hospital and Tumor Institute, 6723 Bertner Avenue, Houston, TX 77030
Gelperin, Alan, Department of Biophysics, AT&T Bell Labs, Room 1C464, 600 Mountain Avenue, Murray Hill, NJ 07974
German, James L., III, Lab of Human Genetics, The New York Blood Center, 310 East 67th St., New York, NY 10021
Gibbs, Martin, Institute for Photobiology of Cells and Organelles, Brandeis University, Waltham, MA 02254
Giblin, Anne E., Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA 02543
Han, Joseph, Department of Developmental Genetics and Anatomy, Case Western Reserve University School of Medicine, Cleveland, OH 44106

Ingoglia, Nicholas, Department of Physiology, New Jersey Medical School, 100 Bergen St., Newark, NJ 07103

Inoue, Sadayuki, Department of Anatomy, McGill University Cancer Centre, 3640 University St., Montreal, PQ H3A 2B2, Canada

Inoué, Shinya, Marine Biological Laboratory, Woods Hole, MA 02543

Isselbacher, Kurt J., Massachusetts General Hospital Cancer Center, 149 13th Street, Charlestown, MA 02129

Issidorides, Marietta, R., Department of Psychiatry, University of Athens, Monis Petraki 8, Athens 140 Greece

Izzard, Colin S., Department of Biological Sciences, SUNY, 1400 Washington Ave., Albany, NY 12222

Jacobs, Neil, Hale & Dorr, 60 State St., Boston, MA 02109

Jaffe, Lionel, Marine Biological Laboratory, Woods Hole, MA 02543

Jannasch, Holger W., Department of Biology, Woods Hole Oceanographic Institution, Woods Hole, MA 02543

Jeffery, William R., Bodega Marine Laboratory, Box 247, Bodega Bay, CA 94923

Johnston, Daniel, Division of Neuroscience, Baylor College of Medicine, Baylor Plaza, Houston, TX 77030

Josephison, Robert K., Department of Biological Sciences, University of California, Irvine, CA 92717

Kahat, E. A., Department of Microbiology, College of Physicians and Surgeons, Columbia University, 630 West 168th St., New York, NY 10032 (resigned)

Kaczmarek, Leonard K., Department of Pharmacology, Yale University School of Medicine, 333 Cedar St., New Haven, CT 06510

Kale, Gabor, Department of Physiology, Basic Sciences Building, New York Medical College, Valhalla, NY 10595

Kaltenbach, Jane, Department of Biological Sciences, Mount Holyoke College, South Hadley, MA 01075

Kaminar, Benjamin, Department of Physiology, School of Medicine, Boston University, 80 East Concord St., Boston, MA 02118

Kane, Robert E., PBRC, University of Hawaii, 41 Ahau St., Honolulu, HI 96813

Kanehiro, Edna S., Department of Biological Sciences, University of Cincinnati, IL 006, Cincinnati, OH 45221

Kao, Chien-yuan, Department of Pharmacology, Box 29, SUNY, Downstate Medical Center, 450 Clarkson Avenue, Brooklyn, NY 11203

Kaplan, Ehud, Department of Biophysics, The Rockefeller University, 1230 York Ave., New York, NY 10024

Karakashian, Stephen J., Apt. 16-F, 165 West 91st St., New York, NY 10024

Karlins, Arthur, Department of Biochemistry and Neurology, Columbia University, 630 West 168th St., New York, NY 10032

Katz, George M., Fundamental and Experimental Research Labs, Merck Sharp and Dohme, P. O. Box 2000, Rahway, NJ 07065

Kelly, Robert E., Department of Anatomy, College of Medicine, University of Illinois, P. O. Box 6998, Chicago, IL 60680

Kemp, Norman E., Department of Biology, University of Michigan, Ann Arbor, MI 48109

Kendall, John P., Faneuil Hall Associates, 176 Federal Street, 2nd Floor, Boston, MA 02110

Kendall, Richard E., 246 Green Harbor Road, East Falmouth, MA 02536

Kerr, Louis M., Marine Biological Laboratory, Woods Hole, MA 02543

Keynan, Alexander, Laboratory for Developmental and Molecular Biology, Department of Biochemistry, Hebrew University of Jerusalem, Givat-Ram, Jerusalem, Israel

Khan, Shahid M. M., Department of Anatomy & Structural Biology, Albert Einstein College of Medicine, 1300 Morris Park Ave., Bronx, NY 10461

Kiehart, Daniel P., Department of Cellular Biology, Duke Medical Center, Box 3709, 307 Nanaline Duke Bldg., Durham, NC 27710

Kirk, Mark D., Division of Biological Sciences, University of Missouri, Columbia, MO 65211

Klotz, Irving M., Department of Chemistry, Northwestern University, Evanston, IL 60201

Knudson, Robert A., Marine Biological Laboratory, Instrument Development Lab, Woods Hole, MA 02543

Koide, Samuel S., Population Council, The Rockefeller University, 1230 York Avenue, New York, NY 10021

Kornberg, Sir Hans, The Master's Lodge, Christ's College, Cambridge CB2 3BU, England, UK

Kosower, Edward M., address unknown

Krahl, M. E., 2783 W. Casas Circle, Tucson, AZ 85741

Kraus, Stephen M., Arthritis Unit, Massachusetts General Hospital, Fruit Street, Boston, MA 02114

Krauss, Robert, FASEB, 9650 Rockville Pike, Bethesda, MD 20814

Kraus, Edward A., Department of Neurobiology, Harvard Medical School, 220 Longwood Ave., Boston, MA 02115

Kriebel, Mahlon E., Department of Physiology, SUNY Health Science Center, Syracuse, NY 13210

Kristan, William B., Jr., Department of Biology B-022, University of California San Diego, La Jolla, CA 92039

Kropinski, Andrew M. B., Department of Microbiology/Immunology, Queen's University, Kingston, Ontario K7L 3N6, Canada

Kuhns, William J., Hospital for Sick Children, Department of Biochemistry Research, Toronto, Ontario M5G 1X8, Canada

Kuhlbrecher, Willem VM., Marine Biological Laboratory, Woods Hole, MA 02543 (resigned)

Kusano, Kiyoshi, NIH, Bldg. 36, Room 4D-20, Bethesda, MD 20892

Kuzirian, Alan M., Marine Biological Laboratory, Woods Hole, MA 02543

Landerman, Aimlee, Yale University School of Forestry, New Haven, CT 06511

LaMarche, Paul H., Eastern Maine Medical Center, 489 State St., Bangor, ME 04401
<table>
<thead>
<tr>
<th>Name</th>
<th>Department/Institution</th>
<th>Address Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mellin, DeForest, Jr.</td>
<td>Department of Biology, Gilmer Hall, University of Virginia</td>
<td>Charlottesville, VA 22903</td>
</tr>
<tr>
<td>Mellon, Richard P.</td>
<td>Department of Physiology, Boston University School of Medicine, 740 E. Concord St., Boston, MA 02118</td>
<td></td>
</tr>
<tr>
<td>Mendelevitch, Michael E.</td>
<td>Cardiovascular Division, Harvard Medical School, 75 Francis Street, Boston, MA 02115</td>
<td></td>
</tr>
<tr>
<td>Metz, Charles B.</td>
<td>Department of Pathology, University of Michigan, 600 E. Greenfield Ave., Milwaukee, WI 53204</td>
<td></td>
</tr>
<tr>
<td>Nelson, Leonard</td>
<td>Department of Physiology, University of Wisconsin, 308 South Wolcott St., Chicago, IL 60612</td>
<td></td>
</tr>
<tr>
<td>Nedergaard, P.</td>
<td>Department of Pharmacology &amp; Cell Biology, University of Wisconsin, 808 South Wolcott St., Chicago, IL 60612</td>
<td></td>
</tr>
<tr>
<td>Niedergaard, P.</td>
<td>Department of Pharmacology &amp; Cell Biology, University of Wisconsin, 808 South Wolcott St., Chicago, IL 60612</td>
<td></td>
</tr>
<tr>
<td>Nishimoto, Toshiro</td>
<td>Department of Pharmacology, Northwestern University Medical School, 303 East Chicago Ave., Chicago, IL 60611</td>
<td></td>
</tr>
<tr>
<td>Nishioka, Eriko</td>
<td>Department of Physiology, Boston University School of Medicine, 740 E. Concord St., Boston, MA 02118</td>
<td></td>
</tr>
<tr>
<td>O'Herron, Jonathan</td>
<td>Jonathan &amp; Shirley O'Herron Foundation, One Rockefeller Plaza, New York, NY 10020</td>
<td></td>
</tr>
<tr>
<td>Oudet, Patrice M.</td>
<td>Department of Neurology, University of Illinois Medical Center, 600 E. Greenfield Ave., Milwaukee, WI 53204</td>
<td></td>
</tr>
<tr>
<td>Mourer, Andrew L.</td>
<td>Marine Biological Laboratory, Woods Hole, MA 02543</td>
<td></td>
</tr>
<tr>
<td>Myers, John W.</td>
<td>Department of Neurobiology, Box 3209, Duke University Medical Center, Durham, NC 27710</td>
<td></td>
</tr>
<tr>
<td>Nardelli, James G.</td>
<td>Department of Biology, University of California, Los Angeles, CA 90024</td>
<td></td>
</tr>
<tr>
<td>Nattie, Robert</td>
<td>Department of Neurology, Northwestern University Medical School, 303 East Chicago Ave., Chicago, IL 60611</td>
<td></td>
</tr>
<tr>
<td>Nishiyama, Toshio</td>
<td>Department of Pharmacology, Northwestern University Medical School, 303 East Chicago Ave., Chicago, IL 60611</td>
<td></td>
</tr>
<tr>
<td>Nishiyama, Toshio</td>
<td>Department of Pharmacology, Northwestern University Medical School, 303 East Chicago Ave., Chicago, IL 60611</td>
<td></td>
</tr>
<tr>
<td>Nishiyama, Toshio</td>
<td>Department of Pharmacology, Northwestern University Medical School, 303 East Chicago Ave., Chicago, IL 60611</td>
<td></td>
</tr>
<tr>
<td>Nishiyama, Toshio</td>
<td>Department of Pharmacology, Northwestern University Medical School, 303 East Chicago Ave., Chicago, IL 60611</td>
<td></td>
</tr>
<tr>
<td>Nishiyama, Toshio</td>
<td>Department of Pharmacology, Northwestern University Medical School, 303 East Chicago Ave., Chicago, IL 60611</td>
<td></td>
</tr>
</tbody>
</table>
Saffo, Mary Beth, Institute of Marine Sciences, 272 Applied Sciences, University of California, Santa Cruz, CA 95064
Sager, Ruth, Dana Farber Cancer Institute, 44 Binney St., Boston, MA 02115
Sagi, Amir, Department of Life Sciences, Ben-Gurion University of the Negev, P.O. Box 653, Beersheva, Israel, 84105
Salama, Guy, Department of Physiology, University of Pittsburgh, Pittsburgh, PA 15261
Salmon, Edward D., Department of Biology, Wilson Hall, CB3240, University of North Carolina, Chapel Hill, NC 27599
Salzberg, Brian M., Department of Neuroscience, University of Pennsylvania, 234 Steimmler Hall, Philadelphia, PA 19104-6074
Sanborn, Richard C., 11 Oak Ridge Road, Tiverton, MA 02536 (deceased)
Sanger, Jean M., Department of Anatomy, School of Medicine, University of Pennsylvania, 36th and Hamilton Walk, Philadelphia, PA 19174
Sanger, Joseph, Department of Anatomy, School of Medicine, University of Pennsylvania, 36th and Hamilton Walk, Philadelphia, PA 19174
Sattelle, David B., AFRC Unit-Department of Zoology, University of Cambridge, Downing St., Cambridge CB2 3EJ, England, UK (resigned)
Saunders, John W., Jr., P. O. Box 381, Waquoit Station, Waquoit, MA 02536
Saz, Arthur K., Department of Immunology, Georgetown University Medical School, Washington, DC 20007
Schachman, Howard K., Department of Molecular Biology, University of California, Berkeley, CA 94720
Schatten, Gerald P., Integrated Microscopy Facility for Biomedical Research, University of Wisconsin, 1117 W. Johnson St., Madison, WI 53706
Schatten, Heide, Department of Zoology, University of Wisconsin, Madison, WI 53706
Schiff, Jerome A., Institute for Photobiology of Cells and Organelles, Brandeis University, Waltham, MA 02254
Schmeier, Arline C., Mercene Cancer Research Institute, Hospital of Saint Raphael, New Haven, CT 06511
Schmiedek, Henry H., Department of Neurosurgery, St. Luke's Hospital, 102 Page St., New Bedford, MA 02740
Schneck, Bruce J., Department of Cellular & Molecular Physiology, Harvard Medical School, 25 Shattuck St., Boston, MA 02115
Schuel, Herbert, Department of Anatomical Sciences, SUNY, Buffalo, Buffalo, NY 14214
Schwartz, James H., Center for Neurobiology and Behavior, New York State Psychiatric Institute—Research Annex, 722 W. 168th St., 7th Floor, New York, NY 10032
Schweitzer, A. Nicola, School of Medicine, Section of Immunology, Yale University, New Haven, CT 06510
Scofield, Virginia Lee, Department of Microbiology and Immunology, UCLA School of Medicine, Los Angeles, CA 90024
Sears, Mary, P. O. Box 152, Woods Hole, MA 02543
Segal, Sheldon J., The Population Council, One Dag Hammarskjold Plaza, New York, NY 10036
Selman, Kelly, Department of Anatomy, College of Medicine, University of Florida, Gainesville, FL 32601
Shanklin, Douglas R., Department of Pathology, Room 584, University of Tennessee College of Medicine, 800 Madison Avenue, Memphis, TN 38163
Shapiro, Herbert, 6025 North 13th St., Philadelphia, PA 19141 (deceased)
Shashoua, Victor E., Ralph Lowell Labs, Harvard Medical School, McLean Hospital, 115 Mill St., Belmont, MA 02178
Shaver, Gaines R., Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA 02543
Shaver, John R., Department of Zoology, Michigan State University, East Lansing, MI 48824
Sheetz, Michael P., Department of Cell Biology, Duke University Medical Center, Box 3709, 385 Nanaline Duke Bldg., Durham, NC 27710
Shepard, David C., P. O. Box 44, Woods Hole, MA 02543
Shepro, David, Department of Microvascular Research, Boston University, 5 Cummington St., Boston, MA 02215
Sheridan, William F., Biology Department, University of North Dakota, Box 8238, University Station, Grand Forks, ND 58202-8238
Sherman, I. W., Department of Biology, University of California, Riverside, CA 92521
Shimonura, Osamu, Marine Biological Laboratory, Woods Hole, MA 02543
Shipley, Alan M., Marine Biological Laboratory, Woods Hole, MA 02543
Siegel, Irwin M., Department of Ophthalmology, New York University Medical Center, 550 First Avenue, New York, NY 10016
Siegelman, Harold W., Department of Biology, Brookhaven National Laboratory, Upton, NY 11973
Silver, Robert B., Department of Physiology, Cornell University, 822 Veterinary Research Tower, Ithaca, NY 14853-6401
Siwicki, Kathleen K., Biology Department, Swarthmore College, 500 College Ave., Swarthmore, PA 19081
Simon, Raymond A., Department of Biophysics, University of Maryland, Baltimore, MD 21201
Skinner, Dorothy M., Oak Ridge National Laboratory, P. O. Box 209, Biology Division, Oak Ridge, TN 37831
Shohida, Roger D., Department of Biological Sciences, 306 Gilman, Dartmouth College, Hanover, NH 03755
Sluder, Greenfield, Worcester Foundation for Experimental Biology, 222 Maple Ave., Shrewsbury, MA 01545
Smith, Peter J. S., Marine Biological Laboratory, Woods Hole, MA 02543
Smith, Ralph L., Department of Integrative Biology, University of California, Berkeley, CA 94720
Smith, Stephen J., Department of Molecular & Cellular Physiology, Beckman Center, Stanford University School of Medicine, Stanford, CA 94305-5426
Smolowitz, Roxanne M., Laboratory of Marine Animal Health, Marine Biological Laboratory, Woods Hole, MA 02543
Sogin, Mitchell, Marine Biological Laboratory, Woods Hole, MA 02543
Sorenson, Martha M., Cicada Universitaria-RFRJ, Department de Bioquimica-ICB/CCS, Rio de Janeiro, RJ 21910, Brasil
Speck, William T., The Presbyterian Hospital in the City of New York, New York, NY 10032-3784
Spector, Abraham, Department of Ophthalmology, Columbia University, 630 West 166th Street, New York, NY 10032
Speer, John W., Marine Biological Laboratory, Woods Hole, MA 02543
Specksnider, Johanna E., Hubrecht Laboratory, Uppsalaalaan 8, 3584 CT Utrecht, The Netherlands
Sperehelakis, Nicholas, Department of Physiology & Biophysics, University of Cincinnati, Cincinnati, OH 45267-0576
Spiegel, Evelyn, Department of Biological Sciences, Dartmouth College, Hanover, NH 03755
Spiegel, Melvin, Department of Biological Sciences, Dartmouth College, Hanover, NH 03755
Spray, David C., Albert Einstein College of Medicine, Department of Neuroscience, 1300 Morris Park Avenue, Bronx, NY 10461
Steele, John Hyslop, Woods Hole Oceanographic Institution, Woods Hole, MA 02543
Steinacker, Antoinette, Dept. of Otolaryngology, Washington University, School of Medicine. Box 8115, 4566 S. 40th Avenue, St. Louis, MO 63110
Steinberg, Malcolm, Department of Biology, Princeton University, Princeton, NJ 08544-1014
Stemmer, Andreas C., Marine Biological Laboratory, Woods Hole, MA 02543
Stetten, Jane Lazarow, 4701 Willard Avenue, Montclair, NJ 07042-4635
Steupler, Paul A., Ecosystems Center, Migraine Biological Laboratory, Woods Hole, MA 02543
Stokes, Darrell R., Department of Biology, Emory University, Atlanta, GA 30222
Stommel, Elijah W., Section of Neurology, Dartmouth-Hitchcock Medical Center, 2 Maynard St., Hanover, NH 03756
Stracher, Alfred, Department of Biochemistry, SUNY Health Science Center, 450 Clarkson Ave., Brooklyn, NY 11203
Streher, Bernard L., 2310 Laguna Circle Dr., Agoura, CA 91301-2884
Strickler, J. Rudi, Center for Great Lakes Studies, 600 East Greenfield Ave., Milwaukee, WI 53204 (resigned)
Strumwasser, Felix, USUHS, Department of Psychiatry, 4301 Jones Bridge Rd., Bethesda, MD 20814-4799
Stuart, Ann E., Department of Physiology, Medical Sciences Research Bldg. 206H, University of North Carolina, Chapel Hill, NC 27599-7545
Sugimori, Mutsuyuki, Department of Physiology and Biophysics, New York University Medical Center, 550 First Avenue, New York, NY 10016
Summers, William C., Huxley College of Environmental Studies, Western Washington University, Bellingham, WA 98225
Suprenant, Kathy A., Department of Physiology and Cell Biology, 4010 Haworth Hall, University of Kansas, Lawrence, KS 66045
Sussman, Maurice, 72 Carey Lane, Falmouth, MA 02540
Sussman, Raquel B., Marine Biological Laboratory, Woods Hole, MA 02543
Sweet, Frederick, Department of OB & GYN, Box 8064, Washington University School of Medicine, 499 South Euclid, St. Louis, MO 63110
Sydlik, Mary Anne, Department of Biology, Westfield State College, Westfield, MA 01086
Szente-Gyorgyi, Andrew, Department of Biology, Brandeis University, Bassine 244, 415 South Street, Waltham, MA 02254
Szente-Gyorgyi, Gwen P., Marine Biological Laboratory, Woods Hole, MA 02543
Szuts, Ete Z., 12 Hamlin Ave., Falmouth, MA 02540

Tabares, Lucia, AVDA, Department of Physiology, Sanchez, Pizjuan 4, 411009 Seville, Spain
Tam, Sidney L., Boston University Marine Program, Marine Biological Laboratory, Woods Hole, MA 02543 (resigned)
Tanzer, Marvin I., Department of Biostructure & Function, Medical School, University of Connecticut, Farmington, CT 06030-3705
Tasaki, Ichijii, Laboratory of Neurobiology, NIMH/NIH, Bldg. 36, Rm. 2B-16, Bethesda, MD 20892
Taylor, Douglass L., Center for Fluorescence Research, Carnegie Mellon University, 4400 Fifth Avenue, Pittsburgh, PA 15213
Teal, John M., Department of Biology, Woods Hole Oceanographic Institution, Woods Hole, MA 02543
Telet, William H., Department of Biology, University of Pennsylvania, Philadelphia, PA 19104
Telzer, Bruce, Thistle Building, Pomona College, 175 W. 6th Street, Claremont, CA 91711

Thordalke, W. Nicholas, Wellington Management Company, 28 State St., Boston, MA 02109
Townsel, James G., Department of Physiology, Meharry Medical College, Nashville, TN 37208
Travis, David M., 223 Newell Road, Holden, MA 01520-1442
Treitsman, Steven N., Worcester Foundation for Experimental Biology, 222 Maple Avenue, Shrewsbury, MA 01545
Trigg, D. Thomas, One Federal Street, 9th Floor, Boston, MA 02211
Trinkaus, J. P., Department of Biology, Yale University, New Haven, CT 06511
Troll, Walter, Department of Environmental Medicine, College of Medicine, New York University, New York, NY 10016
Troxler, Robert F., Department of Biochemistry, School of Medicine, Boston University, 80 East Concord St., Boston, MA 02118
Tucker, Edward B., Department of Natural Sciences, Baruch College, CUNY, 17 Lexington Ave., New York, NY 10010
Turner, Ruth D., Mollusk Department, Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138
Tweedell, Kenyon S., Department of Biological Sciences, University of Notre Dame, Notre Dame, IN 46556
Tykociinski, Mark J., Institute of Pathology, Case Western Reserve University, 2085 Adelbert Rd., Cleveland, OH 44106
Tytell, Michael, Department of Anatomy, Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, NC 27103
Utomo, Hiroshi, Department of Medical Chemistry, Osaka Medical College, 2-7 Daigaku-machi, Takatsuki, Osaka 569, Japan

Valiela, Ivan, Boston University Marine Program, Marine Biological Laboratory, Woods Hole, MA 02543
Vallec, Richard, Cell Biology Group, Worcester Foundation for Experimental Biology, Shrewsbury, MA 01545
Valois, John, Marine Biological Laboratory, Woods Hole, MA 02543
Van Hole, Kensibly, Department of Biochemistry and Biophysics, Oregon State University, Corvallis, OR 97331-6503
Vogel, Steven S., IBM, NIDDK/NIH, Bldg. 10, Rm. 9B04, Bethesda, MD 20892

Waksman, Byron, Foundation for Microbiology, 300 East 54th St., New York, NY 10022
Wall, Betty, 9 George St., Woods Hole, MA 02543
Wallace, Robin A., Whitney Laboratory, 9505 Ocean Shore Blvd., St. Augustine, FL 32086
Wang, Ching-Chung, Department of Pharmaceutical Chemistry, University of California, San Francisco, CA 94143
Wang, Hisien-yu, Department of Biochemistry, National Defense Medical Center, Taipei, Taiwan, Republic of China
Wangh, Lawrence J., Department of Biology, Brandeis University, 415 South St., Waltham, MA 02254
Warner, Robert C., Department of Molecular Biology and Biochemistry, University of California, Irvine, CA 92717
Warren, Kenneth S., Maxwell Communications Corp., 866 Third Avenue, New York, NY 10022
Warren, Leonard, Wistar Institute, 36th and Spruce Streets, Philadelphia, PA 19104
Waterbury, John B., Department of Biology, Woods Hole Oceanographic Institution, Woods Hole, MA 02543
Watson, Stanley, Associates of Cape Cod, Inc., P.O. Box 224, Woods Hole, MA 02543
Wayman, Stephen G., Department of Neurology, LCI 708, Yale School of Medicine, 333 Cedar Street, New Haven, CT 06510
Webb, H. Marguerite, Marine Biological Laboratory, Woods Hole, MA 02543
Members of the Corporation

Weber, Annemarie, Department of Biochemistry and Biophysics, School of Medicine, University of Pennsylvania, Philadelphia, PA 19066
Weidner, Earl, Department of Zoology and Physiology, Louisiana State University, Baton Rouge, LA 70803
Weiss, Dieter G., Institut für Zoologie, Technische Universität München, 8046 Garching, FRG
Weiss, Leon P., Department of Animal Biology, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA 19104
Weissmann, Gerald, New York University Medical Center, 550 First Avenue, New York, NY 10016
Werman, Robert, Neurobiology Unit, The Hebrew University, Jerusalem, Israel
Westerfield, R. Monte, The Institute of Neuroscience, University of Oregon, Eugene, OR 97403
Whittaker, J. Richard, Department of Biology, Bag Service #45111, University of New Brunswick, Fredericton, NB E3B 6E1, Canada
Wilson, Darcy B., San Diego Regional Cancer Center, 3009 Science Park Road, San Diego, CA 92121
Wilson, T. Hastings, Department of Physiology, Harvard Medical School, Boston, MA 02115
Witkovsky, Paul, Department of Ophthalmology, New York University Medical Center, 550 First Ave., New York, NY 10016
Wittenberg, Beatrice, Department of Physiology & Biophysics, Albert Einstein College of Medicine, Bronx, NY 10461
Wittenberg, Jonathan B., Department of Physiology and Biophysics, Albert Einstein College, 1300 Morris Park Ave., Bronx, NY 10461
Wolkem, Jerome J., Department of Biological Science, Carnegie Mellon University, 440 Fifth Ave., Pittsburgh, PA 15213

Wonderlin, William F., Department of Pharmacology & Toxicology, West Virginia University, Morgantown, WV 26506
Worden, Mary Kate, Department of Neurobiology, Harvard Medical School, 220 Longwood Ave., Boston, MA 02115
Worgul, Basil V., Department of Ophthalmology, Columbia University, 630 West 166th St., New York, NY 10032
Wu, Chau Hsiung, Department of Pharmacology, Northwestern University Medical School, Chicago, IL 60611
Wytenbach, Charles R., Department of Physiology and Cell Biology, University of Kansas, Lawrence, KS 66045

Yashphe, Jacob, Hebrew University, Hadassah Medical School, Jerusalem, Israel, 91010
Yeh, Jay Z., Department of Pharmacology, Northwestern University Medical School, Chicago, IL 60611

Zigman, Seymour, School of Medicine and Dentistry, University of Rochester, 260 Crittenden Blvd., Rochester, NY 14620
Zimmerberg, Joshua J., NIH, Bldg. 12A, Room 2007, Bethesda, MD 20892
Zottoli, Steven J., Department of Biology, Williams College, Williamstown, MA 01267
Zucker, Robert S., Neurobiology Division, Department of Molecular and Cellular Biology, University of California, Berkeley, CA 94720
Zukin, Ruth Suzanne, Department of Neuroscience, Albert Einstein College of Medicine, 1410 Pelham Parkway South, Bronx, NY 10461

Associate Members

Alfano, Dr. Louis
Allen, Mr. and Mrs. Wayne
Allison, Mr. and Mrs. Douglas F.
Anderson, Mr. and Mrs. Seneca
Andrews, Dr. Edwin J.
Aristide, Ms. Tracy
Armstrong, Dr. and Mrs. Richard A.
Aspinwall, Mr. and Mrs. Duncan
Atwood, Mrs. Kimball
Bagley, Mr. Everett E.
Bakalar, Mr. and Mrs. David
Ballantine, Mrs. Elizabeth E.
Bang, Mrs. Betsy G.
Bang, Ms. Molly
Banks, Ms. Jamie
Banks, Mr. and Mrs. William L.
Barlow, Mr. and Mrs. R.
Channing
Barnes, Mr. John
Benthos, Inc.
Berg, Mr. and Mrs. C. John
Berg, Ms. Linnea
Bernheimer, Drs. Alan W. and Harriet P.
Bigelow, Mr. and Mrs. Robert O.
Bihrl, Dr. William
Bleck, Dr. Thomas P.
Blumenfeld, Dr. Olg
Boche, Mr. Robert D.
Bolton, Mr. and Mrs. Thomas C.
Borg, Dr. and Mrs. Alfred F.
Borgese, Dr. and Mrs. Thomas
Bowles, Dr. and Mrs. Francis P.
Brauer, Dr. and Mrs. Mark
Briana, Anthony
Brown, Mrs. Jennie P.
Brown, Mrs. Thomas A.
Brown, Dr. and Mrs. Thornton
Buck, Dr. and Mrs. John B.
Barghauser, Dr. Alan H.
Burris, Dr. and Mrs. John E.
Buxton, Mr. and Mrs. Bruce E.
Canney, Ms. Paula
Carlson, Dr. and Mrs. Francis
Carlton, Mr. and Mrs. Winslow G.
Case, Mrs. Patricia A.
Chaet, Mr. and Mrs. Alfred
Chandler, Mr. Robert
Child, Dr. and Mrs. Frank M., III
Chisholm, Dr. Sallie W.
Clark, Dr. and Mrs. Arnold M.
Clark, Mr. and Mrs. Leroy, Jr.
Clement, Mrs. Octavia
Cloud, Dr. Laurence P.
Clowes Fund, Inc.
Clowes, Dr. and Mrs. Alexander W.
Clowes, Mr. Allen W.
Clowes, Mrs. Margaret

Cobb, Dr. Jewel P.
Copeland, Dr. and Mrs. D. Eugene
Cornell, Dr. and Mrs. Neal
Cowan, Ms. Stacy
Cowling, Mr. John
Cowling, Dr. Vincent
Crabb, Mr. and Mrs. David L.
Crain, Mr. and Mrs. Melvin C.
Cross, Mr. and Mrs. Norman C.
Crossley, Miss Dorothy
Crossley, Miss Helen
Crowell, Mrs. Villa
Davis, Mr. and Mrs. Joel P.
DiBerardino, Dr. Marie A.
Donnette, Mr. and Mrs. Joseph
Donovan, Mr. and Mrs. David L.
Douglas, Ms. Jean
Droban, Ms. Suzanne
Drumhery, Mr. and Mrs. Todd A.
Dugan, Mr. and Mrs. William P.
Dulac, Dr. Nicole
Ebert, Dr. and Mrs. James D.
Egloff, Mrs. F. R. L.
Elliott, Mr. Raymond
Ellis, Dr. and Mrs. David
Engles, Mr. and Mrs. George
Esswein, Dr. Arthur
Estabrooks, Mr. Gordon C.

Eustis, Mr. and Mrs. Jack
Farnham, Ms. Elizabeth
Fausch, Mr. and Mrs. David
Fisher, Mr. and Mrs. Frederick S., III
Folino, Mr. John W., Jr.
Freeman, Mr. and Mrs. Howard
Fribourg, Dr. James H.
Friendship Fund
Frosch, Dr. and Mrs. Robert A.
Fye, Mrs. Paul M.
Garfield, Ms. Eleanor
Garrett, Dr. Patricia
Gault, Ms. Christine
Gellis, Dr. and Mrs. Sydney
Glazebrook, Mrs. Rebeckah D.
Glenn, Mr. Gary
Goldstein, Dr. and Mrs. Moses H., Jr.
Goodwin, Mr. and Mrs. Charles
Grant, Mrs. Rose
Greer, Mr. and Mrs. W. H., Jr.
Griffith, Dr. and Mrs. B. Herold
Grossman, Barbara
Haakenson, Dr. Harry O.
Hadamard, Dr. Antoine F.
Hallvorson, Dr. and Mrs. Harlyn O.
Hamstrom, Ms. Mary Elizabeth
Harrington, Mr. Robert B.
Harrington, Mr. Robert D., Jr.
Low, Miss Dorothy
Low, Miss Dorothy
Low, Miss Dorothy
Low, Miss Dorothy
Low, Miss Dorothy
Mackey, Mr. and Mrs. William K.
Mackey, Mr. and Mrs. William K.
MacLeruch, Mr. and Mrs. Margaret M.
Macleod, Mr. and Mrs. Margaret M.
Macleod, Mr. and Mrs. Margaret M.
Macleod, Mr. and Mrs. Margaret M.
Macleod, Mr. and Mrs. Margaret M.
MacInnes, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Macleod, Mr. and Mrs. Philip B.
Gift Shop Volunteers

Barbara Atwood
Patricia Barlow
Harriet Bernheimer
Glorie Borgese
Jennie Brown
Shannon Brown
Elizabeth Buck
Mary Buckley
Shirley Chact
Vera Clark
Peggy Clowes
Jewell Cobb
Villa Crowell
Janet Daniels
Alma Ebert
Ellie Gabriel
Vi Gifford
Rose Grant
Edie Grosch
Barbara Grossman
Jean Halvorson

Helen Hodosh
Polly Hyde
Sally Karush
Brookie Ketchum
Ruth Ann Laster
Evelyn Lauer
Barbara Little
Sally Loessell
Vinnie Mackey
Connie Martyna
Marian Mauzerall
Phyllis Myers
Florence Mixer
Lorraine Mizell
Eleanor Nace
Arlene Park
Bertha Person
Dottie Phinney
Elizabeth Price
Kathryn Price
Julia Rankin

Virginia Reynolds
Erika Righter
Jean Rips
Lola Robinson
Lilyan Saunders
Elsie Scott
Marilyn Shepro
Fran Silverstein
Marcia Simmons
Cynthia Smith
Peggy Smith
Louise Specht
Susie Steinbach
Dorothy Stracher
Natalie Trousof
Mary Ulbrich
Barbara Van Holde
Alice Veeder
Dorothy Ville
Clare Wilber

MBL Tour Guides

Betsy Bang
John Buck
Sears Crowell

Teru Hayashi
Julie Rankin
Lola Robertson

Mary Ulbrich
Donald Zinn
Margery Zinn
Certificate of Organization

Articles of Amendment

Bylaws

Certificate of Organization

(On File in the Office of the Secretary of the Commonwealth)

No. 3170

We, Alpheus Hyatt, President, William Stanford Stevens, Treasurer, and William T. Sedgwick, Charles Sedgwick Minot, Susan Mims and Charles Sedgwick Minot being a majority of the Trustees of the Marine Biological Laboratory, in compliance with the requirements of the fourth section of chapter one hundred and fifteen of the Public Statutes do hereby certify that the following is a true copy of the agreement of association to constitute said Corporation, with the names of the subscribers thereto:

We, whose names are hereto subscribed, do, by this agreement, associate ourselves with the intention to constitute a Corporation according to the provisions of the one hundred and fifteenth chapter of the Public Statutes of the Commonwealth of Massachusetts, and the Acts in amendment thereof and in addition thereto.

The name by which the Corporation shall be known is THE MARINE BIOLOGICAL LABORATORY.

The purpose for which the Corporation is constituted is to establish and maintain a laboratory or station for scientific study and investigations, and a school for instruction in biology and natural history.

The place within which the Corporation is established or located is the city of Boston within said Commonwealth.

The amount of its capital stock is none.

In Witness Whereof, we have hereunto set our hands, this twenty seventh day of February in the year eighteen hundred and eighty-eight, Alpheus Hyatt, Samuel Miles, William T. Sedgwick, Edward G. Gardner, Charles Sedgwick Minot, William G. Farlow, William Stanford Stevens, Anna D. Phillips, Susan Mims, B. H. Van Vleck.

That the first meeting of the subscribers to said agreement was held on the thirteenth day of March in the year eighteen hundred and eighty-eight.

In Witness Whereof, we have hereunto signed our names, this thirteenth day of March in the year eighteen hundred and eighty-eight, Alpheus Hyatt, President, William Stanford Stevens, Treasurer, Edward G. Gardner, William T. Sedgwick, Susan Mims, Charles Sedgwick Minot.

(Approved on March 20, 1888 as follows:)

I hereby certify that it appears upon an examination of the within written certificate and the records of the corporation duly submitted to my inspection, that the requirements of sections one, two and three of chapter one hundred and fifteen, and sections eighteen, twenty and twenty-one of chapter one hundred and six, of the Public Statutes, have been complied with and I hereby approve said certificate this twentieth day of March A.D. eighteen hundred and eighty-eight.

Charles F. Indicott
Commissioner of Corporations

Articles of Amendment

(On File in the Office of the Secretary of the Commonwealth)

We, James D. Ebert, President, and David Shepro, Clerk of the Marine Biological Laboratory, located at Woods Hole, Massachusetts 02543, do hereby certify that the following amendment to the Articles of Organization of the Corporation was duly adopted at a meeting held on August 15, 1975, as adjourned to August 29, 1975, by vote of 444 members, being at least two-thirds of its members legally qualified to vote in the meeting of the corporation:

Voted. That the Certificate of Organization of this corporation be and it hereby is amended by the addition of the following provisions:

"No Officer, Trustee or Corporate Member of the corporation shall be personally liable for the payment or satisfaction of any obligation or liabilities incurred as a result of, or otherwise in connection with, any commitments, agreements, activities or affairs of the corporation.

"Except as otherwise specifically provided by the Bylaws of the corporation, meetings of the Corporate Members of the corporation may be held anywhere in the United States.

"The Trustees of the corporation may make, amend or repeal the Bylaws of the corporation in whole or in part, except with respect to any provisions thereof which shall by law, this Certificate or the bylaws of the corporation, require action by the Corporate Members."

The foregoing amendment will become effective when these articles of amendment are filed in accordance with Chapter 180, Section 7 of the General Laws unless these articles specify, in accordance with the vote adopting the amendment, a later effective date not more than thirty days after such filing, in which event the amendment will become effective on such later date.

In Witness whereof and Under the Penalties of Perjury, we have hereeto signed our names this 2nd day of September, in the year 1975, James D. Ebert, President; David Shepro, Clerk.

(Approved on October 24, 1975, as follows:

I hereby approve the within articles of amendment and, the filing fee in the amount of $10 having been paid, said articles are deemed to have been filed with me this 24th day of October, 1975.

Paul Guzzi
Secretary of the Commonwealth)

Bylaws

(Revised August 7, 1992 and December 10, 1992)

ARTICLE I—THE CORPORATION

A. Name and Purpose: The name of the Corporation shall be The Marine Biological Laboratory. The Corporation’s purpose shall be to establish and maintain a laboratory or station for scientific study and investigation and a school for instruction in biology and natural history.

R68
B. Nondiscrimination The Corporation shall not discriminate on the basis of age, religion, color, race, national or ethnic origin, sex or sexual preference in its policies on employment and administration or in its educational and other programs.

ARTICLE II—MEMBERSHIP

A. Members. The Members of the Corporation ("Members") shall consist of persons elected by the Board of Trustees (the "Board"); upon such terms and conditions and in accordance with such procedures, not inconsistent with law or these Bylaws, as may be determined by the Board. At any regular or special meeting of the Board, the Board may elect new Members. Members shall have no voting or other rights with respect to the Corporation or its activities except as specified in these Bylaws, and any Member may vote at any meeting of the Members in person only and not by proxy. Members shall serve until their death or resignation unless earlier removed with or without cause by the affirmative vote of two-thirds of the Trustees then in office. Any Member who has retired from his or her home institution may, upon written request to the Corporation, be designated a Life Member. Life Members shall not have the right to vote and shall not be assessed for dues.

B. Meetings. The annual meeting of the Members shall be held on the Friday following the first Tuesday in August of each year, at the Laboratory of the Corporation in Woods Hole, Massachusetts, at 9:30 a.m. The Chairperson of the Board shall preside at meetings of the Corporation. If any annual meeting is held in accordance with the foregoing provision, a special meeting may be held in lieu thereof with the same effect as the annual meeting, and in such case all references in these Bylaws, except in this Article II B., to the annual meeting of the Members shall be deemed to refer to such special meeting. Members shall transact business as may properly come before the meeting. Special meetings of the Members may be called by the Chairperson or the Trustees, and shall be held by the Clerk, or in the case of the death, absence, incapacity or refusal by the Clerk, by any other officer, upon written application of Members representing at least ten percent of the smallest quorum of Members required for a vote upon any matter at the annual meeting of the Members, to be held at such time and place as may be designated.

C. Quorum. One hundred (100) Members shall constitute a quorum at any meeting. Except as otherwise required by law or these Bylaws, the affirmative vote of a majority of the Members voting in person at a meeting attended by a quorum shall constitute action on behalf of the Members.

D. Notice of Meetings. Notice of any annual meeting or special meeting of Members, if necessary, shall be given by the Clerk by mailing notice of the time and place of such meeting at least 15 days before such meeting to each Member at his or her address as shown on the records of the Corporation.

E. Waiver of Notice. Whenever notice of a meeting is required to be given a Member, under any provision of the Articles of Organization or Bylaws of the Corporation, a written waiver thereof, executed before or after the Meeting by such Member, or his or her duly authorized attorney, shall be deemed equivalent to such notice.

F. Adjournments. Any meeting of the Members may be adjourned to any other time and place by the vote of a majority of Members present at the meeting, whether or not such Members constitute a quorum, or by any officer entitled to preside at or to act as Clerk of such meeting, if no Member is present or represented. It shall not be necessary to notify any Members of any adjournment unless no Member is present or represented at the meeting which is adjourned in which case, notice of the adjournment shall be given in accordance with Article III D. Any business which could have been transacted at any meeting of the Members as originally called may be transacted at an adjournment thereof.

ARTICLE III—ASSOCIATES OF THE CORPORATION

Associates of the Corporation. The Associates of the Marine Biological Laboratory shall be an unincorporated group of persons (including associations and corporations) interested in the Laboratory and shall be organized and operated under the general supervision and authority of the Trustees. The Associates of the Marine Biological Laboratory shall have no voting rights.

ARTICLE IV—BOARD OF TRUSTEES

A. Powers. The Board of Trustees shall have the control and management of the affairs of the Corporation. The Trustees shall elect a Chairperson of the Board who shall serve until his or her successor is elected and qualified. They shall annually elect a President of the Corporation. They shall annually elect a Vice Chairperson of the Board who shall be Vice Chairperson of the meetings of the Corporation. They shall annually elect a Treasurer. They shall annually elect a Clerk, who shall be a resident of Massachusetts. They shall elect Trustees-at-Large as specified in this Article IV. They shall appoint a Director of the Laboratory for a term not to exceed five years, provided the term shall not exceed one year if the candidate has attained the age of 65 years prior to the date of the appointment. They shall choose such other officers and agents as they shall think best. They may fix the compensation of all officers and agents of the Corporation and may remove them at any time. They may fill any vacancies occurring in any of the offices. The Board shall have the power to choose an Executive Committee from their own number as provided in Article V; and to delegate to such Committee such of their own powers as they may deem expedient in addition to those powers conferred by Article V. They shall, from time to time, elect Members to the Corporation upon such terms and conditions as they shall have determined, not inconsistent with law or these Bylaws.

B. Composition and Election.

1. The Board shall include 24 Trustees elected by the Board as provided below:

(a) At least six Trustees ("Corporate Trustees") shall be Members who are scientists, and the other Trustees ("Trustees-at-Large") shall be individuals who need not be Members or otherwise affiliated with the Corporation.

(b) The 24 elected Trustees shall be divided into four classes of six Trustees each, with one class to be elected each year to serve for a term of four years, and with each such class to include at least one Corporate Trustee. Such classes of Trustees shall be designated by the year of expiration of their respective terms.

2. The Board shall also include the Chief Executive Officer, Treasurer and the Chairperson of the Science Council, who shall be ex officio voting members of the Board.

3. Although Members or Trustees may recommend individuals for nomination as Trustees, nominations for Trustee elections shall be made by the Nominating Committee in its sole discretion. The Board may also elect Trustees who have not been nominated by the Nominating Committee.

C. Eligibility. A Corporate Trustee or a Trustee-at-Large who has been elected to an initial four-year term or remaining portion thereof, of which he/she has served at least two years, shall be eligible for re-election to a second four-year term, but shall be ineligible for re-election to any subsequent term until one year has elapsed after he/she has last served as a Trustee.

D. Removal. Any Trustee may be removed from office at any time with or without cause, by vote of a majority of the Members entitled to vote in the election of Trustees, or for cause, by vote of two-thirds of the Trustees then in office. A Trustee may be removed for cause only if notice of such action shall have been given to all of the Trustees or Members entitled to vote, as the case may be, prior to the meeting at which such action is to be taken and if the Trustee to be so removed shall have been given reasonable notice and opportunity to be heard before the body proposing to remove him or her.

E. Vacancies. Any vacancy in the Board may be filled by vote of a majority of the remaining Trustees present at a meeting of Trustees at which a quorum is present. Any vacancy in the Board resulting from the resignation or removal of a Corporate Trustee shall be filled by a Member who is a scientist.

F. Meetings. Meetings of the Board shall be held from time to time, not less frequently than twice annually, as determined by the Board. Special meetings of Trustees may be called by the Chairperson, or by any seven Trustees, to be held at such time and place as may be designated. The Chairperson of the Board, when present, shall preside over all meetings of the Trustees. Written notice shall be sent to a Trustee's usual or last known place of residence at least two weeks before the meeting. Notice of a meeting need not be given to any Trustee if a written waiver of notice executed by such Trustee before or after the meeting is filed with the records of the meeting, or if such Trustee shall attend the meeting without protesting prior thereto or at its commencement the lack of notice given to him or her.

G. Quorum and Action by Trustees. A majority of all Trustees then in office shall constitute a quorum. Any meeting of Trustees may be regarded as being present, whether or not a quorum is present, and the meeting may be held as adjourned without further notice. When a quorum is present at any meeting of the Trustees, a majority of the Trustees present and voting (excluding abstentions) shall decide any question, including the election of officers, unless otherwise required by law, the Articles of Organization or these Bylaws.

H. Transfers of Interest in Land. There shall be no transfers of title nor long-term lease of real property held by the Corporation without prior approval of not less than two-thirds of the Trustees. Such real property transactions shall be finally acted upon at a meeting of the Board only if presented and discussed at a prior meeting of the Board. Either meeting may be a special meeting and no less than four weeks shall elapse between the two meetings. Any property acquired by the Corporation after December 1, 1989 may be sold, any mortgage or pledge of real
property (regardless of when acquired) to secure borrowings by the Corporation may be granted, and any transfer of title or interest in real property pursuant to the foreclosure or endorsement of any such mortgage or pledge of real property may be effected by any holder of a mortgage or pledge of property of the Corporation, with the prior approval of not less than two-thirds of the Trustees (other than any Trustee or Trustee with a direct or indirect financial interest in the transaction being considered for approval) present at a regular or special meeting of the Board at which the matter is considered.

ARTICLE V—OFFICERS

A. Executive Committee. There shall be an Executive Committee of the Board of Trustees which shall consist of not more than eleven (11) Trustees, including ex officio Trustees, elected by the Board.

The Chairperson of the Board shall act as Chairperson of the Executive Committee and the Vice Chairperson as Vice Chairperson. The Executive Committee shall meet at such times and places and upon such notice and appoint such subcommittees as the Committee shall determine.

The Executive Committee shall have and may exercise all the powers of the Board during the intervals between meetings of the Board except those powers specifically withheld, from time to time, by vote of the Board or by law. The Executive Committee may also appoint such committees, including persons who are not Trustees, as it may, from time to time, approve to make recommendations with respect to matters to be acted upon by the Executive Committee or the Board.

The Executive Committee shall keep appropriate minutes of its meetings, which shall be reported to the Board. Any actions taken by the Executive Committee shall also be reported to the Board.

B. Nominating Committee. There shall be a Nominating Committee which shall consist of not fewer than four nor more than six Trustees appointed by the Board in a manner which shall reflect the balance between Corporate Trustees and Trustees-at-Large on the Board. The Nominating Committee shall nominate persons for election as Corporate Trustees and Trustees-at-Large, Chairperson of the Board, Vice Chairperson of the Board, President, Treasurer, Clerk, Director of the Laboratory and such other officers, if any, as needed, in accordance with the requirements of these Bylaws. The Nominating Committee shall also be responsible for overseeing the training of new Trustees. The Chairperson of the Board of Trustees shall appoint the Chairperson of the Nominating Committee. The Chairperson of the Science Council shall be an ex officio voting member of the Nominating Committee.

C. Science Council. There shall be a Science Council (the "Council") which shall consist of Members of the Corporation elected to the Board by vote of the Members of the Corporation, and which shall advise the Board with respect to matters concerning the Corporation's mission, its scientific and institutional endeavors, and the appointment and promotions of persons or committees with responsibility for matters requiring scientific expertise. Unless otherwise approved by a majority of the members of the Council, the Chairperson of the Council shall be elected annually by the Council. The chief executive officer of the Corporation shall be an ex officio voting member of the Council.

D. Board of Overseers. There shall be a Board of Overseers which shall consist of not fewer than five nor more than eight scientists who have expertise concerning matters with which the Corporation is involved. Members of the Board of Overseers may or may not be Members of the Corporation and may be appointed by the Board of Trustees on the basis of recommendations submitted from scientists and scientific organizations or societies. The Board of Overseers shall be available to review and offer recommendations to the officers, Trustees and Science Council regarding scientific activities conducted or proposed by the Corporation and shall meet from time to time, not less frequently than annually, as determined by the Board of Trustees.

E. Board Committees Generally. The Trustees may elect or appoint one or more other committees (including, but not limited to, an Investment Committee, a Development Committee, an Audit Committee, a Facilities and Capital Equipment Committee and a Long-Range Planning Committee) and may delegate to any such committee or committees any or all of their powers, except those which by law, the Articles of Organization or these Bylaws the Trustees are forbidden from delegating; provided that any committee to which the powers of the Trustees are delegated shall consist solely of Trustees. The members of any such committee shall have such tenure and duties as the Trustees shall determine. The Investment Committee, which shall oversee the management of the Corporation's endowment funds and marketable securities shall include as ex officio members, the Chairperson of the Board, the Treasurer and the Chairperson of the Audit Committee, together with such Trustees as may be required for not less than one-third of the Investment Committee to consist of Trustees. Except as otherwise provided by these Bylaws or determined by the Trustees, any such committee may make rules for the conduct of its business, but, unless otherwise provided by the Trustees or in such rules, its business shall be conducted as nearly as possible in the same manner as is provided by these Bylaws for the Trustees.

F. Actions Without a Meeting. Any action required or permitted to be taken at any meeting of the Executive Committee or any other committee elected by the Trustees may be taken without a meeting if all members of such committees consent to the action in writing and such written consents are filed with the records of meetings. Members of the Executive Committee or any other committee elected by the Trustees may also participate in any meeting by means of a telephone conference call, or otherwise take action in such a manner as may, from time to time, be permitted by law.

G. Manual of Procedures. The Board of Trustees, on the recommendation of the Executive Committee, shall establish guidelines and modifications thereof to be recorded in a Manual of Procedures. Guidelines shall establish procedures for:

1. Nomination and election of members of the Corporation, Board of Trustees and Executive Committee;
2. Election of Officers;
3. Formation and Function of Standing Committees.

ARTICLE VI—OFFICERS

A. Enumeration. The officers of the Corporation shall consist of a President, a Treasurer and a Clerk, and such other officers having the powers of President, Treasurer and Clerk as the Board may determine, and a Director of the Laboratory. The Corporation may have such other officers and assistant officers as the Board may determine, including (without limitation) a Chairperson of the Board, Vice Chairperson and one or more Vice Presidents, Assistant Treasurers or Assistant Clerks. Any two or more offices may be held by the same person. The Chairperson and Vice Chairperson of the Board shall be elected by and from the Trustees, but other officers of the Corporation need not be Trustees or Members. If required by the Trustees, any officer shall give the Corporation a bond for the faithful performance of his or her duties in such amount and with such sureties or sureties as shall be satisfactory to the Trustees.

B. Tenure. Except as otherwise provided by law, by the Articles of Organization or by these Bylaws, the President, Treasurer, and all other officers shall hold office until the first meeting of the Board following the annual meeting of Members and thereafter, until his or her successor is chosen and qualified.

C. Resignation. Any officer may resign by delivering his or her written resignation to the Corporation at its principal office or to the President or Clerk and such resignation shall be effective upon receipt unless it is specified to be effective at some other time or upon the happening of some other event.

D. Removal. The Board may remove any officer with or without cause by a vote of a majority of the entire number of Trustees then in office, at a meeting of the Board called for that purpose and for which notice of the purpose thereof has been given, provided that an officer may be removed for cause only after having an opportunity to be heard by the Board at a meeting of the Board at which a quorum is personally present and voting.

E. Vacancy. A vacancy in any office may be filled for the unexpired balance of the term by vote of a majority of the Trustees present at any meeting of Trustees at which a quorum is present or by written consent of all of the Trustees, if less than a quorum of Trustees shall remain in office.

F. Chairperson. The Chairperson shall have such powers and duties as may be determined by the Board and, unless otherwise determined by the Board, shall serve in that capacity for a term coterminous with his or her term as Trustee.

G. Vice Chairperson. The Vice Chairperson shall perform the duties and exercise the powers of the Chairperson in the absence or disability of the Chairperson, and shall perform such other duties and possess such other powers as may be determined by the Board. Unless otherwise determined by the Board, the Vice Chairperson shall serve for a one-year term.

H. Director. The Director shall be the chief operating officer and, unless otherwise voted by the Trustees, the chief executive officer of the Corporation. The Director shall, subject to the direction of the Trustees, have general supervision of the Laboratory and control of the business of the Corporation. At the annual meeting, the Director shall submit a report of the operations of the Corporation for such year and a statement of its affairs, and shall, from time to time, report to the Board all matters within his or her knowledge which the interests of the Corporation may require to be brought to its notice.

I. Deputy Director. The Deputy Director, if any, or if there shall be more than one, the Deputy Directors in the order determined by the Trustees, shall, in the
absence or disability of the Director, perform the duties and exercise the powers of the Director and shall perform such other duties and shall have such other powers as the Trustees may, from time to time, prescribe.

J. President. The President shall have the powers and duties as may be vested in him or her by the Trustees.

K. Treasurer and Assistant Treasurer. The Treasurer shall, subject to the direction of the Trustees, have general charge of the financial affairs of the Corporation, including its long-range financial planning, and shall cause to be kept accurate books of account. The Treasurer shall prepare a yearly report on the financial status of the Corporation to be delivered at the annual meeting. The Treasurer shall also prepare or oversee all filings required by the Commonwealth of Massachusetts, the Internal Revenue Service, or other Federal and State Agencies. The account of the Treasurer shall be audited annually by a certified public accountant.

The Assistant Treasurer, if any, of or if there shall be more than one, the Assistant Treasurer in the order determined by the Trustees, shall, in the absence or disability of the Treasurer, perform the duties and exercise the powers of the Treasurer, perform such other duties and shall have such other powers as the Trustees may, from time to time, prescribe.

L. Clerk and Assistant Clerk. The Clerk shall be a resident of the Commonwealth of Massachusetts, unless the Corporation has designated a resident agent in the manner provided by law. The minutes or records of all meetings of the Trustees and Members shall be kept by the Clerk who shall record, upon the record books of the Corporation, minutes of the proceedings at such meetings. He or she shall have custody of the record books of the Corporation and shall have such other powers and shall perform such other duties as the Trustees may, from time to time, prescribe.

The Assistant Clerk, if any, or if there shall be more than one, the Assistant Clerks in the order determined by the Trustees, shall, in the absence or disability of the Clerk, perform the duties and exercise the powers of the Clerk and shall perform such other duties and shall have such other powers as the Trustees may, from time to time, prescribe.

In the absence of the Clerk and an Assistant Clerk from any meeting, a temporary Clerk shall be appointed at the meeting.

M. Other Powers and Duties. Each officer shall have in addition to the duties and powers specifically set forth in these Bylaws, such duties and powers as are customarily incident to his or her office, and such duties and powers as the Trustees may, from time to time, designate.

ARTICLE VII—AMENDMENTS

These Bylaws may be amended by the affirmative vote of the Members at any meeting, provided that notice of the substance of the proposed amendment is stated in the notice of such meeting. As authorized by the Articles of Organization, the Trustees, by a majority of their number then in office, may also make, amend or repeal these Bylaws, in whole or in part, except with respect to (a) the provisions of these Bylaws governing (i) the removal of Trustees and (ii) the amendment of these Bylaws and (b) any provisions of these Bylaws by which, the Articles of Organization or these Bylaws, requires action by the Members.

No later than the time of giving notice of meeting of Members next following the making, amending or repealing by the Trustees of any Bylaw, notice thereof stating the substance of such change shall be given to all Members entitled to vote on amending the Bylaws.

Any Bylaw adopted by the Trustees may be amended or repealed by the Members entitled to vote on amending the Bylaws.

ARTICLE VIII—INDENMITY

Except as otherwise provided below, the Corporation shall, to the extent legally permissible, indemnify each person who is, or shall have been, a Trustee, director or officer of the Corporation or who is serving, or shall have served at the request of the Corporation as a Trustee, director or officer of another organization in which the Corporation directly or indirectly has any interest as a shareholder, creditor or otherwise, against all liabilities and expenses (including judgments, fines, penalties, and reasonable attorneys' fees and all amounts paid, other than to the Corporation or such other organization, in compromise or settlement) imposed upon or incurred by any such person in connection with, or arising out of, the defense or disposition of any action, suit or other proceeding, whether civil or criminal, in which he or she may be a defendant or with whom he or she may be threatened or otherwise involved, directly or indirectly, by reason of his or her being or having been such a Trustee, director or officer.

The Corporation shall provide no indemnification with respect to any matter as to which any such Trustee, director or officer shall be finally adjudicated in such action, suit or proceeding not to have acted in good faith in the reasonable belief that his or her action was in the best interests of the Corporation. The Corporation shall provide no indemnification with respect to any matter settled or comprised unless such matter shall have been approved as in the best interests of the Corporation, after notice that indemnification is involved, by (i) a disinterested majority of the Board of the Executive Committee, or (ii) a majority of the Members.

Indemnification may include payment by the Corporation of expenses in defending a civil or criminal action or proceeding in advance of the final disposition of such action or proceeding upon receipt of an undertaking by the person indemnified to repay such payment if it is ultimately determined that such person is not entitled to indemnification under the provisions of this Article VIII, or under any applicable law.

As used in the Article VIII, the terms “Trustee,” “director,” and “officer” include their respective heirs, executors, administrators and legal representatives, and an “interested” Trustee, director or officer is one against whom in such capacity the proceeding in question or another proceeding on the same or similar grounds is then pending.

To assure indemnification under this Article VIII of all persons who are determined by the Corporation or otherwise to be or to have been “inducers” of any employee benefits plan of the Corporation which may exist, from time to time, this Article VIII shall be interpreted as follows: (i) “another organization” shall be deemed to include such an employee benefit plan, including without limitation, any plan of the Corporation which is governed by the Act of Congress entitled “Employee Retirement Income Security Act of 1974”; as amended, from time to time, (“ERISA”); (ii) “Trustee” shall be deemed to include any person requested by the Corporation to serve as such for an employee benefit plan where the performance by such person or his or her duties to the Corporation also imposes duties on, or otherwise involves services by, such person to the plan or participants or beneficiaries of the plan; (iii) “fines” shall be deemed to include any excess tax plan pursuant to ERISA; and (iv) actions taken or permitted by a person with respect to an employee benefit plan in the performance of such person’s duties for a purpose reasonably believed by such person to be in the interest of the participants and beneficiaries of the plan shall be deemed to be for a purpose which is in the best interests of the Corporation.

The right of indemnification provided in this Article VIII shall not be exclusive of or affect any other rights to which any Trustee, director or officer may be entitled under any agreement, statute, vote of Members or otherwise. The Corporation’s obligation to provide indemnification under this Article VIII shall be offset to the extent of any other source of indemnification of any otherwise applicable insurance coverage under a policy maintained by the Corporation or any other person. Nothing contained in the Article shall affect any rights to which employees and corporate personnel other than Trustees, directors or officers may be entitled by contract, by vote of the Board or of the Executive Committee or otherwise.

ARTICLE IX—DISSOLUTION

The consent of every Trustee shall be necessary to effect a dissolution of the Marine Biological Laboratory. In case of dissolution, the property shall be disposed of in such a manner and upon such terms as shall be determined by the affirmative vote of two-thirds of the Trustees then in office in accordance with the laws of the Commonwealth of Massachusetts.

ARTICLE X—MISCELLANEOUS PROVISIONS

A. Fiscal Year. Except as otherwise determined by the Trustees, the fiscal year of the Corporation shall end on December 31st of each year.

B. Seal. Unless otherwise determined by the Trustees, the Corporation may have a seal in such form as the Trustees may determine, from time to time.

C. Execution of Instruments. All checks, deeds, leases, transfers, contracts, bonds, notes and other obligations authorized to be executed by an officer of the Corporation in its behalf shall be signed by the Director or the Treasurer except as the Trustees may generally or in particular cases otherwise determine. A certificate by the Clerk or an Assistant Clerk, or a temporary Clerk, as to any action taken by the Members, Board of Trustees or any officer or representative of the Corporation shall as to all persons who rely thereon in good faith be conclusive evidence of such action.

D. Corporate Records. The original, or attested copies, of the Articles of Organization, Bylaws and records of all meetings of the Members shall be kept in Massachusetts at the principal office of the Corporation, or at an office of the Corporation.
ration's Clerk or resident agent. Said copies and records need not be kept in the same office. They shall be available at all reasonable times for inspection by any Member for any proper purpose, but not to secure a list or catalog for a purpose other than in the interest of the applicant, as a Member, or to the affairs of the Corporation.

E. Articles of Organization. All references herein to the Articles of Organization shall be deemed to refer to the Articles of Organization of the Corporation, as amended and in effect from time to time.

F. Transactions with Interested Parties. In the absence of fraud, no contract or other transaction between this Corporation and another corporation or any firm, association, partnership or person, or any corporation or firm, association, partnership or person invalidated by the fact that any Trustee or officer of this Corporation is pecuniarily or otherwise interested in or is a director, member or officer of such other corporation or of such firm, association or partnership or in or is pecuniarily or otherwise interested in such contract or other transaction or is in any way connected with any person or firm, association, partnership, or corporation peculiarly or otherwise interested therein; provided that the fact that he or she individually or as a director, member or officer of such corporation, firm, association or partnership in such a party or is so interested shall be disclosed to or shall have been known by the Board of Trustees or a majority of such Members thereof as shall be present at a meeting of the Board of Trustees at which action upon any such contract or transaction shall be taken; any Trustee may be counted in determining the existence of a quorum and may vote at any meeting of the Board of Trustees for the purpose of authorizing any such contract or transaction with like force and effect as if he/she were not so interested, or were not a director, member or officer of such other corporation, firm, association or partnership, provided that any vote with respect to such contract or transaction must be adopted by a majority of the Trustees then in office who have no interest in such contract or transaction.