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FOUNDERS, TRUSTEES AND OFFICERS OF THE BOARD AND OF THE CORPORATION

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HARRY WOOLF
INSTITUTE FOR ADVANCED STUDY  
Princeton, New Jersey

REPORT OF THE CHAIRMAN

This report covers a period marked by significant global events. The Institute reflected this exciting time and welcomed an extraordinary number of scholars from Eastern Europe and China — thereby expanding the networks of important intellectual exchanges in the sciences and humanities throughout the worldwide academic community.

The Board of Trustees was enriched through the additions of Rand V. Araskog, Bernard Bailyn, Theodore L. Cross, and Hamish Maxwell.

Rand V. Araskog, a native of Minnesota, graduated from the U. S. Military Academy at West Point and attended the Harvard Graduate School of Arts and Sciences before joining the office of the Secretary of Defense (1954-59). He was with Honeywell, Inc. in Minneapolis until 1966, when he joined the ITT System as director of marketing for its U. S. Defense-Space Group. He has been chief executive of ITT Corporation since 1979 and chairman since 1980. He is a director of the New York Stock Exchange as well as of Dayton Hudson Corporation, Dow Jones & Company, Inc., Hartford Fire Insurance Company and Shell Oil Company and is chairman of the Economic Club of New York and a member of the Council on Foreign Relations. He is the author of *The ITT Wars* (1989) and of articles that have appeared in *The New York Times* and elsewhere.

Bernard Bailyn was born in Hartford, Connecticut and educated at Williams College and Harvard University. He has taught at Harvard since 1949, becoming Professor in 1961 and Winthrop Professor of History in 1966. He was appointed Adams University Professor in 1981, and in 1983 he was named Director of the Charles Warren Center for Studies in American History. He is a member of the American Historical Association (President, 1981), a corresponding Fellow of the British Academy and a member of the American Academy of Arts and Sciences and other scholarly societies. His books include *The Ideological Origins of the American Revolution*, for which he received the Pulitzer and Bancroft Prizes in 1968, *The Origin of American Politics*, *The Ordeal of Thomas Hutchinson*, which was awarded the National Book Award in History in 1975, and *Voyagers to the West*, which won the Pulitzer Prize in 1987.

Theodore L. Cross, born near Boston, went from Amherst College to the Harvard Law School, where he was Editor of the *Harvard Law Review*. He has been a consultant to the U. S. Office of Economic Opportunity and the Department of Health, Education and Welfare. His books include *Black Capitalism*, *The Black Power Imperative* and *Behind the Great Wall* (the last-mentioned co-authored with his wife, Mary Cross). He was co-founder, chairman and chief executive officer
of the publishing company Warren, Gorham & Lamont. Since 1985 he has been chairman of Faulkner & Gray, Inc. He is a trustee of the Folger Shakespeare Library and of Princeton University Press, a member of the Legal Defense Fund of the N.A.A.C.P. and Director of the Institute for Scientific Information.

Hamish Maxwell was born in England and educated at the University of Cambridge. His career with Philip Morris began in 1954. After 1961, he held executive positions with Philip Morris International, which he served as president and chief executive officer from 1978 to 1983. Since 1984, he has been chairman and chief executive officer of Philip Morris Companies, Inc., the parent company of Philip Morris Incorporated, Philip Morris International, Inc., Kraft General Foods and Miller Brewing Company.

In 1990, Dr. Marvin L. Goldberger announced his retirement as director, to be effective in July, 1991. This enormously capable leader leaves the Institute with the deepest regret and with the warm recognition and appreciation of both the Board of Trustees and Faculty. A noted physicist of quick wit and precise intellect, Dr. Goldberger has enhanced the remarkable work of the Institute through his gifts of extraordinary diplomacy and scholarship. Together with his wife, Mildred, he added greatly to the spirit and cohesion of the institution. We thank them and wish them both well.

The seventh director of the Institute is Dr. Phillip A. Griffiths. Dr. Griffiths joins the Institute from Duke University, where he had been Provost and James B. Duke Professor of Mathematics since 1983. He combines the strengths of a world-class mathematician and a superb administrator. The Institute will be most fortunate to benefit from his leadership.

It is an honor to work with the distinguished Board and Faculty of the Institute. In closing, I would like to share a quote from one of our Trustees, G. Daniel Mostow, who said, "Centuries from now, the contributions of the Institute will still be discernible in the fabric of science and technology of that hard-to-imagine future. I believe earnestly that the Institute and the world’s leading universities are the glory of our civilization; that long after the twenty-first century, generations will continue to admire the conjunction of individual genius and private capital that underlay our enduring contributions to knowledge.”

James D. Wolfensohn, Chairman of the Board
It was my pleasure this year to welcome Professor Oleg Grabar to the Faculty of the School of Historical Studies. Professor Grabar, formerly the Aga Khan Professor of Islamic art at Harvard University, was born in France and received his BA from Harvard University and his Ph.D. in Oriental Languages and Literatures and History of Art from Princeton University. Professor Grabar is one of the world’s leading Islamicists, and his work reflects a profound and broad knowledge of all aspects of Islamic history, bringing to bear a wide range of historical perspectives: political, economic, religious, and literary. His work spans participation in field archaeology (directing the excavation of the Moayyad palace at Qasr al-Hayr al-Sharqi in Syria in 1978) to highly theoretical interpretations of Islamic aesthetics.

Professor Grabar has written on many aspects of Islamic art, including its architecture, miniatures, mural paintings and coins. Among his published works are The Formation of Islamic Art (1973, 1987), The Art and Architecture of Islam (with Richard Ettinghausen, 1987) and, most recently, The Great Mosque of Isfahan (1989). Soon to be published are his Mellon lectures on ornament which were delivered at the National Gallery of Art under the title Intermediary Demons: Toward a Theory of Ornament.

The Institute has been saddened by the loss of several important colleagues: Felix Gilbert, Professor Emeritus, School of Historical Studies, who died on February 14, 1991; James F. Gilliam, Professor Emeritus, School of Historical Studies, on March 16, 1990; and Otto E. Neugebauer, Long-Term Member, Schools of Historical Studies and Natural Sciences, on February 19, 1990. The work of these fine scholars not only commanded wide respect, but each man had a profound impact as well on the research of younger scholars.

John H. Elliott, Professor in the School of Historical Studies since 1973, became Regius Professor of Modern History at the University of Oxford in June of 1990. John W. Milnor, Professor in the School of Mathematics since 1970, became Professor and Director of the Institute for Mathematical Sciences of the State University of New York at Stony Brook.

The Institute has a tradition of having Director’s Visitors which provides an opportunity for attracting distinguished people whose interests frequently do not fall into the normal school structure of the Institute. The Institute community is thereby enriched, and the visitors are stimulated by their exposure to the Faculty and Members. Another aspect of the program is that it provides an opportunity to explore new areas which at some future time might become part of the Institute’s on-going activities.
It was a pleasure to have as Director’s Visitors during 1989-91 Joel E. Cohen, Professor of Populations, The Rockefeller University; Richard J. Eden, Professor of Energy Studies at the University of Cambridge; Professor Fang LiZhi, former Director, Center for Astrophysics, University of Science & Technology, People’s Republic of China; Vladimir Gribov, Professor of Physics, L.D. Landau Institute for Theoretical Physics in Moscow; Arnold Newman, photographer; Lev Okun, Head of Laboratory of Elementary Particle Theory, Institute of Experimental and Theoretical Physics, Moscow; Yakov Smorodinski, Kurchatov Institute of Atomic Energy, Moscow; and Gerald Wasserburg, Division of Geological and Planetary Sciences, California Institute of Technology.

At its biennial meeting in May, 1990, the Association of Members of the Institute for Advanced Study (AMIAS) elected Robert S. Doran, president. Dr. Doran, professor of mathematics at Texas Christian University, succeeds Dr. David Pingree.

The research of the Institute is shared through a wide variety of publications, seminars and lectures. In 1989-90, the Faculty of the School of Historical Studies presented a series of lectures that were open to the public. These were followed in 1990-91 by Faculty Lectures by the Schools of Natural Sciences and Social Science. The often over-flowing audiences for these lectures spoke strongly to the Institute’s need for a larger lecture hall. I am pleased to report that plans have progressed well for the construction of the mathematics building and lecture hall with ground-breaking to take place during the fall of 1991.

I am very grateful for all of the support received by the Institute from its Board of Trustees, other individuals, foundations, corporations and the government. The Friends of the Institute has flourished under the leadership of Frank E. Taplin, Jr. and an outstanding Executive Committee.

Important new foundation grants have supported the research of all four Schools. These programs include two-year support for younger scholars in the School of Historical Studies by the Sherman Fairchild Foundation; support for long-term Members in astrophysics and theoretical physics by the W. M. Keck Foundation; three years of parallel and complementary interdisciplinary programs in the Schools of Historical Studies and Social Science by The Andrew W. Mellon Foundation; important programs in both the Schools of Mathematics and Natural Sciences by The Ambrose Monell Foundation; lectures and research in theoretical biophysics by The Seaver Institute; and special programs in the School of Mathematics by the Sloan Foundation.
Government support such as that from the National Science Foundation, NASA, the National Endowment for the Humanities and the State of New Jersey is also recognized with gratitude.

It is with the greatest appreciation that I thank all who contribute to the Institute. Only with this support is the Institute able to continue to pursue independent research at its highest and most productive level.

Marvin L. Goldberger, Director

A speech presented by Marvin L. Goldberger, Director, on May 5, 1990.

There is nothing quite like the Institute for Advanced Study in Princeton, New Jersey. Founded in 1930 by the Bamberger family, it was the inspiration of the renowned educator Abraham Flexner and remains today essentially unchanged, a tribute to his genius. Located on an 800-acre site on the outskirts of Princeton, the Institute is totally independent of Princeton University. There is a Faculty but no students; there is no teaching yet the Institute has a vital educational role; there are no laboratories, but a great deal of research is done. There are 22 permanent Faculty and about 150 visitors (called Members) who come with their families for a year. What kind of strange place is this and how has it maintained its vitality for nearly 60 years?

The original idea of the Institute was to provide a place where a relatively small number of outstanding scholars could work free from the obligations and distractions from research that are inevitably (and properly) present at a university, even the so-called research universities. It was quickly realized, primarily by one of the original Faculty, the mathematician Oswald Veblen, that this would rapidly produce a sterile atmosphere and proposed that there should be a continuing flow of young post-doctoral students as well as a number of older scholars in addition to the Faculty. This annual renewal has been and continues to be the lifeblood of the Institute. Flexner, who became the first Director, chose mathematics to be the first School because it was a field of great intellectual significance and also one in which there were unarguable objective criteria of excellence. His initial appointments of Veblen, John von Neumann and Herman Weyl were selected from the faculty of Princeton and the Institute was, in fact, housed in Fine Hall on the campus until the first permanent building was erected on the present Institute campus. Flexner's greatest coup was the hiring of Albert Einstein. This gave instant credibility to the fledgling endeavor. Mathematics and physics flourished and soon world-class scholars in archaeology, art history, other branches of history, economics, and political science were added to the Faculty. Among this group was the great art historian Erwin Panofsky, as renowned in his field as Einstein was in physics, and archaeologist-classicist Homer Thompson who is still active as an emeritus professor.
Robert Oppenheimer's appearance on the scene after the War as Director was electric. The charismatic hero of the atom bomb project was a magnet for the cream of the post-war crop of theoretical physicists. Faculty appointments included Abraham Pais, Freeman Dyson, C.N. Yang and T.D. Lee (the latter two won the Nobel Prize in physics in 1957 for work done at the Institute). Later accomplishments of the Members have been noteworthy: altogether nine future Nobel Laureates are alumni, as well as winners of the Wolf Prize and MacArthur Prize. The present Faculty of the School of Natural Sciences is exceptional. Five of the six are members of the National Academy of Sciences. Someone likened the two most recent appointments (Edward Witten and Frank Wilczek) to having Roger Clemens and Orel Hershiser on the same team.

It was not only in physics that brilliant appointments were made under Oppenheimer. Mathematicians Borel, Milnor, Montgomery, Selberg, Weil and Whitney joined the School of Mathematics and George Kennan came to the School of Historical Studies, an unusual appointment not without its opposition among the Faculty. It was, of course, a brilliant one and this great man is still active although now an emeritus professor.

The youngest of what are now four Schools is the School of Social Science started during the administration of Carl Kaysen who succeeded Oppenheimer in 1966. (Mathematics and physics split amicably in 1965 when the School of Natural Sciences was established, signifying the appearance among the physicists of astrophysicists.) There are currently three Faculty in Social Science with primary interests in cultural anthropology, political philosophy, and social history; political economics is represented by emeritus professor Albert Hirschman.

The permanent Faculty today still consists of superstars. The Institute continues to be able to hire the very best in spite of the existence at major universities of research professorships offering comparable freedom. The 150 annual Members are selected from among roughly 1000 applicants and the rate of acceptance of invitations is almost 100%. It seems clear that the Institute is doing something very right and something judged by at least the academic community as being very worthwhile. But what is this thing it does? Why should it continue to exist? Why does it merit support from the outside world?

The permanent Faculty do research, learn from each other, guide and learn from the Members; some of them teach at Princeton on a voluntary basis and supervise Ph.D. theses. The Members do research and learn from each other and from the Faculty. Everyone participates in seminars at the Institute, at Princeton University and increasingly at nearby Rutgers. The only obligation the Faculty and Members have is a full-time commitment to research.

The opportunity for total immersion in research is enormously stimulating both for young post-docs trying to begin an existence as independent scholars, and
for older ones to complete work or to take up something entirely different. The Members live together in an apartment complex within walking distance of the campus and eat at a superb dining hall. The whole setup encourages interaction among people from different disciplines and different cultures since the Members come from all over the world. Although the "Two Culture" problem is far from being solved here, the chances for doing so are greater than in a university setting where size and tradition militate against too much interaction. So, what the Institute "does" is to provide a place for people to do research and teach each other under optimal conditions as nearly free from outside stress as is possible. One Member has described it as "paradise without apples or snakes."

Why should the Institute continue to exist? If it didn't exist, should it be created and, if so, how would it differ from what is here? The fact that the Institute can still attract world-class Faculty away from the most prestigious universities and the best and brightest post-docs as Members is proof of its vitality. However, the circumstances that led Flexner to invent the Institute have changed. There are now many more research and post-doctoral opportunities and federal agencies that support such endeavors and thus the Institute's post-graduate educational role is no longer almost unique as it was before World War II. But what makes the Institute different from the universities as a research environment is the way the various pieces come together.

Consider, for example, the young post-docs in mathematics, about 60 in any year. This sheer number of people, all fanatically interested in the same general field, is something no university can offer. In addition, the mathematics community consisting of Institute Faculty and the faculties of Princeton University and Rutgers is simply unmatched. There are few prominent mathematicians in the world that have not passed through the Institute at one time or another. For example, the mathematics equivalent of the Nobel Prize, the Fields Medal, has been awarded 31 times; 18 of the awardees were at the Institute before getting the Medal and many of the rest at some time later. Seven past and present Faculty members are Fields Medalists.

Very much the same can be said for the environment of the 40-odd young physicists and astrophysicists who come each year. The Physics Department at Princeton has always been outstanding and that at Rutgers has improved dramatically in recent years, making the physics environment unusually exciting and attractive. For the past seventeen years the weekly astrophysics lunch seminar has been attended by scientists from up and down the Eastern seaboard and is generally regarded as the clearing house for all hot information. The Members in the School generally tend to stay for two years, but there are a small number of five-year Members who have invariably gone on to tenured appointments at major universities or at the Institute. There are usually several senior people in residence on sabbatical leave from their home institutions.
The atmosphere and style of operation, while no less exciting, is quite different in the Schools of Historical Studies and Social Science. The Members, about 30 in Historical Studies and 20 in Social Science, tend to be mature scholars who already have tenured appointments at universities. They come here to write books, to participate in special programs and to study with the distinguished permanent Faculty. Obviously, a small institution cannot cover all of the humanities. Emphasis in history is ancient Greece and Rome, medieval and modern European history and art history. Social Science consists, at present, of cultural anthropology, political philosophy, and social history. There is an unusually close relationship with Princeton University and the Institute enjoys full privileges at Firestone Library. The presence of this vigorous scholarly activity in the humanities under the same roof with scientific research is one of the things that makes the Institute unique.

On balance, a modern day Flexner, provided he or she were smart enough, wouldn't go too far wrong to re-invent the Institute largely unchanged in overall form. There are some research areas which might well have been expected to flourish that might be encouraged in a reincarnation (and which might well appear here in the future anyway) such as history of science, philosophy, linguistics and aspects of theoretical biology.

Finally, the question of whether the Institute merits support from the outside world must be addressed. The answer from Federal funding agencies like the National Science Foundation, Department of Energy, and the National Endowment for the Humanities (all of which gave us very broad umbrella grants and allow us near total discretion in the use of their funds) is a resounding yes. Foundations likewise are sympathetic to our efforts although they largely insist on the quid pro quo of rather well defined projects. Contributions from corporations are much more difficult to obtain. The Institute's product — books and journal articles — is rather esoteric and only rarely has any practical applications that would excite stockholders. There are few, if any, wealthy alumni to call on. Philanthropically inclined people are often more naturally attracted to their own alma maters. We must, therefore, rely heavily on Trustees for unrestricted funds and individuals who might want to be associated with this unique institution.

A truly civilized society should be prepared to support the highest form of pure intellectual endeavor without regard for immediate practical applications. In the long run, the obscure mathematics and physics at the forefront will inevitably have profound implications philosophically and maybe even practically. In the same way, deepening our understanding and appreciation of the humanities affects how we think about and respect ourselves and will influence how future historians will evaluate our civilization.
ACKNOWLEDGMENTS

The Institute for Advanced Study expresses its deepest appreciation for all gifts and grants to its endowment, for its annual operating support and for in-kind contributions of equipment. These gifts together with careful, coherent stewardship of the endowment and a judicious budgetary process for fund allocation have allowed the Institute to retain its independence and continue to support the expansion of fundamental scientific knowledge and scholarship in the humanities.

Special gratitude is extended to the following individuals and organizations who were major donors to the Institute during the fiscal year 1989-90 and/or 1990-91.

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BEQUEST

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This estate was gratefully received by the
Institute for Advanced Study
in memory of Dr. Erik Ellentuck,
a past Member in the School of Mathematics
INDEPENDENT AUDITORS' REPORT

The Board of Trustees
Institute for Advanced Study —
Louis Bamberger and Mrs. Felix Fuld Foundation

We have audited the accompanying balance sheet of Institute for Advanced Study — Louis Bamberger and Mrs. Felix Fuld Foundation (the “Institute”) as of June 30, 1991, and the related statements of support and revenue, expenses, capital additions and changes in fund balances and of changes in financial position for the year then ended. These financial statements are the responsibility of the Institute’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, such financial statements present fairly, in all material respects, the financial position of the Institute at June 30, 1991 and the results of its operations and the changes in its financial position for the year then ended in conformity with generally accepted accounting principles.

DELOITTE & TOUCHE
Parsippany, New Jersey
August 19, 1991
# Institute for Advanced Study

**BALANCE SHEET**  
**JUNE 30, 1991 [WITH COMPARATIVE AMOUNTS FOR 1990]**

<table>
<thead>
<tr>
<th>Assets</th>
<th>1991</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPERATING FUNDS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and temporary investments</td>
<td>$780,959</td>
<td>$257,921</td>
</tr>
<tr>
<td>Accounts receivable</td>
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<td>95,188</td>
</tr>
<tr>
<td>Government grants and contracts receivable</td>
<td>953,203</td>
<td>249,668</td>
</tr>
<tr>
<td>Accrued income on investments</td>
<td>1,325,729</td>
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<tr>
<td>Prepaid and other assets</td>
<td>245,022</td>
<td>224,534</td>
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<tr>
<td><strong>TOTAL OPERATING FUNDS</strong></td>
<td>$3,368,302</td>
<td>$2,592,186</td>
</tr>
<tr>
<td><strong>PLANT FUNDS:</strong></td>
<td></td>
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</tr>
<tr>
<td>Debt service fund deposits</td>
<td>$458,114</td>
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</tr>
<tr>
<td>Unamortized debt issuance expense</td>
<td>62,142</td>
<td>65,250</td>
</tr>
<tr>
<td><strong>TOTAL PLANT FUNDS</strong></td>
<td>$17,736,655</td>
<td>$15,812,615</td>
</tr>
<tr>
<td><strong>ENDOWMENT AND SIMILAR FUNDS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investments, at cost [Notes B &amp; D]</td>
<td>$182,886,503</td>
<td>$185,513,158</td>
</tr>
<tr>
<td><strong>TOTAL ENDOWMENT AND SIMILAR FUNDS</strong></td>
<td>$182,886,503</td>
<td>$185,513,158</td>
</tr>
</tbody>
</table>

See Notes to Financial Statements
<table>
<thead>
<tr>
<th>LIABILITIES AND FUND BALANCES</th>
<th>1991</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATING FUNDS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts payable and accrued expenses</td>
<td>$1,653,510</td>
<td>$892,309</td>
</tr>
<tr>
<td>Deferred restricted revenue [Note F]</td>
<td>1,536,791</td>
<td>884,113</td>
</tr>
<tr>
<td>Fund balance — unrestricted</td>
<td>178,001</td>
<td>815,764</td>
</tr>
<tr>
<td>TOTAL OPERATING FUNDS</td>
<td>$3,368,302</td>
<td>$2,592,186</td>
</tr>
<tr>
<td>PLANT FUNDS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest payable [Note D]</td>
<td>$293,114</td>
<td>$298,074</td>
</tr>
<tr>
<td>Long-term debt [Note D]</td>
<td>7,489,435</td>
<td>7,640,657</td>
</tr>
<tr>
<td>Plant fund balance</td>
<td>9,954,106</td>
<td>7,873,884</td>
</tr>
<tr>
<td>TOTAL PLANT FUNDS</td>
<td>$17,736,655</td>
<td>$15,812,615</td>
</tr>
<tr>
<td>ENDOWMENT AND SIMILAR FUNDS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fund balances:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True endowment</td>
<td>$37,923,222</td>
<td>$37,761,052</td>
</tr>
<tr>
<td>Quasi-endowment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restricted</td>
<td>16,740,382</td>
<td>16,091,183</td>
</tr>
<tr>
<td>Unrestricted:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designated</td>
<td>11,560,295</td>
<td>10,213,085</td>
</tr>
<tr>
<td>Undesignated</td>
<td>116,662,604</td>
<td>121,447,838</td>
</tr>
<tr>
<td>TOTAL ENDOWMENT AND SIMILAR FUNDS</td>
<td>$182,886,503</td>
<td>$185,513,158</td>
</tr>
</tbody>
</table>
STATEMENT OF SUPPORT AND REVENUE, EXPENSES, CAPITAL ADDITIONS AND CHANGES IN FUND BALANCES FOR THE YEAR ENDED JUNE 30, 1991 [WITH COMPARATIVE TOTALS FOR 1990]

<table>
<thead>
<tr>
<th>OPERATING FUNDS</th>
<th>UNRESTRICTED</th>
<th>RESTRICTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPPORT AND REVENUE:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endowment income [net of management fees]</td>
<td>$6,145,280</td>
<td>$2,375,450</td>
</tr>
<tr>
<td>Private gifts and grants</td>
<td>500</td>
<td>1,274,604</td>
</tr>
<tr>
<td>Government grants and contracts</td>
<td></td>
<td>2,621,374</td>
</tr>
<tr>
<td>Total support and revenue</td>
<td>6,145,780</td>
<td>6,271,428</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPENSES:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Mathematics</td>
<td>1,038,735</td>
</tr>
<tr>
<td>School of Natural Sciences</td>
<td>1,539,086</td>
</tr>
<tr>
<td>School of Historical Studies</td>
<td>1,707,360</td>
</tr>
<tr>
<td>School of Social Science</td>
<td></td>
</tr>
<tr>
<td>Libraries and other academic expenses</td>
<td>1,626,301</td>
</tr>
<tr>
<td>Administration and general</td>
<td>2,614,286</td>
</tr>
<tr>
<td>Auxiliary activity — tenants' housing expenses, net of unrestricted revenue of $224,039 in 1991</td>
<td>52,335</td>
</tr>
<tr>
<td>Total expenses</td>
<td>8,578,303</td>
</tr>
</tbody>
</table>

| EXCESS [DEFICIENCY] OF SUPPORT AND REVENUE OVER EXPENSES BEFORE CAPITAL ADDITIONS | [2,432,523] | [270,168] |

<table>
<thead>
<tr>
<th>CAPITAL ADDITIONS:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gifts and grants</td>
<td></td>
</tr>
<tr>
<td>Realized gain on investments — net</td>
<td></td>
</tr>
<tr>
<td>Gain on sale of plant assets</td>
<td></td>
</tr>
<tr>
<td>Investment income</td>
<td></td>
</tr>
<tr>
<td>Total capital additions</td>
<td></td>
</tr>
</tbody>
</table>

| EXCESS [DEFICIENCY] OF SUPPORT AND REVENUE OVER EXPENSES AFTER CAPITAL ADDITIONS | [2,432,523] | [270,168] |

| FUND BALANCES AT BEGINNING OF YEAR | 815,764 |

<table>
<thead>
<tr>
<th>TRANSFERS:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant acquisitions and principal debt service payments, net</td>
<td>[2,730,767]</td>
</tr>
<tr>
<td>Quasi-endowment funds utilized</td>
<td>4,637,753</td>
</tr>
<tr>
<td>Transfers to other endowment and similar funds</td>
<td>[112,226]</td>
</tr>
<tr>
<td>Total transfers</td>
<td></td>
</tr>
</tbody>
</table>

| FUND BALANCES AT END OF YEAR | $178,001 | $-0- |

See Notes to Financial Statements
<table>
<thead>
<tr>
<th>TOTAL</th>
<th>PLANT FUNDS</th>
<th>ENDO突IOM AND SIMILAR FUNDS</th>
<th>TOTAL 1991 ALL FUNDS</th>
<th>TOTAL 1990 ALL FUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,520,730</td>
<td>$ 68,075</td>
<td>$ 8,588,805</td>
<td>$ 8,548,767</td>
<td>$ 8,548,767</td>
</tr>
<tr>
<td>1,275,104</td>
<td></td>
<td>1,275,104</td>
<td>1,077,708</td>
<td></td>
</tr>
<tr>
<td>2,621,374</td>
<td></td>
<td>2,621,374</td>
<td>2,717,296</td>
<td></td>
</tr>
<tr>
<td>12,417,208</td>
<td></td>
<td>68,075</td>
<td>12,485,283</td>
<td>12,343,771</td>
</tr>
<tr>
<td>3,136,888</td>
<td>277,995</td>
<td>3,414,883</td>
<td>3,024,450</td>
<td></td>
</tr>
<tr>
<td>3,431,559</td>
<td>393,318</td>
<td>3,824,877</td>
<td>3,532,040</td>
<td></td>
</tr>
<tr>
<td>2,505,504</td>
<td>152,255</td>
<td>2,657,759</td>
<td>2,592,334</td>
<td></td>
</tr>
<tr>
<td>1,325,905</td>
<td>70,689</td>
<td>1,396,594</td>
<td>1,506,741</td>
<td></td>
</tr>
<tr>
<td>1,955,822</td>
<td>154,093</td>
<td>2,109,915</td>
<td>1,815,552</td>
<td></td>
</tr>
<tr>
<td>2,619,526</td>
<td>196,142</td>
<td>2,815,668</td>
<td>2,749,194</td>
<td></td>
</tr>
<tr>
<td>144,695</td>
<td>106,933</td>
<td>251,628</td>
<td>289,730</td>
<td></td>
</tr>
<tr>
<td>15,119,899</td>
<td>1,351,425</td>
<td>16,471,324</td>
<td>15,510,041</td>
<td></td>
</tr>
</tbody>
</table>

[2,702,691] [1,283,350] [3,986,041] [3,166,270]

| 1,030,003   | $ 959,804   | 1,989,807                  | 157,543              |
| 809,236     | 809,236     | 13,598,158                 | 443,469              |
| 2,802       |            | 2,802                      | 2,917                |
| 1,032,805   | 1,769,040   | 2,801,845                  | 14,202,087           |

[2,702,691] [250,545] [1,184,196] 11,035,817

815,764 7,873,884 185,513,158 194,202,806 183,166,989

[2,730,767] 2,730,767 [4,918,847]

4,918,847 [400,000] 523,152

$ 178,001 $ 9,954,106 $182,886,503 $193,018,610 $194,202,806

25
STATEMENT OF CHANGES IN FINANCIAL POSITION
FOR THE YEAR ENDED JUNE 30, 1991 [WITH COMPARATIVE TOTALS FOR 1990]

<table>
<thead>
<tr>
<th>Resources Provided:</th>
<th>Operating Funds</th>
<th>Plant Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficiency of support and revenue over expenses before capital additions</td>
<td>$[2,702,691]</td>
<td>$[1,283,350]</td>
</tr>
<tr>
<td>Capital additions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gifts and grants</td>
<td>1,030,003</td>
<td></td>
</tr>
<tr>
<td>Realized gain on investments — net</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain on sale of plant assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment income</td>
<td></td>
<td>2,802</td>
</tr>
<tr>
<td>Excess [deficiency] of support and revenue over expenses after capital additions</td>
<td>[2,702,691]</td>
<td>[250,545]</td>
</tr>
<tr>
<td>Items not using [providing] resources:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td>1,351,425</td>
</tr>
<tr>
<td>Amortization of debt issuance expense</td>
<td></td>
<td>3,108</td>
</tr>
<tr>
<td>Gain on sale of investments — net</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain on sale of plant assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proceeds from sale of investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proceeds from sale of plant assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in receivables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in accrued income</td>
<td>439,146</td>
<td></td>
</tr>
<tr>
<td>Increase in payables</td>
<td>766,194</td>
<td></td>
</tr>
<tr>
<td>Increase in deferred restricted revenue</td>
<td>647,685</td>
<td></td>
</tr>
<tr>
<td>Total resources provided [used]</td>
<td>[849,666]</td>
<td>1,103,988</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resources Used:</th>
<th>Operating Funds</th>
<th>Plant Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchases of investments</td>
<td></td>
<td>3,273,533</td>
</tr>
<tr>
<td>Purchases of plant facilities and equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in receivables</td>
<td>671,735</td>
<td></td>
</tr>
<tr>
<td>Increase in deferred charges</td>
<td>20,489</td>
<td></td>
</tr>
<tr>
<td>Increase in debt service fund deposits</td>
<td></td>
<td>5,040</td>
</tr>
<tr>
<td>Increase in accrued income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in payables</td>
<td></td>
<td>4,960</td>
</tr>
<tr>
<td>Decrease in deferred restricted revenue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction of long-term debt</td>
<td></td>
<td>151,222</td>
</tr>
<tr>
<td>Total resources used</td>
<td>692,224</td>
<td>3,434,755</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transfers:</th>
<th>Operating Funds</th>
<th>Plant Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant acquisitions and principal debt service payments</td>
<td>[2,730,767]</td>
<td>2,730,767</td>
</tr>
<tr>
<td>Quasi-endowment funds utilized</td>
<td>4,918,847</td>
<td></td>
</tr>
<tr>
<td>Transfers to other endowment and similar funds</td>
<td>[123,152]</td>
<td>[400,000]</td>
</tr>
<tr>
<td>Total transfers</td>
<td>2,064,928</td>
<td>2,330,767</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increase (Decrease) in Cash and Temporary Investments</th>
<th>Operating Funds</th>
<th>Plant Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ 523,038</td>
<td>$ 0</td>
<td></td>
</tr>
</tbody>
</table>

See Notes to Financial Statements
## FINANCIAL STATEMENTS

<table>
<thead>
<tr>
<th>ENDOWMENT AND SIMILAR FUNDS</th>
<th>TOTAL 1991</th>
<th>TOTAL 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$ [3,986,041]</td>
<td>$ [3,166,270]</td>
</tr>
<tr>
<td></td>
<td>$ 959,804</td>
<td>157,543</td>
</tr>
<tr>
<td></td>
<td>809,236</td>
<td>13,598,158</td>
</tr>
<tr>
<td></td>
<td>2,802</td>
<td>443,469</td>
</tr>
<tr>
<td></td>
<td>1,769,040</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[1,184,196]</td>
<td>11,035,817</td>
</tr>
<tr>
<td></td>
<td>1,351,425</td>
<td>1,180,185</td>
</tr>
<tr>
<td></td>
<td>3,108</td>
<td>3,107</td>
</tr>
<tr>
<td></td>
<td>[809,236]</td>
<td>[13,598,158]</td>
</tr>
<tr>
<td></td>
<td>[443,469]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>330,055,425</td>
<td>365,343,181</td>
</tr>
<tr>
<td></td>
<td>171,903</td>
<td>1,428,988</td>
</tr>
<tr>
<td></td>
<td>439,146</td>
<td></td>
</tr>
<tr>
<td></td>
<td>766,194</td>
<td>246,607</td>
</tr>
<tr>
<td></td>
<td>647,685</td>
<td></td>
</tr>
<tr>
<td></td>
<td>331,187,132</td>
<td>365,207,540</td>
</tr>
</tbody>
</table>

|                              | 331,441,454 | 365,207,540 |
|                              | 326,791,437 | 362,996,206 |
|                              | 3,273,533   | 1,947,471   |
|                              | 671,735     | 16,263      |
|                              | 20,489      |             |
|                              | 5,040       | 5,433       |
|                              | 68,065      |             |
|                              | 4,960       | 4,567       |
|                              | 264,991     |             |
|                              | 151,222     | 141,222     |
|                             | 330,918,416 | 365,444,218|

|                              | [4,918,847] |             |
|                              | 523,152     |             |

|                              | [4,395,695] | -0-         |

|                              | -0-         | -0-         |

|                              | $ -0-       | $ 523,038   |
|                              |             | $ [236,678]|

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NOTES TO FINANCIAL STATEMENTS · JUNE 30, 1991

A · SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The Institute for Advanced Study — Louis Bamberger and Mrs. Felix Fuld Foundation (the "Institute"), an independent, private institution devoted to the encouragement, support and patronage of learning, was founded in 1930 as a community of scholars where intellectual inquiry could be carried out in the most favorable circumstances.

Focused on mathematics and classical studies at the outset, the Institute today consists of the School of Historical Studies, the School of Mathematics, the School of Natural Sciences and the School of Social Science. Each School has a small permanent faculty, and some 160 fellowships are awarded annually to visiting members from other research institutions and universities throughout the world.

The objectives of the Institute were described as follows in the Founders' original letter to the first Trustees: "The primary purpose is the pursuit of advanced learning and exploration in fields of pure science and high scholarship to the utmost degree that the facilities of the institution and the ability of the faculty and students will permit."

Basis of Presentation

The accompanying financial statements are prepared on the accrual basis and are presented in accordance with recommendations contained in Audits of Certain Nonprofit Organizations issued by the American Institute of Certified Public Accountants. Certain prior year amounts presented for comparative purposes have been reclassified to conform to the current year presentation.

Fund Accounting

The accounts of the Institute are maintained in accordance with the principles of "fund accounting." This is the procedure by which resources for various purposes are classified for accounting and reporting purposes into funds that are in accordance with activities or objectives specified. Separate accounts are maintained for each fund; however, in the accompanying financial statements, funds that have similar characteristics have been combined into fund groups.

Fund balances restricted by outside sources are so indicated and are distinguished from unrestricted funds allocated or designated to specific purposes by action of the governing board. Externally restricted funds may only be utilized
in accordance with the purpose established by the grantor of such funds. In contrast, the governing board retains full control over unrestricted funds to use in achieving any of the Institute's objectives.

True endowment funds are subject to the restrictions of the gift instruments which require that the principal be invested in perpetuity; only income earned on such funds may be utilized. Quasi-endowment funds have been established by the governing board to function as endowment funds and any portion of these funds may be expended. Unrestricted quasi-endowment funds have no external restrictions. However, certain of these funds have been internally designated to support specific needs of the Institute.

All gains and losses arising from the sale, collection, or other disposition of investments and other non-cash assets are accounted for in the fund which owned such assets. Ordinary income earned on investments and receivables is generally accounted for in the fund owning such assets. However, unrestricted income earned on investments of endowment and similar funds is accounted for as revenue in unrestricted operating funds, and restricted income is accounted for as deferred restricted revenue until used in accordance with the terms of the restriction or transferred to endowment and similar funds.

Forward Contracts

The Institute enters into forward exchange contracts for the sale of foreign currencies as hedges of investments denominated in foreign currencies. Gains and losses resulting from such forward contracts are deferred and included in the measurement of the gain or loss of the hedged security when sold.

Plant Assets and Depreciation

Uses of operating funds for plant acquisitions and principal debt service payments are accounted for as transfers to plant funds. Proceeds from the sale of plant assets, if unrestricted, are transferred to operating funds, or, if restricted, to deferred amounts restricted for plant acquisitions. Depreciation is provided over the estimated useful lives of the respective assets on a straight-line basis (buildings and capital improvements 20-40 years, equipment 3-6 years).
B · INVESTMENTS

Investments purchased by the Institute are recorded at cost; investments received by gift are recorded at the fair market value at the date of donation.

Endowment and similar funds investments at June 30, 1991 are comprised of the following:

<table>
<thead>
<tr>
<th>Pooled investments:</th>
<th>CARRYING VALUE</th>
<th>MARKET VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash equivalents</td>
<td>$ 13,401,930</td>
<td>$ 13,401,930</td>
</tr>
<tr>
<td>Equity securities</td>
<td>111,090,089</td>
<td>116,652,481</td>
</tr>
<tr>
<td>Debt securities</td>
<td>53,885,504</td>
<td>54,421,298</td>
</tr>
<tr>
<td>Mortgages and notes receivable from faculty and staff</td>
<td>3,240,975</td>
<td>3,240,975</td>
</tr>
<tr>
<td>Investment accounts receivable</td>
<td>1,805,561</td>
<td>1,805,561</td>
</tr>
<tr>
<td>Investment accounts payable</td>
<td>[555,480]</td>
<td>[555,480]</td>
</tr>
<tr>
<td>Total pooled investments</td>
<td>182,868,579</td>
<td>188,966,765</td>
</tr>
<tr>
<td>Funds invested separately:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity securities</td>
<td>17,924</td>
<td>34,425</td>
</tr>
<tr>
<td>Total</td>
<td>$182,886,503</td>
<td>$189,001,190</td>
</tr>
</tbody>
</table>

Marketable debt and equity securities are carried in the aggregate at lower of cost (amortized, in the case of debt securities) or market. Realized gains and losses are computed based on the average cost of the investment.

Equity securities include the Institute’s interest in certain limited partnerships with a carrying value of approximately $17,875,528 and a market value of approximately $19,170,682 at June 30, 1991. The Institute accounts for these investments under the equity method and, accordingly, recognizes its proportionate share of ordinary income and net realized gains attributable to the investments of the partnerships. The Institute’s proportionate share of ordinary income and net realized loss was $75,991 and $125,783, respectively, for the year ended June 30, 1991.

Substantially all the assets of endowment and similar funds are pooled with each individual fund subscribing to or disposing of units on the basis of the market value per unit, determined on a quarterly basis. Earnings per unit of the pooled investments for the year ended June 30, 1991, exclusive of realized gains and losses, amounted to $350 after deducting management fees.
The following table summarizes changes in carrying and market values of the pooled investments:

<table>
<thead>
<tr>
<th>POOLED ASSETS</th>
<th>MARKET VALUE</th>
<th>CARRYING VALUE</th>
<th>UNREALIZED APPRECIATION</th>
<th>MARKET VALUE PER UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 30, 1990</td>
<td>$196,302,689</td>
<td>$185,495,233</td>
<td>$10,807,456</td>
<td>$7,846</td>
</tr>
<tr>
<td>June 30, 1991</td>
<td>189,001,190</td>
<td>182,886,503</td>
<td>6,114,687</td>
<td>7,704</td>
</tr>
</tbody>
</table>

Decrease in unrealized appreciation for the year ended June 30, 1991  

[4,692,769]

Realized net gain for the year ended June 30, 1991  

809,236

Net change for the year ended June 30, 1991  

[$3,883,533]

C - PHYSICAL PLANT

Physical plant and equipment are stated at cost at date of acquisition, less accumulated depreciation. Library books, other than rare books, are not capitalized.

A summary of plant assets at June 30, 1991 follows:

- Land and improvements: $2,411,447
- Buildings and improvements: 23,796,664
- Equipment: 7,709,413
- Rare book collection: 199,508
- Total: 30,117,032
- Less accumulated depreciation: [16,900,633]
- Net book value: $17,216,399

D - LONG-TERM DEBT

A summary of long-term debt at June 30, 1991 follows:

- 7.804%, 1980 — NJEFA: $7,565,000
- Less unamortized bond discount: [75,565]
- Total long-term debt: $7,489,435
In July, 1980, the Institute received proceeds of the New Jersey Educational Facilities Authority (NJEFA) offering of $8,775,000 Revenue Bonds, 1980 Series A, the Institute for Advanced Study Issue. The proceeds were used for the construction of the West Building, the Dining Hall and the Social Science Library, as well as other construction and major remodeling projects of Institute facilities.

The bonds are dated July 1, 1980, bear interest, payable semi-annually, at the net average annual rate of 7.804%, are subject to redemption at various prices, and require principal payments and sinking fund installments through July 1, 2011. Bond principal in the amount of $165,000 matured on July 1, 1991 and bond principal in the amount of $175,000 (1992), $185,000 (1993) and $200,000 (1994) will mature on July 1 of the designated years. The obligation to pay the Authority on a periodic basis, in the amounts sufficient to cover principal and interest due on the bonds, is a general obligation of the Institute and is collateralized by United States Treasury Notes, 8.875%, due February 15, 1996, with an aggregate face amount of $8,625,000.

Interest expense on long-term debt for the year ended June 30, 1991 was $604,783, of which $293,114 is payable at June 30, 1991.

E · PENSION PLANS AND OTHER POSTRETIREMENT BENEFITS

Separate voluntary defined contribution retirement plans are in effect for faculty members and eligible staff personnel, both of which provide for annuities which are funded with the Teachers Insurance and Annuity Association and/or the College Retirement Equities Fund. Contributions are based on the individual participants' compensation in accordance with the formula set forth in the plan documents on a non-discriminatory basis. Contributions for the year ended June 30, 1991 totalled approximately $747,000.

In addition to providing pension benefits, the Institute provides certain health care and life insurance benefits for retired employees and faculty. Substantially all of the Institute's employees may become eligible for those benefits if they reach normal retirement age while working for the Institute. The cost of retiree health care and life insurance benefits is recognized as expense as premiums are paid. For fiscal year 1991, those costs totalled approximately $128,000.

In December, 1990, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards No. 106, Employers' Accounting for Postretirement Benefits Other Than Pensions ("SFAS 106"). SFAS 106, effective for fiscal year ending 1996, will require that the Institute change its method of accounting for postretirement health care and life insurance benefits to an accrual basis. This change in accounting will require the recognition of a transition liability which represents the actuarial present value of benefits attributed to prior employee service. The Institute has not yet determined what effect the adoption of SFAS 106 will have on its financial condition.
F · CHANGES IN DEFERRED RESTRICTED REVENUE

Restricted receipts, which are recorded initially as deferred restricted revenue, are reported as revenues when expended in accordance with the terms of the restriction or transferred to quasi-endowment funds. Changes in deferred restricted revenue amounts are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at June 30, 1990</td>
<td>$884,113</td>
</tr>
<tr>
<td>Additions:</td>
<td></td>
</tr>
<tr>
<td>Contributions, grants, etc.</td>
<td>4,747,465</td>
</tr>
<tr>
<td>Net restricted endowment income</td>
<td>2,375,450</td>
</tr>
<tr>
<td>Quasi-endowment funds utilized</td>
<td>270,168</td>
</tr>
<tr>
<td>Total additions</td>
<td>7,393,083</td>
</tr>
<tr>
<td>Deductions:</td>
<td></td>
</tr>
<tr>
<td>Funds expended from contributions, grants, etc.</td>
<td>4,094,787</td>
</tr>
<tr>
<td>Funds expended from restricted endowment</td>
<td>2,645,618</td>
</tr>
<tr>
<td>Total deductions</td>
<td>6,740,405</td>
</tr>
<tr>
<td>Balance at June 30, 1991</td>
<td>$1,536,791</td>
</tr>
</tbody>
</table>

G · FUNDS HELD IN TRUST BY OTHERS

The Institute is the residuary beneficiary of a trust and, upon the death of the life tenant, will be entitled to receive the corpus thereof. The approximate market value of the trust’s assets, as reported by the administrator of the trust, aggregated $1,880,000 as of June 30, 1991 and is not included in the accompanying financial statements.

H · FUNCTIONAL ALLOCATION OF EXPENSES

The costs of providing the various programs and other activities of the Institute have been summarized on a functional basis in the statement of support and revenue, expenses, capital additions and changes in fund balances. Accordingly, certain costs have been allocated among the programs and supporting services benefited. The net costs incurred by the Institute in operating both the Dining Hall [$375,000, net of $383,000 in revenues] and members’ housing [$256,000, net of $962,000 in revenues] have been allocated among the programs and supporting services benefited. An overhead charge is allocated to certain schools generally based upon their ability to recover such costs under the terms of various grants and contracts. Overhead allocated from administration and general expenses to various programs totalled $1,099,000 for the year ended June 30, 1991.
THE SCHOOL OF HISTORICAL STUDIES

Faculty
GLEN W. BOWERSOCK
GILES CONSTABLE
JOHN H. ELLIOTT [1990-]
OLEG GRABAR [1990-]
CHRISTIAN HABICHT
IRVING LAVIN
PETER PARET [Andrew W. Mellon Professor]

Professors Emeriti
MARSHALL CLAGETT
FELIX GILBERT*
JAMES F. GILLIAM**
GEORGE F. KENNAN
KENNETH M. SETTON
HOMER A. THOMPSON
MORTON WHITE

Member with Long-Term Appointment
OTTO E. NEUGEBAUER**

*Deceased February 14, 1991
**Deceased March 16, 1990
***Deceased February 19, 1990
THE SCHOOL OF HISTORICAL STUDIES

The School of Historical Studies is concerned principally with the history of western civilization. Within this wide area of study, a large range of topics has been explored at one time or another both by current and emeriti Faculty and by Visiting Members, but the emphasis has been particularly strong in the fields of Greek and Roman civilization, medieval and modern European history, and the history of art, science and ideas.

The particular emphases of the School are a product of its own history. Two years after the opening of the School of Mathematics in 1933, a School of Economics and Politics and a School of Humanistic Studies were established. In Humanistic Studies, the first professor was Benjamin Dean Meritt, a specialist in Greek history and epigraphy, who was closely associated with excavations in the Athenian Agora. The second appointment to the Faculty of the School of Humanistic Studies was that of the German art historian, Erwin Panofsky. Panofsky ranged through the entire gamut of European art from the middle ages to motion pictures, but he was particularly associated with the development of the field of iconology.

Three additional appointments strengthened the field of classical studies: Elias Avery Lowe, a Latin paleographer who worked on the handwriting of pre-ninth century manuscripts; Ernst Herzfeld, a Near Eastern archaeologist and historian, whose scholarly work, by the time of his death, comprised nearly 200 titles; and Hetty Goldman, one of the pioneering American women archaeologists, whose discoveries at Tarsus in Turkey were published in six volumes. Modern history was represented at the Institute from the outset, with the appointment of the military and political historian Edward M. Earle. Earle was an original member of the School of Economics and Politics, which merged in 1949 with the School of Humanistic Studies to become the School of Historical Studies.

After World War II, classical studies were further augmented by the appointments of Homer A. Thompson in Greek archaeology, Harold F. Cherniss in Greek philosophy, and Andrew Alföldi in ancient history and numismatics. Although Alföldi published tirelessly on a wide range of subjects during his years at the Institute, he was mainly preoccupied with the history of early Rome and that of Julius Caesar, on both of which subjects he wrote several books. Medieval history came to the Institute Faculty with Ernst Kantorowicz, whose interests stretched in time from the later phases of classical antiquity to the fifteenth and sixteenth centuries, and in space embraced both western Europe and the Byzantine and Islamic East. The art historical tradition was carried on by Millard Meiss, who was able to complete at the Institute his great work on late medieval manuscript painting in Burgundy.
Additions to the Faculty in modern history came with the appointments of Sir Ernest Llewelyn Woodward in British diplomatic history; George F. Kennan, former Ambassador to Russia, in Russian history and international relations; Felix Gilbert, in Renaissance as well as modern history; and Morton White in the history of modern philosophy. Roman military history and papyrology were represented by James F. Gilliam; medieval history of the Latin East, Venice, and the relations between the Papacy and the Levant, by Kenneth M. Setton; medieval science, especially the classical heritage, by Marshall Clagett.

While these traditions have remained strong in the School of Historical Studies, they have not excluded scholars working in other fields who have come here as Visiting Members. The total number of Visiting Members who have come to the School is now more than a thousand. The articles and books resulting from their research at the Institute are witness to the quality and productivity of their scholarly activity here.

ACADEMIC ACTIVITIES 1989-1991

The School was host to 43 long-term, term, and annual Members in 1989-90 and six Visitors. During the summer of 1989, it also provided research facilities for fourteen summer visitors. Nineteen Members came from foreign countries, including Canada, Cyprus, England, Finland, France, Germany, Italy, Jordan, Poland, Spain and Switzerland.

In 1990-91 there were 43 long-term, term, and annual Members at the School. In addition, twelve summer visitors made use of the School’s research facilities. Sixteen Members and Visitors came from foreign countries, including Australia, Belgium, Canada, France, Germany, Greece, New Zealand, and Spain.

All Members and Visitors in the School of Historical Studies are independent scholars and concentrate on their own subjects. The topics of their individual projects are listed in the next section. But contacts and exchanges with one another, whether organized or informal, are often fruitful and stimulating. Among the formal colloquia — lectures followed by discussions — were those in art history on a monthly basis, sponsored jointly by the School of Historical Studies and Princeton University’s Department of Art and Archaeology. Some of the Members also gave papers at meetings of the Institute’s School of Social Science.

FUNDING

During 1989-90, Members in the School were funded by the Sherman Fairchild Foundation, The Andrew W. Mellon Foundation, the National Endowment for the Humanities, the Helena Rubinstein Foundation, the Fritz Thyssen Stiftung,
as well as by fellowships funded by the Elizabeth and J. Richardson Dilworth, Edwin C. and Elizabeth A. Whitehead, and Hetty Goldman endowment funds. In addition, two summer visitors received funding from the Samuel H. Kress Foundation.

Members’ funding for 1990-91 was received from The Sherman Fairchild Foundation, The Andrew W. Mellon Foundation, the Samuel H. Kress Foundation, and the Fritz Thyssen Stiftung. Fellowships were also funded by the Elizabeth and J. Richardson Dilworth, Edwin C. and Elizabeth A. Whitehead, and Hetty Goldman endowment funds.

FACULTY

During the academic year 1989-90, GLEN BOWERSOCK’S Thomas Spencer Jerome Lectures, Hellenism in Late Antiquity, were published by the University of Michigan Press and the Cambridge University Press. In addition, he published ten scholarly articles and delivered five public lectures, including one in the series of Faculty Lectures sponsored by the School of Historical Studies. Another was the inaugural lecture in a series of annual presentations at the University of North Carolina (Chapel Hill) in honor of T. Robert S. Broughton. During the past academic year two volumes were published in the series Revealing Antiquity, for which he serves as general editor at the Harvard University Press. He joined the editorial board of the new journal, Arabian Archaeology and Epigraphy (Copenhagen) and became the honorary American secretary of the Society for the Promotion of Roman Studies in London.

In 1990-91, Professor Bowersock published ten scholarly articles and delivered a lecture at the annual Historia-Augusta-Colloquium held by the University of Geneva. Christian Habicht and he chaired the first of three year-long Institute Mellon Seminars sponsored by a joint grant to the Schools of Historical Studies and Social Science; the topic for 1990-1991, “The Methodology of Sources,” concentrated upon classical antiquity. Two additional volumes were published in the series Revealing Antiquity. For the Harvard University Press Professor Bowersock served on an ad hoc committee to assess the future of the Loeb Classical Library. He continued his service as a Senior Fellow of Dumbarton Oaks Center for Byzantine Studies, as a Councilor of the American Numismatic Society, and as a member of various other editorial boards and committees. In October 1990 the University of Strasbourg conferred upon him the doctoral degree honoris causa. His current work has been the preparation of the Sather Lectures for the University of California at Berkeley, on “Fiction as History, from Nero to Julian.”

GILES CONSTABLE gave a lecture on “Mary and Martha in the Middle Ages: Changing Views on Action and Contemplation” at the American Philosophical
Society in Philadelphia. In January 1990 he took part in the Faculty Lecture Series giving a paper on "Medieval Monasticism and Modern Society," and in April 1990 gave the Lionel Trilling Lecture at Columbia University, entitled "The Ordering of Society in the Middle Ages." He gave papers at the Penn-Paris International Colloquium at the Bellagio Study and Conference Center and at the 37th Settimane di studio at Spoleto. He organized the Delaware Valley Medieval Association meetings at the Institute and a series of sessions at the 25th International Congress on Medieval Studies at Kalamazoo. During the year several of his scholarly articles and reviews were published. He also co-authored The Cartulary and Charters of Notre-Dame of Homblières.

In 1990-91 Professor Constable gave lectures at Villanova University, the University of Massachusetts, the University of Chicago, the University of California, Berkeley, and at the University of New Mexico. He served as commentator at a session in the meeting of the American Historical Association, served on a committee to visit the history department at Notre Dame University, and attended many meetings and conferences. He published a number of articles and joined the advisory boards of the Revue Mahillon and of Mediterranean Studies.

OLEG GRABAR joined the School of Historical Studies as a permanent faculty member on July 1, 1990 after completing his 36th year of teaching at Harvard University. His book, The Great Mosque of Isfahan, based on the Kevorkian lectures given at New York University, was published by the NYU Press, while the Journal of the Society of Architectural Historians published his paper, "From the Dome of Heaven to the Pleasure Dome," given at the 50th meeting of the society. As a member of the Master Jury of the Fourth Aga Khan Award for Architecture, he attended the Award ceremony in Cairo, lectured in Kuwait, Paris, and the Boston Museum of Fine Arts.

In 1990-91, Professor Grabar gave the inaugural lecture for the Seminar on Patronage in Islamic Art, held at the Walters Art Gallery, Baltimore, and at the Kimball Museum in Fort Worth. He also participated in a number of seminars, including a seminar in memory of Professor R. Wittkower, a seminar on Medieval Art in Palermo, a seminar on ethnicity at SUNY-Binghamton, a seminar on Europe and the Orient at the Council of Europe and UNESCO, and a seminar on Islamic Spain in Grenada. He also lectured on Persian Painting at Penn State University and at the von Grunebaum colloquium at UCLA, and on early Islamic art at the Institut du Monde Arabe in Paris. He served as member and chair of the Steering Committee for the development of an exhibition on the Islamic world at the Smithsonian Institution, as a member of the Max van Berchem Foundation in Geneva, and as a member of the Executive Committee of the Aga Khan Program at Harvard and MIT. He supervised completion of two Ph.D. theses at Harvard, one at MIT, and served as reader for a thesis at the University of Pennsylvania. During the period he also published an article, "Europe and the Orient: An Ideologically Charged Exhibition" (Mugarnas, 1990),

CHRISTIAN HABICHT had his book Cicero the Politician published by The Johns Hopkins University Press. He translated it into German and saw it published under the title Cicero der Politiker by C.H. Beck, Munich. Volume 8 of the new Cambridge Ancient History included his chapter on "The Seleucids and their Rivals". Major papers were published by Chiron, Zeitschrift für Papyrologie und Epigraphik, and Phoenix. Professor Habicht was the James S. Constantine Lecturer of the University of Virginia and University Lecturer at the University of Hamburg. He delivered the Inaugural Lecture at the new Center for Epigraphical Studies, Ohio State University, on "Athens in the Hellenistic Period, 323-30 B.C. In the series of Faculty Lectures at the Institute for Advanced Study he spoke on "Cicero and Caesar."

In 1990-91 Professor Habicht published several papers, among them "New and Old Panathenaic Victor Lists" (together with S. Tracy), an article of 50 pages on a recently found important inscription, in Hesperia 1991. He was engaged in preparing a session for the next International Congress of Greek and Latin Epigraphy, scheduled for Nimes in 1992. He began work on a major general book on Athens in the Hellenistic Period (338-30 B.C.). His file of some 18,000 Athenian citizens of the Hellenistic Period, which he had collected over the last seventeen years and grouped according to their demotic (139 in number) was computerized by Julia Bernheim and is now available for use by other scholars. Professor Habicht was University Lecturer at Cornell University and lectured at the University of Würzburg. In May 1991, on the nomination of the Heidelberger Akademie der Wissenschaften, he was awarded the Reuchlin Prize in the Humanities by the city of Pforzheim; a public ceremony was held on July 6, 1991.

In 1989-90, IRVING LAVIN published several scholarly articles and lectured at a number of American universities. He also delivered lectures and participated in colloquia at Oaxaca, Mexico, and in Europe, at Florence, Rome, Naples, Strasbourg, and Hamburg, and gave a course of lectures at the Collège de France in Paris. He taught a seminar in the Department of Art and Archaeology at Princeton University, and continued to organize the series of colloquia in the history of art sponsored jointly by the School of Historical Studies and the Department. He continued his services to several organizations and institution, including the advisory boards of the J. Paul Getty Trust and the Canadian Centre for Architecture, as chairman of the US National Committee for the History of Art and as a member of the executive committee of the Comité International d'Histoire de l'Art. He also continued to sit on the advisory boards of several scholarly journals, including Art e Dossier; The Journal of Medieval and Renaissance Studies; Palladio, rivista di storia dell'architettura e restauro; and Quaderni d'italianistica. He spoke in the Institute Faculty Lecture Series on "Picasso's Lithograph(s) 'The
Bull(s)’ and the History of Art in Reverse.” A volume of essays by Professor Lavin’s former students was published in celebration of his sixtieth birthday.

In 1990-91, Professor Lavin lectured at the Louvre, and at the American Academy in Rome, and gave a course of lectures at the Instituto di Studi Filosofici in Naples. He participated in colloquia at Santiago di Compostela, Spain, Chantilly, Graz, Tokyo, Düsseldorf, and Taxco, Mexico. His essay “High and Low Before their Time: Bernini and the Art of Social Satire,” was published in Modern Art and Popular Culture, Readings in High and Low, (New York, 1990) in conjunction with the exhibition of the same name at the Museum of Modern Art, New York. Professor Lavin also prepared the final version of a volume of studies to be published by the University of California Press, entitled Past-Present. Essays on Historicism in Art from Donatello to Picasso.

PETER PARET’s monograph Art as History was published in 1989 and translated into German the following year. Makers of Modern Strategy which he edited, has come out in Japanese and Italian editions. His monograph Clausewitz and the State also appeared in a Japanese edition. He published several articles on subjects ranging from the new historical museum in Berlin to the role of military power in the development of the modern state, the latter based on a paper originally given at a symposium on “Power” at the Shelby Cullom Davis Center at Princeton University, and gave lectures and seminars at various Universities, including Harvard, Yale, and Stanford. In March 1991 he gave the banquet address at the annual meeting of the Society of Military Historians in Durham, North Carolina. In the Faculty Lectures Series at the Institute for Advanced Study he spoke on Clausewitz as a political scientist and as a historian. With a former student, Daniel Moran, he completed work on an edition of Carl von Clausewitz’s historical and political writings, which was published at the end of 1991. He co-chaired an interdisciplinary conference in Bad Homburg on the political significance of art collecting in Germany, which was followed by a second conference on this theme at the Institute for Advanced Study in October 1991, jointly sponsored by the Institute, the Fritz Thyssen Foundation, and The Andrew W. Mellon Foundation. He was elected an Honorary Fellow of the London School of Economics and Political Science, and a Fellow of the Leo Baeck Institute.

During the academic year 1991 professor Paret completed two long-term projects, both of which will be published in 1992; a collection of his essays on the relationship between war and political and social change; and a book on posters as historical documents on which he collaborated with Beth Irwin Lewis of the College of Wooster and with his son Paul.
PROFESSORS EMERITI

MARSHALL CLAGETT’S first volume of Ancient Egyptian Science was published by the American Philosophical Society in November, 1989, and was awarded the John Frederick Lewis Prize of the American Philosophical Society. Professor Clagett continues the preparation of Volumes II and III. He presented “Early Egyptian Annals on Stone” at a meeting of the American Philosophical Society and is nearing completion of “Additions to Computer-generated Hieroglyphs.”

FELIX GILBERT died on February 14, 1991 at his home in Princeton. He was 85 years of age. In November, 1990 the Princeton University Press published Professor Gilbert’s last book, History: Politics or Culture? To honor Professor Gilbert’s memory and to express the faculty’s respect and affection for his long-time colleague, the School of Historical Studies will sponsor a public lecture in his name in the spring of 1992.

GEORGE KENNAN’S publications have included articles in Die Zeit, Diplomatic History, Foreign Affairs, and the Washington Post. He has testified before the Senate Foreign Relations Committee, appeared in televised and print interviews concerning contemporary Soviet and German issues, and traveled to both Russia and Germany to meet with diplomatic officials of those countries. Professor Kennan is currently working on a book on his personal and political philosophy.

KENNETH M. SETTON, as editor-in-chief of a multi-volume History of the Crusades, had the satisfaction in the spring of 1990 to see the sixth and final volume in print. In 1990 Professor Setton received, for the third time, the John Frederick Lewis Prize from the American Philosophical Society for his book on Vénice, Austria, and the Turks in the Seventeenth Century. He also received the American Historical Association’s 1990 Award for Scholarly Distinction.

HOMER A. THOMPSON continued to supervise the study and publication of the results of the excavation of the Athenian Agora, of which he was field director from 1947 to 1968. He also completed a study of the Palace of the Giants, a great complex of the fifth century after Christ that overlay most of the area of the Agora in classical times.

MORTON WHITE continued his research in philosophy and intellectual history. He is completing a book in which he analyzes the concepts of free action and free choice while showing the relationship between his own ideas and those of other philosophers, especially William James, Jonathan Edwards, G. E. Moore, and some more recent thinkers. In September, 1989, he delivered a lecture entitled “Philosophy, Japan, and the Future of Advanced Study” at a conference held in Kyoto under the auspices of the International Institute for Advanced Studies.
THE SCHOOL OF HISTORICAL STUDIES
MEMBERS, VISITORS AND RESEARCH STAFF
1989 - 90

BENJAMIN C. B. ARNOLD
Medieval European history
University of Reading, United Kingdom

ELIZABETH BEATSON
Medieval art history
Princeton, New Jersey • A

RICHARD R. BEEMAN
American history
University of Pennsylvania • V

ALAN E. BERNSTEIN
Medieval history
University of Arizona

EVE BLAU
Viennese architecture
Centre Canadien d’Architecture • VS

LAWRENCE M. BRYANT
Early modern French history
California State University, Chico

GLENN RICHARD BUGH
Greek history
Virginia Polytechnic Institute and State University

CHARLES BURROUGHS
Architectural history
State University of New York, Binghamton

DWAYNE E. CARPENTER
Medieval Spanish intellectual history
Columbia University • £

PETRA TEN-DOESSCHATE CHU
19th-century French painting
Seton Hall University • S

OWEN S. CONNELLY, JR.
French history of the revolutionary and
Napoleonic eras
University of South Carolina • £

M. ELIZABETH CROPPER
History of art
The Johns Hopkins University • £

ANTHONY CUTLER
Art history
Pennsylvania State University • £

CHARLES G. DEMPSEY
Renaissance and Baroque art
The Johns Hopkins University • £

BRENDAN DOOLEY
Early modern Italian history
Venezia-Mestre, Italy

PIERRE D. L. R. DU PREY
History of architecture
Queen’s University, Ontario • S

ANTONIO FEROS
Spanish history
Universidad Autónoma de Madrid • A

ROBERT S. J. GARLAND
Greek religion
Colgate University • S

MARGARET T. GIBSON
Medieval history
University of Liverpool • S

CHARLES C. GILLESPIE
History of science
Princeton University • V

GEORGE L. GORSE
Renaissance history
Pomona and Scripps Colleges

ALEXANDRE G. GROUCHEVOY
Roman and Byzantine Arabia
Academy of Sciences (Near East), Leningrad • A

HELMUT HALFMANN
Ancient history
Universität Münster • £

P. H. F. SIEGFRIED JAKEL
Classical philology
Universities of Turku and Helsinki, Finland • S

* First Term • £ Second Term • Member with Long Term Appointment

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THE SCHOOL OF HISTORICAL STUDIES

CHARLES KANNENGIESSER
Early Christianity
*University of Notre Dame* · f

VASSOS KARAGEORGHIS
Archaeology of Cyprus
*Department of Antiquities, Nicosia, Cyprus*

JERZY KLOCZOWSKI
History of the church
*Catholic University, Lublin, Poland*

LINDA A. KOCH
Italian Renaissance art
*Rutgers University* · a

PETER G. LAKE
Early modern English history
*Royal Holloway and Bedford New College, London*

JOSEPH M. LEVINE
British intellectual history
*Syracuse University* · v

BETH IRWIN LEWIS
Modern European history
*The College of Wooster* · r

ANDREW W. LINTOTT
Roman history
*Worcester College, Oxford* · s

R. BURR LITCHFIELD
Modern European history
*Brown University* · s

ERNST LLUCH
History of Spanish economic thought
*Universidad de Barcelona*

JOHN F. LYNCH
Classical philology
*University of California, Santa Cruz*

MARGARET B. LYTTELTON
Near-Eastern Graeco-Roman archaeology
*London* · s

THOMAS F. MATTHEWS
Early Christian-Byzantine art
*Institute of Fine Arts, New York University* · s

JAMES MULDOON
Early modern history
*Rutgers University*

JACOB NEUSNER
Judaic studies
*Brown University*

THOMAS NIPPERDEY
Modern German history
*Universität Münche* · f

ELAINE HISEY PAGELS
History of religion: early Christianity
*Princeton University* · v

ROBERT R. PALMER
18th-century European history
*Princeton, New Jersey* · v

JAMES A. PARENTE, JR.
German and Dutch neo-Latin literature
*The University of Illinois, Chicago*

LEANDRO POLVERINI
Roman history
*University of Perga* · f

JAMES M. POWELL
Medieval history
*Syracuse University*

ERICA REINER
Assyriology
*The Oriental Institute, University of Chicago* · s

JEAN-PAUL REY-COQUAIS
Greek epigraphy of the Near East
*Université de Dijon*

JEANNE ROBERT
Greek epigraphy
*Paris, France* · df

CHRISTOPH SCHAUBLIN
Classical philology
*Universität Bern*

BERND SEIDENSTICKER
Greek and Roman tragedy
*Freie Universität, Berlin* · f

MARY LEE TOWNSEND
Modern European cultural history
*The University of Tilsa*

FRANÇOISE WAQUET
Modern European intellectual history
*University of Paris, Sorbonne* · s
<table>
<thead>
<tr>
<th>Name</th>
<th>Field</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>KENNETH B. WOLF</td>
<td>Medieval European history (Spain)</td>
<td>Pomona College</td>
</tr>
<tr>
<td>FAWZI ZAYADINE</td>
<td>History and archaeology of Petra</td>
<td>Department of Antiquities, Amman, Jordan</td>
</tr>
<tr>
<td></td>
<td><strong>MEMBERS, VISITORS AND RESEARCH STAFF</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>1990 – 91</strong></td>
<td></td>
</tr>
<tr>
<td>NINA ATHANASSOGLIOU-KALLMYER</td>
<td>Early modern European art</td>
<td>University of Delaware</td>
</tr>
<tr>
<td>MARIE-FRANÇOISE BASLEZ</td>
<td>Greek epigraphy and history</td>
<td>École Normale Supérieure</td>
</tr>
<tr>
<td>ALFRED S. BRADFORD</td>
<td>Ancient history</td>
<td>University of Missouri-Columbia</td>
</tr>
<tr>
<td>HORBST BREDKAMP</td>
<td>Spanish romanesque sculpture; Renaissance art</td>
<td>Universität Hamburg</td>
</tr>
<tr>
<td>SARAH C. BRETT-SMITH</td>
<td>Art history of Africa</td>
<td>Rutgers University</td>
</tr>
<tr>
<td>ALAN CAMBON</td>
<td>Late antiquity</td>
<td>Columbia University</td>
</tr>
<tr>
<td>VICKI CARON</td>
<td>Modern western European Jewish history</td>
<td>Brown University</td>
</tr>
<tr>
<td>ROGER CHICKERING</td>
<td>German history</td>
<td>University of Oregon</td>
</tr>
<tr>
<td>PATRICIA B. CRADDOCK</td>
<td>18th-century British literature</td>
<td>University of Florida</td>
</tr>
<tr>
<td>GARTH L. FOWDEN</td>
<td>Late Roman history</td>
<td>National Research Foundation, Athens</td>
</tr>
<tr>
<td>JOHN B. FREED</td>
<td>Medieval German history</td>
<td>Illinois State University</td>
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<td>HANNS GABELMANN</td>
<td>Classical archaeology</td>
<td>Universität Bonn</td>
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<td>LEWIS H. GANN</td>
<td>Modern European history</td>
<td>Stanford University</td>
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<td>PATRICK J. GEARBY</td>
<td>Medieval history</td>
<td>University of Florida</td>
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<td>JULIÁN GONZÁLEZ</td>
<td>Latin literature and epigraphy</td>
<td>University of Seville</td>
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<tr>
<td>MONICA H. GREEN</td>
<td>History of science and medicine</td>
<td>Duke University</td>
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<tr>
<td>WILLIAM W. HAGEN</td>
<td>Early modern and modern German history</td>
<td>University of California, Davis</td>
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<tr>
<td>MICHELE A. HANNOOSH</td>
<td>19th-century literature and art criticism</td>
<td>University of California, Davis</td>
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<tr>
<td>PETER HERZ</td>
<td>Ancient history</td>
<td>Universität Mainz</td>
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<tr>
<td>UVO HÖLSCHER</td>
<td>Classical philology</td>
<td>Universität München</td>
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<tr>
<td>MICHELE HUGLO</td>
<td>Musical paleography; medieval musicology</td>
<td>Centre National de la Recherche Scientifique, Paris (retired)</td>
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<tr>
<td>CHRISTOPHER P. JONES</td>
<td>Greek literature and Roman history</td>
<td>University of Toronto</td>
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* First Term · s Second Term · m Member with Long Term Appointment
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<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Linda A. Koch</td>
<td>Italian Renaissance art</td>
<td>Rutgers University · A</td>
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<tr>
<td>Peter Landau</td>
<td>History of canon law</td>
<td>Universität Müncheu</td>
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<tr>
<td>James H. Marrow</td>
<td>Northern European art</td>
<td>University of California, Berkeley</td>
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<tr>
<td>Constant J. Mews</td>
<td>12th-century intellectual and religious history</td>
<td>Monash University · F</td>
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<tr>
<td>Margaret M. Miles</td>
<td>Classical archaeology</td>
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<tr>
<td>Daniel Moran</td>
<td>Late 18th- and early 19th-century German history</td>
<td>University of Northern Colorado · HF</td>
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<tr>
<td>Robert R. Palmer</td>
<td>18th-century European history</td>
<td>Princeton, New Jersey · V</td>
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<tr>
<td>David R. Ringrose</td>
<td>History of Spain – economic history of Europe</td>
<td>University of California, San Diego</td>
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<tr>
<td>Paul A. Robinson</td>
<td>Modern European intellectual history</td>
<td>Stanford University</td>
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<tr>
<td>Philip H. Rousseau</td>
<td>Late Roman religious history</td>
<td>University of Auckland · F</td>
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<tr>
<td>Ingrid Severin</td>
<td>Modern European history</td>
<td>Nationalgalerie, Berlin · AS</td>
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<tr>
<td>Walter Simons</td>
<td>Medieval church history; mendicant orders</td>
<td>Institute for Advanced Study · A</td>
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<tr>
<td>Fritz Stern</td>
<td>Modern European history</td>
<td>Columbia University · V</td>
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<tr>
<td>Hans Taueuber</td>
<td>Ancient history</td>
<td>Universität Wien · A</td>
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<tr>
<td>Mary Lee Townsend</td>
<td>Modern European cultural history</td>
<td>The University of Tulsa</td>
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<tr>
<td>William L. Tronzo</td>
<td>Medieval art</td>
<td>The Johns Hopkins University · F</td>
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<tr>
<td>Lucette Valensi</td>
<td>History of North Africa and the Middle East</td>
<td>École des Hautes Études en Sciences Sociales · F</td>
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<tr>
<td>Herman van der Wee</td>
<td>Social and economic history</td>
<td>Universität Leuven · S</td>
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<tr>
<td>Albert van Helden</td>
<td>History of science</td>
<td>Rice University</td>
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<td>André Vauchez</td>
<td>Religious history of the Middle Ages</td>
<td>University of Paris-X · S</td>
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<td>Lauren S. Weingarden</td>
<td>Art history</td>
<td>Florida State University · MF · VS</td>
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<tr>
<td>Stephen A. White</td>
<td>Ancient philosophy</td>
<td>University of Texas at Austin</td>
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<td>James R. Wiseman</td>
<td>Archaeology</td>
<td>Boston University</td>
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<tr>
<td>Kenneth B. Wolf</td>
<td>Medieval European history (Spain)</td>
<td>Pomona College</td>
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<tr>
<td>Bartolomé Yun</td>
<td>Spanish economic history</td>
<td>Universidad de Valladolid</td>
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<td>Otto Zwierlein</td>
<td>Classical philology</td>
<td>Universität Bonn</td>
</tr>
</tbody>
</table>

V Visitor · A Research Assistant · R Research Associate · D Distinguished Visitor
THE SCHOOL OF MATHEMATICS

Faculty
ENRICO BOMBIERI [IBM von Neumann Professor]
ARMAND BOREL [Herman Weyl Professor]
LUIS A. CAFFARELLI
PIERRE DELIGNE
ROBERT P. LANGLANDS
JOHN W. MILNOR [Oswald Veblen Professor] [ -1990] THOMAS SPENCER

Professors Emeriti
DEANE MONTGOMERY
ATLE SELBERG
ANDRÉ WEIL
As is customary, the scientific life of the School of Mathematics is centered in
the interaction of its members, informally and through the many seminars (about
ten per week) organized by members and faculty around the whole spectrum of
mathematics.

The Members Seminar, a weekly event which is a tradition in the School, allows
members to present their ideas to a vast mathematical audience. More specialized
seminars were held on automorphic forms, organized by Professor Robert Lang-
lands; the Mordell's Conjecture Seminar and the Number Theory Seminar, both
organized by Professor Enrico Bombieri; the Math-Physics Seminar, organized by
Professors Luis Caffarelli and Thomas Spencer; and the Topology Seminar
organized by Professor Thomas Spencer.

The special seminars during 1989-90 included the opportunity to hear Professor
Vladimir Platonov, Institute of Mathematics, Byelorussian Academy of Sciences,
U.S.S.R., on “A new local-global principle for algebraic groups” and “Local-
global principles in algebra and algebraic number theory,” and Professor Ilya
Piatetski-Shapiro, Tel Aviv University, who spoke on the “Converse theorem
for GL(n).” David Kazhdan of Harvard, talked about “Local systems on moduli
spaces”; in February Jean-Luc Brylinski of Pennsylvania State University gave a
talk on “Geometry of the space of knots”; and a seminar on “The structure of
the Tate-Shafarevitch Group (d’apres Kolyvagin)” was given by Norbert Schapp-
pacher of Max Planck Institute.

The Marston Morse Lectures were delivered by Mikhael Gromov of the IHES
on February 26 and 28, 1990 on the subject of the “Rigidity of Symmetric Spaces
and Related Topics.”

We are sad to recall the death of Emeritus Professor Hassler Whitney. Professor
Whitney, who joined the Institute faculty in 1952, was a recipient of the National
Medal of Science, the Wolf Prize and the Steele Prize.

In June 1990, Professor Jack Milnor left the Institute to accept the position of
Director of the Institute for Mathematical Sciences at the State University at
Stony Brook.

ACADEMIC ACTIVITIES 1990-91

A prominent part of the academic year 1990-91 was the special program dedi-
cated to two aspects of number theory, namely analytic number theory and
algorithmic number theory, the former studying the distribution of number
theoretic sequences by analytical means, and the latter studying the question of complexity of procedures to solve number theoretic questions. The two topics overlap to some extent, each motivating problems and borrowing techniques from the other.

Hendrik Lenstra, a leading specialist in algorithmic number theory, was Distinguished Visiting Professor for this special year. Two weekly seminars, one for each topic, each with double meetings, together with several additional seminars, were devoted to the program. In algorithmic number theory a first main topic was factorization and applications of smooth numbers to various questions, on which Carl Pomerance gave a series of lectures during the fall term. In the same term, Hendrik Lenstra presented in the seminar a course on algorithms in number theory, and he followed in the spring with a course on primality testing and algorithms in algebraic number theory. The purpose of the seminar was to present current techniques and results in these very active areas of number theory to all participants.

A second seminar devoted to analytic number theory was established in collaboration with Rutgers University, with much help of Henryk Iwaniec. Topics included distribution of prime numbers and of smooth numbers in arithmetic progressions (with seminars by Hildebrand, Granville, Friedlander), classical analytic number theory (with seminars by Murty, Goldston, Friedlander, Iwaniec, Duke, Sarnak, Ghosh, Pintz, Perelli, Hejhal, Maier, Heath-Brown, Shahidi, Balog, Viola, Hildebrand, Salerno, Kai Man Tsang, Ramare, Deshouillers), diophantine equations (Lewis, Heath-Brown, Bombieri). Trevor Wooley and Robert Vaughan gave a series of lectures on their recent work, introducing smooth numbers in the study of Weyl sums, with applications to Waring’s problem. Additional lectures were given by Watt, Coppersmith, Mestre, Robbins, Lapidus, Pila and Adolphson, each of whom visited the Institute for a short period during the year.

Noteworthy achievements during the year included the construction by Lenstra and Pomerance of provably fast factorization algorithms by means of quadratic forms; the discovery by Pintz, who used probabilistic techniques from graph theory, of the best lower bound for gaps between primes; and new bounds for character sums obtained by Iwaniec and Friedlander. New results on prime multipllets were obtained by Balog, and new results on smooth numbers by Granville. Further applications of the improved method of Weyl sums were made by Vaughan and Wooley, and new progress on a long-standing problem of Erdo’s was achieved by Bombieri, Granville and Pintz. In conclusion, it was a very active and successful special year.

The seminar on analysis and mathematical physics seminar continued to meet, and the seminar on geometry and topology was organized by the members.
During Term I Mladen Bestvina assumed responsibility, but he was succeeded by Joel Hass in Term II.

In the second term Professors Daniel Gorenstein and Richard Lyons, visiting from Rutgers University, conducted a seminar on finite groups. Pierre Deligne and Vadim Schechtman organized a seminar on Weiss-Zumino-Witten theories to which Edward Witten from the School of Natural Sciences also contributed.

In the seminar on arithmetic groups and related topics, directed by Professor Armand Borel, one of the principal sets of lectures was by the young German mathematician Jens Franke, who explained his recent work on the cohomology of discrete groups and automorphic forms.

Professor Clifford Taubes of Harvard University gave two Marston Morse Lectures in March on the "Interaction Energy in the Calculus of Variations" and "Some Equations on Manifolds with Ends".

ARMAND BOREL was awarded the Leroy P. Steele Prize "...in recognition of cumulative influence extending over a career, including the education of doctoral students." The citation continues in part: "...he placed the facilities of the Institute for Advanced Study at the service of mathematics and mathematicians, using them to foster talent, share his ideas, and facilitate access to recent developments through seminars and lectures. It is simply not possible to cite a career more accomplished or fruitful or one more meaningful to the contemporary mathematical community."

THOMAS SPENCER, together with Jürg Fröhlich of the Swiss Federal Institute of Technology, was awarded the Dannie Heineman Prize in mathematical physics by the American Physical Society. The citation praised their contributions to the rigorous mathematical solutions of some outstanding problems in statistical mechanics and field theory.

LUIZ CAFFARELLI was elected to membership in the National Academy of Sciences, and ROBERT LANGLANDS received an honorary doctor of science degree from McGill University in Montreal.

FUNDING

In 1989-91 major support for programs in the School of Mathematics was received from The Ambrose Monell Foundation, the Alfred P. Sloan Foundation, and the National Science Foundation. Gifts of equipment were received from Sun Microsystems, Inc. and International Business Machines, Inc.
THE SCHOOL OF MATHEMATICS

MEMBERS, VISITORS AND RESEARCH STAFF
1989-90

ALEJANDRO ADEM
Group actions/cohomology of groups
Stanford University

J. F. GILES AUCHMUTY
Variational methods for nonlinear partial
differential equations
University of Houston

DAVID M. AUSTIN
Geometry and topology (Gauge theory)
University of Utah

JOSE BARROS-NETO
Partial differential equations
Rutgers University

DONALD BLASIUS
Number theory
University of California, Los Angeles

CIPRIAN S. Borcea
Torelli problems for complete intersections
algebraic geometry
National Institute for Scientific and Technical Creation,
Bucharest

LIA BRONSARD
Partial differential equations
Brown University

PAUL BURCHARD
D-modules
University of Chicago

JIANGUO CAO
Differential geometry and partial differential
equations
University of Pennsylvania

JENNIFER T. CHAYES
Mathematical physics
University of California, Los Angeles

LINCOLN CHAYES
Mathematical physics
University of California, Los Angeles

VICTOR A. CHULAEVSKY
Dynamical systems and quantum mechanics
U.S.S.R. Academy of Sciences, Moscow

PERCY A. DEIFT
Spectral and inverse spectral theory, integrable
systems
Courant Institute of Mathematical Sciences, New York
University

DENNIS M. DETURCK
Geometric analysis
University of Pennsylvania

ALEXANDRU DIMCA
Topology of algebraic varieties
Max-Planck-Institut für Mathematik, Bonn

VLADIMIR G. DRINFELD
Number theory, automorphic forms
Physical Technical Institute, Novosibirsk, U.S.S.R.

JOHN D. FAY
Theta functions, automorphic forms, and the
Selberg trace formalism
Haverford College

JENS FRANKE
Arithmetical algebraic geometry
Friedrich-Schiller-Universität, Jena

SIDNEY I. FRANKEL
Several complex variables, differential geometry,
ergodic theory
Columbia University

GREGORY A. FREIMAN
Additive number theory
University of Tel Aviv, Israel

BENT FUGLEDE
Potential theory
Kopenhagen Univ. Mathematiske Institut, Denmark

DAVID GABAI
3-manifolds, foliations
California Institute of Technology

3 First Term · 5 Second Term · M Member with Long Term Appointment
<table>
<thead>
<tr>
<th>Name</th>
<th>Field</th>
<th>Institution</th>
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<tr>
<td>ANDREW J. GRANVILLE</td>
<td>Analytic number theory</td>
<td>University of Toronto</td>
</tr>
<tr>
<td>THOMAS C. HALES</td>
<td>Representation theory</td>
<td>Harvard University</td>
</tr>
<tr>
<td>ZHENG-XU HE</td>
<td>Topology and geometry</td>
<td>University of California, San Diego</td>
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<tr>
<td>DENNIS A. HEJHAL</td>
<td>Number theory and complex analysis</td>
<td>University of Minnesota</td>
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<tr>
<td>JING-SONG HUANG</td>
<td>Lie theory, representation theory</td>
<td>Massachusetts Institute of Technology</td>
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<tr>
<td>TAMOTSU IKEDA</td>
<td>Theory of L-functions</td>
<td>Kyoto University</td>
</tr>
<tr>
<td>STEPHANE JAFFARD</td>
<td>Analysis</td>
<td>Ecole Polytechnique, France</td>
</tr>
<tr>
<td>MICHIKO JIMBO</td>
<td>Integrable systems</td>
<td>Kyoto University</td>
</tr>
<tr>
<td>NAIHUAN JING</td>
<td>Quantum groups; Kac-Moody Lie algebras</td>
<td>Yale University</td>
</tr>
<tr>
<td>BRUCE W. JORDAN</td>
<td>Number theory, automorphic forms</td>
<td>Baruch College, The City University of New York</td>
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<tr>
<td>JAY A. JORGENSEN</td>
<td>Arithmetic geometry, complex algebraic geometry</td>
<td>Stanford University</td>
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<tr>
<td>GABRIEL KATZ</td>
<td>Group actions on manifolds</td>
<td>Ben Gurion University, Israel</td>
</tr>
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<td>STEVEN PAUL KERCKHOFF</td>
<td>Topology, differential geometry</td>
<td>Stanford University</td>
</tr>
<tr>
<td>ULRICH M. KORSCHORKE</td>
<td>Topology (knots, links and immersions)</td>
<td>Universität Gesamthochsule Siegen</td>
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<tr>
<td>DIETER KOTSCHICK</td>
<td>Differential and algebraic geometry, 4-manifolds</td>
<td>Wolfson College, Oxford</td>
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<tr>
<td>MICHAEL LARSEN</td>
<td>Arithmetic algebraic geometry</td>
<td>Princeton University</td>
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<td>CLAUDE R. LEBRUN, JR.</td>
<td>Differential geometry, complex analysis, mathematical physics</td>
<td>State University of New York, Stony Brook</td>
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<tr>
<td>YANYAN LI</td>
<td>Partial differential equations, analysis</td>
<td>Princeton University</td>
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<tr>
<td>PAULO LIMA-VILHO</td>
<td>Geometry and topology</td>
<td>State University of New York, Stony Brook</td>
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<tr>
<td>LISA A. MANTINI</td>
<td>Representations of Lie groups</td>
<td>Oklahoma State University</td>
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<tr>
<td>DAVID MASSER</td>
<td>Transcendental number theory</td>
<td>The University of Michigan</td>
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<tr>
<td>OLIVIER MATHIEU</td>
<td>Infinite dimensional Lie algebras</td>
<td>University of Paris, C.N.R.S., France</td>
</tr>
<tr>
<td>HISAYOSI MATUMOTO</td>
<td>Representation theory of semisimple Lie groups, algebraic analysis</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>GEOFFREY MESS</td>
<td>Low dimensional topology</td>
<td>Mathematical Sciences Research Institute, Berkeley</td>
</tr>
<tr>
<td>WERNER MÜLLER</td>
<td>Global analysis, spectral theory</td>
<td>Akademie der Wissenschaften der DDR, Karl-Weierstraf-Institut für Mathematik, Berlin</td>
</tr>
</tbody>
</table>

V Visitor · A Research Assistant · R Research Associate · D Distinguished Visitor
VIJAYAKUMAR MURTY  
Number theory  
*University of Toronto* ·  

JÓZEF H. PRZYTYCKI  
Classical knot theory and its relations to topology of 3-manifolds, statistical mechanics and quantum field theory  
*University of British Columbia* ·  

IGOR REIDER  
Algebraic geometry  
*University of Oklahoma* ·  

JONATHAN D. ROGAWSKI  
Automorphic forms  
*University of California, Los Angeles* ·  

JOACHIM H. RUBINSTEIN  
Geometry and topology, minimal surfaces, network design  
*University of Melbourne, Australia* ·  

ANTHONY J. SCHOLI  
Arithmetic algebraic geometry  
*Durham University, England* ·  

ROBERTO SIUVOTTI  
Mathematical physics  
*Institut für Theoretische Physik der Universität Zürich, Switzerland* ·  

MARK STERN  
Differential geometry  
*Duke University* ·  

MARVIN D. TRETKOFF  
Riemann surfaces, Abelian integrals  
*Stevens Institute of Technology* ·  

ALEJANDRO URIBE  
Spectral theory of elliptic operators  
*Princeton University* ·  

PAUL A. VOJTA  
Number theory  
*University of California, Berkeley* ·  

JAN WEHR  
Mathematical physics of disordered systems  
*Rutgers University* ·  

DAVID J. WRIGHT  
Algebraic groups and number theory, Kleinian and Zeta groups  
*Oklahoma State University* ·  

GISBERT WUESTHOLZ  
Transcendental number theory  
*Eidgenössische Technische Hochschule, Zurich, Switzerland* ·  

HIROFUMI YAMADA  
Non-commutative analysis  
*Tokyo Metropolitan University* ·  

KUNRUI YU  
Transcendental theory and Diophantine approximation  
*Institute of Mathematics, Beijing* ·  

AKIHiko YUKIHI  
Shintani zeta functions and geometric invariant theory  
*Oklahoma State University* ·  

JING ZENG  
Combinatorics, special functions, symmetric group, Young tableaux  
*Université Louis-Pasteur, Strasbourg* ·  

MEMBERS, VISITORS AND RESEARCH STAFF  
1990 – 91  

DAVID AUSTIN  
Geometry and topology (Gauge theory)  
*University of Utah* ·  

ANTAL BALOG  
Number theory  
*Mathematical Institute of the Hungarian Academy of Sciences* ·  

Mladen BESTVINA  
Topology  
*University of California, Los Angeles* ·  

MIKHAIL V. BOROVoi  
Algebraic groups, arithmetic algebraic geometry  
*Far East branch of the U.S.S.R. Academy of Sciences, Khabarovsk* ·  

*First Term · Second Term · M. Member with Long Term Appointment*
MARK BRITTENHAM  
Geometric topology  
Cornell University

LIA BRONSARD  
Partial differential equations  
Brown University

MARC BURGER  
Rigidity of locally symmetric spaces  
Stanford University

LEONARD S. CHARLAP  
Computational number theory  
Institute for Defense Analyses

HENRI COHEN  
Number theory  
University of Bordeaux · s

J. BRIAN CONRY  
Number theory  
Oklahoma State University · v

KEVIN D. CORLETTE  
Differential geometry, harmonic maps  
University of Chicago · s

JOSEPH D’ATRI  
Differential geometry  
Rutgers University

JEAN-MARC DESHOUILLERS  
Number theory  
University of Bordeaux · s

MARIO EUDAVE-MUNOZ  
Low dimensional topology  
University of California, Santa Barbara

JENS FRANKE  
Arithmetical algebraic geometry  
Friedrich-Schiller-Universität, Germany

JOHN FRIEDLANDER  
Number theory  
University of Toronto · v

MASAKI FUJISAWA  
Automorphic L-functions  
The Johns Hopkins University

KRZYSZTOF GALICKI  
Complex geometry and mathematical physics  
Rice University · s

AMIT GHOSH  
Number theory  
Oklahoma State University

V. A. GINZBURG  
Representation theory  
Institute of Physics of the Earth, Moscow · f

HERMAN GLUCK  
Differential geometry  
University of Pennsylvania · f

DANIEL GOLDSTON  
Analytic number theory  
San Jose State University · f

DANIEL GORENSTEIN  
Finite simple group T  
Rutgers University · s

ANDREW GRANVILLE  
Analytic number theory  
University of Toronto

MICHAEL GRINFEL’D  
Mathematical physics/phase transformations  
Institute of the Physics of the Earth, Moscow

MICHEL GROS  
Arithmetic algebraic geometry  
IRMAR, University of Rennes I

MASAKI HANAMURA  
Algebraic geometry  
Massachusetts Institute of Technology

JOEL HASS  
Topology, differential geometry  
University of California, Davis

DENNIS HEJHAL  
Number theory and complex analysis  
University of Minnesota · f

ADOLF HILDERRAND  
Number theory  
University of Illinois, Urbana-Champaign

YI-ZHI HUANG  
Infinite-dimensional Lie algebras and conformal field theory  
Rutgers University
<table>
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<tr>
<th>Name</th>
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<tr>
<td>TAMOTSU IKEDA</td>
<td>Automorphic forms, L-functions, Kyoto University, Japan</td>
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<td>ZHIREN JIN</td>
<td>Partial differential equations, differential geometry, University of Pennsylvania</td>
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<td>ROBION C. KIRBY</td>
<td>Low dimensional topology, University of California, Berkeley</td>
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<tr>
<td>HENDRIK LENSTRA</td>
<td>Computational and algorithmic number theory, University of California, Berkeley</td>
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<td>DONALD J. LEWIS</td>
<td>Diophantine equations, University of Michigan</td>
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<td>RICHARD LYONS</td>
<td>Finite simple groups, Rutgers University</td>
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<td>HELMUT MAIER</td>
<td>Number theory, University of Georgia</td>
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<tr>
<td>GRIGORI ALEKSANDROVIC MARGULIS</td>
<td>Discrete subgroups of Lie groups, ergodic theory, Institute of Information Transmission Problems, U.S.S.R.</td>
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<tr>
<td>FRANK MORGAN</td>
<td>Geometric measure theory, minimal surfaces, Williams College</td>
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<td>G. DANIEL MOSTOW</td>
<td>Discrete and continuous groups, Yale University</td>
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<td>DETLEF HORST MULLER</td>
<td>Real analysis, University of Bielefeld</td>
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<td>RAM MURTY</td>
<td>Number theory, McGill University</td>
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<td>MELVYN NATHANSON</td>
<td>Combinatorial number theory, Lehman College, City University of New York</td>
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<td>NITIN NITURE</td>
<td>Algebraic geometry, Tata Institute of Fundamental Research, India</td>
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<td>ERAN OORT</td>
<td>Algebraic geometry and number theory, University of Utrecht</td>
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<td>GEORGE PANICOLAOU</td>
<td>Fluids, random media, Courant Institute of Mathematical Sciences</td>
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<td>ALBERTO PERELLI</td>
<td>Analytic number theory, University of Napoli</td>
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<td>JANOS PINTZ</td>
<td>Analytic number theory, computational number theory, Mathematical Institute of the Hungarian Academy of Sciences</td>
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<td>CARL POMERANCE</td>
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<td>FRAYDOUN REZAKHANLOU</td>
<td>Probability — infinite particle systems, hydrodynamics, Courant Institute of Mathematical Sciences</td>
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<td>FERNANDO RODRIGUEZ-VILLEGAS</td>
<td>Number theory, Ohio State University</td>
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<td>Automorphic forms, number theory, Katholische University, Eichstatt</td>
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THE SCHOOL OF NATURAL SCIENCES

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JOHN N. BAHCALL
FREEMAN J. DYSON
PIET HUT
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Members with Long-Term Appointments

JULIAN M. BIGELOW [—1990]
OTTO E. NEUGEBAUER*

*Deceased February 19, 1990
THE SCHOOL OF NATURAL SCIENCES

ACADEMIC ACTIVITIES OF THE SCHOOL

Recent activities in the School of Natural Sciences have focused on three frontiers of physics: the very small, the very large, and the very many.

The study of the very small is known as elementary particle physics. Its aim is to understand the nature of the elementary building blocks of matter and their mutual interactions. It has long been traditional to divide the fundamental interactions into four classes — strong, electromagnetic, weak, and gravitational. In the 1970's compelling theories describing three of the four traditional interactions were constructed. The successful theories of the strong, electromagnetic and weak interactions are all very similar mathematically, and beautiful unified theories encompassing these three interactions have been constructed. A great remaining challenge, which drives much of the research of the School, is to understand how gravity fits in.

Over long distances and for macroscopic bodies, gravity is well described by Einstein’s theory of general relativity, perhaps the most beautiful of all physical theories. However, the conceptual framework of general relativity is not easy to reconcile with the conceptual framework used to describe the microworld, i.e., quantum mechanics. We are attempting to address several fascinating physical questions that hinge on the proper treatment of general relativity within quantum mechanics, such as whether the topology of space-time changes due to quantum fluctuations, producing “wormhole” or “baby universes,” whether small black holes can evaporate completely into ordinary particles, and many others.

The mathematical theory of relativity does not seem, superficially, to be closely related in form to the theories that successfully describe the other interactions. Starting in the mid-1980's, however, it has been widely realized that all four interactions arise inexorably together when one tries to extend the traditional theory of interacting point particles to spatially extended objects — superstrings — in a consistent way. This potential “theory of everything” remains the focus of much research at the Institute. The study of superstring theory has stimulated the development of new mathematical techniques, some of which have proved to be of great interest to pure mathematicians. Since superstring theory appears to incorporate gravity in a manner consistent with quantum mechanics, it holds tremendous promise for addressing the problems previously mentioned.

Despite the fact that there is now a reliable “standard model” for the strong, electromagnetic, and weak interactions, much remains to be done in these fields. An especially important theoretical challenge, still only partially met, is to calculate the consequences of quantum chromodynamics or QCD — the modern
theory of the strong interaction — with decent accuracy. At present, some of the world’s fastest computers and novel advanced techniques of parallel processing are employed on this problem, but even so new insights will be necessary to solve it.

Another frontier in the physics of the very small is, remarkably, cosmology. The tie between elementary particle physics and cosmology is that, according to the widely accepted big bang picture, the Universe is extremely hot and dense during its earliest moments. To describe the behavior of matter under such extreme conditions, we must employ all the results and tools of elementary particle physics. An overview of the important astrophysics research being done at the Institute is to be found in Professor John Bahcall’s summary below.

Another area of activity in the School of Natural Sciences for the past two years has been biophysics and computational neuroscience. The goal of efforts in this area is to uncover the principles underlying the operation, organization, and function of the nervous system and thereby explain how the brain solves its intricate perceptual and control problems.

Research done at the Institute for Advanced Study is now helping to clarify how the brain represents spatial, temporal, and color attributes of the visual world and how it uses this information to perform its recognition tasks. It also explains how differences in the visual system of different species can be traced to differences between their visual environments. The findings, while based on theoretical ideas from information theory and physics, suggest concrete predictions for psychophysical and electrophysiological experiments. They may lead to significant clinical and technological applications.

Finally, two spectacular experimental discoveries in the last decade have proved again that the behavior of many identical particles, each in itself mundane — ordinary atoms in ordinary matter — can present startling surprises. Two fascinating, qualitatively new behaviors of matter were discovered: the quantized Hall effect, and high temperature superconductivity. (Both were promptly rewarded with Nobel prizes.) Revolutionary new theoretical concepts involving fractional charge and new forms of quantum statistics have proved their worth in the Hall effect. Vigorous attempts are afoot to exploit these ideas in other contexts, including high temperature superconductivity.

FACULTY

STEPHEN ADLER worked in two main areas during 1989-90: (i) multiscale acceleration algorithms for Monte Carlo analysis, and (ii) quaternionic quantum mechanics. The Monte Carlo work had its genesis in a short paper written in 1981 which pointed out that for multiquadratic actions, one can construct a stochastic analog of the usual deterministic over-relaxation algorithm used for
solving partial differential equations. The idea is to regard the minimization of an action (solving a partial differential equation) as the zero temperature limit of a Monte Carlo process in which the action is thermalized; hence to every algorithm used to solve elliptic PDE's there is in principle a corresponding Monte Carlo algorithm. A few years ago he returned to do more work on over-relaxation, including a detailed theoretical analysis of critical slowing down for Gaussian actions, and an explicit construction of the stochastic algorithm corresponding to the general linear iterative process for a quadratic action. In a talk he gave at the Boston University Workshop on Acceleration Algorithms he surveyed acceleration methods for differential equations with an emphasis on fast Fourier transform and multigrid. This led him to explore ways to implement analogs of the multiscaling idea for lattice gauge theories by appropriate changes of variables. Recently he has pursued this idea in collaboration with Gyan Bhanot and preliminary computations look promising.

For several years Professor Adler has been interested in quaternionic quantum mechanics, a largely unexplored extension of standard complex quantum mechanics. While in Australia in the fall of 1987 he was asked some questions by the neutron scattering people there which led him to look at scattering theory in quaternionic quantum mechanics. He found the novel and surprising result that in non-relativistic quaternionic quantum mechanics, with a general quaternionic potential, the asymptotic states are all contained in a complex subspace of quaternionic Hilbert space, and the S-matrix is complex, not quaternionic. Hence there are no quaternionic scattering phases: quaternionic quantum mechanics acts as an effective complex quantum mechanics on the asymptotic space. There is nonetheless a characteristic signature of the underlying quaternionic dynamics: the effective complex theory is T-violating. One corollary of the asymptotic state structure being complex is that one can use the standard complex tensor product to construct multiparticle scattering states, and so the folklore that quaternionic quantum mechanics is at best a single particle theory is incorrect. Professor Adler is currently writing a book on Quaternionic Quantum Mechanics in which he is working out in detail the quaternionic analogs of many of the results of standard non-relativistic quantum mechanics. He hopes this project will get others interested in further exploration of quaternionic quantum mechanics and will lead to an investigation of the relativistic case.

In 1990-91 Professor Adler continued work on his book on Quaternionic Quantum Mechanics, to be published by Oxford University Press. Material worked out and incorporated during the past academic year included an extensive discussion of relativistic single particle wave equations, their non-relativistic reduction, and the quaternionic structure of the Poincare group; also, the generalized geometric phase, the WKB approximation, and projective representations of the phase space transition group. In the fall of 1991, Professor Adler will be teaching a course based on the book at Princeton University and publication is planned for early 1992. Further work on the quaternionic project, beyond what is in the book, will involve a study of quantum field theory.
In 1990-91 Professor Adler also worked, in collaboration with Gyan Bhanot, on Monte Carlo acceleration algorithms. They explored the use of changes of variables which are specific to lattices whose dimension is a power of two. Preliminary studies on the $U(1)$ lattice gauge theory have been promising, and further extensive computations have shown that the new algorithms reduce the critical exponent from two to close to zero. An extensive program of investigations of the new algorithms is planned. A secondary activity of Professor Adler this year has been the initiation of work on neural networks.

JOHN BAHCALL’S main activity in 1989-90 was in the area of neutrino astrophysics. Together with Roger Ulrich (UCLA), Bahcall added a number of improvements to the standard solar model which they used to predict the event rate in eleven solar neutrino experiments involving among other targets, $^{37}\text{Cl}$, $^{71}\text{Ga}$, $^3\text{H}$, and free electrons. The predicted rate for the $^{37}\text{Cl}$ experiment is about a factor of four larger than the observed rate, which has given rise to many imaginative solutions to the “solar neutrino problem.”

The standard solar model was also used to calculate the p-mode and g-mode oscillation frequencies and compared with observation. The observed and calculated oscillation frequencies are in remarkably good agreement, although there are significant discrepancies at the level of 0.1% of the basic p-mode frequencies. These discrepancies may represent an imprecise description of complicated physics near the solar surface or they signal the need for a slightly improved description near the base of the corrective zone or below. Together with Avi Loeb (IAS), Professor Bahcall has developed a convenient analytic description of heavy element diffusion in solar interiors. The slow process of gravitational settling of heavy elements is the only known physical process not yet included in the Bahcall-Ulrich solar model that might affect the calculated neutrino fluxes or helioseismological frequencies to within measurable accuracy. The Bahcall-Loeb description of heavy element diffusion can be included in future calculations of standard solar models, although there are no computer codes which can be adapted to include properly the diffusion without significant modifications.

Professor Bahcall also calculated improved neutrino absorption and scattering cross sections for all of the solar neutrino experiments that are being actively developed; the calculations for the important deuterium experiment were carried out with K. Kubodera (SUNY) and S. Nozawa (CERN). Together with A. Dar (Technion, Haifa), T. Piran (Jerusalem), W. Press (Harvard), and D. Spergel (IAS and Princeton University), Bahcall carried out analysis of the observed neutrino events from the supernova in the Large Magellanic Cloud, SN1987A. The statistical techniques that were used to combine data from different experiments were adopted by a number of groups, all of which agree that the results of the SN1987A observations are in good agreement with expectations based on standard theoretical ideals regarding supernova explosions.
More recently, Professor Bahcall collaborated on producing new solar models with M. Pinsonneault (Yale University) that include the effect of helium diffusion. Bahcall also wrote a user-friendly, exportable code for energy generation and neutrino production and Pinsonneault wrote an exportable code for solving the Bahcall-Loeb diffusion equations. Together they have calculated a series of new models that give only slightly charged neutrino fluxes but which may yield measurable differences in the solar helioseismological frequencies. Bahcall, A. Gould (IAS) and C. Flynn (Heidelberg) have carried out extensive studies of the dynamics of a new sample of K giants. The results provide a more reliable estimate of the amount of missing matter in the solar vicinity.

During 1989-90, Professor Bahcall also concentrated on developing new software that would calculate the effects of gravitational settling of heavier elements in the interiors of radioactively supported stars. This piece of physics is the last remaining standard physics that has not yet been included in the most sophisticated models of the solar interior. A crude estimate of the effect of this process is that it will raise the predicted higher energy neutrino fluxes by a few percent.

Professor Bahcall's work in 1990-91 had three main themes: investigating the solar neutrino mystery, using the Hubble Space Telescope to make observations of quasars, and chairing the National Research Council study of the highest priority initiatives in astronomy and astrophysics. In the area of solar neutrinos, Bahcall proved a general theorem showing that the shapes of individual energy spectra are independent of their solar origin to measurable accuracy, and he collaborated with Hans Bethe to put forward an explicit solution of the long-standing solar neutrino problem. Bahcall and Bethe also made a general argument that the solar neutrino problem cannot be solved by modifications of astrophysical models, but instead requires new physics. With the Hubble Space Telescope, Bahcall and his collaborators found a much larger than expected number of Lyman' clouds, which may be the precursors of galaxies. In collaboration with researchers at different institutions, he is currently investigating ways of identifying these clouds locally. Bahcall is principal investigator of the Key Project for quasar absorption lines, which is currently the largest single program of the Hubble Space Telescope. He and his collaborators at IAS, CalTech, LaJolla, Pittsburgh, the Royal Greenwich Observatory, and the Institute d’Astrophysique are eagerly awaiting the first observations from this program which will be available in late October, 1991. Together with D. Maoz — the postdoctoral member in charge of this program — and D. Schneider and collaborators from Princeton University and Cambridge, England, Bahcall has studied the images of over one hundred fifty quasars to investigate the extent to which matter in the universe acts as a gravitational lens and forms multiple images of different quasars. Two other postdoctoral members, Guhathakurta and Yanny, are working with Bahcall and Schneider to study the distribution of stars in high resolution images of global clusters, the oldest and — in many ways — the most beautiful collection of stars in the galaxy.
The young members in astronomy and astrophysics have worked on an astonishing variety of topics including the theory and possible detection of dark matter, the distribution of stars between galaxies, the physical characteristics and evolution of neutron stars, the imprint of structure formation on the cosmic microwave background radiation, and the friction developed between mass concentrations as they pass near each other.

History will be the best guide as to which of these many works are most significant. Three specific investigations have already attracted a great amount of attention. D. Schneider has continued his work with J. Gunn (Princeton University) and M. Schmidt (CalTech) in finding and analyzing the most distant objects known in the universe. Their discoveries persist in frustrating theorists by showing that extremely energetic objects exist at the earliest epochs at which we have detailed information about the universe. Another postdoctoral member, P. Guhathakurta, has worked with T. Tyson of Bell Telephone Laboratories and has uncovered a new class of distant blue Galaxies, another source of puzzlement to astronomical theorists. Two young postdoctoral members from Israel, A. Loeb and A. Laor, have developed a fundamental new theory describing how the mass around a bright quasar may be maintained for long periods in the form of a thick disk.

During 1989-90 FREEMAN DYSON divided his time among pure mathematics, physics, astronomy, writing, and lecturing. He published "Mappings and Symmetries of Partitions," in the Journal of Combinatorial Theory and "Feynman's Proof of the Maxwell Equations" in the American Journal of Physics. Professor Dyson also contributed conference reports to the International Astronomical Union Colloquium No. 123, "Observatories in Earth Orbit and Beyond" at the Goddard Space Flight Center, Greenbelt, Maryland, in April, 1990. These were entitled "Major Observatories versus Economy-class Observatories in Space" and "Occultation Astronomy." In addition, he spent a fraction of the year preparing a popular science book with the title "From Eros to Gaia," which he plans to publish in 1991. This consists mainly of public lectures he has given.

During 1990-91 Professor Dyson worked mainly on two mathematical problems in collaboration with Harold Falk of CUNY and Joel Lebowitz of Rutgers, and finished a book of popular scientific lectures based on his Danz Lectures given at the University of Washington in 1988. The Falk problem resulted in a paper with the title "Period of a Discrete Cat Mapping," accepted for publication in the American Mathematical Monthly in 1992. It explains the surprisingly short recurrence times observed when a standard strongly-mixing map of the plane is iterated on a finite lattice. The Lebowitz problem is to determine the statistical distribution of the number of points of a square lattice that lie within a circle with fixed center and variable radius. The Lebowitz problem requires a much deeper analysis and is still unsolved, but with the help of Pavel Bleher and Zhe Ming Cheng enough progress was made to begin writing up some partial results.
for publication. Professor Dyson's book of popular essays is mainly concerned with the problem of maintaining a healthy balance between big science and small science in a variety of disciplines. The book will probably be published in 1992 with the title “From Eros to Gaia.”

In October 1990 Professor Dyson gave the Radcliffe Lecture in Oxford with the title “Carbon Dioxide in the Atmosphere and the Biosphere,” a talk he first gave in the Faculty Lecture Series at the Institute. In January, 1991 he received the Oersted Medal at the annual meeting of the American Association of Physics Teachers in San Antonio, where he gave a talk with the title “To Teach or Not to Teach,” published in the American Journal of Physics. He received honorary degrees at Bates College in Maine and at Haverford College in Pennsylvania. Two talks given at the International Astronomical Union Colloquium were published in the colloquium’s proceedings, Observatories in Earth Orbit and Beyond (ed. Y. Kondo, Kluwer Academic Publishers, 1990).

PIET HUT spent the academic year 1989-90 on sabbatical in Japan and Holland, visiting the astronomy departments at the universities of Tokyo and Utrecht. In Tokyo he was involved in large-scale simulations of the evolution of dense star systems in collaboration with Japanese colleagues, using a supercomputer at the Institute for Supercomputing Research. One of the most important results of these simulations was a statistical description of the migration processes of primordial double stars through a star cluster. In Utrecht he taught a course on the evolution of globular star clusters. His research in Holland focused on observational aspects of star cluster evolution, especially those connected to low-mass X-ray binaries and millisecond pulsars.

In 1990-91 Professor Hut conducted research in stellar and cometary dynamics. In the first area, he studied the effects of primordial binaries on the evolution of global clusters. Working with Roger Romani and Steve McMillan, a number of observational consequences of the dynamical evolution were worked out for the recently discovered millisecond pulsars in these clusters. Another application was a study of the nucleus of the nearby galaxy M33, for which a dynamical model was constructed in analogy with global cluster dynamics, in a collaboration with Lars Hernquist and John Kormendy. A more theoretical project in stellar dynamics focused on analytical and semi-numerical investigation of the exponential growth of errors in N-body calculations, carried out with Jeremy Goodman and Douglas Heggie. In the second area, that of cometary dynamics, Professor Hut constructed models for the formation of multiple impacts during the geological period of the Cretaceous-Tertiary boundary, some 66 million years ago. Stimulated by the recent identification of a huge crater in the Yucatan peninsula, with a diameter of 180 km, for which the age was determined to be compatible with being 66 million years, Hut embarked on a collaboration with Walter Alvarez, Gene Shoemaker, and Sandro Montanari. Their collusion was that the mass extinction at that time may have been triggered by multiple cometary impacts during the northern hemisphere summer.
During 1989-90 FRANK WILCZEK investigated problems in three areas, anyon superconductivity, Aharonov-Bohm effects, and negative curvature. Several years ago he pointed out the possible existence of new forms of quantum statistics in two spatial dimensions, interpolating continuously between fermions and bosons. Particles with such statistics are called anyons. Soon after, it was discovered that anyons actually do exist in actual materials that are effectively two dimensional; specifically quasiparticles in the fractional quantized Hall effect are anyons.

There has been a new level of interest in these ideas, mainly stimulated by Laughlin’s proposal that holes in the new high temperature copper oxide superconductors behave as anyons, and that this property is directly responsible for their superconductivity. Wilczek, Edward Witten, Bert Halperin and Wilczek’s student, Yi-Hong Chen, analyzed the behavior of certain kinds of anyons (Y.-H. Chen, F. Wilczek, E. Witten B. Halperin “On Anyon Superconductivity” *International Journal of Modern Physics, B3, 1001, 1989*). They demonstrated that ideal gases of such particles are indeed superconducting at zero temperature, and analyzed some of the special features of such superconducting states. One by-product of that work was a new understanding of how an old and useful, but previously rather vague, analogy between superconductivity and hydrodynamics could be made precise and be put to use.

A series of possible phenomenological consequences of anyon superconductivity were analyzed in a paper Wilczek co-authored with Halperin and J. March-Russell (*Physics Review, B40, 726, 1989*). Perhaps the most important result of that paper, however, is that every term in the effective Lagrangian for anyon superconductivity calculated in the earlier Chen, Wilczek, Witten and Halperin paper was derived directly and quantitatively from basic principles; for instance, the magnitude of the superconducting linear Hall effect was traced to the value of the angular momentum in the state. Another by-product of this work was the discovery of a new general mechanism whereby massless particles and (closely related) superconductivity may arise. This mechanism, called “spontaneous fact violation,” was identified in the Chen et al paper and in a much more precise and general way in S. Giddings and F. Wilczek, “Spontaneous Fact Violation,” *International Journal of Modern Physics, A5, 635 (1990)*. Subsequently Wilczek combined these papers and allied subjects in a monograph, *Fractional Statistics and Anyon Superconductivity*, World Scientific (1990).

Concerning Aharonov-Bohm effects, a convenient catch-all phrase for several topics that are closely related conceptually but diverse in detail, Wilczek pointed out in an article co-authored with L. Krauss (“Discrete Gauge Symmetry in the Continuum,” *Physics Review Letters, 62, 1071, 1989*) that unbroken discrete gauge symmetries make sense and have non-trivial consequences, even in the continuum. The most striking consequence, from a theoretical point of view, is that black holes may have purely quantum “hair,” i.e., properties that are totally missed in classical physics. Recently the analysis has been sharpened and
extended to non-abelian discrete symmetries in a paper written with M. Alford and March-Russell (Nuclear Physics, B337, 695, 1990).

The most evident physical phenomena associated with discrete gauge symmetries is a special scattering process that generalizes the process of scattering of charged particles off an infinitely thin solenoid analyzed by Aharonov and Bohm in a celebrated paper. In a paper Wilczek wrote with Alford and March-Russell ("Enhanced Baryon Number Violation due to Cosmic Strings," Nuclear Physics, B328, 140, 1989), it was pointed out that this could dramatically enhance the probability for particles to get to the core of cosmic strings, and thus, for instance, be subject to baryon-number violating processes. In a paper written with Y.-S. Wu ("Space-Time Approach to Holonomy Scattering," Physics Review Letters, 65, 13, 1990), the basic mechanism is generalized, notably including the result that non-abelian flux tubes scatter strongly off one another. An important subsequent development, which may be rich in consequences, was described in Alford, K. Benson, S. Coleman, and Wilczek's paper, "Zero Modes of Non-Abelian Vortices," (Nuclear Physics, B349, 414, 1991) where it was found that generically loops of non-abelian flux support a new form of superconductivity such that the charge and current are not localized on the string, i.e., the loop forms a superconducting wire. The superconductivity is forced by basic symmetries and should be very robust.

In the area of negative curvature, Wilczek joined with C. Callan of Princeton University and a number of students to investigate the properties of interacting quantum fields in maximally symmetric spaces of constant negative curvature ("Infrared Behavior at Negative Curvature," Nuclear Physics, B340, 366, 1990). Wilczek has found that many interesting questions that are intractable in flat space become much easier to investigate on the negatively curved space. Specifically, the theory of the strong interaction — QCD — comes under much better analytic control. Semiclassical techniques that have given us much qualitative insight into the basic non-perturbative phenomena of quark confinement and chiral symmetry breakdown give quantitative results in this new context. These can certainly be compared to numerical experiments and perhaps extrapolated to the directly physical case of flat space.

In 1990-91 Professor Wilczek continued exploring the physical implications of new forms of quantum statistics, or anyons. These concepts have proved to be central to the description of recently discovered states of matter, so-called quantized Hall states, that exhibit remarkable electronic behavior. Recently he has combined these concepts with the traditional paring concept of superconductivity theory to predict the existence of other new states of matter which should form at low temperatures in strong magnetic fields.

In a quite different physical direction, but using related mathematics, he has been exploring the implications of discrete gauge symmetries. A notable result has
been to establish that black holes can have previously unsuspected structure—
“hair.” Encouraged by this insight, he is taking a shot at other outstanding
problems in the quantum theory of black holes.

Finally, encouraged by the recent results of large-scale numerical simulations, he
is elaborating his previous suggestions about the behavior of quarks and gluons
at high temperature (second order phase transition) into a detailed quantitative
theory.

In 1989-90 EDWARD WITTEN continued his work on topological field theories
and their relation to string theory and geometry. There were two main develop-
ments during the year. He developed a method to interpret the “one matrix
model” of two dimensional gravity in terms of topological field theory. Apart
from the interest that it attracts among physicists, this gave rise to remarkable
predictions, of quantum field theoric origin, concerning the geometry of the
moduli space of Riemann surfaces. He continued this work in the spring of
1990, showing that the general properties of practically all of the known soluble
models of string theory agreed with what was expected from the topological
field theory point of view.

Professor Witten was also concerned during this period with new ideas about
the quantization of Chern-Simons gauge theories in three dimensions. With
Axelrod and DellaPietra, he developed a detailed quantization of Chern-Simons
theory with compact gauge group, allowing a new perspective on such matters
as the Jones representations of the braid group. He also extended this to the case
of certain non-compact gauge groups, a case that is relevant, among other things,
to understanding three dimensional quantum gravity.

In 1990-1 Professor Witten continued his work on topological field theories,
their relations to string theory, and their geometrical applications. One aspect of
this work involves the study of simple models of string theory (variously called
c \leq 1 models, or models with a target space dimension \leq 2). It is hoped that
experience gained from studying these models will help with the “real thing.”
On the one hand, he has been interested in the worldsheet properties of these
theories, and in particular the extension of his previous work on the algebraic
geometry of “matrix models” of two-dimensional gravity to the N matrix
model. This leads to a very surprising description, coming from quantum field
theory, of intersection theory on a certain family of covers of the moduli space
of Riemann surfaces. When expressed in the language of classical geometry, the
construction involves one or two interesting novelties.

On the other hand, Professor Witten has also been interested in the target space
interpretation of these simple models of string theory, where one hopes to see
glimmers of the “real” putative applications of string theory to space-time phys-
ics. He has made two contribution in this direction. The first was to discover,
for the most physical $D = 2$ case, an exact conformal field theory describing a black hole solution of string theory. There is reasonable hope that this may lead, in due time, to a significantly better understanding of the mysteries of “ordinary” four-dimensional black holes. The second was to discover a new “ground ring” whose existence comes close to explaining why the $D = 2$ conformal field theory has a matrix model interpretation.

Professor Witten also extended his earlier work on three dimensional Chern-Simons gauge theories and their close cousins, developing the semiclassical expansion for non-compact gauge groups (which should be related among other things to three-dimensional quantum general relativity) and studying, in depth, the dimensional reduction of Chern-Simons theory to two dimensions. He also developed further the gauge theory approach to holomorphic factorization of WZW models.

Much work by other members of the School of Natural Sciences was closely related to some of the themes mentioned by Professor Witten. Erik Verlinde and collaborators (including Robbert Dijkgraaf, currently at the IAS) wrote two papers connected with some of these themes. The first was on topological field theories derived from Landau-Ginzberg potentials, and the second was on using $SL(2,\mathbb{R})$ group theory to understand the string theory black hole solution mentioned above. Boris Blok and A. Varchenko (School of Mathematics) investigated the same Landau-Ginzberg models studied by Dr. Verlinde, et al. in the light of catastrophe theory. Nigel Burroughs, M. DeGroot, and a collaborator at Princeton constructed an elegant generalization of the Drinfeld-Sokolov hierarchies of integrable systems in two dimensions. Jan Lacki investigated the integrable models related to the $N$ matrix model. M. Roek and collaborators found new superspace constructions of supersymmetric nonlinear sigma models. Roek and Eric Verlinde illuminated the geometrical interpretation of certain duality transformations of conformal field theories. G. Mandal, Spenta Wadia and collaborators analyzed the space-time physics of $D = 2$ string theory including the validity of the collective J. Cohn and S. de Alwis (formerly of the School of Natural Sciences) studied the applicability of string field theory to the $D < 2$ models.

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• First Term • Second Term • M Member with Long Term Appointment
THE SCHOOL OF NATURAL SCIENCES

RUSSEL KULSRUD
Plasmaphysics
Princeton Plasma Physics Laboratory • S

OFEH LAHAV
Astrophysics
University of Cambridge • F

ABRAHAM LOEB
Astrophysics
Princeton, New Jersey • M

GUATAM MANDAL
Particle physics
Tata Institute, Bombay

MICHAEL D. MCGUIGAN
Particle physics
Rockefeller University

GREGORY MOORE
Particle physics
Princeton, New Jersey • M

KEVIN J. MORIARTY
Particle physics
Princeton, New Jersey

CHIARA NAPPI
Particle physics
Princeton, New Jersey • M

CARLOS ORDOÑEZ
Particle physics
Rockefeller University • S

DONALD E. OSTERBROCK
Astrophysics
University of California, Santa Cruz

JAY M. PASACHOFF
Astrophysics
Williams College

WILLIAM PRESS
Astrophysics
Harvard University • S

ELIEZER RABINOVICI
Particle physics
Racah Institute of Physics, Jerusalem • V

ROGER W. ROMANI
Astrophysics
University of California, Berkeley • M

DONALD P. SCHNEIDER
Astrophysics
Princeton, New Jersey • M

ALFRED D. SHAPERE
Particle physics
Princeton, New Jersey

CHARLES SOMMERFELD
Particle physics
Yale University • F

GLENN D. STARKMAN
Astrophysics
Princeton, New Jersey

PAUL J. STEINHARDT
Particle physics
University of Pennsylvania

ERIK P. VERLINDE
Particle physics
Princeton, New Jersey

MARTIN D. WEINBERG
Astrophysics
Princeton, New Jersey

XIAO-GANG WEN
Particle physics
Institute of Theoretical Physics, Santa Barbara • MS

YONG-SHI WU
Particle physics
University of Utah

YUEMING XU
Astrophysics
University of Colorado

v Visitor • d Distinguished Visitor
MEMBERS, VISITORS AND RESEARCH STAFF
1990 – 91

JOSEPH ATICK
Biophysics/neural systems
Institute for Advanced Study · M

BELAL BAAQUIE
Strings/field theory
National University of Singapore

CHARLES BEICHMAN
Astrophysics
California Institute of Technology

GYAN BHANOT
Computation/statistical physics
Thinking Machines Corporation · f

BORIS BLOK
Particle/mathematical physics
Institute for Advanced Study

NIGEL BURROUGHS
Quantum groups
University of Cambridge

JOANNE COHN
Field theory/string theory
Institute for Advanced Study

RICHARD DAVIS
Particle physics
Institute for Advanced Study

DAVID DEVORKIN
History of astronomy
Smithsonian Institution · s

YESHAYAHU EISENBERG
Particle physics
Weizmann Institute

CHRIS FLYNN
Astrophysics
Institut Heidelberg · vF

PETER GOLDREICH
Astrophysics
California Institute of Technology · vF

ANDREW GOULD
Astrophysics
Institute for Advanced Study

PURagra GUHATHAKURTA
Observational cosmology
Institute for Advanced Study

LAWRENCE HORWITZ
Particle physics
Tel Aviv University · vF

BUELL JANNUZI
Observational cosmology
Steward Observatory

ROMAN JUSZKIEWICZ
Astrophysics
North Copernicus Astronomical Center · f

IAN LACKI
Mathematical physics
Université de Genève

ARI LAOR
Astrophysics
Tel Aviv University

OLAF LECHTENFELD
String theory
The City University of New York

ZHAOPING LI
Biophysics/neural systems
California Institute of Technology

ABRAHAM LOEB
Astrophysics
Institute for Advanced Study · M

JUNICHIRO MAKINO
Astrophysics
University of Tokyo · vF

GAUTAM MANDAL
String theory
Institute for Advanced Study

* First Term · s Second Term · M Member with Long Term Appointment

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DAN MAOZ
Observational cosmology
Tel Aviv University

MICHAEL MCGUIGAN
String theory/particle physics
Institute for Advanced Study

CHIARA NAPPI
Particle physics
Institute for Advanced Study

P. JAMES PEEBLES
Cosmology
Princeton University

SARADA RAJEEV
Field theory
University of Rochester

DOUGLAS RICHSTONE
Astrophysics
University of Michigan

MARTIN ROCEK
Particle physics
State University of New York at Stony Brook

ROGER ROMANI
Astrophysics
Institute for Advanced Study

HERB ROOD
Astrophysics
Institute for Advanced Study

DONALD SCHNEIDER
Observational cosmology
Institute for Advanced Study

ALFRED SHAPERE
String theory
Institute for Advanced Study

NICOLAS SOURLAS
Neural networks
École Normale, Paris

GLENN STARKMAN
Particle astrophysics
Institute for Advanced Study

CLAUDIO TEITELBOIM
Particle physics
Centro de Estudios Científicos de Santiago

SANDIP TRIVEDI
String/quantum field theory
California Institute of Technology

ERIK VERLINDE
Particle physics
Institute for Advanced Study

SPENTA WADIA
String Theory
Tata Institute

XIAO-GANG WEN
Condensed Matter Physics
Institute for Advanced Study

PAUL WIEGMANN
Particle physics
University of California, San Diego

YUEMING XU
Astrophysics
Institute for Advanced Study

BRIAN PHILIP YANNY
Astrophysics
University of Chicago
THE SCHOOL OF SOCIAL SCIENCE

Faculty
CLIFFORD GEERTZ, [Harold F. Lande Professor]
JOAN WALLACH SCOTT
MICHAEL WALZER, [UPS Foundation Professor]

Professor Emeritus
ALBERT O. HIRSCHMAN
THE SCHOOL OF SOCIAL SCIENCE

INTERPRETIVE SOCIAL SCIENCE

Since its inception, the School has been committed to broadly humanistic, "interpretive" approaches to the social sciences. Interpretive social science embraces all the complex ways in which scholars make sense of the social world — policy, economy, religion, and family — through empirical study, discussion within and across disciplinary communities, and the critical revision of accepted conceptions. The School is interested in cultural concepts as they shape the disciplines and, more generally, as they organize all forms of social activity. From this perspective "interpretive social science" is the study of the ways in which human beings create their societies and make life within them meaningful.

With a faculty of four members, the School can hardly hope to "cover" all the relevant academic disciplines. Yet the presence of a permanent faculty provides continuity and coherence for the program of the School over the years and in any single year. Faculty members have participated actively in the most important contemporary debates about the centrality of culture, language, ritual, and moral and aesthetic understandings in the study of society. And although each is rooted in his or her own discipline, all do work that cuts across disciplinary boundaries. It is the common interest in interpretation, and in the construction of meaning, that lends coherence to the School's program. The School is committed to bringing scholars each year who address issues of culture and meaning through concrete study and from different disciplinary backgrounds, as well as scholars who work in the same discipline as one or another faculty member but differ in intellectual perspective. The result is a wide-ranging membership that represents in any given year a more or less coherent set of arguments — the arguments through which, at that moment, the shape of scholarly work is being decided.

ACADEMIC ACTIVITIES OF THE SCHOOL

During the 1989-90 academic year, the School of Social Science had 18 Members, two visitors and three research assistants. Of these 15 were supported wholly or in part by sponsored fellowships. The National Endowment for the Humanities grants provided support for five; The Ford Foundation, two; The Rockefeller Foundation, three; The John D. and Catherine T. MacArthur Foundation, nine; and the Volkswagen-Stiftung, one. UPS Foundation provided general support.

Fields of inquiry among these 23 scholars from Australia, Canada, Germany, and Israel as well as from the United States were anthropology, economics, history, political science and sociology.
A group of faculty, members and guests met biweekly to discuss “National Identity of Post-Colonial Third World States,” the theme for this last year of a three-year emphasis on Group Identities. The Thursday Luncheon Seminars continued with 26 presentations, including some from other Schools and nearby universities and audiences drawn from a wider scholarly community.

In 1990-91 the School of Social Science had 17 Members and two research assistants. Full or partial support for four of these Members came from The Andrew W. Mellon Foundation; the MacArthur Foundation provided support for two and the Volkswagen-Stiftung also funded two. The UPS Foundation provided general support.

Fields of inquiry among these scholars from Argentina, France, Germany, Poland, Israel and the United States were: anthropology, three; history, five; literature, one; philosophy, two; political science, three; sociology, two; and history of science, one.

1990-91 marked the beginning of a three-year focus on the philosophy of history, politics, law, and science, and the conceptual and organizational processes by which knowledge is produced. Faculty and a core group of Mellon Foundation fellows were joined by other members in a biweekly “History” seminar that explored changing approaches to history and the turn to history in the social sciences. The Thursday Luncheon Seminars continued with 21 presentations to audiences drawn from the School of Social Science, other Schools, nearby universities, and the wider scholarly community.

FACULTY

CLIFFORD GEERTZ was the 1989-90 Hitchcock Professor at the University of California, Berkeley, and gave lectures at UC, Berkeley; UC, Los Angeles; and UC, San Francisco, in April. He served as Distinguished Visiting Professor at Hebrew University, Jerusalem, and gave the Jerusalem Harvard Lectures there in May. He has become a Member of the Editorial Board of History and Anthropology; Member of the Advisory Board of the Philosophy of History and Culture Publication Series; consultant for anthropology to Columbia Encyclopedia; and published several articles on various subjects in anthropology.

In 1990-91 Professor Geertz gave lectures to the American Museum of Natural History and the Russell Sage Foundation, New York City; Carleton College, Northfield, Minnesota; and Millersville University, Pennsylvania. He participated in the Tenth Anniversary Symposium of the Whitney Humanities Center, Yale University, and the “Other Orients” symposium at Dartmouth College, and has become a Member of the Editorial Board of Common Knowledge. His

During 1989-90 JOAN SCOTT published "French Feminists and the Rights of 'Man': Olympe de Gouges' Declarations," in *History Workshop* 28 (Autumn 1989) and "Women's History," in *New Perspectives on Historical Writing*, edited by Peter Burke (Polity Press). She gave a paper at a conference on "Women in the French Revolution" at UCLA in October. In March she gave a paper at a conference on "History" at Princeton. She gave lectures at the University of Michigan, Princeton, Kenyon College, Cambridge University and The University of Amsterdam. In December, she was a distinguished visitor at the Rutgers Center for the Critical Analysis of Contemporary Culture.

During 1990-91 Professor Scott lectured at Cambridge University, the University of Amsterdam, the University of California at Santa Cruz, Stanford University, and the New School for Social Research. She gave papers at the meetings of the American Anthropological Association, the American Historical Association, and the Wesleyan University Center for the Humanities. She gave the Herbert G. Gutman Memorial Lecture at City University of New York. She was the Tobias and Hortense Cohen Lewin distinguished professor and lecturer at Washington University in St. Louis. She also served on the selection committee for the Bicentennial Fellowships awarded by the French-American Foundation.

The Tanner Lectures presented in Oxford in May 1989 by MICHAEL WALZER were published in 1990 in *The Tanner Lectures on Human Values*, vol. XI, under the title "Nation and Universe." A number of his books appeared in translation in the period of this report: *Regicide and Revolution* in French; *Just and Unjust Wars* in Italian; *Interpretation and Social Criticism* in French and German; and *Exodus and Revolution* in Japanese. He lectured at Yale, Wesleyan, the Naval War College, Rutgers, Princeton, Pacific Lutheran, University of Washington, New York University, Dickinson College, and Harvard Law School (the John Dewey Lecture). In the 1989-90 spring semester he taught a graduate seminar on "Biblical Politics" at the New School for Social Research.

Professor Walzer gave the first Gunnar Myrdal Memorial Lecture at the University of Stockholm in October 1990. In the course of the 1990-91 academic year, he also lectured at Columbia Law School, Harvard, Johns Hopkins, the University of Utah, the University of Cincinnati, and Hebrew Union College. Several new translations of his books appeared: *Interpretation and Social Criticism* into Italian, *The Company of Critics* into German, and *Spheres of Justice* (abridged) into Swedish. His articles on the Gulf war appeared in *The New Republic* in this country and also in German, Italian, and French periodicals.
Professor Emeritus ALBERT O. HIRSCHMAN completed a book on the "rhetoric of reaction," to be published in 1991 by Harvard University Press. He published "How the Keynesian Revolution was Exported from the United States, and Other Comments" in The Political Power of Economic Ideas: Keynesianism across Nations, edited by Peter A. Hall, Princeton University Press, 1989, and "Opinionated Opinions and Democracy" in Dissent, Summer 1989. He presented a paper at the Lionel Trilling Seminar at Columbia University and gave other invited lectures at Stanford University and Massachusetts Institute of Technology. In March 1990, he was an invited guest at the inauguration of Patricio Aylwin, the new democratically elected President of Chile, and participated in two pre-inauguration seminars that were held on that occasion. In June 1990, he participated in a seminar on social choice theory organized by the Polish Academy of Sciences in Warsaw.

He received honorary degrees from the universities of Buenos Aires, Campinas (State of São Paulo, Brazil), Georgetown (Washington, D.C.), and Yale.

In November 1989, the Inter American Development Bank organized a symposium on "Hirschman's Work and a New Development Strategy for Latin America," held in Buenos Aires, hosted by the Instituto di Tella. In April 1990, the International Studies Association devoted a special session at its 31st annual meeting, held in Washington, D.C, to various aspects of Hirschman's work.


Professor Hirschman spent the 1990-91 academic year at the Wissenschaftskolleg (Institute for Advanced Study) in Berlin. There he helped organize an international colloquium, held in November 1990, on "transitions to market economies in Eastern Europe" and participated in a seminar on comparative history and anthropology at the Free University of Berlin, presenting a paper on "Industrialization and its Manifold Discontents — West, East, and South." This paper, written in German, is to be published in the journal Geschichte und Gesellschaft.
He also gave a talk at the Wissenschaftszentrum Berlin (WZB) on the relations between the 1989/90 collapse of the German Democratic Republic and the concepts of *Exit, Voice, Loyalty*, as analyzed in his 1970 book. He has started to write an essay along these lines. In June 1991 he was invited to lecture at the Hungarian Academy of Sciences, as well as at the University of Budapest. On that occasion, he also stopped in Prague, where he conferred with various social scientists and other scholars.
THE SCHOOL OF SOCIAL SCIENCE

MEMBERS, VISITORS AND RESEARCH STAFF

1989 – 90

THOMAS A. ABERCROMBIE
Anthropology
Stanford University

ARJUN APPADURAI
Anthropology
University of Pennsylvania

EDMUND BURKE, III
Modern history
University of California, Santa Cruz

KATHLEEN M. CANNINGS
Economics
University of Montreal

JOSHUA COLE
French social history
University of California, Berkeley

EMILIA V. DA COSTA
Modern history
Yale University

NICHOLAS B. DIRKS
Modern history
University of Michigan, Ann Arbor

LAURA ENGELSTEIN
History
Princeton University

DRU GLADNEY
Anthropology
Harvard University

LIAH V. GREENFELD
Sociology
Harvard University

TIMUR KURAN
Economics
University of Southern California

WILLIAM LAZONICK
Economics
Barnard College, Columbia University

MENACHEM LORBERBAUM
Philosophy
Shalom Hartman Institute, Jerusalem

ANTHONY C. MILNER
Modern history
Australian National University, Canberra

JOHN NAPORA
Anthropology
University of Virginia

CATHERINE NEWBURY
Political science
University of North Carolina, Chapel Hill

SHERRY ORTNER
Anthropology
University of Michigan

PEARL T. ROBINSON
Political science
Tufts University

WOLFGANG SEIBEL
Political science
University of Constance, Germany

FRED SIEGEL
Modern history
The Cooper Union, New York

ROBERT J. THORNTON
Anthropology
University of Cape Town, South Africa

MAURIZIO VIROLI
Political science
Princeton University

JUDITH R. WALKOWITZ
Modern history
Rutgers University

JOHN WATERBURY
Political science
Princeton University

1 First Term • S Second Term • V Visitor • A Research Assistant • R Research Associate

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MEMBERS, VISITORS AND RESEARCH STAFF
1990 – 91

JAMES BONO
History
State University of New York, Buffalo

CHRISTINA CROSBY
Literature
Wesleyan University

MICHAEL DONELLY
Sociology
Università di Trento, Italy

GENEVİÈVE FRAISSE
Philosophy
Centre National de Recherche Scientifique, Paris

CHRISTOPHER FYNSK
Philosophy
State University of New York, Binghamton

GARY GERSTLE
History
Princeton University

JANET HOSKINS
Anthropology
University of Southern California

EIKO IKEGAMI
Sociology
Yale University

JACEK KOCHANOWICZ
History
Warsaw University

CHUN LIN
Political Science
Harvard University

MENACHEM LORBERBAUM
Philosophy
Shalom Hartman Institute, Jerusalem

DAVID RICCI
Political Science
Hebrew University, Jerusalem

HILDA SABATO
History
University of Buenos Aires

SYLVIA SCHAER
History
University of California, Berkeley

PETER SCHOTTLER
History
Centre National de la Recherche Scientifique, Paris

CHRISTINE STANSELL
History
Princeton University

VALERIO VALERI
Anthropology
University of Chicago

PETER WAGNER
Political Science
Wissenschaftszentrum Berlin für Sozialforschung

ALEX WEINGROD
Anthropology
Ben Gurion University of the Negev

f First Term · s Second Term · v Visitor · R Research Assistant · a Research Associate

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The **Historical Studies – Social Science Library** [Dr. Elliott Shore, Librarian] contains about 100,000 volumes and has subscriptions to about 1,000 journals. The library is strongest in classical studies, ancient history and archaeology, but it contains basic document collections, reference works and important secondary works of scholarship in most fields of history and the social sciences. The journal collection is extensive, and fairly complete back runs exist to the founding of the Institute. The library has occupied its present building since 1964.

The Institute's rare book collection, the gift of Lessing J. Rosenwald, consists of about 2,000 volumes on the history of science and was compiled by Herbert M. Evans in the 1930s. The collection, which is housed in a special room, includes numerous first editions of important scientific works in mathematics, astronomy, physics and the life sciences.

The library has an extensive offprint collection that includes offprints received by Professors Kurt Gödel, Ernst H. Kantorowicz, Elias Avery Lowe, Millard Meiss and Erwin Panofsky and former visiting member Walther Kirchner.

The microfilm collections of the library include a large selection from *Manuscripta*, a collection of several thousand fifteenth-to nineteenth-century printed books from the Vatican Library. The Bavarian Academy has given the Institute a microfilm copy of slips prepared for the *Thesaurus Linguae Latinae*. The library has microfilm copies of the papers of Albert Einstein, Kurt Gödel and Simone Weil.

The Historical Studies – Social Science Library houses the Institute archives. The papers in the collection date from the 1930s and include official correspondence of the Director's Office, minutes of meetings of the Faculty and the Board of Trustees, miscellaneous correspondence concerning past Faculty members, records of the Electronic Computer Project and other documents. The archives also include the Institute's extensive photograph collection.

The **Mathematics – Natural Sciences Library** [Momota Ganguli, Librarian] located on the second floor of Fuld Hall contains about 30,000 volumes (including bound periodicals and monographs) and has subscriptions to about 190 journals. Its collection of older periodicals (prior to 1940) are housed in compact shelving on the lower level of the Historical Studies – Social Science Library. The areas covered by this collection are pure and applied mathematics, astrophysics and theoretical, particle and mathematical physics.
Both of the Institute's libraries participate in the shared cataloguing system of the Research Libraries Group, which gives Institute scholars computerized access to a database that contains more than fourteen million records. Searches of this database retrieve bibliographic information and identify the location of materials in all participating libraries. Scholars who use the Historical Studies - Social Science Library can also conduct computerized searches in the Avery Art Index, the Eighteenth Century Short Title Catalogue and such indexes as Art Index, Humanities Index and the Social Science Index.

All scholars affiliated with the Institute enjoy the same privileges as Princeton University faculty in the Harvey S. Firestone Memorial Library and the nineteen special-subject libraries in the Princeton University Library System and also in the Robert E. Speer Library of the Princeton Theological Seminary.

Librarians, the faculties and visiting scholars of all four Schools at the Institute warmly appreciate gifts, too numerous to mention here, of books and articles from former permanent and visiting members of the Institute community.
RECORD OF EVENTS

What follows is a calendar of events sponsored by the Schools of Historical Studies, Mathematics, Natural Sciences and Social Science and by the Director’s Office

*Academic Year 1989 – 90*

September 22
School of Natural Sciences
Lunchtime Seminar: “Conformal Field Theory Results from Quantization of Chern-Simon Theory”
SCOTT AXELROD, Princeton University

September 28
School of Historical Studies
Art History Colloquium: “Painting and Possession: Poussin’s Self-Portrait for Chantelou and the *Essais* of Montaigne”
M. ELIZABETH CROPPER, School of Historical Studies, IAS

October 3
School of Mathematics
Automorphic Forms Seminar: “Congruences between cusp forms and modular Galois representations”
BRUCE JORDAN, School of Mathematics, IAS

October 4
School of Social Science
National Identity of Post-Colonial Third World States Seminar: Planning meeting
EDMUND BURKE III, SHERRY ORTNER, School of Social Science, IAS

October 5
School of Historical Studies
Art History Colloquium: “Incontriamoci alla Consolata”
ANTHONY CUTLER, School of Historical Studies, IAS
School of Social Science
Luncheon Seminar: “Changing Social Foundations of Industrial Dominance and Decline”
WILLIAM LAZONICK, School of Social Science, IAS

October 6
School of Mathematics
Math/Physics Seminar: “Is there a connection between Ising models and the Riemann hypothesis”
CHARLES NEWMAN, Courant Institute

October 10
School of Mathematics
Automorphic Forms Seminar: “Congruences between cusp forms and modular Galois representations, concluded”
BRUCE JORDAN, School of Mathematics, IAS

October 11
Faculty Lectures: “Gibbon’s Byzantium”
GLEN W. BOWERSOCK, Professor, School of Historical Studies, IAS

October 12
School of Mathematics
Automorphic Forms Seminar: “Modular construction of field extensions and of mixed motives, Part I”
GUNTER HARDER, School of Mathematics, IAS
School of Social Science
Luncheon Seminar: “What Does It Mean to be An ‘American’?”
MICHAEL WALZER, Professor, School of Social Science, IAS

October 13
School of Mathematics
Math/Physics Seminar: “Quantum chaos in hydrogen: Dynamical group approach and a resonance anomaly”
GERHARD C. HEGEBIFELDT, School of Natural Sciences, IAS
October 16
School of Mathematics
Members Seminar: “Irregularities in the distribution of prime numbers”
ANDREW GRANVILLE, School of Mathematics, IAS

October 17
School of Mathematics
Automorphic Forms Seminar: “Modular construction of field extensions and of mixed motives, Part II”
GUNTER HARDER, School of Mathematics, IAS

October 18
School of Social Science
EDMUND BURKE III, SHEFFY ORTNER, School of Social Science, IAS

October 19
School of Mathematics
Math/Physics Seminar: “Semi classical properties of point spectra”
ALEJANDRO URIBE, School of Mathematics, IAS

School of Natural Sciences
Luncheon Seminar: “Wormholes in 2 + 1 Dimensional Gravity”
STEVEN CARLIP, School of Natural Sciences, IAS

October 20
School of Mathematics
Members Seminar: “Local-global principles in algebra and algebraic number theory”
VLADIMIR PLATONOV, Minsk, USSR
School of Natural Sciences
Theoretical Physics Seminar: “Superstring Field Theory”
CHARLES THORN, University of Florida

October 24
School of Mathematics
Special Seminar: “A new local-global principle for algebraic groups”
VLADIMIR PLATONOV, Minsk, USSR

October 26
School of Social Science
Luncheon Seminar: “The Constraints upon Economic Growth in Pre-Industrial Societies”
ANTHONY WRIGHT, Cambridge University

October 27
Board of Trustees Lecture
“Why Spain? A Historian’s Perspective”
JOHN H. ELLIOTT, Professor, School of Historical Studies, IAS

October 31
School of Mathematics
Automorphic Forms Seminar: “I-independence of Galois envelopes”
MICHAEL LARSEN, School of Mathematics, IAS

November 1
School of Mathematics
Special Seminar: “Discrete subgroups of Lie groups applied to combinatorics, computer science and finite groups”
ALEXANDER LUBOTZKY, Hebrew University

School of Social Science
National Identity Seminar: Discussion of Partha Chatterjee, Nationalist Thought and the Colonial World: A Derivative Discourse?
EDMUND BURKE III, SHEFFY ORTNER, School of Social Science, IAS

November 2
School of Historical Studies
Art History Colloquium: “Self-Representation in Poussin’s Mars and Venus”
CHARLES DEMPSEY, School of Historical Studies, IAS

School of Social Science
Luncheon Seminar: “Two Hundred Years of Reactionary Rhetoric: The Futility Thesis”
ALBERT O. HIRSCHMAN, Professor Emeritus, School of Social Science, IAS
School of Mathematics
Algebraic Group Seminar: “The minimum of co-volumes for lattices in SL2”
ALEXANDER LUBOTZKY, Hebrew University

November 3
School of Natural Sciences
Luncheon Seminar: “Conformal Field Theory, Twisted Vertex Operators and the Monster Group”
LOUISE DOLAN, Rockefeller University

November 6
School of Mathematics
Members Seminar: “The inaudible geometry of nilmanifolds”
DENNIS DETURCK, School of Mathematics, IAS
School of Natural Sciences
Theoretical Physics Seminar: “The Quantum Group Structure of 2D Gravity and Minimal Models”
J.-L. GERVAIS, Ecole Normale Superieure, Paris

November 7
School of Mathematics
Automorphic Forms Seminar: “l-independence of Galois envelopes (Conclusion)”
MICHAEL LARSEN, School of Mathematics, IAS

November 8
Faculty Lectures: “Illusion and Disillusion: Spain and the Indies”
JOHN H. ELLIOTT, Professor, School of Historical Studies, IAS

November 9
School of Social Science
WOLFGANG SEIBEL, School of Social Science, IAS

November 13
School of Mathematics
Members Seminar: “Homogeneous vector bundles and families of Calabi-Yau threefolds”
CIPRIAN BORCEA, School of Mathematics, IAS

November 14
School of Mathematics
Automorphic Forms Seminar: “Kolyvagin’s analytic hypothesis (Part I)”
KUMAR MURTY, School of Mathematics, IAS

November 15
School of Social Science
National Identity Seminar: “II. Countries,” chapter from projected book, After the Fact
CLIFFORD GEERTZ, Professor, School of Social Science, IAS

November 16
School of Mathematics
Special Seminar: “Converse theorem for GL(n)”
ILYA PIATETSKI-SHAPORO, Yale University
School of Social Science
LIAH GREENFIELD, School of Social Science, IAS
Director’s Visitor Lecture: “Whatever Happened to the Future? A Personal View on the Energy Crisis”
RICHARD J. EDEN, O.B.E., University of Cambridge

November 17
School of Mathematics
Special Seminar: “Converse theorem for GL(n)”
ILYA PIATETSKI-SHAPORO, Yale University
School of Natural Sciences
Luncheon Seminar: “Stringy Cosmic Strings”
AI SHAPERE, School of Natural Sciences, IAS

November 20
School of Natural Sciences
Theoretical Physics Seminar: “The Large N Limit of W-Algebras and Area Preserving Diffeomorphisms”
YANNIS BAKAS, University of Maryland
School of Mathematics
Members Seminar: “Finite dimensional representations of the quantum group GLq(N)”
HIROFUMI YAMADA, School of Mathematics, IAS

November 21
School of Mathematics
Automorphic Forms Seminar: “Kolyvagin’s analytic hypothesis (Part II)”
KUMAR MURTY, School of Mathematics, IAS
School of Mathematics
Special Seminar: “L-functions for classical groups”
ILYA PIATETSKI-SHAPORO, Yale University
November 27
School of Mathematics
Members Seminar: “Filtration of G-modules”
OLIVIER MATHEU, School of Mathematics, IAS

November 28
School of Mathematics
Automorphic Forms Seminar: “Riemann-Roch in functorial form” (Part I)
JENS FRANKE, School of Mathematics, IAS

November 29
School of Historical Studies
Lecture: “New Developments in the Archaeology of Cyprus”
VASSOS KARAGEORGHS, School of Historical Studies, IAS

School of Social Science
National Identity Seminar: “Disjuncture and Difference in the Global Cultural Economy” and “Global Ethnoscapes: Notes and Queries for a Transnational Anthropology”
ARJUN APPADURAL, School of Social Science, IAS

November 30
School of Social Science
Luncheon Seminar: “Why States Shrink — If They Do”
JOHN WATERBURY, School of Social Science, IAS

December 1
School of Natural Sciences
Luncheon Seminar: “Infrared Behavior at Negative Curvature”
FRANK WILCZEK, Professor, School of Natural Sciences, IAS

December 4
School of Mathematics
Members Seminar: “Scalar-flat Kähler surfaces and anti-self-duality”
CLAUDE LABRUN, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “Nonperturbative Quantum Gravity: New Results and Directions”
LEE SMOLIN, Syracuse University

December 5
School of Mathematics
Automorphic Forms Seminar: “Riemann-Roch in functorial form (Part II)”
JENS FRANKE, School of Mathematics, IAS

December 7
School of Historical Studies
Art History Colloquium: “Triumphant Entries and the Villa of Andrea Doria in Genoa”
GEORGE CORSE, School of Historical Studies, IAS

School of Social Science
Luncheon Seminar: “Ethnic and Gender Imagery in the Construction of Bolivian Identities: Festive and Photographic Representations of Possible Selves”
THOMAS ABERCROMBIE, School of Social Science, IAS

December 11
School of Mathematics
Members Seminar: “Alexander Polynomials for Projective Hypersurfaces”
ALEXANDRU DIMCA, School of Mathematics, IAS

December 12
School of Mathematics
Automorphic Forms Seminar: “Special values of L-functions and mixed motives, (Part I)”
ANTHONY J. SCHOLL, School of Mathematics, IAS

December 13
School of Social Science
DRU GLADNEY, School of Social Science, IAS

Faculty Lectures: “Cicero and Caesar”
CHRISTIAN HABICH, Professor, School of Historical Studies, IAS

December 14
School of Social Science Luncheon Seminar: “How Does Measurement Mean?”
ARJUN APPADURAL, School of Social Science, IAS

December 15
School of Natural Sciences
Lunchtime Seminar: “Surprises With Topological Field Theories”
EDWARD WITTEN, Professor, School of Natural Sciences, IAS
December 18
School of Natural Sciences
Theoretical Physics Seminar: “Statistical Mechanics of Strings at High Energies”
SANJAY JAIN, Brown University

School of Mathematics
Members Seminar: “Conformal Field Theories on Riemann Surfaces”
ROBERTO SIVOTTI, School of Mathematics, IAS

December 19
School of Mathematics
Automorphic Forms Seminar: “Special values of L-functions and mixed motives (Part II)”
ANTHONY J. SCHOLL, School of Mathematics, IAS

December 20
School of Natural Sciences
Lunchtime Seminar: “SU(∞), the Sine Bracket and the Large N Limit of Yang Mills”
DAVID FAIRlie, School of Natural Sciences, IAS

January 9
School of Mathematics
Automorphic Forms Seminar: “Thue’s Method and Mordell’s Conjecture, Part I”
PAUL VOJTA, School of Mathematics, IAS

January 10
School of Historical Studies
FRANCO VENTURI, University of Turin, Italy

School of Mathematics
Number Theory Seminar: “The Generalized Fermat Equation in Function Fields”
ENRICO BOMBIERI, Professor, School of Mathematics, IAS

January 11
School of Historical Studies
Art History Colloquium: “How Art History Mistook Christ for the Emperor”
THOMAS MATHEWS, School of Historical Studies, IAS

January 12
School of Natural Sciences
Lunchtime Seminar: “Topological Orders & Edge Excitations in Quantum Hall States”
XIAO-GANG WEN, School of Natural Sciences, IAS

January 15
School of Mathematics
Members Seminar: “Simple Closed Geodesics on Convex Surfaces”
JIANGOU CAO, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “Unitary Irrational Central Charge on Compact G”
MARTIN HALPERN, University of California, Berkeley

January 16
School of Mathematics
Automorphic Forms Seminar: “Thue’s Method and Mordell’s Conjecture, Part II”
PAUL VOJTA, School of Mathematics, IAS

School of Mathematiccs
Math/Physics Seminar: “Cyclic Cohomology and Supersymmetric Field Theory”
ANDREJ LESNIEWSKI, Harvard University

School of Historical Studies
Medievalist Seminar: “Empire: A Medieval Concept in Early Modern Political Discourse”
JAMES MULDOON, School of Historical Studies, IAS

January 17
School of Mathematics
Number Theory Seminar: “Irregularities in the Distribution of Primes in Arithmetic Progressions, and as the Values of Other Polynomials”
ANDREW GRANVILLE, School of Mathematics, IAS

Faculty Lectures: “Medieval Monasticism and Modern Society”
GILES CONSTABLE, Professor, School of Historical Studies, IAS

January 18
School of Social Science
Luncheon Seminar: “From Politics to Reason of State”
MAURIZIO VIROLL, School of Social Science, IAS

January 22
School of Mathematics
Members Seminar: Quasi Hojsf’ Alegräs
VLADIMIR DRINFELD, School of Mathematics, IAS
January 23
School of Mathematics
Automorphic Forms Seminar: “P-adic Periods on Abelian Varieties, Part I”
DON BLASIUS, School of Mathematics, IAS

School of Mathematics
Math/Physics Seminar: “Random walk in a random environment”
JAN BRICMONT, Université Catholique de Louvain, Belgium

School of Mathematics
Special Seminar: “Local Systems on Moduli Spaces”
DAVID KAŻHDAN, Harvard University

January 24
School of Mathematics
Number Theory Seminar: “Baker’s Method and Mordell’s Conjecture, Part II”
DAVID MASSER, School of Mathematics, IAS

January 25
School of Social Science
National Identity Seminar: “Mothers and Mistresses of the Nation: Ethnic and Gender Imagery in the Construction of Bolivian Identities” and “Q’aqchas and La Plebe in ‘Rebellion’: Carnival vs Lent in 18th century Potosí”
THOMAS ABERCROMBIE, School of Social Science, IAS

January 26
School of Natural Sciences
Luncheon Seminar: “Charter for a Theory of Myth: Malinowski’s Reading of Nietzsche’s ‘Birth of Tragedy’”
ROBERT THORNTON, School of Social Science, IAS

January 29
School of Natural Sciences
Theoretical Physics Seminar: “Dynamical Symmetry in the Vortex/Chern-Simons Interaction”
ROMAN JACKIW, MIT & Columbia

School of Mathematics
Members Seminar: “Signature Defects and Derivatives of Hirzebruch’s L-Polynomial”
MARK STERN, School of Mathematics, IAS

January 30
School of Mathematics
Automorphic Forms Seminar: “P-adic Periods on Abelian Varieties, Part II”
DON BLASIUS, School of Mathematics, IAS

School of Historical Studies
Medievalist Seminar: “From Republic to Duchy: The Social-Spatial Reorientation of Florence, 1551-1632”
R. BURR LITCHFIELD, School of Historical Studies, IAS

January 31
School of Mathematics
Number Theory Seminar: “Baker’s Method and Mordell’s Conjecture, Part II”
DAVID MASSER, School of Mathematics, IAS

February 1
School of Historical Studies
Art History Colloquium: “The Joys of Architectural Restitution”
Pierre Du Préy, School of Historical Studies, IAS

School of Mathematics
Topology Seminar: “Polyhedral Metrics and the Structure of 3-Manifolds”
J.H. RUBINSTEIN, School of Mathematics, IAS

School of Mathematics
Special Seminar: “Mordell’s Conjecture”
PAUL VOJTA, School of Mathematics, IAS

School of Social Science
Luncheon Seminar: “Castes of Mind”
NICHOLAS DIRKS, School of Social Science, IAS

February 5
School of Mathematics
Members Seminar: “On the Generalized Cycle Map for Algebraic Varieties”
PAULO LIMA-FILHO, School of Mathematics, IAS
February 6
School of Mathematics
Automorphic Forms Seminar: “Eisenstein Series on Symplectic Groups”
TAMOTSU IKEDA, School of Mathematics, IAS

February 7
School of Social Science
“Understanding Arab Protest Movements, and “Rural Collective Action and the Emergence of Modern Lebanon: A Comparative Historical Perspective”
EDMUND BURKE III, School of Social Science, IAS

School of Mathematics
Number Theory Seminar: “Baker’s Method and Mordell’s Conjecture, Conclusion”
DAVID MASSER, School of Mathematics, IAS

School of Mathematics
Geometry Seminar: “Non-Abelian Hodge Theory, Part I”
CARLOS SIMPSON, Princeton University

February 8
School of Social Science
Luncheon Seminar: “Writing Post-Orientalist Histories of the Third World: Perspectives from Indian Historiography”
GYAN PRAKASH, Princeton University

School of Mathematics
Topology Seminar: “Intersection Theory on the Moduli Space of Riemann Surfaces and the KdV Hierarchy”
EDWARD WITTEN, Professor, School of Natural Sciences, IAS

School of Mathematics
Special Seminar: “Mordell’s Conjecture”
PAUL VOJTÁ, School of Mathematics, IAS

February 9
School of Mathematics
Geometry Seminar: “Non-Abelian Hodge Theory, Part II”
CARLOS SIMPSON, Princeton University

School of Natural Sciences
Lunchtime Seminar: “Quantum Mechanical Hair”
JOHN PRESKILL, California Institute of Technology

February 12
School of Mathematics
Members Seminar: “Incompressible Flow: Energy and Asymptotic Crossing Number”
ZHENG-XU HE, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “On Superstrings at the Multi-Loop Level”
OLAF LECHTENFELD, City College of New York

February 13
School of Historical Studies
Medievalist Seminar: “Forma vitae: From Religious Rule to Social Organization”
JAMES POWELL, School of Historical Studies, IAS

School of Mathematics
Automorphic Forms Seminar: “Location of Poles of Triple L-functions”
TAMOTSU IKEDA, School of Mathematics, IAS

February 14
Faculty Lectures: “Between Social Science and History: ‘Clausewitz’s On War’ ”
PETER PARET, Professor, School of Historical Studies, IAS

School of Mathematics
Special Seminar: “Geometry of the Space of Knots”
JEAN-LUC BRYLINSKI, Pennsylvania State University

February 15
School of Social Science
Luncheon Seminar: “The Invention of Politics in Malaysia”
ANTHONY MILNER, School of Social Science, IAS
RECORD OF EVENTS 1989 – 1990

School of Mathematics
Topology Seminar: “Singular Spaces, Characteristic Classes and Intersection HoloLOGY”
J. SHANESON, University of Pennsylvania

February 16
School of Mathematics
Special Seminar: “Mordell’s Conjecture”
PAUL VOJTA, School of Mathematics, IAS

School of Mathematics
Mathematics/Physics Seminar: “Anderson Localization in One-Dimensional Quasi Periodic Media”
VICTOR CHULAEVSKY, School of Mathematics, IAS

February 19
School of Mathematics
Members Seminar: “Weighted Derangements and Orthogonal Polynomials”
Jiang Zeng, School of Mathematics, IAS

February 20
School of Mathematics
Automorphic Forms Seminar: “A Local Trace Formula”
JAMES ARTHUR, University of Toronto

February 21
School of Social Science
Pearl Robinson, School of Social Science, IAS

February 22
School of Historical Studies
Art History Colloquium: “Michelangelo’s Campidoglio: Architectural Iconography, Palace Typology and Social History”
CHARLES BURROUGHS, School of Historical Studies, IAS

School of Social Science
Luncheon Seminar: “Reading America: Preliminary Notes on Class and Culture”
SHERRY ORTNER, School of Social Science, IAS

February 23
School of Natural Sciences
Lunchtime Seminar: “Topological Field Theory Approaches to Yang-Mills & Gravity in Four Dimensions”
B. GROSSMAN, School of Natural Sciences, IAS

School of Mathematics
Math/Physics Seminar: “Constructive Criterion for Ergodicity of Probabalistic Cellular Automation”
CHRISTIAN MAES, Leuven

February 26
School of Mathematics
The Thirteenth Marston Morse Lectures: “Rigidity of Symmetric Spaces and Related Topics, Part I”
MIKHAIL GROMOV, Institut des Hautes Etudes Scientifiques

School of Natural Sciences
Theoretical Physics Seminar: “Direct Method for Braid Group Representations & Explicit Yang-Baxterization”
MO-LIN GE, Nankai Math Institute

School of Mathematics
Members Seminar: “Jones Polynomials for Lens Spaces; Skem Modules for 3-manifolds”
JÓZEF PRZYTYCKI, School of Mathematics, IAS

February 27
School of Historical Studies
Medievalist Seminar: “Towards an Urban History of Medieval and Renaissance Genoa”
GEORGE GORSE, School of Historical Studies, IAS

School of Mathematics
THOMAS HALES, School of Mathematics, IAS

February 28
School of Mathematics
Number Theory Seminar: “Eigenvalues of the Laplacian for Hecke Triangle Groups”
DENNIS HEJHAL, School of Mathematics, IAS
School of Mathematics
The Thirteenth Marston Morse Lectures: "Rigidity of Symmetric Spaces and Related Topics, Part II"
MIKHAIŁ GROMOV, Institut des Hautes Études Scientifiques

March 1
School of Historical Studies
Art History Colloquium: "Gustave Courbet's Contemporaneity"
PETRA TEN-DOESCHATE CHU, School of Historical Studies, IAS

School of Mathematics
Topology Seminar: "The Geometry and Cohomology of Sporadic Simple Groups and Groups of Twisted Lie Type"
RICHARD J. MILGRAM, Stanford University

School of Social Science
Luncheon Seminar: "Creating Political Culture: Neotraditional Corporatism and the Politics of Participation in Niger"
PEARL ROBINSON, School of Social Science, IAS

March 2
School of Mathematics
Special Seminar: "Mordell's Conjecture"
PAUL VOJTA, School of Mathematics, IAS

School of Mathematics
Math/Physics Seminar: "On the Regularity of the Density of States"
IIYA GOLDSHEID, USSR

School of Natural Sciences
Luncheon Seminar: "Quantizing the Chiral Schwinger Model on a Riemann Surface"
YON-SHII WU, School of Natural Sciences, IAS

March 5
School of Mathematics
Members Seminar: "Explicit Formulae for Volumes in Cohomology via Theta Functions"
JAY JORGENSEN, School of Mathematics, IAS

School of Natural Sciences
Lecture: "The Biggest Kind of Big Science: Astronomy and the Space Telescope"
ROBERT W. SMITH, National Air and Space Museum of the Smithsonian Institution; The Johns Hopkins University

March 6
School of Mathematics
Automorphic Forms Seminar: "Hecke Algebras, Unipotent Representations and the Fundamental Lemma for SL(n), Conclusion"
THOMAS HALES, School of Mathematics, IAS

March 7
School of Social Science
CATHERINE STAUCH, School of Social Science, IAS

March 8
School of Social Science
Luncheon Seminar: "Reactionary Rebels? Janissaries, Artisans and the Roots of Anti-Modern Protest in the 18th-Century Ottoman Empire"
EDMUND BURKE III, School of Social Science, IAS

School of Mathematics
Topology Seminar: "Topological Aspects of Quantum Field Theory"
FRANK QUINN, Virginia Polytechnic Institute

March 9
School of Natural Sciences
Luncheon Seminar: "Non-Polynomial Closed String Field Theory"
M. KARU, School of Natural Sciences, IAS

School of Mathematics
Special Seminar: "Mordell's Conjecture"
PAUL VOJTA, School of Mathematics, IAS

March 12
School of Mathematics
Members Seminar: "Spectral Theory on Locally Symmetric Spaces and Related Topics"
WERNER MÜLLER, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: "Baryon Number Violation in the Standard Model: Fact or Fiction"
MICHAEL DINE, City College of New York
March 13
School of Historical Studies
Medievalist Seminar: "Roger of Sicily, Bohemund of Antioch, and Their Chronicles"
KENNETH WOLF, School of Historical Studies, IAS

March 14
School of Mathematics
Automorphic Forms Seminar: “Unitary Groups, Cohomology and Endoscopy, Part I”
JONATHAN ROGAWSKI, School of Mathematics, IAS

Faculty Lectures: “Picasso’s Lithograph(s) ‘The Bull(s)’ and the History of Art in Reverse”
IRVING LAVIN, Professor, School of Historical Studies, IAS

March 15
School of Social Science
Luncheon Seminar: “Fields of Chains: Women and Agrarian Change in Eastern Zaire”
CATHERINE NEWBURY, School of Social Science, IAS

March 19
School of Mathematics
Members Seminar: “Yang-Mills Invariants for 4-manifolds with Boundary”
DIETER KOTSCICK, School of Mathematics, IAS

March 20
School of Mathematics
Automorphic Forms Seminar: “Unitary Groups, Cohomology and Endoscopy, Conclusion”
JONATHAN ROGAWSKI, School of Mathematics, IAS

March 21
School of Mathematics
Number Theory Seminar: “Analytic Number Theory and Integer Programming”
GREGORY FREIMAN, School of Mathematics, IAS

March 22
School of Mathematics
Topology Seminar: “Euler Characteristics of Some Weighted Homogeneous Complex Affine Hypersurfaces”
ALEXANDRU DIMCA, School of Mathematics, IAS

School of Social Science
Luncheon Seminar: “Worlds Turned Upside Down: John Smith and the Demerara Slave Rebellion of 1823”
EMILIA DA COSTA, School of Social Science, IAS

March 23
School of Mathematics
Special Seminar: “Mordell’s Conjecture”
PAUL VOJTA, School of Mathematics, IAS

School of Natural Sciences
s. FERRARA, CERN, UCLA

March 26
School of Mathematics
Members Seminar: “A New Kind of Geometry and How to Use it for Classifying Deformations”
PAUL BURCHARD, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “Lattice Gauge Theory on the Columbia Parallel Supercomputer”
FRANK BROWN, Columbia University

March 27
School of Historical Studies
Medievalist Seminar: “The Study of the Bible, c. 1000-1200 C.”
MARGARET GIBSON, School of Historical Studies, IAS

School of Mathematics
Automorphic Forms Seminar: “Base Change of Representations with Cohomology: Archimedean Case, Part I”
JOSEPH JOHNSON, School of Mathematics, IAS

March 29
School of Mathematics
Automorphic Forms Seminar: “Base Change of Representations with Cohomology: Archimedean Case, Part II”
JOSEPH JOHNSON, School of Mathematics, IAS

School of Mathematics
Topology Seminar: “Floer Homology of Oriented 3-Manifolds”
KENJI FUKAYA, University of Maryland/University of Tokyo
School of Social Science
Luncheon Seminar: “Science, Feminism and Romance: Karl Pearson’s Men and Women’s Club, 1885-1889”
JOAN JOSEPH, School of Social Science, IAS

March 30
School of Mathematics
Special Seminar: “Mordell’s Conjecture”
PAUL VOJTA, School of Mathematics, IAS

School of Mathematics
Automorphic Forms Seminar: “Base Change of Representations with Cohomology: Archimedean Case, Part III”
JOSEPH JOHNSON, School of Mathematics, IAS

March 31
School of Social Science
THOMAS ABERCROMBIE and DRU GLADNEY, School of Social Science, IAS

April 2
School of Mathematics
Members Seminar: “Constructions of Wavelets and Analysis of Differential Operators”
STÉPHANE JAFFARD, School of Mathematics, IAS

April 3
School of Mathematics
Automorphic Forms Seminar: “Shintani’s Lemma for GL(n)”
AKIHKO YUKIE, School of Mathematics, IAS

April 4
School of Social Science
JOAN SCOTT, Professor, School of Social Science, IAS

April 5
School of Historical Studies
Art History Colloquium: “Visual Texts: Documents of the Early Industrial City”
EVE BLAU, School of Historical Studies, IAS

School of Mathematics
Topology Seminar: “An Equivariant Theorem for Singular Varieties”
SYLVAIN CAPPELL, Courant Institute

School of Mathematics
Automorphic Forms Seminar: “Unstable Morse Strata of the Space of Pairs of Genus”
AKIHKO YUKIE, School of Mathematics, IAS

School of Social Science
Luncheon Seminar: “Behavior and Gender in Bureaucratic Careers”
KATHLEEN CANNINGS, School of Social Science, IAS

April 6
School of Mathematics
Special Seminar: “Mordell’s Conjecture”
PAUL VOJTA, School of Mathematics, IAS

School of Natural Sciences
Luncheon Seminar: “Strings & Fields in Superfluids and Superconductors”
R. DAVIS, School of Natural Sciences, IAS

April 9
School of Mathematics
Members Seminar: “Vertex Operators, Symmetric Functions and the Spin Group \( \Gamma_N \)”
NAIHUAN JING, School of Mathematics, IAS

April 10
School of Historical Studies
Medievalist Seminar: “‘The Social History of Satan’ — How Satan emerged in apocalyptic Jewish and early Christian literature”
ELAINE PAGELS, School of Historical Studies, IAS

School of Natural Sciences
Theoretical Physics Seminar: “The Neutron Electric Dipole Moment”
BRUCE MCKELLAR, University of Melbourne
April 11
School of Mathematics
Special Seminar: “Mordell’s Conjecture”
Paul Vojta, School of Mathematics, IAS

April 12
School of Social Science
Luncheon Seminar: “The New Deal, Lost and Found”
Fred Siegel, School of Social Science, IAS

School of Mathematics
Topology Seminar: “Periodic Homotopy of Lie Groups”
Martin Bendersky, CUNY

School of Mathematics
Special Seminar: “The Structure of the Tate-Shafarevich Group (d’après Kolyvagin)”
Norbert Schappacher, School of Mathematics, IAS

School of Natural Sciences
Special Seminar: “Quantum Gravitational Measure for Four-Geometries”
Pawel Mazur, UCLA

April 16
School of Mathematics
Members Seminar: “Stochastic Structure and Nonlinear Dynamics of Food Webs”
Joel E. Cohen, Director’s Visitor, IAS

April 18
School of Social Science
National Identity Seminar: “The Work of Leisure, the Culture of Place: The Humble Geographies of Tourism in India”
Carol Breckenridge, University of Pennsylvania

April 19
School of Social Science
Luncheon Seminar: “Prospects for Democratization in Latin America”
Guillermo O’Donnell, University of Notre Dame and CEBRAP, São Paulo, Brazil

School of Mathematics
Topology Seminar: “Local Rigidity and the PSL(2,C) Representation Space of Link Complements”
Steve Kerckhoff, School of Mathematics, IAS

April 20
School of Natural Sciences
Lunchtime Seminar: “Strings from Reduced Large-N QCD via Area Preserving Diffeomorphisms”
I. Bars, School of Natural Sciences, IAS

April 23
School of Natural Sciences
Theoretical Physics Seminar: “Geometrical Critical Models on a Random Surface”
Bertrand Duplantier, Saday

April 26
School of Mathematics
Topology Seminar: “Topological Classification of Stratified Spaces”
Shmuel Weinberger, University of Chicago

School of Social Science
Luncheon Seminar: “Bodily Positions and Mediated Dispositions: Sexuality, Nationality and Tiananmen”
Dru Gladney, School of Social Science, IAS

May 1
School of Natural Sciences
Special Seminar: “CP Violation in B-Decays”
Boris Kayser, NSF — Division of Physics

May 3
School of Natural Sciences
Special Seminar: “Rational Conformal Field Theory & the Fractional Quantum Hall Effect”
Nick Read, Yale University

School of Social Science
Luncheon Seminar: “Women on the Margins: Seventeenth-Century Europeans Confront the ‘Other’ in Quebec and Surinam”
Natalie Davis, Princeton University

May 4
School of Natural Sciences
Lunchtime Seminar: “Quantum Algebra Deforming Maps, Clebsch-Gordan Coefficients, Coproducts, U and R Matrices”
T. Curtright, School of Natural Sciences, IAS

Board of Trustees Lecture
Lecture: “A French Feminist Claims the ‘Rights of ‘Man’”
Joan Wallach Scott, Professor, School of Social Science, IAS
May 7
School of Natural Sciences
Theoretical Physics Seminar: “String Fields in 2-D Gravity & Matrix Models”
SUMIT DAS, Tata Institute

May 9
School of Social Science
National Identity Seminar: Discussion of chapters from Emile Boonzaier and John Sharp, eds., South African Keywords: The Uses and Abuses of Political Concepts, 1988
ROBERT THORNTON, School of Social Science, IAS

May 11
School of Natural Sciences
Lunchtime Seminar: “A Solution of 2-D Topological Gravity”
E. VERLINDE, School of Natural Sciences, IAS

May 14
School of Natural Sciences
Special Historical Talk: “The Pauper and the Prince: George Willis Ritchey, George Ellery Hale, and Big American Telescopes”
DONALD E. OSTERBROCK, School of Natural Sciences, IAS

May 18
School of Natural Sciences
Lunchtime Seminar: “Scattering Theory in Quaternionic Quantum Mechanics”
S. ADLER, Professor, School of Natural Sciences, IAS

May 21
School of Natural Sciences
Theoretical Physics Seminar: “Statistical Mechanics of Flux Lines in High Temperature Superconductors”
DAVID NELSON, Harvard University

May 25
School of Natural Sciences
Lunchtime Seminar: “First Order Phase Transitions in 1-Matrix Models”
G. MANDAL, School of Natural Sciences, IAS
September 21
School of Natural Sciences
Lunchtime Seminar: "Introduction to the Twistor Transform"
EDWARD WITTEN, Professor, School of Natural Sciences, IAS

September 24
School of Mathematics
Special Seminar: "Very cuspidal pseudocoefficients"
J-F LABASSE, University of Paris VII

School of Natural Sciences
Theoretical Physics Seminar: "Complex Random Surfaces"
VIPUL PERIWAL, ITP, Santa Barbara

September 25
School of Natural Sciences
Biophysics & Computation: "Acoustic Imaging Computations in Bat Sonar"
JAMES SIMMONS, Brown University

October 4
School of Historical Studies
Art History Colloquia: "The Cappella Palatina in Palermo"
WILLIAM L. TRONZO, School of Historical Studies, IAS

School of Natural Sciences
Biophysics & Computation: "Brain Modeling Using Neural Networks"
M. VIRASORO, University of Rome I

October 5
School of Natural Sciences
Lunchtime Seminar: "Introduction to the Twistor Transform"
EDWARD WITTEN, Professor, School of Natural Sciences, IAS

October 8
School of Mathematics
Members Seminar: "Area-minimizing cycles in Grassmannians"
FRANK MORGAN, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: "Aspects of N = 2 Strings"
CUMRUN VAFA, Harvard University

October 9
School of Mathematics
Arithmetic Groups and Related Topics: "Harmonic analysis in weighted L^2-spaces"
JENS FRANKE, School of Mathematics, IAS

October 11
School of Mathematics
Joint IAS — Rutgers University School of Mathematics Analytic Number Theory Seminar: "Automorphic L-functions and analytic number theory"
TREYDOON SHAHIDI, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: "Smooth numbers and factorization"
CARL POMERANCE, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: "Algorithms in number theory"
HENDRIK LENSTRA, School of Mathematics, IAS

School of Natural Sciences
Biophysics & Computation: "Order, Chaos & Complexity in Random Logical Networks: A Model of Genome Function"
STUART KAUFMAN, University of Pennsylvania and the Santa Fe Institute

School of Social Science
Social Science Thursday Luncheon Seminar: "Three Challenges for the Literary Theory of Science: Theoretical Texts, Mathematics, and Technology"
BRUNO LATOUR, University of California, San Diego, and L'Ecole des Mines, Paris

October 12
School of Social Science
History Seminar: Organizational Meeting
October 15
School of Mathematics
Members Seminar: “Lattices in U(1,n) and hypergeometric functions”
G. DANIEL MOSTOW, School of Mathematics, IAS

October 16
School of Historical Studies
Medievalists: “Problems in Medieval History Arising from a New Edition of Gibbon”
PATRICIA B. CRADDOCK, School of Historical Studies, IAS

School of Mathematics
Number Theory Seminar: “An elementary approach to the Mordell conjecture”
ENRICO BOMBIERI, Professor, School of Mathematics, IAS

School of Mathematics
Arithmetic Groups and Related Topics: “Harmonic analysis in weighted L^2-spaces [continued]”
JENS FRANKE, School of Mathematics, IAS

School of Mathematics
Topology/Geometry Seminar: “Vassilev’s knot invariants”
XIAO-SONG LIN, Columbia University

October 18
School of Mathematics
Joint IAS — Rutgers University Analytic Number Theory Seminar: “Integers without large prime factors”
ADOLF HILDEBRAND, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “The number field sieve”
HENDRIK LENSTRA, School of Mathematics, IAS

School of Natural Sciences
Biophysics & Computation: “Statistical Mechanics & Error Correcting Codes”
NICOLAS SOURLAS, School of Natural Sciences, IAS

School of Social Science
Social Science Thursday Luncheon Seminar: “The Rise of Washington Think Tanks”
DAVID RICCI, School of Social Science, IAS

October 19
School of Natural Sciences
Lunchtime Seminar: “Integrability in Random Matrix Models”
JAN LACKI, School of Natural Sciences, IAS

October 22
School of Mathematics
Members Seminar: “Supersingular Abelian varieties”
FRANS OORT, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “String Field Theory, Conformal Field Theory & Matrix Models”
ASHOKE SEN, Tata Institute

October 23
School of Mathematics
Analytic Number Theory Seminar: “The Lang-Trotter conjectures”
RAM MURTY, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Smooth numbers in arithmetic progressions [continued]”
ANDREW GRANVILLE, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Smooth numbers and factorization [continued]”
CARL POMERANCE, School of Mathematics, IAS

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School of Mathematics
Algorithmic Number Theory Seminar: “The number field sieve [continued]”
HENRIK LENSTRA, School of Mathematics, IAS

School of Natural Sciences
JOHN MOODY, Yale University

School of Social Science
MICHAEL DONNELLY, School of Social Science, IAS

October 26
Board of Trustees Lecture: “Medieval Jerusalem: The City as a Work of Art and Object of Piety”
OLEG GRABAR, Professor, School of Historical Studies, IAS

October 29
School of Mathematics
Members Seminar: “Non-abelian hypercohomology and Galois cohomology of linear algebraic groups”
MIKHAIL BOROVoi, School of Mathematics, IAS

October 30
School of Historical Studies
Medievalists: “Comparison Between the Letter of Avitus of Vienne to Clovis with the Account by Gregory of Tours of the Conversion of Clovis”
OLIVIER GUILLOT, University of Paris

School of Mathematics
Arithmetic Groups and Related Topics: “Harmonic analysis in weighted L₂-spaces [continued]”
JENS FRANKE, School of Mathematics, IAS

School of Mathematics
Topology/Geometry Seminar: “Evolution of curves on surfaces”
JOEL HASS, School of Mathematics, IAS

October 31
School of Social Science
History Seminar: “How Do We Historicize?” Discussion of Scott, “Historicizing Experience”; additional readings, John Toews, “Intellectual History after the Linguistic Turn”; and William Sewell, Jr., review of Scott
JOAN SCOTT, Professor, School of Social Science, IAS

November 1
School of Mathematics
Joint IAS — Rutgers University Analytic Number Theory Seminar: “On the convex hull of the integer points in a disc”
Antal Balog, School of Mathematics, IAS
“A theorem of Goldbach type”
JOHN FRIEDLANDER, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Algorithms in finite fields”
HENRIK LENSTRA, School of Mathematics, IAS

School of Natural Sciences
JOSEPH J. ATICK, School of Natural Sciences, IAS

School of Social Science
Social Science Thursday Luncheon Seminar: “On Comparing Cultures: Morocco and Indonesia Described and Redescribed”
CLIFORD GEERTZ, Professor, School of Social Science, IAS

November 2
School of Mathematics
Math/Physics Seminar: “Hydrodynamic scaling limits”
S.R.S. VARADHAN, Courant Institute

School of Natural Sciences
Lunchtime Seminar: “Quantum Hair on Black Holes”
FRANK WILCZEK, Professor, School of Natural Sciences, IAS
November 5
School of Mathematics
Members Seminar: “A problem related to one of Littlewood and Offord”
ROBERT VAUGHAN, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “Topological Gravity with Minimal Matter"
KEKE LI, California Institute of Technology

November 6
School of Mathematics
Arithmetic Groups and Related Topics:
“Harmonic analysis in weighted $L^2$-spaces [continued]”
JENS FRANKE, School of Mathematics, IAS

School of Mathematics
Topology/Geometry Seminar: “Essential laminations in non-Haken 3-manifolds”
MARK BRITTENHAM, School of Mathematics, IAS

November 7
School of Mathematics
Special Seminar: “Representations of groups with bounded generation and the congruence subgroup problem”
VLADIMIR PLATONOV, Minsk

November 8
School of Historical Studies
LAUREN S. WEINGARDEN, School of Historical Studies, IAS

School of Mathematics
Joint IAS — Rutgers University Analytic Number Theory Seminar: “Integers without large prime factors”
JOHN FREIDLANDER, School of Mathematics, IAS

November 9
School of Mathematics
Algorithmic Number Theory Seminar:
“Smooth numbers and factorization [continued]”
CARL POMERANCE, School of Mathematics, IAS

November 10
School of Natural Sciences
Biophysics & Computation: “Modeling Neuronal Dynamics”
LARRY ABBOTT, Brandeis University

School of Social Science
Social Science Thursday Luncheon Seminar: “Reading the Gothic Revival: ‘History’ and Hints on Household Taste”
CHRISTINA CROSBY, School of Social Science, IAS

November 12
School of Mathematics
Special Seminar: “Some simple models for percolation”
ROBERT LANGLANDS, Professor, School of Mathematics, IAS

School of Mathematics
Members Seminar: “Controlling topology by Ricci curvature”
SHUN-HUI ZHU, School of Mathematics, IAS

November 13
School of Historical Studies
Medievalists: “Compostela and Vezelay”
MICHEL HUGLO, School of Historical Studies, IAS

School of Mathematics
Seminar: “Geometry of Kuznetzov-Smolodukhov equations, Part I”
VADIM V. SCHECHTMAN, School of Mathematics, IAS

School of Mathematics
Arithmetic Groups and Related Topics:
“Harmonic analysis in weighted $L^2$-spaces [continued]”
JENS FRANKE, School of Mathematics, IAS

School of Mathematics
Topology/Geometry Seminar: “Simple manifolds obtained by adding a 2-handle to a 3-manifold”
MARIO EUDAVE-MUNOZ, School of Mathematics, IAS
November 14  
School of Mathematics  
Math/Physics Seminar: “Non-Gaussian hierarchical renormalization group fixed points”  
HANS KOCHE, University of Texas at Austin

School of Mathematics  
Special Seminar: “Integral lattices with an automorphism”  
HELMUT KOCHE, Berlin

November 15  
School of Mathematics  
Joint IAS — Rutgers University Analytic Number Theory Seminar: “Small gaps between primes”  
DAN GOLDESTON, School of Mathematics, IAS

School of Mathematics  
Algorithmic Number Theory Seminar:  
“Modifications of the number field sieve”  
DON COPPERSMITH, IBM, Yorktown Heights

“Curves of genus 2 with given moduli”  
JEAN-FRANCOIS MESTRE, University of Paris 1 ’II

School of Natural Sciences  
JOHN HOLLAND, University of Michigan and The Santa Fe Institute

School of Social Science  
Social Science Thursday Luncheon Seminar:  
“The Red Iguana: Gender Relations and Cloth Design among the Mimianka of Mali”  
SARAH BRETT-SMITH, School of Historical Studies, IAS

School of Social Science  
History Seminar: “How Is Historical Perspective Established, and Lost?”  
CHRISTINA CROSBY, School of Social Science, IAS

November 16  
School of Natural Sciences  
Lunchtime Seminar: “The Gowdy Cosmology & Two-Dimensional Gravity”  
MICHAEL MCGUIGAN, School of Natural Sciences, IAS

November 19  
School of Mathematics  
Special Seminar: “Remarks on base change for orthogonal groups”  
I. PIATECKI-SHAPIRO, Yale University

School of Mathematics  
Members Seminar: “Dedekind sums, continued fractions and signature cocycles”  
ROBIN KIRBY, School of Mathematics, IAS

School of Natural Sciences  
Theoretical Physics Seminar: “Free Field Approach to Two-Dimensional Conformal Field Theories”  
JIM MCCARTHY, Brandeis

November 20  
School of Mathematics  
Seminar: “Geometry of Knizhnik-Zamolodchikov equations. Part II”  
VADIM V. SCHECHTMAN, School of Mathematics, IAS

School of Mathematics  
Arithmetic Groups and Related Topics:  
“Harmonic analysis in weighted Lp-spaces [continued]”  
JENS FRANKE, School of Mathematics, IAS

School of Mathematics  
Topology/Geometry Seminar: “A Proof of Gilbert-Pollak conjecture on Steiner ratio”  
DING-ZHU DU, Princeton University/Chinese Academy

November 21  
School of Mathematics  
Special Seminar: “Twin buildings and groups of Kac-Moody type”  
JACQUES TITS, Yale University/College de France

School of Mathematics  
Special Seminar: “Some remarks on base change for orthogonal groups”  
JAMES COGDILL, University of Oklahoma

November 26  
School of Mathematics  
Members Seminar: “Perverse sheaves and Langlands’ duality”  
VICTOR GINZBURG, School of Mathematics, IAS
November 27
School of Mathematics
Arithmetic Groups and Related Topics: “Introduction to Marina Ratner’s Work on Unipotent Flows”
MARC BURGER, School of Mathematics, IAS

November 28
School of Mathematics
Topology/Geometry Seminar: “Slicing and Area Minimization”
GARY LAWLOR, Princeton University

November 28
School of Mathematics
Special Seminar: “Kirillov-Kostant Theory and Feynman Path Integrals on Coadjoint Orbits”
KIYOSATO OKAMOTO, Hiroshima University

November 28
Faculty Lectures: “How the Sun Shines”
JOHN BAHCALL, Professor, School of Natural Sciences, IAS

November 29
School of Mathematics
History Seminar: “Constructing Historical Memory” Discussion of Vynsk, “The Realities at Stake in a Poem”; additional reading, selections from Paul Celan, Collected Prose
CHRISTOPHER FYNSK, School of Social Science, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Factoring with quadratic forms”
CARL POMERANCE, School of Mathematics, IAS
“Primality Testing”
HENDRIK LENSTRA, School of Mathematics, IAS

School of Social Science
Social Science Thursday Luncheon Seminar: “Lucie Varga, an Austrian Historian in the ‘Annales’-Circle (1904-1941)”
PETER SCHÖTTLER, School of Social Science, IAS

November 30
School of Natural Sciences
Luncheon Seminar: “Effective Theories of the Fractional Quantum Hall Effect”
BORIS BLOK, School of Natural Sciences, IAS

December 3
School of Mathematics
Math/Physics Seminar: “What is Quantum Chaos”
MARTIN GUTZWILLER, IBM, Yorktown Heights

School of Mathematics
Members Seminar: “Lie groups and ergodic theory”
MARINA RATNER, Berkeley

School of Natural Sciences
Theoretical Physics Seminar: “Fractional Statistics, Gauge Symmetries & Superconductivity”
ZHOU ZOU, Stanford University

December 4
School of Mathematics
Special Seminar: “Truncation and Plancherel measure”
WILLIAM CASSELMAN, University of British Columbia

School of Mathematics
“Geometry of Knizhnik-Zamolodchikov equations, Part III”
VADIM V. SCHECHTMAN, School of Mathematics, IAS

School of Mathematics
Arithmetic Groups and Related Topics: “Raghunathan’s topological conjecture”
MARINA RATNER, Berkeley

School of Mathematics
Topology/Geometry Seminar: “Two-dimensional quantum gauge theory”
EDWARD WITTEN, Professor, School of Natural Sciences, IAS

December 6
School of Mathematics
Joint IAS — Rutgers University Analytic Number Theory Seminar: “Simple zeros of the Riemann zeta function”
DAN GOLDSTON, School of Mathematics, IAS
“Turán Inequalities and the zeros of certain Dirichlet Series”
AMIT GHOSH, School of Mathematics, IAS
School of Mathematics
Algorithmic Number Theory Seminar: “Primality Testing [continued]”
HENDRIK LENSTRA, School of Mathematics, IAS

School of Natural Sciences
Biophysics & Computation: “Neuroethological Analysis of Pitch Perception”
ANDREA SIMMONS, Brown University

School of Social Science
IKEGAMI, School of Social Science, IAS

School of Historical Studies
Art History Colloquia: “Illusionism and Artistic Self-Consciousness North of the Alps, 13th — 16th Centuries”
JAMES H. MARROW, School of Historical Studies, IAS

December 7
School of Mathematics
Special Mathematics Seminar: “Truncation and Plancherel measure”
WILLIAM CASSELMAN, University of British Columbia

December 10
School of Mathematics
Members Seminar: “Quantum groups, homology of local systems and representations of braid groups”
ALEXANDRE VARCHENKO, School of Mathematics, IAS

December 11
School of Mathematics
Topology/Geometry Seminar: “The canonical metrics on teardrops and footballs: The Ricci flow on 2-orbifolds”
LANG-FANG WU, Princeton University

December 12
Faculty Lectures: “Carbon Dioxide in the Atmosphere and the Biosphere”
FREEMAN DYSON, Professor, School of Natural Sciences, IAS

School of Social Science
History Seminar: “The Place of Metaphor in the History of Science”

Discussion of Bono, “Science, Discourse, and Literature” additional reading, selections from Nancy Leys Stepan, Race and Gender: The Role of Analogy in Science

JAMES J. BONO, School of Social Science, IAS

December 13
School of Mathematics
Joint IAS — Rutgers University Analytic Number Theory Seminar: “Vibrating fractal strings and the Riemann zeta function”
MICHAEI LAPIDUS, University of California

“On the distribution of zeros of Epstein zeta functions”

DENNIS A. HEJHAL, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Factoring with quadratic forms [continued]”
CARL POMERANCE, School of Mathematics, IAS

“Primality testing [continued]”

HENDRIK LENSTRA, School of Mathematics, IAS

School of Natural Sciences
Biophysics & Computation: “Modeling the Olfactory Bulb”
ZHAIOPING LI, School of Natural Sciences, IAS

School of Social Science
Social Science Thursday Luncheon Seminar: “Liberty and Discipline: Once Again, towards a Sociohistorical Understanding of Modernity”
PETER WAGNER, School of Social Science, IAS

December 14
School of Natural Sciences
Lunchtime Seminar: “Knot Invariants from the Chiral Potts Model”
TETSUJI MIWA, RIMS, Kyoto

December 17
School of Mathematics
Members Seminar: “The dynamics of free group automorphisms”
Mladen Bestvina, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “Non Self-Dual Solutions to the Yang-Mills Equations”

JEREMY SCHIFF, Columbia University
December 18
School of Mathematics
Topology/Geometry Seminar: "Bending and sliding and rubberbands"
PETER DOYLE, Princeton University

January 14
School of Mathematics
Members Seminar: "Algorithmic design"
ROBERT TARJAN, Princeton University

January 15
School of Mathematics
Topology/Geometry Seminar: "Geometry of bounded homogeneous domains"
JOSEPH D'ATRI, School of Mathematics, IAS

School of Mathematics
Arithmetic Groups and Related Topics:
"Regularization of Eisenstein periods and the density of integral points on certain varieties"
PETER SARNAK, Stanford University

January 16
Faculty Lectures: "The Idea of Holy War in Ancient Israel"
MICHAEL WAIZER, Professor, School of Social Science, IAS

School of Mathematics
Analysis and Math Physics Seminar:
"Mathematical problems of equilibrium shapes of elastic crystals"
MICHAEL GRINFEL'D, School of Mathematics, IAS

January 17
School of Mathematics
Joint IAS — Rutgers University Analytic Number Theory Seminar: "Smooth numbers and additive number theory. An Introduction"
ROBERT C. VAUGHAN, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar:
"Primality testing [continued]"
HENRIK LENSTRA, School of Mathematics, IAS

School of Natural Sciences
Biophysics & Computation: "Computational Hierarchies of Real Neurons: Synaptic Microcircuits & Dendritic Functional Units"
GORDON SHEPHERD, Yale University

School of Social Science
Social Science Thursday Luncheon Seminar:
"Socialism and Human Emancipation"
CHUN HUN, School of Social Science, IAS

School of Historical Studies
Art History Colloquium: "Banana Sculptors: The Theft of Feminity and the Creation of Art"
SARAH C. BRETT-SMITH, School of Historical Studies, IAS

School of Natural Sciences
Biophysics & Computation: "Energy Function Models for Motion Perception & Brain Development: Video Demonstration, Theory & Experiments"
ALAN YUille, Harvard University
January 18
School of Natural Sciences
Lunchtime Seminar: “Exact Solutions & Pairing in the Fractional Quantum Hall Effect”
MARTIN GREEN, School of Natural Sciences, IAS

January 21
School of Mathematics
Members Seminar: “On Fourier coefficients of Eisenstein series on SO(5,2)”
MASAKI FURUSAWA, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “Unpredictability & Complexity in Dynamical Systems”
C. MOORE, Cornell University

January 22
School of Mathematics
Topology/Geometry Seminar: “Unknotted graphs in the 3-sphere”
ABIGAIL THOMPSON, School of Mathematics, IAS

School of Mathematics
Arithmetic Groups and Related Topics: “Cusp Forms and Fermi’s golden rule”
PETER SARNAK, Stanford University

January 23
School of Mathematics
FERNANDO SORIA, School of Mathematics, IAS

School of Social Science
PETER SCHÖTTLER, School of Social Science, IAS

January 24
School of Mathematics
Joint IAS — Rutgers/Analytic Number Theory Seminar: “Divisor function over arithmetic progressions”
HENRYK IWANIEC, Rutgers University

“Smooth numbers and additive number theory [continued]”
ROBERT C. VAUGHAN, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Primality testing via elliptic curves”
CARL POMERANCE, School of Mathematics, IAS

“Primality testing [continued]”
HENRIK LENSTRA, School of Mathematics, IAS

School of Social Science
Social Science Thursday Luncheon Seminar: “‘Man is Political by Nature’: The Maimonidean Chapter of Jewish Political Thought”
MENACHEM FORBERBAUM, School of Social Science, IAS

January 28
School of Mathematics
Members Seminar: “Solvability for a class of invariant differential operators of second order”
DEITELF MÜLLER, School of Mathematics, IAS

January 29
School of Mathematics
Topology/Geometry Seminar: “Group actions, quotients and quaternionic manifolds”
KRYSZTOF GALICKI, School of Mathematics, IAS

January 31
Joint IAS — Rutgers/Analytic Number Theory Seminar: “Large gaps between prime numbers”
JANÓS PINTZ, School of Mathematics, IAS

“Smooth numbers in additive number theory: Technicalities”
ROBERT C. VAUGHAN, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Primality testing via elliptic curves”
CARL POMERANCE, School of Mathematics, IAS

“Primality testing [continued]”
HENRIK LENSTRA, School of Mathematics, IAS

School of Social Science
Social Science Thursday Luncheon Seminar: “Citizenship, Political Participation and the Formation of the Public Sphere in Buenos Aires, 1850s-1880s”
HIEDA SABATO, School of Social Science, IAS
February 1
School of Natural Sciences
Lunchtime Seminar: “Matrix Model Approach to One-Dimensional String Theory”
SPENTA WADIA, School of Natural Sciences, IAS

February 4
School of Mathematics
Members Seminar: “Ramanujan duals — I”
MARC BURGER, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “Classical Closed String Field Theory”
BARTON ZWEBACH, Massachusetts Institute of Technology

February 5
School of Historical Studies
GILES CONSTABLE, Professor, School of Historical Studies, IAS

School of Mathematics
Arithmetic and Related Topics: “Ramanujan Duals — II”
MARC BURGER, School of Mathematics, IAS

School of Mathematics
Topology/Geometry Seminar: “Front propagation for bi-stable reaction diffusion equations”
HIA BRONSARD, School of Mathematics, IAS

February 6
School of Mathematics
Group Theory Seminar: “Finite Split BN-pairs of rank 2”
DANIEL GORENSTEIN, School of Mathematics, IAS

School of Mathematics
Analysis and Math Physics Seminar: “Singular solutions and asymptotic behavior of nonlinear heat equations”
JUAN LUIS VAZQUEZ, University of Autonoma, Madrid

School of Social Science
History Seminar: “Biography?”
Discussion of Lucien Febvre, Martin Luther (1928), Chapters 1-5; additional reading, Febvre’s French-language introduction to the 1944 edition

February 7
School of Historical Studies
Art History Colloquia: “Before Toulouse and Santiago di Compostela: Spanish Sculpture of the 11th Century”
HORST BREDEKAMP, School of Historical Studies, IAS

School of Mathematics
Joint IAS — Rutgers/Analytic Number Theory Seminar: “Large gaps between prime numbers — II”
JANOS PINTZ, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Primality testing via elliptic curves [continued]”
CARL POMERANCE, School of Mathematics, IAS

School of Mathematics
Joint IAS — Rutgers/Analytic Number Theory Seminar: “Primality testing [continued]”
HENDRIK LENSTRA, School of Mathematics, IAS

School of Natural Sciences
Biophysics & Computation: “Statistical Mechanics Description of Supervised Learning”
SARA SOLLA, AT & T, Bell Laboratories

School of Social Science
Social Science Thursday Luncheon Seminar: “History of Science and the ‘Linguistic Turn’”
JAMES BONO, School of Social Science, IAS

February 11
School of Mathematics
Members Seminar: “Geometric interpretation of vertex operator algebras”
YI-ZHI HUANG, School of Mathematics, IAS

February 12
School of Mathematics
Topology/Geometry Seminar: “Categories and the first Pontrjagin class”
J.L. BRYLINSKI, Penn State University
School of Mathematics
Arithmetic Groups and Related Topics:
"Discrete groups of affine transformations"
G.A. MARGULIS, School of Mathematics, IAS

February 13
School of Mathematics
Group Theory Seminar: “Finite Split BN-Pairs of rank 2 [continued]”
DANIEL GORENSTEIN, School of Mathematics, IAS

School of Mathematics
Analysis and Math Physics Seminar: “Woltjer’s variational principle for force free fields: Eigenfunctions of the curl and linkage integrals for trajectories of solenoidal vector fields”
CH.Router, University of Milan

February 14
School of Mathematics
Joint IAS — Rutgers/Analytic Number Theory Seminar: “How are primes distributed?”
ANDREW GRANVILLE, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “Primality testing via elliptic curves [continued]”
CAREL POMERANCE, School of Mathematics, IAS

School of Mathematics
Around WZW Theories Seminar: “Introduction”
Pierre Deligne, Professor, and VADIM SHECHTMAN, School of Mathematics, IAS

School of Natural Sciences
Biophysics & Computation: “Processing of Temporal Information in the Nervous System”
KATHERINE CARR, University of Maryland

School of Social Science
GARY GERSTLE, School of Social Science, IAS

February 18
School of Mathematics
Members Seminar: “Singular solutions of the nonlinear Schrödinger equation”
GEOFFREY PAPANICOLAOU, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: “String Field Theory in Minimal & Topological Backgrounds”
Sunil Mukhi, CERN/Tata Institute

February 19
School of Historical Studies
Medievalists: “De l’Académie à l’École de Chartres: La Transmission du “Timée de Platon l’Occident”
Michel Huglo, School of Historical Studies, IAS

School of Mathematics
Topology/Geometry Seminar: “CR structures and classical invariant theory”
Robert Mizner, Williams College

School of Mathematics
Arithmetic Groups and Related Topics: “Archimedean super-rigidity and hyperbolic geometry”
KEVIN CORETTE, School of Mathematics, IAS

February 20
School of Mathematics
Group Theory Seminar: “Algebra of GL_2(Z), GL_3(Z) and GL_4(Z) via geometry”
John H. Conway, Princeton University

School of Mathematics
Analysis and Math Physics Seminar: “The mathematical theory of renormalization and Eddy diffusivity for turbulent transport”
Andrew Majda, Princeton University

School of Social Science
History Seminar: “The Uses of Language, the Limits of Language”
February 21
School of Mathematics
Joint IAS — Rutgers/Analytic Number Theory Seminar: “Averages of twin primes”
ALBERTO PERELLI, School of Mathematics, IAS
“Smooth numbers in additive Number Theory: Cubes and sums of 3 case powers”
ROBERT C. VAUGHAN, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar:
“Primality testing via elliptic curves [continued]”
CARL POMERANCE, School of Mathematics, IAS
“Primality testing [continued]”
HENDRIK LENSTRA, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: “An additive point of view on the problem of counting integral points on convex curves”
JEAN-MARC DESHOUILLERS, School of Mathematics, IAS
“Cyclotomic polynomials with large coefficients”
HELMUT MAIER, School of Mathematics, IAS

February 28
School of Mathematics
Algorithmic Number Theory Seminar: “An improved algorithm for counting points on elliptic curves”
DAVID ROBBINS, Center for Communications Research
“Counting points on abelian varieties over finite fields”
JONATHAN PILA, Columbia University

School of Mathematics
Number Theory Seminar: “On the square root of special values of certain L-series”
FERNANDO RODRIGUEZ VILLEGAS, School of Mathematics, IAS

School of Mathematics
Analysis and Math Physics Seminar:
“Asymptotic behavior of Maxwell-Higgs fields”
WEI-TONG SHU, School of Mathematics, IAS

School of Mathematics
Group Theory Seminar: “Extended generalized Polygons”
RICHARD WEISS, Tufts University

February 25
School of Mathematics
Members Seminar: “The existence of regular minimizing m-harmonic maps”
DONG ZHANG, School of Mathematics, IAS

February 26
School of Mathematics
Topology/Geometry Seminar: “Representations of knot groups”
MASAAKI WADA, University of Pennsylvania

February 27
Faculty Lectures: “Gravity”
EDWARD WITTEN, Professor, School of Natural Sciences, IAS

School of Mathematics
Number Theory Seminar: “On the square root of special values of certain L-series”
FERNANDO RODRIGUEZ VILLEGAS, School of Mathematics, IAS

School of Mathematics
Analysis and Math Physics Seminar:
“Asymptotic behavior of Maxwell-Higgs fields”
WEI-TONG SHU, School of Mathematics, IAS

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Group Theory Seminar: “Extended generalized Polygons”
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February 28
School of Mathematics
Algorithmic Number Theory Seminar: “An improved algorithm for counting points on elliptic curves”
DAVID ROBBINS, Center for Communications Research
“Counting points on abelian varieties over finite fields”
JONATHAN PILA, Columbia University

School of Mathematics
Number Theory Seminar: “On the square root of special values of certain L-series”
FERNANDO RODRIGUEZ VILLEGAS, School of Mathematics, IAS

School of Mathematics
Analysis and Math Physics Seminar:
“Asymptotic behavior of Maxwell-Higgs fields”
WEI-TONG SHU, School of Mathematics, IAS

School of Mathematics
Group Theory Seminar: “Extended generalized Polygons”
RICHARD WEISS, Tufts University
School of Social Science

Social Science Thursday Luncheon Seminar: “The Genealogy of Exclusionary Democracy and Sexual Difference”

GENEVIEVE BRAVISE, School of Social Science, IAS

March 1

School of Natural Sciences

Lunchtime Seminar: “The Consistent Covariant Quantization of the Brink-Schwarz Superparticle”

YESHAYAHU EISENBERG, School of Natural Sciences, IAS

March 4

School of Mathematics

Members Seminar: “Hodge type of projective varieties of low degree”

HÉLÈNE ESNAULT, Essen University, Germany

School of Natural Sciences

Theoretical Physics Seminar: “On String Theory & Black Holes”

EDWARD WITTEN, Professor, School of Natural Sciences, IAS

March 5

School of Historical Studies

Medievalists: “Ministerial Self-Consciousness: The Iwcn Frescoes in Rodenegg”

JOHN FREED, School of Historical Studies, IAS

School of Mathematics

Topology/Geometry Seminar: “Nilpotent structures and invariant metrics on collapsed manifolds”

JEFF CHEEGER, Courant Institute

School of Mathematics

Arithmetic Groups and Related Topics: “Nonarchimedean super-rigidity”

KEVIN CORLETTE, School of Mathematics, IAS

March 6

School of Mathematics

Group Theory Seminar: “On finite flag-transitive geometries”

JAN SAXL, Princeton University

School of Mathematics

Analysis and Math Physics Seminar: “A review of recent results on the thermo-diffusive model for flame propagation”

HENRI BERESTYCKI, University of Paris VI

School of Social Science

History Seminar: “What is Foucault’s History a History Of?” Discussion of excerpts from Michel Foucault, Discipline and Punish and Language, Counter-Memory, Practice; and plates 1 and 30 from Surveiller et punir

March 7

School of Historical Studies

Art History Colloquia: “Delacroix and Political Satire”

NINA ATHANASSOLOU-KALLMYER, School of Historical Studies, IAS

School of Mathematics

Joint IAS — Rutgers/Analytic Number Theory Seminar: “Constructing auxiliary polynomials”

THOMAS STRUPPECK, Rutgers University

“Effective irrationality types for a class of algebraic numbers”

ENRICO BOMBERI, Professor, School of Mathematics, IAS

School of Mathematics

Algorithmic Number Theory Seminar: “Primality testing with elliptic curves [conclusion]”

CARL POMERANCE, School of Mathematics, IAS

“Primality testing [conclusion]”

HENDRIK LENSTRA, School of Mathematics, IAS

School of Mathematics

Around WZW Theories Seminar: Tensor Categories [continued]

PIERRE DELIGNE, Professor, School of Mathematics, IAS

School of Natural Sciences


DAVID HELD, Cornell University

School of Social Science

Social Science Thursday Luncheon Seminar: “Dogs, Cats, and Chickens: On Some Hauulu Taboos”

VALERIO VALERI, School of Social Science, IAS
March 8
School of Historical Studies
Public Lecture: "Henri Pirenne: Medievalist and Historian of Belgium"
RAUL G. VAN CAENEHEM, University of Ghent

March 11
School of Mathematics
Marston Morse Lecture: "Interaction Energy in the calculus of variations"
CLIFFORD TAUBES, Harvard University

March 12
School of Mathematics
Topology/Geometry Seminar: "Norms of differential forms and volume-minimizing cycles"
DANA MACKenzie, Kenyon College

March 13
School of Mathematics
Analysis and Math Physics Seminar: "Hadamard's well-posedness for the Euler compressible equations"
HUGO DA VEIGA, University of Pisa

School of Mathematics
Group Theory Seminar: "Sylow subgroups and subnormality"
RICHARD LYONS, School of Mathematics, IAS

March 14
School of Mathematics
Joint IAS — Rutgers/Analytic Number Theory Seminar: "Remarks on Selberg's conjectures on Dirichlet series"
J. BRIAN CONREY, School of Mathematics, IAS

School of Mathematics
Algorithmic Number Theory Seminar: "Algorithms in algebraic number theory"
HENDRIK LENSTRA, School of Mathematics, IAS

School of Mathematics
Around WZW Theories Seminar:
"Holomorphic factorization of WZW Models"
EDWARD WITTEN, Professor, School of Natural Science, IAS

School of Natural Sciences
Biophysics & Computation: "Statistical Physics of Random Neural Networks for Associative Memory & Generalization"
DAVID SHEPPINGTON, University of Oxford

March 15
School of Natural Sciences
Lunchtime Seminar: "Interactions & Scattering in d = 1 String Theory"
GAUTAM MANDAL, School of Natural Sciences, IAS

School of Social Science
Social Science Thursday Luncheon Seminar: "Community and the Limits of Theory"
CHRISTOPHER FYNSK, School of Social Science, IAS

March 18
School of Mathematics
Members Seminar: "Twisted endoscopy and representations of p-adic Groups"
FREYDOON SHAHIDI, School of Mathematics, IAS

School of Natural Sciences
Theoretical Physics Seminar: "Is It Possible to Create A Universe in the Laboratory by Quantum Tunneling?"
ALAN GUTH, Massachusetts Institute of Technology

March 19
School of Historical Studies
Medievalists: "Religious History of Medieval France: Recent Achievements and Methodological Prospects"
ANDRÉ VAUCHEZ, School of Historical Studies, IAS

School of Mathematics
Topology/Geometry Seminar: "Tunnel Number, Heegaard genus and hyperbolic volume of 3-manifolds"
COLIN ADAMS, Williams College

School of Mathematics
Arithmetic Groups and Related Topics Seminar: "Non-archimedean super-rigidity II"
KEVIN CORLETTE, School of Mathematics, IAS
March 20
Faculty Lectures: "The Anthropology of Change: Two Towns, Four Decades, One Observer"
CLIFFORD GEERTZ, Professor, School of Social Science, IAS

School of Mathematics
Analysis and Math Physics Seminar: FRANCO BREZZI, Istituto di Analisi Numerica, Pavia

School of Mathematics
Group Theory Seminar: "Symmetric genus of sporadic groups"
ANDREW WOLDAR, Villanova University

School of Mathematics
Analysis and Math Physics Seminar: "An inequality for the time constant in first-passage percolation"
HARRY KESTEN, Cornell University

March 21
School of Mathematics
Around WZW Theories Seminar: "Classical origin of quantum group symmetries in WZW models"
KRZYSZTOF GAWEDSKI, IHES

School of Natural Sciences
W. BIALEK, NEC Research Institute

School of Social Science
Social Science Thursday Luncheon Seminar: "An Alternate Historiography: Objects and Persons in the Colonial Encounter on Sumba"
JANET HOSKINS, School of Social Science, IAS

March 23
School of Historical Studies
Public Seminar: The Methodology of Sources "The Roman Jurists as Historical Sources"
BRUCE W. FRIER, University of Michigan, Ann Arbor

"The Limits of Images as Historical Sources"
OLEG GRABAR, Professor, School of Historical Studies, IAS

"Supernatural Paraphernalia in Polybius's Histories"
FRANK W. WALBANK, University of Liverpool

"Papyri as Historical Sources"
LUDWIG KOENEN, University of Michigan, Ann Arbor

March 25
School of Mathematics
Members Seminar: "Unitarizability of principal series representations of p-adic groups"
HIROYUKI YOSHIDA, School of Mathematics, IAS

March 26
School of Mathematics
Topology/Geometry Seminar: "Computing soap bubbles and growing crystals"
FRED ALMGREN, Princeton University

School of Mathematics
Group Theory Seminar: "Maximal subgroups and chains in Lie-type groups"
RONALD SOLOMON, Ohio State University

School of Mathematics
Analysis and Math Physics Seminar: "Numerical methods for the continuity equations in semiconductor problems"
DONATELLA MARINI, Universita di Genova/IAN-CNR

School of Social Science
History Seminar: "Philosophy and History" Discussion of Fraisse, "Sexual Difference: A Historical Difference"; "De la destination au destin, Histoire philosophique de la différence des sexes"
GENEVIEVE Fraisse, School of Social Science, IAS

March 28
School of Mathematics
Joint IAS - Rutgers/Analytic Number Theory Seminar: "Rational points on singular cubic threefolds"
DONALD J. LEWIS, School of Mathematics, IAS
"x^3 + y^3 + z^3 = k"
ROGER HEATH-BROWN, Oxford University

School of Mathematics
Algorithmic Number Theory Seminar: "q x + a = y^2, 1 <= x <= N"
ENRICO BOMBIERI, Professor, School of Mathematics, IAS
School of Mathematics
Around WZW Theories Seminar:
“Holomorphic factorization of WZW models [continued]”
EDWARD WITTEN, Professor, School of Natural Science, IAS

School of Natural Sciences
Biophysics & Computation: “Real-Time Coding & Computation in Sensory Systems”
F. RIEKE, NEC Research Institute

School of Natural Sciences
Lunchtime Seminar: “Target-Space Duality & the Curse of the Wormhole”
JOHN SCHWARZ, California Institute of Technology

School of Social Science
Social Science Thursday Luncheon Seminar:
“Modernization from Above: Between Market Romanticism and Statist Utopia”
JACEK KOCHANOWICZ, School of Social Science, IAS

March 29
School of Historical Studies and Department of Near Eastern Studies, Princeton University Colloquium: “Ghassanids, Umayyads, and Qusayr Al-’amra”
IRFAN SHAHID, Georgetown University

April 1
School of Mathematics
Members Seminar: “Prescribing scalar curvature on complete manifolds with negative sectional curvature”
ZHIRENJIN, School of Mathematics, IAS

April 2
School of Historical Studies
Medievalists: “The Darker Side of Lay Literacy: Epistolary Execution”
PATRICK GARRY, School of Historical Studies, IAS

School of Mathematics
Topology/Geometry Seminar: “Amalgams of negatively curved groups”
MARK FEIGHN, Rutgers University

April 3
Faculty Lectures: “Anyons for Anyone”
FRANK WILCZEK, Professor, School of Natural Sciences, IAS

School of Mathematics
Group Theory Seminar: “Generation of simple groups, with an application to linear groups”
MARTIN LIEBECK, Imperial College, London

School of Mathematics
Analysis and Math Physics Seminar:
“Whiskered tori for soliton equations: chaotic behavior in near soliton equations”
DAVID MCLAUGHLIN, Princeton University

April 4
School of Historical Studies
MICHELE A. HANNOOSH, School of Historical Studies, IAS

School of Mathematics
Joint IAS – Rutgers/Analytic Number Theory Seminar: “Equations in primes”
ANTAL BALOG, School of Mathematics, IAS
“The Distribution and Moments of Δ(x)”
ROGER HEATH-BROWN, Oxford University

School of Mathematics
Algorithmic Number Theory Seminar:
“Algorithms in algebraic number theory”
HENDRIK LENSTRA, School of Mathematics, IAS

School of Mathematics
Around WZW Theories Seminar:
VAZIM SCHECHTMAN, School of Mathematics, IAS

School of Social Science
Social Science Thursday Luncheon Seminar:
“Love in Greenwich Village: Sex, Gender, and Politics in Radical America, 1890-1920”
CHRISTINE STANSELL, School of Social Science, IAS

April 8
School of Mathematics
Special Seminar: “An Approach to Topological Field Theory”
DAVID KAZHDAN, Harvard University

April 9
School of Mathematics
Topology/Geometry Seminar: “Calibrations and non-orientable surfaces”
TIM MURDOCH, Washington and Lee University
<table>
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<tr>
<th>Date</th>
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<tbody>
<tr>
<td>April 10</td>
<td>School of Mathematics Group Theory Seminar: &quot;A 45-dimensional view of $M_3$&quot;</td>
<td>Rich Margolin, Princeton University</td>
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<td>School of Mathematics Joint IAS — Rutgers/Analytic Number Theory</td>
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<td>Special Seminar: “On the distribution in progressions of quadratic polynomials”</td>
<td>Saverio Salerno, University of Salerno</td>
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<td>April 11</td>
<td>School of Mathematics Joint IAS — Rutgers/Analytic Number Theory</td>
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<td>Seminar: “Rational approximations to some classical constants”</td>
<td>Carlo Viola, University of Pisa</td>
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<td>“On consecutive $k$th power residues”</td>
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<td>ADOFF HILDEBRAND, School of Mathematics, IAS</td>
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<td>School of Mathematics Algorithmic Number Theory Seminar: “Small solutions of quadratic congruences”</td>
<td>Hendrik Lenstra, School of Mathematics, IAS</td>
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<td>ROGER HEATH-BROWN, Oxford University</td>
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<td>“Algorithms in algebraic number theory [conclusion]”</td>
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<td>ADOLF HILDEBRAND, School of Mathematics, IAS</td>
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<td>School of Mathematics Around WZW Theories Seminar: “Holomorphic factorization of WZW models [conclusion]”</td>
<td>Edward Witten, Professor, School of Natural Sciences, IAS</td>
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<td>EDWARD WITTEN, Professor, School of Natural Sciences, IAS</td>
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<td>School of Natural Sciences Biophysics &amp; Computation: “The Quantum Efficiency of Vision”</td>
<td>D. Pelli, Syracuse University</td>
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<td>D. PELLI, Syracuse University</td>
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<td>School of Social Science History Seminar: “How Do New Categories of Social Organization Emerge?” Discussion of Schaffer, &quot;‘Les faits suivants…’: The Investigation and Treatment of ‘Morally Abandoned Children,’ 1889-1912”</td>
<td>Sylvia Schaffer, School of Social Science, IAS</td>
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<td>April 12</td>
<td>School of Natural Sciences Lunchtime Seminar: “String Field Theory for $d \leq 1$”</td>
<td>Joanne Cohn, School of Natural Sciences, IAS</td>
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<td>April 15</td>
<td>Theoretical Physics Seminar: “From Loops to States in Two-Dimensional Quantum Gravity”</td>
<td>Nathan Seiberg, Rutgers University</td>
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<td>April 16</td>
<td>School of Mathematics Topology/Geometry Seminar: “Homological category of 3-manifolds”</td>
<td>Jose Carlos Gomez Larranga, UNAM</td>
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<td>April 18</td>
<td>School of Mathematics Joint IAS — Rutgers/Analytic Number Theory</td>
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<td>Seminar: “On the Polya-Vinogradov inequality”</td>
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<td>ADOLF HILDEBRAND, School of Mathematics, IAS</td>
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<td>“Large Values of the Riemann Zeta-function”</td>
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<td>KAI MAN TSANG, University of Hong Kong</td>
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<td>School of Mathematics Around WZW Theories Seminar: “Central Extensions”</td>
<td>Pierre Deligne, Professor, School of Mathematics, IAS</td>
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<td>PIERRE DELIGNE, Professor, School of Mathematics, IAS</td>
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<td>School of Natural Sciences Biophysics &amp; Computation: “Pattern Formation in Neural Networks with Application to Neurobiology &amp; Psychobiology”</td>
<td>J. Cowan, University of Chicago</td>
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<td>April 19</td>
<td>School of Natural Sciences Lunchtime Seminar: &quot;Fractional Topological Charge &amp; Its Physical Consequences in 2D Sigma Models &amp; 4D Gauge Theories&quot;</td>
<td>Ariel Zhitnitsky, Novosibirsk Institute of Nuclear Physics &amp; University of Minnesota</td>
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<td>April 23</td>
<td>School of Mathematics Topology/Geometry Seminar: “Curve shortening, equivariant Morse theory and closed geodesics on the 2-sphere”</td>
<td>Nancy Hingston, Trenton State University</td>
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School of Mathematics
Analysis and Math Physics Seminar: “On uniformly rotating stars”
YANYAN LI, Princeton University
April 24
School of Mathematics
Analysis and Math Physics Seminar: “Deformation of varieties with trivial canonical line bundle and isolated singularities”
GANG TIAN, SUNY, Stony Brook
April 25
School of Mathematics
Joint IAS — Rutgers/Analytic Number Theory Seminar: “Vinogradov’s Mean Value Theory”
TREVOR WOOLEY, School of Mathematics, IAS
School of Mathematics
Special Seminar: “Some instances of non-archimedean uniformization”
MIKHAEL RAPPOPORT, Huppertal

School of Social Science
History Seminar: “Language, Inscription, and the History of Technology”
Discussion of selections from Friedrich A. Kittler, Discourse Networks, 1800/1900
April 26
School of Natural Sciences
Lunchtime Seminar: “Non-Abelian Statistics in the Fractional Quantum-Hall Effect”
XIAO-GANG WEN, School of Natural Sciences, IAS
April 29
School of Natural Sciences
Theoretical Physics Seminar: “Physical Properties of W Gravity & W Strings”
SUMIT DAS, Tata Institute
April 30
School of Mathematics
Topology/Geometry Seminar: “Gluing negatively curved groups”
RITA GITIK, University of Michigan

School of Natural Sciences
Biophysics & Computation: “Mathware for Wetware: Networks in Neurophysiology”
NANCY KOPPELL, Boston University
May 2
School of Mathematics
Joint IAS — Rutgers/Analytic Number Theory Seminar: “Exponential sums and Newton polyhedra”
ALAN ADOLPHSON, Oklahoma State University
School of Mathematics
Lunchtime Seminar: “Topological Superconductivity”
P AUL WIEG MANN, School of Natural Sciences, IAS
May 9
School of Natural Sciences
Biophysics & Computation: “Variability in the Firing of Retinal Ganglion Cells”
MICHAEL LEVINE, University of Illinois at Chicago
May 16
School of Natural Sciences
Biophysics & Computation: “Can There Be Mathematical Theories of Cognitive Phenomena?”
LES VALIANT, Harvard University
May 17
School of Natural Sciences
Lunchtime Seminar: "Strings in a Black Hole Background"
**ERIK VERLINDE, School of Natural Sciences, IAS**

May 28
School of Natural Sciences
Theoretical Physics Seminar: "Long Distance Physics of Compressible & Incompressible Quantum Fields"
**A. ZEE, ITP, Santa Barbara**

May 31
School of Natural Sciences
Lunchtime Seminar: "The One-Matrix Model & String Field Theory"
**EDWARD WITTEN, Professor, School of Natural Sciences, IAS**

June 12
School of Natural Sciences
Theoretical Physics Seminar: "'t Hooft's Approach to Quantum Black Holes"
**ERIK VERLINDE, School of Natural Sciences, IAS**

June 14
School of Natural Sciences
Lunchtime Seminar: "The Kac-Moody Group: Realization & Applications"
**BELAL BAAQUIE, School of Natural Sciences, IAS**
Annual report. 1987-93.