



I N S T I T U T E
for A D V A N C E D S T U D Y

R E P O R T
F O R T H E A C A D E M I C Y E A R
1 9 9 4 - 9 5

P R I N C E T O N · N E W J E R S E Y

I N S T I T U T E
for A D V A N C E D S T U D Y

R E P O R T
FOR THE A C A D E M I C Y E A R
1994 - 95

OLDEN LANE
PRINCETON · NEW JERSEY · 08540-0631
609-734-8000
609-924-8399 (Fax)

Extract from the letter addressed by the Founders to the Institute's Trustees,
dated June 6, 1930.

Newark, New Jersey.

It is fundamental in our purpose, and our express desire, that in the appointments to the staff and faculty, as well as in the admission of workers and students, no account shall be taken, directly or indirectly, of race, religion, or sex. We feel strongly that the spirit characteristic of America at its noblest, above all the pursuit of higher learning, cannot admit of any conditions as to personnel other than those designed to promote the objects for which this institution is established, and particularly with no regard whatever to accidents of race, creed, or sex.

TABLE OF CONTENTS

- 4 · BACKGROUND AND PURPOSE
- 5 · FOUNDERS, TRUSTEES AND OFFICERS OF THE BOARD AND OF THE CORPORATION
- 8 · ADMINISTRATION
- 11 · REPORT OF THE CHAIRMAN
- 15 · REPORT OF THE DIRECTOR
- 23 · ACKNOWLEDGMENTS
- 27 · REPORT OF THE SCHOOL OF HISTORICAL STUDIES
ACADEMIC ACTIVITIES
MEMBERS, VISITORS AND RESEARCH STAFF
- 36 · REPORT OF THE SCHOOL OF MATHEMATICS
ACADEMIC ACTIVITIES
MEMBERS AND VISITORS
- 42 · REPORT OF THE SCHOOL OF NATURAL SCIENCES
ACADEMIC ACTIVITIES
MEMBERS AND VISITORS
- 50 · REPORT OF THE SCHOOL OF SOCIAL SCIENCE
ACADEMIC ACTIVITIES
MEMBERS, VISITORS AND RESEARCH STAFF
- 55 · REPORT OF THE INSTITUTE LIBRARIES
- 57 · RECORD OF INSTITUTE EVENTS IN THE
ACADEMIC YEAR 1994-95
- 85 · INDEPENDENT AUDITORS' REPORT

INSTITUTE FOR ADVANCED STUDY: BACKGROUND AND PURPOSE

The Institute for Advanced Study is an independent, nonprofit institution devoted to the encouragement of learning and scholarship. From its founding in 1930 it has been a community of scholars where intellectual inquiry can be pursued across a broad range of disciplines under the most favorable conditions. In the words of its original statement of mission, "The primary purpose is the pursuit of advanced learning and exploration in the 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." For nearly two-thirds of a century this founding principle has been sustained and has yielded an unsurpassed record of definitive scholarship.

Although small in scale, the Institute fills a unique role in postgraduate education and scientific and scholarly research. It is organized in four Schools: Historical Studies, Mathematics, Natural Sciences, and Social Science. Within each is found a spectrum of scholarly interests which transcends the usual divisions of academic subjects. This breadth of coverage and the opportunity it affords for independent, self-directed scholarship distinguish the Institute from most other centers for research and scholarship. So too does its permanent Faculty, composed of twenty-one distinguished scholars who guide the work of the Schools and each year award fellowships to about 160 visiting Members from universities and research institutions throughout the world.

From its beginnings, the Institute has been international in composition and a community in character. More than half of today's Faculty began their scholarly careers outside the United States, and each year about a third to half of the Institute's Members come from abroad. This mix of cultures as well as disciplines and of senior and younger scholars greatly enriches the Institute experience, as do the Institute's residential housing, its outstanding dining, numerous lectures, concerts, and other cultural events.

The Institute was established with a major founding gift from New Jersey businessman and philanthropist Louis Bamberger and his sister, Mrs. Felix Fuld. They wished to use their fortunes to make a significant and lasting contribution to society. Abraham Flexner originated the concept from which the Institute took form, encouraged the Bambergers to provide resources for its realization, and served as the Institute's first Director. Through careful management and generous additional support, the Institute's endowment today produces nearly two-thirds of the annual operating budget. To underwrite the critical remaining portion of the budget, the Institute depends upon grants and gifts from individuals, foundations, corporations, and government agencies, including sources within and outside the United States. The Institute is governed by an elected Board of Trustees which appoints a Director to oversee the Institute's operations and guide its development.

Entirely independent in governance and administration, the Institute enjoys a close relationship with Princeton University, Rutgers University, and other academic, cultural, and research organizations. Working together, the Institute and these neighboring institutions have contributed to New Jersey's worldwide reputation in scholarship and science.

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

Founders

LOUIS BAMBERGER

CAROLINE BAMBERGER FULD

The Board of Trustees

HYMAN BASS

*Adran Professor of Mathematics, Columbia University
New York, New York*

RICHARD B. BLACK

*Chairman, ECRM Incorporated
Tewksbury, Massachusetts*

CHARLES L. BROWN

Princeton, New Jersey

ANNE d'HARONCOURT

*The George D. Widener Director
Philadelphia Museum of Art
Philadelphia, Pennsylvania*

JEAN BETHKE ELSHTAIN

*Laura Spelman Rockefeller Professor
of Social and Political Ethics
The University of Chicago
Chicago, Illinois*

VARTAN GREGORIAN

*President, Brown University
Providence, Rhode Island*

PHILLIP A. GRIFFITHS

*Director, Institute for Advanced Study
Princeton, New Jersey*

AGNES GUND

*President, The Museum of Modern Art
New York, New York*

TORU HASHIMOTO

*President and Chief Executive Officer
The Fuji Bank, Limited
Tokyo, Japan*

A. LEON HIGGINBOTHAM, JR.

*Of Counsel
Paul, Weiss, Rifkind, Wharton & Garrison
New York, New York*

PETER R. KANN
Publisher & Chairman
Dow Jones & Company, Inc.
New York, New York

HELENE L. KAPLAN
Of Counsel
Skadden, Arps, Slate, Meagher & Flom
New York, New York

LEON LEVY
Partner, Odyssey Partners
New York, New York

HAMISH MAXWELL
Retired Chairman and CEO
Philip Morris Companies Inc.
New York, New York

ROBERT B. MENSCHEL
Goldman Sachs & Company
New York, New York

NATHAN P. MYHRVOLD
Senior Vice President, Advanced Technology
Microsoft Corporation
Redmond, Washington

MALVIN A. RUDERMAN
Centennial Professor of Physics, Columbia University
New York, New York

RONALDO H. SCHMITZ
Member of the Board of Managing Directors
Deutsche Bank AG
Frankfurt, Germany

PAUL G. STERN
Partner, Forstmann Little & Co.
New York, New York
and
Visiting Professor, The Wharton School
Philadelphia, Pennsylvania

MICHEL L. VAILLAUD
New York, New York

LADISLAUS VON HOFFMANN
President, Omicron Investments, Inc.
Washington, DC

JAMES D. WOLFENSOHN
President, The World Bank
Washington, DC

BRIAN F. WRUBLE
President and Chief Operating Officer
Delaware Management Holdings Inc.
Philadelphia, Pennsylvania

MORTIMER B. ZUCKERMAN
Chairman and Editor-in-Chief
U.S. News and World Report
New York, New York

Trustees Emeriti

THEODORE L. CROSS
J. RICHARDSON DILWORTH
JOSEPH L. DOOB
SIDNEY D. DRELL
WILFRIED GUTH
RALPH E. HANSMANN
HOWARD C. PETERSEN
MARTIN E. SEGAL
DONALD B. STRAUS
FRANK E. TAPLIN, JR.

Board and Corporate Officers

JAMES D. WOLFENSOHN
Chairman of the Board

CHARLES L. BROWN
Vice Chairman of the Board and President of the Corporation

ALLEN I. ROWE
Treasurer of the Corporation

RACHEL D. GRAY
Secretary of the Corporation

ADMINISTRATION

PHILLIP A. GRIFFITHS
Director

ALLEN I. ROWE
*Associate Director,
Administration and Finance*

RACHEL D. GRAY
*Associate Director,
Development and Public Relations*

JAMES H. BARBOUR, JR.
Manager of Administration

ROBERTA B. GERNHARDT
Manager of Human Resources

ARLEN K. HASTINGS
Executive Assistant to the Director

PAMELA R. HUGHES
Development Administrator

ANNE B. HUMES
Administrator, IAS/Park City Mathematics Institute

JULIANNE KMIEC
Member Services Coordinator

PATRICIA H. LABALME
Assistant to the Director

MARY J. MAZZA
Comptroller

NORMAN H. McNATT
Development and Public Relations Officer

FRANZ MOEHN
Cheff/Manager, Dining Hall

PROFESSOR-AT-LARGE EMERITUS

HARRY WOOLF

ARTIST-IN-RESIDENCE

ROBERT TAUB

SCHOOL ADMINISTRATION

LUCILLE ALLSEN

(retired February 1995)

Administrative Officer, School of Social Science

DEBORAH KOEHLER

Administrative Officer, School of Social Science

MARY JANE HAYES

Administrative Officer, School of Mathematics

SANDRA S. LAFFERTY

Administrative Officer, School of Historical Studies

MICHELLE SAGE

Administrative Officer, School of Natural Sciences

LIBRARY ADMINISTRATION

MOMOTA GANGULI

Librarian, Mathematics and Natural Sciences

ELLIOTT SHORE

Librarian; Historical Studies and Social Science

FARIDAH KASSIM

Associate Librarian, Historical Studies and Social Science

COMPUTER ADMINISTRATION

Strategic Planning Committee for

Computing, Telecommunications and Networking

ALLEN I. ROWE

Committee Convener and Facilitator

DAVID H. SAXE

Campus Network and Telecommunications Engineer

(also Senior Computer Scientist, School of Natural Sciences)

ELLIOTT SHORE

Coordinator of Information Access

ROBERT N. THOMPSON

*Computer Manager, Schools of Mathematics, Historical Studies
and Social Science and administrative departments*

SHELLEY WALTZ

Computer Manager, School of Natural Sciences

To be given the leisure to read and think about a range of related issues, to discuss them with colleagues from different disciplines and various cultural backgrounds, to try to formulate one's thoughts into a series of talks to be given at other topflight American institutions, to be able to come back to the Institute to digest the responses, follow up suggestions about further reading, revise one's ideas with the help of colleagues with whom one is now on terms of familiarity and collaboration – this is not a process whose fruitfulness can be guaranteed or whose results can be exactly measured. I can only say that, on the basis of my experience here (and my familiarity with at least some comparable institutions in other parts of the world), it is hard to imagine a set of conditions more likely to be conducive to creative intellectual work than those provided by the School of Social Science at the Institute.

Member, School of Social Science

REPORT OF THE CHAIRMAN

Over the past 65 years, the Institute for Advanced Study has played a singular role in postdoctoral education and research. To my knowledge, no other institution has maintained the same degree of intellectual and financial autonomy or had quite the same privilege to provide opportunities not generally available elsewhere for the finest scholars, especially those in periods of significant intellectual development and scholarly activity.

With a deep regard for the responsibility this entails, we are embarking on a comprehensive and systematic review of the Institute as a whole. The Decadal Review will address important questions in order to seek to ensure that the Institute's support for scholarship in the future may be as significant as it has been in the past. The next decade will be a critical period for all academic institutions; therefore, we are investigating such issues as the context, environment, and challenges for the world of research and scholarship in the future. Within that framework, what should be the mission of the Institute? And, through a combination of continuity and change, how can we best fulfill that mission?

Under the leadership of Richard Black and Helene Kaplan, the Decadal Review will be undertaken by the entire Board of Trustees, building on and augmenting the reports of the recent Visiting Committees to each of the Institute's Schools. We look forward to the process and to the recommendations.

The terms of four outstanding Trustees concluded this past year, and to each of them we extend our deep appreciation.

Charles L. Brown, former Chairman of AT&T, has been a member of the Institute's Board of Trustees since 1979. For the past nine years he has served as Vice Chairman of the Board and President of the Corporation. He has been a key member or chair of the Budget, Finance, Housing, Nominating, and Executive Committees, and in 1990 he chaired the Search Committee which selected the Institute's current director, Phillip Griffiths. Charlie has been an extraordinary colleague and supporter, and I have depended on his insight, patience, and quiet wisdom time and again. The qualities which distinguished his leadership at AT&T have been abundantly evident to me and all who have served with him these past fifteen years at the Institute. We look forward to his continuing association with the Institute in his role as a Trustee Emeritus.

Hamish Maxwell joined the Board of Trustees in 1989. He served as Chairman and Chief Executive Officer of Philip Morris, Inc. from 1984 to 1991, and since then he has been Chair of the Executive Committee. Hamish has brought a vast and varied experience to our deliberations while seeking from the start to understand this unique institution and to strengthen it. As chair of the Development Committee, he has demonstrated a keen interest in the future of the Institute

and contributed significantly to its welfare by focusing our attention on the critical need to expand our endowment. We are delighted that he too will continue his association with the Board as a Trustee Emeritus.

Paul G. Stern was elected to the Board in 1990. As Chairman and Chief Executive Officer of Northern Telecom, he brought with him a pragmatic understanding of the importance of electronic communication and its role in a global setting. To the pressing needs of the Institute for an expanded telephone system, Paul responded by securing the installation of a state-of-the-art communications system for the entire campus, a fundamental resource that has transformed research and management functions at the Institute. We are greatly in his debt for this and for his loyal friendship and support.

The Honorable A. Leon Higginbotham, Jr., Chief Judge Emeritus of the U.S. Court of Appeals for the Third Circuit, has served on the Institute's Board of Trustees since the spring of 1993. Leon has long been devoted to and deeply involved with significant matters of human rights mediation in both this country and abroad. Although we are saddened that time pressures with regard to these crucial endeavors have forced Leon to resign from the Institute's Board, we greatly appreciate his valuable counsel during the time he spent with us.

At its meeting on October 29, 1994, the Board of Trustees elected two new Board members and one Trustee Emeritus.

Agnes Gund is President of the Museum of Modern Art in New York. She holds an A.B. degree from Connecticut College and a Masters in art history from Harvard. She has an extraordinary record of support and committed service in the arts, education, women's issues, AIDS, and community service. Currently serving as a trustee of Brown University, The J. Paul Getty Trust, and the Studio in a School Association, of which she is a founder, Ms. Gund is also an honorary trustee of the Cleveland Center for Contemporary Art and of Independent Curators, Inc. Last year Hamilton College honored her public service with the degree of Doctor of Humane Letters. She also has received the Award of the American Academy in Rome, the Governor's Award of the State of New York, and the Doris C. Freedman Award given by New York City. In addition to her accomplishments as a patron and benefactor, Ms. Gund frequently juries exhibitions and writes and lectures about contemporary art.

Anne d'Harnoncourt, the George D. Widener Director of the Philadelphia Museum of Art, joined the Board as the Academic Trustee for the School of Historical Studies. She is a graduate of Radcliffe College and holds a Masters in art history from the Courtauld Institute of London University. Her association with the Philadelphia Museum of Art began in 1967, and she has also held appointments at the Art Institute of Chicago and the Tate Gallery. She has organized major exhibitions at the Whitney Museum, the Art Institute of Chicago, and

the Museum of Modern Art, as well as the Philadelphia Museum of Art, and her publications include numerous articles, catalogues and contributions to books. Ms. d'Harnoncourt serves as a trustee of the Henry Luce Foundation and the Fairmount Park Art Association and as advisor to the Stuart Foundation and the Foundation for French Museums. She is a member of the American Philosophical Society, the Mayor's Cultural Advisory Committee in Philadelphia, and the Pennsylvania Council for the Arts. She has previously served on panels for the National Endowment for the Arts and as a trustee of the Hirshhorn Museum.

Wilfried Guth, elected Trustee Emeritus, served as a member of the Board from 1982 to 1992 and was the Institute's first Trustee from Germany. Upon his retirement from the Institute's Board of Trustees, he said, "I have witnessed during the last eight years how the Institute has succeeded in combining faithfulness to a unique and cherished tradition with an open mind for new developments in connection with changing world conditions; the internationalization of the Board of Trustees is just one indication of this." As past Chairman of the Supervisory Board of Deutsche Bank AG, Wilfried brought to our Board an important strategic view and a sophisticated understanding of the importance of higher research. We are delighted to welcome him back.

In the 1995-96 academic year, Leon Levy will succeed Charles Brown as Vice Chairman of the Board and President of the Corporation. Leon, a principal of Odyssey Partners in New York, has been a member of the Board since 1988 and for much of that time he has chaired the Finance Committee. As I continue as Chairman of the Institute's Board and take up my new responsibilities as President of the World Bank, I am certain to rely heavily on Leon's wisdom and good counsel and that of the entire Board of Trustees. In advance, I would like to express my gratitude to them.

In June, Mary Keating concluded a four-year term of service as Chair of the Friends of the Institute for Advanced Study. Under her superb leadership the Friends' support of the Institute increased fourfold. As a vital link to the community, the Friends also have contributed in other significant ways to the vigor and well-being of the Institute. On behalf of the Trustees, I would like to record here our most sincere appreciation to Mary and the members of the Friends' Executive Committee: Enrico Bombieri, Charles L. Brown, James Scott Hill, Charles L. Jaffin, Robert F. Johnston, Immanuel Kohn, Frank E. Taplin, Jr., Judith Ogden Thomson, Gail M. Ullman, and Donald M. Wilson. Judith Thomson will succeed Mary as Chair of the Friends.

There are many to thank for their invaluable contributions to the Institute this past year.

Under the outstanding direction of President Emeritus Hanna Gray of the University of Chicago, the Visiting Committees to the Schools of Mathematics and

Social Science completed their work. We are greatly indebted to Mrs. Gray and to the distinguished members of both Committees for their wise and diligent service, and for the foundation they have laid for the Trustees to undertake the Decadal Review.

I am pleased to say that later in this year we plan to announce formally the George F. Kennan Professorship and Memberships at the Institute for Advanced Study. This new Chair is being established as a tribute to an extraordinary man whose contributions to scholarship and diplomacy are unparalleled. The Kennan Chair in the School of Historical Studies will allow outstanding scholars with new perspectives in history to enrich the life of the Institute through term appointments of up to five years. The Kennan Professors will, like Kennan himself, exemplify the importance of history for understanding contemporary affairs and bring the viewpoints of those who have not only studied history but who have helped to shape it. The Kennan Memberships will bring to the Institute each year two or three scholars whose work falls in the general subject area of the incumbent Kennan Professor. We are deeply grateful to every donor who is encouraging this important Chair through contributions which are helping to match the initial generous challenge.

Finally, on behalf of all the Trustees, I want to express my greatest appreciation to each person who contributes to the work of the Institute – Faculty, Members and former Members (AMIAS), staff, foundations, corporations, and Friends of the Institute. Each and every contributor adds in critical measure. The Institute could not fulfill its mission without your support, and I am exceedingly grateful.

James D. Wolfensohn
Chairman, Board of Trustees

REPORT OF THE DIRECTOR

A good measure of the capable and dedicated leadership with which the Institute for Advanced Study has been guided for nearly two-thirds of a century is the respected place it holds in the scholarly community worldwide. As a Trustee since 1979 and Chairman of the Institute's Board of Trustees since 1985, James D. Wolfensohn represents this leadership at the highest level. We are greatly indebted to him on many counts, not least for his decision to continue his commitment to the Institute while taking on the challenge of leading the World Bank.

It is my pleasure to highlight a few activities of the Institute in the past year in addition to those mentioned by the Schools in their academic reports.

Pianist and scholar Robert Taub began his appointment as the Institute's first Artist-in-Residence. Dr. Taub, a Phi Beta Kappa graduate of Princeton University, was awarded his doctoral degree from The Julliard School while there as a Danforth Fellow. He has taught at Julliard, Drew University, and at Boston's Tanglewood Institute. He has been Artist-in-Residence at the University of California, Davis, and from 1990 to 1992, the Blodgett Artist-in-Residence at Harvard. At the Institute for Advanced Study this past year, Dr. Taub presented a series of concerts in Wolfensohn Hall in which he performed twelve of Beethoven's piano sonatas; all of these were recorded for compact disc. He also gave a series of noon-time talks prior to each of the concerts and continued work on a book he is writing on piano technique. Dr. Taub's presence has added much to the intellectual and cultural life of the Institute, and we are grateful to Professor Glen Bowersock, Chair of the Music Committee, for his part in bringing this highly accomplished musician to our midst. I also want to express appreciation to Dr. and Mrs. William Scheide, Mrs. Edith Blodgett, Merrill Lynch, and the Friends of the Institute for their generous support in making Dr. Taub's appointment and recordings possible.

The School of Natural Sciences hosted a special conference, "Unsolved Problems in Astrophysics," which drew several hundred participants to our campus. Physicists and astrophysicists at the graduate level and beyond explored outstanding questions in astrophysics, focusing particularly on those areas to which scientific attention will most likely be directed in the decade ahead. The conference also marked a special anniversary for Professor John Bahcall, chairman of the conference's scientific organizing committee. Professor Bahcall has been conducting astrophysical research and guiding the educational development of postdoctoral astrophysicists at the Institute for Advanced Study for twenty-five years; we congratulate and thank him for his remarkable accomplishments.

I am sorry to report that Kenneth M. Setton, Professor Emeritus in the School of Historical Studies and a leading scholar of European and Ottoman history, passed away on February 18, 1995. He joined the Historical Studies faculty in 1968 and became Professor Emeritus in 1984. A past president of the Medieval Society of America, Professor Setton was also twice vice president of the American Philosophical Society and three times the recipient of the Society's

John Frederick Lewis Prize. In 1980 he received the Charles Homer Haskins Medal of the Medieval Academy of America and in 1990 the Award for Scholarly Distinction of the American Historical Association. Professor Setton's dedication and generosity of spirit were well known. Among his many contributions to the Institute for Advanced Study were gifts to the Institute's libraries, as well as his extraordinary effort to encourage support by others. He will be greatly missed by all who knew him.

Under the direction of Professor Giles Constable, the School of Historical Studies held a conference honoring the 100th anniversary of the birth of Ernst Kantorowicz, Professor in the School from 1951 to 1963. A leading figure in medieval studies, Professor Kantorowicz's talents as an historical scholar were first recognized in his native Germany in the 1920s and 1930s. He is best known for his brilliant and seminal study, *The King's Two Bodies: A Study in Medieval Political Theology*, published in 1957. This and other work he did while in the United States were the subject of the conference.

Peter Schäfer of the Free University of Berlin began a two-year appointment as the Visiting Mellon Professor to the School of Historical Studies. Professor Schäfer's primary interest is the history of religion, particularly medieval and modern Judaism, and over the course of the year he conducted a series of seminars on "Magic in Religion." This was concluded by a symposium of the same name which included public lectures and attracted a wide audience from both the general public and the academic community. We appreciate The Andrew W. Mellon Foundation's generous support of Professor Schäfer and look forward to his second year at the Institute when he will explore the subject of Messianism.

A number of events were held to celebrate the accomplishments of Professor Emeritus Albert O. Hirschman of the School of Social Science. In November a distinguished group of corporate and financial leaders gathered at the Institute to discuss the principal factors that will influence economic development in the United States and non-OECD countries over the next quarter century. This off-the-record discussion was led by Ernest Stern, Managing Director of the World Bank Group, and Paul A. Volcker, former Chairman of the Board of Governors of the Federal Reserve System, and was moderated by James D. Wolfensohn. In March the Institute co-hosted a corporate executive seminar with The James A. Baker III Institute for Public Policy at Rice University entitled "United States-Mexican Relations and Implications for Hemispheric Trade." Former Secretary of State James A. Baker III and Luis Téllez, Chief of Staff of the President of Mexico, led the seminar, which was also moderated by Mr. Wolfensohn. We thank Baker Institute Director Edward P. Djerejian and Rice University President Malcolm Gillis for the exceptional hospitality they extended to us while we were in Houston.

On April 7, the Institute celebrated Professor Hirschman's eightieth birthday with a special colloquium on his scholarship and influence. Led by Mr. Wolfensohn, the panel included Ruth Cardoso, a professor at the University of São Paulo and First Lady of Brazil; Michael McPherson, Dean of the Faculty and Professor of

Economics at Williams College; Thomas Robinson, First Vice President and Manager of International Investment Strategy, Merrill Lynch; Paul Romer, Professor of Economics at the University of California, Berkeley; Emma Rothschild, Senior Research Fellow, King's College, Cambridge; and Amartya Sen, Lamont University Professor of Economics at Harvard. These events and those esteemed individuals who participated in them are a testament to the immense impact that Professor Hirschman's work as a development economist has had the world over.

In the past decade, the School of Mathematics has expanded its activity into aspects of mathematics connected with applied mathematics, physics, and other sciences. It has established a tradition of giving a special focus to one, or possibly more, aspects of mathematics during each year. Each program is led by one or two of the world's leading figures in the discipline together with a member of the permanent Faculty of the School and a selected group of visiting Members. The common and defining feature of these programs is the presence of promising young mathematicians working in close collaboration with well-established senior mathematicians.

The main focus of 1994-95 was intersection cohomology and automorphic forms, an area in which the Faculty of the School of Mathematics is particularly strong. Professor Robert MacPherson worked closely with James Arthur of the University of Toronto to lead this outstanding year. There was also a program in collaboration with DIMACS and Princeton University focusing on various aspects of computer science. Within this program, there was a workshop on the topic of quantum computing. Another focused activity within the area of applied mathematics was a particularly successful workshop on the mathematical aspects of finance. This workshop attracted over 150 people from both academic and financial institutions. In addition, a special workshop on applied kinetic theory was organized by the School.

It was my pleasure to attend the 1995 summer session of the Institute for Advanced Study/Park City Mathematics Institute (PCMI) in Park City, Utah. The mission of the PCMI program is to improve mathematics education at all levels through vertically integrated exposure to contemporary mathematics. Administrative direction is provided by the Institute for Advanced Study, and several of our Faculty and Members have leading roles in the summer meetings. In the spring, the Institute hosted a two-week mentoring program for women participants in the PCMI session in Park City. A detailed summary of the PCMI follows my report, but I would like to acknowledge here the National Science Foundation and the Geraldine R. Dodge Foundation for their generous support of this program. I also thank the dedicated group of mathematicians who serve on the PCMI Steering Committee, as well as my colleagues on the Oversight Board.

Last November the Institute hosted a ceremony to present the 1994 New Europe Prizes, a program begun a year earlier to encourage the establishment of indigenous centers for scholarship in the countries of Eastern Europe and the

former Soviet Union. With very generous funding from the John D. and Catherine T. MacArthur Foundation, the Fritz Thyssen Stiftung, and several European governments, the directors of six West European and United States institutes have established a series of annual monetary prizes to be awarded to scholars from Eastern Europe who previously have been visiting members at one of our six institutes. The awards are to be used to help build new infrastructure for scholarship through specific means such as library acquisitions, support for travel, and grants to young scholars. The New Europe Prize recipients for 1994 are linguists Petr Pit'ha of Prague and Katalin Kiss of Budapest. In addition to hosting the ceremony, the Institute was the site for a two-day meeting of the six directors.

Director's Visitors this past year included molecular biologists Maxine Singer, President of the Carnegie Institution of Washington, and Paul Berg, Director of the Beckman Center for Molecular and Genetic Medicine; John Noonan, Judge of the U.S. Court of Appeals for the Ninth Circuit; mathematician William Fulton of the University of Chicago; Tom Siegfried, science writer for *The Dallas Morning News*; John Noble Wilford, science writer for *The New York Times*; Sir John Thomson, Chairman, Minority Rights International; and Mark Pauly, Bendheim Professor and Vice Dean, Wharton Doctoral Program and Professor of Health Care Systems, The Wharton School of the University of Pennsylvania.

Over the past year the Institute has been cooperating with the Institute Lands Preservation Committee, an alliance of nonprofit environmental, historical, and civic associations. The Committee is seeking to purchase the development rights to 589 acres of Institute woodlands and farm fields in conjunction with a permanent deed restriction for conservation. The development rights are valued at \$16.3 million, and the New Jersey Green Acres program has enhanced the project's viability with a commitment of \$10 million in direct and matching grants and loans.

The Institute's contributions to scholarship are well reflected in the narrative reports prepared by the Schools and individual Faculty. Reflected too, I believe, is evidence of the fulfillment of the Institute's mission of providing opportunities for scholars to conduct research in the most favorable environment possible. At the end of each year, Members are asked to submit reports of their activities and accomplishments, and I am pleased to share with you a typical quote from one of these: "All in all, it was the perfect sabbatical year, and I shall be living off the intellectual capital accumulated here for some years to come."

Finally, to all whose contributions, in whatever form or amount, have helped to sustain and strengthen the Institute, I wish to express my gratitude and that of the entire Institute community. I also acknowledge and thank those who have worked, often for many years, to build and maintain the Institute's strength: the Faculty, Trustees, Members and former Members, the Friends of the Institute, and our staff.

Phillip A. Griffiths
Director

INSTITUTE FOR ADVANCED STUDY/PARK CITY
MATHEMATICS INSTITUTE

The Institute for Advanced Study is in its second year of sponsorship of the IAS/Park City Mathematics Institute (PCMI), a flagship mathematics program which is built on the fundamental theme that interaction among researchers, graduate students, undergraduate students, and high school teachers of mathematics is essential to the optimum functioning of the mathematical enterprise.

The 1995 summer session of the PCMI was held in Park City, Utah, from July 9-29. The summer session brings together high school teachers of mathematics, undergraduate and graduate students, and researchers to participate in distinct but overlapping programs. The summer session is linked to a year-long program in six university-based sites where participating high school teachers work in collaboration with faculty at Clark Atlanta University, Duke University, Idaho State University, Purdue University, Rice University and the University of Louisville. The 1996 summer session will be held at the Institute for Advanced Study in Princeton, New Jersey, from June 23 to July 13.

The 1995 topic for the 51 students attending the Graduate Summer School and the 33 researchers in the Research Program was Nonlinear Wave Phenomena. The Research Program, aimed at mathematicians already carrying out research, has at most one organized activity each day. Topics for additional workshops and working groups are chosen by participants. The following intensive short lecture courses were offered in the Graduate Summer School: *Nonlinear Schrödinger Equations*, Jean Bourgain, Institute for Advanced Study; *Harmonic Analysis, Wavelets and Applications*, Ingrid Daubechies, Princeton University; *Nonlinear Waves: Patterns, Oscillations, Singularities, and Stochasticity*, David W. McLaughlin, Courant Institute; *Waves in Random Media*, George Papanicolaou, Stanford University; and *High Frequency Nonlinear Hyperbolic Waves*, Jeffrey B. Rauch, University of Michigan.

Twenty selected students attended the Undergraduate Program designed to enhance their interest in mathematics in general and nonlinear wave phenomena in particular. The following courses were offered: *An Introduction to Linear and Nonlinear Waves*, Roger Knobel, University of Texas-Pan American; *An Introduction to Solitons*, Steve Cox, Rice University; and *The Computation of Linear and Nonlinear Waves*, Dick Palais, Brandeis University.

Thirty-eight high school teachers worked with researchers and educators to widen their knowledge of mathematics and explore new methods of teaching. The following courses were offered: *Building Mathematics in the Classroom*, Naomi Fisher, University of Illinois at Chicago and Cynthia Hays, McCallum High School (Austin, Texas); *Technology for Teaching Mathematics*, James King, University of Washington; and *Advanced Mathematics*, John Polking, Rice University and John Gilbert, University of Texas at Austin.

In addition, there were several all-Institute lectures: *Mathematics, Music, and Waves*, Robert Bryant, Duke University; *Nonlinear Waves in Traffic*, Barbara Keyfitz, University of Houston; *Shock Waves and Some Recent Problems*, Cathleen Morawetz, Courant Institute; and *Surface Water Waves*, Katherine Socha, Oregon State University.

The IAS/Park City Mathematics Institute is governed by an Oversight Board that consists of Hyman Bass, Academic Trustee, School of Mathematics, Institute for Advanced Study and Adrain Professor of Mathematics, Columbia University; Luis A. Caffarelli, Professor, School of Mathematics, Institute for Advanced Study; Ronald L. Graham, Adjunct Director, AT&T Bell Laboratories; Phillip A. Griffiths, Director, Institute for Advanced Study; Shirley A. Hill, Professor, University of Missouri - Kansas City; William A. Schreyer, Chairman Emeritus, Merrill Lynch & Co., Inc.; and Elaine Wolfensohn.

Members of the Steering Committee oversee the day-to-day operation of the PCMI as follows:

Convener:

John C. Polking, Professor, Rice University

1995 Organizers:

Luis A. Caffarelli, Professor, Institute for Advanced Study

Weinan E, Professor, Courant Institute

Research Program:

John Morgan, Professor, Columbia University

Research Program/Women's Program:

Karen Uhlenbeck, Professor, University of Texas at Austin

Graduate Summer School:

David R. Morrison, Professor, Duke University

Undergraduate Program:

Robert L. Bryant, Professor, Duke University

Steven J. Cox, Professor, Rice University

High School Teachers Program:

Joan Ferrini-Mundy, Professor, University of New Hampshire

Naomi Fisher, Co-Director, MER Network, University of Illinois at Chicago

Cynthia Hays, High School Teacher of Mathematics, Austin, Texas

Frank K. Lester, Jr., Professor, Indiana University

High School Teachers Program/Computer Program:

James R. King, Professor, University of Washington

Recruitment:

Jacqueline Looney, The Andrew W. Mellon Foundation

Continuing Outreach Program:

Herbert C. Clemens, Professor, University of Utah

Editor, PCMI Lecture Series:

Daniel S. Freed, Professor, University of Texas at Austin

MENTORING PROGRAM FOR WOMEN IN MATHEMATICS

Women undergraduate and graduate students participating in the IAS/Park City Mathematics Institute summer session attended a preliminary workshop at the Institute for Advanced Study from May 15-25. The workshop provided a combination of lectures, seminars, working problem groups, mentoring and networking sessions and the opportunity to meet and interact with leading mathematicians. The program was organized by Chuu-Lian Terng, Northeastern University and Karen Uhlenbeck, University of Texas at Austin. The undergraduate lecture was *Vibrating Strings, Beams and Membranes: Finding Their Properties from Nodes or Nodal Lines*, Joyce McLaughlin, Rensselaer Polytechnic Institute; the graduate lectures were *Topics in Fluid Dynamics*, Susan Friedlander, University of Illinois at Chicago and *Nonlinear Hyperbolic Partial Differential Equations*, Barbara Keyfitz, University of Houston.

Guest lecturers included: Suncica Canic, Iowa State University, *Reflections of Shock Waves*; Fan Chung, University of Pennsylvania, *The Essence of Waves and Graphs*; Karen Clark, Trenton State College, *Introduction to Composite Materials*; Sarah Greenwald, University of Pennsylvania, *Zippers and Velcro: The Geometry of Surfaces*; Smadar Karni, Courant Institute, *Numerical Methods for Compressible Interfaces*; Katherine McCall, Los Alamos National Laboratory, *Hysteresis, Discrete Memory, and Nonlinearity in Rocks*; Jane Cronin Scanlon, Rutgers University, *Mathematical Models of Cardiac Components*; Karen Uhlenbeck, University of Texas at Austin, *Bäcklund Transformations Revisited*; and Lan Wang, Institute for Advanced Study, *Diophantine Approximation*.

The Mentoring Program for Women in Mathematics is sponsored by the Institute for Advanced Study and made possible through generous support from the National Science Foundation. The Mentoring Program is an activity of the Institute for Advanced Study/Park City Mathematics Institute, which is supported through grants from the National Science Foundation and the Geraldine R. Dodge Foundation.

My one-year visit to the Institute for Advanced Study has been extremely fruitful and profitable in my research, interdisciplinary collaborations, and professional activities. When I first started my visit, my work was in a critical stage of developing the interactions of spectral graph theory and spectral Riemannian geometry. This involves a “fusion” of the concepts and the techniques from both the discrete and continuous worlds. The results of my research are included in several finished and unfinished papers ranging from deriving new spectral bounds for Riemannian manifolds to developing powerful methods in capturing the discrete invariants with many applications in randomized approximation algorithms and combinatorial optimization.

I have greatly enjoyed working and talking with many people here at IAS. With Professor Langlands, we first examined generalizations and variation of combinatorial Laplacian for graphs with vertex weights that came up in studying Bethe Ansatz and a short note was written on this result. Further discussions led to interesting applications in conformal field theory using generalizations of Kirchhof’s matrix-tree theorems for graphs. We are now rewriting the short note to include the matrix-tree theorems for Dirichlet eigenvalues of graphs.

With Professor Bombieri, I have enjoyed frequent stimulating discussions on current trends and developments in mathematics and computer sciences. In particular, discussions on some of the combinatorial problems arising in enumerating solutions of algebraical equations for which I found some solutions. We organized the workshop on Quantum Computing in December and IAS was the ideal place for such new topics that require interdisciplinary efforts. The staff provided excellent support for the workshop.

From Professor Spencer, I have learned many extremely interesting new combinatorial problems from the viewpoint of statistical physics. There is a great deal of overlap between random walks in the combinatorial and computational sense and the traditional random walks on lattices. In sum, I found many people here sharing my research interests and I have benefitted very much from the interactions. I also helped organize the weekly combinatorics/complexity seminar and we had many excellent speakers bringing in new and exciting developments.

Member, School of Mathematics

ACKNOWLEDGMENTS

The Institute for Advanced Study expresses its deepest appreciation for all gifts and grants to its endowment and capital funds, for annual operating support, and for in-kind contributions. Special gratitude is extended to the following individuals and organizations who were major donors to the Institute during the Fiscal Year 1995.

AMIAS (Association of Members of the Institute for Advanced Study)

- Archer Daniels Midland Foundation
- Bankers Trust Foundation
- Hyman Bass
- Richard B. Black
- The Blodgett Foundation
- Botwinick-Wolfensohn Foundation
- Bristol-Myers Squibb Pharmaceutical Research Institute
- Mr. and Mrs. Charles L. Brown
- James E. Burke
- The Edward T. Cone Foundation
- Mary S. and Theodore L. Cross
- Joseph F. Cullman 3rd
- The Gladys Kriebel Delmas Foundation
- Elizabeth and J. Richardson Dilworth
- Geraldine R. Dodge Foundation
- The Harmon Duncombe Foundation
- Sherman Fairchild Foundation Inc.
- Friends of the Institute for Advanced Study
- The Fuji Bank, Limited
- The Horace W. Goldsmith Foundation
- The Florence Gould Foundation
- Marian and Phillip Griffiths
- The Harry Frank Guggenheim Foundation
- Doris and Ralph E. Hansmann
- Gerda Henkel Stiftung
- Carl B. Hess
- HKH Foundation
- James R. Houghton
- J. Seward Johnson, Sr. Charitable Trusts
- Helene L. and Mark Kaplan
- Immanuel Kohn
- Marie-Josée Kravis and Henry R. Kravis
- The Kresge Foundation
- Leon Levy
- The John D. and Catherine T. MacArthur Foundation
- Hamish Maxwell
- The Andrew W. Mellon Foundation
- Joyce and Robert Menschel
- Merrill Lynch
- Microsoft Corporation
- The Ambrose Monell Foundation
- Nathan P. Myhrvold
- National Aeronautics and Space Administration
- National Endowment for the Humanities

National Science Foundation
NEC Research Institute
State of New Jersey
Blanchette Hooker Rockefeller Fund
William H. Scheide
Martin E. Segal
Elinor M. Siner
Alfred P. Sloan Foundation
Space Telescope Science Institute
Robert D. Stuart, Jr.
Peggy and Frank E. Taplin, Jr.
Task Foundation, Inc.
Texas National Research Laboratory Commission
Trustees of the Institute for Advanced Study
Gail and Richard Ullman
United States Department of Energy
Ladislaus von Hoffmann
John C. Whitehead
Susan and Donald Wilson
Mr. and Mrs. James D. Wolfensohn
Brian F. Wruble
and
other donors who wish to remain anonymous

BEQUESTS

The Institute acknowledges with special gratitude the important bequests of M. Alison Frantz and Dorothy Perlow.

FRIENDS OF THE INSTITUTE

Our sincere gratitude is extended to all Fiscal Year 1995 contributors.

DIRECTOR'S CIRCLE

Mr. and Mrs. Charles L. Brown
Mr. and Mrs. Morton Collins
Sally and Jim Hill
Mr. and Mrs. Charles L. Jaffin
Mr. and Mrs. J. Seward Johnson, Jr.
Mr. and Mrs. Immanuel Kohn
Mr. and Mrs. John S. Reed
Louise and John Steffens

FRIENDS

Sheila and Stephen Albert
Mr. and Mrs. Julian J. Aresty
Mr. and Mrs. William G. Bardel
Dr. and Mrs. Eric Baum
Dr. and Mrs. Leonard E. Baum

- Mr. and Mrs. B. Richard Benioff
 Mariana T. Berry
 G. H. Besselaar
- Dr. and Mrs. B. C. Bhattacharya
 Richard Bilotti
 Corinne Black
 Raymond A. Bowers
 Addie and Harold Broitman
 Mary and William Bundy
 Claire M. Burns
- Mr. and Mrs. Nathaniel Burt
 Betty Wold Johnson and Douglas F. Bushnell
 Barbara and John Chancellor
- Mr. and Mrs. Martin A. Chooljian
 Mr. and Mrs. Ansley J. Coale
 Edward T. Cone
- Mr. and Mrs. Thomas P. Cook
 Mary S. and Theodore L. Cross
 George F. Cumbler
 Michael J. D'Amore
- Professor and Mrs. Sebastian de Grazia
 Rysia de Ravel
 Katherine and Robert Del Tufo
- Elena V. Alexeeva and Pierre R. Deligne
 Mr. and Mrs. James R. Deneen
- Mr. and Mrs. Charles P. Dennison
 Mr. and Mrs. Samuel J. deTuro
 Hanni and Jack Ellis
 E. S. Ettinghausen
- Wendy Pierce Evans and Larry Evans
 M. Alison Frantz (deceased February 1, 1995)
 Evelyn and Robert Geddes
- Mr. and Mrs. Aristedes W. Georgantas
 Ann and Walter Gips
- Mr. and Mrs. Carl Bennett Good
 Mr. and Mrs. William Greenberg
 Mr. and Mrs. Ward S. Hagan
 Mr. and Mrs. Harleston Hall, Jr.
 Leonard M. Harlan
- Dr. and Mrs. Robert H. Harris
 Karen and Peter Hegener
- Drs. Frances and Simeon Hutner
 Mr. and Mrs. Charles Issawi
 Mary Lee and Thomas Jamieson
 Stephen C. Johnes
- Mr. and Mrs. Robert F. Johnston
 Peggy and Alan Karcher
 Mary P. Keating
 Suzanne Keller
- Mr. and Mrs. Robert R. Kobak
 Lori Versaci and Gary Krog
 Patricia and George Labalme
 Weezie and Sam Lambert
 Peter Lawson-Johnston
 Judy and Robert Levine
 Sharon and Frank Lorenzo

Mr. and Mrs. Robert W. Loughlin
 Peter and Marlene Lucchesi
 Jane L. and Robert S. MacLennan
 Nancy and Duncan MacMillan
 Cynthia MacNeille
 Ms. Emily Rose and Professor James H. Marrow
 Eleonore B. McCabe
 Mr. and Mrs. James R. McCredie
 Joseph F. McCrindle
 Charles W. McCutchen
 Jackie and Cy Meisel
 Mr. and Mrs. F. Merle-Smith
 Elizabeth L. Mills
 Rosemary and James O'Brien
 Mr. and Mrs. James A. Perkins
 Mr. and Mrs. Giorgio Petronio
 Elizabeth Stetson and William D. Pettit
 George W. Pitcher
 Dorothy and Charles Plohn, Jr.
 Mr. and Mrs. R. H. Pollack (deceased November 1, 1994)
 Professor and Mrs. T. Alexander Pond
 Mr. and Mrs. Richard G. Poole
 Anne and John Rassweiler
 Mr. and Mrs. Sidney Ratner
 Millard McAdoo Riggs, Jr.
 Laura and William Riley
 Harriet and David Robertson
 Mr. and Mrs. William R. Robins III
 Dr. and Mrs. Leon E. Rosenberg
 Mr. and Mrs. Frederic Rosengarten, Jr.
 Mr. and Mrs. William M. Roth
 Mr. and Mrs. William H. Scheide
 William A. Schreyer
 Mr. and Mrs. David Sengstack
 Janet and Winthrop Short
 Mr. and Mrs. Fred P. Slivon, Jr.
 Mr. and Mrs. Stanley Smoyer
 Margaret R. Spanel
 Eleanor and Lewis Spence
 Swartz Foundation
 Mr. and Mrs. Frank E. Taplin, Jr.
 Dorothy Morgenstern Thomas
 Judith and John Thomson
 Kathrin W. Poole and Howard H. Tomlinson
 Richard B. Tomlinson
 Mr. and Mrs. Charles C. Townsend, Jr.
 Mr. and Mrs. Benjamin B. Tregoe
 Gail M. and Richard H. Ullman
 Mr. and Mrs. Jay Vawter
 Dr. and Mrs. Fong Wei
 Caroline and F. Helmut Weymar
 Laura and Roscoe White
 Governor Christine Todd Whitman and Mr. John R. Whitman
 Susan and Donald Wilson
 Dr. and Mrs. Joseph P. Zawadsky

THE SCHOOL OF HISTORICAL STUDIES

Faculty

GLEN W. BOWERSOCK
GILES CONSTABLE
OLEG GRABAR
CHRISTIAN HABICHT
IRVING LAVIN
PETER PARET [*Andrew W. Mellon Professor*]

Professors Emeriti

MARSHALL CLAGETT
GEORGE F. KENNAN
KENNETH M. SETTON (deceased February 18, 1995)
HOMER A. THOMPSON
MORTON WHITE

The School of Historical Studies is concerned principally with the history of Western and Near Eastern civilization. Within this wide area of study, a large range of topics has been explored at one time or another by Faculty and Members, but the emphasis has been particularly strong in the fields of Greek and Roman civilization, medieval and modern European history, Islamic culture, 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 most closely associated with the development of the field of iconology.

Three additional appointments strengthened the field of classical and Near Eastern 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 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 interest 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 the Soviet Union, in Soviet 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 E. Gilliam; medieval history of the Latin East, Venice, and the relations between the Papacy and the Levant, by Kenneth M. Setton; and 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 Members. More than a thousand Members have come to the School since its founding. 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

FACULTY

Since June 1994 GLEN BOWERSOCK published three books: *Fiction as History – Nero to Julian* (University of California Press), *Studies on the Eastern Roman Empire* (Keip Verlag), and *Martyrdom and Rome* (Cambridge University Press). He also published five articles including an extensive memoir on his late teacher, Sir Ronald Syme (in the *Proceedings of the British Academy*). Professor

Bowersock's *Roman Arabia* was re-issued in paperback in a second edition, and his *Hellenism in Late Antiquity* was translated into Greek for publication in Athens in 1995.

During the academic year Professor Bowersock participated in various colloquia and conferences. At Harvard University he gave a paper on "The Barbarism of the Greeks" during a conference entitled "Greece in Rome." He also spoke on this theme to the Centre Gustave Glotz in the University of Paris I. He went to Capri for an international discussion of the newly discovered Tiberian inscription, *Senatus Consultum de Pisone patre*, and he presented a paper to the colloquium at Heidelberg on "Theorie und Geschichte der Fragmentsammlungen." He also delivered a lecture at the Dumbarton Oaks Symposium on Byzantine Palestine and Transjordan. After participating in a conference on "Historiography in North America" in the Republic of San Marino, he lectured in the School of Roman Jurisprudence in the University of Florence.

Professor Bowersock served on the *jury* for the *soutenance de thèse* of a candidate for the *Doctorat d'état* at the Sorbonne in Paris. With Professor von Staden of Yale University he carried out an evaluation of the Classics Department in the University of Toronto. He served as well on the newly organized Committee on Studies of the American Academy of Arts and Sciences, and he continued as a member of the Publications Committee and Council of the American Philosophical Society. In December 1994 he was elected *correspondant étranger* of the Académie des Inscriptions et Belles-Lettres (Institut de France).

During the academic year 1994-95 GILES CONSTABLE published *Three Studies in Medieval Religious and Social Thought*, the introduction to *Medieval Scholarship: Biographical Studies on the Formation of a Discipline*, an article on preaching in the twelfth century, and two memoirs for Dom Jean Leclercq. In February he was a member of a committee considering the granting of a PhD in Medieval Studies by the Central European University in Budapest, where he also lectured. He spoke at the University of Wisconsin, gave a Faculty Lecture at the Institute for Advanced Study, addressed conferences at Yale University, Ohio State University, Princeton University, and the University of Montana, and spoke and presided at a session of the conference on the council of Clermont in 1095 at Clermont-Ferrand. He spoke at the memorial service for John Boswell in New Haven and attended scholarly meetings in Philadelphia and New Brunswick. He organized a conference in honor of the 100th anniversary of Ernst Kantorowicz's birth and also organized a meeting of the Delaware Valley Medieval Association at the Institute for Advanced Study. In the second semester he taught a course with Professor John Fleming at Princeton University.

OLEG GRABAR was chosen as a member of the UNESCO committee on Jerusalem and spent a week on a fact-finding trip involving the Holy Sepulchre. He lectured at the opening of an exhibition of Islamic manuscripts at Firestone

Library, Princeton University, and at the meeting of the American Philosophical Society, chaired a symposium in the Hellenic Center at Princeton University, summarized the proceedings of a meeting on Islamic urbanism in Casablanca, received an award from the Center for Environmental Research in Rome, gave four lectures at the Collège de France in Paris, led seminars at the Universities of Strasbourg and Aix-en-Provence, gave one of the keynote addresses for a retreat of the Smithsonian Institution staff, chaired a session of the Medieval Academy of America, gave a lecture at the Dumbarton Oaks symposium in Washington, participated in the deliberations of the Publications Committee of the American Philosophical Society, and met in Geneva with the scientific committee of the Max van Berchem Foundation. His publications included: "Different but Compatible Ends, The Object of Art History," *The Art Bulletin*, LXXVI (1994), pp. 396-399; "Remarques sur l'Enciclopedia dell' Arte Medievale," *L'Architettura Medievale in Sicilia: La Cattedrale Di Palermo* (Roma, 1994), pp. 17-22; "The Mosque in Islamic Society Today," *The Mosque*, ed. Martin Frishman and Hasan Uddin Khan (Thames and Hudson Ltd., London, 1994), pp. 242-245.

CHRISTIAN HABICHT read proofs of his new book *Athen, Die Geschichte der Stadt in hellenistischer Zeit*, to be published by C. H. Beck in September 1995, and prepared the index. The Harvard University Press is preparing an English edition and has submitted samples of three different translations to the author for his assessment. Habicht's book, *Cicero the Politician*, has been translated into Japanese and will shortly be published in Japan.

In September 1994, Professor Habicht participated in a symposium sponsored by the German Archaeological Institute at Athens to commemorate H.G. Lolling, who died in 1894. He spoke on "Lolling in Thessaly, 1882" and submitted this paper and another one for the memorial volume.

From April to July 1995, Christian Habicht was Visiting Professor at his *alma mater*, the University of Hamburg. During that period he also gave lectures or seminars at the universities of Zürich, Neuchâtel (at the annual meeting of the Association of Swiss Classicists), Fribourg, Bonn, Regensburg, Augsburg, and Hannover. Lack of time forced him to decline invitations to Munich, Würzburg, Freiburg, Rostock, and Bern. In April 1995, Christian Habicht was one of six speakers invited to an international conference held at All Souls College, Oxford, in commemoration of the anniversary of the death of Louis Robert (Collège de France) in 1985. He spoke on "Louis Robert and the epigraphy of Samos."

He published five papers and had others accepted for publication. He continued to serve on editorial boards, on the committee on membership of the American Philosophical Society and on the committee to supervise the work of the *Inscriptiones Graecae* of the Berlin-Brandenburgische Akademie der Wissenschaften.

IRVING LAVIN was a panelist at the World Economic Forum at Davos, Switzerland, in January 1995 and participated in a symposium commemorating Richard Krautheimer sponsored by the City of Rome in February. In April, he participated in the inauguration of the new Warburg Stiftung at the University of Hamburg. He lectured in a seminar on the Renaissance sponsored by the University of Ferrara, delivered a series of lectures at the Istituto Italiano per gli Studi Filosofici in Naples, and contributed to a colloquium on the historiography of Baroque culture at the Escorial, sponsored by the University of Madrid. Presentations of the Italian edition of his book, *Passato e presente nella storia dell'arte*, Turin, 1994, were held at the University of Venice and at the Accademia Nazionale dei Lincei in Rome.

Professor Lavin continued to organize the series of colloquia in the history of art sponsored by the School of Historical Studies. He also continued his services to several organizations and institutions, specifically as chairman of the U.S. National Committee for the History of Art, as a member of the executive committee of the Comité International d'Histoire de l'Art and the Board of Directors of the College Art Association. He served 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*.

Professor Lavin's publications during 1994-95 included *Erwin Panofsky. Three Essays on Style*, Cambridge, MA and London, 1995, and *Picassos Stiere, oder die Kunstgeschichte von hinten*, Berlin, 1995.

PETER PARET continued to work in two broad and related areas: the history of European culture and the interaction of art with society and politics. He published "Ernst Cassirer und neuere Richtungen der Kulturgeschichte in den Vereinigten Staaten," in *Internationale Zeitschrift für Philosophie*, IV, 2 (1994), which has been reprinted in *Ernst Cassirer: Kulturkritik im 20. Jahrhundert*, ed. Enno Rudolph, Munich, 1995; "Betrachtungen über deutsche Kunst und Künstler im Ersten Weltkrieg," in *Kultur und Krieg*, ed. Wolfgang J. Mommsen, Munich, 1995; "Kolberg as Film and as Historical Document," in *Historical Journal of Film, Radio, and Television*, XIV 4 (1994), which is being reprinted in *World War II: Film and History*, eds. John Chambers and David Culbert, New York, 1995; and "Berlin au temps de Menzel," the introductory essay of the catalogue of the exhibition of the work of Adolph Menzel, organized by the Nationalgalerie in Berlin, which will travel from the Musée d'Orsay in Paris to the National Gallery in Washington and to the Nationalgalerie in Berlin. The essay will also appear in English and German versions. Among his shorter pieces was an article in the *Frankfurter Allgemeine Zeitung* on the conference at the Institute for Advanced Study in November 1994 on the work of Ernst Kantorowicz, who was a member of the Faculty of the School of Historical Studies from 1951 to 1963.

During the academic year Professor Paret completed his two-year appointment as Senior Fellow of the Rutgers University Center for Historical Analysis. He continued to serve as a member of the Council of the American Philosophical Society and as chairman or member of four of the Society's committees, as well as a member of other scholarly institutions in this country and in Europe. He was awarded the honorary degree of Doctor of Letters by the University of South Carolina, where he had given a series of lectures and seminars in 1992.

PROFESSORS EMERITI

MARSHALL CLAGETT's Volume II of his *Ancient Egyptian Science* was published in April 1995 by the American Philosophical Press. Professor Clagett continues work on Volume III here and abroad.

GEORGE KENNAN has continued to use his office at the Institute and to contribute to the discussion of the subjects in which he has taken special interest.

A volume devoted to a history of the Slavic and Baltic Library Resources at the New York Public Library and published in 1994 contained, as its preface, the address Professor Kennan had delivered at a ceremony honoring that section of the library.

He also completed an article, to appear shortly in a prominent national periodical, on the history and present status of relations between the Russian center and Russia's immediate geographic and political environment.

A book entitled *At a Century's Ending*, consisting of some forty of his recent works of less than book size, has now been prepared and edited and is scheduled to appear in February 1996.

At the request of the Secretary of State, Professor Kennan inaugurated, by an initial lecture, an annual lectureship established in his own name by the National Foreign Affairs Training Center in Washington. The lecture was subsequently published in *Foreign Affairs*.

In February 1995 he gave an interview to the National Public Radio on the subject of the Yalta Conference of 1946. In March 1995 he gave a radio interview for *The World Tonight* program of the BBC, on the subject of the origins of the Cold War. He also gave a video interview to Claypoint Productions on the subject of Robert Oppenheimer and the various charges once raised with respect to his loyalty and integrity.

In April 1995 the American Philosophical Society conferred upon Professor Kennan its highest award for achievement in the humanities, social sciences or the arts: the Thomas Jefferson Medal, authorized by the United States Congress in connection with the Society's 250th anniversary. He is the second faculty

member of the School to receive this medal, which was awarded to Professor Peter Paret in 1993.

There were further established in Professor Kennan's name: by the National War College, a chair in National Security Strategy; by the National Committee on American Foreign Policy, the Committee's Award for Distinguished Public Service; and by the Institute for Advanced Study, a Professorship and three Memberships in the School of Historical Studies.

KENNETH M. SETTON died on February 18, 1995. He was 80 years of age. Almost until the end of his life he continued working on his monumental study of the relations between East and West, especially the papacy and Venice, down to the seventeenth century.

HOMER A. THOMPSON. The program for the publication of the results of the excavation of the Athenian Agora by the American School of Classical Studies has been advanced by the appearance in 1995 of Vol. XXVII which is devoted to the pre-Hellenistic buildings on the east side of the Agora. Most significant among them is a series of structures now identifiable as lawcourts. The first buildings in Athens so identifiable, they date from the 5th to the 3rd century B.C., the golden age of Athenian forensic oratory. The volume, authored by Professor Rhys F. Townsend, is based in large part on excavation directed by Professor Thompson who has followed closely the subsequent study.

MORTON WHITE has recently completed the first draft of a book on which he has been working for some time. It is simultaneously an autobiography, a study in the history of ideas, and a product of Professor White's effort to reflect critically on his own work and the related work of others during the last sixty years. In it he links his development as a philosopher and historian of ideas with certain aspects of his personal life, with several influential currents of thought in the twentieth century, and with certain dramatic events in the history of higher learning in America – especially a few in which he has actively participated.

THE SCHOOL OF HISTORICAL STUDIES

MEMBERS, VISITORS AND RESEARCH STAFF

JONATHAN BERKEY
Medieval Islamic History
Davidson College

ANTHONY R. BIRLEY
Roman History
Universität Düsseldorf . *f*

PHILIPPE BORGEAUD
History of Ancient Greek and Roman Religions
Université de Genève . *s*

CHRISTOPHER R. BROWNING
Modern European History
Pacific Lutheran University . *s*

DONALD A. BULLOUGH
Early Medieval History
St. Andrews . *v*

NEITHARD BULST
Social and Institutional History of the Middle Ages
Universität Bielefeld . *f* . *vs*

MICHAEL CHAMBERLAIN
Medieval Islamic History
University of Wisconsin-Madison

ANNE L. CLARK
Medieval Christianity
The University of Vermont

GETZEL M. COHEN
Ancient History
University of Cincinnati . *f*

ALBERT DEROLEZ
Codicology, Medieval Culture
University of Ghent . *s*

JONATHAN DEWALD
Early Modern European History
State University of New York at Buffalo

MARIBEL FIERRO
History of Islam
Instituto de Filologia CSIC

DAVID FRANKFURTER
Religions of Graeco-Roman Egypt
College of Charleston

MICHAL GAWLIKOWSKI
Near Eastern Archaeology
University of Warsaw

THOMAS M. GREENE
English and Comparative Literature
Yale University

RAB HATHFIELD
Italian Renaissance Art
Syracuse University in Italy

JEFFREY HERF
Modern German History
Urbana, Illinois

GABRIEL HERMAN
Ancient History
The Hebrew University . *f* . *vs*

RENATA HOLOD
Islamic Studies
University of Pennsylvania . *v*

SIMON HORNBLOWER
Ancient History
Oriental College

JOHN HORNE
20th Century French History
Trinity College

SARAH ILES JOHNSTON
Ancient Religion
The Ohio State University . *s*

LISA KALLET-MARX
Greek History
University of California, Santa Barbara

MATTHEW T. KAPSTEIN
Philosophy of Religion
Columbia University

HANS G. KIPPENBERG
History of Religions
Universität Bremen . *f*

ANDREW LEES
Modern European Intellectual and Social History
Rutgers University-Camden . *s*

- KATERINI LIAMPI
Numismatics and History of the Ancient World
The National Hellenic Research Foundation . *f*
- ALEXEI LIDOV
History of Art
Centre for Eastern Christian Culture
- STEVEN MANSBACH
History of Art
Center for Advanced Study in the Visual Arts . *f*
- GUIDO MARNEF
Urban Reformation History
University of Antwerp . *s*
- JURGEN MIETHKE
Late Medieval History
Universität Heidelberg
- HUBERT MORDEK
Medieval History
Universität Freiburg . *f*
- ANN E. MOYER
Renaissance Italy
University of California, Santa Barbara
- ROBERT R. PALMER
18th Century European History
Princeton . *v*
- MARCEL A. PIÉRART
History of Greece, Greek Epigraphy
Université de Fribourg
- WILLIAM L. PRESSLY
18th and 19th Century European Art
University of Maryland at College Park
- ANNE REYNOLDS
Renaissance Rome
University of Sydney . *vs*
- MICHAEL RICHTER
Medieval History
Universität Konstanz . *f*
- BRENT D. SHAW
Imperial Rome
The University of Lethbridge
- PHILIP M. SOERGEL
Early Modern European History
Arizona State University
- PETER SPRINGER
History of Art
Universität Oldenburg
- BRIAN BRACE TAYLOR
History of Architecture and Planning
École d'Architecture Paris-Belleville
- MARY LEE TOWNSEND
Modern European Cultural History
The University of Tulsa . *vs*
- FRANS VAN LIERE
Medieval History
Institute for Advanced Study . *a*
- HENDRIK S. VERSNEL
Religions of the Graeco-Roman World
Leiden University . *f*
- LINDA EHRSAM VOIGTS
Old and Middle English
University of Missouri-Kansas City . *s*
- ROBERT WENNING
Palestinian Archaeology
Universität Münster

THE SCHOOL OF MATHEMATICS

Faculty

ENRICO BOMBIERI [*IBM von Neumann Professor*]
JEAN BOURGAIN
LUIS A. CAFFARELLI
PIERRE DELIGNE
ROBERT P. LANGLANDS [*Hermann Weyl Professor*]
ROBERT D. MACPHERSON
THOMAS SPENCER

Professors Emeriti

ARMAND BOREL
ATLE SELBERG
ANDRÉ WEIL

ACADEMIC ACTIVITIES

Professor Robert MacPherson joined our Faculty this fall and helped to organize a year-long program on intersection cohomology and automorphic forms. This is a very exciting and rich field which is also closely related to the work of Pierre Deligne and Robert Langlands. There were nearly twenty participants representing geometric, algebraic and analytic aspects of this field who exchanged ideas and techniques. James Arthur from the University of Toronto gave the Hermann Weyl lectures entitled "The Trace Formula" on October 11, 12, 18, and 19 and continued lecturing on this topic throughout the semester. These lectures provided an excellent introduction to the field. There were several other related lecture series given by Thomas Hales, Alexander Beilinson, Daniel Barbasch, Mark Goresky and others.

The Alfred P. Sloan Foundation provided generous support for two other important programs. Fan Chung (Bellcore) and Enrico Bombieri led a program in combinatorics and complexity theory. The second semester featured special activity in kinetic theory lead by Claude Bardos (Paris) and David Levermore (University of Arizona). The combinatorics and complexity seminar ran all year and was held jointly with Princeton University and the DIMACS center at Rutgers. Topics included probabilistic methods in graph theory and computer science, algebraic combinatorics, representation theory and quantum computing. A special, two-day workshop on quantum computing was held in early December.

Kinetic theory is the study of the collective behavior of a large number of interacting particles – particularly in cases where fluid descriptions break down. This situation arises in such diverse areas as semiconductors, plasma physics and lubrication. Modelling, computation and hydrodynamic limits were the main areas covered by the participants and by numerous short-term visitors. There was a workshop on applied kinetic theory during the last week of March.

The regularly scheduled seminars this year included the “Automorphic Forms/Representation Theory Seminar,” “Combinatorics and Complexity Seminar,” “PDE Seminar,” “Joint IAS/Princeton University/Rutgers Number Theory and Harmonic Analysis Seminar,” “Members Seminar,” the “Applied Math-Math Physics Seminar,” and the “Kinetic Theory Seminar.” Pierre Deligne gave a series of lectures on “Vassiliev Invariants.” In the PDE seminar, Marco Avellana gave a tutorial on mathematics of finance.

For a second year, Luis Caffarelli, José Scheinkman and Srinivasa Varadhan coordinated a workshop on “Mathematical Problems of Finance” supported by the Bankers Trust Foundation. The mathematical problems in this field are connected to stochastic partial differential equations, path integrals and free boundary value problems. The conference was well attended and brought together mathematicians, economists and financiers.

Also for the second year, the Mentoring Program for Women in Mathematics, a component of the IAS/Park City Mathematics Institute, met at the Institute for Advanced Study. The program was organized by Chuu-Lian Terng and Karen Uhlenbeck, and featured courses and special lectures by Joyce McLaughlin (Rensselaer Polytechnic Institute), Barbara Keyfitz (University of Houston), Jane Cronin Scanlon (Rutgers University), and Susan Friedlander (University of Illinois at Chicago.)

The Marston Morse Memorial lectures were given on January 11, 12 and 13 by Frances Kirwan (Oxford University), and she spoke on “Recent Developments in the Topology of Quotient Space in Symplectic and Algebraic Geometry.”

Jean Bourgain received the Fields Medal for his contributions to analysis, and Enrico Bombieri was elected to Academia Europaea.

THE SCHOOL OF MATHEMATICS

MEMBERS AND VISITORS

JAMES AKAO
Computational fluid dynamics and statistical physics
University of California, Berkeley

JAMES ARTHUR
Automorphic forms and trace formulas
University of Toronto

MARCO AVELLANEDA
Diffusion and wave propagation in heterogeneous
media; design of composite materials and their
applications
Courant Institute

ABBAS BAHRI
Partial differential equations of variational type
Rutgers University . *s*

DAN BARBASCH
Representation theory of Lie Groups
Cornell University . *f*

CLAUDE BARDOS
Partial differential equations: Multiscale analysis in
wave propagation and kinetic equations
Université de Paris VII . *s*

ROBERT BEALS
Algorithms for finite groups, theoretical computer
science
University of Oregon

ALEXANDER BEILINSON
Algebraic geometry
Massachusetts Institute of Technology . *f*

CHRISTIAN BORGES
Statistical physics, phase transitions
University of California, Los Angeles

FRANCESCO BRENTI
Algebraic combinatorics
Università di Perugia

SONJA BRENTJES
History of mathematics
Universität Leipzig

RANEE BRYLINSKI
Geometric quantization, geometry, Lie theory
Pennsylvania State University . *s*

XAVIER CABRE
Elliptic and parabolic partial differential equations
Courant Institute

JOSÉ CANO
Algebraic geometric techniques on nonlinear
ordinary differential equations and dynamical systems
Universidad de Valladolid . *s*

SYLVAIN CAPPPELL
Singular varieties, symplectic geometry, transformation
groups
Courant Institute . *f*

SAGUN CHANILLO
Partial differential equations
Rutgers University . *s*

JENNIFER CHAYES
Statistical mechanics, condensed matter physics
University of California, Los Angeles

NEIL CHRISS
Representation theory of algebraic groups over local
fields
University of Chicago

FAN CHUNG
Spectral graph theory
Bellcore (Bell Communications Research) . *f*

PIERRE DEGOND
Asymptotic analysis and numerical methods for
kinetic equations and electromagnetism
Université Paul Sabatier . *s*

FRED DIAMOND
Automorphic forms and modular Galois representations
Columbia University . *f*

KEQUAN DING
Combinatorics, algorithms, optimizations, algebraic
geometry
University of Wisconsin-Madison . *f* . *vs*

GUILLERMO FERNÁNDEZ DEL BUSTO
Linear systems on algebraic surfaces
University of California, Los Angeles

KEVIN FORD
Analytic number theory
University of Illinois at Urbana-Champaign

BRUNO FRANCHI
Degenerate Monge-Ampère equations, weighted
Sobolev inequalities
University of Bologna

PATRICK GÉRARD
Microlocal analysis
Université de Paris-Sud . s

FRANÇOIS GOLSE
Partial differential equations
Université Paris VII/École Normale Supérieure . s

XIANGHONG GONG
Several complex variables
University of Chicago

MARK GORESKY
Geometry and automorphic forms
Northeastern University

ROBERT GRIESS
Finite simple groups and Lie theory
University of Michigan . f

RICHARD HAIN
Hodge theory, polylogarithms, topology of moduli
spaces of curves
Duke University . f

THOMAS HALES
Representation theory of p -Adic groups
University of Michigan

KARLA HORSCH
Periodic nonlinear Schrödinger equation perturbed
toward complex Ginzberg-Landau
University of Arizona . vs

LUCAS HSU
Differential geometry and calculus of variations
Institute for Advanced Study . dra

DANIEL HUYBRECHTS
Moduli spaces of vector bundles on curves, surfaces
and Calabi-Yau manifolds
Max-Planck-Institut für Mathematik

HERVÉ JACQUET
Automorphic forms
Columbia University . f

LIZHEN JI
Geometry of compactifications, symmetric spaces,
degenerating Riemannian manifolds
Massachusetts Institute of Technology

EFSTRATIA KALFAGIANNI
Low dimensional topology; knot theory, topology of
3-manifolds
Columbia University

CHRISTIAN KASSEL
Quantum groups, tensor categories
Institut de Recherche Mathématique Avancée

SEAN KEEL
Higher dimensional algebraic geometry and
intersection theory
University of Texas at Austin

KAMAL KHURI-MAKDISI
Modular forms
Harvard University

MIHAIL KOLOUNTZAKIS
Harmonic analysis; additive number theory;
probabilistic methods
Stanford University

NADINE KOWALSKY
Actions of non-compact simple groups preserving a
geometric structure
University of Chicago

SERGEJ KUKSIN
Infinite-dimensional Hamiltonian systems, including
Hamiltonian partial differential equations
Institut des Hautes Études Scientifiques . s

BRENDON LASELL
Complex algebraic geometry
University of Chicago

RICHARD LAUGESEN
Complex analysis and potential theory
University of Michigan

GÉRARD LAUMON
Drinfeld and Shimura varieties
Université de Paris-Sud . f

C. DAVID LEVERMORE
Applied mathematics
University of Arizona . s

JASON LEVY
Trace formulas
University of Chicago

FANG HUA LIN
Theory of liquid crystals, free boundaries and
geometric measure theory
Courant Institute

MARTIN LUSTIG
Geometric group theory and low-dimensional topology
Ruhr-Universität Bochum . s

MATEI MACHEDON
 $\bar{\partial}$ equation, wave equation
Princeton University

LISA MANTINI
Geometric constructions of unitary representations
and integral geometry
Oklahoma State University

MARK McCONNELL
Topology and arithmetic groups
Oklahoma State University

CLAUDE MITSCHI
Differential Galois theory
Université Louis Pasteur . v

CARLOS MOREIRA
Statistical mechanics
Universidade Federal de Minas Gerais . v

WILLIAM MOROKOFF
Kinetic theory
University of Arizona . s

ALLEN MOY
Representation theory of reductive p-Adic groups
University of Michigan

FEDOR NAZAROV
Harmonic analysis
St. Petersburg State University

MARCEL OLIVER
Asymptotic methods in shallow water dynamics
University of Arizona . vs

GEORGIOS PAPPAS
Arithmetic algebraic geometry
University of Pennsylvania

MATTHIAS PFAU
Shimura varieties and their reduction modulo good
primes
Universität Bielefeld . s

MARY PUGH
Motion of interface in 2-D fluid (PDE's, fluid
dynamics)
Courant Institute

DANA RANDALL
Randomized algorithms for combinatorial problems
University of California, Berkeley

ALEXANDER SHNIRELMAN
Variational methods in the dynamics of an ideal
incompressible fluid
Tel Aviv University . tf

REYER SJAMAAR
Symplectic geometry
Massachusetts Institute of Technology

DIANE SOUVAINÉ
Computational geometry
Rutgers University

MICHAEL SPIESS
Arithmetic algebraic geometry
Universität Regensburg

ARAVIND SRINIVASAN
Algorithms and theory of computation
Cornell University . f

EARL TAFT
Hopf algebras, quantization of algebraic structures
Rutgers University . s

YUICHIRO TAGUCHI
Arithmetic of Drinfeld modules
Tokyo Metropolitan University

DECHUN TAN
Nonlinear PDE's: 2-D Riemann problem for
conservation laws; applied mathematics: nonlinear
stability and instability of combustion waves
Academia Sinica

BURT TOTARO

Algebraic geometry
University of Chicago

SAMUEL VOVSİ

Varieties of group representations
University of California, Los Angeles . vs

LAN WANG

Topology of rational points; Brauer-Manin obstruction
Harvard University . v

WENSHENG WANG

Unique continuation in partial differential equations
University of Chicago . s

TİLLA WEINSTEIN

Differential geometry of immersed surfaces; Lorentz
surfaces
Rutgers University . s

BERNT WENNBERG

Kinetic theory and nonlinear Boltzmann equations
Chalmers University of Technology . vs

DAVID WRIGHT

Algebraic groups and algebraic number theory, Kleinian groups
Oklahoma State University

GISBERT WÜSTHOLZ

Number theory
Eidgenössische Technische Hochschule - Zurich

ROGER ZIERAU

Unitary representations of semisimple Lie groups
Oklahoma State University . s

THE SCHOOL OF NATURAL SCIENCES

Faculty

STEPHEN L. ADLER [*New Jersey Albert Einstein Professor*]

JOHN N. BAHCALL

PIET HUT

FRANK WILCZEK

EDWARD WITTEN

Professor Emeritus

FREEMAN J. DYSON

ACADEMIC ACTIVITIES

STEPHEN ADLER spent the summer and fall of 1994 dealing with the final tasks (indexing and proofreading) connected with publication of his book, *Quaternionic Quantum Mechanics and Quantum Fields*, which has just appeared in print (Oxford University Press, 1995). He intends to spend around half his time in the future working, in collaboration with graduate students and IAS visitors, on issues left unresolved in the book. Currently Professor Adler has a Princeton University graduate student, Andrew Millard, who is starting to work on problems in quaternionic quantum mechanics. Adler and Millard are studying whether the application of statistical mechanical methods to the generalized quantum dynamics formulated in Adler's book leads to the canonical commutation relations which are the foundation of conventional complex quantum mechanics and field theory. A visitor from Italy during the spring of 1995, Stefano De Leo, finished a manuscript on quaternionic group representations and grand unified theories, and Professor Larry Horwitz will visit the Institute during the spring semester of 1996, in order to continue discussions with Professor Adler in the area of quaternionic quantum theory.

Professor Adler is devoting the remainder of his time to the areas of computational neuroscience and pattern recognition, on which he started work several years ago. He has recently reworked and revised a benchmark study of the algorithmic aspects of his neural network patent, in collaboration with IBM visitor Gyan Bhanot and graduate student John Weckel. Professor Adler has just completed a detailed review of image normalization methods, in which he sets up a general framework for image normalization, with close analogies to gauge-fixing methods in gauge field theories, and then systematically applies it to the hierarchy of viewing transformations of planar objects. He has lectured on this work at the Electrical Engineering Department at Princeton and at Siemens Corporate Research, and at an International Machine Vision Symposium held in

Nordfjordeid, Norway, and expects to have continuing contacts with researchers in the machine vision field.

With the support of the School of Natural Sciences faculty, Professor Adler is gearing up to start a theoretical biology group in the School; his work on computational neuroscience will form one component of this program. In collaboration with Phillip Griffiths, the Director of the Institute, and with Professors Arnold Levine and Steven Block of the Department of Molecular Biology at Princeton University, Professor Adler is planning a one-day conference entitled "Thinking about Life: Emerging Themes in Theoretical Biology," which will take place in Princeton on Friday, November 10. The morning session will be held at the University, with the afternoon session at the Institute; the organizers expect to have seven speakers giving a survey of the current status and future prospects of various aspects of theoretical biology. The conference will help in choosing areas for a potential program at the Institute, and also will facilitate networking with the local community interested in the biosciences and allied areas.

JOHN BAHCALL's work in 1994-95 again focused on using solar neutrinos to learn more about stars, and about fundamental physics and on using the Hubble Space Telescope to understand distant, luminous quasars.

Bahcall and Marc Pinsonneault (Ohio State University) included both helium and heavy element diffusion in a series of detailed models of the sun. These models were used to refine the predictions of solar neutrinos for comparison with the four currently operating experiments and with the experiments under construction that will begin operating in 1996. The models with diffusion predict a present-day surface abundance of helium that is in agreement with the value recently measured from helioseismology and are also in agreement with the measured depth of the convection zone. These calculations show that diffusion must be included in precise solar models that account for optical observations of the sun. With two Members of the School of Natural Sciences, Eligio Lisi and Plamen Krastev, Bahcall derived the best-available limit on the oscillation probability of electron-type neutrinos; this work was based upon the agreement between the calculated and the measured rates in the calibration experiment of the GALLEX solar neutrino detector. Together with a student at Princeton University, Andrew Ulmer, Bahcall constructed a simple analytic model of the sun that accounts for the temperature dependence of the neutrino fluxes obtained from precise and detailed solar model calculations. This simple model is useful for understanding the results for the more accurate computer calculations. Bahcall and a group of experts from other institutions completed a study of the current state and future of solar neutrino research; this work, which was initiated by the National Research Council, was published both by *Nature* (as its cover story) and by the NRC. Also, Bahcall and four collaborators published, with Addison-Wesley, a book of reprints and commentaries on the subject: *Solar Neutrinos: The First Thirty Years*.

Bahcall, Sofia Kirhakos (IAS), and Donald Schneider (Pennsylvania State University) used the Hubble Space Telescope to show that quasars, the most luminous objects in the universe, occur in a variety of environments. They discovered that one of the very bright nearby radio-emitting quasars has dramatic tidal wisps and is surrounded by a huge blob of light-emitting material. This appears to be an example of a quasar caught in the act of colliding with diffuse galactic material. Two other quasars were found to lie in the centers of apparently normal host galaxies. These objects, taken together with the earlier discovery by Bahcall and his collaborators that some luminous quasars are not in luminous galaxies, have given rise to new speculations regarding the origin of the quasar phenomenon. One of the possibilities now being discussed is that the universe contains a large number of primordial black holes that, when run into gaseous material, cause the quasar phenomenon.

PIET HUT continued his research in the general field of the dynamics of dense stellar systems. He visited Tokyo University during the summer of 1994, where he worked with Jun Makino on various projects. One of these involved the development of computer codes for the simulation of star cluster evolution on a new generation special-purpose computer, the Grape-4. During the summer, he also visited the Institute for Space and Aeronautical Sciences and the Institute of Physical and Chemical Research, both in Tokyo.

Further progress was made, throughout the year, on an ongoing project of studying gravitational three-body scattering, through a mixture of analytic and numerical approaches. In collaboration with Steve McMillan from Drexel University, Professor Hut continued the development of a comprehensive package that allows the automatic determination of cross sections and reaction rates for any type of stellar three-body encounters. This package was applied to the study of formation mechanisms of X-ray binaries and millisecond pulsars in globular clusters, in collaboration with Fred Rasio, a Member in the School of Natural Sciences.

In order to provide detailed models for the evolution of star clusters, including the interplay between stellar evolution and stellar dynamics, the first steps were taken towards an integration of both types of computational simulation. In collaboration with Simon Portegies Zwart from Utrecht University, a study was initiated of the formation and subsequent evolution of blue stragglers, products of direct physical collisions between individual stars in crowded stellar environments. Professor Hut also continued the development of the time symmetrization meta-algorithm that he had established the previous year with Makino and McMillan. Together with Yoko Funato, from Tokyo University, their symmetrization approach was extended to four-dimensional regularization techniques.

A new area of research with a widely interdisciplinary character, centered around the theme "limits to scientific knowledge," was introduced through two conferences under that title. The first was held at the Santa Fe Institute in Santa Fe, New Mexico, and the second one in Abisko, Sweden, sponsored by

the Swedish Academy of Sciences. Following the first conference, Professor Hut initiated a collaboration with cognitive psychologist Roger Shepard from Stanford University, funded by the Alfred P. Sloan Foundation.

FRANK WILCZEK's work over the last year or so joins smoothly both onto previous work and to plans for the immediate future, so goals, work accomplished, and work planned are discussed together here.

Black Hole Physics. The goal here has been, and remains, to construct a description of the quantum behavior of black holes that incorporates known semi-classical behavior (Hawking radiance) with general principles of quantum theory, and perhaps with specific models of particle physics. In the original work of Hawking, and in essentially all calculations up to very recently, the reaction of quantized matter to a given space-time geometry representing the creation of a black hole was calculated. In this approximation, it is found that at late times thermal radiation is emitted. If it were literally true that the radiation is accurately thermal, paradoxes arise, basically because what comes out of the evaporating black hole would be independent of what went into making it, whereas according to accepted principles of quantum theory each final state is connected with a uniquely determined initial state. For this reason, among others, it is an interesting challenge to calculate more accurately—specifically, to take into account the fluctuating, quantum nature of the space-time geometry. Professor Wilczek and his student, Per Kraus, succeeded in performing a more accurate calculation, which revealed that the radiation is definitely not thermal. This result and the techniques they used to reach it raise new challenges, especially to calculate additional quantities (correlations) and more generally to see how far their basically model-independent, semi-classical analysis can be taken. Professor Wilczek suspects it can be taken quite far, in particular to give a microscopic account of the semi-classical entropy of a black hole and to justify much more rigorously than was previously possible the attractive idea that this entropy counts the number of ways the black hole could have formed.

In another line of investigation, Professor Wilczek and his student, Finn Larsen, have examined the proposal, advocated by Susskind and Uglum, that the infinities that arise in calculating quantum loop corrections to black hole entropy can be identified with renormalization of the Newtonian gravitational constant. They find that with suitable definitions this identification can be made, despite superficial difficulties that appear quite serious (the renormalization can be negative although the entropy appears to be manifestly positive; the renormalization depends on non-minimal couplings to curvature although the geometric entropy, defined in flat space, would appear not to do so).

Ultimately for very small (Planck mass) black holes any sort of semi-classical or perturbative treatment breaks down badly, and some fundamentally different approach is needed. String theory may supply a consistent framework adequate

to address these questions, but it is very challenging to derive the consequences of this theory in a concrete, convincing manner. Recently ideas regarding duality transformations of black hole solutions, and the notion that certain types of black holes may be regarded as elementary particles — ideas which were featured in some of Professor Wilczek's previous reports — have been incorporated into a much larger and more sweeping set of conjectures that touch on some of the most fundamental issues in string theory. He has been studying the relevant work (especially that of Sen) and, together with Larsen, is exploring specific ideas about how to connect it with the semi-classical work.

Phase Transitions in QCD. Professor Wilczek has not published anything on this subject since the major papers with Rajagopal, but he has begun exploring two new directions. First, he has begun to consider the application of ideas developed in condensed matter physics, specifically the analysis of Fermi surface instabilities and of quantum phase transitions, to the problem of QCD at high densities. He hopes in this way, among other things, to develop an alternative approach to the question of K-condensation, which is accurate in the limit of high densities. His earlier work with Nayak concerning non-Fermi liquid metals appears to be quite relevant to this problem. Second, he is exploring an alternative approach to phase transitions in gauge theories, where the phenomenon of frustration has every reason to be important, based on an analogy with the spin glass problem. This involves a non-standard implementation of the large N limit, enforcing permutation but not rotational symmetry in the internal space, which leads to a much richer choice of potential symmetry breaking patterns.

Problems in Condensed Matter Physics. Together with his students Richard Levien and Chetan Nayak, Professor Wilczek has continued to explore various aspects of the quantum Hall complex. These include how predicted exotic quantum numbers of quasiparticles (anomalous charge and statistics, spin-charge separation, and singular mass renormalization) might be manifested directly in space-time experiments. On the more formal side, he and Nayak showed how hidden rotational symmetries of the effective theory describing spin-singlet Hall states are realized non-locally. They are exploring the whole question of apparent non-locality that arises in several ways at the foundations of effective theories describing states in the quantum Hall complex more deeply.

A very exciting recent development, due to Girvin, Kivelson, Sondhi and others, is the realization that spin can play a highly non-trivial, and experimentally accessible, role even in some of the classic incompressible Hall states. In particular, the lowest charged excitations can be baby Skrymions, with a very specific, topologically non-trivial arrangement of spins. The possible relevance of baby Skrymions to quantum magnets, and the possibility that they would have anomalous quantum numbers including fractional spin and statistics, was proposed by Zee and Professor Wilczek several years ago. Wilczek and Nayak showed how the old ideas are embodied in a very concrete and specific form in

this new context, and pointed out what appears to them to be a very accessible direct experimental handle on the predicted fractional spin.

Professor Wilczek and Nayak have also begun to explore the idea that the effective $U(1)_{\infty}$ symmetry of Landau liquid theory might be spontaneously broken. This idea suggests new universality classes for quasi-metallic behavior.

Quantum Computers. Finally, Professor Wilczek has become intrigued by recent discussions of "quantum computers." In the course of digesting the literature, he and Chau have slightly simplified and clarified some of the basic constructions in the theory. They have specific ideas how to realize some of the main operations of quantum computers using classical physics, employing interference in an essential way. This may well make it practical to build at least small-scale prototypes, which have so far been notably elusive. In any case Professor Wilczek plans to devote a substantial effort to this subject in the immediate future, and will be giving a small course on it at Princeton University in the spring of 1996.

During 1994-95, EDWARD WITTEN applied his work with Nathan Seiberg on the vacuum structure of supersymmetric field theory to problems of four-manifolds. He was able to obtain a new approach to defining invariants of smooth four-manifolds that has found wide application.

He also investigated the behavior of string theories for strong coupling, obtaining a satisfactory picture of many new phenomena. Through his work and related work by others, it has become clear that the various string theories investigated in the last twenty-five years are all in fact equivalent, being different manifestations of one underlying structure. This is apparently leading to a rather far-reaching rethinking of the problems in the field.

PROFESSOR EMERITUS FREEMAN DYSON spent the fall term of 1994 as Montgomery Fellow at Dartmouth College, helping to teach undergraduate courses on "History of the Nuclear Age" and "Space Policy." In January 1995 he received the Fermi Award given annually by the U.S. Department of Energy for "outstanding achievements in the development, use or control of atomic energy." In May 1995 he gave the Jerusalem-Harvard lectures at the Hebrew University in Jerusalem, a lecture series sponsored jointly by the Hebrew University and the Harvard University Press. The lectures will be published as a book with the title *Looking Forward*. In June 1995 he received an honorary degree at Dartmouth College. During the year 1994-95 his time was mostly spent in preparing and giving lectures at various places in England, Ireland, Israel and the United States. His scientific interests are mainly in space-science and astrophysics.

THE SCHOOL OF NATURAL SCIENCES

MEMBERS AND VISITORS

PHILIP ARGYRES
String Theory
Institute for Advanced Study

PER BERGLUND
String Theory
Institute for Advanced Study

JULIAN BIGELOW
Applied Mathematics
Institute for Advanced Study . *m*

HOI FUNG CHAU
Condensed Matter
University of Illinois

XENIA DE LA OSSA
String Theory
Institute for Advanced Study

STEFANO DE LEO
Particle Physics
Lecce University . *v*

RAINER DICK
String Theory
University of Munich

KEITH DIENES
Particle Physics
McGill University

ALON FARAGGI
String Model Building
Institute for Advanced Study

KARL FISHER
Astrophysics
Institute of Astronomy-University of Cambridge

MASATAKA FUKUGITA
Astrophysics
Kyoto University . *m*

PETER GOLDREICH
Astrophysics
California Institute of Technology . *v*

ZACHARY HA
Condensed Matter
Institute for Advanced Study

BEI-LOK HU
Particle Physics
University of Maryland . *f*

BUELL JANNUZI
Observational Cosmology
Institute for Advanced Study . *f*

RANDY KAMIEN
Statistical Mechanics/Field Theory
Institute for Advanced Study

MARC KAMIONKOWSKI
Particle Physics/Cosmology
Institute for Advanced Study . *m*

DIMITRA KARABALI
Mathematical Physics
Syracuse University

TIEN KIEU
Particle Physics
University of Melbourne . *v*

PLAMEN KRASTEVA
Astrophysics
University of North Carolina

RANGANATHAN KRISHNAN
Mathematical Physics
Massachusetts Institute of Technology

PAWAN KUMAR
Astrophysics
Massachusetts Institute of Technology . *v*

KEKE LI
Particle Physics
Institute for Advanced Study . *m*

ELIGIO LISI
Particle Physics
CERN

HOI-KWONG LO
Particle Physics
California Institute of Technology

JAN LOUIS
Mathematical Physics
University of Munich . s

JOHN MARCH-RUSSELL
Particle Physics/Condensed Matter
Lawrence Berkeley Laboratory . m

JORDI MIRALDA-ESCUDE
Astrophysics
Institute for Advanced Study . m

FERNANDO MORAES
Condensed Matter
Universidade Federal de Pernambuco

CHIARA NAPPI
Particle Physics
Institute for Advanced Study . m

RAJAMANI NARAYANAN
Particle Physics
Institute for Advanced Study

HERBERT NEUBERGER
Particle Physics
Rutgers University . f

JOGESH PATI
Particle Physics
University of Maryland . s

STERL PHINNEY
Astrophysics
California Institute of Technology . f

M. RONEN PLESSER
String Theory
Institute for Advanced Study . m

FREDERIC RASIO
Astrophysics
Institute for Advanced Study

T. ANDREAS REISENEGGER
Astrophysics
Institute for Advanced Study

HERB ROOD
Astrophysics
Institute for Advanced Study . v

GEORGE RYBICKI
Astrophysics
Harvard University . f

PENNY SACKETT
Astrophysics
Institute for Advanced Study

NATHAN SEIBERG
String Theory
Rutgers University

SAMSON SHATASHVILI
Mathematical Physics
Institute for Advanced Study . f

LEE SMOLIN
Particle Physics
Pennsylvania State University . s

MICHAEL STRAUSS
Astrophysics
Institute for Advanced Study . m

CLAUDIO TEITELBOIM
Particle Physics
Centro de Estudios Científicos de Santiago . m

ANNE THOUL
Astrophysics
Institute for Advanced Study

SCOTT TREMAINE
Astrophysics
Canadian Institute for Astrophysics . v

ROELAND VAN DER MAREL
Astrophysics
Sterrewacht Leiden

ELI WAXMAN
Astrophysics
Institute for Advanced Study . m

DAVID WEINBERG
Astrophysics
Institute for Advanced Study . m

THE SCHOOL OF SOCIAL SCIENCE

Faculty

CLIFFORD GEERTZ [*Harold F. Linder Professor*]

JOAN WALLACH SCOTT

MICHAEL WALZER [*UPS Foundation Professor*]

Professor Emeritus

ALBERT O. HIRSCHMAN

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 ways in which scholars make sense of the social world 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, 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 bring to the Institute each year scholars 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. This results in a wide ranging membership that represents in any given year a more or less coherent set of arguments — the arguments through which, at the moment, the shape of scholarly work is being decided.

ACADEMIC ACTIVITIES

Eighteen scholars from the United States and abroad were invited to be part of the School's scholarly community as Members and Visitors for the 1994-95 academic year from a pool of 193 individuals who applied for membership. Two research assistants also participated in the year's activities. The Andrew W. Mellon Foundation funds provided support for four of the Members; the National Endowment for the Humanities partially funded five Members.

Of the group of twenty scholars from Ethiopia, Ireland, Israel, the United Kingdom and the United States, ten were women. Fields of inquiry of the group included anthropology, three; economics, two; education, one; history, four; history of science, two; literature, two; philosophy, two; political science, three; and sociology, one.

The 1994-95 academic year was the second of a three-year project on "Transitions": the change from authoritarian regimes to democratic ones, from planned economies to free markets, from racist or sexist political and economic arrangements to more egalitarian arrangements, from religious to secular cultures, from national to international science and technology. This second year focused on the movements of feminism and environmentalism, primarily those that self-consciously regard themselves as international in scope and are based on a universalist appeal. The seminar addressed questions about how these movements – western in origin with universalist presumption – have "travelled" to other parts of the world and have fared in recent political transitions in (among others) Eastern Europe, the former Soviet Union and South Africa. The members of the seminar wrote major papers on these issues which were presented at a conference in April. The papers, edited by Professor Scott and Professor Cora Kaplan, director of the Rutgers Institute for Research on Women, will be published in 1996.

PROFESSOR CLIFFORD GEERTZ's book, *After the Fact: Two Countries, Four Decades, One Anthropologist*, a reflection on his career as an anthropologist working in Southeast Asia and North Africa, was published by The Harvard University Press in February. He also contributed to a consideration of the work of Charles Taylor, "The Strange Estrangement: Taylor and the Natural Sciences," in *Philosophy in an Age of Pluralism*, James Tully, ed., Cambridge University Press, 1995. "Disciplines," appeared in *Raritan*, Winter 1995, and a number of other pieces are in press.

In January he was the Fukuoka Five-Year Anniversary Lecturer in Tokyo and Fukuoka, and in June he gave the annual Lectures in Modern Philosophy at the Institut für die Wissenschaften vom Menschen in Vienna. These lectures, "The World in Pieces: Politics and Culture at the end of the Century," will be published in German in early 1996.

He was appointed an Honorary Fellow of The Royal Anthropological Institute of Great Britain and Ireland and a Member of the Scientific Council of the Fondazione San Carlo, Modena, Italy. He was awarded an honorary doctorate in Humane Letters by Princeton University in May.

PROFESSOR EMERITUS ALBERT O. HIRSCHMAN spent most of the academic year preparing the publication of a new book, to be entitled *A Propensity to Self-Subversion*. This is a book of essays that were written since 1986 when he published his previous collection, *Rival Views of Market Society and Other Recent Essays*. In the course of the year, he also revised the French translation which was actually published by Fayard in Paris in April 1995, before the English edition which is to come out at Harvard University Press in July 1995. Translation into German, Spanish, Portuguese and Italian are in progress.

In 1993 he had given an extensive interview to an Italian publisher, Carmine Donzelli, accompanied by two associates. This interview was published as a short book (82 pages) in late 1994 under Hirschman's name and with the title *Passaggi di frontiera: i luoghi e le idee di un percorso di vita* (Trespassing: The Places and Ideas of a Life Course), Donzelli editore, Rome. A German version is to be issued as a long article in *Leviathan*, a social science quarterly which has published several of Hirschman's papers.

He also published two articles: "Self-Subversion" in *Common Knowledge*, Fall 1994, and "Social Democracy Moves South" in *Dissent*, Spring 1995. The former paper reproduces the chapter "A Propensity to Self-Subversion," which is part of the just noted book and was used as its overall title; the second deals with the election of Fernando Henrique Cardoso, a long-time friend and former Member of the School of Social Science, as President of Brazil in November 1994. Professor Hirschman and his wife were invited to participate in the inauguration ceremonies in Brasilia in January 1995.

He took part in a conference in Rome in November 1994 and subsequently lectured at the University of Naples. During May and June of 1995 he returned to the Wissenschaftskolleg of Berlin.

In February 1995 he was elected extra-ordinary member of the newly constituted Academy of Sciences of Berlin-Brandenburg.

PROFESSOR JOAN WALLACH SCOTT led a seminar during 1994-95 in the School of Social Science on "Feminism and Environmentalism" which looked at these movements as they developed in countries undergoing major political transitions. The seminar culminated in a conference held jointly with the Rutgers Institute for Research on Women, the proceedings of which will be published by

Routledge next year. She lectured at Dartmouth, SUNY Binghamton, and the Graduate Center of the City University of New York. She gave the "Gender Lectures" at the Institute for the Human Sciences in Vienna, participated in a conference sponsored by the Collegium Budapest, and gave a lecture at the Central European University (Budapest). During her stay in Europe she also lectured at the Einstein Forum in Potsdam and at the Humboldt University in Berlin. Professor Scott served as a member of Committee A (the committee on academic freedom) of the American Association of University Professors (AAUP). She presented a lecture, "Academic Freedom as an Ethical Practice," to the AAUP, and this will be published next year by the University of Chicago Press in a volume of essays on academic freedom. She has been appointed by the Council for Basic Education to a task force charged with reviewing the National History Standards.

During the academic year 1994-95, PROFESSOR MICHAEL WALZER served as president of the American Society for Political and Legal Philosophy. He lectured at the University of California at Riverside, and gave papers at conferences held at Harvard University, the New School for Social Research, Princeton University, and the Institute for Human Sciences in Vienna. He helped to organize and spoke at the Second Locarno Conference on Politics and Society. He lectured on the welfare state in Stuttgart, Germany, under the sponsorship of the Baden Wurtemberg Ministry of Social Welfare. A similar lecture, on the problem of justice and "exclusion," was published by the French Commissariat General du Plan. His new book, *Thick and Thin: Moral Argument at Home and Abroad*, was published by the University of Notre Dame Press. Oxford University Press brought out a collection of essays devoted to his *Spheres of Justice*, entitled *Pluralism, Justice, and Equality* (edited by David Miller and Michael Walzer). Another book devoted to *Spheres* appeared in the Netherlands under the title *Lokale Rechtvaardigheid*. He contributed essays for a new edition of Jean-Paul Sartre's *Anti-Semite and Jew*. At the Institute, he continued to work on questions of pluralism and ethnicity, aiming at a little book on "toleration," and on a larger collaborative project on Jewish Political Thought, partially funded by a grant from the NEH.

THE SCHOOL OF SOCIAL SCIENCE
MEMBERS, VISITORS AND RESEARCH STAFF

RICHARD ADELSTEIN
Economics
Wesleyan University

TSEHAI BERHANE-SELASSIE
Anthropology
Centre of Concern, Washington, D.C.

ROSI BRAIDOTTI
Philosophy
University of Utrecht

STEFAN COLLINI
Literature
University of Cambridge

PETER GALISON
History of Science
Harvard University . v

YAAKOV GARB
History of Science
Massachusetts Institute of Technology

EVELYNN HAMMONDS
History
Massachusetts Institute of Technology

KIARAN HONDERICH
Economics
Williams College

CAROLINE JONES
Art History
Boston University

DEBRA KEATES
Literature
Rutgers University . a

ADAM KUPER
Anthropology
Brunel University

YAIR LORBERBAUM
Political Science
Shalom Hartman Institute . a

AFSANEH NAJMABADI
History
Barnard College

JOEL PERLMANN
History
Harvard University

MARY POOVEY
Literature
Johns Hopkins University

ANNAMARIA SELENY
Political Science
Princeton University

DANIEL STATMAN
Philosophy
Bar-Ilan University

MICHAEL SULEIMAN
Political Science
Kansas State University

ANNA TSING
Anthropology
University of California, Santa Cruz

MARGARET WATSON
Sociology
University of Cambridge

ROBERT WOKLER
Political Science
University of Manchester

THE LIBRARIES

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 1930's. 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, Erwin Panofsky, Andrew E. Z. Alföldi, and former Member Walter 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 presented 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 1930's 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] is located on the second floor of Fuld Hall and contains some 30,000 volumes (including bound periodicals and monographs) plus subscriptions to nearly 200 journals. Its collection of older periodicals (prior to 1940) is 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 twenty-two million records. Searches of this database retrieve bibliographic information and identify the location of materials in all participating libraries.

The Historical Studies-Social Science Library maintains a computer center with access to a variety of word processing packages for both PCs and Macintoshes, access to databases in the fields of Classical Studies, the History of Science, Islamic and French studies, and connection software to the Internet for additional information resources. The Mathematics-Natural Sciences Library has access to the Math-Sci Online database.

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.

The librarians and the Faculties of all four Schools at the Institute warmly appreciate gifts of books and articles from former and current Members of the Institute.

RECORD OF EVENTS

The following is a calendar of events sponsored by the Schools of Historical Studies, Mathematics, Natural Sciences and Social Science and by the Office of the Director

Academic Year 1994-95

July 21

Institute Lecture

"Recognizing DNA Sequences"

MAXINE SINGER, *Carnegie Institution* and

PAUL BERG, *Beckman Center*

September 20

School of Natural Sciences

Astrophysics Talk: "Central Black Holes and Dark Halos in Elliptical Galaxies"

TIM DE ZEEUW, *Sterrewacht Leiden*

September 20 - June 6

School of Natural Sciences

Tuesday Lunch Seminars: Weekly lunchtime seminars serve as a clearinghouse for new ideas in astronomy and astrophysics

JOHN BAHCALL, *Professor, School of Natural Sciences, IAS*, moderator

September 23

School of Mathematics

PDE Seminar: "The Evolution of the Ginzburg-Landau Vortices"

FANG HUA LIN, *IAS*

September 26

School of Mathematics

Combinatorics and Complexity Seminar:

"The Lower Bound Theorem and the Skeleton Theorem Revisited"

GIL KALAI, *Hebrew University*

Members Seminar: "Finite Subgroups of Lie Groups"

ROBERT GRIESS, *IAS*

September 28 - May 24

School of Historical Studies

Wednesday Art History Lunch Seminars

IRVING LAVIN, *Professor, School of Historical Studies, IAS*, moderator

School of Social Science

Feminism & Environmentalism Seminar:

Organizational Meeting

JOAN W. SCOTT, *Professor, School of Social Science, IAS*

September 30

School of Mathematics

PDE Seminar: "Smoothing Estimates for Null Forms"

MATEI MACHEDON, *IAS*

School of Natural Sciences

Lunchtime Seminar: "Dynamics of $N=2$ Super Yang-Mills Theory in Four Dimensions"

EDWARD WITTEN, *Professor, School of Natural Sciences, IAS*

October 3

School of Mathematics

Combinatorics and Complexity Seminar:

"Codes, Geometries and Extremal Sets of Euclidean Lines"

A. R. CALDERBANK, *AT&T Bell Labs*

School of Natural Sciences

Theoretical Physics Seminar: "Exact Results in Four-Dimensional Spersymmetric Gauge Theories"

KEN INTRILLIGATOR, *Rutgers University*

October 4

School of Natural Sciences

Astrophysics Talk: "Simulations of X-Ray Clusters"

JULIO NAVARRO, *Steward Observatory, University of Arizona*

October 5

School of Mathematics

Special Lecture Series: "Why Didn't Leray

Discover Perverse Sheaves in 1943?"

ROBERT D. MACPHERSON, *Professor, School of Mathematics, IAS*

October 6

School of Mathematics
 Special Lecture Series: "Vassiliev Invariants
 and Motives"
 PIERRE DELIGNE, *Professor, School of
 Mathematics, IAS*

School of Social Science
 Luncheon Seminar: "Robert Smithson's Post-
 modernism and the Technological Sublime"
 CAROLINE JONES, *IAS*

October 7

School of Mathematics
 IAS, Princeton University, Rutgers University
 Number Theory/Harmonic Analysis Seminar:
 "Diophantine Approximation in Projective
 Spaces"
 GIBERT WÜSTHOLZ, *IAS*

October 10

School of Mathematics
 Combinatorics and Complexity Seminar:
 "Recent Progress in the WZ Theory of Auto-
 mated Finding and Proving of Identities"
 HERB S. WILF, *University of Pennsylvania*

October 11

School of Mathematics
 Hermann Weyl Lecture: "The Future of the
 Trace Formula"
 JAMES ARTHUR, *IAS*

School of Natural Sciences
 Astrophysics Talk: "UV-Bright LINERs: The
 Lowest-Luminosity AGNs?"
 DAN MAOZ, *Tel-Aviv University*

October 12

School of Historical Studies
 Magic & Religion Seminar: "Magic and
 Religion in Ancient Judaism"
 PETER SCHÄFER, *IAS*

School of Mathematics
 Hermann Weyl Lecture: "The Future of the
 Trace Formula" (continued)
 JAMES ARTHUR, *IAS*

School of Natural Sciences
 Condensed Matter Seminars: "Renormalization
 Group Approach to Interacting Fermions: An
 Introduction"
 R. SHANKAR, *Yale University*

School of Social Science
 Feminism & Environmentalism Seminar: Dis-
 cussion of Wendy Brown, "Finding the Man
 in the State"; and Peggy Watson, "Eastern
 Europe's Silent Revolution: Gender" and
 "The Rise of Masculinism in Eastern Europe"
 PEGGY WATSON, *IAS*

October 13

School of Historical Studies
 Art History Colloquium: "The Massacre at
 Paris on August 10th, 1792: Johan Zoffany's
 Paintings of the French Revolution"
 WILLIAM L. PRESSLY, *IAS*

Islamic Seminar
 MICHAEL COOK, *Princeton University* and
 OLEG GRABAR, *Professor, School of Historical
 Studies, IAS*

School of Mathematics
 Vassiliev Invariants Seminar: "Vassiliev
 Invariants and Motives"
 PIERRE DELIGNE, *Professor, School of
 Mathematics, IAS*

IAS, Princeton University, Rutgers University
 Number Theory/Harmonic Analysis Seminar:
 "Anghilation of Selmer Groups for the
 Adjoint of 2 Modular Forms"
 MATTHIAS FLACH, *Princeton University*

School of Social Science
 Luncheon Seminar: "'Severed Hands':
 German Atrocities in 1914—The Genesis and
 Function of a Myth"
 JOHN HORNE, *IAS*

October 14
 School of Mathematics
 PDE Seminar: "Existence, Regularity, and
 Long-time Behavior for a Degenerate Fourth
 Order PDE Modelling Droplet Motion"
 MARY PUGH, *IAS*

Applied Math-Math Physics Seminar: "Statistical Physics of Type II Superconductors"
DAVID HUSE, *AT&T Bell Labs*

October 17
School of Mathematics
Combinatorics and Complexity Seminar: "A Lower Bound for the Monotone Depth of Connectivity"
ANDREW YAO, *Princeton University*

Members Seminar: "Comparison of Lattice Sums and Integrals Using Generalized Bernoulli Numbers, a Todd Class, and Singularities of Analytic Functions"
SYLVAIN CAPPELL, *IAS*

School of Natural Sciences
Theoretical Physics Seminar: "Big Bad Nucleosynthesis"
LAWRENCE KRAUSS, *Case Western Reserve University*

October 18
School of Historical Studies
Medieval Seminar: "Monstrous Birth and Its Meanings in Early Modern Germany"
PHILIP SOERGEL, *IAS*

School of Mathematics
Geometry and Modular Varieties Seminar: "Local Langlands Conjectures and Characteristic Cycles, I"
DAN BARBASCH, *IAS*

Hermann Weyl Lecture: "The Future of the Trace Formula" (continued)
JAMES ARTHUR, *IAS*

School of Natural Sciences
Astrophysics Talk: "Reverberation Mapping of Active Galactic Nuclei"
GEORGE RYBICKI, *Harvard-Smithsonian Center for Astrophysics*

October 19
School of Mathematics
Hermann Weyl Lecture: "The Future of the Trace Formula" (conclusion)
JAMES ARTHUR, *IAS*

Applied Math-Math Physics Seminar: "Statistics of Shocks and Burger's Turbulence"
MARCO AVELLANEDA, *IAS*

October 19 - May 31
School of Natural Sciences
Weekly Informal Physics Lecture Series
EDWARD WITTEN, *Professor, School of Natural Sciences, IAS*, moderator

IAS Friends' Forum
"The Piano Sonatas of Beethoven"
ROBERT TAUB, *Artist-in-Residence, IAS*

October 20
School of Historical Studies
Historical Studies Seminar: "Archaeology of South Yemen"
ALEXANDER SEDOV, *Russian Academy of Sciences*

School of Mathematics
Vassiliev Invariants Seminar: "Vassiliev Invariants and Motives"
PIERRE DELIGNE, *Professor, School of Mathematics, IAS*

IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar: "Automorphic Spectrum of Symmetric Spaces"
HERVÉ JACQUET, *IAS*

School of Natural Sciences
Astrophysics Talk: "The Highest Energy Cosmic Rays"
JIM CRONIN, *University of Chicago*

School of Social Science
Luncheon Seminar: "A Brief History of Modern Abstraction: Ellen Ranyard and the Female Bible Mission"
MARY POOVEY, *IAS*

October 21
School of Mathematics
PDE Seminar: "Nonlinear Stability of the Strong Detonation Waves to the Simplest Combustion Model"
DECHUN TAN, *IAS*

School of Natural Sciences
Lunchtime Seminar: "Perturbative
Construction of Conformal Field Theories"
R. KRISHNAN, IAS

October 24
School of Mathematics
Combinatorics and Complexity Seminar:
"Dynamic Probabilistic Methods"
JOEL SPENCER, *Courant Institute*

October 25
School of Mathematics
Geometry and Modular Varieties Seminar:
"Local Langlands Conjectures and Character-
istic Cycles, II"
DAN BARBASCH, IAS

"The Future of the Trace Formula"
JAMES ARTHUR, IAS

School of Natural Sciences
Astrophysics Talks: "Rotation and Magnetic
Fields of Degenerate Dwarfs"
PETER GOLDREICH, *California Institute of
Technology*
"Accretion Disk Winds from Active Galactic
Nuclei"
NORMAN MURRAY, *Canadian Institute for
Theoretical Astrophysics*

October 26
School of Mathematics
"The Future of the Trace Formula"
JAMES ARTHUR, IAS

Applied Math-Math Physics Seminar:
"Testable Monte Carlo Algorithms for Self-
avoiding Walks"
DANA RANDALL, IAS

School of Natural Sciences
Condensed Matter Seminars: "The
Supersymmetric Approach to Pseudopotentials
in Condensed Matter Physics"
Y. C. LEE, *SUNY, Buffalo*

October 27
School of Mathematics
Vassiliev Invariants Seminar: "Vassiliev
Invariants and Motives"
PIERRE DELIGNE, *Professor, School of
Mathematics, IAS*

School of Social Science
Luncheon Seminar: "Arab-Americans: The
Search for Identity"
MICHAEL SULEIMAN, IAS

October 28
Institute Lecture
"Black Holes and Quantum Mechanics:
Trouble on the Horizon?"
FRANK WILCZEK, *Professor, School of Natural
Sciences, IAS*

School of Natural Sciences
Lunchtime Seminar: "Defects & Textures in
Chiral Polymer Crystals"
R. KAMIEN, IAS

October 31
School of Mathematics
Combinatorics and Complexity Seminar:
"The Ring Loading Problem"
PETER WINKLER, *AT&T Bell Labs*

Members Seminar: "Complex and P-adic
Local Systems, Harmonic Maps, and Singular
Subspaces of Kähler Manifolds"
BRENDON M. LASSEL, IAS

November 1
School of Historical Studies
Medieval Seminar: "Government and Freedom
in the Political Theory of the Early 14th
Century"
JÜRGEN MIETHKE, IAS

School of Mathematics
Geometry and Modular Varieties Seminar:
"Local Langlands Conjectures and
Characteristic Cycles, III"
DAN BARBASCH, IAS

Automorphic Forms/Representation Theory Seminar: "The Problem of Comparing Automorphic Forms on Different Groups"

JAMES ARTHUR, IAS

School of Natural Sciences

Astrophysics Talk: "HST Images of Host and Companion Galaxies of Nearby Luminous Quasars"

JOHN BAHCALL, *Professor, School of Natural Sciences, IAS*

November 2

School of Natural Sciences

Condensed Matter Seminars: "A Cellular Automaton Model of the Immune System: Experiments 'In Machina'"

PHILIP SEIDEN, *IBM*

School of Social Science

Feminist & Environmentalism Seminar: Discussion of Gro Harlem Brundtland, "Sustainable Development: An Overview"; "Setting the Stage for the Brundtland Report"; "Feminist Critiques of Science"; "The Relationship between Women and Nature: Debates within Feminism"; and "Women, the Environment and Sustainable Development: Emergence of the Theme and Different Views"

ROSI BRAIDOTTI, *IAS*

November 3

School of Historical Studies

Art History Colloquium: "The Battle Murals by Leonardo and Michelangelo for the Hall of the Great Council of Florence"

RAB HATFIELD, *IAS*

Magic & Religion Seminar: "Magic and Religion: Some Greek Doubts"

HENDRIK VERSNEL, *IAS*

School of Mathematics

Vassiliev Invariants Seminar: "Vassiliev Invariants and Motives"

PIERRE DELIGNE, *Professor, School of Mathematics, IAS*

Applied Math-Math Physics Seminar:

"Unfolding the Steady Boussinesq Equation and its Singularities"

RUSSEL CAFLISCH, *University of California, Los Angeles*

IAS, Princeton University, Rutgers University Number Theory/Harmonic Analysis Seminar:

"On Selberg's Eigenvalue Conjecture"

ZEEF RUDNICK, *Princeton University*

School of Social Science

Luncheon Seminar: "Zulaykha and Yusuf: 'The Best Story'"

AFSANEH NAJMABADI, *IAS*

November 4

School of Historical Studies

A Conference in Honor of the 100th Anniversary of Ernst Kantorowicz's Birth: "Kantorowicz on Continuity and Change in the History of Medieval Rulership"

ROBERT L. BENSON, *University of California, Los Angeles*

"'Not only in learned circles': The Reception of Frederick the Second"

ECKHART GRÜNEWALD, *Kassel-Wilhelmshöhe*

"The Reception of Kantorowicz's Works in Germany and Europe since 1945"

JOHANNES FRIED, *Johann Wolfgang Goethe-Universität*

School of Mathematics

PDE Seminar: "Supremum Estimates for Elliptic and Parabolic Equations"

XAVIER CABRE, *IAS*

Tutorial on Mathematical Finance:

"Derivative Financial Products, Arbitrage and Valuation Principles"

MARCO AVELLANEDA, *IAS*

November 5

School of Historical Studies

A Conference in Honor of the 100th Anniversary of Ernst Kantorowicz's Birth: "Conceptions of Time and Eternity: An Early Draft of Ideas in *The King's Two Bodies*"

ROBERT E. LERNER, *Northwestern University*

"Kantorowicz's Constitutional Narrative"

CARL LANDAUER, *Oakland, California*

"The Two Bodies of the French King"

RALPH E. GIESEY, *University of Iowa*

"Kantorowicz on Late Antiquity and Byzantium"

IHOR SEVCENKO, *Harvard University*

"Kantorowicz and Dante"

CHARLES T. DAVIS, *Tulane University*

"Images of History, Images in History: A

Contribution to the Intellectual Biography of Ernst Kantorowicz"

HANS BELTING, *Staatliche Hochschule für*

Gestaltung, Karlsruhe

November 7

School of Mathematics

Combinatorics and Complexity Seminar:

"Search for Extremal Sequences and Polynomials"

ANDREW ODLYZKO, *AT&T Bell Labs*

School of Natural Sciences

Theoretical Physics Seminar: "Asymmetric

Higher Level Current Algebra Embeddings in String Theory"

SHYAMOLI CHAUDHURI, *University of*

California, Santa Barbara

November 8

School of Mathematics

Geometry and Modular Varieties Seminar:

"Geometry Behind Barbasch's Lectures"

ROBERT MACPHERSON, *Professor, School of*

Mathematics, IAS

Automorphic Forms/Representation Theory

Seminar: "The Problem of Relating Classical Groups with $GL(n)$ "

JAMES ARTHUR, *IAS*

School of Natural Sciences

Astrophysics Talk: "Cosmology with the CMB"

DOUGLAS SCOTT, *University of California, Berkeley*

November 9

School of Mathematics

Special PDE Seminar: "Construction of

Quasi-Periodic Solutions for Hamiltonian PDE"

JEAN BOURGAIN, *Professor, School of*

Mathematics, IAS

Special Lecture Series: "Renormalization and the Free Field"

THOMAS SPENCER, *Professor, School of Mathematics, IAS*

School of Natural Sciences

Condensed Matter Seminars: "Crossover in Field Theory with Applications to Finite Size Scaling and Finite Temperature Field Theory"

DENJOE O'CONNOR, *Dublin Institute for Advanced Study*

Sackler Colloquium Series: "The World as a Hologram"

LEONARD SUSKIND, *Stanford University*

School of Social Science

Seminar in Honor of Albert O. Hirschman

ERNEST STERN, *Managing Director, The World Bank Group*

PAUL A. VOLCKER, *Former Chairman of the Board of Governors, Federal Reserve System*

JAMES D. WOLFENSOHN, *President, James D.*

Wolfensohn, Inc. and Chairman, IAS, moderator

Feminism & Environmentalism Seminar: Discussion of Jacklyn Cock, "Going Green at the Grassroots: The Environment as a Political Issue"; Sociology as if Survival Mattered"; and "Towards the Greening of the Church in South Africa"

JACKLYN COCK, *University of Witwatersrand*

November 10

School of Historical Studies

Magic & Religion Seminar: "Spells, Sorcerers and the Domestication of Magic in Indian and Tibetan Buddhism"

MATTHEW KAPSTEIN, *IAS*

School of Mathematics

Vassiliev Invariants Seminar: "Vassiliev Invariants and Motives"

PIERRE DELIGNE, *Professor, School of Mathematics, IAS*

Special Geometry Seminar: "A Mathematical Theory of Quantum Cohomology"

GANG TIAN, *Courant Institute*

IAS, Princeton University, Rutgers University
 Number Theory/Harmonic Analysis Seminar:
 "Lattice Points in the Sphere"
 F. CHAMIZO, *Rutgers University*

School of Natural Sciences
 Astrophysics Talk: "Toward Understanding
 CMB Anisotropies: An Analytic Approach"
 WAYNE HU, *University of California, Berkeley*

School of Social Science
 Luncheon Seminar: "The 'New' Social
 Movements in South Africa's Transition to
 Democracy"
 JACKLYN COCK, *University of Witwatersrand*

November 11
 School of Mathematics
 PDE Seminar: "Rotational Symmetry of
 Solutions to Liouville Systems"
 SAGUN CHANILLO, *IAS*

Tutorial on Mathematical Finance: "The
 Black-Scholes 'Technology': Valuation and
 Hedging Strategies for Options on Equity,
 Indexes and Futures"
 MARCO AVELLANEDA, *IAS*

School of Natural Sciences
 Lunchtime Seminar: "Fractional Statistics in
 One Dimension: A Reality or an Illusion?"
 ZACHARY HA, *IAS*

November 14
 IAS Concert Series
 Pre-Concert Lecture: "Beethoven: The Piano
 Sonatas"
 ROBERT TAUB, *Artist-in-Residence, IAS*

School of Mathematics
 Combinatorics and Complexity Seminar:
 "Factoring Integers with the Number Field
 Sieve"
 ARJEN LENSTRA, *AT&T Bell Labs*

School of Natural Sciences
 Theoretical Physics Seminar: "A Critical
 Look at the Decoherent Histories Approach
 to Quantum Mechanics"
 FAY DOWKER, *University of California, Santa
 Barbara*

November 15
 IAS Concert Series
 Beethoven: The Piano Sonatas, Program 1
 ROBERT TAUB, *Artist-in-Residence, IAS*

School of Historical Studies
 Medieval Seminar: "Frederick II as a Hunter"
 JOHANNES FRIED, *Johann Wolfgang Goethe-
 Universität*

School of Mathematics
 Geometry and Modular Varieties Seminar:
 "Local Langlands Conjectures and
 Characteristic Cycles, IV"
 DAN BARBASCH, *IAS*

Automorphic Forms/Representation Theory
 Seminar: "The Problem of Relating Classical
 Groups with $GL(n)$ " (continued)
 JAMES ARTHUR, *IAS*

School of Natural Sciences
 Astrophysics Talk: "Density Fluctuations in
 the Intergalactic Medium and the Gunn-
 Peterson Effect"
 ANDREAS REISENEGGER, *IAS*

November 16
 School of Mathematics
 Special PDE Seminar: "Construction of Quasi-
 Periodic Solutions for Hamiltonian PDE, II"
 JEAN BOURGAIN, *Professor, School of
 Mathematics, IAS*

School of Natural Sciences
 Theoretical Physics Seminar: "S-duality"
 EDWARD WITTEN, *Professor, School of Natural
 Sciences, IAS*

Condensed Matter Seminar: "Fractals and
 Self-Organized Criticality"
 MICHAEL CREUTZ, *Brookhaven National
 Laboratory*

School of Social Science
 Feminism & Environmentalism Seminar:
 Discussion of Jacklyn Cock, "Women in South
 Africa's Transition to Democracy"; and
 "Women and the Military: Implications for
 Demilitarization in the 1990s in South Africa"
 JACKLYN COCK, *University of Witwatersrand*

Friends' Forum

"Broken Symmetries: Some Experiences with
Institution Building in Eastern Europe"
WOLF LEPENIES, Rector, *Wissenschaftskolleg zu
Berlin*

November 17

School of Historical Studies
Magic & Religion Seminar: "Magic in Roman
Law"
HANS KIPPENBERG, *IAS*

Historical Studies Seminar: "Acts of the
Martyrs"
T. D. BARNES, *University of Toronto*

Islamic Seminar
MARIBEL FIERRO, *IAS*

School of Mathematics
IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar:
"Cohomology of Siegel Three-folds"
G. LAUMON, *IAS*

Special Geometry Seminar: "Monopoles and
4-Manifolds"
EDWARD WITTEN, *Professor, School of Natural
Sciences, IAS*

Vassiliev Invariants Seminar: "Vassiliev
Invariants and Motives"
PIERRE DELIGNE, *Professor, School of
Mathematics, IAS*

School of Natural Sciences
Theoretical Physics Seminar: "Some Issues
Related to Chiral Fermions"
MICHAEL CREUTZ, *Brookhaven National
Laboratory*

School of Social Science
Luncheon Seminar: "East German Commu-
nism and the Suppression of the Jewish
Question after 1945"
JEFFREY HERF, *IAS*

November 18

1994 New Europe Prize Ceremony
Principal Speakers:
WOLF LEPENIES, *Wissenschaftskolleg zu Berlin*
NEIL SMELSER, *Center for Advanced Study in
the Behavioral Sciences*
KATALIN KISS, *Budapest*
DIRK VAN DE KAA, *Netherlands Institute for
Advanced Study in the Humanities and Social
Sciences*
PETR PITHA, *Prague*
W. ROBERT CONNOR, *National Humanities
Center*
BJORN WITTRÖCK, *Swedish Collegium for
Advanced Study in the Social Sciences*
ALEXANDER GAVRILOV, *Bibliotheca Classica
of St. Petersburg*
Guest Speaker: "Freedom of Expression versus
Democracy"
CONOR CRUISE O'BRIEN, *Dublin*

IAS Concert Series
Beethoven: The Piano Sonatas, Program I
ROBERT TAUB, *Artist-in-Residence, IAS*

School of Mathematics
PDE Seminar: "Approximation Theorems in
Function Spaces Associated with Vector
Fields"
BRUNO FRANCHI, *IAS*

November 19

IAS Concert Series
Beethoven: The Piano Sonatas, Program I
ROBERT TAUB, *Artist-in-Residence, IAS*

November 21

School of Mathematics
Combinatorics and Complexity Seminar:
"The Geometry of A -graded Algebras"
BERND STURMFELS, *Courant Institute*

Members Seminar: "Combinatorial Properties
of Kazhdan-Lusztig Polynomials"
FRANCESCO BRENTI, *IAS*

November 22

School of Historical Studies
 Medieval Seminar
 OLEG GRABAR, *Professor, School of Historical Studies, IAS*

School of Mathematics
 Geometry and Modular Varieties Seminar:
 "Iwahori-Hecke algebras and the geometry of
 Langlands Parameters"
 NEIL CRISS, IAS

Automorphic Forms/Representation Theory
 Seminar: "The Problem of Relating Classical
 Groups with $GL(n)$ " (continued)
 JAMES ARTHUR, IAS

School of Natural Sciences
 Astrophysics Talk: "Celestial Circles: The
 Archaeology of Pulsar Binaries"
 STERL PHINNEY, *California Institute of Technology*

November 23

School of Mathematics
 Special Geometry Seminar: "Monopoles and
 4-Manifolds" (continued)
 EDWARD WITTEN, *Professor, School of Natural
 Sciences, IAS*

November 28

School of Mathematics
 Members Seminar: "Self-organized Criticality
 and Singular Diffusion"
 JENNIFER CHAYES, IAS

School of Natural Sciences
 Theoretical Physics Seminar: "Non-Abelian
 Duality & the Phases of Supersymmetric
 Theories"
 N. SEIBERG, IAS

November 29

School of Historical Studies
 Medieval Seminar: Frühmittelalterliche
 Gesetzgeber und *iustitia* in Miniaturen
 weltlicher Rechtshandschriften"
 HUBERT MORDEK, IAS

School of Mathematics
 Geometry and Modular Varieties Seminar:
 "Geometric Langlands Correspondence, I"
 ALEXANDER BEILINSON, IAS

Automorphic Forms/Representation Theory
 Seminar: "The Problem of Relating Classical
 Groups with $GL(n)$ " (continued)
 JAMES ARTHUR, IAS

School of Natural Sciences
 Astronomy Talk: "Microlensing towards the
 Galactic Bulge and the Large Magellanic
 Cloud"
 DAVID BENNETT, *Lawrence Livermore
 Laboratory*

November 30

School of Mathematics
 Applied Math-Math Physics Seminar:
 "Asymptotic Behavior of the Flows of 2-
 Dimensional Ideal Incompressible Fluid for
 Large Time"
 ALEXANDER SHNIRELMAN, IAS

School of Natural Sciences
 Condensed Matter Seminar: "Renormaliza-
 tion Group Approach to Diffusion-Limited
 Reactions"
 BENJAMIN P. LEE, *University of Maryland/
 Institute for Physical Science and Technology*

School of Social Science
 Feminism & Environmentalism Seminar:
 Group Discussion of Bina Agarwal, "The
 Gender and Environment Debate: Lessons
 from India"; "Introduction: Transnational
 Feminist Practices and Questions of Post-
 modernity"; Donna Haraway, "The Promises
 of Monsters: A Regenerative Politics for
 Inappropriate/d Others"; and Chandra
 Mohanty, "Under Western Eyes"

December 1

School of Historical Studies
 Art History Colloquium: "Foreign Presences:
 Russian Artists in Berlin"
 STEVEN MANSBACH, IAS

Force in History Seminar: War, Art, and
 Cultural History
 "Some Comments on Cultural History"
 DONALD KELLEY, *Rutgers University*
 "Sun-tzu and the 'Art' of Warfare: Reflections
 on Classical Chinese Cosmology"
 ROGER AMES, *University of Hawaii*

"Art, Propaganda, and the Reality of War in a Drawing by Niklaus Manuel"

PETER PARET, *Professor, School of Historical Studies, IAS*

"War and Glory in the Hall of Battles of El Escorial"

JONATHAN BROWN, *New York University*

"The Stigma of Violence: The Experience of Mass Death in Germany, 1914-1964"

MICHAEL GEYER, *University of Chicago*

Magic & Religion Seminar: "Magic in 18th Century Hasidism"

MOSHE IDEL, *Princeton University*

School of Mathematics

Special Seminar: "An Action of the Galois Group Gal ($\sqrt[n]{Q}$) on Knots"

V. G. TURAEV, *Strasbourg*

Vassiliev Invariants Seminar: "Vassiliev Invariants and Motives"

PIERRE DELIGNE, *Professor, School of Mathematics, IAS*

Special Geometry Seminar: "Monopoles and 4-Manifolds"

EDWARD WITTEN, *Professor, School of Natural Sciences, IAS*

IAS, Princeton University, Rutgers University

Number Theory/Harmonic Analysis Seminar: "Galois Representations Occurring in the Selmer Group"

D. ROHRLICH, *Boston University*

School of Social Science

Luncheon Seminar: "Word Order; Natural Languages as Social Systems"

RICHARD ADELSTEIN, *IAS*

December 2

School of Historical Studies

Force in History Seminar: War, Art, and Cultural History

"From the Imperial to the Popular Legend of Napoleon Bonaparte during the July Monarchy"

BARBARA DAY, *Temple University*

"Otto Dix's Painting 'The Trench' and his Print Portfolio 'War,' the Tenth Anniversary of the Beginning of World War I, and the Imagery of War in the Early Weimar Republic"

REINHOLD HELLER, *University of Chicago*

"Three Representations of Force in Latter Han Shandong"

MARTIN J. POWERS, *University of Michigan*

"Commemorating War in Eighteenth Century China"

JOANNA WALEY-COHEN, *New York University*

School of Mathematics

Quantum Computing Workshop: "Quantum Versus Classical Information and Computation"

CHARLES BENNETT, *IBM Yorktown Heights*

"Can Quantum Mechanics Speed Up Prime Factorization"

PETER SHOR, *AT&T Bell Labs*

"Communication Complexity for Quantum Machines"

ANDREW YAO, *Princeton University*

"Compressing Quantum Information"

BENJAMIN SCHUMACHER, *Kenyon College*

Special Geometry Seminar: "Cohomology Rings of Symplectic Quotients"

SHAUN MARTIN, *Oxford University*

Tutorial on Mathematical Finance, III:

"Interest Rate-Sensitive Derivatives: a Survey on the Mathematical Modelling of Interest Rates and Applications"

MARCO AVELLANEDA, *IAS*

December 5

School of Mathematics

Combinatorics and Complexity Seminar:

"Local System Cohomology and the Folkman Complex"

HIROAKI TERAOKI, *University of Wisconsin*

Members Seminar: "Geometric Aspects of Graphs"

FAN CHUNG, *IAS*

December 6

School of Mathematics

Automorphic Forms/Representation Theory Seminar: "The Problem of Relating Classical Groups with GL(n)" (continued)

JAMES ARTHUR, *IAS*

Geometry and Modular Varieties Seminar:
"Geometric Langlands Correspondence, II"
ALEXANDER BEILINSON, IAS

December 7

Institute Lecture
"Crime and Punishment in Renaissance
Florence: The Case of Antonio Rinaldeschi"
GILES CONSTABLE, *Professor, School of
Historical Studies, IAS*

School of Mathematics
Applied Math/Math Physics Seminar: "Proba-
bility Density and Diagrammatic Technique
in the Turbulence of Waves"
VICTOR GURARIE, *Princeton University*

December 8

School of Historical Studies
Islamic Seminar
SONYA BRENTJES, IAS

Magic & Religion Seminar: "Ritual Expertise
in Roman Egypt and the Problem of the
Category 'Magician'"
DAVID FRANKFURTER, IAS

School of Mathematics
IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar:
"Cubic Theta Series"
N. PROSKURIN, *Steklov Institute*

Vassiliev Invariants Seminar: "Vassiliev
Invariants and Motives"
PIERRE DELIGNE, *Professor, School of
Mathematics, IAS*

School of Social Science
Luncheon Seminar: "Explaining Rising
Mortality among Men in Eastern Europe"
MARGARET WATSON, IAS

December 9

School of Mathematics
PDE Seminar: "Ginzburg-Landau Vortices:
Recent Development and Open Problem"
HAIM BREZIS, *Rutgers University*

Tutorial on Mathematical Finance, IV: "Non-
linear PDE's in Finance: Transaction Costs
and Markets with Uncertain Volatilities"
MARCO AVELLANEDA, IAS

December 12

School of Mathematics
Combinatorics and Complexity Seminar:
"Another Look at Szemerédi's Regularity
Lemma"
JÁNOS KOMLÓS, *Rutgers University*

School of Natural Sciences
Theoretical Physics Seminar: "Precision
Electroweak Test, Grand Unification, & the
Standard Model"
PAUL LANGACKER, *University of Pennsylvania*

December 13

School of Historical Studies
Medieval Seminar: "Ireland and Her
Neighbors in the Seventh Century"
MICHAEL RICHTER, IAS

School of Mathematics
Geometry and Modular Varieties Seminar:
"Geometric Langlands Correspondence, III"
ALEXANDER BEILINSON, IAS

Automorphic Forms/Representation Theory
Seminar: "The Problem of Relating Classical
Groups with $GL(n)$ " (continued)
JAMES ARTHUR, IAS

School of Natural Sciences
Astrophysics Talk: "What Will We Learn
from Observations of the Cosmic Microwave
Background"
DAVID SPERGEL, *Princeton University*

December 14

School of Mathematics
Applied Math-Math Physics Seminar: "Multi-
dimensional Generalizations of Subharmonic
Melnikov Theorems"
DAVID LEVERMORE, IAS

School of Natural Sciences
Condensed Matter Seminar: "Soluble Free-
Fermion Model in d Dimensions"
F. Y. WU, *Northeastern University*

School of Social Science

Feminism & Environmentalism Seminar:
Group Discussion of Lisa DiCaprio, "East
German Feminists: The Lila Manifesto";
Nanette Funk, "Feminism East & West" and
"The Fate of Feminism in Eastern Europe";
Lata Mani, "Multiple Mediations: Feminist
Scholarship in the Age of Multinational
Reception"; Mira Marody, "Why I Am Not a
Feminist ..."; and Anne Snitow and Nanette
Funk, articles in *Peace & Democracy News*

December 15

School of Historical Studies

Magic & Religion Seminar: "Cardano's
Cosmos: A Renaissance Astrologer Reads the
Book of Nature"
ANTHONY GRAFTON, *Princeton University*

School of Natural Sciences

Astrophysics Talk: "Ionization and Abun-
dances of Intergalactic Gas"
DAVID TYTLER, *University of California at San
Diego*

School of Social Science

Luncheon Seminar: "The Enlightenment
Project and Its Critics"
ROBERT WOKLER, *IAS*

December 16

School of Natural Sciences

Lunchtime Seminar: "Spacetime Aspects of
Quasi-Particle Propagation: Singular Masses,
Spin-Charge Separation & Quantum Drifts"
FRANK WILCZEK, *Professor, School of Natural
Sciences, IAS*

December 19

School of Mathematics

Members Seminar: "Bruhat-Tits Buildings and
the Representation Theory of P-adic Groups"
ALLEN MOY, *IAS*

December 20

School of Mathematics

Automorphic Forms/Representation Theory
Seminar: "Gelfand Pairs and Functoriality"
HERVÉ JACQUET, *IAS*

January 9

School of Natural Sciences

Theoretical Physics Seminar: "Manifest
Supersymmetry & the ADHM Construction
of Instantons"
A. GALPERIN, *John Hopkins University*

January 10

School of Natural Sciences

Astrophysics Talk: "A New Look at Magnetic
Reconnection"
ERIC BLACKMAN, *Harvard/Smithsonian
Center for Astrophysics*

January 11

School of Mathematics

The Eighteenth Marston Morse Memorial
Lectures: "Recent Developments in the
Topology of Quotient Space in Symplectic
and Algebraic Geometry" (I)
FRANCES KIRWAN, *Oxford University*

School of Social Science

Feminism & Environmentalism Seminar:
Discussion of Tsehai Berhane-Selassie, "A
Gendered Political Process: Women, War and
Conflict Resolution"
TSEHAI BERTHANE-SELASSIE, *IAS*

January 12

School of Historical Studies

Islamic Seminar

OLEG GRABAR, *Professor, School of Historical
Studies, IAS*

Magic & Religion Seminar: "Spell and Poem"
THOMAS GREENE, *IAS*

School of Mathematics

The Eighteenth Marston Morse Memorial
Lectures: "Recent Developments in the
Topology of Quotient Space in Symplectic
and Algebraic Geometry" (II)
FRANCES KIRWAN, *Oxford University*

Vassiliev Invariants Seminar: "Quantum
Invariants of Knots and the Kontsevich
Invariant"
CHRISTIAN KASSEL, *IAS*

School of Social Science
Luncheon Seminar: "Judgment after Objectivity"
PETER GALISON, IAS

January 13

School of Mathematics
The Eighteenth Marston Morse Memorial
Lectures: "Recent Developments in the
Topology of Quotient Space in Symplectic
and Algebraic Geometry" (III)
FRANCES KIRWAN, *Oxford University*

January 16

IAS Concert Series
Pre-Concert Lecture: "Beethoven: The Piano
Sonatas"
ROBERT TAUB, *Artist-in-Residence, IAS*

School of Mathematics
Kinetic Theory Seminar: "Introduction and
Some History"
DAVID LEVERMORE, IAS

January 17

IAS Concert Series
Beethoven: The Piano Sonatas, Program II
ROBERT TAUB, *Artist-in-Residence, IAS*

School of Mathematics
Geometry and Modular Varieties Seminar:
"Langlands Duality for Algebraic Surfaces"
VICTOR GINZBURG, *University of Chicago*

Automorphic Forms/Representation Theory
Seminar: "On the Automorphic Representa-
tions of Classical Groups"
JAMES ARTHUR, IAS

IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar:
"Geometric Properties of Arithmetic
Fuchsian Groups"
P. SCHMUTZ, *Eidgenössische Technische
Hochschule*

School of Social Science
Feminism & Environmentalism Seminar:
Discussion of Paulla Ebron and Anna Tsing,
"In Dialogue? Reading across Minority
Discourses"; Saidiya Hartman, "The Territory
between Us"; and Joan Scott, "Rereading the
History of Feminism"
ANNA TSING, IAS

January 18

School of Mathematics
Special Lecture Series: "Geometry of Non-
integrable Distributions" (I)
PHILLIP GRIFFITHS, *Director, IAS*

January 19

School of Mathematics
IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar:
"The Logarithmic Hardy-Littlewood-Sobolev
Inequality and Zeta Functions on Spheres"
CARLO MORPURGO, *University of Milan*

School of Social Science
Luncheon Seminar: "The Independent
Women's Movement in Russia; Current
Status and Strategies for the Future"
ANASTASIA POSADSKAYA, IAS

January 20

IAS Concert Series
Beethoven: The Piano Sonatas, Program II
ROBERT TAUB, *Artist-in-Residence, IAS*

School of Natural Sciences
Lunchtime Seminar: "An Open Universe
from Inflation"
MARTIN BUCHER, *Princeton University*

January 21

IAS Concert Series
Beethoven: The Piano Sonatas, Program II
ROBERT TAUB, *Artist-in-Residence, IAS*

January 23

School of Mathematics
Special Lecture Series: "Geometry of Non-
integrable Distributions" (II)
PHILLIP GRIFFITHS, *Director, IAS*

Members Seminar: "Fundamental Tones and
Buckling Loads of Clamped Plates"
RICHARD LAUGESSEN, IAS

Kinetic Theory Seminar: "Initial-Boundary
Value Problems for the Boltzmann Equation"
CARLO CERCIGNANI, IAS

January 24

School of Mathematics
 Geometry and Modular Varieties Seminar:
 "The Connection Between Geometric Lang-
 lands and the Bethe Ansatz"
 EDWARD FRENKEL, *Harvard University*

Automorphic Forms/Representation Theory
 Seminar: "On the Automorphic
 Representations of Classical Groups"
 (continued)
 JAMES ARTHUR, *IAS*

School of Natural Sciences
 Astrophysics Talk: "Myths about Inflation
 and the Microwave Background"
 PAUL STEINHARDT, *University of Pennsylvania*

January 25

Institute Lecture
 "Geometry in a Space of Configurations
 (Robot Arms, Roman Arches, and
 Suspension Bridges)"
 ROBERT MACPHERSON, *Professor, School of
 Mathematics, IAS*

School of Natural Sciences
 Condensed Matter Seminar: "Mobility,
 Stability and Structure of Surfaces"
 E. D. WILLIAMS, *University of Maryland*

School of Social Science
 Feminism & Environmentalism Seminar:
 Discussion of Mahnaz Afkhami, "Women in
 Post-Revolutionary Iran: A Feminist Perspec-
 tive"; and Afsanah Najmabadi, "Feminism in
 an Islamic Republic?"
 AFSANAH NAJMABADI, *IAS*

January 26

School of Historical Studies
 Magic & Religion Seminar: "Miracle, Magic,
 and Disenchantment in Early Modern
 Germany"
 PHILIP SOERGEL, *IAS*

School of Mathematics
 Special Seminar: "On Dilogarithm Identities"
 EDWARD FRENKEL, *Harvard University*

School of Social Science
 Luncheon Seminar: "The Interplay Between
 American and Dutch Medievalism: A Brief
 Survey and a Case Study in Historic
 Anthropology"
 ARNOLD A. J. BIJSTERVERELD, *Vrije Universiteit
 at Amsterdam*

January 27

School of Mathematics
 PDE Seminar: "Global Solutions for the
 Complex-Ginzburg-Landau Equation"
 DAVID LEVERMORE, *IAS*

January 30

School of Mathematics
 Combinatorics and Complexity Seminar:
 "Central Limit Theorem in Lattice Point
 Problems"
 JOZSEF BECK, *Rutgers University*

Members Seminar: "Counting Number Fields
 via Group Representations"
 DAVID WRIGHT, *IAS*

Kinetic Theory Seminar: "Entropy Inequal-
 ities and Dissipation Bounds in Kinetic Theory"
 ERIC CARLEN, *Georgia Institute of Technology*

January 31

School of Mathematics
 Geometry and Modular Varieties Seminar:
 "Jacquet Functors and Unrefined Minimal K-
 types"
 ALLEN MOY, *IAS*

Automorphic Forms/Representation Theory
 Seminar: "On the Automorphic Representa-
 tions of Classical Groups" (conclusion)
 JAMES ARTHUR, *IAS*

February 1

School of Mathematics
 Applied Math-Math Physics Seminar: "Weak
 Turbulence as a Squeezing"
 SERGEJ KUKSIN, *IAS*

School of Natural Sciences
 Condensed Matter Seminar: "Random
 Branched Growth and Diffusion-Limited
 Aggregation"
 THOMAS C. HALSEY, *Exxon Research*

February 2
 School of Historical Studies
 Magic & Religion Seminar: "Chaldean
 Oracles and the Hellenization of Magic"
 SARAH ILES JOHNSTON, *IAS*

School of Mathematics
 IAS, Princeton University, Rutgers University
 Number Theory/Harmonic Analysis Seminar:
 "New Estimates for Mean Values of Weyl
 Sums"
 KEVIN FORD, *IAS*

School of Social Science
 Luncheon Seminar: "Portraying the
 Monstrous Birth in Early Modern Germany"
 PHILIP SOERGEL, *IAS*

February 3
 School of Mathematics
 PDE Seminar: "Local and Global Estimates
 for the First and Second Eigenfunctions of a
 Convex Domain"
 DAVID JERISON, *MIT*

School of Natural Sciences
 Lunchtime Seminar: "Model-Independent
 Features of g -Loop String Amplitudes"
 RAINER DICK, *IAS*

February 6
 School of Mathematics
 Combinatorics and Complexity Seminar:
 "Using DNA to Solve NP-Complete
 Problems"
 RICHARD LIPTON, *Princeton University*

Kinetic Theory Seminar: "DiPerna-Lions
 Solutions of the Boltzmann Equation and
 Infinitesimal Well-posedness"
 DAVID LEVERMORE, *IAS*

Members Seminar: "Compactifications of
 Symmetric Spaces and Heat Kernel
 Asymptotics"
 LIZHEN JI, *IAS*

School of Natural Sciences
 Theoretical Physics Seminar: "Massive String
 States as Extreme Black Holes"
 MIKE DUFF, *Texas A&M*

February 7
 School of Historical Studies
 Medieval Seminar: Discussion of the text in
 MS St. Petersburg, Biblioteka Saltykova-
 Shchedrina, lat. F. v. I N. 22*

School of Mathematics
 Geometry and Modular Varieties Seminar:
 "Semistability and Fontaine's p -adic Hodge
 Structures"
 BURT TOTARO, *IAS*

Automorphic Forms/Representation Theory
 Seminar: "The Fundamental Lemma"
 THOMAS HALES, *IAS*

February 8
 School of Mathematics
 Applied Math-Math Physics Seminar:
 "Construction of Periodic and Quasi-periodic
 Solutions for Hamiltonian PDE"
 JEAN BOURGAIN, *Professor, School of
 Mathematics, IAS*

School of Social Science
 Feminism & Environmentalism Seminar: Dis-
 cussion of Robert Gottlieb, "Reconstructing
 Environmentalism: Complex Movements,
 Diverse Roots"; William Beinart, "The Politics
 of Colonial Conservation"; Ramachandra
 Guha, "Radical American Environmentalism
 and Wilderness Preservation: A Third World
 Critique"; Frederick Buttel, "Environmental-
 ization: Origins, Processes, and Implications
 for Rural Social Change"; Richard Grove,
 "The Origins of Environmentalism"; Sheila
 Foster, "Race(ial) Matters: The Quest for
 Environmental Justice"; and J. Peter Brosius,
 "Negotiating Citizenship in a Modified
 Landscape: The Case of Penan Hunter-Gath-
 erers in Sarawak, East Malaysia"
 YAAKOV GARB, *IAS*

February 9

School of Mathematics
IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar:
"Algebraic Geometry over \mathbb{Q} "
L. SZPIRO, *Columbia University*

School of Social Science
Luncheon Seminar: "Locating Global
Environmentalism"
ANNA TSING, *IAS*

February 10

School of Mathematics
PDE Seminar: "Some Properties of the Space
Homogeneous Boltzmann Equation"
BERT WENNBERG, *IAS*

February 13

School of Mathematics
Combinatorics and Complexity Seminar:
"Approximating the Tutte Polynomial of
Dense Graphs"
NOGA ALON, *Tel Aviv University*

Kinetic Theory Seminar: "Global Weak Solutions
for the Boltzmann Equation in a Slab"
CARLO CERCIGNANI, *IAS*

Members Seminar: "Fourier Coefficients of
Forms of Half-Integral Weight"
KAMAL KHURI-MAKDISI, *IAS*

February 14

School of Mathematics
Geometry and Modular Varieties Seminar:
"Local Character Expansions"
ALLEN MOY, *IAS*

Automorphic Forms/Representation Theory
Seminar: "The Fundamental Lemma"
(continued)
THOMAS HALES, *IAS*

School of Natural Sciences
Astrophysics Talk: "Quantum Gravity for
Cosmologists"
LEE SMOLIN, *IAS*

Theoretical Physics Seminar: "Diagrammatic
Analysis of Gauge Transformations"
HARRY LAM, *McGill University*

February 15

School of Mathematics
Special Lecture Series: "On the Search for
Finite Models of Renormalization"
ROBERT LANGLANDS, *Professor, School of
Mathematics, IAS*

School of Natural Sciences
Condensed Matter Seminar: "Scaling Properties
of DC Gel Electrophoresis of DNA"
GERARD BARKEMA, *Cornell University*

February 16

School of Historical Studies
Magic & Religion Seminar: "Unlimited
Energy and Limited Access: The Bamana
System of Spiritual Exchange"
SARAH BRETT-SMITH, *Rutgers University*

School of Mathematics
IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar:
"Lattice Point on a Small Arc"
ANTONIO CORDOBA, *Princeton University*

School of Social Science
Luncheon Seminar: "Rethinking African
Nationalism through Ethnicity: The Ethiopian
Case"
TSEHAI BERHANE-SELASSIE, *IAS*

February 17

School of Mathematics
PDE Seminar: "High and Low Frequencies of
Observation of Waves"
CLAÛDE BARDOS, *IAS*

School of Natural Sciences
Lunchtime Seminar: "On the Instanton
Contribution to the Masses of E_6 Singlets"
XENIA DE LA OSSA, *IAS*

February 20

School of Mathematics
Combinatorics and Complexity Seminar:
"Tiling the Line with Translates of One Tile"
JEFF LAGARIAS, *AT&T Labs*

Kinetic Theory Seminar: "Global Existence of
Isentropic Compressible Flow by a Kinetic
Model"
SHMUEL KANIEL, *Hebrew University*

Members Seminar: "Truncated Integrals of Theta Series"

JASON LEVY, IAS

School of Natural Sciences

Theoretical Physics Seminar: "New Tests of Supersymmetric Unification"

LARRY HALL, *University of California, Berkeley*

Theoretical Physics Seminar: "Some Recent Developments in Quantum Mechanics"

YAKIR AHARANOV, *University of South Carolina*

February 21

School of Historical Studies

Medieval Seminar: "Observations on Medieval Book-Lists, Especially of the Southern Low Countries"

ALBERT DEROLEZ, IAS

School of Mathematics

Geometry and Modular Varieties Seminar: "Shimura Varieties: the Geometric Side of the Zeta Function," I

JAMES MILNE, *University of Michigan*

Automorphic Forms/Representation Theory Seminar: "The Fundamental Lemma"

(continued)

THOMAS HALES, IAS

February 22

Institute Lecture

"The Politics of Rescue: Military Intervention in the World Today"

MICHAEL WALZER, *Professor, School of Social Science, IAS*

School of Mathematics

Applied Math-Math Physics Seminar: "Stability Criteria for Solutions of the 2d Euler Equation"

CLAUDE BARDOS, IAS

School of Social Science

Feminism & Environmentalism Seminar: Group Discussion of Brechin and Kempton, "Global Environmentalism: A Challenge to the Postmaterialism Thesis?"; Gaile McGregor, "Reconstructing Environment: A Cross-Cultural Perspective"; Sheila Foster, "Race(ial) Matters: The Quest for Environmental Justice"; and Robert Kaplan, "The Coming Anarchy"

February 23

School of Historical Studies

Art History Colloquium: "Paul Klee: 'Pointillism' and Politics"

PETER SPRINGER, IAS

School of Mathematics

Geometry and Modular Varieties Seminar: "Shimura Varieties: the Geometric Side of the Zeta Function," II

JAMES MILNE, *University of Michigan*

Special Seminar: "A New Algorithm for the Braid Group Word Problem"

PATRICK DEHORNOY, *University of Caen*

IAS, Princeton University, Rutgers University

Number Theory/Harmonic Analysis Seminar:

"Galois Structure Invariants Attached to Motives over Number Fields"

DAVID BURNS, *Kings College*

School of Natural Sciences

Condensed Matter Seminar: "Edge Excitations in Non-Abelian FQH States"

X. G. WEN, MIT

School of Social Science

Luncheon Seminar: "Mothers and the Making of Monsters in the 18th Century"

ROSI BRAIDOTTI, IAS

February 24

School of Mathematics

PDE Seminar: "Eigenvalues and Convexity"

BILL BECKNER, *University of Texas*

February 27

School of Mathematics
Combinatorics and Complexity Seminar: "A
Statistical Physics Approach to Trees,
Polymers and Optimization"
THOMAS SPENCER, *Professor, School of
Mathematics, IAS*

Kinetic Theory Seminar: "Diffusive
Approximation of a Kinetic Equation and
Automorphisms of the Torus"
CLAUDE BARDOS, *IAS*

Members Seminar: "How Many Lorentz
Surfaces Are There?"
TILLA WEINSTEIN, *IAS*

February 28

School of Mathematics
Geometry and Modular Varieties Seminar:
"Shimura Varieties: the Geometric Side of the
Zeta Function," III
JAMES MILNE, *University of Michigan*

Automorphic Forms/Representation Theory
Seminar: "The Fundamental Lemma"
(conclusion)
THOMAS HALES, *IAS*

March 1

School of Mathematics
Applied Math-Math Physics Seminar: "John's
Global Existence Theorem for Nonlinear
Wave Equations in Higher Dimension"
HANS LINDBLAD, *Princeton University*

Friends' Forum
"The Magic of the Golem"
PETER SCHÄFER, *IAS*

March 2

School of Historical Studies
Art History Colloquium: "Seeing and Know-
ing: An Interpretation of Pierre Chareau's
Glass House in Paris"
BRIAN BRACE TAYLOR, *IAS*

Magic & Religion Seminar: "At the Margins
of Magic, Science, and Religion: The Philoso-
phers' Game in Renaissance Europe"
ANN MOYER, *IAS*

School of Mathematics
Geometry and Modular Varieties Seminar:
"Shimura Varieties: the Geometric Side of the
Zeta Function" (conclusion)
JAMES MILNE, *University of Michigan*

IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar:
"Sums of Digits and Sieves"
E. FOUVRY, *Paris*

School of Social Science
Luncheon Seminar: "Eunuchs for the King-
dom of Heaven's Sake: Self-Castrators in
19th-Century Russia"
LAURA ENGLESTEIN, *Princeton University*

March 3

School of Mathematics
PDE Seminar: "Double-Periodic Solutions of
Quasilinear Cauchy-Riemann Equations"
SERGEJ KUKSIN, *IAS*

Special PDE Seminar: "Compensated Method
for Gas Dynamic DiPerna Methods Revisited"
BENOIT PERTHAME, *Paris VII*

School of Natural Sciences
Lunchtime Seminar: "Physical Predictions
from Quantum Gravity"
LEE SMOLIN, *IAS*

March 6

School of Mathematics
Combinatorics and Complexity Seminar: "On
 $q = -1$ "
JOHN STEMBRIDGE, *University of Michigan*

Kinetic Theory Seminar: "On the Fokker-
Planck-Landau Collision Operator of Plasma
Physics"
PIERRE DEGOND, *IAS*

Members Seminar: "Existence of Power Series
Solutions of O.D.E."
JOSE CANO, *IAS*

School of Natural Sciences

Theoretical Physics Seminar: "Perturbative Couplings of Vector Multiplets in $N=2$ Vacua of the Heterotic String"

JAN LOUIS, IAS

March 7

School of Historical Studies

Medieval Seminar: "The Opposition to Mysticism in Muslim Spain"

MARIBEL FIERRO, IAS

School of Mathematics

Geometry and Modular Varieties Seminar: "Categories of Representations and Local Langlands Philosophy"

WOLFGANG SOERGEL, *Freiburg, Germany*

Automorphic Forms/Representation Theory Seminar: "Lefschetz Numbers of Hecke Correspondences"

MARK GORESKY, IAS

School of Natural Sciences

Astrophysics Talk: "Dynamical Models for Elliptical Galaxies: Third Integrals, Cusps, and Triaxiality"

TIM DE ZEEUW, *Sterrewacht Leiden*

March 8

School of Mathematics

Geometry Seminar: "Actions of Noncompact Simple Groups on Lorentz Manifolds and Other Geometric Manifolds"

NADINE KOWALSKY, IAS

Special Kinetic Theory Seminar: "Kinetic Theory of Bubbly Flow"

GIOVANNI RUSSO, *University of L'Aquila*

Applied Math-Math Physics Seminar: "Geometry of Differential Equations"

LUCAS HSU, IAS

School of Social Science

Feminism & Environmentalism Seminar: Discussion of Anastasia Posadskaya, "The Women's Dimension of the Social Transformation: From Forum to Forum" and "Women's Studies in Russia: Prospects for a Feminist Agenda"; and Maxine Molyneux, " 'Women in Action: Country by Country'; 'The Soviet Union'; 'Interview with Anastasia Posadskaya' "

ANASTASIA POSADSKAYA, IAS

March 9

School of Historical Studies

Art History Colloquium: "Music and the Visual Arts: Their Relationship in Later Renaissance Thought"

ANN E. MOYER, IAS

Magic & Religion Seminar: "Between Religion and Magic: Some Witchcraft Trials in the Spanish Netherlands, 17th Century"

GUIDO MARNEF, IAS

School of Mathematics

IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar: "Heights, and Linear Equations in Variables which Lie in Multiplicative Groups"

WOLFGANG SCHMIDT, *University of Colorado*

School of Social Science

Luncheon Seminar: "The Death of Bertha Valentine: Science, Medicine and Public Health in Late 19th Century New York City"

EVELYNN HAMMONDS, IAS

School of Mathematics

PDE Seminar: "Uniqueness for the Sinh-Gordon Equation with Applications to Onsager's Theory of Turbulence"

MICHAEL KIESSLING, *Rutgers University*

March 13

IAS Concert Series

Pre-Concert Lecture: "Beethoven: The Piano Sonatas"

ROBERT TAUB, *Artist-in-Residence, IAS*

School of Mathematics
 Mathematical Problems in Finance
 Conference: "Reflected Backward Stochastic
 Differential Equations"
 ETIENNE PARDOUX, *Université de Provence*
 "Pricing Derivative Securities in Markets with
 Frictions"
 THALEIA ZARIPHPOULOU, *University of
 Wisconsin*

Combinatorics and Complexity Seminar:
 "Packing Points on a Sphere with Applica-
 tions to Statistics, Combinatorics, etc."
 NEIL SLOANE, *AT&T Bell Labs*

Kinetic Theory Seminar: "On the Fokker-
 Planck-Landau Collision Operator of Plasma
 Physics"
 PIERRE DEGOND, *IAS*

Members Seminar: "Growth of Varieties of
 Groups and Algebras and the Gelfand-
 Kirillov Dimension"
 SAMUEL VOVSİ, *IAS*

March 14

IAS Concert Series
 Beethoven: The Piano Sonatas, Program III
 ROBERT TAUB, *Artist-in-Residence, IAS*

School of Mathematics
 Mathematical Problems in Finance Conference:
 "International Quadratic Gaussian Model"
 NICOLE EL KAROUI, *Université Pierre et Marie
 Curie*
 "Convexity of European Option Prices"
 STEVEN SHREVE, *Carnegie Mellon University*
 "Swap Rates and Credit Quality"
 DARELL DUFFIE, *Stanford University*

Geometry and Modular Varieties Seminar:
 "Some Combinatorics of the Category $\mathcal{V}Cal$
 Q_S "
 WOLFGANG SOERGEL, *Freiburg, Germany*
 Automorphic Forms/Representation Theory
 Seminar: "Weighted Cohomology"
 MARK GORESKY, *IAS*

School of Natural Sciences
 Astrophysics Talk: "Faint Galaxies and QSO
 Absorption Lines"
 MASATAKA FUKUGITA, *Kyoto University*

March 15

School of Mathematics
 Mathematical Problems in Finance Conference:
 "There is No Nontrivial Hedging Portfolio for
 Option Pricing with Transaction Costs"
 HALIL METİ SONER, *Carnegie Mellon
 University*
 "Some Geometrical Observations about Interest
 Rate Models. Infinte Dimensional Models
 and Smoothness of the Yield Curve"
 RAPHAEL DOUADY, *École Normale Supérieure*
 "Long-Lived Information, Price Pressure and
 Volatility"
 KERRY BACK, *Washington University*

Geometry Seminar: "Some Computations of
 Formal Unipotent Monodromy Representa-
 tions of Braid Groups"
 CLAUDIO PROCESI, *University of Rome*

School of Natural Sciences
 Condensed Matter Seminar: "Coherent
 Periodic Oscillations"
 GEOFF GRINSTEIN, *IBM*

March 16

School of Mathematics
 Mathematical Problems in Finance Confer-
 ence: "Non-Linear PDE's and Diversification
 of Volatility Risk in Derivatives Markets"
 MARCO AVELLANEDA, *IAS/Courant Institute*
 "Models Margins: Nonlinear Techniques for
 Out-of-the-Money Positions"
 JEAN-MICHEL LASRY, *Caisse Autonome De
 Refinancement*
 "Arbitrage and Viability with Fixed Trading
 Costs"
 HEDI KALLAL, *Salomon Brothers*

School of Social Science
 Luncheon Seminar: "Change and Continuity
 in Environmental World View: The Politics
 of Rachel Carson's *Silent Spring*"
 YA AKOV GARB, *IAS*

March 17

IAS Concert Series
 Beethoven: The Piano Sonatas, Program III
 ROBERT TAUB, *Artist-in-Residence, IAS*

School of Mathematics

Mathematical Problems in Finance Conference:
"Estimating the Dynamics of Short Term
Interest Rates"
JOSÉ SCHEINKMAN, *University of Chicago*

March 18

IAS Concert Series
Beethoven: The Piano Sonatas, Program III
ROBERT TAUB, *Artist-in-Residence, IAS*

March 20

School of Mathematics
Combinatorics and Complexity Seminar:
"Graphs, Eigenvalues and Optimization"
LASZLO LOVASZ, *Yale University*

Kinetic Theory Seminar: "Monte Carlo
Methods for the Boltzmann Equation"
WILLIAM MOROKOFF, *IAS*

Members Seminar: "Connected Shimura
Varieties and the Langlands and Rapoport
Conjecture"
MATTHIAS PFAU, *IAS*

School of Natural Sciences

Theoretical Physics Seminar: "SO(10) Sym-
metry & the Puzzle of Quark & Lepton Masses"
K. S. BABU, *Bartol Research Institute*

March 21

School of Historical Studies
Medieval Seminar: "How Should We Read
the Letters of Alcuin?"
DONALD BULLOUGH, *IAS*

School of Mathematics

Geometry and Modular Varieties Seminar:
"Koszul Duality and Representation Theory"
WOLFGANG SOERGEL, *Freiburg, Germany*

Automorphic Forms/Representation Theory
Seminar: "Weighted Cohomology" (continued)
MARK GORESKY, *IAS*

School of Natural Sciences

Astrophysics Talk: "How Soon Will We Know
the Correct Solution to the Solar Neutrino
Problem?"
FLAMEN KRASSTEV, *IAS*

March 22

School of Mathematics
Geometry Seminar: "Perverse Sheaves and
the Langlands Dual Group"
BURT TOTARO, *IAS*

Special Lecture Series: "Diophantine
Equations and Diophantine Approximation"
ENRICO BOMBIERI, *Professor, School of
Mathematics, IAS*

Applied Math-Math Physics Seminar: "Non-
equilibrium States in Model Microscopic
Systems and the Structure of Shocks"
JOEL LEBOWITZ, *Rutgers University*

School of Social Science

Feminism & Environmentalism Seminar:
Discussion of Tsehai Berhane-Selassie,
"Transitions, Environments, Translations:
The Meanings of Feminism in Contemporary
Politics"
TSEHAI BERHANE-SELASSIE, *IAS*

March 23

School of Historical Studies
Art History Colloquium: "Christian Imagery
and the Theology of Schism"
ALEXEI LIDOV, *IAS*

Magic & Religion Seminar: "Magic and Reli-
gion in Arabic Classifications of Science and
Encyclopedias: About Miracles and Miracle
Performers"
SONJA BRENTJES, *IAS*

Magic & Religion Seminar: "Magic, Prophecy,
and Ritual in Andalusi Society (Islamic
Spain)"
MARIBEL FIERRO, *IAS*

School of Mathematics
Automorphic Forms/Representation Theory
Seminar: "Weighted Cohomology" (conclusion)
MARK GORESKY, *IAS*

IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar:
"Heights of Subvarieties Over M-Fields"
W. GUBLER, *IAS*

School of Social Science

Luncheon Seminar: "From the Heavens to the Trading Floor: Viewing the Stock Exchange's Spectacle of Prophecy"

KIARAN HONDERICH, IAS

March 24

School of Mathematics

PDE Seminar: "Asymptotic Behavior in the Fluid Dynamic Limit for the Broadwell Equations"

ZHOUPING XIN, *Courant Institute*

School of Natural Sciences

Lunchtime Seminar: "String Unification"

ALON FARAGGI, IAS

School of Social Science

Baker Institute/Institute for Advanced Study

Meeting in Honor of Albert O. Hirschman:

"United States-Mexican Relations and Implications for Hemispheric Trade"

JAMES D. WOLFENSOHN, *President-elect of The World Bank and Chairman, IAS*

JAMES A. BAKER III, *Former Secretary of State of the United States*

LUIS TÉLLEZ, *Chief of Staff of the Presidency of the Republic of Mexico*

March 27

School of Historical Studies

Magic Symposium: "Good and Bad Accounts of Graeco-Roman Magic?"

RICHARD GORDON, *Munich*

"Jewish Magic in the Greek Magical Papyri"

HANS DIETER BETZ, *University of Chicago*

"Jewish Liturgy and Magic"

PETER SCHÄFER, *Freie Universität Berlin*

Panel: "Greek Magic"

HANS DIETER BETZ, *University of Chicago*

CHRISTOPHER FARAONE, *University of Chicago*

DAVID FRANKFURTER, *College of Charleston*

JOHN GAGER, *Princeton University*

RICHARD GORDON, *Munich*

FRITZ GRAF, *University of Basel*

SARAH JOHNSTON, *Ohio State University*

"How to Cope with a Difficult Life: Magic in Greece and Rome"

FRITZ GRAF, *University of Basel*

School of Mathematics

Combinatorics and Complexity Seminar: "Subspace Arrangements and Complexity"

ANDERS BJÖRNER, *Sweden*

Members Seminar: "The De Rham

Cohomology of Schemes with Group Action"

GEORGE PAPPAS, IAS

School of Natural Sciences

Workshop on Applied Kinetic Theory:

"Hydrodynamical Models for Carrier Transport in Semiconductors"

MARCELLO ANILE, *Citta' Universitaria*

"Transport Coefficients of Plasmas and Semiconductors"

PIERRE DEGOND, *IAS/Université Paul Sabatier*

"A Vlasov Description of the Euler Equation"

PETER SMERKA, *University of Michigan*

"Moment Closures for Kinetic Theories"

DAVID LEVERMORE, *IAS/University of Arizona*

March 28

School of Historical Studies

Magic Symposium: "Language, Signs, and Magic"

THOMAS GREENE, *Yale University*

"Christian Magic and the Rights of Women:

The Ninth-Century Lothar Crystal"

VALERIE FLINT, *University of Auckland*

"Magic and Politics in Early Modern Europe"

STUART CLARK, *University of Swansea*

"The Heidelberg Magical Book of Mary and the Angels"

MARVIN MEYER, *Chapman University*

"Magic and Theology in Ancient Egypt"

JAN ASSMAN, *University of Heidelberg*

School of Mathematics

Geometry Seminar: "Refined Gromov-Witten Invariants"

MAXIM KONTSEVICH, *University of California, Berkeley*

School of Natural Sciences

Astrophysics Talk: "The Distribution of Mass and Gas in the Center of Clusters of Galaxies Implied by X-Ray and Lensing Observations"

JORDI MIRALDA-ESCUDE, IAS

Workshop on Applied Kinetic Theory: "A Generalization of the Hydrodynamic Model Equations to Arbitrary Order Movements Using Variable Coordinate System Galerkin Methods"

CHRISTIAN RINGHOFER, *Arizona State University*

"On a Macroscopic Quantum Fluid Model"
INGENUIN GASSER, *Technische Universität Berlin*

"On a 35-Moment Closure for the Boltzmann Equation of Gaskinetic Theory"

CLINTON GROTH, *University of Michigan*

"Applications of Moment Methods to Fluid Dynamics"

WILLIAM MOROKOFF, *IAS*

March 29

School of Mathematics

Geometry Seminar: "M. Reid's Conjecture and Mirror Symmetry"

MAXIM KONTSEVICH, *University of California, Berkeley*

Special Seminar: "Matrix Methods in Combinatorial Group Theory"

VLADIMIR SHPILRAIN, *Ruhr-Universität Bochum*

Workshop on Applied Kinetic Theory: "Self-Consistent Relaxation-Time Models in Quantum Mechanics"

ANTON ARNOLD, *Purdue University*

"Homogenization and Wigner Functions"

PETER MARKOWICH, *Technische Universität Berlin*

School of Social Science

Feminism & Environmentalism Seminar: Discussion of "Feminism in Post-Communist Russia and the Ukraine"

SVETLANA KUPRYAHSKINA and ANASTASIA POSADSKAYA, *IAS*

Friends' Forum

"Footprints of the Human Experience"

JOHN NOBLE WILFORD, *Senior Science Writer, The New York Times*

March 30

School of Mathematics

IAS, Princeton University, Rutgers University
Number Theory/Harmonic Analysis Seminar: "Matching Universal Deformation Rings with Hecke Algebras"

FRED DIAMOND, *Cambridge*

School of Natural Sciences

Workshop on Applied Kinetic Theory: "The Semiclassical Limit in a One Dimensional Periodic Medium with an External Potential"

PATRICK GERARD, *IAS/Université de Paris-Sud*

"Existence and Uniform Bounds for Steady Fluid-Poisson Models"

IRENE GAMBA, *Courant Institute*

"A Maxwellian Lower Bound for Solutions of the Boltzmann Equation"

BERNT WENNBERG, *IAS/Chalmers University of Technology*

"New Results of Regularization for the Boltzmann Equation"

LAURENT DESVILLETES, *Université d'Orleans*

School of Social Science

Luncheon Seminar: "The Literary Critic as Intellectual in Twentieth-Century Britain (and some Other Places)"

STEFAN COLLINI, *IAS*

Feminism & Environmentalism Seminar:

Discussion of Yaakov Garb, "Gender,

Environment, Women, Nature, and Beyond"

YAAKOV GARB and ANNA TSING, *IAS*

March 31

School of Mathematics

PDE Seminar: "Local Solvability for a Class of Overdetermined Systems of Vector Fields"

F. TREVES, *Rutgers University*

School of Natural Sciences

Workshop on Applied Kinetic Theory: "Gas-Kinetic Schemes for the Compressible Flow Simulations"

KUN XU, *Princeton University*

"Rigorous Derivation of the Incompressible

Navier Stokes Limit at Low Reynolds Number"

CLAUDE BARDOS, *IAS/ENS Cachan*

April 3

School of Mathematics
Combinatorics and Complexity Seminar:
"Spectral Techniques in Computational
Geometry"
BERNARD CHAZELLE, *Princeton University*

School of Natural Sciences
Theoretical Physics Seminar: "Towards a Uni-
fied Origin of Families, Forces & Mass Scales"
JOGESH PATI, *IAS*

April 4

School of Historical Studies
Medieval Seminar: "A Marian Icon in the
Life of a Convent: The Madonna of San
Sisto"
ANNE CLARK, *IAS*

School of Mathematics
Geometry and Modular Varieties Seminar:
"Galois Representations from the Mod p
Cohomology of $SL(3, Z)$ "
MARK McCONNELL, *IAS*

Automorphic Forms/Representation Theory
Seminar: "Unpublished Work of Bernstein on
 p -adic Groups"
NEIL CRISS, *IAS*

School of Natural Sciences
Astrophysics Talk: "Gaseous Galactic Haloes
and QSO Absorption Line Systems"
HOJUN MO, *Max-Planck-Institut für Astro-
physik, Munich*

April 5

School of Mathematics
Special Seminar: "Examples of Compact
Energy Surfaces in $S^1 \times Bbb R^{2p}$, $2p \geq 6$,
with No Periodic Orbits"
MICHAEL HERMAN, *Princeton University*

Applied Math-Math Physics Seminar: "Flux
Line Correlations in Two Dimensions"
CHRISTOPHER KING, *Northeastern University*

School of Social Science
Feminism & Environmentalism Seminar:
Discussion of draft of Conference Paper
PEGGY WATSON, *IAS*

April 6

School of Mathematics
IAS, Princeton University, Rutgers University
Harmonic Analysis and Number Theory
Seminar: "The Cohen-Lenstra Heuristic"
J. K. YU, *Princeton University*

School of Natural Sciences
Astrophysics Talk: "The Latest on Neutron
Star Planets"
ALEKSANDER WOLSZCZAN, *Pennsylvania
State University*

School of Social Science
Luncheon Seminar: "Constructing a Hybrid
Polity and Economy: The Internal Transfor-
mation of Hungarian Socialism"
ANNAMARIA SELENY, *IAS*

April 7

School of Mathematics
Special Mathematics Seminar: "Smoothing
Estimates for the Wave Equation"
MATEI MACHEDON, *IAS*

School of Natural Sciences
Lunchtime Seminar: "Elusive Order Param-
eters for Non-Abelian Gauge Theories"
HOL-KWONG LO, *IAS*

School of Social Science
Seminar in Honor of Professor Albert O.
Hirschman on his 80th Birthday:
"Development and Poverty: General Theories
and Particular Cases"
JAMES D. WOLFENSOHN, *President-elect, The
World Bank and Chairman, IAS*
PHILLIP A. GRIFFITHS, *Director, IAS*
MICHAEL S. McPHERSON, *Williams College*
EMMA ROTHSCILD, *King's College, Cambridge*
THOMAS R. ROBINSON, *Merrill Lynch*
RUTH CORREA LEITE CARDOSO, *First Lady
of Brazil*
JOSÉ SERRA, *Minister of Planning, Brazil*
PAUL ROMER, *University of California, Berkeley*
AMARTYA SEN, *Harvard University*

April 10

School of Mathematics
Combinatorics and Complexity Seminar:
"Chain Enumeration in Polytopes"
L. J. BILLERA, *Cornell University*

April 11

School of Natural Sciences
Astrophysics Talk: "Mass Estimates of Clusters
and the Baryon Fraction of the Universe"
GUS EVRARD, *University of Michigan*

April 12

School of Mathematics
Applied Math-Math Physics Seminar:
"Percolation in a 3D Vortex Gas as a Model
for the Lambda Transition"
JAMES AKAO, *IAS*

School of Natural Sciences
Condensed Matter Seminar: "Incoherence of
Hopping between Coupled Luttinger Liquids"
STEVE STRONG, *NEC, Princeton*

Sackler Colloquium Series: "Observation of
Top Quark Production in $\bar{p} - p$ Collisions"
BRUCE BARNETT, *Johns Hopkins University*

April 13

School of Mathematics
IAS, Princeton University, Rutgers University
Harmonic Analysis and Number Theory
Seminar: "Aspects of Automorphic Functions
in Transcendence Theory"
PAULA COHEN, *Paris*

School of Social Science
Luncheon Seminar: "'Culture': A Cultural
History"
ADAM KUPER, *IAS*

April 17

School of Mathematics
Combinatorics and Complexity Seminar:
"Combinatorial Methods in Homological
Algebra"
G. C. ROTA, *Massachusetts Institute of Technology*

Kinetic Theory Seminar: "Shock Profiles in
Kinetic Theory"
FRANCOIS GOLSE, *IAS*

April 18

School of Natural Sciences
Astrophysics Talk: "Some Unusual Molecular
Clouds in the Galaxy"
PAWAN KUMAR, *MIT*

April 19

School of Mathematics
Mathematics Lecture Series: "Cauchy
Rotations and Monotonicity of Maps"
LUIS A. CAFFARELLI, *Professor, School of
Mathematics, IAS*

Applied Math-Math Physics Seminar: "On A
Forest-Fire Cellular Automaton Model"
HOI FUNG CHAU, *IAS*

April 20

School of Mathematics
IAS, Princeton University, Rutgers University
Harmonic Analysis and Number Theory Sem-
inar: "Zeta Functions of Curves in Families
with Large Monodromy and Applications to
the Geometry of Curves and their Jacobians"
N. CHAVDAROV, *Princeton University*

School of Social Science
Luncheon Seminar: "Russian Jewish Social
Structure and Russian Jewish Immigration to
the United States, ca. 1900: New Evidence
from Russian Census and American
Immigration Records"
JOEL PERLMANN, *IAS*

April 21

School of Mathematics
PDE Seminar: "An Invariant for Yamabe Type
Flows in Dimension $n \geq 4$ "
ABBAS BAHRI, *IAS*

School of Natural Sciences
Lunchtime Seminar: "Exactly Marginal
Operators & Duality in Four-Dimensional
 $N=1$ Supersymmetric Gauge Theory"
ROBERT G. LEIGH, *Rutgers University*

April 24

School of Mathematics
Combinatorics and Complexity Seminar:
"Some Applications of Algebraic Geometry to
Combinatorics"
RICHARD STANLEY, *MIT*

Special Seminar: "Holomorphic Bundles over
a Hyperkaehler Manifold"
MISHRA VERBITSKY, *Harvard University*

April 25

School of Natural Sciences
Astrophysics Talk: "A New Class of Binary Pulsars"
VICTORIA KASPI, *California Institute of Technology*

April 26

School of Mathematics
Applied Math-Math Physics Seminar: "On the Driven Burgers Equation"
VICTOR YAKHOT, *Princeton University*

School of Natural Sciences
Condensed Matter Seminar: "Quantum Computing Using Spins"
D. V. DIVENCENZO, *IBM*

April 27

IAS Concert Series
The Moscow Conservatory Trio

School of Mathematics
IAS, Princeton University, Rutgers University
Harmonic Analysis and Number Theory Seminar: "Counting Rational Points on Curves"
L. CAPORASO, *University of Rome II* and *Harvard University*

April 27 - 29

School of Natural Sciences
Astrophysics Conference: "Some Unsolved Problems in Astrophysics"
JOHN N. BAHCALL, *Professor, School of Natural Sciences, IAS, Scientific Organizing Chairman*
PIET HUT, *Professor, School of Natural Sciences, IAS, Local Organizing Chairman*

School of Social Science
Luncheon Seminar: "Hypocrisy and Self-Deception"
DANIEL STATMAN, *IAS*

April 28

School of Mathematics
PDE Seminar: "Application to Scalar-Curvature Problems on High-Dimensional Standard Spheres"
ABBAS BAHRI, *IAS*

April 30

School of Social Science
Feminism in Global Perspective Conference: "Transitions, Environments, Translations: The Meanings of Feminism in Contemporary Politics" (joint conference with the Rutgers University Institute for Research on Women)
JOAN W. SCOTT, *Professor, School of Social Science, IAS*

May 1

School of Natural Sciences
Theoretical Physics Seminar: "Computation of Heavy-Light Decay Constants in Lattice QCD"
URS HELLER, *SCRI*

Theoretical Physics Seminar: "Geometric Entropy for Matrix Models & Strings"
SUMIT DAS, *Tata Institute of Fundamental Research*

May 2

School of Natural Sciences
Astrophysics Talk: "Weak Lensing by Large-Scale Structure: Theory and Observations"
JENS VILLUMSEN, *Max-Planck-Institut für Astrophysik*

May 3

School of Social Science
Feminism & Environmentalism Seminar: Discussion of Zaki Pathak, "Re-Cognising the Academy/Defamiliarising Practices—the Scene of a Feminist Pedagogy"
ZAKIA PATHAK, *IAS*

May 5

Institute Lecture
"The Rhetoric of Crisis in Higher Education"
JOAN W. SCOTT, *Professor, School of Social Science, IAS*

School of Natural Sciences
Physics Seminar: "From Two to Four, in an Hour (or More)"
SAMSON SHATASHVILI, *IAS*

- May 9
School of Natural Sciences
Astrophysics Talk: "Highest Energy Cosmic Rays and Gamma-Ray Bursts"
ELI WAXMAN, *IAS*
- Theoretical Physics Seminar: "Action Principle, State Counting & Statistical Thermodynamics of Black Holes"
CLAUDIO TEITELBOIM, *IAS*
- May 10
School of Natural Sciences
Condensed Matter Seminar: "Widsom of Pearls: Dynamic Shape Transformations in Membranes Induced by Laser Tweezers"
PHILIP NELSON, *University of Pennsylvania*
- School of Social Science
Feminism & Environmentalism Seminar: Discussion of Bina Agarwal, "Gender, Environment and Collective Action"
BINA AGARWAL, *IAS*
- May 11
School of Mathematics
IAS, Princeton University, Rutgers University
Harmonic Analysis/Number Theory Seminar: "Recent Progress on the Structure Theory of Set Addition"
JEAN-MARC DESHOUILLEERS, *University of Bordeaux II*
- May 16-19
IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics: "Vibrating Strings, Beams and Membranes: Finding Their Properties from Nodes or Nodal Lines"
JOYCE McLAUGHLIN, *Rensselaer Polytechnic Institute*
"Nonlinear Hyperbolic Partial Differential Equations"
BARBARA KEYFITZ, *University of Houston*
- May 17
IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics: "Mathematical Models of Cardiac Components"
JANE CRONIN SCANLON, *Rutgers University*
- School of Natural Sciences
Astrophysics Talk: "The Evolution of Galaxies in Different Environments"
JACQUELINE VAN GORKOM, *Columbia University*
- Condensed Matter Seminar: "Piezoelectricity of Cholesteric Elastomers"
ROBERT PELCOVITS, *Brown University*
- May 18
IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics: "Numerical Methods for Compressible Interfaces"
SMADAR KARNI, *Courant Institute*
- "Zippers and Velcro: The Geometry of Surfaces"
SARAH GREENWALD, *University of Pennsylvania*
- May 19
IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics: "Hysteresis, Discrete Memory, and Nonlinearity in Rocks"
KATHERINE MCCALL, *Los Alamos National Laboratory*
- School of Natural Sciences
Lunchtime Seminar: "Non-Thermal Character of Black Hole Radiation"
FRANK WILCZEK, *Professor, School of Natural Sciences, IAS*
- May 20
IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics: "Bäcklund Transformations Revisited"
KAREN UHLENBECK, *University of Texas at Austin*
- May 22-25
IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics: "Vibrating Strings, Beams and Membranes: Finding Their Properties from Nodes or Nodal Lines"
JOYCE McLAUGHLIN, *Rensselaer Polytechnic Institute*
"Topics in Fluid Dynamics"
SUSAN FRIEDLANDER, *University of Illinois at Chicago*

May 22

IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics:
"Introduction to Composite Materials"
KAREN CLARK, *Trenton State College*

May 23

IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics:
"The Essence of Waves and Graphs"
FAN CHUNG, *University of Pennsylvania*

"Diophantine Approximation"

LAN WANG, *IAS*

May 24

IAS/Park City Mathematics Institute
Mentoring Program for Women in Mathematics:
"Reflections of Shock Waves"
SUNCICA CANIC, *Iowa State University*

School of Natural Sciences

Condensed Matter Seminar: "Shear Alignment and Instability of Smectic Phases"
MARK GOULIAN, *Exxon Research and Engineering*

June 2

School of Natural Sciences
Lunchtime Seminar: "Interacting Fixed Points in N=2 Supersymmetric SU(3) Gauge Theory"
PHILIP ARGYRES, *IAS*

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, 1995, 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, 1995, 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.

September 1, 1995

DeBette & Touche LLP

BALANCE SHEET
 JUNE 30, 1995 (WITH COMPARATIVE TOTALS FOR 1994)

ASSETS	1995	1994
OPERATING FUNDS:		
Cash and temporary investments	\$ 209,496	\$ 250,256
Accounts Receivable	146,755	94,129
Government grants and contracts receivable	1,205,876	1,238,090
Accrued income on investments	1,343,451	1,494,018
Prepaid and other assets	419,580	400,697
Due from endowment fund	<u>700,000</u>	<u>1,200,000</u>
TOTAL OPERATING FUNDS	<u><u>\$ 4,025,158</u></u>	<u><u>\$ 4,677,190</u></u>
PLANT FUNDS:		
Short-term investments (Note B)	\$ 7,306	\$ 252,542
Unamortized debt issuance expense	107,629	116,888
Land, buildings and improvements, equipment and rare book collection - net (Note C)	<u>25,338,888</u>	<u>25,350,171</u>
TOTAL PLANT FUNDS	<u><u>\$ 25,453,823</u></u>	<u><u>25,719,601</u></u>
ENDOWMENT AND SIMILAR FUNDS:		
Investments, at cost (Note B)	\$ 237,669,844	\$ 230,259,227
 TOTAL ENDOWMENT AND SIMILAR FUNDS	 <u><u>\$ 237,669,844</u></u>	 <u><u>\$ 230,259,227</u></u>

See notes to financial statements.

LIABILITIES AND FUND BALANCES	1995	1994
OPERATING FUNDS:		
Accounts payable and accrued expenses	\$ 1,042,446	\$ 1,299,427
Deferred restricted revenue (Note F)	2,964,162	3,377,700
Fund balance - unrestricted	18,550	63
	<u>4,025,158</u>	<u>4,677,190</u>
TOTAL OPERATING FUNDS	<u>\$ 4,025,158</u>	<u>\$ 4,677,190</u>
PLANT FUNDS:		
Long-term debt (Note D)	\$ 16,502,365	\$ 16,898,418
Fund balance	8,951,458	8,821,183
	<u>25,453,823</u>	<u>25,719,601</u>
TOTAL PLANT FUNDS	<u>\$ 25,453,823</u>	<u>\$ 25,719,601</u>
ENDOWMENT AND SIMILAR FUNDS:		
Due to operating funds	\$ 700,000	\$ 1,200,000
Accrued investment management fees	3,346,364	437,637
Fund balances:		
True endowment	52,626,454	49,101,876
Quasi-endowment:		
Restricted	19,467,024	18,974,509
Unrestricted:		
Designated	14,876,417	14,217,581
Undesignated	146,653,585	146,327,624
	<u>237,669,844</u>	<u>230,259,227</u>
TOTAL ENDOWMENT AND SIMILAR FUNDS	<u>\$ 237,669,844</u>	<u>\$ 230,259,227</u>

STATEMENT OF SUPPORT AND REVENUE, EXPENSES, CAPITAL ADDITIONS
AND CHANGES IN FUND BALANCES YEAR ENDED JUNE 30, 1995
(WITH COMPARATIVE TOTALS FOR 1994)

	OPERATING FUNDS	
	UNRESTRICTED	RESTRICTED
SUPPORT AND REVENUE:		
Endowment income	\$ 6,280,364	\$ 2,525,946
Less management fees	(2,854,300)	(1,147,994)
Private gifts and grants	1,500	1,837,436
Government grants and contracts		<u>3,811,288</u>
Total support and revenue	<u>3,427,564</u>	<u>7,026,676</u>
EXPENSES:		
School of Mathematics	1,417,703	2,360,683
School of Natural Sciences	1,700,994	2,167,680
School of Historical Studies	1,889,451	957,967
School of Social Science	33,000	1,681,090
Libraries and other academic expenses	1,445,198	1,250,475
Administration and general	3,448,652	12,742
Auxiliary activity - tenants' housing expenses net of unrestricted revenue of \$190,713 in 1995	<u>61,677</u>	<u>94,245</u>
Total expenses	<u>9,996,675</u>	<u>8,524,882</u>
DEFICIENCY OF SUPPORT AND REVENUE OVER EXPENSES BEFORE CAPITAL ADDITIONS	(6,569,111)	(1,498,206)
CAPITAL ADDITIONS:		
Gifts and grants		
Realized gain on investments - net		
Gain (loss) on sale of plant assets		
Total capital additions		
(DEFICIENCY) EXCESS OF SUPPORT AND REVENUE OVER EXPENSES AFTER CAPITAL ADDITIONS	(6,569,111)	(1,498,206)
FUND BALANCES AT BEGINNING OF YEAR	63	
TRANSFERS:		
Plant acquisitions and principal debt service payments and other, net	(2,278,901)	
Quasi-endowment funds utilized	9,039,438	1,572,456
Transfers to other endowment and similar funds	<u>(172,939)</u>	<u>(74,250)</u>
FUND BALANCES AT END OF YEAR	\$ <u>18,550</u>	\$ <u>-</u>

See notes to financial statements.

FINANCIAL STATEMENTS

TOTAL	PLANT FUNDS	ENDOWMENT AND SIMILAR FUNDS	TOTAL 1995 ALL FUNDS	TOTAL 1994 ALL FUNDS
8,806,310			\$ 8,806,310	\$ 7,966,779
(4,002,294)			(4,002,294)	(2,713,247)
1,838,936			1,838,936	1,778,778
3,811,288			<u>3,811,288</u>	<u>3,753,309</u>
<u>10,454,240</u>			<u>10,454,240</u>	<u>10,785,619</u>
3,778,386	\$ 465,512		4,243,898	3,989,867
3,868,674	496,439		4,365,113	4,801,401
2,847,418	312,805		3,160,223	3,056,473
1,714,090	145,993		1,860,083	1,537,040
2,695,673	117,329		2,813,002	2,427,055
3,461,394	286,815		3,748,209	3,600,313
<u>155,922</u>	<u>117,816</u>		<u>273,738</u>	<u>281,935</u>
<u>18,521,557</u>	<u>1,942,709</u>		<u>20,464,266</u>	<u>19,694,084</u>
(8,067,317)	(1,942,709)		(10,010,026)	(8,908,465)
	136,303	\$ 1,891,363	2,027,666	2,306,784
		13,108,632	13,108,632	27,285,475
	<u>24,380</u>		<u>24,380</u>	<u>157,548</u>
	<u>160,683</u>	<u>14,999,995</u>	<u>15,160,678</u>	<u>29,749,807</u>
(8,067,317)	(1,782,026)	14,999,995	5,150,652	20,841,342
63	8,821,183	228,621,590	237,442,836	216,601,494
(2,278,901)	2,278,901			
10,611,894		(10,611,894)		
(247,189)	(366,600)	613,789		
<u>18,550</u>	<u>\$ 8,951,458</u>	<u>\$ 233,623,480</u>	<u>\$242,593,488</u>	<u>\$237,442,836</u>

STATEMENT OF CHANGES IN FINANCIAL POSITION
YEAR ENDED JUNE 30, 1995 (WITH COMPARATIVE TOTALS FOR 1994)

	OPERATING FUNDS	PLANT FUNDS
RESOURCES PROVIDED BY:		
Deficiency of support and revenue over expenses before capital additions:	\$ (8,067,317)	\$ (1,942,709)
Capital additions:		
Gifts and grants		136,303
Realized gain on investments - net		
Gain on sale of plant assets		<u>24,380</u>
Excess (deficiency) of support and revenue over expenses after capital additions	<u>(8,067,317)</u>	<u>(1,782,026)</u>
Items not using (providing) resources:		
Depreciation		1,942,709
Gain on sale of investments - net		
Proceeds from sale of investments		245,236
Decrease in receivables		
Decrease in accrued income	150,567	
Decrease in unamortized debt service expense		9,259
Increase in payables		
Increase in trust fund obligations		
Increase in accrued management fees		
Increase in deferred restricted revenue		
Increase in interfund - payables		
Decrease in interfund - receivables	<u>500,000</u>	
Total resources (used in) provided by	<u>(7,416,750)</u>	<u>415,178</u>
RESOURCES USED:		
Purchase of investments		
Purchase of plant facilities and equipment		1,931,426
Increase in interfund - receivables		
Decrease in interfund - payables		
Increase in receivables	20,412	
Increase in prepaid and other assets	18,883	
Decrease in payables	256,981	
Decrease in deferred restricted revenue	413,538	
Reduction of long-term debt		396,053
Decrease in accrued management fees		
Total resources used	<u>709,814</u>	<u>2,327,479</u>
TRANSFERS:		
Plant acquisitions and principal debt service payments	(2,278,901)	2,278,901
Quasi-endowment funds utilized	10,611,894	
Transfers to other endowment and similar funds	<u>(247,189)</u>	<u>(366,600)</u>
Total transfers	<u>8,085,804</u>	<u>1,912,301</u>
INCREASE (DECREASE) IN CASH AND TEMPORARY INVESTMENTS	<u>\$ (40,760)</u>	<u>\$ -</u>

See notes to financial statements.

FINANCIAL STATEMENTS

ENDOWMENT AND SIMILAR FUNDS	TOTAL 1995 ALL FUNDS	TOTAL 1994 ALL FUNDS
\$	\$ (10,010,026)	\$ (8,908,465)
1,891,363	2,027,666	2,306,784
13,108,632	13,108,632	27,285,475
	24,380	157,548
<u>14,999,995</u>	<u>5,150,652</u>	<u>20,841,342</u>
	1,942,709	1,930,954
(13,108,632)	(13,108,632)	(27,285,475)
630,168,454	630,413,690	768,053,204
	150,567	207,619
	9,259	91,180
		9,260
		112,811
421,841	421,841	
2,908,727	2,908,727	
		446,093
		500,000
	500,000	
<u>635,390,385</u>	<u>628,388,813</u>	<u>764,906,988</u>
624,892,280	624,892,280	748,300,679
	1,931,426	2,725,204
		500,000
500,000	500,000	
	20,412	
	18,883	72,221
	256,981	12,597,073
	413,538	
	396,053	376,052
		85,503
<u>625,392,280</u>	<u>628,429,573</u>	<u>764,656,732</u>
(10,611,894)		
613,789		
<u>(9,998,105)</u>		
\$ -	\$ (40,760)	\$ 250,256

NOTES TO FINANCIAL STATEMENTS
YEAR ENDED JUNE 30, 1995

A. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The Institute for Advanced Study (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.

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). Interest expense, net of related interest income, is capitalized on construction in progress of qualifying assets.

Recently Issued Accounting Standards - In June 1994, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards No. 116, "Accounting for Contributions Received and Contributions Made" ("SFAS 116"). SFAS 116, effective for fiscal year 1996, establishes accounting standards for contributions. Contributions received are to be recognized as revenues when received, at fair value. Contributions made are to be recognized as expenses when made, at fair value. Not-for-profit entities, such as the Institute, are required to categorize contributions received as affecting permanently restricted net assets, temporarily restricted net assets, or unrestricted net assets and to recognize the expiration of donor restrictions when they expire. The Institute has not yet determined what effect the adoption of SFAS 116 will have on its financial statements.

In June 1994, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards No. 117, "Financial Statements of Not-for-Profit Organizations" ("SFAS 117"). SFAS 117, effective for fiscal year 1996, requires not-for-profit organizations to provide a statement of financial position, a statement of activities, and a statement of cash flows. The Institute has not yet determined what effect the adoption of SFAS 117 will have on its financial statements.

In March 1995, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards No. 121, "Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to be Disposed of" ("SFAS 121"). SFAS 121 requires assets held and used by an entity to be reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. Assets impairment is required to

be recognized if the sum of the expected future net undiscounted cash flow is less than the carrying amount of the asset. SFAS 121 is effective for the Institute for fiscal 1997. The Institute has not yet determined what effect the adoption of SFAS 121 will have on its financial statements.

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, 1995 are comprised of the following:

	CARRYING VALUE	MARKET VALUE
Pooled investments:		
Equity securities	\$ 162,291,994	\$ 181,040,769
Debt securities	80,022,044	81,139,485
Mortgages and notes receivable from faculty and staff	2,972,952	2,972,952
Investment accounts receivable	5,288,859	5,288,859
Investment accounts payable	(13,435,187)	(13,435,187)
Investment real estate	<u>485,000</u>	<u>485,000</u>
Total pooled investments	237,625,662	257,491,878
Funds invested separately:	<u>44,182</u>	<u>59,182</u>
Total	<u>\$ 237,669,844</u>	<u>\$ 257,551,060</u>

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 \$80,949,627 and a market value of approximately \$84,018,843 at June 30, 1995. 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 gain and net realized gain was \$1,626,554 and \$7,786,613, respectively, for the year ended June 30, 1995.

In addition, equity securities include the Institute's interest in an open-ended investment fund (the "Fund") incorporated in the Cayman Islands with a carrying value of \$30,393,144 and a market value of \$33,385,019 at June 30, 1995. The Institute accounts for this investment at the lower of cost or market value. Market value is determined as the number of shares held by the Institute multiplied by the net asset value for such shares. Net asset value, as determined by the Fund,

reflects the underlying assets held by the Fund and any investment gain or loss. Realized gains and losses are computed based on the actual cost of the investment.

Substantially all of 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, 1995, exclusive of realized gains and losses, amounted to \$304 after deducting management fees.

The following table summarizes changes in carrying and market values of the pooled investment portfolio.

	INVESTMENT PORTFOLIO		UNREALIZED APPRECIATION	MARKET VALUE PER UNIT
	MARKET VALUE	CARRYING VALUE		
June 30, 1994	\$ 232,512,859	\$230,259,227	\$ 2,253,632	\$ 9,545
June 30, 1995	257,551,060	237,669,844	<u>19,881,216</u>	10,869
Increase in unrealized appreciation for the year ended June 30, 1995			17,627,584	
Realized net gain for the year ended June 30, 1995			<u>13,108,632</u>	
Realized net gain and increase in realized appreciation for the year ended June 30, 1995			<u>\$ 30,736,216</u>	

Short-term investments within the plant fund represent unexpended proceeds of the 1991 NJEFA bonds. Such funds are invested in U.S. Government obligations with maturities of less than one year. At June 30, 1995, the market value of such securities approximates their carrying value.

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, 1995 follows:

Land and improvements	\$ 2,423,920
Buildings and improvements	33,536,907
Equipment	11,186,025
Rare book collection	203,508
Joint ownership property	<u>648,300</u>
Total	47,998,660
Less accumulated depreciation	<u>(22,659,772)</u>
Net book value	<u>\$ 25,338,888</u>

D. LONG-TERM DEBT

A summary of long-term debt at June 30, 1995 follows:

6.275%, 1991 - NJEFA	\$ 16,735,000
Less unamortized bond discount	<u>(232,635)</u>
 Total long-term debt	 <u>\$ 16,502,365</u>

In September 1991, the Institute received proceeds of the New Jersey Educational Facilities Authority (NJEFA) offering of \$17,895,000 Revenue Bonds, 1991 Series B, the Institute for Advanced Study Issue. The proceeds are to be used for the construction of a new academic building and debt retirement. A portion of the proceeds totalling \$7,677,232 were used to retire the existing Revenue Bonds, 1980 Series A.

The bonds are dated September 1, 1991, bear interest, payable semi-annually, at the net average annual rate of 6.275%, are subject to redemption at various prices, and require principal payments and sinking fund installments through June 30, 2021. Bond principal in the amount of \$425,000 (1996), \$455,000 (1997), \$480,000 (1998) and \$510,000 (1999), \$535,000 (2000) will mature in each of the designated years. The remaining balance of \$14,330,000 is payable in semi-annual installments through June 30, 2021. 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.

At June 30, 1995, the estimated fair value of the Institute's long-term debt was \$13,597,188.

Interest expense on long-term debt for the year ended June 30, 1995 was \$1,100,466.

E. PENSION PLANS AND OTHER POST RETIREMENT 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 to 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, 1995 totalled approximately \$831,803.

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 1995, those costs totalled approximately \$159,759.

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 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.

E. 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:

	Total Deferred Restricted Revenue
Balance at June 30, 1994	\$ 3,377,700
Additions:	
Contributions, grants, etc.	5,358,829
Net restricted endowment income	2,064,729
Quasi-endowment funds utilized	<u>1,498,206</u>
Total additions	<u>8,921,764</u>
Deductions:	
Funds expended from contributions, grants, etc.	5,772,367
Funds expended from restricted endowment	<u>3,562,935</u>
Total deductions	<u>9,335,302</u>
Balance at June 30, 1995	<u>\$ 2,964,162</u>

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 \$2,167,621 as of June 30, 1995 and is not included in the accompanying financial statements.

H. FUNCTIONAL ALLOCATION OF EXPENSES

The costs of providing the various programs and other activities 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 (\$491,352 net of \$362,642 in revenues) and members' housing (\$329,930, net of \$1,069,340 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 \$1,476,685 for the year ended June 30, 1995.

Interest expense on plant fund debt, net of interest income on short-term investments, is allocated to schools based upon their occupancy of academic buildings funded with such debt. Allocated interest expense totalled \$1,107,793 and allocated interest income totaled \$7,327 for the year ended June 30, 1995.

1. TAX STATUS

The Institute is exempt from Federal income taxes pursuant to Section 501(c)(3) of the Internal Revenue Code and is listed in the Internal Revenue Service Publication 78.

* * * * *

AS3C .179 1985-98
Institute for Advanced Study
Princeton, N.J. Report for
the academic years...

AS3C .179 1985-98
Institute for Advanced Study
Princeton, N.J. Report for
the academic years...

DATE	ISSUED TO

**HISTORICAL STUDIES-
SOCIAL SCIENCE LIBRARY
INSTITUTE FOR ADVANCED STUDY
PRINCETON, NEW JERSEY 08540**

DEMCO

