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Director's Report

The signing of the General Agreement of Cooperation with the Chinese Institute of Archaeology (CASS)
Almost thirty years ago, in 1983, a young archaeologist with a newly minted PhD arrived at the Institute for Advanced Studies in Jerusalem. Israel Finkelstein was invited to join a group composed of leading archaeologists. Yigael Yadin wanted two promising young scholars to join the research group he was organizing at the IAS. His condition to Finkelstein was that he first complete his PhD. The two young scholars invited to join the group were Israel Finkelstein (Tel Aviv University) and Amihai Mazar (The Hebrew University). As Israel relates, “I worked like a dog, in the field and in writing, and did not sleep much. But I completed my doctoral work and was welcomed into Yadin’s group. For me the experience was one of humbly studying at the feet of great scholars.”

Many of the fellows visiting at the IAS are experienced researchers and noted scholars in their field. However, the Institute has always striven to seek out and welcome young and promising researchers, to join with and learn from those who have already achieved excellence and expertise in their respective fields.

The tradition continues. From September 2010 – February 2011 the IAS hosted the Langlands Duality in Representation Theory and Gauge Theory research group. The group organizer was David Kazhdan (The Hebrew University), a leading mathematician and the recipient of the 2012 Israel Prize for Mathematics and Computer Science. Together with the eight members of his group, and four distinguished visitors, Kazhdan welcomed twenty-five graduate students from the best universities. We were delighted with the infusion of young, talented energy, even though their healthy appetite at our daily lunch did put a bit of strain on the Institute’s budget.

Inasmuch as a good organizational foundation enables the successful launching of creative endeavors, I will begin by presenting two new administrative changes. A financial commitment was obtained by one of our philanthropic supporters. This commitment was the product of a decennial evaluation for the years 2001-2010. The academic committee that reviewed the performance of the IAS over the past decade repeatedly complimented the IAS for its commitment to innovation while maintaining an exceptional level of academic performance.

An additional administrative innovation involves a change in governance. Along with an official name change – the Israel Institute for Advanced Studies – the Institute will now have a Board of Directors. Beginning in 2012 there will be two academic committees; one to approve the research groups dealing with the Humanities and Social Sciences, and one to approve research groups dealing with the Natural Sciences.

It was a year of intense activity, with the Institute hosting six research groups.

Research Groups:

We began the year with two six-month groups. Encountering Scripture in Overlapping Cultures: Early Jewish, Christian and Muslim Strategies of Reading and their Contemporary Implications brought together scholars of Jewish, Christian and Muslim interpretation to conduct a close comparative analysis of shifting encounters with Scripture in three overlapping cultures. The group organizers were Meir Bar-Asher (The Hebrew University) and Mordechai Cohen (Yeshiva University). Langlands Duality in Representation Theory and Gauge Theory, organized by David Kazhdan (The Hebrew University), presented both educational and research seminars, covering many new and important developments in Category Theory, Topology, Representation Theory and Physics.

March 2011 brought a changing of the guard, with four new research groups taking up residence at the Institute until the conclusion of the academic year. Algorithmic Game Theory: The Next Decade was led by Michal Feldman and Noam Nisan (both of
The emerging new field of research lies at the crossroads of computer science, game theory and economics. The group focused on defining the main challenges of this field which is vital to addressing many of the challenges posed by the Internet. *Computation and the Brain* focused on developing a systematic philosophical account of the role of computation in neuroscience. The organizers were Eli Dresner (Tel Aviv University) and Oron Shagrir (The Hebrew University).

*Cultural Archaeology of Jews and Slavs: Medieval and Early Modern Judeo-Slavic Interaction and Cross-Fertilization* endeavored to explore the mutual transparency of the cultural traditions of Jews and Slavs over a long stretch of their millenary co-territoriality. The group organizers were Alexander Kulik and Moshe Taube (both of The Hebrew University).

*Sovereignty, Global Justice and the Ethics of War*, led by Yitzhak Benbaji (Bar-Ilan University) and Eyal Benvenisti (Tel Aviv University), sought to develop and define a workable set of ideas about international justice in the current era of globalization and institutional change in the international community.

**Victor Rothschild Memorial Symposia: Advanced Schools**

Our Advanced Schools continue to attract the premier emerging generation of scholars at the start of their academic careers, as they come to learn and be mentored by those who have set the standard for stellar academic achievement.

Three Advanced Schools took place during the 2010-2011 academic year:

Peter Sarnak (Princeton University) and David Kazhdan (The Hebrew University) directed the 15th Midrasha Mathematicae which took place December 19-24, 2010. The topic was *Derived Categories of Algebro-Geometric Origin and Integrable Systems.*

The 28th Winter School in Theoretical Physics
focused on Topological States in Condensed Matter Physics. The School directors were David Gross (UC Santa Barbara) and Ady Stern (Weizmann Institute of Science). The School took place December 27, 2010 - January 4, 2011.

In June 20 – 29, 2011, Eric Maskin (IAS Princeton) and Eyal Winter (The Hebrew University) directed the 22nd Jerusalem School in Economic Theory. The School focused on The Global Financial Crisis.

The School in Life Sciences took place September 2011, and will therefore be included in the Annual Report of 2011-2012.

Jointly Sponsored IAS-ISF Conferences:

The tradition of jointly sponsoring conferences with the Israel Science Foundation continues. The following eight innovative and varied topics of interest were presented this year at the IAS.

* Cannabinoids in Biology and Medicine, organized by Itai Bab (The Hebrew University)
* Visual Constructs of Jerusalem, organized by Bianca Kühnel (The Hebrew University)
* Whispering/Prompting/Shadowing: Performed Voices, organized by Freddie Rokem and Michal Grover-Friedlander (Tel Aviv University)
* Olfaction: From Receptor to Behavior, organized by Adi Mizrahi (The Hebrew University)
* 13th Century France: Continuity and Change, organized by Judah Galinsky and Elisheva Baumgarten (Bar-Ilan University)
* Interactions of Cardiac Steroids with the Na+, K-ATPase: Molecular, Physiological and Pharmacological Implications, organized by David Lichtstein and Haim Rosen (The Hebrew University)
* Stick-Slip Dynamics, from Nano to Geophysical Scales, organized by Jay Fineberg (The Hebrew University) and Michael Urbakh (Tel Aviv University)
• Approaches to the Lexicon, organized by Edit Doron (The Hebrew University)

IAS Conferences:
The following four IAS conferences took place this year:
• Frontiers in Brain Repair, organized by Micha Spira (The Hebrew University) and James Fawcett (University of Cambridge)
• Cambridge History of the World, organized by Benjamin Z. Kedar (The Hebrew University)
• Microbiology: Pathogens and Host Response, organized by Philippe Sansonetti, Ivo G. Boneca, Robert Weil (Pasteur Institute), Ilan Rosenshine, Sigal Ben Yehuda and Yinon ben Neriah (The Hebrew University)
• The First ENTIS OTIS International Joint Meeting on Clinical Teratology, Organized by Asher Ornoy (The Hebrew University)

Special Lectures
We appreciate the gift of being able to pursue research in a rarefied atmosphere, but we are also conscious of the social responsibility that this entails. While the research group Sovereignty, Global Justice and the Ethics of War investigated concepts of international justice overall, it took time to address a very concrete issue that Israel wrestles with in its quest for security and a peaceful coexistence. Soldiers from an elite unit of the Israel Defense Forces attended a lecture at the IAS, given by Yitzhak Benbaji, one of the organizers of the above-mentioned research group. The soldiers form a cadre of officers who must, perforce, deal on a very real basis with the issue of ethical behavior in the midst of armed conflict. The reciprocity of the exchange was heartening. The soldiers were interested in hearing the opinions of scholars who study the theoretical basis of ethical behavior in different situations. The scholars were pleased to be invited to address the soldiers, and in the subsequent question and answer session, bring
their theoretical research to bear on the reality of the soldiers’ experiences.

**International Collaboration**

International collaboration has always been one of the hallmarks of the IAS. We were pleased this year to both significantly and substantially expand our collaborative ventures with China. In February 2011, a General Agreement of Cooperation was signed between the IAS and The Institute of Archaeology, Chinese Academy of Social Sciences. Recognizing the common interests shared by both Institutes in many academic and cultural fields, and wishing to promote cooperative ventures between the two Institutes, Professor Wang Wei, Director of the Institute of Archaeology in Beijing and I agreed to facilitate the short-term exchange of teachers and scholars who wish to visit and/or participate in the excavation programs of each Institute; to exchange publications, reference documents and audio/visual documentations; to promote bilateral archaeological forums, symposia and lectures; to facilitate the exchange of students wanting to conduct research and/or study in the educational programs of each institution; and to promote the exchange of knowledge between China and Israel in the fields of archaeological and historic conservation, and in the sciences of archaeology.

Our collaboration with NetIAS (Network of European Institutes for Advanced Study) deepened in 2010. The EURIAS (European Institutes for Advanced Study) Fellowship Program, an initiative of NetIAS, and one which promotes the focused, self-directed work of excellent researchers within the stimulating environment of a multidisciplinary and international group of fellows, in 2010 invited Israel to join as a participating member. Individual researchers applying for a EURIAS fellowship may now request to pursue their ten-month research residency at the Israel Institute for Advanced Studies, with financial support from NetIAS.
Advanced Schools
Three Advanced Schools were held in the 2010-2011 academic year.

The 15th Midrasha Mathematicae, which took place December 19-24, 2010, was directed by Peter Sarnak (Princeton University) and David Kazhdan (The Hebrew University). The School focused on Derived Categories of Algebro-Geometric Origin and Integrable Systems. It was held jointly with the Langlands Duality Research Group Conference.

In recent years it became clear that the derived category of coherent sheaves on an algebraic variety is a fundamental invariant of the variety which can be thought of as a significant enhancement (“categorification”) of its cohomology. One of the approaches to building noncommutative geometry is based on this notion. Derived categories have by now become a standard tool in algebraic geometry; however, during the last decade a totally new circle of ideas inspired by quantum field theory has entered the subject. Numerical invariants of derived categories (and thus of algebraic varieties, representations etc.) are expected to be governed by integrable systems.

The conference "Derived Categories of Algebro-Geometric Origin and Integrable Systems" was devoted to the new connections between integrable systems related to quantum field theory and numerical invariants of categorical structures arising in algebraic geometry or representation theory. Structures that were discussed included quantum cohomology, Bridgeland’s stability conditions, and representations of Hecke algebras and their generalizations.

The conference organized a series of five lectures:

- Victor Ginzburg on "Noncommutative Geometry and Calabi-Yau algebras"
- Hiraku Nakajima on "Quiver varieties and cluster algebras"
- Nikita Nekrasov on "Supersymmetric vacua and quantum integrability"
- Andrei Okounkov on "Quantum groups and quantum cohomology"
- Yukinobu Toda on "Curve counting invariants via stable objects"

Ginzburg described new algebraic structures arising naturally in the geometry of Calabi-Yau manifolds and mirror symmetry. In particular, he gave a universal construction of Calabi-Yau algebras in terms of a noncommutative symplectic DG algebra resolution.

Nakajima explained the relation between tensor products of representations of quantum loop algebras and cluster algebras, studied by him and by Hernandez-Leclerc. In particular, he stressed a geometric approach to cluster algebras via graded quiver varieties.

Nekrasov described the connection between the quantum integrable systems, representation theory of Yangians, and geometric representation theory on the one hand, and the supersymmetric gauge theories, Donaldson invariants, and their equivariant analogues on the other hand, which has been observed in recent years. He reviewed the experimental facts leading to this correspondence, and introduced a number of interesting notions along the way, such as the new set of Darboux coordinates on the moduli space of SL_2- local systems on a Riemann surface possibly with punctures.

Okounkov talked about the explicit construction of the Mirror symmetry related representations and the structure of complex, semisimple, simply-connected groups and double-affine algebras. Let G denote a complex, semisimple, simply-connected group and B its associated flag variety. Okounkov explained in detail the identification of the equivariant quantum differential equation for the cotangent bundle to the corresponding flag variety with the affine Knizhnik-Zamolodchikov connection of Cherednik and Matsuo and outlined an extension to arbitrary symplectic resolutions.

Yukinobu Toda surveyed the development of the theory of the Donaldson-Thomas (DT) invariant, which is a counting invariant of stable sheaves on a Calabi-
Yau 3-fold and PT-theory which corresponds to the curve counting on a Calabi-Yau 3-fold. Recently the wall-crossing formula of DT type invariants was established by Joyce-Song and Kontsevich-Soibelman. As an application, several important properties of the generating series of the rank one DT invariants have been proved, e.g. DT/PT correspondence and rationality conjecture. Yukinobu Toda summarized these developments.

We are planning a publication of a book reflecting the conference talks by the American Mathematical Society (AMS).

The 28th Winter School in Theoretical Physics, on Topological States in Condensed Matter Physics, was held between the 27th of December 2010 and the 4th of January 2011. The general director of the School was David Gross (Kavli Institute for Theoretical Physics, UC Santa Barbara and Nobel laureate, Physics, 2004). It was codirected by Ady Stern, from the Weizmann Institute of Science in Rehovot, and Shoucheng Zang from Stanford University in Palo Alto, California.

Students in the school came from about twenty countries. Teachers in the school included Vladimir Falko (UK), Morly Heiblum (Israel), Charles Kane (USA), Michael Levin (USA), Andreas Ludwig (USA), Chetan Nayak (USA), Yuval Oreg (Israel), Kareljan Schoutens (Netherlands), Assa Auerbach (Israel), Aharon Kapitulnik (USA), Amir Yacoby (USA), Ali Yazdani (USA), Joseph E. Avron (Israel), David Goldhaber-Gordon (USA) and the School directors.

The topics covered included the physics of graphene, quantum Hall effect, topological insulators, topological quantum computation, and non-abelian lattice models. Both theoretical and experimental aspects were covered, with the goal of highlighting the common themes that lead the study of seemingly very different topological states of matter.
The topics are at the forefront of present-day research in condensed matter physics, as attested by the great demand for participation in the School. The directors had to decline about half of the applications they received, due to lack of space. The talks were very well attended, stretching the space and time provided by the Institute to its absolute maximum.

The 22nd Jerusalem Summer School in Economic Theory took place June 20 – 29, 2011. The topic was The Global Financial Crisis. The School was directed by Eric Maskin (IAS Princeton and Nobel laureate, Economics, 2007) and Eyal Winter (Director of the Center for Rationality at The Hebrew University).

Some observers (mostly outside the economics profession) have suggested that the recent financial crisis constitutes a crisis in economic theory. Standard theory, they maintain, cannot explain how such a crisis could have come about. But, in fact, a large mainstream body of theoretical literature – going back many years – clearly demonstrates how over-leveraging by banks and other financial institutions can lead to just such a collapse.

Indeed, the literature demonstrates that there is a natural tendency for these institutions to take this type of risky position and therefore, that there is a strong case for governments to impose leverage limits and minimum capital requirements. It may not be outlandish to claim that the crisis of 2007-2009 might have been avoided had this literature been studied and its lessons implemented by policy makers. The 2011 Summer School examined some of the main ideas from the literature.

Professor Stanley Fischer (Governor of the Bank of Israel) spoke about Crisis Lessons and Questions. Professor Bengt Holmstrom (MIT) delivered the 2011 Arrow Lecture, Ignorance is (almost) Bliss: An Alternative View of the Financial Crisis. Additional distinguished speakers included Markus Brunnermeier (Princeton University), John Geanakoplos (Yale University), Simon Gilchrist (Boston University), Ilan Kremer (The Hebrew University and Stanford University), John Moore (University of Edinburgh and the LSE) and Larry Summers (Harvard University).

The School was accompanied by a round table discussion on the causes of the financial crises and the role of government intervention in the financial market. The panel of this event was addressed by the audience which included students of the Summer School, Hebrew University faculty and representatives from the media.

The School in Life Sciences took place September 2011, and will therefore be included in the Annual Report of 2011-2012.
IAS-ISF and IAS Conferences
Eight conferences were held together with the Israel Science Foundation (ISF). We began the year with the first of these joint conferences: *Cannabinoids in Biology and Medicine.* The conference, organized by Itai Bab of The Hebrew University, took place October 31 – November 11, 2010.

Cannabinoids are natural and synthetic substances that activate receptors in the brain and other parts of the body and mimic the action of THC, the active ingredient of marijuana and hashish. Together, the naturally occurring cannabinoids in the body, their receptors and metabolizing enzymes, are called the "endocannabinoid system." The discovery of THC in 1964 and the endocannabinoids almost 30 years later were carried out by Israeli scientists led by Prof. Raphael Mechoulam of The Hebrew University of Jerusalem. Inspired by these discoveries, many aspects of the endocannabinoid system are being studied by hundreds of scientists around the world, including first-class Israeli researchers. A significant part of these research efforts deals with the development of new drugs to treat neural diseases, diabetes and obesity, high blood pressure, fear and anxiety, inflammation, osteoporosis and cancer. Many of the studies in the field are being published in leading scientific journals like *Science* and *Nature.*

The conference hosted thirty of the world’s most prominent cannabinoid scientists, as well as seventy Ph.D. students and postdoctoral fellows. It was dedicated to Raphael Mechoulam's 80th birthday and was chaired by Itai Bab of The Hebrew University, who discovered the skeletal cannabinoid system. The conference addressed in depth major issues of current cannabinoid research. The conference hosted Ruth Arnon, President of the Israel Academy of Sciences and Menachem Ben Sasson, President of The Hebrew University. The conference was unanimously praised by all participants and generated strong, positive echoes internationally. It was supported by grants from the Institute for Advanced Studies and the Israel Science Foundation, as well as by Yissum.

The conference on *Visual Constructs of Jerusalem* was organized by Bianca Kühnel (The Hebrew University), It took place November 14-20, 2010.

The study of Jerusalem in the representational arts has gained considerable momentum over the past twenty years. Differentiations that used to be made between earthly and heavenly, real and ideal, are no longer satisfactory. As the corpus of Jerusalem representations gains in volume, they reveal an extraordinary, at times contradictory complexity. They also reveal increased relevance for the study of neighboring disciplines such as comparative religion, theology, literature, and cartography. On the one hand, Jerusalem images defy categorization; on the other, they cry out for overall (re) consideration.

The current extraordinary revival of Jerusalem studies in the world faithfully mirrors the new awareness of the scholarly potential of the topic, one of the most multifarious in the history of human thought. The special emphasis on the visuality of Jerusalem reflects the prominence achieved over the past twenty years by visual studies in the scholarly world and their impact on studies traditionally centered on the word. Promoted by digital technologies, the proliferation of images has led to rethinking and revision of disciplines susceptible to adopting images as their main arsenal of sources. These primarily include humanistic disciplines such as art history, history, literature, and philosophy, but also natural sciences.

This development, revolutionary in scope, has played a leading role in the revival of Jerusalem imagery. The wealth and diversity of Jerusalem visual representations in Jewish, Christian, and Islamic art, in minor and monumental media, from Late Antiquity to the present, offer an especially apt framework to explore new approaches inspired by the new theoretical thinking accompanying the visual turn we are all
It is only by creating large forums for debate and discussion, as the 2010 conference aimed to do, where rich and varied visual material were considered from new theoretical and methodological viewpoints, that the visuality of Jerusalem can become a valuable source for the study of the city that played and still plays a crucial role as the meeting point of the three world religions; Judaism, Christianity, and Islam.

The renewed interest in the visuality of Jerusalem all over the learned world is manifested by the many gatherings and symposia organized over the past few years or planned for the near future. It was particularly appropriate for Jerusalem itself to take the lead in defining new scholarly paths for the visual study of Jerusalem. According to Bianca Kühnel, the Hebrew University was the first to generate a comparative discussion on the visuality of Jerusalem, and it should now also be the place to guide Jerusalem visual studies in a new direction. Sixty-five scholars from all over the world participated. Dozens of international scholars presented their research along with twenty-three Israeli scholars, among them advanced students.

The conference was initiated by the European Forum at the Hebrew University, with the support of the Israel Institute for Advanced Studies at the Hebrew University, the Israel Science Foundation, and the ERC (European Research Council), as well as the assistance and support of a number of foreign embassies in Israel.

The conference was conceived as the opening event of a comprehensive international project. A book based on the conference presentations is now in preparation, to be published by Brepols in 2013.

The central idea behind Whispering/Prompting/Shadowing: Performed Voices, which took place January 30 – February 4, 2011 and was organized by Freddie Rokem and Michal Grover-Friedlander (both of Tel Aviv University), was to introduce innovative ways to conceive of staged voices and voices in performance as well as broader cultural and philosophical understandings of the human voice. Towards this aim three notions were chosen to act as prisms through which such voices might be filtered to open new and surprising horizons of interpretation and meaning: Whispering: the notion of vocal inflection, Prompting: the notion of vocal substitution, and Shadowing: the notion of nocturnal doubling.

These three notions complicate and enrich the stark dichotomies of voice/body, embodiment/disembodiment/re-embodiment and can generate insights into the elusiveness of voice as well as offer new models of illusory voices. The three critical terms of the conference also relate to their own counterparts, from which they implicitly deviate, e.g., how in performance whispering relates to speaking, prompting to spontaneity, and shadowing to “soloistic” declamation or even to total silence. This critical anatomy of voicing and the mapping of the vocalities of performance go much further than any previous attempt to study performed voices.

Therefore, the topics outlined in the proposal are critically important in the area of Performance Studies, Musicology and Literary Studies as well as of Philosophy and Aesthetics. The ideas emerging from this conference will hopefully make a significant and creative addition to the theory and philosophy of performance and hopefully also to the relevant artistic practices of singers, actors and “voice artists.” The conference offered a unique chance to explore the affinities and interactions between performance as a practice in the arts and the endeavors to research performance in intellectual and academic contexts.

It was an ideal forum for creating a synergy between them. The conference included an array of performances by voice artists, singers and actors as well as an exploration of the acoustic modification
of the voice in a variety of spaces. The topic reflected the current turn, in performance research, to what we might term a physiognomics of theory, or the performative dynamics of what were, heretofore, conventionally either academic or strictly professional, practical concerns.

The conference on *Olfaction: From Odorants to Behavior* was organized by Adi Mizrahi (The Hebrew University) together with Tali Kimchi (Weizmann Institute), Noam Sobel (Weizmann Institute) and Shlomo Wagner (University of Haifa). It took place February 6-10, 2011.

In olfaction there is a poor understanding of the link between the stimulus, its resultant neural activity, and ensuing percept. In other words, there is no scientist or perfumer who can look at a novel molecule and predict its smell, or smell a novel odor and predict its molecular structure. Olfaction is processed within a hierarchical system going from olfactory epithelium to bulb to cortex. From molecular/genetic studies we know that the olfactory epithelium consists of ~10 million receptor neurons. The olfactory receptors are G-protein coupled second-messenger dependent (GPCRs). An odorant molecule binds to the extracellular aspect of the receptor, and triggers a cascade of events that culminates in the opening of cation ion channels. This is followed by a rush of positively charged ions into the cell, which depolarizes, triggering an action potential sent to the olfactory bulb.

We know that mammals have about 1,000 different olfactory receptor subtypes, and each receptor neuron expresses only one of these. Moreover, each receptor subtype responds to a few different odors, and each odorant activates a few different receptor subtypes. This gives rise to a vast multidimensional space for encoding smell. The olfactory receptor neurons project to the olfactory bulb, where all receptors of a given type converge to a common point called an olfactory glomerulus. Thus, the glomeruli form a type of map of olfactory information at this level. Information is then projected to the olfactory cortex where not much is known on how it is processed. The conference was aimed at bringing together scientists who study all levels of the olfactory process, in order to help bridge the gaps between levels of processing.

The conference included a select group of world leaders. Scientists from Harvard, Max Planck, UCSD, Duke and NYU, all presented seminars. The lectures were not brief conference-style lectures, but rather full in-depth considerations of the topic. Moreover, two keynote presentations were given, one by Catherine Dulac from Harvard, and one by Hitoshi Sakano from the University of Tokyo. Finally, the conference involved the more junior scientists (graduate and postdoctorate students) by conducting a DataBlitz, an event where young scientists presented their key results in rapid format.

The conference was an unusual success. This was evident in the responses of the scientists themselves, who reiterated the unusual quality of the interaction. Several participants later independently contacted the organizers, using superlatives to describe the influence of this conference on their respective research plans. More importantly however, this conference gave the growing Israeli community of young olfaction scientists (including graduate and postdoctorate students) critical exposure and “quality time” with world leaders in their field. We know for a fact that this conference has led to several postdoctoral plans for Israeli graduate students in leading international laboratories.

*Thirteenth Century France: Continuity and Change*, took place February 14-17, 2011. The organizers were Elisheva Baumgarten and Judah
Galinsky (both of Bar-Ilan University). The conference focused on the thirteenth century in medieval France as a period of innovation and change. The purpose of this gathering was to define the changes that took place in medieval society during this century. On the one hand the thirteenth century in medieval Northern France is often sandwiched between the so-called “twelfth century Renaissance” and the fourteenth century, which was characterized by famine and disease and changed the face of Europe. At the same time, the thirteenth century is regularly examined in many contexts: the pinnacle of apostolic power; the rise of the mendicant movement (orders) and popular piety; the expansion of universities as well as substantial urban economic growth; a century of major deterioration in Christian-Jewish relations resulting in expulsions in England and later in France, and organized attacks on Jewish communities in Germany. These developments are seldom discussed simultaneously and one of the goals of the conference was to devote some attention to all these trends.

The participants in the conference, who were all medievalists from a variety of disciplinary backgrounds, surveyed and questioned whether unique features and new trends began developing in the 13th century, or if there was merely an intensification of trends that already existed in the 12th century. Many speakers also sought to define the uniqueness of France as opposed to neighboring areas. A special emphasis was placed on the relationships between Jews and Christians in medieval France as well as on a systematic comparison between intellectual and social developments in both societies. Connections were made and parallels were drawn between changes within both religious communities and the dialogue and polemic concerning them.

Each of the four days of the conference consisted of sessions that focused on specific issues such as religious polemic, Bible and society, legal developments, gender, social history, language and artistic portrayals within the Jewish and Christian traditions. Each day ended with a roundtable in which two participants reflected on all of the sessions throughout the day, and suggested common themes and questions that arose as a result of these sessions.

Despite the distinction of genres and disciplines that existed between the sessions at the conference, the discussions as a whole highlighted the way in which the different trends that characterized the thirteenth century – economic, legal and social – helped to create a growing body of questions that probe boundaries, both real and imagined, between Jewish and Christian communities.

The participating speakers came from the United States, England, France and Israel, and they were joined by local medievalists as well as a number of international graduate students. The conference was supported by the Israel Institute for Advanced Studies, the Israel Science Foundation, the Fanya Gottesfeld Heller Center for the Study of Women in Judaism and the Research Authority at Bar-Ilan University, the Bernard Revel Graduate School and the Centre de recherche français de Jérusalem (CRFJ).

The conference on Interactions of Cardiac Steroids with the Na⁺, K⁺-ATPase: Molecular, Physiological and Pharmacological Implications, held on February 28 – March 3, 2011, was organized by David Lichtstein and Haim Rosen, of The Hebrew University. Cardiac Steroids (CS) is a family of compounds that has been used in western and eastern medicines for hundreds of years. These steroids, originally extracted from plants, have been identified in animal and human tissues and are considered as hormones implicated in the regulating numerous physiological functions.

The only identified receptor for these steroids is the plasma membrane Na⁺, K⁺-ATPase, an enzyme responsible for the transport of sodium and potassium across the cell membrane. The interaction of CS with the Na⁺, K⁺-ATPase and its consequences is a major
issue with tremendous implications in basic biology as well as in physiology and pharmacology.

The conference gathered together world-leading scientists in this field to enable fruitful discussions on the following major topics: the CS as a new family of hormones; the molecular interactions of CS with the Na\(^+\), K\(^+\)-ATPase; the effect of CS on intracellular signal transduction pathways; the physiological activities of CS in mammals; the involvement of CS-Na\(^+\), K\(^+\)-ATPase interaction in diseases; the molecular mechanisms underlining the pharmacological activities of CS.

The conference was a great success. In addition to the numerous novel discoveries that were presented, it initiated the establishment of several new multidisciplinary, multinational collaborations among the participants. Furthermore, first steps toward the founding of a network for the standardization of the methodologies and nomenclature in the field were taken. The overall agreement among the participants was that the field of the endogenous regulators of the Na\(^+\), K\(^+\)-ATPase is of tremendous potential and is facing significant breakthroughs.

The conference on *Stick-Slip Dynamics, from Nano to Geophysical Scales* was organized by Jay Fineberg (The Hebrew University) and Michael Urbakh (Tel Aviv University). It took place May 2-3, 2011 and focused on the different methods of studying and simulating a transition from static to kinetic friction, and the interfacial dynamical processes responsible for energy dissipation. The aim of the conference was to discuss recent scientific results on different aspects of nano- and macro-scale friction and to formulate important unresolved problems.

Friction mechanisms play a central role in diverse systems and phenomena that span vast ranges of scales, from the nanometer contacts inherent in technological
micro- and nano-machines to the geophysical scales characteristic of earthquakes. Despite the practical and fundamental importance of tribology and the growing efforts in the field, many key aspects of friction dynamics are only partially understood. One of the main difficulties in understanding and predicting frictional response is the complexity of highly non-equilibrium processes going on in any tribological interface which include detachment and re-attachment of multiple junctions (“bonds”) between the contacting surfaces in relative motion. These non-equilibrium processes result in stick-slip dynamics that are central to many different fields of physics and material science including tribology, micro- and nano-mechanics systems (as in MEMS and NEMS), granular materials, dynamics of fractures and earthquakes.

The conference included five sessions (twenty oral presentations) that concentrated on the discussion of the following topics:

- Probing tribology at the nanoscale: trends in experimental techniques
- Development of more realistic models of contact and noncontact AFM
- Experimental and theoretical studies of friction on micro- and macro-scales, from single asperity to multi-asperity contacts
- Friction on a geophysical scale
- Mechanisms of stick-slip motion at nano- and macro-scales
- Controlling friction response and tuning high-dissipative sliding regimes

In addition, students and young scientists presented their works at the poster session.

During the conference, special attention was paid to a discussion of new algorithms which can reliably bridge the micro- and macroscopic time and length scales of the simulations in frictional phenomena from atomic scale processes to seismic events.

Recent advances in studies of nanoscale friction were covered in talks by E. Meyer (Basel), A. Foster (Helsinki), A. Schirmeisen (Muenster), R. Perez (Madrid) and M. Szymoski (Krakow). E. Meyer and A. Foster presented new exciting experimental and theoretical results on the mechanism of energy dissipation on the nanoscale and discussed how one can differentiate between electronic and phononic contributions to friction; A. Schirmeisen demonstrated that unique information on the mechanism of friction can be obtained measuring friction between nanoparticles and substrate.

Of special interest was the session on mesoscale friction, where a physical nature of precursor of friction (E. Bouchbinder, Weizmann Institute) and mechanisms of stabilization of stick-slip motion by modulations of shear force were discussed (H. Savage, Columbia University and M. Urbakh, Tel Aviv University).

Interesting and stimulating results were presented at the session on friction at the geophysical scale (J.R. Rice, Harvard University; E. Aharonov, The Hebrew University; Z. Reches, University of Oklahoma; Y. Ben-Zion, UCLA; V. Popov, Tech. University Berlin), where various ways to characterize and model friction were discussed. In particular, V. Popov suggested a novel approach for prediction of time of transition from stick to slip that is based on the application of rate-state model for a description of frictional response; frictional shear in fluid-filled granular media and in fault gouge were discussed by J.R. Rice and E. Aharonov.

Other sessions dealt with friction in confined liquids (E. Charlaix, University of Lyon), the effect of ageing on friction at different scales (R. Carpick, University of Pennsylvania) and fundamental problems of static friction (J. Fineberg, The Hebrew University). Experimental studies performed by Fineberg’s group demonstrated that a friction coefficient is not a constant material property, but varies with the external loading configuration.
The conference *Approaches to the Lexicon* was held on June 13-16, 2011. The conference was organized by the Language, Logic and Cognition Center (LLCC) of The Hebrew University of Jerusalem, with the support of the Israel Institute for Advanced Studies at The Hebrew University and the Israel Science Foundation. Edit Doron of the LLCC organized the event, assisted by Avigail Tsirkin-Sadan (The Hebrew University).

The conference brought together a group of leading linguists from Israeli universities (Bar-Ilan, Ben-Gurion, Haifa, The Hebrew University, Tel Aviv) and universities in Brazil, Canada, Cyprus, France, Germany, Greece, the Netherlands, Norway, UK and the USA. This was the third in a series of conferences dedicated to the same topic, the first of which took place at the University of Southern California in 2009, and the second at the University of Stuttgart in 2010.

Talks focused on questions pertaining to the nature of lexical units (words) – the building blocks of the mental lexicon of speakers of language in general. What is the internal structure of a word? Is there syntactic structure within a word, and what is its nature? How compositional is the meaning of words? Are word-class labels such as Noun, Verb, etc, assigned and represented within the lexicon, or is the lexicon category-free? How is the argument-structure of different predicates represented? What is the phonological representation of a word? Should roots be viewed as part of the structure of words in Semitic languages and in language in general? What are the implications of the different views on these issues for questions of language acquisition – more specifically for bootstrapping and word learning – and for questions of word coinage?

Various theories of the lexicon were represented at the conference, such as Distributed Morphology, Lexeme-Based Morphology, Active Lexicon, and others. Different participants were adherents of different theoretical views, which led to lively and sometimes even heated debates. Yet there seems to have been total unanimity concerning the success and fruitfulness of the event.
Four IAS Conferences were held this year at the IAS. The first of these conferences took place January 10-13, 2011. The topic was *Frontiers in Brain Repair* and the organizers were Micha E. Spira (The Hebrew University) and James Fawcett (University of Cambridge).

Repair of the nervous system, particularly of the spinal cord, has always been one of the great aspirations of neurobiology. As knowledge about the development of the nervous system has grown in concept and in detail, it seemed a natural step to use this knowledge to try to repair the nervous system if it is damaged. The result has been dramatic progress toward biological interventions for repairing the CNS, with some promising compounds now in clinical trials. In parallel, there has been a worldwide effort to harness electronics as a way of compensating for brain and spinal cord damage. The robotics and electronics aspects are well advanced, but methods for interfacing electronics with the nervous system are still inadequate and unreliable.

The conference attracted 110 participants (Europe, US and Israel), many of them young scientists planning their future career path. To make the conference accessible to non-specialists, four of the speakers were asked to present introductory overviews of the subject area before each session.

The first session of the meeting was on the subject of axon regeneration. All damage to the nervous system damages axons, but the outcome depends on which axons are damaged. In peripheral nerves and in invertebrates axons mount a vigorous regeneration response, which often leads to damaged axons reconnecting with a target and restoring function. In the mammalian central nervous system axons retract a few millimeters from the site of injury, then make no regenerative response. The reasons for this regenerative failure are the many growth-inhibitory molecules in the CNS environment, and the intrinsically poor regeneration ability of the axons.
Frank Bradke (Germany), Micha Spira, Laura Gumy (UK), Avihu Klar (Israel), Richard Eva (UK), Oded Behar (Israel), Britta Eickholt (UK), Michael Coleman (UK), and Mike Fainzilber (Israel) all spoke about the intrinsic growth and connection ability of axons, while Anne Logan from the UK, Martin Schwab from Switzerland and Michal Schwartz from Israel spoke about how the environment of the damaged CNS blocks axon regeneration.

The second session was on the subject of protection and recovery after CNS damage. This encompassed two concepts. After CNS damage there is a period of around a week during which the area of damage expands via secondary processes, sometimes doubling the size of the lesion and its functional consequences. Despite huge investments by major pharmaceutical companies there is as yet no solution to stopping this process. After the lesion has formed there is some recovery of neurological function, which can be enhanced by rehabilitation. This is due to plasticity, a process whereby limited local sprouting of axons makes bypass circuits to restore some of the lost connectivity. Michal Schwartz spoke on inflammation and neuroprotection, Jonathan Friedman (Israel) spoke on protection after stroke and Yukiko Goda and Jessica Kwok (UK), and Martin Schwab spoke on plasticity.

The third session was on cell replacement. Because nervous system damage kills neurons, and because new neurons are not made to replace this damage in mammals, there has been great interest in the use of implanted stem cell-derived cells and in controlling the behavior of the nervous system’s own stem cells to repopulate areas of damage. However, this concept has been difficult to achieve. Instead it now appears that many forms of stem cell are protective if they are implanted after damage. The brain contains a very specialized form of stem cell known as the oligodendrocyte precursor, which is able to repair damaged myelin, although this process fails in multiple sclerosis. Or Shemesh and Daniel Offen (Israel) spoke about stem cells, Tamir Ben-Hur (Israel) spoke about multiple sclerosis and Ron Goldstein (Israel) spoke about using stem cells to study regeneration.

The final session was on interfacing electronics with the nervous system. Biological repair of CNS damage will probably always be incomplete, so a parallel focus on electronic repair is essential. The main problems at present are in making reliable electrodes or other interfaces with the nervous system with sufficient bandwidth, and in interpreting their output. Andreas Hierlemann (Switzerland), James Fitzgerald (UK), Patrick Tresco (USA) and Micha Spira spoke on interface design. Andrew Schwartz (USA), Lev Tov Aharon (Israel), Carsten Mehring (Germany) and Eilon Vaadia (Israel) spoke on the interpretation of electrical information coming from the CNS, and Daniel Chew (UK) spoke about using interfaces for bladder control.

The response of the conference participants was overwhelmingly positive. Altogether this was a successful conference, with high attendance and good feedback from the participants. The organizers are very grateful to John D. Levy and the Academic Study Group for having initiated the planning of the conference, and for funding the participation of speakers from the UK. The Israel Institute for Advanced Studies provided the facilities, funding and organization that made the meeting possible.

A world history conference, Cambridge History of the World, was held February 6-8, 2011. The organizers were Benjamin Z. Kedar (The Hebrew University) and Merry Wiesner-Hanks (The University of Wisconsin-Milwaukee).
World history is a new subject for Israeli historians. A few years ago, The Hebrew University introduced the subject. Just a handful of Israeli faculty conduct research in this field. Hence the importance of the conference that brought together leading world historians from abroad, alongside some Israelis, to discuss papers on a history of the world between 500CE and 1500CE that highlights cross-cultural communication and conquest and the accompanying growth of regional states, empires, and economic systems. Volume 5 of the *Cambridge History of the World* is to consist of the final versions of these papers. The discussions enhanced the coherence of the projected volume and detected a lacuna—the absence of a paper dealing with technological innovation—that has been subsequently filled up.

The conference was dedicated to the memory of Professor S.N. Eisenstadt, who played a major role in its planning and in enlisting a number of key participants; it was held under the joint auspices of the Israel Institute for Advanced Studies and the Israel Academy of Sciences and Humanities.

The participants were Jean-Claude Cheynet (France), Michal Biran and Diego Olstein (Israel), Björn Wittrock (Sweden), Charles Burnett and Miri Rubin (United Kingdom), Susan Stuard, Linda Walton, Anatoly Khazanov, Clifford J. Rogers, Richard Smith, Richard von Glahn, David Conrad and Sabine MacCormack (United States), as well as the conference organizers, Benjamin Z. Kedar and Merry Wiesner-Hanks. Video conferences were held with Himanshu Prabha Ray (India) and Johann Arnason (Australia). Participants also discussed the papers of Michel Balard (France), Hans Belting and Joachim Radkau (Germany), Tansen Sen (Singapore), Susan Reynolds (United Kingdom), Michael Cook, Patrick Geary and Michael Smith (United States).

A break in the discussions allowed for a visit of the Temple Mount/al-Haram al-Sharif, the recent excavations of Jerusalem's Eastern Cardo, and the Church/Mosque/Synagogue in which, according to the traditions of the three religions, the tomb of the Prophet Samuel is located.

The first international *ENTIS - OTIS* conference took place in Jerusalem, March 26-30, 2011. This was the first meeting of members from two organizations; the European (European Network of Teratogen Information Services - ENTIS) and the North American (Organization of Teratogen Information Specialists – OTIS). These organizations offer teratological counseling to pregnant women and medical professions, as to the risk of harm to the developing embryo and fetus following maternal exposure to possible teratogenic agents, i.e. drugs, chemicals, high doses of irradiation or maternal diseases during pregnancy.

Asher Ornoy, (The Hebrew University Hadassah Medical School) organized the conference and chaired the Scientific Committee. The conference took place at the Israel Institute for Advanced Studies of The Hebrew University. There were four scientific symposia, free communications and three business meetings of ENTIS and OTIS council members to discuss scientific collaboration and future meetings. The symposia were as follows:

- The Role of Genetics and Epigenetics in Clinical Teratology
- The Placenta in Clinical Teratology: Mechanisms of Drugs Transfer; the Effects of Placental Insufficiency on the Fetus
- Challenges in Clinical Teratology
- Psychotropic Drugs and Fetal Brain: Possible Teratogenicity and Behavioral Changes

The meeting was very successful from all points of view and the over one hundred participants, eighty of
them from abroad, were appreciative of the efforts of the host and organizers in convening and conducting this gathering. The next ENTIS - OTIS meeting is scheduled to take place in 2014 in Toronto, Canada.

The conference on Microbiology: Pathogens and Host Response, which took place May 10-13, 2011, was organized by Philippe Sansonetti, Ivo G. Boneca and Robert Weil of the Pasteur Institute, and Ilan Rosenshine, Sigal Ben Yehuda and Yinon ben Neriah of The Hebrew University.

The conference focused on host-pathogen interaction. Host-pathogen interaction is the most important factor in determining the fate of infection, including the severity of a disease. Pathogens possess highly evolved mechanisms for infection and for adaptation to various host cells, both of which protect them against the host immune system.

Although the disease mechanisms vary considerably, most pathogens have virulence factors that interact with host molecules, often perturbing normal cellular processes. These virulence factors may mimic host molecules, and mediate diverse events such as adhesion and invasion of the pathogen. Understanding how pathogens employ complex strategies to mimic and manipulate host cell functions, and subvert cell signaling and host immune systems, can help the design of new therapeutic strategies.

Bringing together leading scientists from different disciplines related to the topic of microbiology and host-pathogen interaction provided exciting presentations and extensive discussions of new concepts. We predict that interactions established during the conference will be a key factor for future fruitful collaborations.
Encountering Scripture in Overlapping Cultures: Early Jewish, Christian and Muslim Strategies of Reading and their Contemporary Implications

group report

group directors: Meir Bar-Asher and Mordechai Z. Cohen
Contemporary critical theory, which highlights the creative dimension of the reading process, is increasingly reorienting the study of the history of scriptural interpretation, situating it within the flux of literary and cultural movements at large. This international research group brought together scholars of Jewish, Christian and Muslim interpretation to conduct a close comparative analysis of shifting encounters with Scripture in three overlapping cultures. Drawing upon diverse yet complimentary perspectives, the participants in this group opened fresh investigations of five fundamental subjects:

a. the critical role that interpretation played in the formation of Sacred Scripture;
b. changing conceptions of the "plain sense" of Scripture;
c. the ways in which classical rhetoric and poetics informed scriptural interpretation;
d. tensions created by the need to transplant Scripture into new linguistic media;
e. the ways in which the Bible has been reconfigured in literature, art and scholarship.

The academic activities of our group consisted of weekly seminar meetings and a four-day conference. All of the fellows and some of the visiting scholars presented two or three substantial papers – often on quite different subjects – to the group. From among these, the following selection illustrates some of the major aspects of the group’s collaborative work.

**Interpretation as an Aspect of the Formation of Sacred Scripture**

Although it would ultimately take on an independent character, interpretation was integrally linked with the very formation of Sacred Scripture. Adele Berlin gave a seminar on the methodological implications of "inner-biblical" interpretation. As she illustrated, differences between biblical accounts of the same narrative once taken as manifestations of variant textual traditions are now perceived from a literary perspective as reinterpretations of earlier narratives. She analyzed Psalm 105 as a reinterpretation of the Exodus narrative intended to bolster the faith of the exiles returning to Judea during the Persian period. James Kugel discussed the interpretative moves made by the author of the Book of Jubilees in his adaptation of the Genesis stories. Living in the intertestamental period, this author still did not have the option to compose a separate commentary and instead rewrote the biblical text, manifesting interpretive principles and motifs later applied in early Christian and rabbinic interpretation. Sidney Griffith explored the appearance of the Bible in the Qur’an, showing how biblical stories referred to in the Qur’an as part of a common knowledge (perhaps reflecting oral Arabic Bible translations) were refashioned to support a new theory of Islamic prophetology.

**Changing Concepts of the Literal Sense**

The medieval period witnessed new interest in the "plain sense" of Scripture – in Judaism (peshat), Christianity (sensus litteralis) and Islam (zāhir, haqiqa). Jon Whitman showed how Christian conceptions of the literal sense underwent radical change from antiquity to the modern period. Early thinkers tend to align the "letter" of Scripture with the "surface" of the text; but by the thirteenth century the "literal" sense comes to be associated with the intention of the author. This shift gradually aligns the "letter" with the "spirit" of the text. Previously relegated to the circumference, the "literal" sense increasingly occupies the center of scriptural meaning in late medieval and early modern Christian commentary. By the early nineteenth century, the notion of spiritualizing the "letter" informs the emerging theory of the "symbol" and the modern aesthetics of literature. Alastair Minnis focused on late medieval developments in the Latin tradition influenced by the new Aristotelian learning that privileged the literal sense as logically
compelling and "immediate," whereas the "mediate" mystical senses were deemed subjective. The increasing prestige of the literal sense generated the notion of the "double literal sense," which encompassed readings previously classified as "spiritual." Robert Gleave, moving to Muslim hermeneutics, explored the notions of zāhir (literal sense) and haqīqa (literal language), discerning three definitions of these concepts: (1) the understanding of the original speakers of Arabic, (2) grammatical analysis by linguistic experts, (3) the meaning that was "obvious" to an ordinary speaker of the Arabic language – a combination of (1) and (2) that eventually dominated Muslim hermeneutics. Mordechai Cohen challenged the static view of the Jewish notion of peshat by demonstrating the different trajectories of this term – related in various ways to corresponding Arabic and Latin ones – within the medieval Jewish exegetical tradition. Cohen outlined how Judeo-Arabic models of peshat capitalized on newly acquired knowledge of Arabic learning, whereas in France, the focus on peshat in the school of Rashi is best understood in terms of contemporaneous trends in Latin conceptions of Bible exegesis.

Rhetoric and the Poetics of Reading
Since almost immediately after the formation of the Christian Bible, a tension has existed between the pagan classical tradition and Sacred Scripture. In her conference seminar, Rita Copeland identified a subtradition in medieval Christian hermeneutics: the application of the precepts of rhetorical argumentation to scriptural exposition. She considered how exegetes recruited the inner and most technical elements of rhetorical theory to hermeneutical purposes, and how the program of technical rhetoric (inventional theory) fared as an expository template, surveying texts from late antiquity (Augustine and Cassiodorus) to the Middle Ages (Rupert of Deutz, Thomas of Chobham, and the Prologue to the Wycliffite Bible). Andrew Kraebel explored the development of a method for reading the Psalms as poems, a technique formed in the cathedral school of Rheims. Teaching both classical poetry and biblical exegesis, Remigius of Auxerre, active at Rheims from c. 883-900, brought the interpretive priorities of the liberal arts to bear on the Psalter, and his approach was elaborated further.
by late-eleventh-century Rémois masters, including Bruno le Chartreux, John of Rheims, and Roscellinus of Compiègne. Wolfhart Heinrichs explored the Arabic notion of majāz in Arabic rhetoric, Qur’anic hermeneutics and Muslim jurisprudence, showing how it was related to haqīqa, the reasons given for its usage, and the rationale of those who denied the very existence of majāz in the Qur’an. Mordechai Cohen outlined two manifestations of rhetoric and poetics in Jewish interpretation. The poet Moses Ibn Ezra represents a Judeo-Arabic view of rhetorical form in Scripture as a “false” imaginative garb incidental to its inner “truth” (haqīqa), which exegetes in that tradition identified with peshat. By contrast, Rashi’s school in France, unaware of classical rhetoric and poetics, defined peshat as the external literary form of Scripture, secondary to its inner sense which was identified with Midrash – a hierarchy resembling that of the “letter” and “spirit” in Christian interpretation.

Sacred Authority and the Idioms of the Text

The transplantation of sacred Scripture from its original geographic and cultural contexts often generated controversies over its re-adaptation in a new idiom. Meira Polliack explored how the Hebrew Bible was transplanted into the Arabic idiom – in translation and interpretation. She juxtaposed two Jewish responses to the Islamic scriptural model. Saadia, in the multicultural milieu of tenth-century Baghdad, maintained a traditional balance between the Bible and the authoritative teachings of the Rabbis, whereas his Karaite contemporaries in Iraq and Palestine fundamentally re framed the Bible’s centrality within their conception of Judaism. Meir Bar-Asher addressed the thorny question in Islam over the permissibility of translating the Qur’an. His discussion reveals the great hesitation over this endeavor, largely as a result of the Muslim notion of i’jāz al-qur’ān, usually rendered as the “inimitability of the Qur’an,” a stylistic superiority that cannot be adequately represented in any language but Arabic. The diametrically opposed Christian view that sacred Scripture must be translatable was presented by Stephen Prickett, who explored the implications of Robert Lowth’s account of biblical parallelism, which allowed for a new appreciation of the sublimity of the Hebrew Bible.

Reconfiguring the Biblical Narrative

Beyond translation, cultural adaptation often required more radical “rewritings” of Scripture based on new cultural and intellectual contexts. Sidney Griffith explored the special mode of typological interpretation employed by the Syriac Christian Fathers to read the Old Testament in light of later Christian realities, a unique mode of reading distinct from Latin allegorical interpretation. Piero Boitani showed how the biblical Creation Account was adapted and rendered in Christian art over the centuries of the Middle Ages into the Renaissance. Bringing our study into the contemporary era, Adele Berlin discussed how various twentieth-century methodologies of literary criticism have been applied to the biblical text. As she observed, every such analysis is dependent on particular theoretical premises, and therefore, as is the case for pre-modern interpretation, reveals as much about the interpretive context as it does about the Bible.

The collective scholarship of our group reflects a bold new step in the academic study of Jewish, Christian and Muslim scriptural interpretation. All three of these fields have witnessed substantial advances in the last generation. Yet, with rare exceptions, scholarship in each is typically insulated, dealing with developments exclusively within one faith community. The argument advanced by our project is that awareness of parallel trajectories is crucial to understanding the unique turns made within Jewish, Christian and Muslim interpretation of Scripture, apart from revealing commonalities and, at times, mutual influence among
them. And, indeed, the substantial overlap among Jewish, Christian and Muslim approaches to Scriptural interpretation discovered in the exchanges of our group yielded fruitful and illuminating comparisons, across linguistic, confessional, geographic and chronological boundaries, enabling us to situate the study of scriptural interpretation in the polemics and poetics of overlapping civilizations. In order to present the insights generated by this special interdisciplinary nexus to the wider academic community, we intend to publish an edited volume with contributions from each of the fourteen scholars who participated in our project.

In addition to the academic activities of the group, its interactions were enriched by socially-oriented activities that led to lively and profound intellectual exchanges. A group trip to the north of Israel included a discussion led by James Kugel about Elijah’s struggle with the prophets of Baal on Mt. Carmel, a talk by Sidney Griffith near the shore of the Sea of Galilee about Jesus’ Sermon on the Mount, and a presentation by Jon Whitman at Karnei Hittin on the crushing defeat of the Crusaders by Saladin at the historic Battle of Hattin in 1187.

A warm, intimate dinner hosted by Meir and Ruth Bar-Asher featured a lecture by Reuven Amitai (Dean of the Humanities, The Hebrew University) on the Arabic inscription at Qal‘at Namrud, which our group visited on its trip to the North. A subsequent trip to Qumran and Masada inspired discussions among the group about the nature of early biblical interpretation and its relation to the origins of Christianity. At the conclusion of our conference, the group was treated to an in-depth presentation on the Ardon Windows at the National Library of Israel by Ahuva Passow-Whitman, former Senior Curator of Art at The Hebrew University.

In addition to these special events, our daily interaction as a group at lunchtime provided opportunities to discuss issues related to our various fields of study. Rita Copeland gave a lunch talk about medieval Latin education of young boys and the literary texts it enlisted. Usually, though, lunch discussions were informal extensions of our seminars, each of which was augmented by distinguished guest scholars from Israel and abroad. For example, at the initiative of Sidney Griffith, a special guest lecture on the place of the Qur’an in the literature of Late Antiquity was given by Angelika Neuwirth (Freie Universität Berlin), a world-renowned expert on the Qur’an.

Members of our group also shared their scholarship with the Israeli academic community at large by giving lectures at various local academic institutions, including Bar-Ilan University, University of Haifa, The Hebrew University of Jerusalem, The National Library of Israel and Tel Aviv University. A special “Outreach Lecture” open to the public was given at the IAS by Mordechai Cohen, with greetings by Richard Joel (President of Yeshiva University), presenting our group’s findings to a packed audience of 150 people, highlighting the relevance of our subject to a diverse cross-section of the broader Israeli community.

Listed below are fellows’ publications while at the IAS:

**Meir Bar-Asher**
- “The Permissibility to Translate the Qur’an” (forthcoming).
- “Isma’ili Qur’an Exegesis” (project in progress).

**Adele Berlin**

**Mordechai Cohen**
- A monograph provisionally entitled, The Rule of Peshat: Jewish Constructions of the Plain Sense of Scripture in their Christian and Muslim Intellectural Contexts, c. 900-1300 (forthcoming December 2012).
- “‘Words of Eloquence’: The Role of Poetics and Rhetoric in the Peshat Tradition of Jewish Bible
Interpretation” (forthcoming June 2011).

Rita Copeland
• "Insinuating Authors” in Selected Essays from the English Institute, an ACLS Humanities e-Book (forthcoming).
• Editor, "The Middle Ages” in The Oxford History of Classical Reception in English Literature, vol.1 (in preparation).

Sidney Griffith

Yaakov Kaduri (James Kugel)

Meira Polliack
• “The Karaite Authentication of Jewish Scripture in Light of the Islamic Conception of the Qur’an as a Book” (an article, forthcoming).
• "The Disintegration of the Concept of the ‘Dual Torah’ in Medieval Jewish Thought” (an article, forthcoming).
• With Michael G. Wechsler (eds.), ongoing series of "Karaite Texts and Studies" Brill Publications.

Jon Whitman
• “Sacred Scripture as Imaginative Literature: From Late Medieval Hermeneutics to Early Modern Poetics” [material for planned book].
• "The Literal Sense of Christian Scripture: Redefinition and Revolution” [planned article].
• "Fable and Fact: Judging the Language of Scripture (Judges 9:8-15)” [planned article].
Meir Bar-Asher
Department of Arabic Language and Literature
The Hebrew University of Jerusalem

Selected Publications:

Adele Berlin
Department of English and Jewish Studies
University of Maryland

Selected Publications:

Mordechai Z. Cohen
Bernard Revel Graduate School
Yeshiva University
Research Interests: Jewish Bible interpretation in its Christian and Muslim cultural contexts, especially its connections with Arabic poetics and Muslim jurisprudence.

Selected Publications:

Rita Copeland
Departments of Classical Studies and English
University of Pennsylvania

Selected Publications:
Sidney Griffith
Department of Semitic Languages
Institute of Christian Oriental Research
The Catholic University of America

Selected Publications:

Yaakov Kaduri
(James Kugel)
Bible Department
Bar-Ilan University

Selected Publications:

Meira Polliack
Department of Hebrew Culture Studies
Tel Aviv University

Selected Publications:

Jon Whitman
Department of English
The Hebrew University of Jerusalem

Selected Publications:

Visiting Scholars: Robert Gleave, University of Exeter; Alastair Minnis, Yale University; Stephen Prickett, University of Glasgow
Langlands Duality in Representation Theory and Gauge Theory

group director: David Kazhdan
The Langlands Duality in Representation Theory and Gauge Theory research group was in residence at the IAS from September 1, 2010 – February 28, 2011. With eight members, four visitors, and twenty-five graduate students, the group held both research seminars and "educational" seminars (the latter geared to both the graduate students and the research group members). Both were a success. The educational seminars covered quite a lot of new and important developments in Category Theory, Topology, Representation Theory and Physics. This exposure to new areas was of interest to both established mathematicians as well as graduate students. The research seminars were productive, with a number of new results related to the seminar's topics already in evidence.

Our group consisted of eight members, 4 visitors who came for 1-2 months and 25 graduate students. We ran 3-4 seminars a week with several Israeli mathematicians. Some of these seminars were "educational" [for both graduate students and the members] and some were research seminars. Both parts of the program were a success. The educational part covered quite a lot of new and important developments in Category theory, Topology, Representation theory and Physics. This exposure to new areas is important for both established mathematicians as well as graduate students. The research seminars were quite productive, with a number of new results related to the seminar’s topics already in evidence.

1.1.

Usually, by the Langlands correspondence people understand a paradigm of results and conjectures, where one establishes a correspondence between solutions to a certain problem (A) for a reductive group $G$, and a seemingly different problem (B) for the Langlands dual group $G^\vee$.

The original instance of such a correspondence is the arithmetical global Langlands program, where problem (A), attached to a reductive group $G$, considers the set of irreducible automorphic representations of this group over a global field $K_{glob}$, and problem (B), attached to a reductive group $G^\vee$, considers the set of conjugacy classes of homomorphisms of the Galois group of $K_{glob}$ into $G$.

Another instance, also going back to Langlands, is formulated for a local field $K_{loc}$, and problem (A) considers irreducible representations of the locally compact group $G(K_{loc})$, and problem (B) considers the set of conjugacy classes of homomorphisms of the Galois group of $K_{loc}$ into $G$.

Further examples, each of which constitutes a major achievement, have to do with problem (A) being that of classification of irreducible representations of the Chevalley group attached to $G$, character sheaves on $G$, and modular representations of $G$. In each case problem (B) has to do with the geometry of adjoint orbits in $G$. These instances of the Langlands program were the subject of a years-long work of G. Lusztig.

A third group of examples was proposed by V. Drinfeld and G. Laumon, where problem (A) considers perverse sheaves on the moduli space $Bun_G(X)$ of $G$-bundles on a given algebraic curve $X$, and problem (B) considers coherent sheaves on the moduli space $LocSys_G(X)$ of $G$-valued local systems on $X$. It is this example that is usually referred to as “Geometric Langlands,” as it can be viewed as a geometric and a higher categorical counterpart of the original Langlands program mentioned above.

However, it should be said that given a problem (A) for $G$, the answer to the question "what must (B) be for $G^\vee$?" has so far been empirical, and each of the established cases of Langlands correspondence follows its own path. Thus, it is fair to say that no unifying principle has been found that would explain the nature of Langlands correspondence. One can only say that in the case when $G$ is abelian, and hence $G$ is also...
abelian, in almost all the known examples, Langlands correspondence amounts to various fancy versions of the Fourier transform.

The different forms of the Langlands correspondence are discovered [or at least conjectured] in many areas of mathematics. Moreover, it was realized recently that some aspects of the Langlands correspondence are related to Montonen-Olive Electric-Magnetic duality of the Quantum Field Theory and to dualities of the String Physics. The aim of our research group was to further research of the several new directions that have appeared in recent years in the understanding of the Langlands correspondence, which lie on the juncture between representation theory, algebraic geometry, higher category theory and mathematical physics. Very often people working in one of these areas have only a very vague understanding of concepts and problems in other areas. So we ran a number of seminars to help the study of unfamiliar mathematics and even less familiar physics. These directions included:

a. The quantum geometric Langlands program
b. Representations of affine Kac-Moody groups and Lie algebras over local fields
c. Relations of the above to quantum field theory

In what follows we shall provide a description of each of the above directions and their interrelations.

1.2. Quantum geometric Langlands

Let $K$. be a local field of dimension 1 of characteristic zero over a ground field $k$, i.e., $K. = k((i))$, and let $G$ be a reductive group with Lie algebra $g$. We consider $G(K.)$ as an algebro-geometric object, i.e., as a group ind-scheme. Problem (A) that we are going to study is that of higher representation theory of $G(K.)$. i.e., we shall consider the 2-category of categories acted on by $G(K.)$. This can be thought of as a geometrization or categorification of the classical local Langlands correspondence.
However, one readily notices that the above problem admits a deformation: namely, we can introduce a level, i.e., a symmetric invariant form $k$: $g \otimes g \to k$, and consider the 2-category of categories acted on by $G(K_{\text{loc}})$ at level $k$. Examples include: the category $\hat{g}_{\text{aff}}$-mod of representations of the affine Kac-Moody Lie algebra $\hat{g}$ corresponding to $g$ at level $k$, and the category of twisted D-modules on the affine Grassmannian, or other homogeneous spaces of $G(K_{\text{loc}})$. We regard $k$ as a quantum parameter, because in the case of representations of the affine Kac-Moody algebra it can be translated to the parameter $q$ in the quantum group corresponding to $G$.

One notes that when $k$ is non-degenerate, it admits an inverse which can be interpreted as a level $\frac{1}{k}$ for the Langlands dual Lie algebra. A striking feature of this situation is that problem (B) corresponding to $G$ is semantically the same as problem (A) for $\hat{G}$. The following has been formulated in greater detail:

**Conjecture 1.3.1**

There exists a 2-equivalence between the following 2-categories:

$\{\text{Categ. acted by } G(K_{\text{loc}}) \text{ at level } k\} \leftrightarrow \{\text{Categ. acted by } \hat{G}(K_{\text{loc}}) \text{ at level } \frac{1}{k}\}$.

If this conjecture is established, it would shed light on the entire paradigm of Langlands correspondence over local fields of dimension 1. First, it demystifies the relation between problems (A) and (B) in the non-quantum case: that is, the seemingly different nature of these problems has to do with the two limiting points for the parameter $k$, namely, zero and infinity. Second, the way in which we envision the proof of this conjecture has in its core reduction to the case of a torus, i.e., the resulting correspondence would be seen as an enhancement of correspondence in the abelian case given by the Fourier transform. We were not able to prove this conjecture but obtained a number of important and clarifying results which I expect will lead to the complete proof.
1.3. Representations of affine Kac-Moody groups and Lie algebras over local fields

Unlike the representation theory of reductive groups over a 1-dim. local field, which has been studied extensively for all of the second half of the 20th century, the theory corresponding to groups over fields of a 2-dimensional nature is only now beginning to be developed. There are a number of directions of current research in this area:

a) Representations of groups of the form $k((i))$ on pro-vector spaces, where $K$ is a 1-dimensional local field. This has been initiated in a series of works by D. Gaitsgory and D. Kazhdan.

b) Consider the loop group, or rather the central extension of its polynomial version (with the loop rotation included) $G_{aff} = G_n \times \hat{G}$, where $1 \rightarrow G_n \rightarrow \hat{G} \rightarrow G[t, t^{-1}] \rightarrow 1$, as a reductive group corresponding to the affine root system. Although the group $G_{aff}$ is infinite-dimensional, it is believed that from many points of view its behavior is similar to that of finite-dimensional reductive groups. It is natural to ask which of the Langlands duality results and conjectures (both local and global, classical and geometric) can be formulated in this context.

One step in this direction has been carried out in [BrKa], namely, the generalization to the affine case of the Satake isomorphism, which is the starting point of Langlands duality.

Let $K$ be a local field, and let $O \subset K$ denote its ring integers of $K$. Then the group $G(K)$ is a locally compact topological group and $G(O)$ is its maximal compact subgroup. One may study the spherical Hecke algebra $H$ of $G(O)$-bi-invariant compactly supported $C$-valued measures on $G(K)$. The Satake isomorphism is a canonical isomorphism between $H$ and the complexified Grothendieck ring $K'_c(G^\vee)$ of finite-dimensional representations of $G^\vee$.

In [BrKa] we introduced an affine version of the spherical Hecke algebra, denoted $H(G_{aff})$ and...
demonstrated that $H(G_{aff})$ is isomorphic to the appropriately defined complexified Grothendieck ring $K'(\mathbb{G}^{\vee}_{aff})$ of the category of integrable representations of $\mathbb{G}^{\vee}_{aff}$, where the latter is the Langlands dual group of $G_{aff}$.

This version of affine Satake isomorphism allows one to define the notion of Hecke eigen-forms for $G_{aff}$. In [BKE] we studied the Eisenstein series for $G_{aff}$, defined by Kapranov and further investigated by Garland, from this point of view.

c) Along with the Satake equivalence for $G_{aff}$, one would like to study its geometric version, which should construct explicitly the category $\mathbb{G}^{\vee}_{aff}$ in terms of Gaff. This was initiated in [BrF], where the authors set up a framework for the geometric version of the Satake isomorphism for $G_{aff}$. A recent paper[G] made initial steps to the realization of this program.

1.4. Relations to quantum field theory

Many of the aforementioned problems find their home in the framework of quantum field theory. Therefore, gauge theory, where a group $G$ appears as a group of local symmetries, has the potential of providing a unified physical approach to various seemingly different instances of the Langlands correspondence. In this approach, the relation between a problem (A) involving a group $G$ and a problem (B) involving the Langlands dual group $\hat{G}$ comes as a suitable reinterpretation of the electric-magnetic duality conjecture, which relates two four-dimensional gauge theories that provide equivalent description of the same physics. The electric-magnetic duality has many variations, which involve gauge theories in different dimensions, with different amount of supersymmetry.

Supersymmetry plays an important role here: first, such dualities are typically found in supersymmetric gauge theories. Secondly, supersymmetric theories often can be twisted to produce a topological quantum field theory (TQFT). It is the latter, topological version which usually has a direct contact with the corresponding mathematical problem.
At the same time, topological quantum field theories naturally lead to higher categorical structures. Thus, an $n$-dimensional TQFT is a functor that associates numbers ("topological invariants") to closed $n$-manifolds, vector spaces to $(n-1)$-manifolds, categories to $(n-2)$-manifolds, 2-categories to $(n-3)$-manifolds, and so on. Moreover, such structures are enriched by the existence of various disorder operators — such as line and surface operators — which play an important role in understanding the dynamics of supersymmetric gauge theories. The study of these operators affords a deeper understanding of dualities on the one hand and is related to representation theory on the other.

A prominent example of this enterprise is a four-dimensional Yang-Mills theory with maximal supersymmetry. Electric-magnetic duality in this theory is conjectural, but has a natural explanation relying on the existence of a strongly-coupled six-dimensional superconformal field theory with maximal supersymmetry. After a suitable topological twist and a reduction of the resulting topological gauge theory on a Riemann surface $X$, this leads to the physical interpretation of the geometric Langlands correspondence on the curve $X$. In this approach, line operators of the four-dimensional gauge theory play the role of Hecke operators, while surface operators are necessary for incorporating ramification. Moreover, proper understanding of boundary conditions and their transformation under duality leads to a geometric analog of the functoriality principle and the phenomenon of endoscopy.

A. Kapustin’s recent work focused on dualities in field theories, with an emphasis on topological field theories (TFT). The goal of this work is to interpret duality conjectures in physics in mathematical terms, to find new evidence for these conjectures, and to understand nonlocal operators in TFT. Kapustin studied Wilson-'t Hooft line operators in 4d gauge theories and analyzed electric-magnetic duality for non-simply-laced gauge
groups. A joint work with E. Witten connected the geometric Langlands program to Montonen-Olive duality in gauge theory, as well as to mirror symmetry. It was also shown that the geometric Satake correspondence (local geometric Langlands) is physically interpreted as the correspondence between categories of Wilson and ‘t Hooft line operators in dual gauge theories.

Two follow-up papers by A. Kapustin (one in collaboration with N. Saulina) extend this to more general Wilson–‘t Hooft operators. This extension appears to be related to the work of R. Bezrukavnikov, M. Finkelberg and I. Mirkovic [BFM].

While in Jerusalem, A. Kapustin gave a course explaining to mathematicians the relation between the Quantum physics and the category theory and worked on the theory of higher-dimensional nonlocal operators in gauge theory for geometric Langlands. Some of the new results appear in [KS1]. Examples of such operators are surface operators studied by S. Gukov and E. Witten [GW1]. These operators form a higher categorical structure and should be relevant for a categorification of the local geometric Langlands duality.

In addition to many scientific discussions, the research group enjoyed several social outings – hikes, evening get-togethers and a celebratory restaurant dinner at the end of the group’s stay. I have no doubt that the interest in both mathematics and personal interaction which we experienced will continue for many years.

Listed below are fellows’ publications while at the IAS:

**Michael Finkelberg**

**Dennis Gaitsgory**
- "Notes on Geometric Langlands Correspondence," please see http://www.math.harvard.edu/~gaitsgde/GL/
- With John Francis, "Koszul Duality and Homotopy Theory for Chiral and Factorization Algebras" (forthcoming).

**David Kazhdan**
- With Michael Larsen and Yakov Varshavsky, *The Tannakian Formalism and the Langlands Conjectures* (Published in 2010).

**Anton Kapustin**
- "Geometry of Topological Defects of Two-Dimensional Sigma-Models" (with Kevin Setter, Caltech), arXiv:1009.5999.
Joseph Bernstein

The School of Mathematical Sciences
Tel Aviv University

Research Interests: Algebraic geometry. Representation theory. Automorphic forms and number theory.

Selected Publications:
"Analytic Continuation of Distributions with Respect to a Parameter." Functional Analysis and its Applications 6, No.4, 26-40.

Roman Bezrukavnikov

Department of Mathematics
MIT

Research Interests: Representation theory. Algebraic geometry.

Selected Publications:

Alexander Braverman

Mathematics Department
Brown University

Research Interests: Algebraic geometry. Representation theory.

Selected Publications:

Michael Finkelberg

Department of Mathematics
State University Higher School of Economics, Moscow

Research Interests: Representation theory. Algebraic geometry.

Selected Publications:
Dennis Gaitsgory
Department of Mathematics
Harvard University
Research Interests: Geometrization of automorphic forms. The theory of chiral algebras.

Selected Publications:

Anton Kapustin
Physics Department
Caltech
Research Interests: Supersymmetric gauge theories. Duality. Topological field theory.

Selected Publications:

David Kazhdan
Department of Mathematics
The Hebrew University of Jerusalem
Research Interests: Representations of groups.

Selected Publications:

Ivan Mirkovic
Department of Mathematics and Statistics
University of Massachusetts
Research Interests: Representation theory. Quantum field theory. Algebraic geometry. Number theory.

Selected Publications:

Visiting Scholars: Sergei Gukov, Caltech; Xinwen Zhu, Harvard University
group report

Computation and the Brain

group directors: Eli Dresner and Oron Shagrir
The concept of computation plays a major role in the current research of brain function. As Peter Stern and John Travis wrote in "Of Bytes and Brains" in Science (2006:75), "Computational neuroscience is now a mature field of research. In areas ranging from molecules to the highest brain functions, scientists use mathematical models and computer simulations to study and predict the behavior of the nervous system." Another typical statement of the centrality of computation to the study of the brain can be found in Christof Koch’s introduction to his book, The Biophysics of Computation: "The brain computes! This is accepted as a truism by the majority of neuroscientists engaged in discovering the principles employed in the design and operation of nervous systems.” In popular culture too, the brain is often referred to as a fantastically complicated and effective computational system, which we attempt to study and mimic with our own, man-made computers.

However, the instrumental and explanatory role of the notion of computation in neuroscience is still in need of analysis and clarification. There are various different ways in which computational models and the notion of computation are applied in the study of the brain, and it is important for these to be distinguished and assessed. For example, as attested by the two quotations in the previous paragraph, the term "computational neuroscience" may refer to two different enterprises: Stern and Travis talk of the extensive use of computer models and simulations in the study of brain functions, while Koch gives expression to the view that the modeled system itself, i.e., the brain, computes. Both perspectives are part of what is one of the major scientific projects of our time—the effort to explain how the brain, as a physical system, works. However, together these two perspectives manifest a duality that is not found in other sciences, where e.g., stomachs, planetary systems, and tornadoes are studied through the use of computational models and simulations, but are not perceived as computing systems.

Thus what is called for is a systematic, philosophical analysis of the role of computation in neuroscience. What is the exact role of computer models and simulations in brain research? What is the explanatory role of the view that the brain itself performs computations? How are the two enterprises (of using computer models in brain research, and of viewing the brain as a computer) related? Do they employ the same concept of computation? Are they components of a wider explanatory framework? These are the questions that our IAS research group, Computation and the Brain, set out to consider, discuss and offer answers to.

The core of our group was comprised of seven philosophers, each approaching the questions outlined above from a distinctive perspective: William Bechtel (philosophy of biology, UC San Diego), Eli Dresner (philosophy of logic and language, Tel Aviv University), Frances Egan (philosophy of cognitive science and of mind, Rutgers University), Arnon Levy (philosophy of biology, Van Leer Institute), Hilla Jacobson (philosophy of mind, Ben-Gurion University), Robert Matthews (philosophy of mind and linguistics, Rutgers University) and Oron Shagrir (philosophy of mind and science, The Hebrew University). Through many hours of discussion each of us sharpened his or her own perspective on the issues involved, became closely acquainted with the perspectives of the other members of the group, and together we moved forward toward an agreed upon, unified picture of the subject. Here, in a nutshell, are three of the main outlooks on computational processes and the ways in which they are related to the brain, that we focused our attention on. (These outlooks do not negate each other, but rather need to be incorporated together.)

One perspective on computation and the brain is mechanistic. In recent years it has been acknowledged that research and explanation in biology typically
involves the study of mechanisms—spatially and temporally located systems that are designed to serve a certain function, and this by virtue of their being composed of parts, the interaction among which allows the system to fulfill this function. The brain, it should be acknowledged, is a biological system (or part thereof), and hence brain research should (and does) manifest mechanistic characteristics. It therefore needs to be clearly explicated whether the brain can be described as a computing mechanism (as opposed to other mechanisms in our body), and how such a characterization is operative in brain research—e.g., in the explanations offered by scientists and in the mathematical models used in these explanations. Bechtel and Levy led our discussions of these issues.

A second outlook characterizes computing systems not in terms of their mechanistic constitution, but rather as systems, the purpose of which is to compute a certain mathematical function. It is obvious that this characterization applies to man-made computing systems—their function is determined by our intentions and decisions—but how (and in what sense) do brain scientists discover the purpose of certain areas and neural networks in the brain? How do they find out what mathematical function they are computing? Egan and Shagrir pursue these questions in their research, and by discussing their work we were able to incorporate this approach to computation within the unified conceptual framework we were trying to develop.

Finally, a third strain of thinking about computation in general, and about the brain as a computing system in particular, ties computation to the representation of content. Psychological research, as well as our everyday ascriptions of beliefs and desires to each other, depict us as having intentional states that are directed at
the world around us. This kind of thinking is also extremely common in brain research, where neural states are depicted as carrying information, and neural processes are described as yielding information through computation. Jacobson, Matthews and Dresner have addressed in their work the question of content from a variety of perspectives, and our challenge was to assess how their answers to this formidable question (as well as answers offered by others) fit the other parts of the picture we were studying.

We did not pursue these ambitious research goals in isolation, but rather through intensive interaction with members of the heterogeneous community of brain researchers. In our weekly seminars we not only discussed each other’s work, but also invited several eminent brain scientists who presented their research on various concrete brain processes and functions, and also joined our discussion of the more general methodological and philosophical questions that their work gives rise to.

Beyond these weekly exchanges, there were two visitors who stayed with us for longer periods and informed our research by introducing additional perspectives on the questions we were facing. One was Adele Abrahamsen (UC San Diego), who is a cognitive scientist specializing in language. Research into language acquisition, production and comprehension has always been central to cognitive science, and it looms large in contemporary brain science. Therefore it was important for us to examine, through her help, how the more general issues we were dealing with are reflected in the current research being conducted on language and the brain. Our second guest was Jack Copeland (University of Canterbury), who specializes in philosophical and historical aspects of the notion of computation as it is used in mathematical logic and computer science. His input was vital for our analysis of the way(s) in which this notion has come to play such a central role in the wholly different domain of brain research.
Beyond this routine of highly intensive intellectual stimulation we held a four-day workshop titled Philosophy and the Brain: Computation, Realization and Representation, which was the highlight of our stay at the IAS. Almost all aspects of our research program, as described above, were addressed in an extensive series of presentations. The typical format of these presentations was quite challenging, but consequently also very rewarding: Each speaker was allotted 5-10 minutes to present an overview of a paper that all the participants had read in advance. The rest of the time was dedicated (sometimes heated, but practically always productive) discussion. It was therefore not surprising, but still gratifying, that the participants viewed the workshop as interesting, productive and enjoyable. For us, the research group members, the workshop was probably even more useful than to other workshop participants, as it was an occasion for various emerging agreements (as well as persistent disagreements) to surface with greater clarity and precision.

In sum, our semester at the Jerusalem IAS was of tremendous benefit for us all. Opportunities for this type of focus on joint research are rare, and we feel that we made good use of the one provided to us by the Institute and its helpful staff. We plan to continue cooperating in various forms, possibly also by taking advantage of the option for a reunion meeting offered by the IAS, and to give expression to the insights gained from our joint work in a series of individually produced papers. We hope to be able to make significant contributions to this fast-moving, intriguing and important field.

Listed below are fellows' publications while at the IAS:

**William Bechtel:**
- With O. Shagrir, "Marr’s Computational Level and Delineating Phenomena," project in progress.

**Eli Dresner:**

**Frances Egan:**
- "Two Kinds of Representational Content for Cognitive Theorizing" (in progress).

**Hilla Jacobson:**
Arnon Levy:
- "What was Hodgkin and Huxley’s Achievement?" (under review).
- "What’s at Stake in the Mechanism(s) Debate(s)," (in progress).

Robert Matthews:
- "Measurement-Theoretic Accounts of Propositional Attitudes," in *Philosophy Compass*.
- Continued work on "Poverty of Stimulus Arguments Revisited," under revision.

Oron Shagrir:
- With Jack Copeland, “Turing and Gödel on Computability and the Mind,” to be published in *Computability: Gödel, Church, Turing, and Beyond*. MIT Press.
William Bechtel
Department of Philosophy
UC San Diego

Research Interests: Philosophy of the life sciences, including cell and molecular biology, biochemistry, neuroscience and cognitive science.

Selected Publications:

Eli Dresner
Department of Philosophy and
Department of Communication
Tel Aviv University

Research Interests: Philosophy of language. Philosophical logic. Philosophy of computation.

Selected Publications:

Frances Egan
Department of Philosophy
Rutgers, The State University of New Jersey


Selected Publications:

Hilla Jacobson
Department of Philosophy
Ben-Gurion University of the Negev


Selected Publications:
Robert Matthews
Department of Philosophy
Rutgers Center for Cognitive Science
Rutgers, The State University of New Jersey

Selected Publications:

Oron Shagrir
Department of Philosophy
Cognitive Science Program
The Hebrew University of Jerusalem

Selected Publications:

Arnon Levy
The Van Leer Institute
Jerusalem
Research Interests: Philosophy of science. Philosophy of biology.

Selected Publications:

Visiting Scholars: Mark Sprevak, University of Cambridge; Adele Abrahamsen, UC San Diego
Algorithmic Game Theory: The Next Decade

group directors: Michal Feldman and Noam Nisan
The last decade has seen the emergence and growth of a new interdisciplinary field of research often termed "Algorithmic Game Theory." This field lies at the crossroads of computer science, game theory, and economics; a combination which is necessary for addressing many of the challenges posed by the Internet. Not only is this field full of intellectual excitement internally, and not only has it already begun to intellectually influence the three parent disciplines, but it also has significant implications for the Internet, as evidenced by the large number of researchers in the field hired by Google, Yahoo, and Microsoft.

At the approximate age of ten years, it seems that the field of Algorithmic Game Theory is maturing. The goal of this group was to concentrate some of the leading scholars impacting on this field, each with his or her different point of view, trying to elucidate the main challenges of the field and attempting to chart the future course of the field for the next decade. Each of our group members brought their own unique research and areas of expertise.

Among the research topics covered during our stay at the Institute were: Networks with contagious risk, the different aspects of how the evaluation of the Generalized Second Price mechanisms are used for selling ads on the Internet, and the understanding of the performance of simple auctions and modeling auctions used in practice (Eva Tardos); Interviewing in stable matching problems and cost-sharing mechanisms (Nicole Immorlica); Sketching valuation functions, the equilibria of simple market mechanisms, and optimal multi-item auctions (Noam Nisan); Auction design for agents with uncertain, private values (Anna Karlin); A general framework for computing optimal correlated equilibria in compact games, computing Nash equilibria of action-graph games via support enumeration, mechanism design and auctions, and computational equilibrium analysis of voting games (Kevin Leyton-Brown); Envy-free mechanisms for multiunit auctions with budgets, cost sharing games with capacitated network links, and game theoretic perspectives of the facility location problem (Michal Feldman); Bargaining in networks (Amos Fiat).

The group members exhibited significant diversity in terms of their experience, background, current research directions and age. Yet we have resisted the temptation to widen the scope of this effort even further, ensuring that they all speak a common language – that of Game Theory on the one hand and Algorithms on the other.

It was a rare opportunity to bring together this group of founders and leading researchers in the field, to chart the path of algorithmic game theory in its next decade. We could not hope for a better timing for such an initiative, where the field is sufficiently mature to lead to a breakthrough in itself and its parent disciplines, yet young enough to be open minded to new ideas and themes.

During the semester we held a seminar on Algorithmic Game Theory, featuring talks by members of the research groups, as well as many additional guests. Some of the talks presented were:

- Online Competitive Auctions (Elias Koutsoupias)
- Revenue Maximization with a Single Sample (Tim Roughgarden)
- Beyond Equilibrium: Predicting Human Behavior in Normal Form Games (Kevin Leyton-Brown)
- Emergence of Cooperation in Social Networks (Nicole Immorlica)
- Revenue Maximization in Probabilistic Single-Item Auctions via Signaling (Michal Feldman)
- Approximately Optimal Mechanism Design via Differential Privacy (Rann Smorodinsky)

Our fellows and guests also gave many talks in the Computer Science department colloquium, and all talks were highly attended. The unprecedented concentration of leaders in this field that this group brought to The Hebrew University drew many other short-term and long-term visitors. Christos Papadimitriou (UC Berkeley) gave an outstanding talk on "Games, Algorithms and the Internet," followed by a wonderful dinner for all
the fellows. We also hosted Tim Roughgarden (Stanford University) for several short visits.

The group members, guests and students of this special semester participated in the group seminar which was held every Sunday, sharing and exchanging their recent work and ideas. In addition, the Computer Science department colloquium made good use of the presence of all our fellows and guests and hosted them for several talks as well.

Prior to the semester’s main event - the "Innovations in Algorithmic Game Theory" workshop - we organized a trip to the historical site of Masada and The Dead Sea. Most participants of the workshop joined the trip as well, despite its seemingly unusual hours (departing at 2am from Jerusalem). We ascended to the top of Masada just in time to see the sun rise over the Jordanian mountains, and had a tour of this magnificent milestone in Israel’s historical heritage. We then took a short and marvelous tour of the botanical garden of Ein Gedi, and finally, we descended to the lowest place on earth - The Dead Sea - for a relaxing dip in its unique waters.

The workshop was described by many of its participants as a unique and wonderful event, bringing together the people in the field of Algorithmic Game Theory to meet and discuss their most recent research and share their ideas. The workshop was packed with over 100 registered participants, a great list of 35 speakers, a panel on "Future Directions in AGT," trips to Masada and the Old City of Jerusalem, and concluded with a party at Amos Fiat’s new 300-year-old house. The workshop offered a wide coverage of AGT, excellent talks, high energy levels, and real "community-building." Aside from the fascinating talks, we also held a poster session in which students had a chance to display their work in a very informal and relaxed atmosphere. During the workshop we also held a tour of the Old City of Jerusalem, followed by the workshop banquet in a restaurant overlooking the Old City.

In addition, there have been many social events organized sporadically by the participants of the special
semester - movie nights, sailing trips, and many others. It was an extremely successful and enjoyable semester. Much of the work that has been done during the semester has already been published in prestigious conferences and journals, and some of it is in the submission process. It seems that the field is maturing and becoming more assimilated in the field of Economics.

Listed below are fellows’ publications while at the IAS:

**Michal Feldman:**
- With Amos Fiat, Stefano Leonardi and Piotr Sankowski, “Envy-Free Multi-Unit Auctions with Budget Constraints – working paper.

**Amos Fiat:**
- With Michal Feldman, Stefano Leonardi and Piotr Sankowski, “Envy-Free Multi-Unit Auctions with Budget Constraints,” working paper.

**Nicole Immorlica**
Anna Karlin
- With E. Celis, K. Leyton-Brown, T. Nguyen, and David Thompson, "Auction Design for Agents with Uncertain, Private Values" (in process).

Elias Koutsoupias
- With Amos Fiat, Katrina Ligert, Yishay Mansour and Svetlana Olonetsky, "Beyond Myopic Best Response (in Cournot Competition)" – accepted for publication in the symposium on discrete algorithms.

Kevin Leyton-Brown
- With Albert Xin Jiang, "Polynomial-Time Computation of Exact Correlated Equilibrium in Compact Games," Submitted to ACM TEAC.

Noam Nisan
• Equilibria of Simple Market Mechanisms, working paper.

Eva Tardos:
• With Albert Xin Jiang, “Polynomial-Time Computation of Exact Correlated Equilibrium in Compact Games,” Submitted to ACM TEAC.
Michal Feldman  
School of Business Administration  
Center for the Study of Rationality  
The Hebrew University of Jerusalem  

Selected Publications:  

Amos Fiat  
Department of Computer Science  
School of Mathematical Sciences  
Tel Aviv University  
Research Interests: Competitive analysis of online algorithms. Computational game theory.

Selected Publications:  

Nicole Immorlica  
Department of Electrical Engineering and Computer Science  
Northwestern University  

Selected Publications:  

Anna Karlin  
Department of Computer Science and Engineering  
University of Washington, Seattle  
Research Interests: Algorithmic game theory with a focus on mechanism design. Design and analysis of algorithms. On-line algorithms and competitive analysis. Probabilistic methods.

Selected Publications:  
**Elias Koutsoupias**  
Department of Computer Science  
University of Athens  
Research Interests: Theoretical computer science. Algorithmic game theory. Decision making under uncertainty.

**Selected Publications:**  

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**Kevin Leyton-Brown**  
Department of Computer Science  
University of British Columbia  
Research Interests: Computational game theory. Mechanism design and auction theory. Empirical algorithmics.

**Selected Publications:**  

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**Noam Nisan**  
School of Computer Science and Engineering  
The Hebrew University of Jerusalem  
Research Interests: Algorithmic game theory, in particular in electronic markets and auctions.

**Selected Publications:**  

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**Eva Tardos**  
Department of Computer Science  
Cornell University  

**Selected Publications:**  
Sovereignty, Global Justice and the Ethics of War

group directors: Yitzhak Benbaji and Eyal Benvenisti
In an era of globalization and massive institutional change in the international community, developing a workable set of ideas about global or international justice is one of the most important tasks facing philosophers, political theorists, lawyers and economists. Current events raise imperative political and moral questions concerning the moral standing of states and ethnocultural communities, states’ rights against intervention in their internal affairs, their right to use force to protect their territorial integrity, and their right to protect their citizens or to protect citizens of other states. Similarly, the growing interdependence among states introduces an entire set of concerns regarding global distributive justice, whereas the histories of relationships among states (colonialism, wars, secessions, etc.) suggest concerns regarding global corrective justice. These questions focus on the duties of affluent states to aid poor countries and refugees, the duties of colonial states to compensate their former colonies, the just treatment of statelessness and the just distribution of cultural rights, citizenship, residency, wealth and the world’s natural resources. These ample practical applications of global justice are what make it one of the most viable and increasingly important subfields of political philosophy.

Interestingly, some of the most fundamental themes of global justice have been widely discussed in the context of just war theory. Michael Walzer’s widely studied analysis of the accepted *jus ad bellum* (namely, the branch of international law that determines which wars are just) is a very good example. Walzer’s interpretation — often referred to as “the legalist paradigm of international law” — proposes that states have a moral right to their autonomy and territorial integrity, in the same way that, for John Locke, individuals have a natural right to their life, body and property. Based on this conception, the legalist paradigm assigns to states a right to protect their sovereignty by waging defensive wars. In Walzer’s view, the laws of war embody another basic value of global justice: they contend with the universal principle that all civilians, regardless of nationality or any other group affiliation, are endowed with the same rights, primarily their equal right to life. The question as to what extent each of the fighting armies must respect the right to life of the civilians of the other side is a pertinent one. In other words, does the civilian’s equal right to life translate into an obligation on the attacking army to respect the lives of enemy civilians, as much as they are expected to respect the lives of their own civilians.

It should come as no surprise then, that current scholarship demonstrates that the moral principles that guide just war theory can be successfully applied to other areas of international ethics. Rival theories regarding the just causes for war, and their link to the debate between statists and cosmopolitans (Statists are those who emphasize the role of the state, while Cosmopolitans stress the shared community of all humanity) regarding the moral standing of states, are crucial for analyzing themes of global distributive and corrective justice. Therefore, a joint analysis of the policies and institutions that best realize these principles yields interesting and significant implications.

The domains are different in many respects. Global justice regulates the distribution of resources, while the ethics of war regulate killing, lethal risks and power relations between states and individuals. And yet, in both fields the most fundamental disagreements take into account the moral standing of states, and the moral and legal meaning of sovereignty. The regulation of killing also involves questions of distributive justice such as the distribution of risk to combatants and civilians, and the appropriate level of investments to reduce civilian casualties, as well as the question whether and when wars for securing resources are justified. The joint discussion of wars, distributive/corrective justice and international institutions produced significant contributions in all three areas that could not have been
derived by examining any of them in isolation.

The research group on “Sovereignty, Global Justice and the Ethics of War” brought together scholars from these diverse fields to address these issues. The members of the group were Yitzhak Benbaji (Bar-Ilan University), Eyal Benvenisti (Tel Aviv University), Tsilly Dagan (Bar-Ilan University), Chaim Gans (Tel Aviv University), Judith Lichtenberg (Georgetown University), David Luban (Georgetown University Law Center), Balakrishnan Rajagopal (MIT) and Michael Walzer (Institute for Advanced Study, Princeton). We also enjoyed a two-month visit by Seth Lazar (University of Oxford).

Let us present the activity of the research group by dividing its overall topic of research into three areas. The first topic explored by the group was the morality of the laws of war. Scholars (Benbaji, Luban, Walzer) as well as guests (Daniel Statman [University of Haifa], Michael Gross [University of Haifa] and Gabriella Blum [Harvard University]) explored the morality of the laws of war, with special attention to the institutional arrangements recommended by the statist and the cosmopolitan competing theories of just wars. Perhaps the most important questions raised in these talks were: What is the appropriate level (i.e. global or national) for promoting justice in military conflicts? What is the role of national governments (on the one hand) and existing and potential international institutions (on the other) in implementing the just goals of just wars?

The second topic explored by the group was the statist and cosmopolitan theories of global justice, mainly distributive, but also corrective. Members of the group (Benvenisti, Dagan, Gans, Lichtenberg, Rajagopal and Walzer) addressed questions such as: Which principles ought to guide a just international society? What are the most suitable institutional arrangements to promote justice in the international realm? How should burdens be shared among states, and what is the moral obligation of states toward foreign communities in need? How, in particular, should
citizenship be distributed? They reexamined those answers that have been offered to the first question, including, on the one hand: self-determination, local culture-dependent justice, a fair distribution of the cooperative surplus, respect of cultural diversity; or on the other hand: protection of universal rights, global distributive justice, and global welfare. These two topics were primarily raised in our weekly seminars, in which each fellow presented his or her work and received valuable feedback from colleagues intimately familiar with the work of the speaker.

A third topic which the group explored is how debates between statists and cosmopolitans in these two fields—international justice and just war theory—are related, and how morality and the laws of war are implemented in the different conceptions of international justice. To this end, the group organized two workshops. The first—Global Justice and International Institutions—addressed the delicate balancing act between a sovereign’s rights and interests and those of foreign agents, such as neighboring countries or other nations. The workshop advanced a systematic account of the new institutional structure which governs international life, and the relation of this new structure to the ideal global justice. The second workshop, Global Justice and Just War Theory, discussed a unified theory of international justice and just wars, examining such questions as sovereignty and territorial rights, the conflicts created by the sovereign rights of states and the human rights of their citizens, and global redistribution as a just cause for war.

Guests of these workshops included speakers from New York University, the University of Oxford and the European University Institute. They were supported by the Faculties of Law at Tel Aviv University and Bar-Ilan University, as well as the Oxford Institute for Ethics, Law and Armed Conflict. Together these workshops addressed the challenge of a unified morality of transnational institutions, global justice and war. Members of the group had the opportunity to discuss...
this account of unified morality with experts in their respective fields.

Needless to say, the aim of the research group was not to exhaust this rich set of issues. Instead, we attempted to deepen the understanding of the challenges that globalization creates, and to offer a richer theoretical framework for analyzing and assessing the design of policies in the international arena. The convening of a multidisciplinary group of philosophers, political scientists and lawyers at the IAS offered a unique opportunity to do so.

Listed below are fellows’ publications while at the IAS:

**Yitzhak Benbaji:**

**Eyal Benvenisti:**
- "Sovereigns as Trustees of Humanity: The Minimal Other-Regarding Obligations" (posted on SSRN).
- "The Obligation to Investigate Compliance with the Laws of Armed Conflict after the Conflict" (to be published in the IDC Center Law Review (Hebrew).
- "Cosmopolitanism and the Laws of War."
Tsilly Dagan:

Chaim Gans:
- Three Zionisms and Post-Zionism – A Political Theory for the Jewish People, Haifa University Press (Hebrew).

Judith Lichtenberg:

David Luban:
- "War as Punishment" (under submission to journals).
- "Military Lawyers and the Two Cultures Problem" (in progress, written for the September ELAC conference in Oxford).

Balakrishnan Rajagopal:
- Development as Justice (book project).
- Accountability of International Organizations as a Justice Claim: A View from the Global South (Paper).
- LDCs and Global Governance: A New Approach (paper).

Michael Walzer:
- "Can the Good Guys Win?," European Journal of International Law.
- "Proportionality and Responsibility," an article to be included in a book published by Routledge.
- "Justice, Justice Shalt Thou Pursue," to be included in a festschrift for Chief Rabbi Sachs in the UK.
Yitzhak Benbaji
Faculty of Law and Department of Philosophy
Bar-Ilan University
Research Interests: Ethics, Political philosophy, Philosophy of language, Practical rationality.

Selected Publications:

Eyal Benvenisti
Faculty of Law
Tel Aviv University
Research Interests: International law, Constitutional law, Administrative law.

Selected Publications:

Tsilly Dagan
Faculty of Law
Bar-Ilan University

Selected Publications:

Chaim Gans
Faculty of Law
Tel Aviv University
Research Interests: Legal theory, Political philosophy, Philosophical analysis of public affairs, Nationalism.

Selected Publications:
Judith Lichtenberg  
Department of Philosophy  
Georgetown University  
Research Interests: Ethics. Political philosophy. Domestic and international justice.  

Selected Publications:  

David J. Luban  
Georgetown University Law Center  

Selected Publications:  

Balakrishnan Rajagopal  
International Development Group  
MIT Department of Urban Studies and Planning  

Selected Publications:  

Michael Walzer  
School of Social Science  
Institute for Advanced Study, Princeton  

Selected Publications:  

Visiting Scholars: Seth Lazar, University of Oxford; Jennifer G. Pitts, University of Chicago; David Rodin, University of Oxford
Cultural Archaeology of Jews and Slavs: Medieval and Early Modern Judeo-Slavic Interaction and Cross-Fertilization

group directors: Alexander Kulik and Moshe Taube
The aim of the group was to bring together historians, philologists and scholars of comparative religion to help bring down disciplinary barriers and to show how the Slavic and the Jewish cultures can be revealed, each one of them respectively, as unique repositories of the lost texts, sensibilities, and traditions of the other’s culture. It sought to examine, on the one hand, unique data which Slavic cultures preserve on Medieval and Early Modern East European Jews, and on the other hand, key elements of Slavic cultural traditions preserved by Medieval and Early Modern East European Jews. We explored cultural exchange within the Khazarian-Slavic, Judeo-Greek-Church Slavonic, Old Russian-Jewish, early modern Polish-Jewish, and other cultural realms from the late 9th - early 10th centuries to late 17th - early 18th centuries. The topics were not limited to direct Judeo-Slavic contacts, but included, inter alia, issues such as Slavic reception of ancient Jewish sources, Slavonic Bible and pseudepigrapha, Slavonic Josephus, Biblical iconography, etc.

While previous studies dedicated to Judeo-Slavic dialogue considered Jews and Slavs as two separate entities divided by religious, social, cultural, ethnic, and linguistic barriers, this research group was brought together to operate on an opposite assumption—that the barriers between Jews and Slavs were porous, that religious differences quite often enhanced the exchange, and similarities between them outweighed the differences. Furthermore, the group sought to complicate the assumption that Judeo-Slavic interaction was based predominantly on Slavic borrowings from Jewish literary legacy. Studies by the group participants indicated that interaction depended not only and not necessarily on direct borrowings, but also on the transparency of a variety of East European cultures, which shared a common pool of ideas, images, and genres.

The group focused on an array of texts broadly defined: Eastern European Jewish and Karaite epigraphy, Slavic Bible versions, ancient Jewish pseudepigrapha and medieval midrash preserved exclusively in Slavic, Hebrew medieval scientific texts in East Slavic translation, Slavic historiography and Church Slavonic literature, witnessing medieval and early modern Jewish history and Judeo-Slavic contacts in the Slavic lands influenced by Jewish texts or containing anti-Judaic polemics, literature of the Muscovite Judaizers, Jewish Rabbinic works referring to Slavic realia, Jewish and Slavic documentary sources, and more, leading to a better understanding and richer interpretation of the most current topics in the field.

Each of the participants studied their own set of texts while sharing with other participants their methodological concerns and innovative approaches. The group provided a unique opportunity to scholars in different fields, namely in Slavic, Jewish, and Oriental studies, comparative linguistics, Biblical philology, comparative religion, Medieval and Early Modern East European history and culture to define and elaborate a new scholarly methodology, reminiscent to that of an archaeologist who seeks to reconstruct a vanished cultural layer. Thus centering its attention on previously unexplored and under-explored Medieval and Early Modern texts and documents, the group sought to reconstruct Judaic and Slavic historical and cultural legacies—texts, traditions, and sensibilities—some of which were hitherto considered irretrievably lost, such as Judeo-Church Slavonic theological discourse, some misinterpreted or not integrated into discussion, and some regretfully neglected.

The presentations of the group fellows and guests covered diverse aspects of Judeo-Slavica along with an effort to develop a common language and methodology across different relevant disciplines. Thus, in the field of Jewish Hellenistic heritage preserved in Slavonic sources, Andrei Orlov (Marquette University) presented new conceptual developments in anti-anthropomorphi
polemics in the *Apocalypse of Abraham*, trying to understand their place in the larger anti-corporeal ideology of the Slavonic pseudepigraphon.

Anatoly Alexeev (St. Petersburg State University), in his study of the Slavonic *Josephus*, combined the question of medieval Jewish involvement in its translation and the problem of ancient vs. medieval interpolations in the *Judean War* and their connection to medieval Christian historiography. Reuven Kiperwasser (Bar-Ilan University) discussed the Rabbinic tradition of the account of Solomon and Asmodeus found in the Slavonic *Palaea*. In the field of early East European Jewish history, Shaul Stamper (The Hebrew University) suggested a new critical review of the sources for the conversion of the Khazars to Judaism, ascribing the conversion to a literary tradition rather than to historical reality. Alexander Kulik (The Hebrew University) suggested re-examining the question of the spoken language of the Jews inhabiting Slavic lands during the early Middle Ages (10th-13th c.). Offering a new linguistic and historical analysis of multicultural data, Kulik demonstrated that the evidence on the knowledge of East Slavic among early East European Jews is incomparably richer than data on any other language they may have spoken during this period. The resulting picture may impact on diverse fields of knowledge and induce a reevaluation of many historical and linguistic problems. Alexander Peresvetoff-Morath (Stockholm University) has identified surprising genealogical links between five anti-Judaic Orthodox texts of the Kievan period central in forming the image of the Jews in early East Slav Christian Culture. In particular this relates to finding new sources for the absolutely central East Slavonic 11th-century literary text, metropolitan Hilarion’s *Sermon on Law and Grace*, viz. the Byzantine *Book of Jacob the Newly-Converted Jew*. The late medieval phenomena of the Russian Judaizers, as well as translations from Hebrew, were discussed in several presentations. Moshe Taube (The Hebrew University) presented a thorough review of
the Corpus of medieval translations from Hebrew to Slavic and a balanced evaluation of the collaborative effort of Jews and Christians necessary for such joint translation projects, discussed the obstacles in the path of this collaboration, and proposed different possible scenarios for the emergence of the two distinct groups of translations from Hebrew, the earlier group (before 1450) and the later group (between 1450 and 1530).

Michael Schneider (Bar-Ilan University) discussed the problems of connections between the beliefs of the Judaizers and the mystical teaching of their contemporary, Moses of Kiev. William Ryan (University of London) reevaluated the Slavic version of one of the most popular medieval texts, the pseudo-Aristotelian *Secret of Secrets*, in Slavic *Tainata tainykh*. This Ruthenian translation of a Hebrew version of the Arabic *Sirr al-asrār*, belongs to a group of translations associated with the Judaizing movement of the 15th century, and the presentation traced its destiny in the Muscovite milieu in which it continued to be read as late as the eighteenth century. Sergejus Temčinas (University of Vilnius) presented a newly discovered 16-century East Slavic manuscript containing a manual of Hebrew and discussed its sources, its *Sitz im Leben*, and the dialectal characteristics of the Hebrew it reflects. For the early modern period, Judith Kalik (The Hebrew University) introduced a representative survey of cultural interactions between Jews and Slavs in the early Polish-Lithuanian Commonwealth, demonstrating that it could be attested to mostly in the lower, illiterate layers of the society, therefore leaving behind only indirect evidence. Yohanan Petrovsky-Shtern (Northwestern University), in his study of practical Kabbalah and natural medicine in the Polish-Lithuanian Commonwealth during 1690-1750, and his respondent Moshe Rosman (Bar-Ilan University), presented important methodological insights for the study of Judeo-Christian interaction. Dan Shapira (Bar-Ilan University) provided an innovative historiographic study of the intellectual climate for early Judeo-Slavic
studies in the first half of the 19th century. Several guest lectures went beyond the period defined by the group, enriching typological and methodological aspects of the discussion. Thus, Viktor Zhivov (UC Berkeley) spoke on sin and salvation in the history of Russian spirituality, while Serge Ruzer (The Hebrew University) as respondent, provided a Jewish comparative aspect. Andrew Wachtel (Northwestern University) introduced the study of poetry as a means to understanding nation and state building in the 19th century, and Andrei Rogatchevski (University of Glasgow) presented his research which examines the Russian-language mass media in Israel.

New projects and partnerships were built. Anatoly Alexeev, Alexander Kulik, and Moshe Taube designed an edition of early Slavic translations from Hebrew. Alexander Kulik and Judith Kalik made progress in collecting primary sources on the Jewish presence in Poland during the Middle Ages. Moshe Taube and William F. Ryan (Warburg Institute, London), resumed their work on an edition of the Slavic version of the Secretum Secretorum with its Maimonidean interpolations, an edition that will juxtapose the Slavic version with its Hebrew sources and will be accompanied by an English translation and a commentary. This edition will be published by the Warburg Institute.

The international conference held in June enabled the contextualization of the discussion in a wider range of topics. In addition to the group fellows, the conference hosted many of the most prominent scholars in Slavic and Jewish studies, such as Florentina Badalanova-Geller (Freie Universität Berlin), Israel Bartal (The Hebrew University), Christfried Bötrich (Ernst Moritz Arndt University of Greifswald), Lorenzo DiTommaso (Concordia University), Michael Flier (Harvard University), James Kugel (Harvard University/Bar-Ilan University), Heinz Miklas (University of Vienna), Wölfi Moskovich (The Hebrew University), Svetlina Nikolova (Cyrillo-Methodian Research Centre at the Bulgarian Academy of Sciences), Renee Perelmutter
Not all the participants of the research group, and a fortiori not all the participants of the conference, knew one another personally before the meeting in Jerusalem. The daily interaction on both the academic and social level created bonds that will last. The lively discussions of the talks presented during the sessions of the conference and the private discussions that followed during the very enjoyable social events, helped to foster new ties between researchers from Israel and abroad, as well as rekindling old ones. These will no doubt enhance future scholarly cooperation for the benefit of one and all.

The main accomplishment of this semester-long intensive interaction in the propitious atmosphere of the Israel Institute for Advanced Studies afforded the group members the opportunity to learn about their colleagues’ current research and also to view their own work in a broader scholarly context that encompasses their particular interests. The benefits of this improved vision are already tangible in the form of specific plans of collaboration as outlined above and below.

Listed below are fellows’ publications while at the IAS:

Moshe Taube
Judith Kalik and Alexander Kulik during a lunch talk


**Alexander Kulik**
- Biblical Pseudepigrapha in Slavonic Traditions (under contract with Oxford University Press).
- Struggle of Michael and Satanael in collaboration with Michael Stone (The Hebrew University of Jerusalem) and Emmanouela Grypeou (University of Cambridge Press), in progress.
- "Jews and the Language of Eastern Slavs."

**Dan Shapira**
- Editor of the Hebrew Tombstone Inscriptions from the Pre-Ottoman and Ottoman Periods from Mangup, the Crimea. (forthcoming).
- "Hebrew Tombstone Inscriptions from the Pre-Ottoman and Ottoman Periods from Chufut-Qal’eh, the Crimea" (in progress).
- Sources for the Study of Khazar History (Hebrew) (in progress).
- Eastern European Karaites in the Last Generations, Ben-Zvi Institute, Jerusalem, 2011.

**Alexander Pereswetoff-Morath**
- "What is Common to a Metropolitan and a Philosopher? The Book of Jacob as a proof-text for Heilsgeschichte in Kievan Rus’," in the Slavonic and East European Review, UK (in process).
- Monographic editions of the Slavonic versions of Book of Jacob, the Newly-Converted Jew and of the Dialogue of Timothy and Aquila (in process).
Judith Kalik

• "They are like Jews: Use of the Jews in Inter-confessional Christian Polemic in the Polish-Lithuanian Commonwealth."
• "Jews and Slavs in the Polish-Lithuanian Commonwealth: Focal Points of Interaction."
• "Jews, Orthodox, and Uniates in Ruthenian Lands of the Polish-Lithuanian Commonwealth."

Yohanan Petrovsky-Shtern

• "Arkheologiya tarbutit: kabalah ma’asit be-mizrah eropa, ha-meah ha 17-18" for the Efraim Urbach Memorial Conference (Israeli Academy of Sciences, May 16, 2011), to be published in a forthcoming volume resulting from the conference.
• The Shtetl As It Was, forthcoming summer 2012

Andrei Orlov

• A monograph on sacerdotal traditions in the Apocalypse of Abraham provisionally entitled The Patriarch and the Scapegoat: The Sacerdotal Universe of the Apocalypse of Abraham.

Anatoly Alexeev

• On Jerusalem Vestige of the Byzantine-Slavonic Lectionary (in process).
• Jewish-Slavic Literary Contacts of Middle Ages: The Status Questionis (in process).
• Aramaic Targum and New Testament (in process).
Anatoly A. Alexeev  
St. Petersburg State University  
**Research Interests:** Textual criticism. History of Bible translations. Intercultural and interreligious contacts in the Middle Ages.  
**Selected Publications:**  

Judith Kalik  
The Hebrew University of Jerusalem  
**Research Interests:** East European Jewish History (Jewish relations with the Church, nobility, peasants, burghers, economic and administrative history, legal status of the Jews.)  
**Selected Publications:**  

Alexander Kulik  
Department of German, Russian and East European Studies  
The Hebrew University of Jerusalem  
**Research Interests:** Medieval and modern Judeo-Slavica. Palaeoslavica and broader aspects of Russian and East European cultural history. Historical-traditional and philological study of Jewish literature of the Hellenistic and Roman periods. Early Eastern European Jewish history.  
**Selected Publications:**  
*History of the Jews in Russia: From Antiquity to Early Modern Period.* Jerusalem/Moscow: Gesharim/Mosty Kultury, 2009 (Russian).  
Published in Hebrew, Jerusalem: Zalman Shazar Center for Jewish History, 2010.

Andrei Orlov  
Department of Theology  
Marquette University  
**Selected Publications:**  

Visiting Scholars:  
Israel Bartal, The Hebrew University of Jerusalem; Michael S. Flier, Harvard University; William F. Ryan, Warburg Institute/University of London; Viktor M. Zhivov, UC Berkeley; Michael Schneider, Bar-Ilan University; Boris A. Uspensky, University of Naples.
Alexander Pereswetoff-Morath
Royal Swedish Academy of Letters, History and Antiquities

Selected Publications:
‘Whereby we Know that it is the Last Time’: Musings in Anti-Messiahs and Antichrists in a Ruthenian Textual Community. Antidoron natalicum Laurentio Steensland expleto sexagesimo quinto aetatis anno oblatum. Lund 2006, viii+122pp.

Yohanan Petrovsky-Shtern
Department of History
Northwestern University

Selected Publications:

Dan Shapira
Department of Near Eastern History
Bar-Ilan University

Selected Publications:

Moshe Taube
Department of Linguistics
Department of German, Russian and East European Studies
The Hebrew University of Jerusalem

Selected Publications:
The Institute for Advanced Studies
The Institute for Advanced Studies at The Hebrew University, established in 1975, is a national science institution dedicated to the advancement of research and learning at the highest level. It is open to scholars in all academic fields, from both Israel and abroad, and it is the only institution of its kind in Israel.

Each year the Institute hosts approximately 40 fellows. Fellows of the Institute are members of Collaborative Research Groups that convene for a period of up to a year. In any given year the Institute hosts three to six Collaborative Research Groups, composed of scholars from Israel and abroad in comparatively equal proportions. A wide range of disciplines has been represented by the research groups hosted at the Institute – from Integrability and Gauge/String Theory to Algorithmic Game Theory, from Computation and the Brain to Bounded Rationality.

Fellows at the Institute participate in the IAS programs, free of their normal teaching obligations and administrative duties. The Institute attracts scholars who constitute the vanguard in their various disciplines. By encouraging long-term interaction, the Institute contributes to the interchange of knowledge and the vitality of academic life in Israel and throughout the world.

Any scholar may submit a proposed topic for a research group along with the names of those who will be part of the group. Research groups are composed of eight fellows as well as additional guests.

The Institute offers specialized conferences for scholars in innovative, comprehensive topics, with an opportunity to share and explore the latest research and methodologies. The IAS continues to co-host several joint conferences with the Israel Science Foundation. Given the success of these conferences, the joint sponsorship will continue and future plans include broadening the scope of these conferences. Additional programs at the IAS include conferences that are open to a wide academic audience. Some conferences are a reunion of past research groups convening to supplement their research.

In addition to research groups and conferences, the IAS annually hosts the Victor Rothschild Memorial Symposia, with the participation of five Advanced Schools representing the following disciplines: Jewish Studies and Comparative Religion, Economic Theory, Theoretical Physics, Life Sciences and Mathematics. The Advanced Schools, each directed by a scholar of international standing, attract young doctoral and postdoctoral candidates from all over the world. The candidates are given an opportunity to interact with leading scientists involved in pioneering research in their respective fields.

The IAS also actively participates in the international programs conducted by SIAS, along with its unique exchange programs for scientists and scholars with the Collège de France. All those interested in our academic programs are invited to visit our website at www.as.huji.ac.il.
Research Groups
2011 – 2012

The Migration of Criminal Law Principles from National to International Law
September 1, 2011 – February 29, 2012
Coordinator: Miriam Gur-Arye (The Hebrew University)

Practical and Theoretical Rationality: A Comparative Study
September 1, 2011 – February 29, 2012
Coordinator: Ruth Weintraub (Tel Aviv University)

Jewish Physicians in Medieval Christian Europe: Professional Knowledge as a Cultural Change
March 1, 2012 – August 31, 2012
Coordinators: Gad Freudenthal (CNRS Paris and University of Geneva) and Reimund Leicht (The Hebrew University)

Bounded Rationality: Beyond the Classical Paradigm
March 1, 2012 – August 31, 2012
Coordinator: Elchanan Ben-Porath (The Hebrew University)

Integrability and Gauge/String Theory
March 1, 2012 – May 31, 2012
Coordinators: Romuald A. Janik (Jagiellonian University) and Matthias Staudacher (Max-Planck-Institute for Gravitational Physics, Potsdam)

Molecular Electronics
June 1, 2012 – August 31, 2012
Coordinator: Amnon Aharony (Ben-Gurion University)
Research Groups
2012 – 2013

Patterns and Processes in Organizational Networks
September 1, 2012 – February 1, 2013
Coordinators: Yuval Kalish (Tel Aviv University) and Amalya Oliver (The Hebrew University)

Neo-Aramic Dialectology
September 1, 2012 – July 1, 2013
Coordinators: Steven Fassberg (The Hebrew University), Simon Hopkins (The Hebrew University) and Hezy Mutzafi (Tel Aviv University)

Convergence and Divergence
September 1, 2012 – July 1, 2013
Coordinators: Bernard M. Levinson (University of Minnesota), Konrad Schmid (University of Zurich) and Baruch Schwartz (The Hebrew University)

The Influential Child
March 1 – August 1, 2013
Coordinators: Maayan Davidov (The Hebrew University) and Ariel Knafo (The Hebrew University)
Academic Calendar:
September 1, 2011 – August 31, 2012
September

September 11-16, 2011
The 19th Jerusalem School in Life Sciences
Molecular Medicine: Cancer Biology and Therapy
Director: Roger Kornberg (Stanford University)
Codirectors: David Engelberg (The Hebrew University), Yossi Orly (The Hebrew University) and Yosef Yarden (Weizmann Institute of Science)

September 18-23, 2011
Summer Institute
The Political, Social and Intellectual History of the Mamluk and Mongol Empires: A Comparative Perspective
Organizers: Reuven Amitai (The Hebrew University), Sabine Schmidtke (Free University of Berlin) and Leigh Chipman (Bar-Ilan University)

October

October 23 – 27, 2011
IAS-ISF Conference
ICAZ FRWG 16th meeting: Fish and Fishing: Archaeological, Anthropological, Taphonomical and Ecological Perspectives
Organizers: Naama Goren-Inbar, Irit Zohar and Rivka Rabinovich (all of The Hebrew University)

November

November 16 – 19, 2011
IAS Conference
The First China-Israel Meeting on Strongly Correlated Electron Matter
Organizers: Assa Auerbach (Technion – Israel Institute of Technology) and Aharon Kapitulnik (Stanford University)

November 20, 2011
IAS Advanced Schools Directors’ Meeting
Organizers: Eliezer Rabinovici (The Hebrew University) and Lea Prawer (The Hebrew University)

November 24-26, 2011
IAS Conference
Arab Literatures in Hebrew
Organizers: Hannan Hever and Omri Grinberg (both of The Hebrew University)

December

December 19 – 20, 2011
Research Group Reunion
Medieval Hebrew Terminology in the Making
Organizers: Resianne Fontaine (Vrije Universiteit Amsterdam) and Gad Freudenthal (CNRS, University of Geneva)

December 21-22, 2011
Research Group Conference
The Migration of Criminal Law Principles from National to International Law
Organizer: Miriam Gur-Arye (The Hebrew University)

December 27, 2011 – January 5, 2012
Advanced School
The 29th Jerusalem Winter School in Theoretical Physics
Current Trends in Particle Physics and Cosmology
General Director: David Gross (KITP, UC Santa Barbara)
Director: Eliezer Rabinovici (The Hebrew University)
January

January 10-12, 2012
Research Group Conference
Practical and Theoretical Rationality: A Comparative Study
Organizer: Ruth Weintraub (Tel Aviv University)

January 16-19, 2012
IAS-ISF Conference
On The Move: The Middle East and the "First Modern Globalization" (1880-1940)
Organizers: Liat Kozma (The Hebrew University), Avner Wishnitzer (The Hebrew University), Johann Büsow (University of Hague) and Valeska Huber (German Historical Institute of London)

February

February 1 – 8, 2012
IAS-ISF Conference
The Third Indian Israeli International Meeting on String Theory – Holography and its Applications
Organizers: Ofer Aharony (Weizmann Institute of Science) and Jacob Sonnenschein (Tel Aviv University)

February 19 – 23, 2012
IAS-ISF Conference
Models and Methods for Analysis of Lymphocyte Repertoire Generation, Development, Selection and Evolution - 2
Organizer: Ramit Mehr (BIU)

February 28 – March 2, 2012
IAS Conference
Collective Memory
Organizers: Vered Vinitsky-Seroussi (The Hebrew University) and Yunqian Chen (IAS, Nanjing University)

April

April 2- 5, 2012
Research Group Conference
Integrability in Gauge and String Theory: Spectrum, Correlation Functions and Amplitudes
Organizers: Romuald A. Janik (Jagiellonian University) and Matthias Staudacher (Max-Planck Institute for Gravitational Physics, Potsdam)

April 29 – 30, 2012
Rothschild Fellows’ Conference
Organizer: Yad Hanadiv

May

May 1 – 6, 2012
IAS-ISF Conference
Ideology of Power and Power of Ideology in Early China
Organizers: Yuri Pines (The Hebrew University) and Paul R. Goldin (University of Pennsylvania)

May 29-31, 2012
IAS-ISF Conference
Personality in Israel: Research Workshop on the Implications of Personality on Employee Reactions and Organizational Processes and Outcomes
Organizers: Shaul Oreg (The Hebrew University), Yair Berson (University of Haifa) and Lilach Sagiv (The Hebrew University)

May – June

May 29 – June 4, 2012
Research Group Conference
Bounded Rationality
Organizer: Elchanan Ben-Porath
June

June 5 - 8, 2012
SIAS Conference
Organizers: Eliezer Rabinovici (The Hebrew University) and Lea Prawer (The Hebrew University)

June 10 – 15, 2012
Advanced School
16th Midrasha Mathematicae
Words and Growth
Directors: Peter Sarnak (IAS Princeton) and Aner Shalev (The Hebrew University)

June 11 – 13, 2012
IAS-ISF Conference
Death and Sacrifice in Modern Islam: History, Ethics and Politics
Organizers: Meir Hatina (The Hebrew University) and Meir Litvak (Tel Aviv University)

June 18 – 27, 2012
Advanced School
The 23rd Jerusalem School in Economic Theory
Intertemporal Public Economics
Directors: Eric Maskin (Harvard University) and Eyal Winter (The Hebrew University)

June 24 – 28, 2012
IAS Conference
From Jahiliyya to Islam
Organizer: Yohanan Friedmann
(The Hebrew University)

July

July 2 – 4, 2012
Research Group Reunion
Encountering Scripture in Overlapping Cultures: Early Jewish, Christian and Muslim Strategies of Reading and their Contemporary Implications
Organizers: Meir Bar-Asher (The Hebrew University) and Mordechai Cohen (Yeshiva University)

July 9 – 11, 2012
Research Group Reunion
Personal and Institutional Religion: Christian Thought and Practice from the Fifth to the Eighth Century
Organizers: Brouria Bitton-Ashkelony (The Hebrew University) and Lorenzo Perrone (University of Bologna)

July 8 – 17, 2012
Summer School for Graduate Students in Jewish Studies
Mingled Identities: Rethinking the Notion of Identity in Jewish Culture
Organizers: Israel Yuval (The Hebrew University) and David Ruderman (University of Pennsylvania)

July 16 – 20, 2012
IAS-ISF Conference
Molecular Electronics in Jerusalem, International Meeting
Organizers: Amnon Aharony (Ben-Gurion University), David Cahen (Weizmann), Yoseph Imry (Weizmann), Abraham Nitzan (Tel Aviv University) and Oren Tal (Weizmann)

July 22 – 26, 2012
The 20th Jerusalem School in Life Sciences
Nuclear Organization, Dynamics and Activity
Director: Roger Kornberg (Stanford University)
Codirector: Yossi Gruenbaum (The Hebrew University)