

**Center for The Study of Rationality
The Hebrew University of Jerusalem**

Scientific Report
June 2009 – June 2010

Presented by
Eyal Winter
Center Director

About the Center

Founded in 1991, the Hebrew University's Center for the Study of Rationality is a unique venture in which faculty, students, and guests join forces to explore the rational basis of decision-making. Coming from a broad sweep of departments—mathematics, economics, psychology, biology, education, computer science, philosophy, business, statistics, and law—its members apply game-theoretic tools to examine the processes by which individuals seeking the path of maximum benefit respond to real-world situations where individuals with different goals interact.

Largely inspired by the pioneering work of Professors Robert John Aumann (Nobel Laureate in Economics 2005) and Menahem Yaari (President of the Israel Academy of Sciences and Humanities), the range of the Center's scientific activity is unparalleled in the world. Most interdisciplinary centers aim to promote cooperation between researchers in two or three different fields, whereas the Center for the Study of Rationality is a truly multidisciplinary enterprise, drawing on the talents of outstanding scholars from ten different departments in four faculties of the University. The richness of perspective is a vital aspect of the Center's mission: to explore models that describe interactive decision-making as it occurs in every one of these disciplines, and beyond.

Through its workshops and conferences the Center challenges academics to break free from the governing rubrics of their individual specialties and, instead, to direct their gaze toward the wider horizon of interactive dynamics. As of the 2005–2006 academic year the Center opened a Ph.D. Program for Excellent Students: taking specially designed courses that are offered by the Center, the students accepted to the program are the best from all the institutions of higher learning in Israel and from all the disciplines represented by Center members.

The Center is a hub of activity: it holds workshops, conferences, seminars, and lectures, including the popular "Rationality on Friday" interdisciplinary colloquium; it hosts world-class guest scholars from around the world, and publishes a series of highly regarded Discussion Papers based on Center activities. Depending on the availability of funding the Center also hosts post-doctoral Fellows.

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This report was prepared for the annual meeting of the Academic Committee of the Center (June 28, 2010):

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Contents

1. Visiting Scholars	5
2. Seminars	6
3. Conferences	9
4. Special Events	10
5. Center Laboratories	11
6. The Ph.D. Program in Rationality	14
7. Center Publications	15
8. Distinctions and Promotions	16
9. International Cooperation	16

Appendices

Appendix 1:	“Rationality on Friday”: Abstracts (p. 17)
Appendix 2:	“Game Theory and Mathematical Economics”: Abstracts (p. 19)
Appendix 3:	“Computation and Economics”: Abstracts (p. 23)
Appendix 4:	“The Second Israeli–Turkish Murat Sertel Memorial Conference on Economic Theory”: Paper Titles (p. 27)
Appendix 5:	The 19 th Annual Rationality Conference: Paper Titles (in Hebrew) (p. 28)
Appendix 6:	Students in the Ph.D. Program in Rationality (p. 29)
Appendix 7a:	Statement by the Ph.D. Program Coordinator (p. 30)
Appendix 7b:	Ph.D. Program Course Descriptions (in Hebrew) (p. 31)
Appendix 8:	Discussion Papers (p. 32)
Appendix 9:	Center Members (p. 35)

1. Visiting Scholars

During the academic year 2009–2010, the Center hosted eighteen visitors from around the world. These scholars conduct joint work with Center members, lecture in its various colloquia, and meet with Center students. They include senior scientists as well as post-doctoral students and annual guests.

Short-term Visitors

Marc-Arthur Diaye, Economics, École Nationale de la Statistique et de l'Analyse de l'Information Paris; June 17–30, 2010. Host: Eyal Winter.

Shaddin Dughmi, Computer Science, Stanford University; May 24–June 30, 2010. Host: Noam Nisan.

Dean P. Foster, Statistics, University of Pennsylvania; May 20–June 6, 2010. Host: Sergiu Hart.

Gagan Goel, Computer Science, Georgia Institute of Technology; Nov. 30, 2009–Jan. 15, 2010. Host: Noam Nisan.

Hanna W. Halaburda, Business School, Harvard University; June 1–10, 2010. Host: Eyal Winter.

Vijay Krishna, Economics, Penn State University; June 24–29, 2010. Host: Motty Perry.

Sylvie Lebloise, Psychology, Toulouse University; Apr. 9–June 18, 2010. Host: Ilan Yaniv.

Bart Lipman, Economics, Boston University; Feb. 13–23, 2009. Host: Elchanan Ben-Porath.

Barbara Mellers, Hass Organizational Behavior and Industrial Relations Group, UC Berkeley; Dec. 19–26, 2009. Host: Ilana Ritov.

Jean-François Mertens, Mathematical Economics and Game Theory, Université Catholique de Louvain, Belgium; Oct. 12–Nov. 2, 2009, Feb. 25–Mar. 19, 2010. Host: Abraham Neyman.

Benny Moldovanu, Economics, University of Bonn; Feb. 1–7, 2010. Host: Eyal Winter.

Rosemarie Nagel, Economics and Business, Universitat Pompeu Fabra; Dec. 27, 2009–Jan. 7, 2010. Host: Shmuel Zamir.

Phil Reny, Economics, University of Chicago; Feb. 23–Mar. 4, 2010, June 14–24, 2010. Host: Motty Perry.

Daniel Seidmann, Economics, Nottingham University; Apr. 11–16, 2009. Host: Eyal Winter.

Philip-Eyrikson Tetlock, Psychology, Business, and Political Science, UC Berkeley; Dec. 19–26, 2009. Host: Ilana Ritov.

Tristan Tomala, Economics and Decision Science, HEC Paris; May 1–8, 2010. Host: Abraham Neyman.

Matthias Uhl, Economics, Max Planck Institute for Economics, Germany; Mar. 1–Apr. 30, 2010. Host: Ilan Yaniv.

Asher Wolinsky, Economics, Northwestern University; May 30–June 19, 2010. Host: Sergiu Hart.

Visiting Scholars

Joseph Halpern, Computer Science, Cornell University; all year. Host: Eyal Winter.

Ilan Kremer, Business and Economics, Hebrew University and Stanford University; all year. Host: Eyal Winter.

Zur Shapira, Business and Psychology, NYU; a regular annual guest.

2. Seminars

This year the Center conducted four series of seminar meetings: “Rationality on Friday,” “Game Theory and Mathematical Economics,” “Student Seminar,” and “Computation and Economics.” In addition to these formal weekly meetings there are also various occasional seminar meetings, often informal and sometimes during our regular “sandwich luncheon” meetings on Sundays.

“Rationality on Friday”

“Rationality on Friday,” coordinated by Center Member Prof. Ilana Ritov, is a forum to which the best Israeli and international researchers are invited to present state-of-the-art research topics. Open to the general public, this multidisciplinary colloquium has become a staple of the Center and has gained wide popularity.

This year’s lectures:

1. **Noga Alon**, Tel Aviv University (Nov. 13, 2009):
“Voting Paradoxes.”
2. **Esteban F. Klor**, Hebrew University (Nov. 27, 2009):
“Does Terrorism Work?”
3. **Barbara Mellers**, UC Berkeley (Dec. 18, 2009):
“Wants’ or ‘Oughts’ in Economic Games?”
4. **Daphna Lewinsohn-Zamir**, Hebrew University (Jan. 8, 2010):
“Assessing Outcomes.”
5. **Joe Halpern**, Cornell University (Feb. 26, 2010):
“Iterated Regret Minimization: A New Solution Concept.”
6. **Michael O. Rabin**, Harvard University and Hebrew University (Mar. 5, 2010):
“Practical Zero Knowledge Proofs and Application to Financial Processes.”
7. **Ron Aharoni**, Technion (Apr. 9, 2010):
“What Is Philosophy?”
8. **Ido Erev**, Technion (May 7, 2010):
“A Choice Prediction Competition for Market Entry Games: An Introduction.”
9. **Simon Gächter**, University of Nottingham (May 28, 2010):
“Culture and Cooperation.”

(For abstracts of the “Rationality on Friday” lectures, see Appendix 1.)

“Game Theory and Mathematical Economics”

This series of talks explores the connection between the fields of Mathematical Economics and Game Theory. Of the nineteen talks, eight were given by speakers from abroad, five by Hebrew University faculty, four by lecturers from other Israeli universities, and two by students in the Ph.D. Program in Rationality.

1. **Jean-François Mertens**, Université Catholique de Louvain (Oct. 25, 2009):
“Cournot Equilibrium without Apology: Existence and the Cournot Inverse Demand Function.”

2. **Sergiu Hart**, Hebrew University (Nov. 1, 2009):
"Comparing Risks."
3. **Ran Spiegler**, Tel Aviv University and University College London (Nov. 15, 2009):
"Price Competition under Limited Comparability."
4. **Ilan Kremer**, Hebrew University and Stanford University (Nov. 22, 2009):
"Endogenous Information Flows and the Clustering of Announcements."
5. **Joe Halpern**, Cornell University (Nov. 29, 2009):
"Game Theory with Costly Computation."
6. **Michal Feldman**, Hebrew University (Dec. 6, 2009):
"Strategyproof Approximation Mechanisms for Location on Networks."
7. **Yuval Salant**, Northwestern University (Dec. 20, 2009):
"Eliciting Welfare Preferences from Behavioral Datasets."
8. **Ehud Kalai**, Northwestern University (Dec. 27, 2009):
"Engineering Cooperation in Two-Person Strategic Games with Private Information."
9. **Liad Blumrosen**, Hebrew University (Jan. 3, 2010):
"Posted Prices, Dynamic Auctions and Optimal Auctions: An Asymptotic Analysis."
10. **Shmuel Zamir**, Hebrew University (Jan. 10, 2010):
"On Bayesian–Nash Equilibria Satisfying the Condorcet Jury Theorem: The Dependent Case."
11. **Elchanan Mossel**, Statistics and Computer Science, UC Berkeley, and Mathematics and Computer Science, Weizmann Institute (Jan. 17, 2010):
"Some Network Models in Economics and Related Areas."
12. **Eilon Solan**, Tel Aviv University (Mar. 7, 2010):
"Borel Games with Lower-semi-continuous Payoffs."
13. **Jean-François Mertens**, Université Catholique de Louvain (Mar. 14, 2010):
"Regularity and Stability of Equilibria in an Overlapping Generations Growth Model."
14. **Itai Sher**, University of Minnesota (Mar. 21, 2010):
"Optimal Selling Mechanisms on Incentive Graphs."
15. **Noga Alon**, Tel Aviv University (Apr 25, 2010):
"Bigger Committees Require Bigger Budgets."
16. **Tristan Tomala**, HEC (May 2, 2010):
"Mechanism Design and Communication Networks."
17. **Ron Peretz**, Hebrew University (May 9, 2010):
"Concealed Correlation through Bounded Recall Strategies."
18. **Éva Tardos**, Cornell University (May 23, 2010):
"Network Games and the Price of Anarchy or Stability."
19. **Itai Arieli**, Hebrew University (May 30, 2010):
"Average Testing and the Efficient Boundary."
20. **Eran Shmaya**, Northwestern University (June 13, 2010):
"Expressible Tests Need Not Be Manipulable."

(For abstracts of the "Game Theory and Mathematical Economics" lectures, see Appendix 2.)

"Student Seminar"

The Student Seminar is an open, friendly, and informal venue in which students of the Center present and discuss their academic work. In addition to throwing light on what one's fellow students are working on, the seminar promotes interdisciplinary cooperation and exchange. The seminar is open to outside lecturers by special invitation of the students.

This year's seminar series was coordinated by Ph.D. student Ilan Nehama.

1. **Roi Zultan** (Nov. 3, 2009): "*The Absentminded Driver in the Lab.*"
2. **Meir Meshulam** (Nov. 10, 2009): "*An Empirical Study of Rational Emotions.*"
3. **Adi Koplovitz** (Nov. 24, 2009): "*Smith and Moral Luck.*"
4. **Zhigang Cao** (Dec. 8, 2009): "*Vector Games.*"
5. **Assaf Romm** (Dec. 22, 2009): "*Effects of Jump Bidding in English Auctions.*"
6. **Ilan Nehama** (Mar. 11, 2010): "*Approximate Aggregation for the Doctrinal Paradox.*"
7. **Matthias Uhl** (Apr. 15, 2010): "*Quod Licet Mihi, Non Licet Tibi?: An Experiment on Weak Paternalism.*"
8. **Amir Ban** (Apr. 29, May 6 2010): "*The Dynamics and Origins of Reputation in Economic and Social Contexts.*"
9. **Ron Aboodi** (May 13, 2010): "*Is the 'Principle of Indifference' in Probability Theory Justified?*"
10. **Nils Rimmel** (June 3, 2010): "*Collective Moral Hazard as a Source of Systemic Risk in Financial Markets: What Drives Correlation among Banks?*"
11. **Einav Hart** (June 17, 2010): "*Splitting, Stealing, and Guessing.*"

"Computation and Economics"

The Computation and Economics Seminar focuses on topics that lie on the border of computer science, game theory, and microeconomics, such as electronic markets, auctions, algorithmic game theory, algorithmic mechanism design, and social choice. The organizers are Center members Dr. Michal Feldman and Prof. Noam Nisan.

1. **Piotr Krysta**, University of Liverpool (Nov. 1, 2009):
"*Utilitarian Mechanism Design for Multi-objective Optimization.*"
2. **Liad Blumrosen**, Hebrew University (Nov. 8, 2009):
"*Auctions with Online Supply.*"
3. **Uri Nadav**, Tel Aviv University (Nov. 15, 2009):
"*On the Convergence of Regret Minimization Dynamics in Concave Games.*"
4. **Aviv Zohar**, Hebrew University (Nov. 22, 2009):
"*Incentive Compatibility and Dynamics of Congestion Control.*"
5. **Ilan Kremer**, Hebrew University and Stanford University (Nov. 29, 2009):
"*Hannan and Blackwell Meet Black and Scholes: Approachability, Calibration, and Robust Option.*"
6. **Gagan Goel**, Georgia Institute of Technology (Dec. 6, 2009):
"*Algorithms for Auctions with Budget Constraints.*"
7. **Itai Ashlagi**, Harvard Business School (Dec. 20, 2009):
"*Monotonicity and Implementability.*"
8. **Moshe Babaioff**, Microsoft Research, Silicon Valley (Dec. 27, 2009):
"*Online Auctions, Matroids, and Secretary Problems.*"
9. **Amir Ban**, Hebrew University (Jan. 3, 2010):
"*An Economic Theory of Reputation.*"
10. **Michael Schapira**, Yale University and UC Berkeley (Jan. 10, 2010):
"*Computation and Incentives in Combinatorial Public Projects.*"
11. **Elchanan Mossel**, Weizmann Institute (Jan. 17, 2010):
"*The Geometry of Manipulation.*"

12. **Katrina Ligett**, Cornell University (Jan. 31, 2010):
"Information-sharing and Privacy in Social Networks."
13. **Ron Peretz**, Hebrew University (Mar. 7, 2010):
"Learning Cycle Length with Finite Automata."
14. **Noam Nisan**, Hebrew University (Apr. 25, 2010):
"Best-reply Mechanisms."
15. **Michal Feldman**, Hebrew University (May 2, 2010):
"Bayesian Ignorance."
16. **Mishael Rosental**, Hebrew University (May 9, 2010):
"An Expedition into the World of Pure Strategies Dynamics, Sink Equilibria, and Random Games."
17. **Michael Schapira**, Yale University and UC Berkeley (May 16, 2010):
"Game Dynamics out of Sync."
18. **Ron Siegel**, Northwestern University (May 23, 2010):
"Asymmetric All-pay Auctions with Interdependent Values."
19. **Elad Dokow**, Hebrew University (May 30, 2010):
"Aggregation of Binary Evaluations without Manipulations."
20. **Shaddin Dughmi**, Stanford University (June 6, 2010):
"Black Box Randomized Reductions in Algorithmic Mechanism Design."
21. **Orna Kupferman**, Hebrew University (June 13, 2010):
"Formal Methods Meet Computation and Economics."

(For abstracts of the "Computation and Economics" lectures, see Appendix 3.)

3. Conferences

The 20th Summer School in Economic Theory

The Summer School in Economics is hosted annually by the Center in collaboration with the Institute for Advanced Studies of the Hebrew University. Taught by renowned HU and guest scholars, it attracts an audience of advanced graduate and post-doctoral students from around the world. The School is headed by Nobel Laureate Prof. Eric Maskin from Princeton University, and is co-directed by Center Director Prof. Eyal Winter.

The 20th School, June 19–30, 2009, was dedicated to *"The Economics of Contracts"* (157 participants).

The Second Israeli–Turkish Murat Sertel Memorial Conference on Economic Theory

Continuing Israeli–Turkish cooperation initiated in 2005 by our Turkish colleagues in Istanbul, the Second Israeli–Turkish Conference was hosted by the Center in collaboration with the Haifa University Economics Department.

The Conference, October 19–20, 2009, was dedicated to central issues in micro-economic theory and game theory. Center Director Prof. Eyal Winter was the liaison. The organizers

were Prof. Michael Landsberger of Haifa University and Prof. Remzi Sanver of Bilgi University.

(For the list of paper titles, see Appendix 4.)

The 19th Annual Rationality Conference

The 19th Annual Rationality Conference (“Retreat”) took place at the Ma’agan Eden Hotel in the Galilee on January 24–26, 2010. As always, the conference was an opportunity for Center faculty and advanced doctoral students to present and discuss their ongoing research.

The academic program of the 19th Conference, organized this year by Ph.D. candidate Yoed Halbersberg, was attended by 70 participants; 7 faculty and 13 doctoral students gave lectures. Topics ranged over biology, cognitive psychology, theoretical economics, education, sociology, mathematics, and law. As always, the lecture sessions were interspersed with nature tours, led by Center member Prof. Avi Shmida.

(For the titles of the papers presented at the retreat, see Appendix 5.)

Conference in Honor of Professor Yisrael Aumann on the Occasion of His Eightieth Birthday

The Aumann 80 Conference was hosted by the Center, the Israel Academy of Sciences and Humanities, and the Einstein Institute of Mathematics. The conference took place on June 9–10, 2010, respectively at the Center and the Israel Academy.

The program included greetings by Prof. Sarah Stroumsa, Rector, Hebrew University, Prof. Menahem Yaari, President, Israel Academy, Prof. Menahem Megidor, President, Hebrew University, opening remarks by Prof. Sergiu Hart, and a lecture by Prof. Yisrael Aumann.

The Conference speakers were former doctoral students of Prof. Aumann: Prof. Dov Samet, Prof. Yossi Feinberg, Prof. Elon Kohlberg, Dr. Itai Arieli, Prof. Sergiu Hart, Prof. Shmuel Zamir, Prof. Bezalel Peleg, Prof. Abraham Neyman, Prof. Benyamin Shitovitz, and Prof. Yair Tauman.

4. Special Events

Round Table on “Rationality and Irrationality of the Privatization of Public Services”

On March 4, 2010, the Center hosted a roundtable discussion on “Rationality and Irrationality of the Privatization of Public Services.” Participants discussed the permissibility or impermissibility on the part of the state to privatize execution or implementation of fundamental societal decisions.

The organizer was Center member Alon Harel; the panel members were Profs. Omer Moav, Dani Filc, and Alon Harel.

Special Lectures

1. On November 23, 2009, the Center hosted lectures by two internationally renowned researchers of unconscious motivation: “*More News from Nowhere: The Unconscious Origin of Motivated Human Behavior*,” by Prof. Henk Aarts, Utrecht University, and “*Conscious Experiences from Unconscious Sources: Goals, Outcomes and Self-Agency*,” by Prof. Ruud Custers, Utrecht University. The organizer was Center member Dr. Ran Hassin.
2. On December 17, 2009, Prof. Philip Tetlock, UC Berkeley, gave a talk entitled “*The Logic of Multi-functional Research Programs: People as Intuitive Politicians, Theologians and Prosecutors*.”
3. On March 21, 2010, former Center Ph.D. student Dr. Ro’i Zultan, Max Planck Institute, spoke on “*Imperfect Recall and Time Inconsistencies: An Experimental Test of the Absent-minded Driver Paradox*” (joint work with M. Vittoria Levati and Matthias Uhl, Max Planck Institute).

Fulbright Distinguished Chair Lecture by Prof. Joseph Halpern

On March 7, 2010, the Center in collaboration with the US–Israel Education Foundation hosted the Fulbright Distinguished Chair Lecture. Prof. Joseph Halpern, Cornell University, a Fulbright Distinguished Chair Fellow in the Natural Sciences and Engineering, spoke on “*Knowledge and Common Knowledge in Multi-Agent Systems*.” Prof. Halpern showed that common knowledge is both necessary and unattainable in practical multi-agent systems, but this paradox gets resolved to some extent through the use of variants of common knowledge.

5. Center Laboratories

“BeeHave”: The Bee Behavior Laboratory

The Bee Behavior Laboratory (BeeHave) uses bumblebees foraging on artificial flowers as a model system to study interactive decision-making in animals. The BeeHave members are Prof. Dan Cohen, Prof. Uzi Motro, Prof. Avi Shmida, Dr. Tamar Keasar, and Noam Bar-Shai.

1. Bees’ counting ability

Our main activity during 2009–2010 was the study of bees’ numerical competence. Our work included both laboratory experiments and field observations. In the laboratory we conducted complementary control experiments to rule out alternative explanations for the results we had obtained in previous years, which indicated that bumblebees learn to use numerical information in foraging tasks. The field work studied the behavior demonstrated by bees of natural populations while visiting flowers of Bristly Hollyhock (*Alcea setosa*) and White Mustard (*Sinapis alba*), where there is a numerical regularity in reward distribution. Our results from the field confirmed what had been found in the laboratory, namely, that bees can learn and use numerical cues, and base foraging decisions on them. The findings from the

Mustard also suggest an evolutionary significance for dispensing the reward in a fixed number of portions in each flower. The results of the Hollyhock study were presented to the Center of Rationality members during the annual retreat at Ma'agan.

2. Ecology of the “Red Anemone Guild”

We used sampling and experiments to investigate the role of large red floral displays in attracting beetle visitors. We found that the Glaphyrid-beetles have a special receptor to see the red color, and indeed they visit almost exclusively the red artificial plastic bowls. Both male and female beetles prefer large red floral displays and artificial bowls. No significant preference was found for flowers with black centers. Female beetles feed on the flowers more often than males, while males shelter in the flowers overnight more than females. Males also make frequent moves (“jumps”) between flowers, presumably to search for females. These jumps between flowers are very important in the pollination of the Red Anemone Guild flowers. The various observations and experiments indicate that in the case of the Glaphyrid beetles flower size and color are the main preferences that drive the selection on the flowers. This may explain the extra large red flowers of the Anemone, *Ranunculus asiaticus*, *Tulipa*, *Glaucium*, and *Papaver* in the Middle East. Preliminary results were summarized in Discussion Paper 515 of the Center for the Study of Rationality.

3. The Evolution of Toothed Nectarines in the Genus *Colchicum*:

Among the 81 different species of *Colchicum*, only five are known to have crested toothed appendages around their nectarines. These *Colchicums* grow in the transitional belt and in the north Negev in Israel and bloom at the end of autumn and at the beginning of winter, when flowering is very rare. We studied two species of *Colchicum* in the field and showed that the toothed appendages protect flowers from nectar-robbing ants. Through the simple manipulation of cutting away the inner appendages of the petals, we were able to prove that ants avoid nectarines with long crested appendages. Such a situation may explain the evolution of the “corona” in many other genera of Angiosperms, e.g., *Narcissus*, *Silene*, and *Scilla*.

Publications

1. De Jong, T., F. Thuijsman, A. Shmida (2009), Optimal Sex Allocation in Plants and the Evolution of Monoecy, *Evolutionary Ecology Research* 10, 1082–1109.
2. Keasar, T., A. Shmida (2009), An Evaluation of Israeli Forestry Trees and Shrubs as Potential Forage Plants for Bees, *Israel Journal of Plant Sciences* 57, 49–64.
3. Arnon, R., T. Keasar, N. Hempel De Ibarra, D. Cohen, A. Shmida (2009), Learning of Colored Targets with Vertical and Horizontal Components by Bumblebees (*Bombus terrestris* L.), *Israel Journal of Plant Sciences* 57, 193–201.
4. Keasar, T., A. Sadeh, Y. Gerchman, A. Shmida (2009), The Signaling Function of an Extra-floral Display: What Selects for Signal Development? *Oikos* 118, 1752–1759.
5. Keasar, T., A. R. Harari, G. Sabatinelli, D. Keith, A. Dafni, O. Shavit, A. Zylbertal, A. Shmida (2010), Red Anemone Guild Flowers as Focal Places for Mating and Feeding of Mediterranean Glaphyrid Beetles, *Biological Journal of the Linnean Society* 99, 808–817.

6. Holzapfel, C., A. P. Hadas, A. Shmida (2009), Resilience of Mediterranean and Desert Vegetation after Disturbance, *Farstarxiv* 80, 297–304.
7. Leshem, Y., T. Keasar, A. Shmida (2010), Female-biased Nectar Production in the Protandrous, Hermaphroditic Shrub *Salvia hierosolymitana*: Possible Reasons and Consequences, *Annals of Botany* (submitted).
[Discussion Paper # 494, Center for the Study of Rationality, Hebrew University]
8. Bar-Shai, N., T. Keasar, A. Shmida (2010), The Use of Numerical Information by Bees in Foraging Tasks, *Behavioral Ecology* (submitted).
[Discussion Paper # 554, Center for the Study of Rationality, Hebrew University]
9. Martinez, J., M. Vorbyev, J. Schorn, A. Shmida, R. Menzel (2010), Flower Color Discrimination in Glaphyrid (Coleoptera) as compared to Hymenopteran Color Discrimination (mimeo).

מאמרים בעברית:

1. שמידע א. ת. קיסר וא. זילברטל 2009 פרחים אדומים בישראל .
"טבע הדברים", מס. 77.
2. שמידע א., א. בינימיני, ו. ציקטונוב וע. ריטנר, 2009. חומייני בירושלים.
"טבע הדברים", מס 161 :70-79.
3. שמידע א. וחברי המרכז לרציונליות, 2009. ג'בל-רם, חלון אל המסיב-הערבו-נובי. "טבע הדברים",
מס 163 :54-67.

"RatioLab": Interactive Decision Laboratory

The Laboratory for the Study of Interactive Decision-making (RatioLab) is devoted to the experimental study of human decision-making. This state-of-the-art computerized facility enables researchers to conduct interactive decision-making experiments with many participants while fully controlling the strategic aspects of the situation (payoffs, type and amount of information and feedback available to the players, and communication opportunities between players). RatioLab is shared by psychologists, economists, and game theorists who employ experimentation as a methodology for testing and refining theory. The research activity at RatioLab increases every year. Below are the research projects currently under way at RatioLab.

1. "*Absolute and Relative Gain in Intergroup Conflict.*" Supported by Israel Science Foundation grant to G. Bornstein (Psychology).
2. "*Cross Cultural Experiments on Strategic Decision-making.*" Supported by the German Science Foundation (DFG) grant to E. Winter and R. Selten (Economics).
3. "*The Neurobiological Basis of Human Cooperation, Trust and Altruistic Behaviors: Nexus of Molecular Genetics, Economics, Game Theory, and Neural Imaging.*" Supported by the Hebrew University Center for Converging Sciences to G. Bornstein (Psychology), R. P. Ebstein (Biomedicine & Social Sciences), A. Darvasi (Computing

Sciences, Biotechnology & Biomedicine), A. Knafo (Psychology), and A. Maril (Cognitive Science).

4. *“The Weight of Impulses in Decision Making: Effects of Rejoicing, Regret, and Envy in a Repeated Competitive Situation.”* Supported by Israel Science Foundation grant to Y. Kareev and J. Avrahami (School of Education).
5. *“Non-consequentialist Voting.”* Supported by Phillip P. Mizock and Estelle Mizock Chair in Administrative and Criminal Law to A. Harel (Law).

Ten different experiments with over 1000 participants were conducted this year.

RatioLab wishes to acknowledge with gratitude the support received from the Center for the Study of Rationality this year, and relies on receiving similar support next year. The Center’s financial support is used to update equipment and software and help pay the RatioLab’s administrative staff. All research activity is paid for through research grants.

6. The Ph.D. Program in Rationality

The Center’s graduate program opened in the 2005–2006 academic year. In its first year, 21 students were admitted. Now in its fourth year, the Program has grown to 38 students, all of them outstanding in their fields. We continue to attract first-rate students who come from the departments of Computer Science, Philosophy, Life Science, Cognition, Education, Mathematics, Economics, Law, Statistics, Sociology, and Business Administration.

(For a list of students in the Ph.D. Program in Rationality in 2009–2010, see Appendix 6.)

The Director of the Graduate Program is Center member Prof. Carl Posy.

Candidates for the Center’s Ph.D. program must be registered in a doctoral or a master’s program of one of the HU departments. In addition to the requirements of their department, the students must also meet the additional criteria set by the Center.

(See statement by the Ph.D. program Coordinator in Appendix 7a.)

Course Offerings for the Ph.D. Program in Rationality

The courses in the Ph.D. Program in Rationality are designed and given by the Center’s faculty for the benefit of the doctoral students in the Program. Ten specially created courses were offered during the current 2009–2010 academic year:

1. *Game Theory – Advanced Seminar* (Prof. Abraham Neyman)
2. *Mathematical Economics* (Prof. Sergiu Hart)
3. *Law & Rationality* (Prof. Alon Harel)
4. *Microeconomics for M.A Students (Micro A)* (Prof. Elchanan Ben-Porath)
5. *Game Theory & Information Economics (Micro B)* (Prof. Elchanan Ben-Porath)
6. *Computational Game Theory* (Prof. Noam Nisan and Dr. Michal Feldman)
7. *Behavioral Decision-making* (Prof. Gary Bornstein and Prof. Eyal Winter)
8. *Selected Topics – Philosophy of the Social Sciences* (Prof. Edna Ullmann-Margalit)

9. *Evolutionarily Adaptive Models* (Prof. Uzi Motro and Prof. Dan Cohen)
10. *Student Seminar*

(See course descriptions, in Hebrew, in Appendix 7b.)

Scholarships

The Center awarded a scholarship to each of its 37 students. In addition, Prof. Yisrael Aumann's doctoral student was awarded the Jozef Straus Scholarship for Excellent Student, the President's Prize, and the Rector's Prize.

Visiting Fellows

Nils Rimmel is a Ph.D. student from the University of St. Gallen. He is a Fellow of the Center from February 2010 to July 2010. He is completing a Ph.D. thesis entitled "Collective Moral Hazard as a Source of Systemic Risk in Financial Markets" under the supervision of Center members Prof. Yisrael Aumann and Prof. Eyal Winter.

Eva Maria-Steiger is a Ph.D. student from the University of Bonn. She was a Fellow of the Center from September 2009 to December 2009, where she conducted experimental work on incentives in organizations with Center member Prof. Eyal Winter.

Post-doctoral Fellows

Dr. Ofra Rechter is a Post-doctoral Scholar of the Center from October 2009 to October 2010. Dr. Rechter and Center member Prof. Carl Posy are editing an anthology of the best current work on Kant's philosophy of mathematics.

Dr. Natan Kahan is a Post-doctoral Scholar of the Center from October 2009 to October 2010. Dr. Kahan is conducting research with Center member Prof. Yisrael Aumann on the nexus between game theory and health management.

7. Center Publications

Discussion Papers

In 2009–2010, 42 Discussion Papers were added to the Center's highly regarded DP Series, currently comprising 555 papers. The DP Series includes many articles by Center faculty and students subsequently published in prestigious journals (such as *Econometrica*, *Proceedings of the National Academy of Sciences (USA)*, *Games and Economic Behavior*, *Mathematics of Operations Research*, and *Social Research*).

(See Appendix 8 for the list of this year's DPs.)

Books Published by Center Members

- **Ran Hassin**, Kevin Ochsner, and Yaacov Trope (eds.), *Self Control in Society, Mind, and Brain*, Oxford University Press, 2010.
- **Bezalel Peleg** and Hans Peters, *Strategic Social Choice: Stable Representations of Constitutions*, Springer, 2010.

8. Distinctions and Promotions

Center members are highly regarded in the scientific world and hold numerous honors and distinctions. The following members were honored during the 2008–2009 period:

- Former Center member Prof. Avishai Margalit awarded the Israel Prize.
- Prof. Uriel Procaccia awarded the Zeltner Prize for Lifetime Achievement in Law by the Board of Governors of the Bonn Institute of Law and Culture.
- Prof. Sergiu Hart awarded a European Research Council Advanced Investigator Grant.
- Dr. Ein-Ya Gura and Prof. Michael Maschler's *Insights into Game Theory* named an "Outstanding Academic Title for 2009" by *Choice*, a publication of the American Library Association.
- Prof. Ehud Guttel promoted to Associate Professor and awarded the Cheshin Prize for Young Scholar.
- Prof. Carl Posy appointed editor of the *Rutherford Journal for History and Philosophy of Science and Technology*.
- Dr. Michal Feldman awarded the Alon Fellowship.

9. International Cooperation

MPI

The International Max Planck Research School on Adaptive Behavior in a Fundamentally Uncertain World (IMPRS Uncertainty) was established about four years ago as a joint undertaking of three Max Planck Institutes – that for Economic Systems in Jena, that for Public Goods in Bonn, and that for Human Development in Berlin – and the University of Jena, Indiana University, and the Hebrew University of Jerusalem (through the Center for the Study of Rationality). This year the University of Trento joined the School. The School accepts about ten new doctoral students per year, for a three-year period. In addition to regular Ph.D. studies the school holds a month-long summer school at the Max Planck Institute for Economic Systems in Jena, and 2–3-day workshops at the participating institutes.

Members of the Center for the Study of Rationality take an active role in teaching at the Summer School: Judith Avrahami, Gary Bornstein, Yaakov Kareev, and Ilan Yaniv all served as instructors in previous years. In October 2010 the Center will host the school's Workshop. We expect about 30 visitors, who will stay in Jerusalem for three days to attend presentations by Center members.

Appendix 1: “Rationality on Friday” (Abstracts)

Noga Alon, Tel Aviv University (Nov. 13, 2009):

“Voting Paradoxes.”

The early work of Condorcet in the 18th century and that of Arrow and others in the 20th century revealed the complex and interesting mathematical problems that arise in the theory of Social Choice, showing that the simple process of voting leads to strikingly counterintuitive paradoxes. I will describe some of these, focusing on several recent intriguing examples.

Esteban F. Klor, Hebrew University (Nov. 27, 2009):

“Does Terrorism Work?”

This paper examines whether terrorism is an effective tool to achieve political goals. By exploiting variation in terror attacks over time and across locations in Israel from 1984 to 2006, we show that local terror attacks cause Israelis to be: (i) more willing to grant territorial concessions to the Palestinians; (ii) more willing to accept a Palestinian state; (iii) and less likely to identify oneself as being right-wing. These effects are especially pronounced within demographic groups that are traditionally right-wing in their political views. However, terror attacks beyond a certain threshold are less effective, and may reach levels that cause Israelis to adopt a less-accommodating position. In addition, we show that terror induces Israelis to vote increasingly for right-wing parties, as the right-wing parties move leftward in response to terror. Hence, terrorism appears to be an effective strategy in terms of shifting the entire Israeli political landscape to the left. These findings may shed light on the causes underlying the spread of global terrorism in the last few decades.

Barbara Mellers, UC Berkeley (Dec. 18, 2009):

“‘Wants’ or ‘Oughts’ in Economic Games?”

Not all players view self-interest as financial gain and fairness as equality. What happens when players define these constructs for themselves? We propose a simple method for measuring these constructs and show that player-defined “wants” and “oughts” predict ultimatum game and dictator game offers, as well as a well-known factor for decreasing cooperation and a new approach that increases cooperation.

Daphna Lewinsohn-Zamir, Hebrew University (Jan. 8, 2010):

“Assessing Outcomes.”

No one denies the importance of outcomes. Whether the object of our evaluation is acts, legal rules, policies or institutions, the outcomes they generate must be taken into account. Given the pivotal role of outcomes for legal analysis, surprisingly little attention has been devoted to the question of what an outcome actually is. Law-and-economics scholars, for example, typically disregard this issue, implicitly adopting the narrowest possible definition of outcomes, namely, end-results in terms of wealth. This talk addresses the gap in the literature by conducting an experiment which examines people’s assessment of outcomes. The experimental findings reveal that individuals reject a narrow, simplistic conception of outcomes and embrace a broad one instead. In addition to end-results, various other factors are regarded as being part of the ensuing outcome itself. Consequently, events with similar end-results are perceived as generating different outcomes. Specifically, factors such as how an outcome was brought about, the voluntariness or non-voluntariness of the parties’ behavior, the intentionality or non-intentionality of their acts, and the identity of the parties involved, significantly affect people’s perception of the goodness or badness of the outcome. These findings have potentially far-reaching implications. If efficiency analysis aims at maximizing people’s welfare-measured by the extent to which their preferences are fulfilled, it must not ignore the fact that preference-satisfaction is determined by various factors in addition to the end-results. Analysis of several legal issues illuminates this general conclusion. The fact that individuals perceive outcomes broadly sheds light on a diversity of issues such as: punitive and liquidated damages in contract law, the efficient breach doctrine, compensation for takings of property, the choice between property rules and liability rules, land assembly for economic development projects, the zoning vs. homeowner associations debate, and the public/private distinction.

Joe Halpern, Cornell University (Feb. 26, 2010):

“Iterated Regret Minimization: A New Solution Concept.”

We develop a general game-theoretic framework for reasoning about strategic agents performing possibly costly computation. In this framework, many traditional game-theoretic results (such as the existence of

Nash equilibrium) no longer hold. Nevertheless, we can use the framework to provide psychologically appealing explanations for observed behavior in well-studied games (such as finitely repeated prisoner's dilemma and rock-paper-scissors). Furthermore, we provide natural conditions on games sufficient to guarantee that equilibria exist. As an application of this framework, we develop a definition of protocol security relying on game-theoretic notions of implementation. We show that a natural special case of this definition is equivalent to a variant of the traditional cryptographic definition of protocol security; this result shows that, when taking computation into account, the two approaches used for dealing with "deviating" players in two different communities – Nash equilibrium in game theory and zero-knowledge "simulation" in cryptography – are intimately related.

Michael O. Rabin, Harvard University and Hebrew University (Mar. 5, 2010):

"Practical Zero Knowledge Proofs and Application to Financial Processes."

We shall explain the surprising construct of Zero Knowledge Proofs and give a novel practical implementation. These constructs will be applied to the creation of secure financial processes such as auctions, procurement, and stock transactions. The lecture will be self-contained and accessible to non-specialists.

Ron Aharoni, Technion (Apr. 9, 2010):

"What Is Philosophy?"

בני אדם מזהים דיונים פילוסופיים ובעיות פילוסופיות בקלות. קרוב לוודאי שפירוש הדבר הוא שלבעיות פילוסופיות יש מבנה מושגים משותף, שהוא אולי סמוי, אבל מובהק. גילוי המבנה הזה אינו משימה פילוסופית: הוא אמור להיעשות על ידי התבוננות במעשיהם של הפילוסופים, וניסיון לגלות את מבנה החשיבה שמאפיין את הדיונים שלהם. למענה על השאלה הזאת יש השלכות על בעיות הפילוסופיה עצמן. בניגוד לתחושתם של הפילוסופים, לחקירות שלהם יש אובייקט במציאות: החשיבה האנושית. אלא שחקירת החשיבה נעשית מתוך מבנה מושגים מסוים מאוד: מבנה שבו אין הפרדה בין מערכת המושגים הנחקרת לזו המשמשת לחקירה. בהרצאה (כמו בספר שעליו היא מבוססת, "החתול שאיננו שם", מאגנס 2009) אעבור על בעיות הפילוסופיה המרכזיות ואראה כיצד הן נולדות מהיעדר הפרדה כזו. למעשה ההפרדה חיונית, וההנחה של היעדר הפרדה אינה תקינה ואף אינה אפשרית. מן הרגע שההפרדה נעשית, נעלמות הבעיות הפילוסופיות הגדולות, שכל כולן אינן אלא הצבת המבנה המעגלי וקריאה לעזרה עקב הפרדוקסים שנולדים ממנו. לבעיות אחרות יש תוכן של ממש, אלא שהן בעיות רגילות שאפשר להשיב עליהן באמצעות התבוננות במציאות. בבעיות כאלה האפקט של ההפרדה אינו היעלמות הבעיה, אלא אבדן הנופך הפילוסופי.

Ido Erev, Technion (May 7, 2010):

"A Choice Prediction Competition for Market Entry Games: An Introduction."

A choice prediction competition is organized that focuses on decisions from experience in market entry games (<http://sites.google.com/site/gpredcomp>). The competition is based on two experiments: an estimation experiment and a competition experiment. The two experiments use the same methods and subject pool, and examine games randomly selected from the same distribution. We present the results of the estimation experiment, and clarify the descriptive value of several baseline models. The experimental results reveal the robustness of eight behavioral tendencies that were documented in previous studies of market entry games and individual decisions from experience. The best baseline model (I-SAW) assumes reliance on small samples of experiences, and strong inertia when the recent results are not surprising. The competition experiment will be run in May 2010, but will not be revealed until September. To participate in the competition, researchers are asked to e-mail to the organizers models (implemented in computer programs) that read the incentive structure as input, and derive the predicted behavior as an output. The submitted models will be ranked based on their prediction error. The winners of the competition will be invited to publish a paper that describes their model.

Simon Gächter, University of Nottingham (May 28, 2010):

"Culture and Cooperation."

Does the cultural background influence the success with which genetically unrelated individuals cooperate in social dilemma situations? We provide an answer by analyzing the data of Herrmann et al. (*Science* 2008), who study cooperation and punishment in sixteen subject pools from six different world cultures (as classified by Inglehart & Baker (*American Sociological Review* 2000)). We use analysis of variance to disentangle the importance of cultural background relative to individual heterogeneity and

group-level differences in cooperation. We find that culture has a substantial influence on the extent of cooperation, in addition to individual heterogeneity and group-level differences identified by previous research. The significance of this result is that cultural background has a substantial influence on cooperation in otherwise identical environments. This is particularly true in the presence of punishment opportunities.

Appendix 2: “Game Theory and Mathematical Economics” (Abstracts)

Jean-François Mertens, Université Catholique de Louvain (Oct. 25, 2009):

“Cournot Equilibrium without Apology: Existence and the Cournot Inverse Demand Function.”

In a multi-commodity framework with absence of wealth effects, we prove the existence of equilibrium for Cournot oligopoly, and that the concept is completely unambiguous. We also obtain a uniquely defined endogenous inverse demand function, depending on the competitive sector.

Sergiu Hart, Hebrew University (Nov. 1, 2009):

“Comparing Risks.”

(1) We introduce two simple orders between risky assets (“gambles”): wealth-uniform dominance and utility-uniform dominance. These orders are based on comparing the acceptance and rejection decisions of risk-averse agents, and they extend the partial orders induced by (first- and second-degree) stochastic dominance. We show that our uniform dominance orders riskiness orders are in fact complete – any two gambles can be compared – and that they are equivalent to the orders induced, respectively, by the Aumann–Serrano (2008) index of riskiness, and the Foster–Hart (2009) measure of riskiness.

(2) We provide an axiomatic characterization of the measure of riskiness of “gambles” (risky assets) that was introduced by Foster and Hart (2009). The axioms are based on the concept of “reserve.”

Ran Spiegler, Tel Aviv University and University College London (Nov. 15, 2009):

“Price Competition under Limited Comparability.”

This paper studies market competition when firms can influence consumers’ ability to compare market alternatives, through their choice of price formats. We introduce random graphs as a tool for modeling limited comparability of formats. Our main results concern the interaction between firms’ equilibrium price and format decisions and its implications for industry profits and consumer switching rates. We show that narrow regulatory interventions that aim to facilitate comparisons may have adverse consequences for consumer welfare. Finally, we argue that our limited-comparability approach provides a new perspective into the phenomenon of product differentiation here is a link to the paper.

Ilan Kremer, Hebrew University and Stanford University (Nov. 22, 2009):

“Endogenous Information Flows and the Clustering of Announcements.”

We consider the strategic timing of information releases. We develop a dynamic disclosure model in which a firm may privately receive information. Because investors don’t know whether the firm is informed, the firm will not necessarily disclose immediately. We show that bad market news can trigger the immediate release of information by firms. Conversely, good market news can slow the release of information by firms. Thus, our model generates clustering of negative announcements. Surprisingly, this result holds only when firms can preempt the arrival of external information. These results have implications for conditional variance and skewness of stock returns.

Joe Halpern, Cornell University (Nov. 29, 2009):

“Game Theory with Costly Computation.”

We develop a general game-theoretic framework for reasoning about strategic agents performing possibly costly computation. In this framework, many traditional game-theoretic results (such as the existence of Nash equilibrium) no longer hold. Nevertheless, we can use the framework to provide psychologically appealing explanations for observed behavior in well-studied games (such as finitely repeated prisoner’s dilemma and rock-paper-scissors). Furthermore, we provide natural conditions on games sufficient to guarantee that equilibria exist. As an application of this framework, we develop a definition of protocol security relying on game-theoretic notions of implementation. We show that a natural special case of this definition is equivalent

to a variant of the traditional cryptographic definition of protocol security; this result shows that, when taking computation into account, the two approaches used for dealing with “deviating” players in two different communities – Nash equilibrium in game theory and zero-knowledge “simulation” in cryptography – are intimately related.

Michal Feldman, Hebrew University (Dec. 6, 2009):

“Strategyproof Approximation Mechanisms for Location on Networks.”

We consider the problem of locating a facility on a network, represented by a graph. A set of strategic agents have different ideal locations for the facility; the cost of an agent is the distance between its ideal location and the facility. A *mechanism* maps the locations reported by the agents to the location of the facility. Specifically, we are interested in social choice mechanisms that do not utilize payments. We wish to design mechanisms that are *strategyproof*, in the sense that agents can never benefit by lying, or, even better, *group strategyproof*, in the sense that a coalition of agents cannot all benefit by lying. At the same time, our mechanisms must provide a small approximation ratio with respect to one of two optimization targets: the social cost or the maximum cost. We give an almost complete characterization of the feasible truthful approximation ratio under both target functions, deterministic and randomized mechanisms, and with respect to different network topologies. Our main results are the following: we show that a simple randomized mechanism is group strategyproof and gives a $(2-2/n)$ -approximation for the social cost, where n is the number of agents, when the network is a circle (known as a *ring* in the case of computer networks); we design a novel “hybrid” strategyproof randomized mechanism that provides a tight approximation ratio of $3/2$ for the maximum cost when the network is a circle; and we show that no randomized SP mechanism can provide an approximation ratio better than $2-o(1)$ to the maximum cost even when the network is a tree, thereby matching a trivial upper bound of two.

Yuval Salant, Northwestern University (Dec. 20, 2009):

“Eliciting Welfare Preferences from Behavioral Datasets.”

A behavioral dataset contains various preference relations displayed by a single individual in different payoff-irrelevant circumstances. We introduce a framework for eliciting the individual’s welfare preferences in such cases. In this framework, the different preference relations displayed by the individual are the outcome of a cognitive process that distorts an unobserved preference relation reflecting the individual’s welfare. We demonstrate the operation of eliciting the underlying welfare preferences from behavioral datasets for several cognitive processes.

Ehud Kalai, Northwestern University (Dec. 27, 2009):

“Engineering Cooperation in Two-person Strategic Games with Private Information.”

Left to the incentives of selfish players, outcomes of strategic games are highly inefficient, especially in the presence of private information. Due to the abundance of this phenomenon in many social environments, it is important to construct mechanisms that overcome such inefficiencies. There are two major issues: (1) The determination of a fair and efficient outcome among the many compromises possible in a strategic game, and (2) the establishment of a play protocol under which strategic players will agree to the selected compromise. The paper presents a solution to both of these issues in an important class of two-person Bayesian games with monetary payoffs. The proposed solution builds on earlier concepts in game theory. It coincides with the von Neumann minmax value on the class of zero-sum games and with the major solution concepts to the Nash Bargaining Problem. Moreover the solution has a simple elegant formula that is easy to compute, and it seems to be connected to the Shapley Value when considering the case of more than two players.

Liad Blumrosen, Hebrew University (Jan. 3, 2010):

“Posted Prices, Dynamic Auctions and Optimal Auctions: An Asymptotic Analysis.”

This paper considers two alternatives to optimal auctions: posted-price mechanisms and dynamic auctions. In posted-price mechanisms, the seller posts a single price and sells the item at this price to a bidder that accepts this price. In a dynamic-auction setting, bidders arrive sequentially and each bidder leaves the market before the next bidder arrives. We establish an exact asymptotic characterization of the optimal revenue in such mechanisms for general distributions, under a mild condition taken from the literature on extreme-value theory. We also devise posted-price and dynamic mechanisms that achieve this optimal revenue. We discuss how the dispersion of the prior distribution affects the obtained revenue, and show that such mechanisms may lose a non-trivial share of the revenue compared to optimal auctions, even in large markets. One immediate corollary of our results is that the fraction of the optimal-auction revenue that is obtainable with posted-price mechanisms is always at least 71% and with dynamic mechanisms is at least 78%, and these bounds are tight.

Shmuel Zamir, Hebrew University (Jan. 10, 2010):

“On Bayesian–Nash Equilibria Satisfying the Condorcet Jury Theorem: The Dependent Case.”

We investigate sufficient conditions for the existence of Bayesian–Nash equilibria that satisfy the *Condorcet Jury Theorem (CJT)*. In the Bayesian game G_n among n jurors, we allow for arbitrary distribution on the types of jurors. In particular, any kind of dependency is possible. If each juror i has a “constant strategy,” σ^i (that is, a strategy that is independent of the size $n \geq i$ of the jury), such that $s = (\sigma^1, \sigma^2, \dots, \sigma^n \dots)$ satisfies the *CJT*, then by McLennan (1998) there exists a Bayesian–Nash equilibrium that also satisfies the *CJT*. We translate the *CJT* condition on sequences of constant strategies into the following problem:

(**) For a given sequence of binary random variables $X = (X^1, X^2, \dots, X^n, \dots)$ with joint distribution P , does the distribution P satisfy the asymptotic part of the *CJT*?

We provide sufficient conditions and two general (distinct) necessary conditions for (**). We give a complete solution to this problem when X is a sequence of exchangeable binary random variables.

Elchanan Mossel, UC Berkeley and Weizmann Institute (Jan. 17, 2010): *“Some Network Models in Economics and Related Areas.”*

I will talk about various models and results where network structures play an important role. The topics to be discussed are a subset of the following to be determined by the audience: Bayesian Learning on Networks, Coordination on Social Networks, the Viral Marketing Problem, and Random Games on Random Graphs.

Eilon Solan, Tel Aviv University (Mar. 7, 2010):

“Borel Games with Lower-Semi-Continuous Payoffs.”

Borel games are (possibly infinite) games with perfect information and without chance moves. I will review the basic results in this area: the determinacy of zero-sum Borel games with winning sets (Martin), the existence of the value and of equilibria (Mertens and Neyman). I will then talk of the existence of subgame-perfect equilibria in those games, culminating in a recent result by Flesch, Kuipers, Mashiah-Yaakovi, Schoemakers, Solan, and Vrieze on Borel games with lower-semi-continuous payoffs.

Jean-François Mertens, Université Catholique de Louvain (Mar. 14, 2010):

“Regularity and Stability of Equilibria in an Overlapping Generations Growth Model.”

In an exogenous-growth economy with overlapping generations (OG) we analyze local stability of a “balanced growth” equilibrium with respect to endowment perturbations, interpreted as the consumption value of a government policy to individuals. We show that generically in the space of parameters equilibria around BGE are locally unique and are locally differentiable functions of endowments, with derivatives given by kernels. Further, those equilibria are stable in the sense that the effects of temporary changes decay exponentially fast at infinity. It follows that equilibrium welfare too is differentiable, and that computation of the derivative is analytically very simple: there is not even a need to invert the system of equilibrium equations.

Itai Sher, University of Minnesota (Mar. 21, 2010):

“Optimal Selling Mechanisms on Incentive Graphs.”

We present a model highlighting one advantage of negotiation over posted prices from the seller’s perspective. In the process, we develop a general methodology for studying mechanism design with weaker incentive constraints. To do so, we introduce the notion of an incentive graph, which encodes the relevant constraints. This construction is relevant when agents can present hard evidence and when they are boundedly rational. In such settings, we show that the optimal selling mechanism involves price discrimination and study the form which this price discrimination takes. When the incentive graph has a tree structure, we offer a complete solution. Our solution involves an adaptation of the classic notion of a virtual valuation as in Myerson (1981) to a tree. We show that for acyclic graphs, all allocations are incentive-compatible, but, nevertheless, the revenue-maximizing mechanism is in many ways similar to that found in the classic analysis.

Noga Alon, Tel Aviv University (Apr. 25, 2010):

“Bigger Committees Require Bigger Budgets.”

I will discuss some combinatorial properties of majority voting, focusing on a result demonstrating the assertion of the title whose analysis combines combinatorial ideas with techniques from Discrete Optimization and the theory of the VC dimension of range spaces.

Tristan Tomala, HEC (May 2, 2010):

“Mechanism Design and Communication Networks.”

This paper characterizes the communication networks (directed graphs) for which, in any environment (utilities and beliefs), every incentive-compatible social choice function is implementable. We show that any incentive-compatible social choice function is implementable on a given communication network, in all environments with either common independent beliefs and private values or a worst outcome, if and only if the network is strongly connected and weakly 2-connected. A network is strongly connected if for each player there exists a directed path to the designer. It is weakly 2-connected if each player is either directly connected to the designer or indirectly connected to the designer through two disjoint paths (not necessarily directed). We couple encryption techniques together with appropriate incentives to secure the transmission of each player’s private information to the designer.

Ron Peretz, Hebrew University (May 9, 2010):

“Concealed Correlation through Bounded Recall Strategies.”

Two agents choose mixed m -recall strategies, s and t , over finite sets of actions, A and B . The strategies induce a random play, which is observed by an observer whose recall capacity is M . The goal of the players is to make the observer believe that they play a sequence of i.i.d. random actions whose distribution is $Q \in \Delta(A \times B)$. The notion of “concealed correlation” was introduced by Gilad Bavyly and Abraham Neyman (2003) when they studied an asymmetric version of the problem, where there are at least two agents and one of them has a much greater recall capacity than the others. We characterize the set of distributions Q , for which this task is possible, as a function of the ratio M/m . For example: Consider the case $A=B=\{0,1\}$ and Q is given by $Q(1,1)=Q(0,0)=1/2$. In this case the critical ratio is 2. That is, the players implement a $2m$ periodic sequence. The distance between Q^{2m} and the distribution of $2m$ consecutive elements of the sequence converges to zero as m grows. The distance is the \bar{d} distance, which is the correct measure in the context of repeated games. This work is a step in the direction of establishing a folk theorem for repeated games with bounded recall. It tries to tackle the difficulty of computing the Individually Rational Level (IRL) of the players. Consider, for example, the case where all the players have an m -recall capacity. Lehrer (1988) has proven that the IRL of each player is not larger than her IRL in a one-stage game. Namely, the other players can “conceal” any uncorrelated mixed action. Our work shows that in some games the IRL of a player can be strictly less than her IRL in the one-stage game. Namely, the other players can sometimes conceal correlated actions, as well.

Éva Tardos, Cornell University (May 23, 2010):

“Network Games and the Price of Anarchy or Stability.”

Network games play a fundamental role in understanding behavior in many domains, ranging from communication networks through markets to social networks. Such networks are used, and also evolve, due to selfish behavior of the users and owners. In light of these competing forces, it is surprising how efficient these networks are. It is an exciting challenge to understand the operation and success of these networks in game theoretic terms: what principles of interaction lead selfish participants to form such efficient networks? We study the degradation of quality of solution caused by the selfish behavior of users.

Itai Arieli, Hebrew University (May 30, 2010):

“Average Testing and the Efficient Boundary.”

We propose a simple adaptive procedure for playing strategic games: “average testing.” In this procedure each player sticks to his current strategy if it yields a payoff that exceeds his average payoff by ϵ and randomly chooses a strategy otherwise. We demonstrate that in a generic two-player strategic game, if each player operates according to the average testing procedure, and the game is played in large enough blocks of size k , then the average payoff converges almost surely to the ϵ -efficient boundary.

Eran Shmaya, Northwestern University (June 13, 2010):

“Expressible Tests Need Not Be Manipulable.”

A decision maker needs predictions about the realizations of a repeated experiment in each period. An expert provides a theory that, conditional on each finite history of realizations, supplies a probabilistic prediction. However, there may be false experts without any knowledge of the data-generating process who may deliver theories strategically. Hence, empirical tests for these theories are necessary. A test is

manipulable if a false expert can pass the test with a high probability. For the theories to be deliverable and for tests to be implementable, they have to be computable. Considering only computable theories and tests, we show that there is a test that is not manipulable and that accepts true experts with high probabilities. In particular, the constructed test is both future-independent (Olszewski and Sandroni (2008)) and sequential. Our conclusion overturns earlier results that future-independent tests are manipulable, and shows that computability considerations have significant effects in these problems.

Appendix 3: “Computation and Economics” (Abstracts)

Piotr Krysta, University of Liverpool (Nov. 1, 2009):

“Utilitarian Mechanism Design for Multi-objective Optimization.”

We study mechanism design for NP-hard multi-objective optimization problems with one objective function and secondary objectives modeled by budget constraints. Our main contribution is showing that two of the main tools for the design of approximation algorithms for multi-objective optimization problems, approximate Pareto curves and Lagrangian relaxation, can lead to truthful approximation schemes. By exploiting the first method, we devise truthful FPTASs for the multi-budgeted versions of minimum spanning tree, shortest path, maximum matching, and matroid intersection problems. By building on the second method, we present a universally truthful Las Vegas PTAS for the minimum spanning tree problem with a single budget constraint, without violating the budget constraint. Our achieved approximation guarantees match the best known approximation guarantees for the respective problems, which, however, were obtained by non-truthful algorithms. In this talk I will focus on the minimum spanning tree problem with a single budget constraint. This is joint work with Fabrizio Grandoni, Stefano Leonardi and Carmine Ventre.

Liad Blumrosen, Hebrew University (Nov. 8, 2009):

“Auctions with Online Supply.”

We study the problem of selling identical items to unit-demand bidders in a setting in which the total supply of items is unknown to the mechanism. Items arrive dynamically, and the seller must make the allocation and payment decisions online with the goal of maximizing social welfare. Our main result is a separation between models with stochastic and adversarial supply. We show that all truthful mechanisms achieve a diminishing fraction of the optimal social welfare in the adversarial setting. In contrast, in the stochastic model, under a standard monotone hazard-rate condition, we present a truthful mechanism that guarantees a constant fraction of the optimum. Joint work with Moshe Babaioff and Aaron Roth.

Uri Nadav, Tel Aviv University (Nov. 15, 2009):

“On the Convergence of Regret Minimization Dynamics in Concave Games.”

We study a general sub-class of concave games which we call socially concave games. We show that if each player follows any non-external regret minimization procedure then the dynamics will converge in the sense that both the average action vector will converge to a Nash equilibrium and that the utility of each player will converge to her utility in that Nash equilibrium. We show that many natural games are socially concave games. Specifically, we show that linear Cournot competition, linear resource allocation games, and atomic splittable routing with affine cost functions are socially-concave games, and therefore our convergence result applies to them. In addition, we show that a simple best-response dynamics might diverge for linear resource allocation games, and is known to diverge for linear Cournot competition and atomic routing games. For the TCP congestion games we show that “near” the equilibrium the games are socially concave, and using our general methodology we show the convergence of a specific regret minimization dynamics. Joint work with Eyal Even Dar and Yishay Mansour.

Aviv Zohar, Hebrew University (Nov. 22, 2009):

“Incentive Compatibility and Dynamics of Congestion Control.”

We study the conditions under which congestion control schemes can be both efficient, so that capacity is not wasted, and incentive-compatible, so that each participant can maximize its utility by following the prescribed protocol. We show that both conditions can be achieved if routers run strict priority queueing (SPQ) or weighted fair queueing (WFQ) and end-hosts run any of a family of protocols which we call

Probing Increase Educated Decrease (PIED). A natural question is whether incentive-compatibility and efficiency are possible while avoiding the per-flow processing of WFQ. We partially answer that question in the negative by showing that any policy satisfying a certain “locality” condition cannot guarantee both properties. Our results also have implications for convergence to some steady-state throughput for the flows. Even when senders transmit at a fixed rate (as in a UDP flow that does not react to congestion), feedback effects among the routers can result in complex dynamics which do not appear in the simple topologies studied in past work. Joint work with Brighten Godfrey, Michael Schapira, and Scott Shenker.

Ilan Kremer, Hebrew University and Stanford University (Nov. 29, 2009):

“Hannan and Blackwell Meet Black and Scholes: Approachability, Calibration, and Robust Option.”

We provide a financial interpretation for the concepts of calibration and approachability; these concepts led to a growing literature in game theory and microeconomics. The interpretation we provide is based on robust upper bounds for option pricing. We focus on the original gradient strategies developed by Hannan and Blackwell and demonstrate how trading strategies that minimize regret yield upper bounds for the prices of European call options. We then argue that the gradient strategy proposed by Hannan–Blackwell is path-dependent and therefore suboptimal when finite horizons are considered. Based on path independence we solve for the optimal strategy and bound. Joint work with Peter DeMarzo and Yishay Mansour.

Gagan Goel, Georgia Institute of Technology (Dec. 6, 2009):

“Algorithms for Auctions with Budget Constraints.”

Inspired by Internet ad auctions, we study the following budgeted allocation problem: we are given a set of m indivisible items and n agents; each agent i is willing to pay b_{ij} for the item j and has a maximum overall budget of B_i . The goal is to find an allocation of items to the agents so as to maximize the total revenue. In this talk, I will briefly survey our recent results on designing approximation and online algorithms, hardness of approximation, and designing truthful mechanism for the above problem. Then I will describe in detail an approximation algorithm, and sketch hardness of approximation.

Itai Ashlagi, Harvard Business School (Dec. 20, 2009):

“Monotonicity and Implementability.”

Consider a model with a finite number of alternatives, and with agents with private values and quasi-linear utility functions. A domain of valuations for an agent is a monotonicity domain if every finite-valued monotone randomized allocation rule defined on it is implementable, in the sense that there exists a randomized truth-telling direct mechanism that implements this allocation rule. We fully characterize the set of all monotonicity domains. Joint work with Mark Braverman, Avinatan Hassidim, and Dov Monderer.

Moshe Babaioff, Microsoft Research, Silicon Valley (Dec. 27, 2009):

“Online Auctions, Matroids, and Secretary Problems.”

We consider the problem of online auction design (e.g. Priceline.com). Maximizing welfare in such auctions is complicated by the fact that decisions are instantaneous and irrevocable. The classic secretary problem introduced by Dynkin (1963) can be used to design approximately welfare-maximizing auctions in the simple single-unit auction setting, when assuming that bidders arrive in a random order. We generalized the problem to combinatorial settings; specifically, we study matroid domains in which the sets of agents that may be simultaneously satisfied constitute a matroid. We present truthful $O(\log(k))$ -competitive auction for any rank k matroid, and constant-competitive auctions for several specific matroids that are of economic interest. We then consider the discounted secretary problem. There is a time-dependent “discount” factor $d(t)$, and the benefit derived from assigning the item at time t to agent e is $d(t)$ times $v(e)$. For this problem, we show a lower bound of $\Omega(\frac{\log n}{\log \log n})$, and a nearly-matching $O(\log n)$ -competitive truthful auction with general (and possibly increasing) $d(t)$. Additionally, we present a constant-competitive truthful auction when the expected optimum is known in advance, proving the large value of knowing this market statistics. This talk is based on joint work with Immorlica and Kleinberg (SODA’07) and Dinitz, Gupta, Immorlica, and Talwar (SODA’09).

Amir Ban, Hebrew University (Jan. 3, 2010):

“An Economic Theory of Reputation.”

How do you choose a mechanic to fix your car? When you need medical or legal advice, with whom will you consult? Most people follow the reputation of the relevant establishments. A dynamical system

unfolds wherein experts' reputation attracts the potential customers. The experts' expertise affects the probability of satisfying the customers. This rate of success in turn influences the experts' reputation. We are considering here several models where each expert has an innate, constant, but unknown level of expertise and a publicly known, dynamically varying reputation. The specific model depends on: (i) the way that experts' reputation affects customers' preferences, and (ii) how experts' reputation is modified as a result of their success/failure in satisfying the customers' requests. We investigate several such models and elucidate some of the key characteristics of reputation in such a market of experts and customers. Joint work with Nati Linial.

Michael Schapira, Yale University and UC Berkeley (Jan. 10, 2010):

"Computation and Incentives in Combinatorial Public Projects."

The Combinatorial Public Projects Problem (CPPP) is an abstraction of resource allocation problems in which agents have preferences over alternatives, and an outcome that is to be collectively shared by the agents is chosen so as to maximize the social welfare. We explore CPPP from both a computational perspective and a mechanism design perspective. We examine CPPP in the hierarchy of complement-free (subadditive) valuation classes and present positive and negative results for both unrestricted and truthful computation. Joint work with Dave Buchfuhrer and Yaron Singer.

Elchanan Mossel, Weizmann Institute (Jan. 17, 2010):

"The Geometry of Manipulation."

I will present a recent proof with Isaksson and Kindler of a quantitative version of the Gibbard-Satterthwaite theorem.

Katrina Ligett, Cornell University (Jan. 31, 2010):

"Information-sharing and Privacy in Social Networks."

We present a new model for reasoning about the way information is shared among friends in a social network, and the resulting ways in which it spreads. Our model formalizes the intuition that revealing personal information in social settings involves a trade-off between the benefits of sharing information with friends, and the risks that additional gossiping will propagate it to people with whom one is not on friendly terms. We study the behavior of rational agents in such a situation, and we characterize the existence and computability of stable information-sharing networks, in which agents do not have an incentive to change the partners with whom they share information. We analyze the implications of these stable networks for social welfare, and the resulting fragmentation of the social network. Joint work with Jon Kleinberg.

Ron Peretz, Hebrew University (Mar. 7, 2010):

"Learning Cycle Length with Finite Automata."

We study the space and time automaton-complexity of the CYCLE-LENGTH problem. The input is a periodic stream of bits whose cycle length is bounded by a known number n . The output, a number between 1 and n , is the exact cycle length. We also study a related problem, CYCLE-DIVISOR. In the latter problem the output is a large number that divides the cycle length, that is, a number $k \gg 1$ that divides the cycle length, or (in case the cycle length is small) the cycle length itself. The complexity is measured in terms of the SPACE, the logarithm of the number of states in an automaton that solves the problem, and the TIME required to reach a terminating state. We analyze the worse input against a deterministic (pure) automaton, and against a probabilistic (mixed) automaton. In the probabilistic case we require that the probability of computing a correct output is arbitrarily close to one. We establish the following results:

CYCLE-DIVISOR can be solved in deterministic SPACE $o(n)$, and TIME $O(n)$.

CYCLE-LENGTH can be solved in probabilistic SPACE $o(n)$, and TIME $O(n)$.

CYCLE-LENGTH can be solved in deterministic SPACE $O(nL)$, and TIME $O(n/L)$, for any small $L > 0$.

CYCLE-LENGTH cannot be solved in deterministic (SPACE \times TIME) smaller than $\Omega(n^2)$.

Noam Nisan, Hebrew University (Apr. 25, 2010):

"Best-reply Mechanisms."

Best-reply (aka best-response) dynamics are perhaps the simplest dynamics considered in settings of games with complete information. Due to their "uncoupled" nature they apply in settings of games with private information as well. This work takes a mechanism-design point of view to these best-reply dynamics. In particular we ask when are such best-reply strategies of the players really in (ex-post-Nash) equilibrium? When is it best to best-reply? We show a surprising number of examples where this is the case taken from

both economics and from Internet protocols. This is work in progress with Michael Schapira, Greg Valiant, and Aviv Zohar.

Michal Feldman, Hebrew University (May 2, 2010):

“Bayesian Ignorance.”

We quantify the effect of Bayesian ignorance by comparing the social cost obtained in a Bayesian game by agents with local views to the expected social cost of agents having global views. Both benevolent agents, whose goal is to minimize the social cost, and selfish agents, aiming at minimizing their own individual costs, are considered. When dealing with selfish agents, we consider both best and worst equilibria outcomes. While our model is general, most of our results concern the setting of network cost sharing (NCS) games. We provide tight asymptotic results on the effect of Bayesian ignorance in directed and undirected NCS games with benevolent and selfish agents. Among our findings we expose the counterintuitive phenomenon that “ignorance is bliss”: Bayesian ignorance may substantially improve the social cost of selfish agents. We also prove that public random bits can replace the knowledge of the common prior in an attempt to bound the effect of Bayesian ignorance in settings with benevolent agents. Altogether, our work initiates the study of the effects of local vs. global views on the social cost of agents in Bayesian contexts. Joint work with Noga Alon, Yuval Emek, and Moshe Tennenholtz.

Michael Rosental, Hebrew University (May 9, 2010):

“An Expedition into the World of Pure Strategies Dynamics, Sink Equilibria, and Random Games.”

In his paper “The Search for Equilibrium Concepts,” Papadimitriou writes: “There are several desiderata one might expect from an equilibrium concept: First and foremost it should be natural and convincing as a prediction of agent behavior. Then it should be universal – all games should have it, because otherwise it is an incomplete prediction.” In many senses sink equilibria, as defined in the paper “Sink Equilibria and Convergence” by Goemans, Mirrokni and Vetta, is such an equilibrium concept. It can be argued that sink equilibrium is a natural, convincing, and universal equilibrium concept. It is not hard to show that a sink equilibrium always exists, and that any dynamic that can be implemented as a random walk on the strategy profile graph will eventually converge to one. In this talk we will discuss our ongoing attempt to research the differences between sink equilibria and Nash equilibria. We will mention results that show that the price of anarchy differs substantially from the price of sinking in specific families of games. The rest of the talk will focus on random games (as was described by Hart, Rinott, and Weiss), and our ongoing research of the typical differences between these notions in random games. We conjecture that a random dynamic on a random game will almost surely not converge to Nash equilibrium. We also conjecture that the price of anarchy converges to 1, while the price of sinking is unbounded. Joint work with Noam Berger, Michal Feldman, and Ofer Neiman. (Remark: This is a work in progress; a large part of it will focus on conjectures and open questions.)

Michael Schapira, Yale University and UC Berkeley (May 16, 2010):

“Game Dynamics out of Sync.”

Internet protocols, large-scale markets, social networks, and multi-processor computer architectures are dynamic environments where decision makers repeatedly interact. Game theory provides a useful tool to analyze these interactions, but such analysis has so far primarily concentrated on synchronous environments in which steps take place simultaneously or in a known, prescribed order. We explore the convergence of game dynamics to an equilibrium in asynchronous environments. We use ideas from distributed computing to exhibit a general impossibility result for a broad class of adaptive dynamics. We consider implications of our result across a wide variety of interesting and timely applications. We present some basic observations that show that other kinds of dynamics (e.g., regret-minimizing dynamics) are more robust to asynchrony. We also explore the (communication and computational) complexity of convergence in asynchronous environments,

Ron Siegel, Northwestern University (May 23, 2010):

“Asymmetric All-pay Auctions with Interdependent Values.”

I investigate two-player all-pay auctions in which each player obtains a private signal, and each player’s valuation for winning may depend on both players’ signals. Private values, common values, and one informed and one uninformed player are special cases. I show that every such game has a unique equilibrium, and describe a simple algorithm that solves for the equilibrium. The analysis may be useful in studying competitions in which players expend resources before the outcome is known, such as lobbying, research and

development races, and labor-market tournaments.

Elad Dokow, Hebrew University (May 30, 2010):

“Aggregation of Binary Evaluations without Manipulations.”

We study a general aggregation problem in which a society has to determine its position (yes/no) on each of several issues, based on the positions of the members of the society on those issues. There is a prescribed set of feasible evaluations, i.e., permissible combinations of positions on the issues. Among other things, this framework admits the modeling of preference aggregation (where the issues are pairwise comparisons and feasibility reflects rationality) and of judgment aggregation (where the issues are propositions and feasibility reflects logical consistency). We study several definitions of manipulation by a single voter in this framework, and the possibility of designing a non-manipulable aggregation rule. This is a work in progress; many of our main questions are still open.

Shaddin Dughmi, Stanford University (June 6, 2010):

“Black-box Randomized Reductions in Algorithmic Mechanism Design.”

We give the first black-box reduction from arbitrary approximation algorithms to truthful approximation mechanisms for a non-trivial class of multi-parameter problems. Specifically, we prove that every packing problem that admits an FPTAS also admits a truthful-in-expectation randomized mechanism that is an FPTAS. Our reduction makes novel use of smoothed analysis, by employing small perturbations as a tool in algorithmic mechanism design. To argue that our perturbation schemes are incentive-compatible, we develop a “duality” between linear perturbations of the objective function of an optimization problem and of its feasible set. Viewed from the dual perspective, our mechanisms are maximal-in-distributional-range and hence truthful in expectation. Joint work with Tim Roughgarden.

Orna Kupferman, Hebrew University (June 13, 2010):

“Formal Methods Meet Computation and Economics.”

The area of formal methods studies mathematical approaches to reasoning about systems. This includes, for example, algorithms for formally verifying that systems satisfy their specifications, automatic synthesis of systems that satisfy a desired specification, and more. The systems that we study are reactive, and the specifications refer to the ongoing interaction between a system and its environment. The popularity of systems whose environment consists of other users has led to the adoption of concepts like rationality, equilibria, and incentive-compatibility by the area of formal methods. In the talk, I will demonstrate this on the problem of automatic synthesis of systems.

Appendix 4: “The Second Israeli–Turkish Murat Sertel Memorial Conference on Economic Theory (Paper Titles)”

1. Mehmet Barlo, “Bounded Memory with Finite Action Spaces” (joint with Guilherme Carmona and Hamid Sabourian).
2. Elchanan Ben-Porath, “Implementation with Partial Provability.”
3. Marc-Arthur Diaye, “Desires under Uncertainty” (joint with Daniel Schoch).
4. Ido Erev, “The Description-Experience Gap in Decisions and Games.”
5. Gabi Gayer, “Perception of Probabilities in Situations of Risk: A Case-Based Approach.”
6. Nicolas Gravel, “Uniform Expected Utility Criteria for Decision Making under Ignorance or Objective Ambiguity.”
7. Ron Holzman, “Sharing the Cost of a Capacity Network” (joint with Anna Bogomolnaia and Herve Moulin).
8. Özgür Kibris, “On the Investment Implications of Bankruptcy Laws” (joint with Arzu Kibris).
9. Levent Kockesen, “Strategic Effects of Incomplete and Renegotiation-Proof Contracts” (joint with Emanuele Gerratana).
10. Semih Koray, “Implementation via Codes of Rights” (joint with Kemal Yildiz).

11. Jean Laine, "Choosing a Committee: Approval Balloting and the Search for a Compromise" (joint with G. Laffond).
12. Igal Milchtaich, "Implementability of Correlated and Communication Equilibrium Outcomes."
13. Zvika Neeman, "Renegotiation-Proof Mechanism Design" (joint with Gregory Pavlov).
14. Selcuk Ozyurt, "A Theory of Market Microstructure and Reputation."
15. Remzi Sanver, "Social Choice without the Pareto Principle under Weak Independence" (joint with Ceyhun Coban).
16. Ella Segev, "Efficiency Levels in Sequential Auctions with Dynamic Arrivals" (joint with Ron Lavi).
17. Rann Smordinsky, "Equilibrium and Potential in Coalitional Congestion Games" (joint with Sergey Kuniavsky).
18. Eilon Solan, "The Averaging Principle" (Gadi Fibich and Arie Gaviou).
19. Ipek Gursel Tapki, "Trade Rules for Uncleared Markets with a Variable Population."
20. Alain Trannoy, "Tax and Migration Competition when the Highly Skilled Vote with their Feet: Strategic Investment in Culture."
21. Eyal Winter, "Throwing a Party: Contracting with Type-dependent Externalities" (joint with Shai Bernstein).

Appendix 5: The 19th Annual Rationality Conference (Paper Titles)

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| אורי וייס, "רציונליות של אי רציונליות" | .1 |
| אוריאל פרוקצ'יה, "Das Adam Smith Problem" | .2 |
| אלון הראל, "האם ההסתברות שלי להיות הקול המכריע משפיעה על ההצבעה?" | .3 |
| איתי אריאלי, "Infinite Sequential Games with Perfect but Incomplete Information" | .4 |
| אסף רום, "תמריצים ותירוצים באתרי היכרויות" | .5 |
| רות גביון, "היועץ המשפטי לממשלה: התאמה בין התפקיד ובין דרך המינוי" | .6 |
| יוסי רינות, "על ריבוי השערות, כריית נתונים, הטיות בחירה, דגים מתים ודילוגים" | .7 |
| שרית וייסבורד, "Identifying Moral Hazard in Car Insurance" | .8 |
| רן חסין, "Non-conscious Goal Conflicts and Their Effects on More (or Less) Strategic Behaviors" | .9 |
| זיו הלמן, "קבוצת המיקוח במשחקים שיתופיים חוזרים" | .10 |
| מיקו רותם, "אסטרטגיות הרמייה של סחלבן החורש" | .11 |
| רן שורר, בחינה מחודשת של נוסחת הקפיטציה" | .12 |
| יעקב בביצ'נקו, "Completely Uncoupled Dynamics and Nash Equilibrium" | .13 |
| נועם בר שי, "התנהגות תלוית מספר של דבורים בחיפוש אחר מזון על פרחים" | .14 |
| אילן נחמה, "עוד הוכחה למשפט Gibbard-Satterthwaite" | .15 |
| דני כהן, "מדוע שיפורים בדרך של ברירה טבעית עשויים להביא להכחדתו של המין" | .16 |
| אברהם נוימן, "עוד על משחקים עם אינפורמציה לא מלאה" | .17 |
| תמר קיסר, "התנהגות חיפושיות ואבולוציה של תכונות פרח בכלניות ופרגים" | .18 |
| שהם חשן-הלל, "מהשוואה חברתית לפרו-חברתיות: תפקידה של החלטה פעילה" | .19 |
| איל וינטר, "עמידות העדר" | .20 |
| אמנון שרייבר, "אסטרטגית קופסה-אריבטראז'ים ויעילות שוק ההון בישראל" | .21 |

Appendix 6: Students in the Ph.D. Program in Rationality

Ran Aboodi – M.A Philosophy
Omri Allouche – Ph.D. Evolution, Systematics, and Ecology (Ronen Kadmon)
Ariel Almasi – M.A Economics
Itai Arieli – Ph.D. Mathematics (Yisrael Aumann)
Yaakov Babichenko – Ph.D. Mathematics (Sergiu Hart)
Amir Ban – Ph.D. Computer Science (Nati Linial)
Gilad Bavly – Ph.D. Mathematics (Abraham Neyman)
Ronny Ben-Porath – Ph.D. Economics (Motty Perry)
Gil Ben-Zvi – M.A. Computer Science
Yonatan Fredland – M.A. Economics
Yoed Halbersberg – Ph.D. Law (Ehud Guttel)
Einav Hart – M.A. Cognition (Gary Bornstein)
Omer Idan – Ph.D. Mathematics (Abraham Neyman)
Uri Isserles – Ph.D. Statistics (Yosef Rinott)
Elian Jeifez – M.A. Cognition (Gary Bornstein)
Aviv Keren – Ph.D. Philosophy (Carl Posy)
Amir Konigsberg – Ph.D. Philosophy (Gabriel Mozkin)
Adi Koplovitz – M.A. Philosophy
Neta Krakover – M.A. Computer Science
Yehuda Levi – Ph.D. Mathematics (Abraham Neyman)
Debora Marciano – M.A. Psychology
Moti Michaeli – Ph.D. Economics (Yisrael Aumann)
Ilan Nehama – M.A. Computer Science (Noam Nisan)
Noa Nitzan – Ph.D. Mathematics (Yisrael Aumann)
Gali Noti – M.A. Computer Science
Moran Ofir – Ph.D. Law (Uriel Procaccia)
Ron Peretz – M.A. Mathematics (Abraham Neyman)
Assaf Rom – M.A. Economics
Miko Rotem – M.A. Evolution, Systematics, and Ecology (Avi Shmida)
Amnon Schreiber – M.A. Economics (Eugene Kandel)
Shorer Ran – M.A. Economics (Elchanan Ben-Porath)
Sarit Weisburd – Ph.D. Economics (Saul Lach)
Uri Weiss – Ph.D. Law (Yisrael Aumann)
Elyashiv Wiedman – M.A. Economics (Motty Perry)
Shifra Wine – Ph.D. Law (Alon Harel)
Ro'i Zultan – Ph.D. Education (Yaakov Kareev)

Appendix 7a: Statement by the Ph.D. Program Coordinator

The Graduate Program at the Center for the Study of Rationality:

In 2006 the Rationality Center established an educational program that is open to selected M.A. and Ph.D. students at the Hebrew University.

The program accepts students of exceptional intellectual ability and academic achievement, whose interests coincide with (or can be served by) the Center's focus on game theory and decision making. We require that the students be registered in one of the established M.A. or Ph.D. programs at the University.

Admission to the program is highly selective. Indeed, the applicant pool is at this point fairly self-selecting: there are very few inquiries and almost no applications from students who have not already achieved a superior academic record. *This year saw 13 formal applications and in addition 18–20 inquiries that were rejected out of hand. From this pool 5 new students matriculated.*

Each year the Center offers a selection of graduate courses in a variety of areas. These are very rigorous courses. The program requires its students (both M.A. and Ph.D. students) to take 15 credit-hours of classes (selected from these course offerings) over and above the standard requirements of their home department.

In addition to their coursework, the students participate in a student-run seminar in which they present their work in progress. They also participate actively in the Center's annual retreat. Each year several of them present talks there.

The students are active participants in the day-to-day intellectual life of the Center. They use the two rooms and work stations that are provided for them for their own work and for many interdisciplinary conversations. Some indeed are collaborating in the active research of Center faculty members.

The program now has a total of 37 registered students. They are a cadre of future leaders in the academic, public, and private spheres. We believe that the ideal number is no more than 35, and we are structuring our admissions accordingly.

Students at the Center continue to achieve academic honors and recognition at the University – including a number of prestigious fellowships and awards.

Last year at this time the graduate program faced a severe financial crisis. In its initial years the Center managed to supply fellowship support for nearly all of its students. In the standard case the support came to a 100% fellowship for a period of 10 months. (A “100% fellowship” means that the student receives 100% of the standard monthly stipend set by the University for students at the given student's level of studies.) However, the Center's Fellowship program was initially fully funded by the Horowitz foundation, which, as you know, collapsed in the wake of last year's financial crisis. Through help from the University and participation by Center members we were able to cobble together sufficient funds to pull through the last academic year. Happily, in the course of the year the administration of the Center reached an agreement with the University and with the Yad HaNadiv Foundation for a

grant and matching funds devoted to the Center's Graduate Program. In light of this influx of funds the Center is instituting a graduated scale of fellowship aid to its student members. There will be three tiers of fellowships – 100%, 150%, and 200%, each paid over a twelve-month period. The criteria for each level of support are being formalized and will be circulated to students and faculty of the Center.

It should be noted that the Center also supplies excellent working facilities – including the two student rooms, computers, and supplies – for its student population.

Given the success of the Graduate Program up till now, the excellent financial and material support we give our students, and the friendly atmosphere of the Center, we may assume that there will be a continued demand for places.

Submitted by Carl Posy
Coordinator of the Graduate Program

Appendix 7b: Ph.D. Program Course Descriptions

קבלת החלטות התנהגותיות (גרי בורנשטיין ואייל וינטר)

התחום של קבלת החלטות התנהגותית חוקר כיצד אנשים מקבלים החלטות הלכה למעשה. העניין בנושא זה משותף לחוקרים בפסיכולוגיה, כלכלה, מדע המדינה, מנהל עסקים ותחומים אחרים. המחקר ההתנהגותי כולל בנוסף להמשגה התיאורטית איסוף נתונים, בעיקר באמצעות ניסויי מעבדה המציבים בפני הנבדקים בעיות החלטה עם תוצאות כספיות. הסמינר יכלול סדרת הרצאות של מומחים בתחום שיעסקו בין היתר במושגי פתרון התנהגותיים, השפעה של הטיות על התנהגות שוק, עדוד שיתוף פעולה ואספקטיים מוחיים של קבלת החלטות.

סוגיות נבחרות בפילוסופיה של מדעי החברה, קבלת החלטות ורציונאליות (עדנה אולמן-מרגלית)
יידונו מאמרים נבחרים בפילוסופיה של מדעי החברה, תורת ההחלטה ורציונאליות. ייתכן שיהיו הרצאות אורח במהלך הקורס. התלמידים יידרשו להציג, לנתח את המאמרים (המאמרים ברובם באנגלית)

נושאים חישוביים בתורת המשחקים (מיכל פלדמן ונועם ניסן)
הקורס ידון בנושאים הנמצאים בממשק של מדעי המחשב, תורת המשחקים ומיקרו כלכלה, ויכלול מגוון רחב של תחומים, אשר תופסים לאחרונה מקום משמעותי במסחר אלקטרוני באינטרנט. בין התחומים שיידונו: תכנון מנגנונים ומכרזים, מכרזים קומבינאטוריים, סיבוכיות חישובית של מציאת שוויי משקל משחקי רשת, משחקי פוטנציאל, (POTENTIAL GAMES) מחיר אנרכיה, (PRICE OF ANARCHY) מחיר יציבות, (PRICE OF STABILITY) טובין דיגיטליים, ועוד. הקורס מוצע לתלמידי שנה ג' ולתלמידים לתארים מתקדמים {במינהל עסקים, מדעי המחשב, ובמרכז לרציונליות

סמינר במשחקים רב שלביים (אברהם נוימן)
משחקים חוזרים עם סיבוכיות מוגבלת, משחקים סטוכסטיים, משחקים חוזרים עם אינפורמציה לא מלאה ומשחקים רב שלביים עם פוני תשלום כלליות.

משפט ורציונליות (אלון הראל)

האדם הרציונאלי, האינדיבידואל ממקסם התועלת, הוא מהמאפיינים הבולטים של הניתוח האקדמי של המשפט בעידן המודרני. יחד עם זאת, בשנים האחרונות האדם הרציונאלי נתון לביקורת מתמדת, הן כמי שאמור לייצג את האופן בו פרטים מתנהגים, והן כמי שראוי לקבל את העדפותיו באופן נורמטיבי. במסגרת הקורס נעמוד על התפקיד המרכזי שמילא הפרט ממקסם התועלת, גיבורה הבולט של הגישה הכלכלית, בניתוח המשפטי. לאחר שנציג את תרומותיה העיקריות בהקשרים שונים, נבחן שתי גישות ביקורתיות הקוראות תיגר על הניתוח הכלכלי המסורתי בתחום המשפט. האחת, גישת ה Behavioral Law & Economics - המציגה את את המגבלות הקוגניטיביות בהם לוקים בני אנוש באופן שיטתי ולפיכך מבקרת את ההנחה לפיה פרטים הם ממקסמי תועלת אדוקים. השנייה, Expressive Law & Economics, גישה "עשירה" הקוראת להגשים באמצעות המשפט מטרות רחבות יותר מאשר מיקסום תועלת כלכלית במובן הצר. כפי שנראה, כל אחת מהגישות האמורות מספקת נקודות מבט שונה להערכת האופן בו פועלים כללים משפטיים.

Appendix 8: Discussion Papers (2009–2010)

(These and all earlier DPs can be found on our website: www.ratio.huji.ac.il.)

514. **Daniel Lehmann**, "Foundations of Non-Commutative Probability Theory" (June 2009).
515. **Tamar Keasar, Ally R. Harari, Guido Sabatinelli, Denis Keith, Amots Dafni, Ofrit Shavit, Assaph Zylbental, and Avi Shmida**, "Red Anemone Guild Flowers as Focal Places for Mating and Feeding of Mediterranean Glaphyrid Beetles" (July 2009).
516. **Alex Gershkov and Motty Perry**, "Contracts for Providers of Medical Treatments" (July 2009).
517. **Sergiu Hart**, "A Simple Riskiness Order Leading to the Aumann–Serrano Index of Riskiness" (August 2009)
518. **Robert J. Aumann**, "Game Engineering" (September 2009). Transcript of the lecture at Koźmiński University in Warsaw, Poland, May 14, 2008.
519. **Eytan Sheshinski**, "Longevity and Aggregate Savings" (September 2009).
520. **Eytan Sheshinski**, "Uncertain Longevity and Investment in Education" (September 2009).
521. **Eyal Winter, Ignacio Garcia-Jurado, Jose Mendez-Naya, and Luciano Mendez-Naya**, "Mental Equilibrium and Rational Emotions" (September 2009).
522. **Ziv Hellman**, "Iterated Expectations, Compact Spaces, and Common Priors" (October 2009).
523. **Ziv Hellman**, "Bargaining Set Solution Concepts in Repeated Cooperative Games" (October 2009).

524. **Itai Arieli and Yehuda Levy**, “Infinite Sequential Games with Perfect but Incomplete Information” (November 2009).
525. **Bernhard von Stengel and Shmuel Zamir**, “Leadership Games with Convex Strategy Sets” (November 2009).
526. **Dror Lellouche and Assaf Romm**, “Information Effects of Jump Bidding in English Auctions” (December 2009).
527. **Bezalel Peleg and Shmuel Zamir**, “On Bayesian–Nash Equilibria Satisfying the Condorcet Jury Theorem: The Dependent Case” (December 2009).
528. **Gary Bornstein and Ori Weisel**, “Punishment, Cooperation, and Cheater Detection in ‘Noisy’ Social Exchange” (December 2009).
529. **Yakov Babichenko**, “Completely Uncoupled Dynamics and Nash Equilibria” (January 2010).
530. **Jay Bartroff, Larry Goldstein, Yosef Rinott, and Ester Samuel-Cahn**, “On Optimal Allocation of a Continuous Resource Using an Iterative Approach and Total Positivity” (January 2009); *Advances in Applied Probability* 42 (2010).
531. **Sergiu Hart**, “Comparing Risks by Acceptance and Rejection” (February 2010).
532. **Ziv Hellman and Dov Samet**, “How Common Are Common Priors?” (February 2010).
533. **Yoed Halbersberg**, “Liability Standards for Multiple-victim Torts: A Call for a New Paradigm” (February 2010).
534. **Marco Francesconi, Christian Ghiglino, and Motty Perry**, “On the Origin of the Family” (February 2010).
535. **Itai Arieli**, “Backward Induction and Common Strong Belief of Rationality” (February 2010).
536. **Robert J. Aumann**, “The Role of Incentives in the World Financial Crisis” (February 2010).
537. **Robert J. Aumann**, “A Response Regarding the Matter of the Man with Three Wives” (February 2010).
538. **Noga Alon, Yuval Emek, Michal Feldman, and Moshe Tennenholtz**, “Bayesian Ignorance” (February 2010).
539. **Edith Cohen, Michal Feldman, Amos Fiat, Haim Kaplan, and Svetlana Olonetsky**, “Envy-free Makespan Approximation” (February 2010).
540. **Edith Cohen, Michal Feldman, Amos Fiat, Haim Kaplan, and Svetlana Olonetsky**, “Truth and Envy in Capacitated Allocation Games” (February 2010).

541. **Noga Alon, Michal Feldman, Ariel D. Procaccia, and Moshe Tennenholtz**, “Strategyproof Approximation Mechanisms for Location on Networks” (February 2010).
542. **Omer Lev**, “A Two-Dimensional Problem of Revenue Maximization” (April 2010).
543. **Alex Gershkov and Benny Moldovanu**, “Optimal Search, Learning, and Implementation” (April 2010).
544. **Deniz Dizard, Alex Gershkov, and Benny Moldovanu**, “Revenue Maximization in the Dynamic Knapsack Problem” (April 2010).
545. **Moses Shayo and Alon Harel**, “Non-Consequentialist Voting” (April 2010).
546. **Ron Peretz**, “Learning Cycle Length through Finite Automata” (April 2010).
547. **Maya Bar-Hillel**, “Some Surprising Results from the New Psychology and Some Surprising Legal Implications They Suggest” (May 2010); *Mishpat ve’Asakim* (forthcoming).
548. **Maya Bar-Hillel**, “Scientific Proof versus Legal Proof: Ruminations about Mathematical and Statistical Reasoning in Legal Factfinding” (May 2010); *Odyssey* 8 (2010).
549. **Maya Bar-Hillel, Alon Maharshak, Avital Moshinsky, and Ruth Nofech**, “Does a Rose by Any Other Name Smell as Sweet? A Cognitive Perspective on Poets and Poetry” (May 2010).
550. **Ro’i Zultan, Maya Bar-Hillel, and Nitsan Guy**, “When Being Wasteful is Better than Feeling Wasteful” (May 2010).
551. **Maya Bar-Hillel**, “A Commentary on Mel Rutherford’s ‘On the Use and Misuse of the ‘Two Children’ Brainteaser’” (May 2010); *Pragmatics and Cognition* 18 (2010).
552. **Judith Avrahami and Yaakov Kareev**, “The Role of Impulses in Shaping Decisions” (May 2010); *Journal of Behavioral Decision Making* (forthcoming).
553. **Yaakov Malinovsky and Yosef Rinott**, “Best Invariant and Minimax Estimation of Quantiles in Finite Populations” (May 2010).
554. **Eytan Sheshinski**, “Limits on Individual Choice” (June 2010).
555. **Noam Bar-Shai, Tamar Keasar and Avi Shmida**, “The Use of Numerical Information by Bees in Foraging Tasks” (June 2010).

Appendix 9: Members of the Center (2009–2010)

Robert J. Aumann	Mathematics
Judith Avrahami	Education
Maya Bar-Hillel	Psychology
Michael Ben-Or	Computer Science
Elhanan Ben-Porath	Economics
Liad Blumrosen	Economics
Gary Bornstein	Psychology
Dan Cohen	Biology
Michal Feldman	Business School
Alex Gershkov	Economics
Ehud Guttel	Law
Ein-Ya Gura	Science Teaching
Alon Harel	Law
Sergiu Hart	Mathematics, Economics
Ran Hassin	Psychology
Eva Illouz	Sociology, Anthropology
Daniel Kahneman – Fellow	Psychology & Public Policy
Gil Kalai	Mathematics
Eugene Kandel	Economics, Business School
Yaakov Kareev	Education
Igal Kwart	Philosophy
Daniel Lehmann	Computer Science
Nathan Linial	Computer Science
Yonatan Loewenstein	Brain and Cognitive Sciences
Abraham Neyman	Mathematics
Noam Nisan	Computer Science
Bezalel Peleg	Mathematics
Motty Perry	Economics
Carl Posy	Philosophy
Uriel Procaccia	Law
Yossi Rinott	Statistics

Illana Ritov	Education
Ya'acov Ritov	Statistics
Ester Samuel- Cahn	Statistics
Eytan Sheshinski	Economics
Avi Shmida	Biology
Edna Ullmann-Margalit	Philosophy, Education
Benjamin Weiss	Mathematics
Eyal Winter	Economics
Menahem Yaari	Economics
Ilan Yaniv	Psychology
Shmuel Zamir	Statistics