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Eliezer Hershkovitz
Curriculum Vitae

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Fields: Bioinformatics, Soft Condense Matter, Chemical Physics.

Education

- 1985-1988** B.Sc. In physics and mathematics from the Hebrew University.
1989-1991 M.Sc. In theoretical physics from the Weizmann Institute of Science.
Adviser: Prof. Shimon Levith.
Thesis subject: "2D QCD".
1992-1997 Ph.D. in Physics, Weizmann Institute of Science.
Adviser: Prof. Eli Pollak.
Thesis subject: "Multi Dimensional Activated Rate Processes".

Positions and research experience

- 1987** Summer research position, Department of Physics, Hebrew University.
Adviser Prof. Steinberger.
1989-1991 M.Sc. student, Department of Physics, Weizmann Institute.
1992-1997 Ph.D. student, Department of Chemical Physics, Weizmann Institute
of Science. Adviser: Prof E. Pollak.
1997-1998 Postdoctoral student, Department of chemical physics,
Weizmann Institute of Science,
Studied Surface diffusion. Adviser: Prof E. Pollak.
1998-1999 Postdoctoral associate, Laboratoire de Spectrometrie Physique,
Joseph-Fourier University. adviser: L. Wiesenfeld: Studied the influence
of stochastic noise on chaotic dynamics.
1999-2000 Visiting scientist position, Department of Chemical Physics,
Weizmann Institute of Science
Studied the problem of reaction rates on molecular bridges.
2000-2002 Postdoc fellow, Georgia Institute of Technology, School of Chemistry and
Biochemistry. Adviser: R. Hernandez:
Studying stochastic dynamic in irreversible processes.

2002- Research scientist, Georgia Institute of Technology,
School of Electrical and Computer Engineering.
Folding mechanism and Motifs recognition of globular RNA.

Awards and grants

1989-1991 M.Sc. scholarship, Weizmann Institute.
1992-1997 Ph.D. scholarship, Weizmann Institute.
1998-1999 Chateaubriand Fund - France's Ministry of Foreign Affairs. \$35,000.

Publications

1. E. Pollak and E. Hershkovitz, "Activated rate processes: A multi-dimensional Kramers turnover theory," *J. Phys. Chem.* **180**, 191-197 (1992).
2. E. Hershkovitz and E. Pollak, "Multidimensional generalization of the Pollak Grabert Hanggi theory for activated rate processes," *J. Chem. Phys.* **106**, 7678-7699 (1997).
3. E. Hershkovitz "Forth order integrator for stochastic differential equations", *J. Chem. Phys.* **108**, 9253, (1998).
4. E. Hershkovitz, P. Talkner, E. Pollak and Y. Georgievskii "Multiple hops in Multidimensional activated surface diffusion" *Surf. Sci.* **421**, 73, (1999).
5. P. Talkner, E. Hershkovitz, E. Pollak and P. Hanggi "Controlling Activated Surface Diffusion by External fields" *Surf. Sci.* **437**, 198, (1999).
6. E. Hershkovitz and L. Wiesenfeld, "Multidimensional reactive rate calculations in chaotic systems", *J. Chem. Phys.* **113**, 4558, (2000).
7. E. Hershkovitz and E. Pollak, "Kramers turnover theory for bridges", *Ann. Phys.*, **9**, 764, (2000).
8. E. Hershkovitz and R. Hernandez, "Fast Numerical Integrator for Stochastic Differential Equations with Non-stationary Multiplicative Noise", *J. Phys. Chem.* **105**, 2687, (2001).

9. E. Hershkovitz, E. Tannenbaum, S. Howerton, A. Sheth, A. Tannenbaum and L. Williams, "Automated identification of RNA conformational motifs: theory and application to the HM LSU 23S rRNA", *Nucl. Acids. Res.* **31**, 6249, (2003).
10. E. Hershkovitz and R. Hernandez, "Chemical Reaction Dynamics within Anisotropic Solvents in Time-Dependent Fields", Accepted for publication in *J. Chem. Phys.*, (2004).
11. E. Hershkovitz, G. Sapiro, A. Tannenbaum and L. Williams, "Statistical Analysis of RNA Backbone", Submitted to *IEEE Transactions on Computational Biology and Bioinformatics* (2004).

Articles in Preparation

1. E. Tannenbaum, E. Hershkovits, S. B. Howerton, G.S. Perng, A. R. Tannenbaum and L. D. Williams, "Role of magnesium in the folding of Globular RNA"

Conference Presentations

1. E. Hershkowitz and E. Pollak, "Chaos in Zwanzig Hamiltonian systems", CECAM International Workshop on Many Degrees of Freedom Chaos, Lyon, France (August 1994).
2. E. Hershkowitz and E. Pollak, "Non Linear Dynamics Effects on Dissipative Processes", International winter school for Quantum Chaos, Rehovot, Israel (Feb 1996).

Invited speaker

3. E. Hershkovitz and L. Wiesenfeld, "Stochastic Three Body problem", Gordon research conference, "Dynamics of simple systems in chemistry and Physics", Salve Regina University RI USA (July 1999).

Poster on Stochastic dynamic of multidimensional systems.

4. E. Hershkovitz and L. Wiesenfeld "Stochastic effects in 3D open Chaotic systems", in "Hamiltonian Dynamics and Molecular Physics: Beyond Two Degrees of Freedom", California Institute of Technology, (July 2000).

Invited Speaker.

5. E. Hershkovitz and R. Hernandez “Fast numerical integration for non-stationary stochastic dynamics”, ACS meeting, San Diego, (Apr 2001).
Speaker
6. E. Hershkovitz and R. Hernandez “Chemical processes in non-homogeneous liquid environments”, Gordon conference on “Chemistry and physics of liquids”, Holderness School , (Aug 2001).
Poster
7. E. Hershkovitz and R. Hernandez “Simulation in time an space dependent environment”, 4th Annual Harold Nations Seminars in Chemistry, “Frontiers in Bimolecular Simulation liquids”, Georgia Institute of Technology , (Oct, 5, 2001).
Poster
8. E. Hershkovitz and R. Hernandez “Implementation of fast stochastic integrators for small scale mechanical systems”, International Conference, “Nano Biology 2001”, Emory, (Oct 25-27, 2001).
Poster
9. E. Hershkovitz and R. Hernandez “Computational methods for thermally activated systems with external fields”, SETCA meeting, Georgia Institute of Technology, Atlanta, GA, (May 2002).
Speaker
10. E. Hershkovitz A. Tannenbaum and L. Williams “Structural motifs recognition in rRNA”, Gordon conference on “Nucleic Acids”, Salva Regina, RI , (Jun 2003).
Poster
11. E. Hershkovitz “RNA Structure” workshop , Benasque, Spain (Aug 2003)
Poster
12. E. Hershkovitz, E. Tannenbaum, A. Tannenbaum and L. Williams, “ Search algorithm for RNA structural motifs”, The Fourth Georgia Tech and UGA International conference of Bioinformatics, Atlanta, GA, (Nov 2003).
Speaker
13. E. Hershkovitz and R. Hernandez, “Dynamics of systems in a time dependent anisotropic bath”, Sermacs meeting, Atlanta, GA, (Nov 2003).

14. E. Hershkovitz G. Sapiro A. Tannenbaum and L. Williams, “Reducing RNA Conformational Complexity”, Ninth Annual Meeting of the RNA Society, Madison, Wisconsin (June 2004).

Speaker

Teaching Experience

1. **2002** Lecturing in the course ECE 6550: Linear systems and Control, Department of Electrical Engineering, Georgia Institute of Technology.
2. **2003** workshop Facilitator in BMED 1300: Problem based learning.

Names of References

1. Professor Eli Pollak, Chemical Physics Department, Weizmann Institute of science, Rehovot 76100, Israel, Tel: +972 8 9342307, e-mail eli.pollak@weizmann.ac.il.
2. Professor Loren Williams, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA 30332-0400, Phone: 404 894-9752, Fax 404 894-7452, Email loren.williams@chemistry.gatech.edu
3. Professor Allen Tannenbaum, Departments of Electrical & Computer and Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA 30332-0250, Phone: 404-894-7582 and 404-894-0290, Fax: 404-894-7583, Email: tannenba@ece.gatech.edu.
4. Professor Rigoberto Hernandez, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA 30332-0400, e-mail hernandez@chemistry.gatech.edu, Tel: 404.894.0594.

Research Interests

1. Structural Bioinformatics: Patterns recognition and folding dynamics of globular RNA.
2. Computational tools: Developing fast numerical integrators for dynamical systems with stochastic forces and simulations of large systems.
3. Soft condensed matter theory: friction, diffusion and reaction within liquid crystals.

4. Non-equilibrium Statistical Mechanics: Reaction rate processes, Surface Diffusion, Irreversible systems and statistical system with external forces (Ratchets).