EYAL FATTAL, Ph. D.

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CURRENT POSITIONS

Senior Research Scientist (parallel to associate professor, "Darga Aleph"), since 2/2014.
Head of the applied mathematics department

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RESEARCH FOCUS:

Research and development of fluid dynamic models using analytical and numerical methods for studying atmospheric flow and dispersion phenomena above, through and around complex domains such as urban canopies and complex terrain:

- Dispersion and transport of pollutants in the atmospheric boundary layer (ABL) within and above canopies:
  - Development of detailed Lagrangian stochastic dispersion models for non-homogeneous turbulence in urban canopies, in flat and in complex terrain.
  - Developing approximate and efficient pollutant dispersion models that take into account the spatial and temporal uncertainty conditions in the wind field.
- Micrometeorology:
  - Development of models for predicting the wind field in urban areas, both in time and in space.
  - Characterizing the structure of the turbulent boundary layer based on detailed meteorological measurements.
  - Design and analysis of urban tracer experiments in flat and in complex terrain in order to improve pollutant dispersion modeling.

RESEARCH EXPERIENCE:

The Israel institute for Biological Research (IIBR), Ness Ziona, 1998/*To Date*
(*Applied Math. Dept., Environmental Sciences Division, **Senior Research Scientist**; see details above)*

The Hebrew University of Jerusalem, Jerusalem, Israel 2007-2008
*(The Fritz Haber Research Center for Molecular Dynamics, Prof. Roi Baer; **Sabbatical Research Fellow**)*
Development of a new numerical method, an adaptive multigrid method, optimal for the solution of parabolic differential equations, e.g. the mass conservation equation use in Lagrangian-Stochastic models. The new generalized adaptive multigrid was shown to maintain the linear numerical convergence scaling, while allowing the change of grid sampling based on the physical sampling needed.

University of California Los-Angeles, California, USA 1996-1998
*(Prof. Emily A. Carter, Department of Chemistry and Biochemistry, **Post-doctoral Fellow**)*
Research and development of numerical models and methods in computational quantum chemistry, new methods for calculating transition metal interactions, semi-classical methods combining molecular dynamics with quantum ab-initio methods.

The Hebrew University of Jerusalem, Jerusalem, Israel 1989-1996
(*Prof. Ronnie Kosloff, The Fritz Haber Research Center for Molecular Dynamics, **Ph.D. student***)

Thesis research involved the development of a new numerical method for solving the electron-nuclear quantum dynamics equations of motion. The new scheme generalized a uniform grid method to a non-uniform adaptive grid method and includes analysis tools for the designs of optimal sampling efficiency.

EDUCATION and PROFESSIONAL PREPARATION:

Post-doctoral:

Post-doctorate in Theoretical and Computational Physical Chemistry
Department of Chemistry and Biochemistry, Univ. of California Los-Angeles (UCLA), California, USA 1998

Graduate:

Ph.D. in Theoretical and Computational Physical Chemistry
The Hebrew University of Jerusalem, Jerusalem, Israel 1996
Thesis Topic: *The Mapped Fourier Method in Electron-Nuclear Quantum Dynamics*.

M. Sc. in Theoretical and Computational Physical Chemistry, Graduated Cum Laude
The Hebrew University of Jerusalem, Jerusalem, Israel 1992

Under-Graduate:

B. Sc. in Chemistry, Graduated Cum Laude
The Hebrew University of Jerusalem, Jerusalem, Israel 1988

AWARDS & HONORS:

* 2009: The IIBR Environmental Sciences Division Award for Excellence in research.
  (Israel Institute for Biological Research)
* 2003: The IIBR Institutional Award for excellence in research.
  (Israel Institute for Biological Research)
* 1997: The Univ. of California Los-Angeles senior post-doctoral stipends.
  (Univ. of California Los-Angeles, Chemistry and Biochemistry dept., USA)
* 1992: The Amiel Excellence Award for Graduate Students.
  (School of Chemistry, The Hebrew University)
  1992,1994: World Sephardi Federation Research Award for Ph.D. Students.
  (World Sephardi Federation, Israel)
* 1990, 1991, 1992, 1993, 1994, 1995: The School of Chemistry Commendation for Outstanding Teaching Assistant.
  (School of Chemistry, The Hebrew University)

TEACHING EXPERIENCE:

Teaching Assistant at The Hebrew University in:

Advanced Quantum Chemistry *(graduate School of Chemistry)*
Advanced Quantum Mechanics: Reaction Dynamics Simulations Lab *(graduate School of Chemistry)*
Ordinary Differential Equations *(undergraduate and graduate School of Chemistry)*
Physical Chemistry: Kinetics of Chemical Reactions, Thermodynamics *(undergraduate Life Sciences and Medical School)*
General Chemistry *(undergraduate Medical School)*

OTHER ACADEMIC ACTIVITIES

Thesis supervisor:

- **PhD Thesis supervisor to (2011-2016):** *Ziv Klausner (IIBR)*, "*A unified probabilistic approach for the description of arbo-viruses spread via atmospheric transport and its application to the eastern Mediterranean area*", Joint supervision at The Hebrew university, Rehovot, with Dr. E. Klement, Koret School of Veterinary Medicine, The Faculty of Agriculture, Food and Environment.