Yaron Hadad

CONTACT
INFORMATION

Researcher
Department of Mathematics
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RESEARCH
INTERESTS

Theoretical and Fundamental Physics: the theory of relativity, mathematical consequences of Einstein's equations, conservation laws, anomalies of general relativity and physical implications of the theory; physics of high acceleration, electrodynamics, the problems of self-force and radiation-reaction, analytic study of radiation-reaction models; foundations of quantum theory, non-locality; **Applied Mathematics:** integrable systems, soliton theory and the inverse scattering transform, in particular its applications to physics and general relativity, solutions of differential equations; mathematical models for nutrition

EDUCATION

Ph.D., Mathematics and Physics

Department of Mathematics, University of Arizona, Tucson, Arizona, U.S.A 2013

- Thesis Topic: *Integrable Nonlinear Relativistic Equations*
- Advisor: Prof. Vladimir E. Zakharov

B.A., Mathematics and Physics

Departments of Mathematics and Physics, Technion Institute of Technology, Haifa, Israel, 2006

- *cum laude*
- Graduation Project: *Variational approach for the derivation of finite-dimensional models of dissipative solitons*
- Advisor: Prof. Alexander Nepomnyaschy

PUBLICATIONS

[1] Y. Hadad, V. Zakharov
"Transparency of Strong Gravitational Waves"
Journal of Geometry and Physics, Volume 80 (2014)

[2] Y. Hadad, L. Labun, J. Rafelski, N. Elkina, C. Klier, H. Ruhl.
"Effects of Radiation-Reaction in Relativistic Laser Acceleration"
Phys. Rev. D 82, 096012 (2010)
doi:10.1103/PhysRevD.82.096012

[3] J. Rafelski, L. Labun, Y. Hadad
"Horizons of Strong Field Physics"
AIP Conf. Proc. 1228:39-53 (2010)
doi:10.1063/1.3426079

[4] J. Rafelski, L. Labun, Y. Hadad, P. Chen
"Quantum Vacuum Structure and Cosmology"
Tenth Workshop on Non-Perturbative Quantum Chromodynamics at l'Institut Astrophysique de Paris June 8-12 (2009)

PAPERS IN PREPARATION	[5] Y. Hadad, V. Zakharov "On the absence of singularities in gravitational waves collision"
	[6] Y. Hadad, A. Elitzur, E. Cohen, I. Kaminer "A novel geometrical interpretation of the electromagnetic field and the radiation-reaction problem"

AWARDS

The University of Arizona, Tucson, Arizona, U.S.A
- Daniel Bartlett Award, 2012
- Outstanding Graduate Teaching Assistant, Spring 2011

Technion Institute of Technology, Haifa, Israel
- The Dean of the Mathematics Faculty list of honor, 2006
- The President of the Technion's list of honor, 2005
- The Dean of the Mathematics Faculty list of honor, 2004

Israeli Defense Forces (I.D.F)
- Bakum's List of Honor for the development of the I.D.F's personnel assignment system, 2003

INVITED TALKS

DICE 2014, Castiglioncello, Tuscany, Italy
"*The Hidden Geometry of Electromagnetism*"
Spacetime - Matter - Quantum Mechanics Conference   **September 15th, 2014**

RockHealth, San Francisco, California, U.S.A
"*Nutrino: Using technology to help kids eat better*"
Health Kids Workshop   **August 4th, 2014**

The Hebrew University, Jerusalem, Israel
"*Probing Radiation Reaction in the High Acceleration Regime*"
Physics Seminar   **January 22th, 2014**

The University of Akron, Akron, Ohio
"*Nutrino: Closing the Nutrition Loop*"
The 10th Annual Nutrition Forum   **February 7th, 2014**

Universidad del Norte, Barranquilla, Colombia
"*Integrability of the vacuum Einstein equation*"
Congreso Colombiano de Matematicas 2013   **July 15th, 2013**

The Next Web, Amsterdam, Holland
"*Nutrino*"
Final of The Next Web (Talk link)   **April 24th, 2013**

The University of Arizona, Tucson, Arizona, U.S.A
"*Gravitational Solitons on Einstein-Rosen Metric*"
Recent progress of waves processes in nature   **October 9, 2011**

Max Planck Institute and **Ludwig-Maximilians-Universität**,
Frauenchiemsee, Germany
"*Radiation and Acceleration*"
The Annual Laboratory for Attosecond Physics Meeting   **October 3, 2009**

TEACHING EXPERIENCE

Technion Institute of Technology, Haifa, Israel

Instructor of Math 104221: Complex Functions & Integral Transformations   **Fall 2013**

T.A. of Math 104020 : Calculus 2m1	**Fall 2013**

The University of Arizona, Tucson, Arizona, U.S.A

SuperTA of Math 523A: Real Analysis (for PhD students)	**Fall 2012**
T.A. of Math 254 : Ordinary Differential Equations	**Fall 2011**
Instructor of Math 254: Ordinary Differential Equations	**Summer II 2011**
Instructor of Math 223: Vector Calculus	**Spring 2011**
T.A. for Math 488 / 588: Differential Geometry, General Relativity and Cosmology **Spring 2011**	
Grader for Math 456 / 556: Applied Partial Differential Equations	**Spring 2011**
Instructor of Math 223: Vector Calculus	**Fall 2010**
SuperTA of Math 523A: Real Analysis (for PhD students)	**Fall 2010**
Instructor of Math 129: Calculus II	**Summer II 2010**
Instructor of Math 129: Calculus II	**Spring 2010**
Instructor of Math 124 : Calculus	**Spring 2009**
Instructor of Math 120R: Preparation for Calculus	**Fall 2008**
Instructor of Math 110: College Algebra	**Spring 2008**
Instructor of Math 110: College Algebra	**Fall 2007**

Technion Institute of Technology, Haifa, Israel

T.A. of Math 104215: Complex Functions	**Fall 2006**
Grader for Math 104270 : Analytical Methods in Partial Differential Equations	**Fall 2006**
T.A. of Math 104192 : Introduction to Applied Mathematics	**Fall 2005**

PROFESSIONAL EXPERIENCE

Department of Physics, **Ludwig-Maximilians-Universität**, Munich, Germany

Visiting Student Researcher   **June - December 2009**

- *On the problem of radiation-reaction and electromagnetic radiation in view of Kaluza-Klein like theories*
- Found a new analytic solution of the Landau-Lifshitz Equation, and studied its physical significance (see publications)
- Advisor: Prof. Johann Rafelski

Department of Mathematics, **The University of Arizona**, Tucson, Arizona, U.S.A

Research Tutorial Group Project   **Fall 2008 - Spring 2009**

- *Numerical solutions of the Einstein field equations*
- Developed a numerical solver for Einstein's Field Equation in MATLAB
- Advisor: Prof. Misha Stepanov

Department of Particle Physics and Astronomy,**Weizmann Institute of Science**, Rehovot, Israel

Student Researcher **Summer 2006**
- *On the Z^0 composition in a mini black hole decay*
- Project was part of the preparations for the search of Supersymmetry with the ATLAS detector at CERN
- Studied numerically the composition of Z^0 bosons in mini black hole decays
- Advisor: Prof. Ehud Duchovni

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<tr><td>CONFERENCES
AND WORKSHOPS</td><td>

DICE 2014, Castiglioncello, Tuscany, Italy
Spacetime - Matter - Quantum Mechanics **September 15-19, 2014**

RockHealth, San Francisco, California, U.S.A
Healthy Kids Workshop **August 4th, 2014**

Universidad del Norte, Barranquilla, Colombia
Congreso Colombiano de Matematicas 2013 **August 15-19, 2013**

The University of Arizona, Tucson, Arizona, U.S.A
Incoming Students Integration Workshop **August 3-7, 2012**

Mathematical Sciences Research Institute, Berkeley, California, U.S.A
Mathematical General Relativity **July 9-20, 2012**

The University of Arizona, Tucson, Arizona, U.S.A
Recent progress of waves processes in nature **October 7-9, 2011**

UCLA, Los Angeles, California, U.S.A
Supersymmetry Workshop in Mathematics and Physics **February 6-7, 2010**

Max Planck Institute and **Ludwig-Maximilians-Universität**, Frauenchiemsee, Germany
The Annual Laboratory for Attosecond Physics Meeting **October 3-8, 2009**

CERN, Geneva, Switzerland
The Annual Cosmo International Conference on Particle Physics and Cosmology **September 7-11, 2009**

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NONACADEMIC PROFESSIONAL EXPERIENCE

Nutrino, Barcelona, Spain and Tel-Aviv, Israel

Co-founder and Chief Science Officer **2010-present**
- Designer of a mathematical optimization algorithm for nutrition and health
- This platform provides a framework to conduct research on the effects of nutrition on our well-being.

Dr. Joseph Ben-Shoshan's Clinic, Tel-Aviv University and Sheba Medical Center, Tel-Aviv, Israel

Programmer & assistant **2000-2006**
- Developed clinic's management software and website
- Hardware acquisition and technical support

Hidonet, Tel-Aviv, Israel

Head of Research & Development **2005**
- Design and program of a user adapting promotion website

Sal Interactive, Tel-Aviv, Israel

Head of Research & Development   **2004-2005**
- Websites design and programming
- Software design and database administration

Graphipus Group, Tel-Aviv, Israel

Programmer   **2003-2004**
- Programmer of the "Urban Voids" international design competition web-gallery, Van Alen Institute, New York City, New York, U.S.A
- Programmer of the "Parachute Pavilion" open design competition web-gallery, Van Alen Institute, New York City, New York, U.S.A
- Programmer of website for Ofer Kenya Safari Ltd., Mombasa, Kenya

Israeli Defense Forces

Military service (mandatory)   **July 2000 - June 2003**
- Developer and designer of the personal assignment program of the I.D.F
- Adapted the SAS engine for an optimized assignment of military's personnel

Mescon Technologies, Ramat-Ahayal, Israel

Programmer and web developer   **Summer 1997**
- Programmed an interactive software for demonstration purposes of products
- Developed and designed a website

SOFTWARE SKILLS Computer Programming:
- C, C++, Java, JavaScript, Pascal, Basic, PHP, GNU make, SQL, MySQL, Mathematica, MATLAB, Maple, HTML, Flash, Python

Productivity Applications:
- TEX (LATEX, BIBTEX, PSTricks), Lyx, Microsoft Office, iWork

Operating Systems:
- Apple OS X, Linux, Microsoft Windows family, and other UNIX variants

LANGUAGES   English and Hebrew - fluent; Spanish and German - advanced; Italian - basic

SERVICE   Recent contributor to Wikipedia.
- Contributions to articles on complex analysis, soliton theory, general relativity, electromagnetism, Lagrangian and Hamiltonian mechanics.