

CURRICULUM VITAE

IGOR RODNIANSKI

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US citizen

Professional History

2011 Spring Henry Burchard Fine Professor of Mathematics, Princeton University
2007–2008 Thomas D. Jones Professor of Mathematical Physics, Princeton University
2005 – Professor, Princeton University
2003 – 2005 Associate Professor, Princeton University
2002 – 2004 Long-Term Prize Fellow, Clay Mathematics Institute
2000 – 2003 Assistant Professor, Princeton University
1999 – 2000 Instructor, Princeton University

Visiting Positions

2009 Spring Invited Professor, Institut Henri Poincaré
2009 Spring Visiting Professor, University of Cambridge
2006 Spring Visiting Professor, MIT
2005 August Member, Isaac Newton Institute
2005 May Invited Professor, Université Paris XIII
2003 – 2005 Adjunct Associate Professor, University of Miami
2003 June Invited Professor, Université Cergy-Pontoise
2002 Fall Member, Institute for Advanced Study

Research Interests

Partial Differential Equations, Analysis, Mathematical Physics

Education

1999 Ph.D. in Mathematics Kansas State University
1996 M.S. in Physics St.-Petersburg University
1993 B.S. in Physics St.-Petersburg University

Honors and Awards

Clay Mathematics Institute Long-Term Prize Fellowship
Training, Research and Motion (TRAM) Network (Beijing, Bonn, Cambridge, Israel, Moscow, Princeton), 2009-2012, Principal Investigator
Research Training Group (RTG) in Analysis and Geometry, 2005-2008, Principal Investigator
NSF grants 1999-2013

Academic Service

Member of the AMS Eastern Section Program Committee, 2011-2013
Member of the Princeton Council on International Teaching and Research, 2008-2010
Member of the Mathematics Department Strategic Planning Committee
2010-2011
Junior Hiring Committee, Department of Mathematics, Princeton University, 2003-2005,
2006-2008, 2009-2010

Member of the Editorial Board:

International Mathematical Research Notices
International Mathematical Research Papers
Discrete and Continuous Dynamical Systems, 2008-2010
Mathematical Research Letters
Selecta Mathematica
Journal of Functional Analysis
Analysis and PDE

Organized conferences:

“Hot Topic” Workshop, MSRI, Berkeley, September 2009
Clay Institute Summer School “Evolution equations”, ETH, Zurich, July 2008
Workshop “Evolution equations and self-gravitating systems”, Max Planck Institute, Golm,
September 2007
Summer School in Analysis and Geometry, Princeton, July, 2006, 2007
Geometric and Analytical Aspects of Nonlinear Dispersive Equations, MSRI, December, 2005
Hyperbolic problems in Global Problems in Mathematical Relativity, Newton Institute,
Cambridge, August, 2005
Miami Waves Conference, University of Miami, January, 2004

Selected Invited Lectures

Barrett Lectures, University of Tennessee, May, 2011

Abel Symposium, Oslo, September 2010
 AMS National Meeting, Invited Address, San Francisco, January 2010
 AMS Sectional Meeting, Invited Address, Waco, October 2009
 XII Marcel Grossmann Meeting, Plenary lecture, Paris, July 2009
 Riviere-Fabes Symposium, 2008
 International Congress of Mathematicians, Mathematical Physics Sectional lecture, Madrid, August, 2006
 International Congress Mathematical Physics, Plenary lecture, Rio de Janeiro, August, 2006
 Physics in the 21st century: 100 years after Einstein's "Annus Mirabilis", Zurich, June, 2005
 Colloque du Groupement de Recherche "Analyse des Equations aux Dérivées Partielles", Forge les Eaux, June 2005
 Yamabe Lecture, Northwestern University, April 2005
 XXth Geometry Festival, Stony Brook, April 2005
 International Congress of Mathematical Physics, General Relativity section, Lisbon, August, 2003
 50 years of the Cauchy problem in General Relativity, Cargese, August 2002
 Colloque du Groupement de Recherche "Analyse des Equations aux Dérivées Partielles", Forge les Eaux, June 2002

Publications

- [1]. *An explicitly soluble phase-transition problem in linear theory of elasticity*, Vestnik St-Petersburg University Math. 28 (1995), no. 4, 28-34
- [2]. *Regulated smoothing for Schrödinger evolution* (with L. Kapitanski), Internat. Math. Res. Notices (1996), no. 2, 41-54
- [3]. *On the fundamental solution of a perturbed harmonic oscillator* (with L.Kapitanski and K.Yajima), Topol. Methods in Nonlinear Anal. Vol. 9 (1997), no.1, 77-106
- [4]. *Does a quantum particle know the time?* (with L. Kapitanski), IMA Volumes in Mathematics and Its Applications, Vol. 109, 355-371, 1999 (Proceeding of the workshop "Emerging applications of number theory", IMA, 1998)
- [5]. *Continued fractions and Schrödinger evolution*, Contemp. Math., 236 (1999), 311-323 (Proceedings of the conference "Continued Fractions: from analytic number theory to constructive approximation", University of Missouri, Columbia, 1998)
- [6]. *Fractal solutions of the Schrödinger equation*, Contemp. Math., 255 (2000), 181-187 (Proceedings of the conference "Nonlinear partial differential equations, dynamics and continuum physics", Mount Holyoke, 1998)

- [7]. *Shape and Morse theory of attractors* (with L. Kapitanski), *Comm. Pure Appl. Math.*, 53 (2000), no. 2, 218-242
- [8]. *On the global regularity of wave maps in the critical Sobolev norm* (with S. Klainerman), *Inetrnat. Math. Res. Notices* (2001) no. 13, 656-677
- [9]. *A physical space approach to wave equation bilinear estimates* (with S. Klainerman and T. Tao), *Journal d'Analyse*, 87 (2002), 299-336
- [10]. *Diophantine properties of the elements of $SO(3)$* (with V. Kaloshin), *Geom. Funct. Anal.*, 11 (2001), no. 5, 953-970
- [11]. *Improved regularity results for the quasilinear wave equations* (with S. Klainerman), *Duke Math. J.*, 117 (2003), no.1, 1-124
- [12]. *Rough solutions of the Einstein vacuum equations* (with S. Klainerman), *C.R. Acad. Sci. Paris Ser. I Math.*, 334 (2002), no.2, 125-130
- [13]. *Classical and quantum scattering for a class of long range random potentials* (with W. Schlag), *Internat. Math. Res. Notices* (2003), no. 5, 243-300
- [14]. *Regularity and geometric properties of solutions of the Einstein-Vacuum equations* (with S. Klainerman), *Journées équations aux dérivées partielles, Forges-les-Eaux* (2002)
- [15]. *Dispersive estimates for the solutions of the Schrödinger equation with time-dependent and rough potentials* (with W. Schlag), *Invent. Math.* 155 (2004) no.3, 451-514
- [16]. *Rough solutions of the Einstein vacuum equations* (with S. Klainerman), *Ann. Math.* 161 (2005), 1143-1193
- [17]. *The causal structure of microlocalized rough Einstein metrics* (with S. Klainerman), *Ann. Math.* 161 (2005), 1195-1243
- [18]. *Ricci defects of microlocalized Einstein metrics* (with S. Klainerman), *J. Hyperb. Diff. Eqs.* 1 (2004), no. 1
- [19]. *The weak null condition for the Einstein vacuum equations* (with H. Lindblad), *Com.Rend. Math.* 336 (2003), no. 11, 901-906
- [20]. *Dispersive analysis of the charge transfer model* (with A. Soffer and W. Schlag), *Comm. Pure Appl. Math.* 58 (2005), no.2, 149-216
- [21]. *Global regularity for the Maxwell-Klein-Gordon equation with small critical Sobolev norm in high dimensions* (with T. Tao), *Comm. Math. Phys.* 251 (2004), no.2, 377-426
- [22]. *Causal structure of the Einstein metrics with bounded curvature flux* (with S. Klainerman), *Inventiones Math.* 159 (2005), 437-529
- [23]. *Sharp trace theorems for null hypersurfaces of Einstein metrics with bounded curvature flux* (with S. Klainerman), *Geom. Funct. Anal.* 16 (2006), 164-229
- [24]. *A geometric approach to the Littlewood-Paley theory* (with S. Klainerman), *Geom. Funct. Anal.* 16 (2006), 126-163

- [25]. *Bilinear estimates on curved space-times* (with S. Klainerman), J. Hyperb. Diff. Eqs. 2 (2005), 279-291
- [26]. *Global existence for the Einstein vacuum equations in wave coordinates* (with H. Lindblad), Comm. Math. Phys. 256 (2005), 43-110
- [27]. Appendix to the paper: *Angular regularity and Strichartz estimates for the wave equation* (by J. Sterbenz), Internat. Math. Res. Notices, 4 (2005), 187-231
- [28]. *A proof of Price's law for the collapse of a self-gravitating scalar field* (with M. Dafermos), Inventiones Math. 162 (2005), 381-457
- [29]. *Asymptotic stability of the multi-soliton states of NLS* (with A. Soffer and W. Schlag), preprint
- [30]. *A note on boundary value problems for black hole evolutions* (with M. Dafermos), preprint
- [31]. *Global stability of Minkowski space-time in harmonic gauge* (with H. Lindblad), Ann. Math. 171 (2010), No. 3, 1401-1477.
- [32]. *Long-time decay estimates for Schrödinger equations on manifolds* (with T. Tao), Ann. Math. Studies 163 (2007), 223-253
- [33]. *Small amplitude nonlinear waves on a black hole background* (with M. Dafermos), J. Mathématique Pures Appliquées 84 (2005), 1147-1172
- [34]. *A Kirchoff-Sobolev parametrix for the wave equations in a curved space-time* (with S. Klainerman), J. Hyp. Diff. Eq. 4 (2007), 401-433
- [35]. *On the radius of injectivity of null hypersurfaces* (with S. Klainerman), JAMS 21 (2008), 775-795
- [36]. *The red-shift effect and radiation decay on black hole space-times* (with M. Dafermos), Comm. Pure Appl. Math. 62 (2009), no. 7, 859-919.
- [37]. *The Cauchy problem in General Relativity*, Proceedings of ICM, Vol. III, 421-442, 2006
- [38]. *The Wave Map Problem. Small data critical regularity (after T. Tao)*, Bourbaki seminar, Astérisque 311 (2007), 365-384
- [39]. *Decay of a linear scalar field on Schwarzschild space-time*, Proceedings of the X-EDP seminar, Exp. No. XI, 2007
- [40]. *Sharp L^1 estimates for singular transport equations* (with S. Klainerman), J. Eur. Math. Soc. (JEMS) 10 (2008), no. 2, 477-505.
- [41]. *The wave equation on Schwarzschild-de Sitter spacetimes* (with M. Dafermos), arXiv:0709.2766v1 [gr-qc]
- [42]. *A note on energy currents and decay for the wave equation on a Schwarzschild background* (with M. Dafermos), arXiv:0710.0171v1 [math.AP]
- [43]. *Rates of convergence towards mean field dynamics* (with B. Schlein), Comm. Math. Phys. 291 (2009), no. 1, 31-61.

- [44]. *A proof of the uniform boundedness of solutions to the wave equation on slowly rotating Kerr backgrounds* (with M. Dafermos), to appear in *Inventiones Math.*
- [45]. *The Heat Equation*, Princeton Companion to Mathematics
- [46]. *On the formation of singularities in the critical $O(3)$ σ -model* (with J. Sterbenz), *Ann. Math.* 172 (2010), No. 1, 187242.
- [47]. *Lectures on black holes and linear waves* (with M. Dafermos), arXiv:0811.0354 [gr-qc]
- [48]. *On the global well-posedness of the one-dimensional Schrödinger map flow* (with Y. Rubinstein, G. Staffilani), *Anal. PDE* 2 (2009), no. 2, 187–209.
- [49]. *Boltzmann limit for a homogenous Fermi gas with dynamical Hartree-Fock interactions in a random medium* (with T. Chen), to appear *J. Stat. Phys.*
- [50]. *A new physical-space approach to decay for the wave equation with applications to black hole spacetimes* (with M. Dafermos), in *XVIth International Congress on Mathematical Physics*, P. Exner (ed.), World Scientific, London, 2009, arXiv:0910.4957v1 [math.AP]
- [51]. *On the breakdown criterion in General Relativity* (with S. Klainerman), *J. Amer. Math. Soc.* 23 (2010), 345–382.
- [52]. *Stable blow up dynamics for the critical co-rotational Wave Maps and equivariant Yang-Mills problems* (with P. Raphael), to appear in *Publications Mathématiques de l’IHÉS*
- [53]. *The Stability of the Irrotational Euler-Einstein System with a Positive Cosmological Constant* (with J. Speck), arXiv:0911.5501 [math.AP]
- [54]. *On the formation of the trapped surfaces* (with S. Klainerman), to appear in *Acta Math.*
- [55]. *On emerging scarred surfaces for the Einstein vacuum equations* (with S. Klainerman), *Discrete Contin. Dyn. Syst.* 28 (2010), no. 3, 1007–1031.
- [56]. *Decay for solutions of the wave equation on Kerr exterior spacetimes I–II: The cases $|a| \ll M$ or axisymmetry* (with M. Dafermos), arXiv:1010.5132
- [57]. *The black hole stability problem for linear scalar perturbations* (with M. Dafermos), arXiv:1010.5137