Resume

Personal Information

First name / Surname:	Piotr Migdał
Date of birth:	1986-03-13
Citizenship:	Polish
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Research Interests

quantum optics, quantum information, complex systems, mathematical modelling in psychology

Education

ICFO - The Institute of Photonic Sciences, Castelldefels (Barcelona), Spain
Quantum Optics Theory Group, advisor: prof. Maciej Lewenstein **Feb 2011** –

- Symmetries and self-similarities of quantum states, application of sequence-analysis methods for quantum states.

University of Warsaw, Warsaw, Poland
Inter-faculty Studies in Mathematics and Natural Sciences **2005 – 2011**

- Master's Degree (5 year programme) Jan 2011
  Physics (Theoretical Physics — Quantum Optics and Atomic Physics)
  thesis: Quantum codes immune to collective decoherence and photon loss,
  advisor: Konrad Banaszek, grade: 5/5
- Bachelor's Degree, Mathematics Sept 2009
  thesis: A mathematical model of the mafia game, advisor: Jacek Miekisz, grade: 5/5

High School No 5, Bielsko-Biała, Poland
Programme with extended mathematics, physics and computer science **2001 – 2005**
graduated with first-class honours degree

Research Experience

Interdisciplinary Centre for Mathematical and Computational Modelling, University of Warsaw, Warsaw, Poland
dr Dariusz Plewczyński Group, mathematical psychology **Nov 2010** –

- Cognitive computing: human information sharing models, models of human perception.

Institute of Theoretical Physics, University of Warsaw, Warsaw, Poland
prof. Konrad Banaszek Group, quantum optics (theoretical physics) , TEAM Programme operated by the Foundation for Polish Science **Jan – Sep 2010**

- Quantum-enhanced protocols in realistic environments: Generation schemes for robust entangled states.

ICFO - The Institute of Photonic Science,
Castelldefels (Barcelona), Spain
prof. Maciej Lewenstein Group, quantum optics (theoretical physics) **Oct 2009**

- Ultra-cold atomic gases in non-abelian gauge fields.

Faculty of Physics, Nicolaus Copernicus University, Toruń, Poland
prof. Konrad Banaszek Group, quantum optics (theoretical physics) **2007 – 2009**

- Analysis of spontaneous parametric down-conversion, estimation of the quantum noise.
- Averaging procedures for generating decoherence-free states.

Faculty of Physics, University of Warsaw, Warsaw, Poland
prof. Czesław Radzewicz Group, applied optics (experimental physics) **2006 – 2007**

- Wavefront sensor with Fresnel zone plates for use in an undergraduate laboratory.

Francis Bitter Magnet Laboratory, Massachusetts Institute of Technology,
Jagadeesh Moodera Group, spintronics (experimental physics) Cambridge (MA), USA
during the Research Science Institute 2005 scholarship **Jul — Aug 2005**

- Experimental work on organic tunnelling barriers.

Projects, Activities

Teaching, popularization and organizational work

- a moderator of Theoretical Physics - Stack Exchange Nov 2011–May 2012
- prepared and lead a month-length course *Introduction to quantum cryptography* for 2 talented high-school students for Jovenes y Ciencia programme by Caixa Catalunya Jun 2011
- co-organizer of the 6th and 7th Summer Scientific Schools 2010-2011
- co-organizer of Flaszki (a series of 5-min talks) 2010
- inter alia co-founder and president of the Physics Students' Society, Univ. of Warsaw 2006–
- member of the *Neurobiology Students' Scientific Society*, Univ. of Warsaw 2008–2011
- voluntary tutor of the Polish Children's Fund during 9 scientific workshops (for gifted high school individuals), the last one: Physics of Herd 2006–2011
- 9 talks on students' conferences (physics, mathematics, psychology) 2006–2010
- 5 scientific and didactic shows 2006–2010
- mentor of A. Kubica and W. Pilewski, winners (1st prize) of the 21st European Union Contest for Young Scientists in Paris 2009
- head organizer of the 7th Polish Physics Students' Societies Conference (7–10.11.2008, University of Warsaw, 80 participants from 15 universities, 36 talks) 2007–2009
- problem setter of the Polish Physics Olympiad 2006–2008

Courses and conferences — participant

- ECCS2011: European Conference of Complex Systems and two satellite events: Complex Dynamics of Human Interactions and PhD 'Research in Progress' Workshop 2011
- NetSci 2011: The International School and Conference on Network Science 2011
- Balaton Summer School in Physics: Self-organization and complex systems 2010
- Summer Course: Quantum Engineering, Advanced Level 2009
- Quantum Optics and Quantum Information 2008
- 7 scientific workshops organized by the Polish Children's Fund 2003–2005

Other

- co-founder of Confrenzy — a website listing scientific events Mar 2011–

Awards, Scholarships

- ICFO Innovation Fund grant awarded for Confrenzy Oct 2011
- Scholarship of the Minister of Science and Higher Education for exceptional achievements in science 2007–2010
- 2nd place in the Didactic Show Competition (Faculty of Physics, University of Warsaw) 2008
- Research Science Institute (Massachusetts Institute of Technology, Cambridge, MA, USA) 2005
- Scholarship of the Polish Children's Fund 2003–2005
- Scholarship of the Minister of Education, Science and Sport 2003–2005
- Bronze Medal in the International Physics Olympiad (Pohang, South Korea) 2004
- 2nd place in the 53rd Polish Physics Olympiad 2004
- 7th place in the 52nd Polish Physics Olympiad 2003

Publications

Papers

- J. Rodriguez-Laguna, P. Migdał, M. Ibanez Berganza, M. Lewenstein, G. Sierra, Qubism: self-similar visualization of many-body wavefunctions, New J. Phys. 14 053028 (2012), arXiv:1112.3560
- P. Migdał, M. Denkiewicz, J. Rączaszek-Leonardi, D. Plewczynski, Information-sharing and aggregation models for interacting minds, arXiv:1109.2044 (after a positive review from the Journal of Mathematical Psychology)
- P. Migdał, K. Banaszek, Immunity of information encoded in decoherence-free subspaces to particle loss, Phys. Rev. A 84, 052318 (2011), arXiv:1107.3786
- P. Migdał, A mathematical model of the Mafia game, arXiv:1009.1031
- P. Migdał, W. Wasilewski, Noise reduction in 3D noncollinear parametric amplifier, Appl. Phys. B 99, 657-671 (2010), arXiv:0908.2207
- K. Banaszek, R. Demkowicz-Dobrzański, M. Karpinski, P. Migdał, C. Radzewicz, Quantum and semiclassical polarization correlations, Opt. Comm. 283, 713-718 (2010), arXiv:0908.3548
- P. Migdał, P. Fita, C. Radzewicz, Ł. Mazurek, Wavefront sensor with Fresnel zone plates for use in an undergraduate laboratory, Am. J. Phys. 76, 229 (2008)
- T. S. Santos, J. S. Lee, P. Migdal, I. C. Lekshmi, B. Satpati, J. S. Moodera, Room-Temperature Tunnel Magnetoresistance and Spin-Polarized Tunneling through an Organic Semiconductor Barrier, Phys. Rev. Lett. 98, 016601 (2007)

Conference talks — presenting author

- P. Migdał, M. Denkiewicz, J. Rączaszek-Leonardi, D. Plewczynski, *Two and more heads deciding: models of information-sharing and aggregation for two-choice discriminative tasks*, Complex Dynamics of Human Interactions (a ECCS2011 satellite) (12-16.09.2011, Vienna, Austria)

Conference posters — presenting author

- A. Kubica, P. Migdał, The spatial shape of the Spiral Zone Plate foci, International Conference on Optical Angular Momentum (23–25.03.2010, York, UK)
- P. Migdał, W. Wasilewski, *Optimization of a 3D noncollinear parametric amplifier*, Quantum Optics VII - Quantum Engineering of Atoms and Photons (8–12.06.2009, Zakopane, Poland)

Popular science and education-related articles (all in Polish)

- P. Migdał, S. Krawczyk, Zespół Aspergera, nauki ścisłe i kultura nerdów (Asperger Syndrome, Hard Science and Nerd Culture), V Krakowska Konferencja Kognitywistyczna (2011), a popular science article
- P. Migdał, Szczypta magii w każdym promyku – o polaryzacji światła (A bit of magic in every ray - on the polarization of light), III Sylwestrowe Warsztaty Naukowe, 65-67 (2010), a popular science article
- M. Kotowski, M. Kotowski, P. Migdał, K. Sołtys, Drogowskaz Pasjonata, czyli jak rozwijać się w szkole i w trakcie studiów (Guidelines for the Curious - how to develop oneself during high school and university years), (2010), a collection of advice
- P. Migdał, Mafia, zdradziecka parzystość oraz pi (Mafia, treacherous parity and pi), Delta - miesięcznik popularnonaukowy, 14-15, 07/2010 (2010), a short popular science article
- P. Migdał, Zapaleńcy i Wypaleńcy, czyli rzecz o utracie pasji w trakcie studiów (Flames of passion... and of burnout, or: about the loss of motivation during studies), (2010), an essay
- eds: M. Zientkiewicz, P. Migdał, M. Nowaczyk, M. Pomorski, B. Szczygieł, 7th Polish Physics Students' Societies Conference - proceedings, ISBN: 978-83-61026-05-1, (2009), a book (132 pages, 10 reviewed papers)

Skills

- Languages: Polish (native), English (fluent)
- Science-related computer languages: Mathematica, MATLAB, LabView, LaTeX, Python
- Systems: Linux (user), Windows (user), Mac OS X (user)

Hobbies

photography, hiking, cognitive science