

Mateusz Chwastyk

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Education

- International Post-Graduate Studies, Polish Academy of Sciences, 2011 – present
Institute of Physics, Warsaw, Poland
Expected Ph.D. defence: August 2016
- M.Sc. in Physics, Nicolaus Copernicus University, 2009 – 2011
Faculty of Physics, Astronomy and Applied Informatics, Toruń, Poland
Dissertation: *Screening of the Coulomb interaction in semiconductor quantum dots*
- B.Sc. in Physics, Nicolaus Copernicus University, 2006 – 2009
Faculty of Physics, Astronomy and Applied Informatics, Toruń, Poland
Dissertation: *Quantum dots – zero-dimensional semiconductor structures*

List of publications

1. **M. Chwastyk**, P. Rózański, M. Zieliński, Atomistic Calculation of Coulomb Interactions in Semiconductor Nanocrystals: Role of Surface Passivation and Composition Details, *Acta Phys. Pol. A* 122, 312 – 314 (2012)
2. **M. Chwastyk**, A. Galera-Prat, M. Sikora, À. Gómez-Sicilia, M. Carrión-Vázquez and M. Cieplak, Theoretical tests of the mechanical protection strategy in protein nanomechanics, *Proteins: Struct., Funct., Bioinf.* 82, 717–726 (2014)
3. **M. Chwastyk**, M. Jaskólski, M. Cieplak, Structure-based analysis of thermodynamic and mechanical properties of cavity-containing proteins-case study of plant pathogenesis-related proteins of class 10, *FEBS J.* 281, 416-429 (2014)
4. **M. Chwastyk** and M. Cieplak, Knotted Proteins under Tension, *Israel J. Chem.* 54 1241–1249 (2014)
5. B. Sikora, K. Fronc, I. Kamińska, K. Koper, **M. Chwastyk**, P. Stępień, W. Paszkowicz, T. Wojciechowski, K. Sobczaka and D. Elbaum, Fluorescence resonance energy transfer between ZnO/MgO/carboxymethyl- β -cyclodextrin and Nile Red in HeLa cells – biosensing applications, *RSC Advances* (2014)
6. I. Kamińska, K. Fronc, B. Sikora, K. Koper, R. Minikayev, W. Paszkowicz, K. Sobczak, T. Wojciechowski, **M. Chwastyk**, A. Reszka, B. J. Kowalski, P. Stępień, D. Elbaum, Synthesis of ZnAl₂O₄:(Er³⁺,Yb³⁺) spinel type nanocrystalline upconverting luminescent marker in HeLa carcinoma cells, using a combustion aerosol method route, *RSC Adv.* 4, 56596-56604 (2014)
7. **M. Chwastyk** and M. Cieplak, Cotranslational folding of deeply knotted proteins, *J. Phys.: Condens. Matter - special issue: Knots* 27, 354105 (2015)
8. **M. Chwastyk**, A. Poma and M. Cieplak, Statistical radii associated with amino acids to determine the contact map: fixing the structure of a type I cohesin domain in the *Clostridium thermocellum* cellulosome, *Phys Biol.* 12, 046002 (2015)
9. A. Poma, **M. Chwastyk** and M. Cieplak, Polysaccharide-protein complexes in a coarse-grained model, *J. Phys. Chem. B* 119, 12028-12041 (2015)

10. **M. Chwastyk** and M. Cieplak, Multiple folding pathways of proteins with shallow knots and co-translational folding, *J. Chem. Phys.* 143, 045101 (2015)
11. A. B. Poma, **M. Chwastyk**, and M. Cieplak, Coarse-grained model of the native cellulose Ia and the transformation pathways to the I β allomorph, *Cellulose* (in press)
12. **M. Chwastyk**, D. Thompson, and M. Cieplak, Towards designer cohesins – single-site mutations exert a powerful non-local influence on the protein structure and stability (manuscript)
13. **M. Chwastyk**, M. Jaskólski, and M. Cieplak, Volume of cavities in proteins and virus capsids (submitted to *Proteins: Structure, Function, and Bioinformatics* – under review)

Schools, Conferences and Seminars

- 2003 – Workshop on astronomy, Centre for Astronomy at the Nicolaus Copernicus University, Piwnice, Poland
- 2004 – First Young Polish Mathematicians Conference, September 17-19, 2004, Warsaw, Poland
- 2004 – Workshop on number theory, Faculty of Mathematics, Informatics and Mechanics of Warsaw University, Warsaw, Poland
- 2004 – Workshop on astronomy, Astronomical observatory of Warsaw University, Ostrowik, Poland
- 2004 – Workshop on astronomy, Centre for Astronomy at the Nicolaus Copernicus University, Piwnice, Poland
- 2011 – 40th *Jaszowiec* International School & Conference on the Physics of Semiconductors, June 25th – July 1st, 2011, Krynica-Zdrój, Poland
– **poster** *Atomistic Calculation of Screened Coulomb Interactions in Semiconductor Nanostructures*
- 2011 – WELCOME Scientific Meeting On Hybrid Nanostructures, August 28-31, 2011, Toruń, Poland
– **poster** *Atomistic Calculation of Screened Coulomb Interactions in Semiconductor Nanostructures*
- 2011 – Biomolecules and Nanostructures – Będlewo, September 4 – 8, 2011, Będlewo, Poland
– **poster** *Atomistic Calculation of Screened Coulomb Interactions in Semiconductor Nanostructures*
- 2012 – Workshop on Physical Virology – International Centre for Theoretical Physics, September 24-28, 2012, Trieste, Italy
- 2013 – Biomolecules and Nanostructures 4, May 15-19, 2013, Pułtusk, Poland
– **poster** *Theoretical tests of the mechanical protection strategy in protein nanomechanics.*
- 2013 – E-MRS Fall Meeting 2013, September 16-20, 2013, Warszawa, Poland
– **poster** *Theoretical tests of the mechanical protection strategy in protein nanomechanics.*
- 2014 – The Seminar on Biological Physics and Bioinformatics at the Institute of Physics and the Institute of Biochemistry and Biophysics with P. Zielenkiewicz (Institute of Biochemistry and Biophysics) and B. Lesyng (Warsaw University), May 7th, 2014, Warszawa, Poland
– **oral presentation** *Proteins with cavities and proteins with knots.*
- 2014 – VI Doctoral Symposium IF PAN, May 16-17, 2014, Małdralin, Poland
– **oral presentation** *Proteins with cavities and proteins with knots.*
- 2014 – NanoFun Conference, March 28th, 2014, Warszawa, Poland
– **poster** *Theoretical tests of the mechanical protection strategy in protein nanomechanics.*

- 2014 – Significance of Knotted Structures for Function of Proteins and Nucleic Acids, September 17-21, 2014, Warszawa, Poland
– **poster** *PR10 - Proteins with cavities.*
- 2014 – CellulosomePlus Kick-Off meeting, January 16th, 2014, Madrid, Spain
- 2015 – Repetitive, Non-Globular Proteins: Nature to Nanotechnology, March 30th – April 1st, 2015, York, England
– **oral presentation** *Pathways of folding of knotted proteins and the effects of co-translation.*
- 2015 – Biomolecules and Nanostructures 5, May 13-17, 2015, Jaroszwice, Poland
– **oral presentation** *Pathways of folding of knotted proteins and the effects of co- translation.*
- 2015 – VII Doctoral Symposium IF PAN, May 25-27, 2015, Mađralin, Poland
- 2015 – The “Rice Masterclass” given by Professor Stuart Rice, The Royal Irish Academy, July 9th, 2015, Dublin, Ireland
- 2015 – Challenges In Molecular Biology, Biophysics, and Biomedicine, September 17-19, 2015, Warszawa, Poland
– **poster** *Pathways of folding of knotted proteins and the effects of co-translation.*
- 2015 – 1st Rolling Conference, December 17th, 2015, Warszawa, Poland
– **oral presentation** *Coarse-grained models for proteins: on-ribosome proteins folding*
- 2016 – Condensed Matter Physics Seminar at the Institute of Physics Polish Academy of Sciences, March 8th, 2016, Warszawa, Poland
– **oral presentation** *Proteins with knots.*
- 2016 – Skype Seminar at Institute for Computational Science and Technology HCM City, March 18th, 2016, Warszawa, Poland
– **oral presentation** *Proteins with knots.*

Research Scholarships

- July 29th – September 6th, 2013 – Tyndall National Institute at UCC, Cork, Ireland
- June 8th – August 17th, 2014 – University of Limerick, Limerick, Ireland
- June 8th – August 16th, 2015 – University of Limerick, Limerick, Ireland

Grants

- October 1st, 2010 – September 31st, 2011 – investigator in grant of Foundation for Polish Science *Control of exciton levels in quantum dots: atomistic theory as a step towards entangled photon pairs generation*, grant director: Dr. Michał Zieliński from Department of Quantum Physics, Institute of Physics NCU Toruń, Poland
- November 1st, 2013 – October 31st, 2017 – investigator in European grant FP7-NMP *Boosting Lignocellulose Biomass Deconstruction with Designer Cellulosomes for Industrial Applications*, grant director: Prof. Marek Cieplak from Institute of Physics, Polish Academy of Sciences, Warsaw, Poland

Software development

- Author and administrator of the SPACEBALL server (<http://www.ifpan.edu.pl/~chwastyk/spaceball>)

Competitions & Awards

- Polish Olympiad in Mathematics: 2005, 2006 – regional finals
- Polish Olympiad in Physics: 2006 – regional finals
- XV and XVI International French Championship of the Mathematical and Logical Games: national semi-final

Developing interests

- Interdisciplinary Scientific Camp in Świder, Poland 2004
- Japanese Language and Culture Course, 2007
- Japanese Language Course, 2007
- Stipend and member of the research group under the Homing Plus project 2010 – 2011 at Department of Quantum Physics, Institute of Physics NCU Toruń, Poland

Skills

- Polish native speaker
- Advanced in English
- Basic in German and Japanese
- Programming languages: C, C++, Fortran, PHP, HTML, AWK, Python, OpenMP
- Operating systems: Windows 95/98/XP/Vista/7, Linux
- Software for quantum chemistry: GAMES, Gaussian, MOLDEN
- Software for molecular dynamics: GROMACS, PyMOL, VMD, NAMD

Interests

- Quantum physics: mechanics, simulations, numerical methods, quantum field theory
- Nanotechnology: Applied nanotechnology for diagnose, treat, and prevent cancer
- Quantum informatics, cryptography, biophysics, biotechnology
- Neuroscience, brain networks
- Algorithms and programming languages
- Amateur astronomy observations, marathons & running races

May 6, 2016