

CURRICULUM VITAE

Alexandre V. Morozov

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CITIZENSHIP

Russian (H1B visa status)

LANGUAGES

Russian (native), English (native-like),
French (basic)

COMPUTER SKILLS

C/C++, Perl, Fortran 77, R/S-PLUS, Math-
ematica, Matlab, parallel computing with
Linux clusters

EDUCATION

Ph.D. in Physics

University of Washington, Seattle, USA,
February 2003 [**Biological Physics**]

Advisor: Prof. Baker D.

M.Sc. in Physics

University of Washington, Seattle, USA,
1997

Honors Diploma in Physics (equivalent to M.Sc.)

Rostov State University, Rostov-on-Don,

Russia, 1995 [**Condensed Matter Theory**]

Advisors: Prof. Vedrinskii R.V., Prof. Kraizman V.L.

EXPERIENCE

September 2007 - present

Assistant Professor,

Department of Physics & Astronomy and the
BioMaPS Institute for Quantitative Biology,
Rutgers University, Piscataway, New Jersey,
USA

Research Area: *Biological Physics and
Bioinformatics*

September 2007 - August 2008

Visiting Professor,

Center for Studies in Physics and Biology,
The Rockefeller University, New York, USA

Research Area: *Biological Physics and
Bioinformatics*

September 2003 - August 2007

Postdoctoral Fellow/Associate,

Center for Studies in Physics and Biology,
The Rockefeller University, New York, USA,
Laboratory of Prof. Eric Siggia

Research Area: *Computational Structural Biology and Bioinformatics*

“Development of computational methods to study chromatin structure, predict transcription factor binding specificities, and model evolution of transcriptional regulation in eukaryotes”

March 2003 - August 2003

Postdoctoral Fellow,

Howard Hughes Medical Institute, University of Washington, Seattle, USA, Laboratory of Prof. David Baker

Research Area: *Computational and Theoretical Biophysics*

”Analysis and improvement of empirical potential functions for macromolecular simulations using quantum mechanical methods”

1999 - February 2003

Predocctoral Research Assistant,

Howard Hughes Medical Institute, University of Washington, Seattle, USA, Laboratory of Prof. David Baker

Research Area: *Computational and Theoretical Biophysics*

Thesis: “Free energy functions in protein stability and folding kinetics”

Date: February 2003

1996 - 1999

Graduate Teaching Assistant,

Department of Physics, University of Washington, Seattle, USA

1993 - 1995

Diploma (M.Sc.) Thesis Research,

Theoretical Physics Department, Rostov State University, Rostov-on-Don, Russia, Laboratory of Prof. Vedrinskii R.V.

Research Area: *Condensed Matter Theory*

Thesis: “ $M_{4,5}$ absorption spectra in cubic and tetragonal phases of crystalline $KNbO_3$ ”

Date: July 1995

GRANTS & FELLOWSHIPS

- Pending R01 grant (HG004708-01A1) from the National Institutes of Health (NIH), 2008 - 2012, "Biophysical Models for Prediction and Design of Eukaryotic Chromatin Structure" (Principal Investigator).
- Leukemia and Lymphoma Society Fellowship, 2005-2008 (funded by the Lehman Brothers Foundation through The Leukemia and Lymphoma Society since July, 2006)
- IPAM Travel Fellowship, 2006
- New Focus Student Travel Grant, 2003
- PMMB Travel Scholarship, 2002
- J.Soros Undergraduate Student Stipend, 1994-1995

PATENTS

Russian Federation patent #2076440, registered 03.27.1997 in the State Patent Registry

PUBLICATIONS

Research Papers:

Biophysics and Computational Biology

1. **Morozov, A.V.**, Fortney, K., Gaykalova, D.A., Studitsky, V.M., Widom, J. & Siggia, E.D. (2008). Extrinsic and Intrinsic Nucleosome Positioning Signals, *submitted* (arXiv:0805.4017).
2. **Morozov, A.V.** & Siggia, E.D. (2007). Connecting protein structure with predictions of regulatory sites. Proc.Nat.Acad.Sci. 104, 7068–7073.
3. Foat, B.C., **Morozov, A.V.** & Bussemaker, H.J. (2006). Statistical mechanical modeling of genome-wide transcription factor occupancy data by MatrixREDUCE. Bioinformatics 22, e141–e149.
4. **Morozov, A.V.**, Tsemekhman, K. & Baker, D. (2006). Electron density redistribution accounts for half the cooperativity of α helix formation. J.Phys.Chem. B Lett. 110, 4503–4505.
5. **Morozov, A.V.**, Havranek, J.J., Baker, D. & Siggia, E.D. (2005). Protein-DNA binding specificity predictions with structural models. Nucl.Acids Res. 33, 5781–5798.
6. Misura, K., **Morozov, A.V.** & Baker, D. (2004). Analysis of anisotropic side-chain packing in proteins and application to high-resolution structure prediction. J.Mol.Biol. 342, 651–664.
7. **Morozov, A.V.**, Kortemme, T., Tsemekhman, K. & Baker, D. (2004). Close agreement between the orientation dependence of hydrogen bonds observed in protein structures and quantum mechanical calculations. Proc.Nat.Acad.Sci., 101, 6946–6951.

8. **Morozov, A.V.**, Misura, K., Tsemekhman, K. & Baker, D. (2004). Comparison of quantum mechanics and molecular mechanics dimerization energy landscapes for pairs of ring-containing amino acids in proteins. J.Phys.Chem. B, 108, 8489–8496.
9. Tsai, J., Bonneau, R., **Morozov, A.V.**, Kuhlman, B., Rohl, C.A. & Baker, D. (2003). An improved protein decoy set for testing energy functions for protein structure prediction. Proteins: Str.,Func.,Gen., 53, 76–87.
10. Gray, J.J., Moughon, S., Kortemme, T., Schueler-Furman, O., Misura, K., **Morozov, A.V.** & Baker, D. (2003). Protein-protein docking predictions for the CAPRI experiment. Proteins: Str.,Func.,Gen., 52, 118–122.
11. **Morozov, A.V.**, Kortemme, T. & Baker, D. (2003). Evaluation of models of electrostatic interactions in proteins. J.Phys.Chem. B 107, 2075–2090.
12. Kortemme, T., **Morozov, A.V.** & Baker, D. (2003). An orientation-dependent hydrogen bonding potential improves prediction of specificity and structure for proteins and protein-protein complexes. J.Mol.Biol. 326, 1239–1259.
13. Alm, E., **Morozov, A.V.**,¹ Kortemme, T. & Baker, D. (2002). Simple physical models connect theory and experiment in protein folding kinetics. J.Mol.Biol. 322, 463–476.

Physics

14. **Morozov, A.V.** & Uscinski, B.J. (2005). A hierarchy of approximate solutions for the fourth moment of waves in random media. *to be submitted*.
15. **Morozov, A.V.** (2002). Two-frequency mutual coherence function of electromagnetic waves in random media: a path-integral variational solution. J.Opt.Soc.Am. A 19, 2074–2084.
16. Vedrinskii, R.V., Taranukhina, A.I., Bugaev, L.A., Kraizman, V.L., **Morozov, A.V.**, Wendland, C., Hasselkaml, D., Scharmann, A. (1996). Bond length determination for transition atoms by shallow level EELFS. Surface Science, 352-354, 32–35.

Review Papers:

17. **Morozov, A.V.** & Kortemme, T. (2005). Potential functions for hydrogen bonds in protein structure prediction and design. Adv.Prot.Chem. 72, 1–38.

Theses:

- Free energy functions in protein structural stability and folding kinetics.
Ph.D. Thesis, University of Washington, Seattle, USA.
- $M_{4,5}$ absorption spectra in cubic and tetragonal phases of crystalline $KNbO_3$.
Diploma Thesis, Rostov State University, Rostov-on-Don, Russia.

Conference Presentations:

1. The 6th annual BioMaPS Summer School on "Chromatin Structure and Gene Regulation", 2008 (invited talk)

¹EA & AVM contributed equally to this work

2. Annual APS March Meeting, 2008 (invited talk)
3. IPAM SEWS4 workshop: Search and Knowledge Building for Biological Datasets, 2007 (invited talk)
4. 39th Symposium on the Interface: Computing Science and Statistics (Systems Biology), 2007 (invited talk)
5. New York Academy of Sciences session on "Biophysical models of gene regulation", 2007 (invited talk)
6. CSHL Meeting on Systems Biology: Global Regulation of Gene Expression, 2007 (poster)
7. 14th Annual International conference on Intelligent Systems for Molecular Biology (ISMB 2006) (reviewed paper, published in Bioinformatics (2006) 22, e141-e149)
8. CSHL Meeting on Systems Biology: Global Regulation of Gene Expression, 2006 (poster)
9. CSHL Meeting on Systems Biology: Global Regulation of Gene Expression, 2005 (talk)
10. 15th Meeting of Methods in Protein Structure Analysis, 2004 (poster)
11. 87th OSA Annual Meeting & Laser Science XIX, 2003 (talk)
12. 7th Johns Hopkins Folding Meeting, 2003 (poster)
13. Annual APS March Meeting, 2003 (poster)
14. PMMB Mathematics and Molecular Biology VII, 2002 (poster)
15. 15th European Conference on Surface Science, 1995 (poster)

Invited Seminars:

1. Princeton University, Princeton, NJ (U.S.A.), PICASso "Successes of Computational Science" seminar, December 2007
2. Northwestern University, Evanston, IL (U.S.A.), BMBCB seminar, October 2007
3. MIT Department of Mathematics & Theory of Computation Group at CSAIL: Bioinformatics Seminar, April 2007
4. Engelhardt Institute of Molecular Biology RAS (Russian Academy of Sciences), Moscow (Russia), June 2006
5. Institute of Protein Research RAS (Russian Academy of Sciences), Pushchino (Moscow region, Russia), June 2006
6. Brown University, Providence, RI (U.S.A.), CCMB, 2005
7. University of California, San Francisco, CA (U.S.A.), Department of Biopharmaceutical Sciences, 2005
8. Cornell University, Ithaca, NY (U.S.A.), Department of Chemistry, 2004
9. Rutgers University, Piscataway, NJ (U.S.A.), Department of Chemistry, 2004
10. University of Milano-Bicocca, Milan (Italy), Graduate School of Chemistry, 2003

Invited Lectures:

1. University of California, San Francisco, 2005. "Density Functional Theory with Applications in Chemistry and Biology".

Organizer:

1. The 6th annual BioMaPS Summer School on "Chromatin Structure and Gene Regulation", 2008

Reviewer for:

Physical Review Letters, Physical Review B, Physical Review E,
Bioinformatics, Nucleic Acids Research, Genome Biology,
Biopolymers, Journal of Physical Chemistry,
Proteins: Structure, Function and Bioinformatics,
Journal of Bioinformatics and Computational Biology,
International Journal of Biological Macromolecules,
Journal of Computer-Aided Molecular Design, Biochemistry,
BMC Structural Biology, Journal of Molecular Biology,
Journal of Molecular Graphics and Modelling.