

June 13, 2011

Department of Pathology
Department of Applied Mathematics
University of Washington
Seattle, WA, 98195

Dear Dr. Kristin Swanson,

As a scientist with multidisciplinary experience in Physics, Mathematics, Biophysics and Computational Biology, I am writing to offer my accomplishments and qualifications for the postdoctoral fellow or research scientist position. I would like to work on the human health related project and the modeling of brain tumor growth and response to therapy is very exciting and motivating.

I received PhD in biophysics from International Max-Planck Institute (associated with Potsdam University, Germany), where I did research in the group of Prof. Reinhard Lipowsky. At the present time I'm working as a postdoctoral fellow at the University of Connecticut Health Center (laboratory of Prof. Leslie Loew, Department of Cell Biology, Center of Cell Analysis and Modeling). Being a PhD student and postdoctoral fellow, I have integrated into a highly interdisciplinary and collaborative environment, where biologists, medical scientists, and physicists successfully combine experimental and modeling approaches to address such scientific issues as cell signaling, cell motility, cell division, cell-cell interactions, tissue pattern formation, and morphogenesis. The multidisciplinary nature of my work requires fundamental background in applied mathematics, physics, and biology and strong computational skills. I have made essential contribution to the development of "Virtual Cell" and "Virtual FRAP" modeling and analysis software. The success of this modeling software is corroborated by users, in particular cell biologists and medical scientists and by the fact that the number of users grows exponentially.

To put into practice the results of my theoretical work I have been engaged in a successful collaboration with experimental groups and I have performed my own experiments.

I am interested in this position and believe that my scientific expertise will benefit the strengths of your program.

Please find enclosed my CV, and a list of my references.

Thank you for your consideration.

Sincerely,



Pavel Kraikivski, Ph.D.

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Richard D. Berlin Center for Cell Analysis and Modeling,
Department of Cell Biology,
University of Connecticut Health Center, 263 Farmington Ave, Farmington, Connecticut 06030-
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RESEARCH EXPERIENCE

- 2006 – present **Postdoctoral fellow.** Cytoskeletal Filaments, Intracellular transport, Actin bundling, Kinetics of actin dendritic nucleation, Biological pathway quantification, Cell motility, Diffusion in crowded cytoplasm, Contribution to Virtual Cell development. *Center for Cell Analysis and Modeling, Department of Cell Biology, University of Connecticut Health Center (Prof. L.M. Loew laboratory, Prof. B.M. Slepchenko, and Prof. V. Rodionov).*
- 2002 – 2006 **Ph.D candidate.** Semiflexible polymers adsorbed on structured substrates. Collective filament dynamics in motility assays for motor proteins. Short- and long-working-distance optical trappings. *Max-Planck Institute for Colloids and Interfaces, Germany (Prof. R. Lipowsky, Prof. Jan Kierfeld and Dr. R. Dimova)*
- 1999 – 2002 **Research technician.** Electrospray ionization mass spectrometry, Optical emission spectroscopy. *Institute for Analytical Instrumentation Russian Academy of Science, Russia (Prof. L.N. Gall laboratory)*
- 1997 – 2002 **Research technician.** Glassy chalcogenide semiconductors, Electron paramagnetic resonance spectroscopy. *Ioffe Physical-Technical Institute of the Russian Academy of Sciences, and St.-Petersburg State Technical University, Russia (Prof. K. D. Tsendin and Prof. K.F. Shtel'makh laboratories)*

EDUCATION

- 2002 - 2005 **Ph.D. Physics**, summa cum laude, Potsdam University and Max-Planck Institute for Colloids and Interfaces, Department of Theory and Bio-systems, Potsdam, Germany
Dissertation: “*Non-equilibrium dynamics of adsorbed polymers and filaments*”.
Advisors: Prof. Reinhard Lipowsky, and Prof. Jan Kierfeld
- 2000 - 2002 **M.Sc. Physics**, summa cum laude, St.-Petersburg State Technical University, Russia
Thesis: “*Negative $-U$ centers and two-well potentials in glassy chalcogenide semiconductors*”
Advisor: Prof. K. D. Tsendin
- 1996 - 2000 **B.Sc. Physics**, summa cum laude, St.-Petersburg State Technical University, Russia
Thesis: “*Bifurcation parameter values in simple theory of two-well potentials*”
Advisor: Prof. K. D. Tsendin

PROFESSIONAL ASSOCIATIONS AND ACTIVITIES

Reviewer: Biophysical journal, Physical Biology, IET System Biology

Grant writing experience: involved in writing grants, System Biology and R01 NIH grants.

Biophysical Society, member 2005-present

American Society for Cell Biology, member 2006-present

TEACHING

2010	Teaching assistant, Virtual Cell Summer Course, UCONN External expert for Cell Biology Course journal club, UCONN
2009	Teaching assistant, Virtual Cell Summer Course, UCONN
2008	Teaching assistant, Computational Cell Biology Course, Cold Spring Harbor Laboratory.
	Teaching assistant, Virtual Cell Summer Course, UCONN
2007	Teaching assistant, Virtual Cell Summer Course, UCONN

PUBLICATIONS

1. **Kraikivski P.**, R. Lipowsky, and J. Kierfeld. Filament Crossing and Ordering in Gliding Assays for Motor Proteins. *In submission to Biophys. J.*
2. Lomakin A. J.* , **P. Kraikivski***, I. Semenova, I. Zaliapin, E. Nadezhdina, B. M. Slepchenko, A. Akhmanova, and V. Rodionov. CLIP-170-dependent capture of membrane organelles by microtubules increases the rate of minus-end directed transport. (*co-first author), *submitted in Molecular Biol. Cell.*
3. Novak I. L., F. Gao, **P. Kraikivski**, and B. M. Slepchenko. 2011. Diffusion amid random overlapping obstacles: Similarities, invariants, approximations. *J. Chem. Phys.* 134, 154104.
4. **Kraikivski P.**, and B. M. Slepchenko. 2010. Quantifying a pathway: Kinetic analysis of actin dendritic nucleation. *Biophys. J.* 99(3) 708-715 (**Featured Article**).
5. Lomakin A. J., I. Semenova, I. Zaliapin, **P. Kraikivski**, E. Nadezhdina, B. M. Slepchenko, A. Akhmanova, and V. Rodionov. 2009. CLIP-170-Dependent Capture of Membrane Organelles by Microtubules Initiates Minus-End Directed Transport. *Dev. Cell* 17: 323–333.
6. Novak I. L., **P. Kraikivski**, and B. M. Slepchenko. 2009. Diffusion in Cytoplasm: Effects of Excluded Volume Due to Internal Membranes and Cytoskeletal Structures. *Biophys. J.* 97:758-767.
7. **Kraikivski P.**, B. M. Slepchenko, and I. L. Novak. 2008. Actin Bundling: Initiation Mechanisms and Kinetics. *Phys. Rev. Lett.* 101:128102(4).
8. Kierfeld J., K. Frenzel, **P. Kraikivski**, and R. Lipowsky. 2008. Active dynamics of filaments in motility assays. *Eur. Phys. J. Special Topics* 157:123-133.

9. **Kraikivski P.**, B. Pouligny, R. Dimova. 2006. Implementing both short- and long-working-distance optical trappings into a commercial microscope. *Rev. Sci. Instrum.* 77:113703(10).
10. Kierfeld J., **P. Kraikivski**, and R. Lipowsky. 2006. Filament Ordering and Clustering by Molecular Motors in Motility Assays. *Biophys. Rev. Lett.* 1:363-374.
11. Kierfeld J., P. Gutjahr, T. Kühne, **P. Kraikivski**, and R. Lipowsky. 2006. Buckling, Bundling, and Pattern Formation: From Semi-Flexible Polymers to Assemblies of Interacting Filaments. *J. Comput. Theor. Nanosci.* 3:898-911.
12. **Kraikivski P.**, R. Lipowsky and J. Kierfeld 2006. Enhanced Ordering of Interacting Filaments by Molecular Motors. *Phys. Rev. Lett.* 96:258103(4).
13. **Kraikivski P.**, R. Lipowsky and J. Kierfeld 2005. Point force manipulation and activated dynamics of polymers adsorbed on structured substrates. *Europhys. Lett.* 71:138-144.
14. **Kraikivski P.**, R. Lipowsky and J. Kierfeld 2005. Activated dynamics of semiflexible polymers on structured substrates. *Eur. Phys. J. E.* 16:319-340.
15. **Kraikivski P.**, L.N. Gall. 2004. Optical tweezers: applications in biophysics. *Nauch. Priborostroenie (Scientific Instrumentation)* 14(1): 10-17.
16. **Kraikivski P.**, L.N. Gall. 2004. Measuring forces and velocities of motor proteins by a trapped microtubule. *Nauch. Priborostroenie (Scientific Instrumentation)* 14(3): 48-56.
17. **Kraikivski P.**, R. Lipowsky and J. Kierfeld 2004. Barrier crossing of semiflexible polymers. *Europhys. Lett.* 66:763-769.

BOOK CONTRIBUTION

18. Kierfeld J., **P. Kraikivski**, T. Kühne, and R. Lipowsky. Cooperative Behaviour of Semiflexible Polymers and Filaments in *Traffic and Granular Flow '05*, edited by A. Schadschneider, T. Pöschel, R. Kühne, M. Schreckenberg, D.E. Wolf, pages 239-249 (Springer, Berlin, 2007).

PUBLISHED CONFERENCE PROCEEDINGS

1. **Kraikivski P.** and B. M. Slepchenko. 2010. Kinetic Analysis of Actin Dendritic Nucleation from a Physicist's Standpoint. *Biophys. J.* 98(3) pp. 556A.
2. **Kraikivski P.**, Novak I., Slepchenko B.M. 2007. A model of protruding lamellipodia: stability of the shape and filopodial extensions. *Biophys. J.* pp. 482A.
3. **Kraikivski P.**, Lipowsky R., Kierfeld J. 2007. Active filament ordering in motility assays for motor proteins. *Biophys. J.* pp. 483A.
4. Novak I. L., **Kraikivski P.**, Slepchenko B. M. 2007. Effects of crowding on intracellular diffusion. *Biophys. J.* pp. 564A.
5. **Kraikivski P.**, Kierfeld J., Lipowsky R. 2005. Simulation of collective filament dynamics in motility assays for motor proteins. *Biophys. J.* 88(1) pp. 502A.

TALKS

- 2010 12th Annual Greater Boston Area Statistical Mechanics Meeting, MA
- 2009 11th Annual Greater Boston Area Statistical Mechanics Meeting, MA
- 2006 Dynamics on Complex Networks and Applications, MPIPKS Dresden, Germany
- 2005 Deutsche Physikalische Gesellschaft, Berlin, Germany
- 2004 Deutsche Physikalische Gesellschaft, Regensburg, Germany

SEMINARS

- Informal Condensed Matter Seminars, MIT, MA
- Squishy Physics Seminars, Harvard University, MA
- Condensed Matter Seminars, Brown University, RI
- System Biology Seminars, Einstein Medical School, Bronx, NY
- Physics Seminars, University of Southern California, CA
- Condensed Matter Physics Seminars, Syracuse University, NY
- Physics Seminars, Houston University, TX

POSTERS

- 2010 Biophysical Society 54th Annual Meeting
- 2009 American Society for Cell Biology 49th Annual Meeting
Cell Migration Consortium Annual Meeting
- 2008 American Society for Cell Biology 48th Annual Meeting
Frontiers in Cell Migration from Mechanism to Disease, NIH, Bethesda, MD
Computational Cell Biology, Cold Spring Harbor Laboratory
- 2007 Biophysical Society 51st Annual Meeting
Cell Migration Consortium Annual Meeting
American Society for Cell Biology 47th Annual Meeting
Computational Cell Biology, Cold Spring Harbor Laboratory
- 2006 American Society for Cell Biology 46th Annual Meeting
- 2005 Biophysical Society 49th Annual Meeting

COMPUTER SKILLS

- Linux, Windows
- C++, FORTRAN, Pascal, Java
- VCell, BioNetGen, CompuCell3D, GENESIS, NFSim, Kappa, Image J, MetaMorph
- AutoCAD, LabView
- Mathematica, MATLAB
- Microsoft Office, LaTeX
- Parallel programming - MPI
- Open Science Grid
- Partial Differential Equations, Monte-Carlo, Molecular dynamics, Langevin dynamics
- computer simulation experience*: reaction – diffusion systems, systems of many interacting particles, polymers, neuronal networks

LANGUAGES

- Russian – fluent
- English – fluent
- German – intermediate
- Japanese – basic

REFERENCES

Dr. Leslie M. Loew

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Professor of Computer Science and Engineering, Director, R. D. Berlin Center for Cell Analysis and Modeling
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