

Mikhail K. Levin

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EDUCATION *Ph.D.*, Biochemistry, The Ohio State University, Columbus, OH 1999-2002
Thesis: DNA Unwinding Mechanism of the Helicase from Hepatitis C Virus
M.S., Biochemistry, The Ohio State University, Columbus, OH 1994-1999
Engineer Technologist (M.S.), Biotechnology 1984-1992
Moscow Institute of Fine Chemical Technology, Moscow, Russia

EMPLOYMENT *Instructor* 2010-present
Division of Biomedical Informatics, Department of Clinical Sciences
UT Southwestern Medical Center, Dallas, TX

- developed C++ library for knowledge representation <http://owl-cpp.sourceforge.net/>
- developed HPC software for haplotype association mapping (HAM) http://www.assembla.com/spaces/mouse_ham
- developed methods for formal representation of pathway knowledge
- designed lectures on gene prediction and functional annotation
- developed software for multiple sclerosis diagnostics using next-generation sequencing data

Senior Research Associate 2008-2010
Department of Biostatistics & Bioinformatics
Duke University Medical Center, Durham, NC

- developed computational models of dendritic cell maturation
- developed software for quantitation of lymph node images

Postdoctoral Fellow 2003-2008
Center for Cell Analysis and Modeling
University of Connecticut Health Center, Farmington, CT

- developed software for model-based analysis of experimental data <http://gfit.sourceforge.net/>
- simulated spatial stochastics of reacting particles
- studied nuclear transport
- developed analysis methods for fluorescence correlation spectroscopy (FCS)
- modeled assembly of mRNA granules
- developed library for efficient simulation of mass-action kinetics

Pre-, Post- doctoral Fellow 1999-2003
Department of Biochemistry, Robert Wood Johnson Medical School
University of Medicine and Dentistry of New Jersey, Piscataway, NJ

- discovered novel helicase mechanism
- developed computational models of HCV helicase

Research Assistant 1995-1999
Department of Biochemistry, The Ohio State University, Columbus, OH

- discovered cooperative behavior of HCV helicase
- studied structure-function of helicase from bacteriophage T7

RESEARCH INTERESTS

Computational

- Ontologies and knowledge representation
- Modeling of biological processes
- Statistical genetics
- Fluorescence correlation spectroscopy (FCS)
- Image analysis

Biological

- Innate and adaptive immune response
- Nuclear transport system
- Nucleic acids: synthesis, unwinding, repair
- mRNA granules: assembly, transport, and targeting

PUBLICATIONS

1. NV Johnson, SH Ahn, H Deshmukh, **MK Levin**, CL Nelson, WK Scott, A Allen, VG Fowler, LG Cowell* (2012) Haplotype Association Mapping Identifies a Candidate Gene Region in Mice Infected with *Staphylococcus aureus*. *G3* (in press).
2. V Tatavarty, MF Ifrim, **MK Levin**, G Korza, E Barbarese, J Yu, JH Carson (2012) Single-molecule imaging of translational output from individual RNA granules in neurons. *Mol Biol Cell* 23:918–929.
3. **MK Levin**, A Ruttenberg, AM Masci, LG Cowell* (2011) *owl_cpp*, a C++ library for working with OWL ontologies, in *Proc. International Conference on Biomedical Ontology*.
4. AM Masci, **MK Levin**, A Ruttenberg, LG Cowell* (2011) Connecting ontologies for the representation of biological pathways, in *Proc. International Conference on Biomedical Ontology*.
5. M Pandey, **MK Levin**, SS Patel* (2010) Experimental and computational analysis of DNA unwinding and polymerization kinetics. *Methods Mol Biol* 587:57–83.
6. V Rajagopal, M Gurjar, **MK Levin***, SS Patel* (2010) The protease domain increases the translocation stepping efficiency of the hepatitis C virus NS3-4A helicase. *J Biol Chem* 285:17821–17832.
7. S Chen, **MK Levin**, M Sakato, Y Zhou, MM Hingorani* (2009) Mechanism of ATP-driven PCNA clamp loading by *S. cerevisiae* RFC. *J Mol Biol* 388:431–442.
8. **MK Levin***, MM Hingorani, RM Holmes, SS Patel, JH Carson (2009) Model-based global analysis of heterogeneous experimental data using *gfit*. *Methods Mol Biol* 500:335–359.
9. M Wieland, **MK Levin**, KS Hingorani, FN Biro, MM Hingorani* (2009) Mechanism of cadmium-mediated inhibition of Msh2-Msh6 function in DNA mismatch repair. *Biochemistry* 48:9492–9502.
10. JH Carson*, Y Gao, V Tatavarty, **MK Levin**, G Korza, VP Francone, LD Kosturko, MJ Maggipinto, E Barbarese (2008) Multiplexed RNA trafficking in oligodendrocytes and neurons. *Biochim Biophys Acta* 1779:453–8.
11. Y Gao, V Tatavarty, G Korza, **MK Levin**, JH Carson* (2008) Multiplexed dendritic targeting of α calcium calmodulin-dependent protein kinase II, neurogranin, and activity-regulated cytoskeleton-associated protein RNAs by the A2 pathway. *Mol Biol Cell* 19:2311–2327.
12. A Paradise, **MK Levin**, G Korza, JH Carson* (2007) Significant proportions of nuclear transport proteins with reduced intracellular mobilities resolved by fluorescence correlation spectroscopy. *J Mol Biol* 365:50–65.
13. **MK Levin**, M Gurjar, SS Patel* (2005) A Brownian motor mechanism of translocation and strand separation by hepatitis C virus helicase. *Nat Struct Mol Biol* 12:429–35.
14. NM Stano, YJ Jeong, I Donmez, P Tummalapalli, **MK Levin**, SS Patel* (2005) DNA synthesis provides the driving force to accelerate DNA unwinding by a helicase. *Nature* 435:370–373.
15. YJ Jeong, **MK Levin**, SS Patel* (2004) The DNA-unwinding mechanism of the ring helicase of bacteriophage T7. *Proc Natl Acad Sci USA* 101:7264–9.
16. **MK Levin**, YH Wang, SS Patel* (2004) The functional interaction of the hepatitis C virus helicase molecules is responsible for unwinding processivity. *J Biol Chem* 279:26005–12.
17. **MK Levin**, JH Carson* (2004) Fluorescence correlation spectroscopy and quantitative cell biology. *Differentiation* 72:1–10.
18. **MK Levin**, SS Patel* (2004) Helicases as Molecular Motors, ed M Schliwa (Wiley-VCH Verlag GmbH & Co. KGaA), pp 179–203.
19. **MK Levin**, MM Gurjar, SS Patel* (2003) ATP binding modulates the nucleic acid affinity of hepatitis C virus helicase. *J Biol Chem* 278:23311–16.
20. **MK Levin**, SS Patel* (2002) Helicase from hepatitis C virus, energetics of DNA binding. *J Biol Chem* 277:29377–85.
21. SS Patel*, RP Bandwar, **MK Levin** (2002) Transient-state kinetics and computational analysis of transcription initiation. in *Kinetic analysis of macromolecules a practical approach*, ed K Johnson (Oxford University Press).
22. NM Stano, **MK Levin**, SS Patel* (2002) The +2 NTP binding drives open complex formation in T7 RNA polymerase. *J Biol Chem* 277:37292–37300.
23. **MK Levin**, SS Patel* (1999) The helicase from hepatitis C virus is active as an oligomer. *J Biol Chem* 274:31839–46.

* corresponding author

RECENT PRESENTATIONS UT Southwestern Medical Center, Biomedical Informatics Retreat “Formal representation of quantitative knowledge in immunology” 2011

UT Southwestern Medical Center, Department of Clinical Sciences “Towards comprehensive representation of biological knowledge: combining conceptual and quantitative domains” 2010

Brookhaven National Laboratory, Biology Department “Validating computational models using global regression analysis” (invited talk) 2008

National Technology Centers for Networks and Pathways, All Hands Meeting, “*gfit*, software for global regression analysis of heterogeneous sets of experimental measurements” (poster) 2008

Biophysical Society 52nd Annual Meeting, “A universal approach for global fitting of experiments of different types to a computational model of a system” (poster) 2008

IBM T. J. Watson Research Center, “Integration of experimental data with computational models and statistical tools” (invited talk) 2007

GlaxoSmithKline, “*gfit*—environment for model-based global analysis of experimental data” (invited talk) 2007

Computational Cell Biology meeting, “*gfit*—An open environment for model-based global analysis of experimental data” (software demonstration) 2007

Biophysical Society 51st Annual Meeting, “Gfit—an Open Environment for Model-based Global Analysis of Experimental Data” (poster) 2007

University of Medicine and Dentistry of New Jersey, Department of Biochemistry, “Biological models and global analysis of experiments: utilizing your data to the full extent” (invited talk) 2006

6th International Weber Symposium on Innovative Fluorescence Methodologies in Biochemistry and Medicine, “Fluorescence correlation spectroscopy of nuclear transport proteins in live cells” (poster) 2005

Wesleyan University, Hughes Summer Program, “Studying single molecules in live cells by fluorescence correlation spectroscopy” (invited lecture) 2005

UCHC, CCAM, Advanced Techniques in Live Cell Microscopy course, “Fluorescence correlation spectroscopy: virtual and physical” (lecture) 2005

UCHC, MMSB Retreat, “Spatial Monte Carlo simulation: application to FCS” (poster) 2005

USA IMMIGRATION permanent resident (green card)

STATUS

REFERENCES available upon request