Kirill N. Shokhirev, Ph.D.

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SUMMARY

Research and Development Scientist excelling at solving multidisciplinary problems, with superb analytical and computational skills, recognized model-building expertise, and experience in industry and academia. Creative thinker successful at inventing, validating, and presenting ideas, implementing new algorithms and integrating them with existing code. Energetic, self-motivated quick-learner, able to work efficiently and productively on a variety of research and software engineering projects.

PROFESSIONAL EXPERIENCE

Physical Sciences Inc. Andover, MA   Present

Research and Development for government and industry

Consultant

- Created test platform for simulating vehicle motion and signal propagation in urban environments. Developed and tested data fusion algorithms for detection and localization of radiological sources
- Advanced data fusion optimization methods for Chemical-Biological sensor networks by utilizing information-theoretical analysis, algorithm development and numerical simulation

MAGMA DESIGN AUTOMATION, San Jose, CA   2006 -2008

Software development and research for integrated circuit design

Member of Technical Staff

- Invented and tested novel mathematical and computational approaches (coordinate transformation, SVD, Fourier analysis, optimization) to simulating optical and diffusion phenomena resulting in implementation of a new lithography model for optical proximity correction (OPC), and novel approaches to lithography-process checking (LPC).
- Developed calibration framework for testing model results against experimental data. Implemented original algorithms (C++ and MATLAB) and integrated new code with existing software.

UNIVERSITY OF CALIFORNIA, Berkeley, California   1997 – 2006

Graduate/Postdoctoral Researcher at Physics Department (1999 – 2006)

- Formulated and implemented novel quantitative approaches to studying the human nervous system by creating detailed dynamic models of neuronal response to visual images and interactions between brain cells.
- Created mathematical models of parameter distributions and response within realistic neuronal populations. Developed software in MATLAB, FORTRAN90 and C++ for large scale (~10^7) simulations.
- Evaluated the performance of model neuronal systems in representing and extracting information about visual objects using statistical estimation methods and Information Theory (linear estimator, ML, Fisher Information), resulting in several scientific publications.
- Contributed to several interdisciplinary research projects, discovered novel approaches to studying complex systems by developing rigorous models, and applying physical analogies and mathematical methods. Collaborated with faculty and staff members and mentored undergraduate researchers.

Graduate Student Instructor at Department of Molecular and Cell Biology (2002)

- Participated in teaching of an upper-division course on computational modeling of biological systems. Supervised the computer laboratory for the course. Developed new instructional materials and methods.

Graduate Student Researcher at Physics Department (1997 –1999)

- Participated in ultra-low experiments on superfluid He^3 . Developed computer software used in the analysis of experimental data. Created theoretical models of Josephson Effect.

EDUCATION

PhD, Physics, University of California, Berkeley, CA

Advisor: Donald A. Glaser

Thesis: Estimation of the orientation of short lines with a realistic population of cortical neurons

BS, Physics and Mathematics, University of Arizona, Tucson, AZ

SKILLS AND TECHNOLOGIES

- Model building and simulation, physics, mathematics, probability and statistics, data fusion, neuroscience, computational biology, scientific programming, numerical methods, algorithms, distributed computation, data analysis, image processing, numerical optimization
- MATLAB, C/C++, TCL, FORTRAN, MPI, CVS, Mathematica, LabView, MS Office, Java, Eclipse

- Linux workstation/cluster, Windows

PUBLICATIONS

Shokhirev K. N., Kumar T., & Glaser D. A. The influence of cortical feature maps on the encoding of the orientation of a short line. *Journal of Computational Neuroscience, 20(3):* 285-297, 2006

Shokhirev, K. N., Kumar, T., & Glaser, D. A. (2003). Estimation of the parameters of a visual stimulus from the responses of a realistic population of model visual neurons [Abstract]. *Journal of Vision*, *3*(12), 81a, http://journalofvision.org/3/12/81/, doi:10.1167/3.12.81.

Shokhirev K N, Glaser D A Interaction among cortical maps [Abstract] NEUROCOMPUTING 44: 993-1000 JUN 2000

Dharmasena G, Phillips TR, **Shokhirev KN**, Parker GA, Keil M Vibrationally and rotationally resolved angular distributions for $F+H_2$ -> $HF(v, j)$ + H reactive scattering. JOURNAL OF CHEMICAL PHYSICS 106(23): 9950-9953 JUN 15 1997

LANGUAGES

Russian

CITIZENSHIP

USA

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