CURRICULUM VITAE

Peter Husen
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Born: November 1, 1982

Family status: Live with my wife, Kamilla J. Husen, Research Librarian at the University Library of Southern Denmark, and her two children, Anna, born October 1, 2001 and Marie, born August 24, 2004, as well as our mutual daughter, Clara Pi, born December 15, 2013.

Research Interests

I have a combined background in Physics and Computer Science and have specialized in computationally intensive studies of complex biomolecular systems:

- Monte Carlo methods using the Wang-Landau entropic sampling approach to determine free energy landscapes of biopolymers and molecular motors

- Specialized imaging techniques to study domain formation on spherical lipid membranes

- Multiscale studies of biological macromolecules combining molecular dynamics with quantum chemical calculations.

Employment History

2015 - : Postdoc in the QuantBio group at the Department of Physics, Chemistry and Pharmacy, University of Southern Denmark

- Multiscale studies of protein systems, combining molecular dynamics simulations with quantum chemical calculations

- Co-development of the VIKING software package

2012 - 2015: Software developer at EmaZys Technologies ApS

- Software for controlling and analyzing measurements on the prototype instrument developed at the company

- General research and development of the technology, e.g. by analyzing and optimizing the achievable precision of measurements in the lab and carrying out experiments on our own solar cell installation

- System and network administration including the infrastructure for collecting measurement data and software tools for internal documentation, project management and version control

2011 - 2012: Postdoc in the Functional Lipidomics group at the Department of Biochemistry and Molecular Biology, University of Southern Denmark

- Development of software to extract quantitative data of lipid contents from mass spectrometry using an Orbitrap mass spectrometer. The software employs a database of known lipids and the ions, they may form, to facilitate the generation of target lists of peaks to extract from these spectra with very high data contents.

- Also design of the workflow for further analysis of the lipid composition data using the data mining software Orange (http://orange.biolab.si) and the visualization software Tableau. The workflow uses a relational database-like approach for the data integration.

2008 - 2011: PhD Fellow at the Department of Physics and Chemistry, University of Southern Denmark. Affiliated with the MEMPHYS Center for Biomembrane Physics

- Development of software and methods for image analysis of 3D confocal microscopy image data of spherical membranes. See the project description and under "Education"

- Teaching of Quantum Mechanics, Classical Mechanics, first year Physics lab courses and Physics for medical students

2005 - 2007: Teaching assistant in physics courses at the Department of Physics and Chemistry, University of Southern Denmark

1997 - 2006: IT assistant at Odense City Museums

- Software development, technical problem solving and user support. The internally developed systems were in large part database systems using Microsoft SQL Server as a backend and Microsoft Access as a frontend, or alternatively web based frontends written in PHP or ASP. My assignments included frontend development and ad hoc programming for importing data from old and outdated systems into the new databases.

Education

2011: PhD in biophysics at the University of Southern Denmark (SDU) with the dissertation "Physical characterization of membrane domains"

- In this project, I developed software and methods for image analysis of 3D confocal microscopy images of spherical lipid membranes. The software produces an image on a surface mesh from a 3D bitmap to allow studies of the surface structure. This further allows the study of the thermodynamic phases in the lateral structure of lipid membranes. The project has aspects of physics, geometry and computer science.

- Thesis can be found on: http://www.memphys.sdu.dk/~phusen/phd.pdf

2008.: M.Sc. in combined physics and computer science with the Master's project "Computer Simulations of Molecular Motors" at SDU

- In my Master's project, I carried out Monte Carlo simulations of the molecular kinesin and its electrostatic and steric interactions with itself and a

microtubule. The project involved development and optimization of algorithms for dealing with a large number of electrostatic interactions and development of a scheme for parallelization of the Wang Landau algorithm for Monte Carlo simulations. The calculations were performed on supercomputer Horseshoe (http://www.dcsc.sdu.dk/) at SDU.

- The thesis can be found on http://www.memphys.sdu.dk/~phusen/speciale.pdf

2005: B.Sc. in Physics and Computer Science with the Bachelor's Project ("Tight-binding metoden til undersøgelse af faste stoffers elektroniske struktur") at SDU

- Calculation of the electronic band structure in semiconductor crystals based on the tight-binding model.

2002: Matematisk studentereksamen at Odense Katedralskole

Other Experience

2009: Stayed at the Laboratory of Scientific Image Analysis (SCIAN-Lab) at the Faculty of Medicine, University of Chile, Santiago, Chile as part of the PhD program

2006 - 2007: President of the physics student union "Fysisk Fagråd" and co-founder of the new union "Æter" for all students at the Department of Physics and Chemistry, SDU

Languages

- Danish as native language
- Fluent in spoken and written English.

Programming Languages

Strong experience with the following languages

• C / C++	• Python	• PHP	• Java	• BASIC / Visual Basic
• Javascript	• ASP	• SQL	• Bash	• Octave/Matlab
• .NET	• Maple	• Fortran	• HTML	• Qt

Some experience with

• Pascal	• Haskell	• Prolog	• Assembler for Sparc and x86

Other IT experience

- Strong experience with Linux and UNIX-like systems
- Experience with the database systems MySQL, PostgreSQL, MSSQL, SQLite and Access
- Broad experience with numerical methods, simulations and data analysis on large datasets
- Experience with embedded systems (Linux on ARM) and microcontroller programming

Publications

Peter Husen, Matthias Fidorra, Steffen Härtel, Luis A. Bagatolli, and John H. Ipsen. A method for analysis of lipid vesicle domain structure from confocal image data. *European Byophysics Journal.* Vol 41, No 2, 2011, 161-175

Peter Husen, Laura R. Arriaga, Francisco Monroy, John H. Ipsen and Luis A. Bagatolli. Morphometric image analysis of giant vesicles: a new tool for quantitative thermodynamics studies of phase-separation in lipid membranes. *Biophysical Journal* Vol 103, No 11, 2012, 2304-2310.

Peter Husen, Kirill Tarasov, Maciej Katafiasz, Elena Sokol, Johannes Vogt, Jan Baumgart, Robert Nitsch, Kim Ekroos, Christer S. Ejsing. Analysis of Lipid Experiments (ALEX): A Software Framework for Analysis of High-Resolution Shotgun Lipidomics Data, *PLoS one.* Vol 8, No 11, 2013

Tripta Bhatia, Peter Husen, John H. Ipsen, Luis A. Bagatolli, Adam Cohen Simonsen. Fluid domain patterns in free-standing membranes captured on a solid support. *Biochimica et Biophysica Acta (BBA)-Biomembranes* Vol 1838, Issue 10, 2014, 2503-2510