Uppsala University
Department of Information Technology
Division of Scientific Computing

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Sonja Mathias

Curriculum vitae

Born March 21, 1990, in Berlin, Germany.

Graduate Studies

Since 09/2015	**PhD student in Scientific Computing**, Uppsala Universitet, Sweden Division of Scientific Computing at the IT Department **Project:** *Multiscale Modeling and Simulation of Dynamic Cell Populations* Advisor: Andreas Hellander (Associate Professor)
10/2012 - 07/2015	**Master of Science in Mathematics**, Universität Bonn, Germany Final grade:"Very Good" **Master Thesis:** *A Kernel-Based Learning Method for an efficient Approximation of the high-dimensional Born-Oppenheimer Potential Energy Surface* At the Institute for Numerical Simulation, in collaboration with the Fraunhofer Institute for Algorithms and Scientific Computing SCAI Supervisors: Prof. M. Griebel and Dr. J. Hamaekers

Undergraduate Studies

10/2009 - 08/2012	**Bachelor of Science**, Universität zu Lübeck, Germany Final grade: "Very Good" Course of studies: 'Computational Life Science'

Publications

Mathias, S., Coulier, A., & Hellander, A. (2021). CBMOS: a GPU-enabled Python framework for the numerical study of center-based models. BioRxiv, doi:10.1101/2021.05.06.442893

Mathias, S., Coulier, A., Bouchnita, A., & Hellander, A. (2020). Impact of Force Function Formulations on the Numerical Simulation of Centre-Based Models. Bulletin of Mathematical Biology 82 (10), 132

Barker, J., Bulin, J., Hamaekers, J., & Mathias, S. (2017). Localized Coulomb Descriptors for the Gaussian Approximation Potential. Scientific Computing and Algorithms in Industrial Simulations, 25-42

Erb, W., & Mathias, S. (2015). An alternative to Slepian functions on the unit sphere–A space-frequency analysis based on localized spherical polynomials. Applied and Computational Harmonic Analysis, 38(2), 222-241.

Conferences, Summer Schools and Talks

08/2020	Contributed talk at SMB2020 (held remotely) within the minisymposium "Shapes, patterns and forces in developmental biology". Title: Impact of force function formulations on the numerical simulation of centre-based models
01/2020	Half-time seminar at the seminar program in Scientific Computing, Uppsala Universitet, Sweden, Title: Impact of force function formulations on the numerical simulation of center-based models
11/2019	Research talk during a research visit to the ChemSpaceLab at the University of Basel, Title: Learning cellular neighborhood updates - Ideas from Quantum ML applied to cell simulations
09/2019	Poster presentation at Philip Maini's 60th birthday workshop in Oxford, UK, Title: Choose your force function wisely - a computational study on center-based models
05/2019	Poster presentation at the Workshop on Modelling in Biology and Medicine in Gothenburg, Sweden, Title: Studying the Scaling Mechanisms of Cartilage Sheets
11/2017	Participation in the **Oberwolfach Seminar** *"Mathematical Modeling in Systems Biology"*, MFO, Germany
10/2017	*Swedish e-Science Academy 2017*, Umeå Universitet, Sweden

	Poster: *Studying the Scaling Mechanisms of Cartilage Sheets*
09/2017	Participation in the *UK Multiscale Biology Summer School*, University of Nottingham, Great Britain
10/2016	*Scientific Computing in Sweden*, Uppsala Universitet, Sweden
	Poster: *Multiscale Modeling of Dynamical Cell Populations*
07/2016	Participation in the **10th q-bio Summer School**, San Diego, CA, USA, and the associated **Student Symposium** at the *10th q-bio Conference*, Nashville, TN, USA
04/2016	*Seminar Program in Scientific Computing*, Uppsala Universitet, Sweden
	Research talk: *Numerical Modeling of Cell Populations Communicating Via Diffusible Signal Molecules*

Experiences in Research as a Student Assistant

10/2013 - 06/2015	*Fraunhofer SCAI*, St. Augustin, Germany:
	Student assistant in the *Virtual Materials Design* Group
08/2013 - 09/2013	*Max Planck Institute for Evolutionary Biology*, Plön, Germany
	Research internship in the *Evolutionary Theory* Group of Prof. A. Traulsen

Awards and Grants

11/2017	Travel grant from the **Anna-Maria Lundin stipend** at *Smålands Nation* in Uppsala, Sweden
03/2016	**'Ada Lovelace-Prize 2015'** given by the *Institute for Numerical Simulation* for the best master thesis of a female student in the area 'Numerical Mathematics' at the *University of Bonn*
01/2013	**'Philips-Best-Bachelor Award 2012'** given by the *Philips GmbH* for the best graduation results in 'Computational Life Science' at the *Univ. of Lübeck*
06/2009	**'DMV-Abiturpreis 2009'** given by the *German Mathematical Society* for excellent results in the examination subject 'Mathematics'

Outreach Activities

04/06/2021	Participation in an online **Native Scientist** workshop as a researcher talking to students in Halmstad, Sweden
04/10/2017	Participation in the **Native Scientist** event *"Challenging assumptions"* in Stockholm, Sweden
07/2017	Wikipedia article on *Cell-based models*

Skills

Programming	C/C++, Matlab, Python, Java; version control using git and SVN
Languages	German (native), English (very good), French (very good), Swedish (good)

Uppsala, June 4, 2021