Curriculum vitae

Name	Michael Muskulus
Birthday	04 November 1974
Birthplace	Sorengo (Switzerland)
Nationality	German
Work addres	Mathematical Institute Leiden University Niels Bohrweg 1 2333 CA Leiden The Netherlands
e-mail	muskulus@math.leidenuniv.nl
webpage	http://www.math.leidenuniv.nl/~muskulus
phone	++31-71-527-7058
fax	++31-71-527-6985

Education

08/04-present	Mathematical Institute, Leiden University PhD student Initially funded by NWO project VIEWS (Computational Life Sciences) Supervisor: Prof. Verduyn-Lunel, Prof. Rozenberg Projected date of defence: November 2009.
08/99-03/04	Universität Hamburg Diploma in theoretical physics, grade 2 (“good”) Master thesis: Scattering in noncommutative field theory Supervisor: Prof. Fredenhagen Subsidiary subject: philosophy
10/97-08/99	Universität Hamburg Vordiplom in physics, grade 1 (“very good”) Subsidiary subject: oceanography
09/85-06-94	Carl-Lämmle-Gymnasium Laupheim Abitur (“A-level”), grade 1.5 (“very good”)

Current projects and collaborations

- Distance-based analysis of dynamical systems and time series by optimal transport. (Topic of my PhD thesis)
- Mathematical analysis and modelling of respiratory function, with special emphasis on obstructive lung diseases and the forced oscillation technique. Collaboration with the group of Peter J. Sterk (Department of respiratory medicine, Amsterdam Medical Centre).
- Modelling and analysis of circadian oscillators. Collaboration with the group of Joke Meijer (Department of neurophysiology, Leiden University Medical Centre).
- Statistical analysis of MR images in murine models of Alzheimer’s disease. Collaboration with the group of Huub J. de Groot (Leiden solid-state NMR and biophysical organic chemistry group) and the group of Joke Dijkstra (Department of radiology, Leiden University Medical Centre).
- Inverse modelling of neuronal activity by Wasserstein distances. Collaboration with the group of Andreas Daffertshofer (Faculty of Human Movement Sciences, VU University Amsterdam).
- Analysis of magnetic transfer ratios in MR images. Collaboration with the group of Mark van Buchem (Department of radiology, Leiden University Medical Centre).

Peer-reviewed publications in journals

- [1] Muskulus M, Houweling S, Verduyn-Lunel S, Daffertshofer A: Functional similarities and distance properties. *Journal of Neuroscience Methods*, to appear.
  DOI: `10.1016/j.jneumeth.2009.06.035`.
- [2] Boonstra TW, Houweling S, Muskulus M: Does asynchronous neuronal activity average out on a macroscopic scale? *Journal of Neuroscience* **29** (2009), 8871–8874.
- [3] Muskulus M, Scheenstra AEH, Braakman N, Dijkstra J, Verduyn-Lunel S, Alia A, et al.: Prospects for early detection of Alzheimer’s disease from serial MR images in transgenic mouse models. *Current Alzheimer Research*, to appear.
- [4] Brijder R, Hoogeboom JH, Muskulus M: Strategies of loop recombination in ciliates. *Discrete Applied Mathematics* **156** (2008), 1736–1753.
- [5] Li H, Muskulus M: Analysis and modeling of job arrivals in a production grid. *ACM SIGMETRICS Performance Evaluation Review* **34** (2007), 59–70.
- [6] Muskulus M, Houweling S, Rozenberg G, Besozzi D, Cazzaniga P, Pescini D, et al.: Cycles and communicating classes in membrane systems and molecular dynamics. *Theoretical Computer Science* **372** (2006), 242–266.

- [7] Muskulus M, Brijder R: Complexity of biocomputation: Symbolic dynamics in membrane systems. *Int. J. Found. Comp. Sci.* **17** (2006), 147–165.
- [8] Jacob D, Goettel H, Jungclaus J, Muskulus M, Podzun R, Marotzke J: Slowdown of the thermohaline circulation causes enhanced maritime climate influence and snow cover over Europe. *Geophysical Research Letters* **32** (2005), L21711. (AGU highlight)
- [9] Muskulus M, Jacob D: Tracking cyclones in regional model data: The future of Mediterranean storms. *Advances in Geosciences* **2** (2005), 13–19.

Peer-reviewed conference papers & chapters in books

- [10] Scheenstra AEH, Muskulus M, Staring M, van den Maagdenberg AMJV, Verduyn-Lunel S, Reiber JHC, et al.: The 3D Moore-Rayleigh test for the quantitative groupwise comparison of MR brain images. In: 21st Conference on Information Processing in Medical Imaging (IPMI '09), accepted. (Best Poster Award)
- [11] Muskulus M, Verduyn-Lunel S: Reconstruction of functional brain networks by Wasserstein distances in a listening task. In: Kakigi R, Yokosawa K, Kurik S (eds): Biomagnetism: Interdisciplinary Research and Exploration. Hokkaido University Press. Sapporo, Japan (2008), pp. 59–61. (Young Investigator Award for Excellent Paper)
- [12] Archer C, Dobberschütz S, Godeau MF, Grasman J, Gunsing M, Muskulus M, et al.: Dynamical models of extreme rolling of vessels in head waves. In: Proceedings of the 67th European Study Group Mathematics with Industry. Wageningen, The Netherlands (2009), to appear.
- [13] Muskulus M: Applications of Page Ranking in P systems. In: Corne D, et al. (eds): Workshop on Membrane Computing 2008, *Lecture Notes in Computer Science* **5391** (2009), 311–324.
- [14] ten Cate A, Geurts BJ, Muskulus M, et al.: Modelling and simulation of phase-transitions in multi-alloy aluminium casting. In: Bokhove O, Hurink J, Meinsma G, et al. (eds): Proceedings of the 63rd European Study Group Mathematics with Industry. Enschede, The Netherlands (2008), pp. 117–139.
- [15] Muskulus M: Three approaches to extend the Heston model. In: Vellekoop M, et al. (eds): Mathematics in Industry. European Study Group with Industry (SWI2007), Utrecht, The Netherlands (2007), pp. 93–100.
- [16] Li H, Muskulus M, Wolters L: Modelling correlated workloads by combining model based clustering and a localized sampling algorithm. In: Proceedings of the 21st ACM International Conference on Supercomputing. Seattle, USA (2007), pp. 64–72.
- [17] Li H, Heusdens R, Muskulus M, Wolters L: Analysis and synthesis of pseudo-periodic job arrivals in grids: A matching pursuit approach. In: Seventh IEEE International Symposium on Cluster Computing and the Grid (CCGrid '07), Rio de Janeiro, Brazil (2007), pp. 183–196.
- [18] Li H, Muskulus M, Wolters L: Modelling job arrivals in a data-intensive grid. In: 12th Workshop on Job Scheduling Strategies for Parallel Processing (JSSPP). Saint-Malo, France. *Lecture Notes in Computer Science* **4376** (2006), 210–231.
- [19] Muskulus M, Houweling S, Rozenberg G, et al.: Reaction cycles in membrane systems and molecular dynamics. In: Graciani C, Paun Gh, Romero-Jimenez A, et al. (eds): Vol. 2 of Fourth Brainstorming Week on Membrane Computing. Fenix Editora, Sevila (2006), pp. 185–208.
- [20] Brijder R, Hoogeboom HJ, Muskulus M: Applicability of loop recombination in ciliates using the breakpoint graph. In: Berthold R, et al. (eds): Computational Life Sciences II (CompLife 2006). *Lecture Notes in Computer Science* **4216** (2006), 97–106.
- [21] Muskulus M, Brijder R: First steps towards a geometry of computation. In: Gutierrez-Naranjo MA, et al. (eds): Third Brainstorming Week on Membrane Computing. Fenix Editora, Sevilla (2005), pp. 197–218.
- [22] Muskulus M: An observation on the Sevilla complexity. In: Gutierrez-Naranjo MA, et al. (eds): Cellular Computing (Complexity Aspects). Fenix Editora, Sevilla (2005), pp. 257–266.

Peer reviewed conference abstracts & posters

- [23] Ferrarini L, Scheenstra AEH, Frisoni GB, Muskulus M, Pievani M, Ganzola R, et al.: Morphological changes in the hippocampus predict MCI conversion to AD: An MR-based comparison between Moore-Rayleigh and permutation tests. In: Alzheimer's Association 2009 International Conference on Alzheimer's Disease (ICAD '09), accepted (poster).
- [24] Muskulus M, Slats AM, Verduyn-Lunel SJ, Sterk PJ: Within-breath fluctuations of respiratory impedance under methacholine challenge in asthma. In: American Thoracic Society International Conference 2009. San Diego, USA, accepted (poster discussion).
- [25] Muskulus M, Slats AM, van der Plas DT, et al.: Discrimination of asthma and COPD by reconstructing unbiased probability distributions (attractors) from the dynamics of respiratory impedance. *Am J Resp Crit Care Med* **177** (2008), A947 (abstracts issue).
- [26] Muskulus M: Identification of P system models assisted by biochemical databases. In: Ibarra OH, Sosik P (eds): Prague International Workshop on Membrane Computing. Preliminary Proceedings, Sileasian University in Opava, Faculty of Philosophy and Science (2008), pp. 46–49.
- [27] Jacob D, Muskulus M, Podzun R: Tracking cyclones in regional model data: The future of Mediterranean storms. In: 6th Plinius Conference on Mediterranean storms (PLC6). Mediterranean Sea (2004), PLC6-A-00007 (speaker).
- [28] Jacob D, Muskulus M, Podzun R: Tracking cyclones in regional model data: The future of Vb cyclones. In: 4th Annual Meeting of the European Meteorological Society (EMS4). Nice, France. *EMS Annual Meeting Abstracts* **1** (2004), 00259 (speaker).

Other publications

- [29] Muskulus M, Scheenstra AEH, Verduyn-Lunel S: A generalization of the Moore-Rayleigh test for testing symmetry of vector data and two-sample problems. Technical Report MI-2009-05, Mathematical Institute, Leiden University (2009).
- [30] Muskulus M, Verduyn-Lunel S: The analysis of dynamical diseases by optimal transportation distances. *ERCIM News* **73** (2008), 16–17.
- [31] Muskulus M: Speltheorie voor beginners. ("Game theory for beginners") *Eureka!* **20** (2008), 8–10.
- [32] Muskulus M, de Waal H: Over luie studenten, groepsdynamica en pokeren. ("On lazy students, group dynamics and poker") *Nieuw Archief voor Wiskunde* **5/9** (2008), 287–290.

Awards

- Best Poster Award. Information Processing in Medical Imaging (IPMI'09). Williamsburg, USA. July 2009.
- Young Investigator Award for Excellent Paper. BIOMAG International Conference on Biomagnetism. Sapporo, Japan. August 2008.

Teaching activities

- Lecturer: Mathematical Principles of Development (2nd year students of Life Science & Technology), spring 2009.
- Lecturer: Workshop on Synergetics (PhD students), spring 2008.
- Lecturer: Mathematics 1A (1st year students of Molecular Science & Technology), autumn 2007.
- Lecturer: Mathematics of Development (2nd year students of Life Science & Technology), spring 2007.
- Course Assistant: Linear Algebra II, autumn 2008.
- Course Assistant: Analysis III, autumn 2006.
- Course Assistant: Mathematics of Development, spring 2006.
- Course Assistant: Basic mathematics for biologists, spring 2005.
- Course Assistant: Mathematics for physicists I-IV, 1999-2003.

Administrative work

- Member of Organizing Committee: Seventh Workshop on Membrane Computing WMC7, Leiden, 2006.
- Refereed papers for: *Theoretical Computer Science, Advances in Geosciences, Proceedings of the Royal Society London A, Journal of Zhejiang University SCIENCE A, Soft Computing*.

Further Training

- 67th Study Group Mathematics with Industry (SWI2009). Wageningen University, The Netherlands. January 2009.
- BrainModes 2008. VU University Amsterdam, The Netherlands. December 2008.
- Oberwolfach Seminar on Applied Time Series Analysis in Scientific Computing. Oberwolfach, Germany. November 2008. (invited)
- 63rd Study Group Mathematics with Industry (SWI2008). University of Twente, The Netherlands. January 2008.
- Probability and Statistics in Population Genetics. Stieltjes Onderwijsweek. Lorentz Center, The Netherlands. January 2007.
- 58th Study Group Mathematics with Industry (SWI2007). Utrecht University, The Netherlands. January 2007.
- Space, Time and the Organization of Life. Summer school for Computational Life Sciences. Conferentiecentrum Kapellerput, The Netherlands. June 2006.
- Control Theory with Modeling Applications to Physiology and Medicine. Summer school. Graz, Austria. July-August 2005.
- NWO/Science's Next Wave Talentendag. Slot Zeist, The Netherlands. April 2005.
- 2nd Summerschool for Theoretical Physics, Freiburg, Germany. 2002.
- Summer University for Plasma Physics. Max Planck Institute for Plasma Physics. Berlin, Germany. 2000.

Practical experience

- Summer student at CERN, Geneva (Switzerland). Processing of CHORUS experimental data, 2001.
- Second AMBOS/AMREB cruise (oceanography). Qingdao-Qingdao (P.R.China), 1999. Sampling of sea water (hydrographic profiles).
- First AMBOS/AMREB cruise. Qingdao-Qingdao (P.R.China), 1998.

Computer Skills

Programming languages	C++, C, Fortran, Perl, Python, Matlab
Operating systems	Gentoo Linux (administration)
Statistical computing	R (two packages in preparation)
Applications	LaTeX, ITK (MR image analysis), Corel Technical Designer

Languages

German: native speaker
English: fluently written & spoken
Dutch: fluently spoken, sufficiently written
French: basic knowledge
Norwegian: beginner

Foreign Experience

08/00-09/00	5 weeks in Iceland
06-97-09/97	10 weeks in India & Nepal
11/96-02/97	3 months in New Zealand (fruit picking)
03/96-05/96	3 months in Wales (summer-camp assistant with Mountain Ventures Ltd.)

Community Service

10/94-01/96	Landkreis Friesland, Abt. Rettungsdienst Trained as ambulance personnel (“Rettungssanitäter”) 12 months duty in Wangerooge and Jever, Germany

Further Skills

Driving license (1993)

Further Interests

Rock Climbing (UIAA VI)
ING Marathon Amsterdam 2005 (4h 10min)
Hiking (Annapurna Circuit 1997; Daisetsuzan Grand Traverse 2008)
Go (Japanese board game, 3 kyu)

Michael Muskulus
Leiden, July 23, 2009.