Curriculum Vitae

Michael Marxen, Ph. D., Dipl. Phys.

Date of Birth: June 25th, 1971

Profession: Physicist

Specialization: Medical physics, functional brain imaging, magnetic resonance imaging (MRI), X-ray computed tomography (CT), magneto-encephalography (MEG)), fluid dynamics, blood flow physiology, image processing, cognitive science, and attention

Nationality: German (Permanent Residency in Canada)

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Current Position

Postdoctoral Fellow, Rotman Research Institute, Baycrest Centre for Geriatric Care, Toronto, Canada. Research Projects: "Functional Magnetic Resonance Imaging and Magneto-encephalography of Somatosensory Cortex", "Evaluation of Parallel Magnetic Resonance (MR) Imaging based on Quantitative Brain Morphometry", and "fMRI and MEG in stroke subjects"

Education

1998-2004	**Ph.D. (Physics)**, *University of Toronto*, Department of Medical Biophysics, Supervisor: R. M. Henkelman Thesis: "Fractal Characteristics of Vascular Structure & Modeling of Blood Flow in Three Dimensions"
1991-1998	**Diplom (M. Sc.)**, *Ruprecht-Karls-Universität*, Heidelberg, Germany, Faculty of Physics and Astronomy, Supervisor: B. Jähne Thesis: "Particle Image Velocimetry in fluid flows with strong velocity gradients"
1994 – 1995 1997	Exchange Student at *McMaster University*, Hamilton, Canada Research Stay at *University of Toronto*, Department of Mechanical and Industrial Engineering, Toronto, Canada
1991-1993	**Vordiplom (BSc)**, *Universität Osnabrück*, Department of Physics, Osnabrück ,Germany

Scholarships and Awards

2007	University of Toronto - *Edward Christie Stevens Fellowship*
2002 –2003	Government of Ontario- *Ontario Graduate Scholarship* (for Science &

Technology)

1999 – 2002 *Heart and Stroke Foundation of Canada Scholarship*

1994 *Ontario-Baden-Württemberg Student Exchange Scholarship*

Professional Experience

2006 – Present **Postdoctoral Fellow**, Rotman Research Institute, Baycrest Centre for Geriatric Care (Toronto, Canada). Functional Magnetic Resonance Imaging and Magneto-encephalography of Somatosensory Cortex

2005 – 2006 Independent Studies of Asian philosophies and associated journalistic work

2004 – 2005 **Research Associate**, Sunnybrook & Women's College Health Sciences Centre, Toronto, Canada. Development of a new technique to measure blood flow distribution using computed tomography (CT) to quantitate microspheres deposition and three-dimensional measurements of blood flow distribution and vascular structure in the same organ.

1998 **Research Associate**, University of Toronto, Department of Mechanical and Industrial Engineering, Toronto, Canada. Software development for Particle Image Velocimetry

1994, 1992, 1991 **Student Intern**: Siemens AG, Drive Technology, Circuitry and Installation Technology, Berlin, Germany

Teaching and Supervisory Experience

2006 – Present **Supervision of Research Assistant –** Rotman Research Institute, Baycrest, Toronto

2000 –2005 **Supervision and Instruction of 3 Research Assistants –** Department of Medical Biophysics, University of Toronto.

2004 **Supervision of Student Intern (Undergraduates) –** Department of Medical Biophysics, University of Toronto.

2000 **Supervision of Student Interns (Undergraduates) –** Department of Medical Biophysics, University of Toronto

2000 – 2004 **Teaching Assistant**: MBP 1024Y "Advanced Medical Imaging" Department of Medical Biophysics (Graduate Level), University of Toronto, Toronto, Canada

1997 **Teaching Assistant**: PHY 180H1F "Elements of Physics I (Mechanics)" (Undergraduate Level) Department of Physics, University of Toronto, Toronto, Ontario

1996 **Teaching Assistant**: "Image Processing Lab", Department of Physics and Astronomy, *Universität Heidelberg*, Heidelberg, Germany

Publications

Journal

1) M. Marxen, J. G. Sled, and R. M. Henkelman: **Volume Ordering for Analysis and Modeling of Vascular Systems.** Submitted to Ann. Biomed. Eng.

2) **M. Marxen**, J. G. Sled, L. X. Yu, C. Paget, and R. M. Henkelman: Comparing Microsphere Deposition and Flow Modeling in 3D Vascular Tree**s.** *Am. J. Physiol. Heart Circ.* 2006;291:H2136-H2141.

3) **M. Marxen**, C. Paget, L. X. Yu, and R. M. Henkelman: Estimating perfusion using microCT to locate microspheres**.** *Phys. Med. Biol*. 2006; 51: N9-N16.

4) J. G. Sled, **M. Marxen**, and R. M. Henkelman: Analysis of microvasculature in whole kidney specimens using micro-CT. *Proc. SPIE* 2004; 5535: 53.

5) **M. Marxen**, M. M. Thornton, C. B. Chiarot, G. Klement, J. Koprivnikar, J. G. Sled, and R. M. Henkelman: MicroCT scanner performance and considerations for vascular specimen imaging. *Med. Phys*. 2004; 31: 305- 313.

6) **M**. **Marxen** and R. M. Henkelman: Branching tree model with fractal vascular resistance explains fractal perfusion heterogeneity**.** *Am. J. Physiol*. *Heart Circ. Physiol.* 2003; 284: 1848 – 1857.

7) **M. Marxen**, P. E. Sullivan, M. R. Loewen, and B. Jähne: Comparison of Gaussian particle center estimators and the achievable measurement density for particle tracking velocimetry**.** *Exp. Fluids* 2000; 29(2): 145 – 153.

Conference Proceedings

8) **M. Marxen**, T. L. Dawson, M. K. Hanratty, G. S. Smith, and S. J. Graham: Evaluating Faster Structural MRI Acquisitions based Organization for Human Brain Mapping, Fourteenth Annual Meeting, June 15 – 19, 2008, Melbourne, Australia.

9) **M. Marxen**, T. L. Dawson, T. Bardouille, B. Ross, F. Tam, and S. J. Graham: Transient and Steady-State Components of the fMRI BOLD and MEG Signals from Somatosensory Cortex. Organization for Human Brain Mapping, Fourteenth Annual Meeting, June 15 – 19, 2008, Melbourne, Australia.

10) **M. Marxen**, T. L. Dawson, F. Tam, and S. J. Graham: Transient and Steady-State Components of the fMRI BOLD Signal in Somatosensory Cortex. International Society for Magnetic Resonance in Medicine, Sixteenth Scientific Meeting & Exhibition, May 3-9, 2008, Toronto, Ontario, Canada.

11) **M. Marxen**, T. Q. Duong, and R. M. Henkelman: Modeling Blood Flow in Combined Inversion Recovery and Displacement-Encoded ^{19}F MR**.** International Society for Magnetic Resonance in Medicine, Tenth Scientific Meeting & Exhibition, May 18-24, 2002, Honolulu, Hawaii, USA.

12) C. B. Chiarot, **M. Marxen**, J. Satomi, J. G. Sled, R. M. Henkelman: Microcomputed Tomography of the Renal Vasculature in Mice. Oct. 19-20, 2001, High Resolution Imaging in Small Animals Meeting, Rockville Maryland, USA and Sep. 9-10, 2001,

Imaging Network Ontario Symposium, Toronto, Ontario, Canada.

13) **M. Marxen** and R. M. Henkelman: Verification of a New Modeling Approach to Perfusion Heterogeneities using Micro-Computed Tomograms of Vascular Casts. Biomedical Engineering Society, Annual Meeting, October 12-14, 2000, Seattle, Washington, USA.

14) **M. Marxen**, P. E. Sullivan, M. R. Loewen, B. Jähne: Gaussian Particle Center Estimators for Particle Tracking. Apr. 2-4, 1998, Johns Hopkins Environmental Fluid Mechanics Conference, Baltimore, Maryland, USA.

Lectures and Presentations

2002 **Lecture on "Embryonic Cardiac Development"** Department of Medical Biophysics, University of Toronto

1999 **Lecture on "Fundamentals of Quantum Computation"** - Department of Medical Biophysics, University of Toronto

1998 **3 Lectures on the Interpreter Language "Heurisko" -** Department of Mechanical and Industrial Engineering, University of Toronto

1998 **Invited Talk: "High Particle Density Particle Tracking Velocimetry for Turbulence Studies".** Fluid Mechanics Seminar, Department of Mechanical and Industrial Engineering, University of Toronto

Professional Development

2002-2003 **Teaching Assistants Training Program Certificate** from the University of Toronto: Attended workshops on
- Dealing with Disruptions,
- Preparing a Teaching Dossier
- Using Writing to Learn in Tutorial Teaching

2003 **Attended THE 500 "Teaching in Higher Education"**, University of Toronto:
- Lectures on presentation skill, teaching dossier, student and faculty writing, innovating pedagogy, equity issues, grading, instructional technology, and other related topics

References

(a) Prof. Simon J. Graham (Postdoctoral Supervisor)
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(b) Prof. R. Mark Henkelman (Ph.D. Supervisor), University Professor
Departments of Medical Biophysics and Medical Imaging
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(c) Prof. Stephen Strother (collaborator)
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(d) Prof. John G. Sled (former collaborator)
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