

Kämpfer, Thomas Urs
1 Follensbee Avenue, Apt. 1
Lebanon NH 03766 USA



Date of birth April 27, 1973
Nationality Swiss

Phone +1 603 646 44 72 +1 603 381 12 51
E-mail thomas.kaempfer@a3.epfl.ch

Professional experience

2006 - **Research scholar** at the US Army Cold Regions Research and Engineering Laboratory ERDC-USACRREL, Hanover NH, USA. Study of the properties of metamorphosing snow by **microstructural modeling** approaches.

2003 - 2006 **Post-doctoral researcher** in the Snow Physics Team at WSL, Swiss Federal Institute for Snow and Avalanche Research, Davos, Switzerland (SLF). **Project leader** of the snow microstructure project.

1998 - 2002 **Development of a metallurgically oriented software** for the modeling of solidification processes. PhD thesis under the direction of Prof. M. Rappaz, Computational Materials Laboratory, Institute of Materials, Faculty of Engineering, EPFL

1998 - 2001 **Teaching assistant** for a numerical modeling course with Prof. M. Rappaz and for laboratory workshops with Dr. E. Blank, Institute of Materials, EPFL

1996 (3 months) **Trainee, Alusuisse Technology Center**, Chippis (CH). Programming of interfaces and visualizations with EnSight.

Education

1998 - 2002 **PhD** at the Institute of Materials, Faculty of Engineering, **Swiss Federal Institute of Technology, Lausanne** (EPFL)

1998 **Mathematics Engineer**, EPFL

1997 - 1998 Diploma work in numerical analysis as an exchange student at **North Carolina State University** (NCSU)

1996 - 1997 **Teaching certificate** in applied mathematics (CESMA), EPFL

1993 - 1998 Studies at the Institute of Mathematics, EPFL

Computer skills

Programming C, C++, Fortran, TCL/TK, DCL, Perl, IDL
Environments Unix, MS Windows, VMS
Utilities LAPACK, MATLAB, ANSYS, Paraview, EnSight, Mathematica, LaTeX, MS Office

Languages

German Mother tongue (Swiss German)
English Fluent
French Fluent
Spanish Basic

Research experience

2006 - , USACRREL *Development of Microstructural Snow Models*, Post-doctoral researcher through a fellowship of the Oak Ridge Institute for Science and Education.

Study of snow metamorphism and its influence on snow properties like optical, mechanical, or thermal properties through the development and application of microstructure based numerical simulations. Development of Finite Element and Discrete Element models, including diffuse interface modeling for solid-vapor phase-changes and sintering models at a crystal-scale level.

2003 - 2006, WSL/SLF *Modeling of, and experiments on Snow Metamorphism at the Microstructural Level*, Post-doctoral researcher in the Snow Physics Team at WSL, Swiss Federal Institute for Snow and Avalanche Research, Davos, Switzerland (SLF).

X-ray computed micro-tomography experiments on evolving snow and related image processing. Microstructure based numerical modeling and simulation of energy and mass conservation problems with phase-change using the material snow.

Project leader, planing of experiments, development of simulation tools, and supervision of a masters thesis on image analysis.

1998-2002, EPFL *Modeling of Macrosegregation Using an Adaptive Domain Decomposition Method*, PhD thesis under the direction of Prof. M. Rappaz, Computational Materials Laboratory, Institute of Materials, Faculty of Engineering, EPFL

Development of a metallurgically oriented software for the modeling of solidification processes.

1997/98, NCSU *Approximation of the Stefan Problem in \mathbb{R}^2 by a Finite Volume Method*, diploma work assisted by Prof. J. Rappaz, EPFL and Prof. P.A. Gremaud, North Carolina State University (NCSU), Raleigh (USA).

Publications: reviewed journal papers (ISI)

Th. U. Kaempfer, M. Schneebeli Observation of Isothermal Metamorphism of New Snow and Interpretation as a Sintering Process, *Journal of Geophysical Research* **112** (2007), D24101, doi:10.1029/2007JD009047

Th. U. Kaempfer, M. A. Hopkins, D. K. Perovich A 3D Microstructure Based Photon Tracking Model of Radiative Transfer in Snow, *Journal of Geophysical Research* **112** (2007), D24113, doi:10.1029/2006JD008239

L. Bäurle, Th. U. Kaempfer, D. Szabo Sliding Friction of Polyethylene on Snow and Ice: Contact Area and Modeling, *Cold Regions Science and Technology* **47**(3) (2007), pp. 276-289

Th. U. Kaempfer, M. Schneebeli, S. A. Sokratov A Microstructural Approach to Model Heat Transfer in Snow, *Geophysical Research Letters* **32** (2005), doi:10.1029/2005GL023873

Th. U. Kaempfer, M. Rappaz Modelling of macrosegregation during solidification processes using an adaptive domain decomposition method, *Modelling Simul. Mater. Sci. Eng.* **11** (2003), pp. 575-597

Publications: reviewed

Th. U. Kaempfer, S. A. Sokratov, M. Schneebeli The effect of the structural evolution of snow on heat transfer, *Proceedings of 3rd International Symposium on Two-Phase Flow Modelling and Experimentation, Pisa, Italy* (2004), ed. G. P. Gelata, P. Di Marco, A. Mariani, R. K. Shah, Edizioni ETS, Pisa, ISBN 88-467-1075-4

Th. U. Kaempfer *Modeling of Macrosegregation Using an Adaptive Domain Decomposition Method*, Thèse no. 2666 (2002), École Polytechnique Fédérale de Lausanne, CH-1015 Lausanne

Publications: non-reviewed

Th. U. Kaempfer, M. Schneebeli, B. Pinzer, M. Plapp, Heat- and Mass Transfer in Snow: A Micro-Structural Study using Computed Micro-Tomography and Phase-Field Modeling *Proceedings of the 65th Annual Meeting of the Eastern Snow Conference* (2008), May 2008, Fairlee, Vermont, USA

Th. U. Kaempfer, M. Plapp Modeling Heat and Mass Transfer in Snow at a Microstructural Level using a Phase-Field Approach - First Results, *Proceedings of the 64th Annual Meeting of the Eastern Snow Conference* (2007), May 2007, St. Johns, Newfoundland, Canada

Th. U. Kaempfer, M. Rappaz Numerical modeling of macrosegregation during solidification processes using multiple, adaptive finite element grids, *Modeling of Casting, Welding and Advanced Solidification Processes*, 2000(IX), pp. 640-647, ed. P. R. Sahn, P. N. Hansen, J. G. Conley, Shaker Verlag, P.O. Box 1290, 52013 Aachen, Germany

Publications: in preparation

Th. U. Kaempfer, M. Plapp Phase-Field Modeling of Dry Snow Metamorphism, *Physical Review E*, to be submitted 2008

Invited presentations

Th. U. Kaempfer Microstructural Modeling of Snow Processes, *Johannes Gutenberg University Mainz*, Environmental Geochemistry Group, June 2008, Mainz, Germany

Th. U. Kaempfer, M. Hopkins, M. Plapp Microstructural Modeling of Snow- and Firn Processes, *Workshop on the Microstructure and Properties of Firn* (2008), March 2008, Dartmouth College, Hanover, New Hampshire, USA

Conference presentations and posters

Th. U. Kaempfer, M. Sturm, J. Johnson, M. Hopkins A Micro-Structural Phase-Field Model for Snow Metamorphism and toward Experimental Validation using Migrating Air Inclusions in Ice, *AGU Fall Meeting, American Geophysical Union* (2007), December 2007, San Francisco, USA

Th. U. Kaempfer, M. Plapp Microstructural Modeling of Snow Metamorphism Using a Phase Field Method, *IUGG XXIV General Assembly* (2007), July 2007, Perugia, Italy

Th. U. Kaempfer, M. A. Hopkins, M. Schneebeli A Micro-Structural Look at Snow: X-Ray Micro-Tomography in Combination with Numerical Simulations, *ASSW, Arctic Science Summit Week* (2007), March 2007, Hanover, New Hampshire, USA

Th. U. Kaempfer, M. A. Hopkins, D. K. Perovich A 3D Microstructure Based Photon Tracking Model of Radiative Transfer in Snow, *AGU Fall Meeting, American Geophysical Union* (2006), December 2006, San Francisco, USA

Th. U. Kaempfer, D. Schmid, S. A. Sokratov, M. Schneebeli Isothermal metamorphism of snow at different temperatures, *EGU General Assembly, Vienna, Austria* (2006), Geophysical Research Abstracts, vol. 8, Abstract EGU06-A-05530

Th. U. Kaempfer, M. Schneebeli, S. A. Sokratov Numerical Modeling of Heat and Mass Transfer in Snow Based on the Microstructure as Observed by Computed X-Ray Micro-Tomography, *Euromat 2005, European Congress on Advanced Materials and Processes* (2005), September 2005, Prague, Czech Republic

- Th. U. Kaempfer, M. Schneebeli, S. A. Sokratov Computaton and Visualization of Mass Transport during Temperature Gradient Metamorphism of Snow, *EGU General Assembly, Nice, France* (2004), Geophysical Research Abstracts, vol. 6, Abstract EGU04-A-00523
- M. Schneebeli, Th. U. Kaempfer, S. A. Sokratov Time-Lapse X-Ray Computed Tomography of Snow Metamorphism: Instrumentation, *EGU General Assembly, Nice, France* (2004), Geophysical Research Abstracts, vol. 6, Abstract EGU04-A-06109
- S. A. Sokratov, Th. U. Kaempfer, M. Schneebeli Effective Heat Conductivity and Structure of Snow, *EGU General Assembly, Nice, France* (2004), Geophysical Research Abstracts, vol. 6, Abstract EGU04-A-01323
- Th. U. Kaempfer, M. Rappaz Simulation of macrosegregation during solidification processes using multiple, adaptive finite element grids, *Journées d'automne 1999 de la SF2M, Revue de Métallurgie* (1999), p. 131, Société Française de Métallurgie et de Matériaux, Les Fontenelles, Nanterre, France

Hobbies Cross-country orienteering, mountain-biking, mountaineering (skiing, hiking), music (playing the euphonium)

References Upon request

Lebanon, August 2008