

Personal information

Name	Toni Mikael LASSILA
Date/place of birth	02.12.1980 in Helsinki, Finland
Nationality	Finnish
Language skills	Finnish (native), English (fluent), Swedish (basic), French (basic)
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Education

D.Sc. (Tech.), Mathematics (2007 - 2010)

Department of mathematics and systems analysis
Aalto University, Helsinki, Finland
Thesis topic: *Model reduction and level set methods for shape optimization problems*
Supervisor: Prof. Timo Eirola (Aalto)

M.Sc. (Tech.), Engineering mathematics (1999-2007)

Institute of Mathematics, Department of engineering physics and mathematics
Helsinki University of Technology, Espoo, Finland
Thesis topic: *Numerical shape optimization; an application to wave damping* (in Finnish)
Supervisor: Prof. Timo Eirola (TKK)

Publications

Lassila T., Manzoni A. and Rozza G.: *On the approximation of stability factors for general parametrized partial differential equations with a two-level affine decomposition*, submitted, 2011.

Lassila T., Quarteroni A. and Rozza G.: *A reduced basis model with parametric coupling for fluid-structure interaction problems*, SIAM Journal on Scientific Computing, submitted, 2011.

Lassila T., Malossi A.C.I., Astorino M. and Deparis S.: *Geometrical multiscale model of an idealized left ventricle with fluid-structure interaction effects coupled to a one-dimensional viscoelastic arterial network*. Proceedings of the ECCOMAS Thematic International Conference on Simulation and Modeling of Biological Flows (SIMBIO 2011), September 21-23, VUB, Brussels, Belgium, 2011.

Lassila T. and Rozza G.: *Model reduction of semiaffinely parameterized partial differential equations by two-level affine approximation*. Comptes Rendus Mathématique 349:61–66, 2011.

Lassila, T. and Rozza, G.: *Model reduction of steady fluid-structure interaction problems with free-form deformations and reduced basis methods*. Proceedings of 10th Finnish Mechanics Days, Jyväskylä, December 2009, pp. 454--465, 2009.

Rozza, G., Lassila, T., Manzoni, A.: *Reduced basis method for shape optimization in thermal flows parameterized with a polynomial geometric map*. Proceedings of International Conference on Spectral and High-Order Methods, Trondheim, Norway. Lecture Notes in Computational Science and Engineering, Springer, 2009.

Lassila, T. and Rozza, G.: *Parametric free-form shape design with PDE models and reduced basis method*, Computer Methods in Applied Mathematics and Engineering, 199(23-24):1583-1592, 2010.

Xuan Z.C., Lassila T., Rozza G. and Quarteroni A.: *On computing upper and lower bounds on the outputs of linear elasticity problems approximated by the smoothed finite element method*. International Journal of Numerical Methods in Engineering 83:174-195, 2010.

Eirola, T. and Lassila, T.: *Optimization of convex shapes: an approach to crystal shape identification*, Proceedings of the 2nd International Conference on Scale Space and Variational Methods in Computer Vision, Voss, Norway, June 2009, pp.660-671, 2009.

Lassila, T.: *Optimal damping of a membrane and topological shape optimization*, Structural and Multidisciplinary Optimization 38(1):43-52, 2009.

Conference and workshop presentations (international)

Lassila T., Astorino M., Deparis S., Malossi A.C.I., Quarteroni A.: *Multiscale model of an idealized left ventricle with fluid-structure interaction effects coupled to a one-dimensional viscoelastic arterial tree*, ECCOMAS Thematic International Conference on Simulation and Modeling of Biological Flows (SIMBIO 2011), VUB, Brussels, Belgium, September 21–23, 2011.

Lassila T., Manzoni A., Rozza G.: *Geometrical and computational reduction strategies for the approximation and optimization of viscous flows*, Workshop JLL-SMP: "Reduced Basis Methods in High Dimensions", Laboratoire Jacques-Louis Lions, Université Paris 6, June 23–24, 2011.

Lassila T., Manzoni A., Quarteroni A., Rozza G.: *Reduced order modelling for inverse problems in haemodynamics*. 16th International Conference on Finite Elements in Flow Problems, Munich, Germany, March 23–25, 2011.

Lassila T., Manzoni A., Rozza G.: *Reduced basis method for the reliable model reduction of Navier-Stokes equations in cardiovascular modelling*. Model Reduction for Complex Dynamical Systems, TU Berlin, December 2–4, 2010.

Lassila T., Quarteroni A., Rozza, G.: *Reduced formulation of steady fluid-structure interaction with parametric coupling*. IV International Symposium on Modelling of Physiological Flows, Chia Laguna, Sardinia, June 2–5, 2010.

Lassila, T.: *Model reduction of steady fluid-structure interaction problems with free-form deformations and reduced basis methods*, 10th Finnish Mechanics Days, Jyväskylä, December 2009.

Lassila, T.: *How to get in better shape (mathematically)*, SIAM Computational Science and Engineering conference, Miami, United States, March 2009.

Work experience

December 2010 -

Post-doctoral research assistant at Chair of Modelling and Scientific Computing (CMCS), Mathematics Institute of Computational Science and Engineering (MATHICSE), Ecole Polytechnique Fédérale de Lausanne, Switzerland. Supervisor: Prof. Alfio Quarteroni.

August 2009 - November 2010

Assistant at Department of Mathematics and Systems Analysis, Aalto University School of Science and Technology.

September 2008 - June 2009

At the Institute of analysis and scientific computing (IACS), Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland. Primary duties: visiting graduate student, supervisor: Prof. Alfio Quarteroni.

February 2007 - August 2008 Research fellow

At the Institute of Mathematics, Department of Engineering Physics and Mathematics, Helsinki University of Technology. Primary duties: completion of master's thesis, topic *Numerical shape optimization; an application to wave damping* (in Finnish), supervisor Prof. Timo Eirola.

September 2006 - May 2007 Research and teaching assistant

At the Systems Analysis Laboratory, Department of Engineering Physics and Mathematics, Helsinki University of Technology. As part of the research group for *Aircraft trajectory optimization and computational methods for pursuit evasion games*. Work supervised by Dr. Kai Virtanen. Primary duties: implementation and testing of collocation methods for optimal trajectory control and adaptive mesh generation methods for path constrained optimal control problems.

June 2006 - July 2006 Research fellow

At the Institute of Mathematics, Department of Engineering Physics and Mathematics, Helsinki University of Technology. Primary duties: completion of special research project in mathematics, topic *Adaptive mesh generation methods for path constrained optimal control*, supervisor Prof. Timo Eirola.

August 2003 - May 2006 University studies

January 2003 - July 2003 Compulsory Finnish military service

May 2000 - January 2003 Operations engineer

For Manufacturing Channel Europe Ltd in Nummela, Finland. Primary duties: design, programming, development, and maintenance of an enterprise resource planning application for small-and-medium sized businesses.

Teaching experience

Course assistant for the course *Finite Element Method I* held in spring 2010 at the Department of Mathematics and Systems Analysis, Aalto University School of Science and Technology.

Head assistant for the course *Basic Course in Mathematics C3-I* and *C3-II* held in fall 2009 at the Institute of Mathematics, Helsinki University of Technology.

Course assistant for the course *Special Course in Numerical Analysis: Numerical methods for bifurcations* held in spring 2008 at the Department of Mathematics and Systems Analysis, Helsinki University of Technology.

Course assistant for the course *Finite Difference Methods* held in fall 2007 at the Institute of Mathematics, Department of Engineering Physics and Mathematics, Helsinki University of Technology.

Course assistant for the course *Dynamic Optimization* held in spring 2007 at the Systems Analysis Laboratory, Department of Engineering Physics and Mathematics, Helsinki University of Technology.

Students supervised

Dupraz, Marie: *Problème évolutif non linéaire & réduction POD* (semester project BA6, spring 2011, EPFL)

Professional activities and memberships

Member of Society of Industrial and Applied Mathematicians (SIAM)

Member of International Association for Computational Mechanics (IACM)

Member of Finnish Society of Computational Sciences (SuLaTiS)

Member of the organizing committee of the international conference *Perspectives in Numerical Analysis 2008* held at Helsinki University of Technology in May 2008 as part of the TKK Special Year in Numerics

Member of Alumnus Society of Aalto University School of Science and Technology (PoliAlumni)

Reviewer for the international journals *Applications and Applied Mathematics*, *Finite Elements in Analysis and Design*, *Inverse Problems in Science and Engineering*, and *Numerical Methods for Partial Differential Equations*.

Finalist in the student paper prize competition of the *SIAM Computational Science & Engineering* conference held in March 2009 in Miami, United States.