Sofie Esterhazy

Curriculum vitae

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Profile

Expertise: Applied mathematics, partial differential equations, wave propagation, scattering and resonance theory, numerical computations, finite element methods, programming, scientific research and publications, simulation and visualization

Nationality: Austria

Born: 30. August 1983

Working experience

April 2009 -Dec. 2013 **Scientific researcher**, *Vienna University of Technology*, Department of Mathematics and Geoinformation, Institute for Analysis and Scientific Computing, Austria.

- Basic research in the field of numerical analysis for the Helmholtz equation
- Applied research in the field of laser physics, implementation of a new solution method
- Independent research and programming, scientific publication work
- Cooperative work between research groups, assistance in teaching
- Funded by the Graduate School "PDEtech" and the WWTF project "Light coupling to light" (under the "Mathematik und..."-Program 2009)

March 2008 -April 2009 **Scientific assistant**, *Wolfgang-Pauli-Institute*, c/o Department of Mathematics, University of Vienna, Austria.

- Simulation and Visualizations of a nonlinear Schrödinger model with applications on Bose-Einstein-Condensation
- Generation of video simulations and comprehensive visualizations for presentations
- Interdisciplinary cooperation and documentation work

July 2007 -August 2007 **Intern**, *Engineering Center Steyr*, Magna Power train, Austria.

- Simulation and optimization of fluid dynamics in parts

Education

April 2009 -Oct. 2013 **PhD**, *Vienna University of Technology*, Vienna, Austria.

- Doctoral studies in Technical Mathematics within the „Graduate School PDEtech"
- Thesis title: "High-order finite element analysis of the Helmholtz equation and its application in laser physics", Supervisor: J. Markus Melenk
- Conferment of the academic degree of "Doktorin der technischen Wissenschaften" (Dr. tech.)

Oct. 2002 -June 2008 **MSc**, *University of Vienna*, Vienna, Austria.

- Diploma Program in Mathematics with a concentration in Applied Mathematics at the University of Vienna;
- Thesis title: "Numerical simulation and visualization of the Gross-Pitaevskii equation", Supervisor: Norbert J. Mauser
- Conferment of the academic degree of "Magistra der Naturwissenschaften" (Mag. rer. nat.)

June 2001 **Graduation**, *Academic High School, Billrothstrasse 73*, 1190 Vienna, Austria.

Extra

Nov. 2012 **CTBTO**, Advanced Science Course, Interdisciplinary Workshop for scientific academics and diplomatic politicians, UNO City, Austria

Oct. 2006 -June 2007 **Erasmus**, Study abroad within the Erasmus Program at the Pierre et Marie Curie University, Paris, France

Nov. 2001 -June 2002 **Voluntary Scervice** within the development program of the "one world foundation" in Ahungalla, Sri Lanka

Computer Skills

Programs Latex, Mathematica, Maple, Matlab/Simulink, Microsoft Office, Adobe Photoshop, CorelDraw

Languages Fortran, C, C++

Platforms Linux, Macintosh, Windows

Languages

German Native

French Fluent

English Fluent

Interests and Hobbies

Traveling, sewing, backing

Conferences, workshops etc.

05.-11.06, 2009 **Summer school**, under the Graduate School PDEtech and the Wissenschaftskolleg (WK) "Differential Equation Models in Science and Engineering", Weissensee, Austria.

28.-30.06 2009 **Workshop**, *hp-Adaptive Finite Element Methods*, Humboldt-Universität zu Berlin, Germany.

28.06-02.07, 2010 **Summer school**, under the Graduate School PDEtech and the Wissenschaftskolleg (WK) "Differential Equation Models in Science and Engineering", Weissensee, Austria.

30.05-06.06, 2012 **Spring school**, *Nonlinear Partial Differential Equations*, Université libre de Bruxelles, Belgium.

25.-30.08, 2013 **Conference**, *Journées Singulières Augmentées 2013*, Université de Rennes 1, France.

- Poster: "An efficient solution method for the Steady-state Ab-initio Laser Theory"

PDEtech Seminar Talks

12.11.2009 FEM-Computation of a Helmholtz EVP within a new approach for multimode lasers

22.04.2010 Stability and Convergence for high order computations of the Helmholtz equation

18.11.2010 Refined L^2-convergence for high order FEM of the Helmholtz equation, part 1

26.05.2011 Refined L^2-convergence for high order FEM of the Helmholtz equation, part 2

15.12.2011 "Phase shift"-explicit error analysis of the Helmholtz equation

Publications

2013 **S. Esterhazy, D. Liu, M. Liertzer, A. D. Stone, J. M. Melenk, S. Johnson and S. Rotter**, *A scalable numerical approach for the Steady-State Ab-Initio Laser Theory*, PRA, submitted.

2012 **S. Esterhazy and J. Melenk**, *An analysis of discretizations of the Helmholtz equation in L^2- and in negative norms*, in press in Comp. Math. Appl. , extended version available as ASC Report 31/2012.

2011 **S. Esterhazy and J. Melenk**, *On Stability of Discretizations of the Helmholtz Equation*, Book chapter in: Numerical Analysis of Multiscale Problems, I.G. Graham, T.Y. Hou, O. Lakkis, R. Scheichl (Eds.), Springer LNCSE 83 (2012), pp. 285-324 , extended version available as ASC Report 01/2011 .

Theses

PhD **S. Esterhazy**, *High-order finite element analysis of the Helmholtz equation and its application in laser physics*, 2013, Vienna University of Technology .

Master **S. Esterhazy** , *Numerical simulation and visualization of the Gross-Pitaevskii equation*, 2008, University of Vienna.