Helmut Wahanik, PhD

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Toronto, Canada
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Status in Canada: Permanent Resident.

Areas of focus

Scientific Computing, Software Engineering, Applied Partial Differential Equations, Inverse Problems and Machine Learning, Numerical Methods.

Software Development:
C++, C# and .NET, Python, Matlab, Visual Studio, Linux, Math libraries. Very interested in parallel computing and performance optimization, including MPI and GPU coding.

Education

2015 - 2016   **Postdoctoral Fellow - Computer Science**
University of Calgary, Calgary-Alberta
Research on polygon mesh processing in Python, C++, and Trelis. Collaboration with the Geo-innovation research group at Aramco Research Center, Houston, Texas, USA.

2007-2011   **PhD Mathematics**
Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro-Brazil, www.impa.br
Also supervised by TUDelft-The Netherlands.
Thesis work on shock waves and rarefactions of partial equations modelling porous media flow. Numerical computing algorithms written in C++ and Matlab, in Linux. During the Ph.D, two exams were presented: in Partial Differential Equations / Fluid Dynamics, and in Functional analysis / Fourier analysis.

2006-2007   **Scientific Computing Advanced Training**
University of Bristol, Bristol-UK.
EU grant for young scientists, Department of Mathematics, University of Bristol-UK.
Advanced training in scientific computing, focusing in numerical methods for Navier-Stokes.

2005-2006   **MSc Mathematics**
IMPA, Rio de Janeiro-Brazil
Applied Partial Differential Equations, Fluid Dynamics, Scientific Computing, Numerical Methods, Numerical Analysis.

1999-2004   **BSc Mathematics**
Universidad de los Andes, Bogotá-Colombia

Selected publications and talks

Please find a list of publications and talks at: https://github.com/hwahanik

Professional Experience

**Oct 2019 -
currently**

Applied Mathematician / Software Developer
Rocscience, Toronto, https://www.rocscience.com
Research and development of high performance scientific computing algorithms. Main projects: original work on the Fast Multipole Method algorithm for elasticity, released into a product for analysis of underground excavations (C++), work on Sparse Bayesian Learning algorithms (C++ and Matlab), and mentoring students from University of Toronto and University of Waterloo.

**Jun 2016 -
Sept 2019**

Software Developer
Waterloo Hydrogeologic, Waterloo-Ontario, https://www.waterloohydrogeologic.com
Coding an industry leading scientific computing platform for groundwater simulation, based on a large architecture with 180+ projects and more than 7 million lines of code (C#, .NET, and a bit of F#).

2015 - 2016

Research Project Manager
University of Calgary, Calgary-Alberta.
Member of the Interactive Modelling, Visualization and Analytics (illustraRes) research group, working as a project manager of applied research for Aramco Research.

2011-2015

Research Scientist
Schlumberger, Rio de Janeiro-Brazil.
Research on Bayesian inversion algorithms for seismic tomography (Transdimensional MCMC), where the parameter space dimension is variable. Work on diverse projects in applied statistics, scientific computing, and business intelligence.

Projects:
• Seismic tomography research together with Schlumberger Gould Research (SGR) at University of Cambridge-UK, and University of Edinburgh-UK. Link to tMCMC publications
• Application of parallel processing techniques in Fortran, MPI, and Python, in Linux, together with University of Cambridge-UK. Link to tMCMCTomography code
• Author of statistics reliability study for deepwater wells in the Gulf of México.
• Research on characterization of Carbonates Rock lab samples. Link to papers
• Research in modelling of well fluids jointly with Schlumberger Moscow Research, Moscow-Russia.
• Delivered crucial business intelligence solutions for the creation of game-theory-inspired winning strategies for bidding contracts valued above USD 200 million.

Experience in education

2007-2011 Teaching assistant for math graduate courses, IMPA, Rio de Janeiro.
2006-2007 Teaching assistant for science courses, Department of Mathematics, University of Bristol-UK.
1999-2004 Lecturer, Universidad de los Andes. Courses: Statistics for the Social Sciences, Linear Algebra, and Differential Calculus. Teaching assistant for several undergraduate subjects, including Probability and Calculus.

Awards

2005-2011 PhD and MSc Full Graduate Scholarships, IMPA, Rio de Janeiro-Brazil
2006-2007 Scientific Computing Advanced Training EU-Mobility Grant, Dept. of Mathematics, U. of Bristol-UK
2000 Henry Yerly Scholarship of Excellence, Dept. of Mathematics, Universidad de los Andes, Bogotá-Colombia

Other

Hobbies: Running, swimming, spending time with my adorable family.
Languages: English (*fully proficient*), Spanish (*native*), Portuguese (*as a native Brazilian*).