

Pavel Solin, Ph.D.

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Professional Preparation

Charles University (Prague, Czech Republic)	MMCM ¹	M.S. Degree, 1996
Charles University (Prague, Czech Republic)	MMCM	Ph.D. Degree, 1999
Johannes-Kepler University (Linz, Austria)		post-doc, 1999–2001
The University of Texas at Austin (Austin, TX)		post-doc, 2001–2002
Rice University (Houston, TX)		post-doc, 2002–2004

¹MMCM = Mathematical Modeling and Computational Mathematics. An interdisciplinary M.S. and Ph.D. program combining Physics, Mathematics, and Computer Science.

Appointments

Associate Professor, University of Texas at El Paso (UTEP): Aug. 2004 – Dec. 2008
Associate Professor, University of Nevada, Reno (UNR): January 2009 – present

Five publications most closely related to the project

1. P. Solin, K. Segeth, I. Dolezel: *Higher-Order Finite Element Methods*, 408 pages, Chapman & Hall/ CRC Press, ISBN 1-584-88438-X, 2004.
2. P. Solin, J. Cervený, L. Dubcova, I. Dolezel: Multi-Mesh *hp*-FEM for Thermally Conductive Incompressible Flow. In: Proceedings of ECCOMAS Conference COUPLED PROBLEMS 2007 (M. Papadrakakis, E. Onate, B. Schrefler Eds.), CIMNE, Barcelona, pp. 547 - 550.
3. P. Solin, J. Cervený, L. Dubcova: Adaptive Multi-Mesh *hp*-FEM for Linear Thermoelasticity. Research Report No. 2007-08, Department of Mathematical Sciences, UTEP. Accepted to J. Comput. Appl. Math.
4. L. Dubcova, P. Solin, J. Cervený, P. Kus: Space and Time Adaptive Two-Mesh *hp*-FEM for Transient Microwave Heating Problems. Accepted to Electromagnetics.
5. P. Solin, J. Cervený, I. Dolezel: Arbitrary-Level Hanging Nodes and Automatic Adaptivity in the *hp*-FEM, Math. Comput. Simul. 77 (2008), 117 - 132,

Dr. Solin's group and the open-source project Hermes

Since 2004, the group of Dr. Solin has been developing novel space- and space-time adaptive higher-order finite element methods (*hp*-FEM) for multiscale multiphysics coupled problems. The methods are based on novel *PDE-independent* computational a-posteriori error estimates that enable the design of robust adaptive methods that work reliably for *arbitrary combinations of multiphysics PDE problems*. The novel computational methods are being implemented in C++/Python within the open-source project Hermes² (*higher-order modular finite element system*).

²<http://hpfem.math.unr.edu/projects/hermes2d>

Past accomplishments, expertise, and synergistic activities

- Dr. Solin is the author of two monographs on higher-order finite element methods (*Higher-Order Finite Element Methods*, CRC Press, 2003, and *Partial Differential Equations and the Finite Element Method*, J. Wiley & Sons, 2005), co-author of one monograph on integral methods in low-frequency electromagnetics (*Integral Methods in Low-Frequency Electromagnetics*, Wiley/Blackwell, 2009, in print), approx. 20 papers in refereed high-impact international journals, and numerous other refereed papers in journals and conference proceedings papers.
- Dr. Solin is the author or co-author of several novel computational methods such as goal-oriented automatic adaptivity for higher-order finite element methods (*hp*-FEM), approximation with arbitrary-level hanging nodes in the *hp*-FEM, novel automatic adaptivity algorithms for the *hp*-FEM, space-time adaptive multimesh *hp*-FEM for coupled PDE systems, etc.
- Currently, Dr. Solin's open source project Hermes is the only software available that allows for the solution of arbitrary multiphysics PDE systems via space-time adaptive *hp*-FEM on dynamical meshes.
- Member of the Institute of Thermomechanics of the Academy of Sciences of the Czech Republic in Prague.
- Organizer of international conferences
 - *Finite Element Methods in Engineering and Science (FEMTEC 2009)*, January 4 - 9, 2009, Granlibakken conference center, Tahoe City, CA.
 - *European Seminar on Coupled Problems (ESCO 2008)* on June 8 - 13, 2008, Jetrichovice, Czech Republic.
 - *Finite Element Methods in Engineering and Science (FEMTEC 2006)*, December 11-15, 2006, University of Texas at El Paso.
- Organizer of numerous minisymposia at large international conferences ICOSAHOM, IMACS Modeling, MAFELAP, ECCOMAS, SIAM Meetings, etc.
- Referee for J. Comput. Phys., Math. Comput. Sim., J. Comput. Appl. Math., Comput. Methods Appl. Math. Engrg., Int. J. Numer. Appl. Math., Appl. Math. Referee of manuscript proposals for CRC Press and Wiley.
- Member of three technical committees of IMACS. Member of editorial board of Surv. Math. Appl. and Acta Technica. Guest editor for Math. Comput. Sim. and J. Comput. Appl. Math.
- Played a leading role in the creation of a new Ph.D. program in Computational Science at the University of Texas at El Paso in the period 2004 - 2008.

Awards and honors

Bernardo Bolzano Prize (M.S. thesis, 1996),
Josef Hlavka Prize (Ph.D. dissertation, 1999),
Babuška Prize (Ph.D. dissertation, 1999),
TICAM Postdoctoral Fellowship Award (UT Austin, 2001 - 2002),
W.M. Rice Postdoctoral Fellowship Award (Rice University, 2002 - 2004),
Prize of the First Degree by the President of the Czech Technical University for the monograph *Higher-Order Finite Element Methods (CRC Press/Chapman & Hall, 2003)*.