

Małgorzata Peszyńska
CURRICULUM VITÆ

PERSONAL INFORMATION

Born: August 28, 1962, Warsaw, Poland. **Citizenship:** United States and Poland
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EDUCATION AND EMPLOYMENT INFORMATION

EDUCATION

Habilitation (Mathematics)	Warsaw University of Technology, Poland	2011
Thesis:	<i>Analysis of mathematical and computational models for flow and transport processes</i>	
Ph.D. (Mathematics)	University of Augsburg, Augsburg, Germany	1992
Advisor:	Prof. Dr. Karl-Heinz Hoffmann	
Thesis:	<i>Fluid flow through fissured media. Mathematical analysis and numerical approach.</i>	
M.Sc. (Applied Mathematics)	Warsaw University of Technology, Warsaw, Poland	1986

EMPLOYMENT

Professor	Department of Mathematics Oregon State University	2012–
Associate Professor	Department of Mathematics Oregon State University	2006–12
Assistant Professor	Department of Mathematics Oregon State University	2003–06
Research Associate	Center for Subsurface Modeling (CSM) Institute for Computational Engineering and Sciences, (ICES), The University of Texas at Austin	1998–03
Associate Director	CSM TICAM University of Texas at Austin	2002–03
Lecturer	Department of Mathematics The University of Texas at Austin	1995–98
Visiting Assistant Professor	Department of Mathematics and Center for Applied Math., Purdue University	Fall 93 1994–95
Assistant Professor	Institute of Mathematics Warsaw University of Technology, Warsaw	1993–94
Senior Researcher	Systems Research Institute, Polish Academy of Sciences (SRI PAS), Warsaw, Poland	1992–94
DAAD Research Fellow	University of Augsburg Augsburg, Germany	1990–92
Researcher	Systems Research Institute, Polish Academy of Sciences (SRI PAS), Warsaw, Poland	1986–90

AWARDS

(Please see “Professional Experience” for travel awards.)

- Joel Davis Faculty Excellence Award, awarded by Mathematics Department, 2016
- Graduate Faculty Award, (awarded by Mathematics Graduate students), 2016.
- Kosciuszko Foundation, Distinguished Fellow of the Collegium of Eminent Scientists of Polish Origin and Ancestry, January 2015.
<http://www.thekf.org/kf/programs/eminentscientists/>
- Fulbright Research Scholar, 2009-2010, project “*Coupling of discrete and continuum models of metastable configurations*” in collaboration with Interdisciplinary Centre for Modeling (ICM), University of Warsaw, Warsaw, Poland
- Mortar Board Top Professor Award, Oregon State University, May 2005
- Co-author of [10] nominated for Best Paper in Geophysics by Society of Exploration Geophysicists at the occasion of its 75th Anniversary, awarded as Honorable Mention - Geophysics Award, presented at the Award Ceremony in Houston, November 4, 2005
- First Award of the Director and Scientific Council of Systems Research Institute, Polish Academy of Sciences, for best research work in 1993
- Stefan Batory (Soros) Foundation International Travel Award (1993)
- Deutscher Akademischer Austauschdienst (DAAD) Research Fellowship, 1990–1992, University of Augsburg, Augsburg, Germany

GRANT SUPPORT

Federal, state, and industry grants

- Principal Investigator: “APG: Improve STEM graduate student preparedness for workforce.”, \$11,900, NSF DMS-1738014, 2017
- Principal Investigator: “Phase transitions in porous media across multiple scales”, \$383,894K, NSF DMS-1522734, 2015-18
- Principal Investigator: “Risk Reduction of CO₂ Storage with Stochastic Simulations” (Co-PI Mina Ossiander), DOE NETL project Nov. 15, 2013-October 31, 2014, \$94,000
- Principal Investigator: “Cumulative Evaluation of Spatial Risk & Uncertainty in Support of CO₂ Storage Evaluation” (Co-PI Mina Ossiander), DOE NETL project Nov. 15, 2013-October 31, 2014, \$60,000
- Co-Principal Investigator: “Feasibility of Biogeochemical Sealing of Wellbore Cements: Lab and Simulation Tests” (PI: Marta Torres, CEAOS OSU, Co-PI: Rick Colwell), DOE NETL project Nov. 15, 2013-October 31, 2014, \$258,787
- Principal Investigator: “Hybrid modeling in porous media”, NSF DMS-1115827, 9/15/2011–8/31/2014, \$299,905
Senior Personnel: Dorte Wildenschild (OSU School of Chemical, Biological, and Environmental Engrg.).
- Co-Principal Investigator: “SOLAR: Enhanced Photovoltaic Efficiency through Heterojunction Assisted Impact Ionization” (subcontract from Univ. of Oregon, PI-Stephen Kevan), NSF DMS-1035513, 9/1/2010-8/31/2013, \$1,638,803. The total OSU amount of approximately \$670K includes a supplement from Oregon Nanosciences and Microtechnologies Institute (ONAMI)
Other OSU co-principal investigators: Janet Tate and Guenter Schneider (OSU Physics).

- NVIDIA Research Professor: received donation of three Graphics Processing Unit cards NVIDIA Tesla C1060 for High Performance Computing (HPC) needs in teaching/research in computational science worth \$1,444.32, Spring 2009
These cards were used in the HPC component of MTH 654/9 taught by Peszynska in Fall 2009, and were part of Math Learning Center Computer Lab.
- Co-Principal Investigator: “Modeling, Analysis and Simulation of Multiscale Preferential Flow”, Department of Energy, Multiscale Mathematics Program DOE 98089, PI: Showalter, 8/15/2005-8/14/2008, extended to 8/15/2010. \$647,329
- Principal Investigator: “Modeling, Analysis and Simulation of Multiscale Nonlinear Systems: Workshop at Oregon State University”, National Science Foundation, NSF-DMS 0707562, 06/01/2007-10/31/2008, \$27,634
- Principal Investigator: “Model adaptivity for porous media”, National Science Foundation, NSF-DMS 0511190, 06/15/2005-05/31/2010. \$306,304
- Co-Principal Investigator: NSF/ITR “Data Intense Challenge: Instrumented Oilfield of the Future” (PI: Wheeler, \$1,461,005, Sept.’01-’03).
- Co-Principal Investigator: NSF 0215389 SCREMS Proposal “A Parallel Computer Cluster for Multiphysics and Multiscale Modeling of Subsurface and Surface Flows” (PI: Wheeler, \$80,664; ’02-’03).
- Senior Personnel and Participant:
 - NSF 9873326 (KDI “Multiscale Physics Based Simulation of Fluid Flow for Energy and Environmental Applications”, PI: Mary F. Wheeler ’98-’02).
 - National Partnership for Advanced Computational Infrastructure, Alpha Project “Coupling of Models for Energy and Environment”, (PI: Mary F. Wheeler ’98-’03).
 - Department of Energy (“Multi block discretizations for multiphysics porous media problems”, PI: Mary F. Wheeler ’98-’01).
 - Department of Energy (“New generation framework of reservoir simulators”, NGOTP, PIs: Tom Morgan, Mary F. Wheeler ’98-’00).
 - Department of Energy (“Two-way coupled flow and geomechanics”, NGOTP, PI: Sue Minkoff, subcontract from Sandia Laboratories, ’00-02).
 - Texas Higher Education Board: Advanced Research/Technology Program “Modeling and computer simulation of environmental remediation using parallel finite elements and PC clusters” (PI: Wheeler, ’99-’01).
 - Industrial Affiliates Program of CSM (’98-’03).

Internal OSU grants

- OSU Faculty Release Time Award, Fall 2010
- OSU Faculty Release Time Award, Fall 2005
- Principal Investigator: OSU Research Equipment Reserve Fund, “Purchase of High Performance Computing (HPC) cluster nodes for computational science research in College of Science (COS)”, 5/2006 \$33,295
- OSU Faculty Release Time Award, Fall 2004

SCHOLARSHIP AND CREATIVE ACTIVITY

RESEARCH AREAS AND INTERESTS

- [A] Analysis and numerical approximation of partial differential equations; problems with memory and hysteresis; coupled phenomena (*multiphysics*). Development of error estimates and estimators, grid and time step adaptivity. Analysis of problems with interfaces and discontinuous data.
- [M] Mathematical modeling of multiphase, multicomponent flow and transport problems in porous media at multiple scales including porescale. Modeling methane hydrates, coalbed methane, shale gas. Multiscale models for carrier transport in solar cells with heterojunctions. Biofilm modeling.
- [H] Hybrid models for coupling continuum and discrete models and deterministic and stochastic models.
- [C] Challenges in scientific computing: (heterogeneous) domain decomposition (*multi-physics*), parallel, distributed, and GPU computing. Couplings of algorithms. Uncertainty modeling and quantification.
- [U] Stochastic and statistical modeling and uncertainty quantification.

PUBLICATIONS

The listing below is chronological in each category. In particular, [1]-[37] are journal publications, [38]-[56] are other refereed publications, [57]-[66] are other publications including conference proceedings and invited book chapters, and [70]-[79] are technical reports. Additional outreach materials to which I contributed are at [80]-[83]. For links to the articles please see

<http://www.math.oregonstate.edu/~mpesz/publications>.

Author names marked with a '' are of the undergraduate (*), graduate (**), and postdoctoral (***) students and trainees that I advised, and/or mentored, and/or supported.*

(i) Refereed journal publications

- [1] M. Peszyńska, *Analysis of an integro-differential equation arising from modelling of flows with fading memory through fissured media*, J. Partial Diff. Eqs. **8** (1995), pp. 159–173.
- [2] M. Peszyńska, *On a model for nonisothermal flow in fissured media*, Differential and Integral Equations **8** (1995), no. 6, pp. 497–1516.
- [3] M. Peszyńska, *Finite element approximation of diffusion equations with convolution terms*, Math. Comp. **65** (1996), no. 215, pp 1019-1037.
- [4] J. Douglas, Jr., M. Peszyńska, R. E. Showalter, *Single phase flow in partially fissured media*, Transport in Porous Media **28**, pp. 285–306, 1997.
- [5] M. Peszyńska, R. E. Showalter, *A Transport Model with Adsorption Hysteresis*, Differential and Integral Equations, **11** (1998), no.2, 327–340.
- [6] M. Peszyńska, M. F. Wheeler, I. Yotov, *Mortar upscaling for multiphase flow in porous media*, Comp. Geosciences (6), pp. 73-100, 2002.
- [7] Q. Lu (**), M. Peszyńska, M. F. Wheeler, *A Parallel Multi-Block Black-Oil Model in Multi-Model Implementation*, SPE Journal 7(3), pp. 278-287, September 2002, SPE 79535, revised form of [61].

- [8] M. F. Wheeler, M. Pezzyńska, *Computational Engineering and Science Methodologies for Modeling and Simulation of Subsurface Applications*, Advances in Water Resources, 25 (8-12): 1147-1173, Aug-Dec 2002
- [9] S. Minkoff, C. M. Stone, S. Bryant, M. Pezzyńska, M. F. Wheeler, *Coupled Fluid Flow and Geomechanical Deformation Modeling*, Journal of Petroleum Science and Engineering (2003), vol 38/1-2 pp 37 - 56.
- [10] S. Minkoff, C. M. Stone, S. Bryant, M. Pezzyńska, *Coupled Geomechanics and Flow Simulation for Time-Lapse Seismic Modeling*, Geophysics **69**, No 1, 2004. pp 200-211.
- [11] V. Bhat, V. Matossian, M. Parashar, M. Pezzyńska, M. Sen, P. Stoffa, M. F. Wheeler, *Autonomic Oil Reservoir Optimization on the Grid*, Concurrency and Computation: Practice and Experience (**17**), 2005, pp 1-26.
- [12] T. Kurc, U. Catalyurek, X. Zhang, J. Saltz, R. Martino (**), M. F. Wheeler, M. Pezzyńska, A. Sussman, C. Hansen, M. Sen, R. Seifoullaev, P. Stoffa, C. Torres-Verdin, M. Parashar, *A Simulation and Data Analysis System for Large Scale, Data-Driven Oil Reservoir Simulation Studies*, Concurrency and Computation: Practice and Experience (**17**), 2005, pp 1441-1467.
- [13] M. Pezzyńska, *Mortar adaptivity in mixed methods for flow in porous media*, International Journal of Numerical Analysis and Modeling (**2**), No 3, 2005, pp 241–282.
- [14] M. Pezzyńska, *The total compressibility condition and resolution of local nonlinearities in an implicit black-oil model with capillary effects*, Transport in Porous Media, (**63**), Number 1, April 2006, pp 201 - 222
- [15] M. Pezzyńska, R. E. Showalter, *Multiscale elliptic-parabolic systems for flow and transport*, Electron. J. Diff. Eqns., Vol. 2007(2007), No. 147, pp. 1-30.
- [16] M. Pezzyńska, S.-Y. Yi (***), *Numerical methods for unsaturated flow with dynamic capillary pressure in heterogeneous porous media*, International Journal of Numerical Analysis and Modeling, Vol. 5 (2008), Supp, pp. 126-149.
- [17] C. Garibotti (**), M. Pezzyńska, *Upscaling Non-Darcy flow*, Transport in Porous Media, published online March 13, 2009. DOI 10.1007/s11242-009-9369-2, Volume 80, Issue 3 (2009), Pages 401-430.
- [18] M. Pezzyńska, R. E. Showalter, S.-Y. Yi (***), *Homogenization of a pseudo-parabolic system*, Applicable Analysis, Vol. 88, No.9, September 2009, 1265-1282.
- [19] V. Klein (**), M. Pezzyńska. *Robust a-posteriori estimators for multilevel discretizations of reaction-diffusion systems*. *International Journal of Numerical Analysis and Modeling*, 8(1):1–27, 2011.
- [20] M. Pezzyńska, A. Trykozko, *Convergence and Stability in Upscaling of Flow with Inertia from Porescale to Mesoscale*, Intl. J. Multiscale Comp. Engineering, Volume 9, Issue 2 (2011), pp 215-229.
- [21] V. Klein (**), M. Pezzyńska, *Adaptive double-diffusion model and comparison to a highly heterogeneous micro-model*, Journal of Applied Mathematics, vol. 2012, Article ID 938727, 26 pages, 2012. doi:10.1155/2012/938727.
- [22] M. Pezzyńska, A. Trykozko, *“Pore-to-Core Simulations of Flow with Large Velocities Using Continuum Models and Imaging Data”*, Computational Geosciences, Vol. 36, 2013, pp 277=300. DOI: 10.1007/s10596-013-9344-4.
- [23] M. Pezzyńska, *“Numerical scheme for a scalar conservation law with memory”*, Numerical Methods for PDEs, Volume 30, Issue 1, pages 239-264, January 2014.

DOI=10.1002/num.21806&ArticleID=1159335

- [24] D. Foster (**), T. Costa (**), M. Peszynska, G. Schneider, “*Multiscale modeling of solar cells with interface phenomena*”, Journal of Coupled Systems and Multiscale Dynamics, Vol. 1, Issue 2, 2013.
- [25] N. Gibson, P. Medina (**), M. Peszynska, R. Showalter, “*Evolution of phase transitions in methane hydrate*”, J. Math. Anal. Appl. Volume 409, Issue 2 (2014), 816-833, doi=10.1016/j.jmaa.2013.07.023.
- [26] Y. Zhang (**), M. Peszynska, S. Yim, “*Coupling of viscous and potential flow models with free surface for near and far field wave propagation*, International Journal of Numerical Analysis & Modeling, Series B, Volume 4, Number 3, p 256-282, 2013.
- [27] M. Ossiander, M. Peszynska, V. Vasylykivska (**), “*Conditional Stochastic Simulations of Flow and Transport with Karhunen-Loeve Expansions, Stochastic Collocation, and Sequential Gaussian Simulation*, Journal of Applied Mathematics, Volume 2014, Article ID 652594, 21 pages. <http://dx.doi.org/10.1155/2014/652594>
- [28] M. Peszynska, R. Showalter, S.-Y Yi (**), “*Flow and transport when scales are not separated: Numerical analysis and simulations of micro- and macro-models*, IJNAM, Volume 12, Number 3, 2015, pp 476-515.
- [29] M. Peszynska, R. Showalter, J. Webster, “*Advection of Methane in the Hydrate Zone: Model, Analysis, and Examples*”, Mathematical Methods for Applied Sciences, Volume 38, pp 4613-4629, 2015, DOI: 10.1002/mma.3401
- [30] T. Costa (**), D. Foster (**), M. Peszynska, “*Progress in modeling of semiconductor structures with heterojunctions*, Journal of Coupled Systems and Multiscale Dynamics, Vol. 3, Issue 1, 2015, pp 2330-152X/2015/001/021, doi:10.1166/jcsmd.2015.1066
- [31] M. Peszynska, A. Trykozko, G. Iltis, S. Schlueter, D. Wildenschild, “*Biofilm growth in porous media: experiments, computational modeling at the porescale, and upscaling*”, Advances in Water Resources, Volume 95 (2016), pages 288-301. <http://dx.doi.org/10.1016/j.advwatres.2015.07.008>.
- [32] A. Trykozko, M. Peszynska, M. Dohnalik “*Modeling non-Darcy flows in realistic porescale proppant geometries*”, Computers and Geotechnics, Vol. 71, January 2016, pp 352-360. <http://dx.doi.org/10.1016/j.compgeo.2015.08.011>.
- [33] M. Peszynska, F.P. Medina (**), W.-L. Hong, M. Torres, “*Methane hydrate formation under conditions of variable salinity II. Time-stepping variants and sensitivity of reduced numerical model*”. Computation. Special Issue on Advances in Flow and Transport in Porous Media, Volume 4, Issue 1, pp 1-19, 2016. doi:10.3390/computation4010001; Open access link: <http://www.mdpi.com/2079-3197/4/1/1>.
- [34] M. Peszynska, W.-L. Hong, M. Torres, J.-H. Kim, “*Methane hydrate formation in Ullung Basin under conditions of variable salinity. Reduced model and experiments*”. Transport in Porous Media, 114 (1), 2016, pages 1-27, DOI 10.1007/s11242-016-0706-y. <http://link.springer.com/article/10.1007/s11242-016-0706-y>
- [35] M. Ossiander, M. Peszynska, L. Madsen, A. Mur, W. Harbert, “*Estimation and simulation for geospatial porosity and permeability data, Environmental and Ecological Statistics*”, Volume 24, Issue 1 (2017), Page 109, doi:10.1007/s10651-016-0362-y
- [36] F.P. Medina (**), M. Peszynska, “*Stability for implicit-explicit schemes for non-equilibrium kinetic systems in weighted spaces with symmetrization*”, Journal of Computational and Applied Mathematics, Volume 328, 15 January 2018, Pages

- 216-231. doi: 10.1016/j.cam.2017.07.020 <https://doi.org/10.1016/j.cam.2017.07.020>
- [37] T. Costa (**), K. Kennedy (**), M. Peszynska, “*Hybrid three-scale model for evolving pore-scale geometries*”, Computational Geosciences, 2018, in press.

(ii) Refereed conference proceedings and book chapters

- [38] M. Peszyńska, *Finite element approximation of a model of nonisothermal flow through fissured media*, in Finite Element Methods, M. Krizek, P. Neittaanmaki, R. Stenberg (Eds), Lecture Notes in Pure and Applied Mathematics **164** (1994), pp. 357–366, Marcel Dekker.
- [39] M. Peszyńska, *Memory effects and microscale*, Proceedings of IFIP Conference “Modelling and Optimization of Distributed Parameter Systems with Application in Engineering”, Warsaw, July 17-21, 1995 Proceedings: K. Malanowski, Z. Nahorski, M. Peszyńska (Eds.), Chapman & Hall, 1996.
- [40] M. Peszyńska, *A Differential Model of Adsorption Hysteresis with Applications to Chromatography*, III Coloquio sobre Ecuaciones Diferenciales Y Aplicaciones, May 1997, Vol. II, Angel Domingo Rueda, Jorge Guinez, eds., 1998 Universidad del Zulia, Venezuela.
- [41] M. Peszyńska, Q. Lu (**), M. F. Wheeler, *Coupling different numerical algorithms for two-phase fluid flow*, MAFELAP 1999, Brunel University, June 1999, The Mathematics of Finite Elements and Applications X, MAFELAP X, J.R. Whiteman, Ed., Elsevier, 2000, pp. 205-214, August 1999.
- [42] M. Peszyńska, *Advanced Techniques and Algorithms for Reservoir Simulation, III: Multiphysics coupling for two phase flow in degenerate conditions*, IMA Volumes in Mathematics and its Applications, Volume 131: Resource Recovery, Confinement, and Remediation of Environmental Hazards, Eds.: J. Chadam, A. Cunningham, R.E. Ewing, P. Ortoleva, and M. F. Wheeler, pp 21-40, Springer-Verlag, 2002.
- [43] M. Peszyńska, E. W. Jenkins, M. F. Wheeler, *Boundary conditions for fully implicit two-phase flow model*, “Recent Advances in Numerical Methods for Partial Differential Equations and Applications”, Xiaobing Feng and Tim P. Schulze, eds., Contemporary Mathematics Series (306), 2002, pp 85-106, American Mathematical Society.
- [44] J. Saltz, U. Catalyurek, T. Kurc, M. Gray, S. Hastings, S. Langella, S. Narayanan, R. Martino, S. Bryant, M. Peszynska, M. F. Wheeler, A. Sussman, M. Beynon, C. Hansen, D. Stredney, and D. Sessana. *Driving Scientific Applications by Data in Distributed Environments*, Proceedings of International Conference on Computational Science (ICCS 2003) Part IV, Melbourne, Australia (June 2-4, 2003). Lecture Notes in Computer Science, Vol. 2660, pp. 355-364, 2003.
- [45] M. Peszyńska, *Multiphysics Coupling of Three-Phase and Two-Phase Models of Flow in Porous Media*, in “Analysis and Simulation of Multifield Problems”, Eds: Wolfgang Wendland, Messoud Efendiev, Lecture Notes in Applied and Computational Mechanics **12**, Springer-Verlag, 2003.
- [46] M. Peszyńska, A. Trykozko, K. Augustson (*), *Computational upscaling of inertia effects from porescale to mesoscale*, ICCS 2009 Proceedings, Eds. : G. Allen, J. Nabrzyski, E. Seidel, D. van Albada, J. Dongarra, and P. Sloot, LNCS 5544, Part I, pp. 695-704. Springer-Verlag, Berlin-Heidelberg, 2009.
- [47] M. Peszyńska, A. Trykozko, W. Sobieski, *Forchheimer law in computational and exper-*

- imental studies of flow through porous media at porescale and mesoscale*, Current Advances in Nonlinear Analysis and Related Topics, GAKUTO Internat. Ser. Math. Sci. Appl., Vol. 32 (2010), pp. 463-482.
- [48] M. Peszyńska, M. Torres, A. Tréhu. *Adaptive modeling of methane hydrates*, Proceedings of International Conference on Computational Science, ICCS 2010 Procedia Computer Science Vol. 1 (2010), pp 709-717. Available online via www.elsevier.com/locate/procedia and www.sciencedirect.com
- [49] M. Peszyńska, A. Trykozko, K. Kennedy (**), *Sensitivity to anisotropy in non-Darcy flow model from porescale through mesoscale*, In *Proceedings of CMWR XVIII in Barcelona, June 21-24, 2010*. available online at <http://congress.cimne.com/CMWR2010/Proceedings>, 2010. paper 46.
- [50] V. Klein (**), M. Peszyńska. *Adaptive multi-level modeling of coupled multi-scale phenomena with applications to methane evolution in subsurface*, In *Proceedings of CMWR XVIII in Barcelona, June 21-24, 2010*. available online at <http://congress.cimne.com/CMWR2010/Proceedings>, 2010. paper 47.
- [51] S.-Y. Yi (***) , M. Peszyńska, and R. Showalter. *Numerical upscaled model of transport with non-separated scales*, In *Proceedings of CMWR XVIII in Barcelona, June 21-24, 2010*, available online at <http://congress.cimne.com/CMWR2010/Proceedings>, 2010. paper 188.
- [52] M. Peszynska, *Methane in subsurface: mathematical modeling and computational challenges* , Computational Challenges in the Geosciences, edited by Clint Dawson and Margot Gerritsen, Springer, 2013, ISBN 978-1-4614-7433-3.
- [53] A. Trykozko, M. Peszynska, “*Pore-Scale Simulations of Pore Clogging and Upscaling With Large Velocities*”, GAKUTO International Series, Mathematical Sciences and Applications, Vol. 36 (2013), 277-300.
- [54] T. Costa (**), D. Foster (***) , M. Peszynska, “*Domain Decomposition for Heterojunction Problems in Semiconductors*”, VECPAR 2014, International Meeting on High Performance Computing for Computational Science, Eugene, OR June 30-July 3, 2014, http://www.vecpar.org/papers/vecpar2014_submission_2.pdf. Revised and accepted for Springer LNCS, 2014.
- [55] M. Peszynska, “*Modeling and Problem Solving: Curriculum and Program Development*”, The Interdisciplinary Contest in Modeling: Culturing Interdisciplinary Problem Solving, COMAP, 2014, Edited by Chris Arney and Paul J. Campbell, pp 177-192. ISBN 9781933223529.
- [56] Wei-Li Hong, M. Peszynska, “*Numerical modeling of gas hydrate dynamics in nature marine sediments: Case studies from Hydrate Ridge, Cascadia Margin and Ulleung Basin*”, in *Gas Hydrates: from Characterization and Modeling to Applications*, edited by Daniel Broseta, Livio Ruffine, Arnaud Desmedt, to appear in 2018.

(iii) Other including non-refereed conference proceedings and invited book chapters

- [57] M. F. Wheeler, T. Arbogast, S. Bryant, J. Eaton, Q. Lu (**), M. Peszyńska, I. Yotov, *Parallel Multiblock/Multidomain Approach for Reservoir Simulation*, SPE 51884, 15th SPE Reservoir Simulation Symposium, Houston, TX, Feb. 14-17, 1999.
- [58] S.E. Minkoff, C.M. Stone, J.G. Arguello, S. Bryant, J. Eaton, M. Peszyńska, M. F. Wheeler, *Staggered in Time Coupling of Reservoir Flow Simulation and*

- Geomechanical Deformation: Step 1 - One-Way Coupling*, SPE 51920, 15th SPE Reservoir Simulation Symposium, Houston, TX, Feb. 14-17, 1999.
- [59] M. F. Wheeler, M. Peszyńska, X. Gai (**), O. El-Domeiri, *Modeling Subsurface Flow on PC Cluster*, High Performance Computing 2000, A. Tentner, Ed., SCS, pp. 318-323.
- [60] M. Peszyńska, Q. Lu (**), M. F. Wheeler, *Multiphysics Coupling of Codes*, Computational Methods in Water Resources, L.R. Bentley, J.F. Sykes, C.A. Brebbia, W.G. Gray, and G.F. Pinder, Eds., A.A. Balkema, 2000, pp. 175-182.
- [61] Q. Lu (**), M. Peszyńska, M. F. Wheeler, *A Parallel Multi-Block Black-Oil Model in Multi-Model Implementation*, (TICAM Report 01-34), SPE 66359, SPE Reservoir Simulation Symposium, Houston, TX, Feb. 11-14, 2001, in revised form [7].
- [62] M. F. Wheeler, J. A. Wheeler, M. Peszyńska, *A Distributed Computing Portal for Coupling Multi-Physics and Multiple Domains in Porous Media*, Computational Methods in Water Resources, L.R. Bentley, J.F. Sykes, C.A. Brebbia, W.G. Gray, and G.F. Pinder, Eds., A.A. Balkema, 2000, pp. 167-174.
- [63] M. Peszyńska, S. Sun (**), *Reactive transport model coupled to multiphase flow models*, Computational Methods in Water Resources, S. M. Hassanizadeh, R.J. Schotting, W.G. Gray, and G.F. Pinder, Eds., Elsevier, 2002, pp. 923-930.
- [64] M. F. Wheeler, M. Peszyńska, B. Rivière, *Computational Science Issues in Modeling Oil and Gas Production*, Proceedings of the 8th European Conference on the Mathematics of Oil Recovery-ECMOR VIII, (8p), EAGE, 2002. DOI 10.3997/2214-4609.201405953
- [65] M. Peszynska, R. Showalter, A. Trykozko, *Modeling, analysis, and simulation of processes in evolving porous media in applications to methane hydrate and biofilm modeling*, Oberwolfach Workshop on Reactive Flows in Deformable, Complex Media, September 21-26, 2014, Eds. Margot Gerritsen, Jan Martin Nordbotten, Iuliu Sorin Pop, and Barbara Wohlmuth, Report No. 43/2014, p.19-20, DOI: 10.4171/OWR/2014/43
- [66] F. P. Medina (**), and M. Peszynska, *“Hybrid modeling and analysis of multicomponent adsorption with applications to coalbed methane”*, Porous Media: Theory, Properties, and Applications, Nova Science Publishers, Editor: Doris Wolfe. Chapter 1, pages 1-52, 2016, ISBN 978-1-63485-474-0.
- [67] M. Peszynska, *“Never Heard of Methane Hydrate? That Might be Good News”*, SIAM News, January 2018

(iv) Theses

- [68] M. Peszyńska, *Fluid flow through fissured media. Mathematical analysis and numerical approach*, Ph.D. Thesis, University of Augsburg, 1992, Augsburg, Germany
- [69] M. Peszyńska, *“Analysis of mathematical and computational models for flow and transport processes”*, Habilitation Dissertation (extended abstract) (in Polish), Warsaw University of Technology, Warsaw, Poland, 2011, 11 pages

(v) Technical Reports

- [70] M. Peszyńska, *The domain decomposition module for parallel realization of the algorithm for boundary value problems solving*, (in Polish), University of Warsaw, Research Report R.R.I.14, Warsaw, 1989.

- [71] M. Niezgódka, A. Siemińska–Lewandowska, B. Przygodzka, P. Kowalski, M. Peszyńska, and A. Trykozko, *A study of artificial freezing ground techniques for the needs of underground construction in Warsaw*, (in Polish), Systems Research Institute, Polish Academy of Sciences, Warsaw, April 1990.
- [72] M. Peszyńska, *The numerical implementation of SAM (Schwarz Additive Method) for discrete parabolic problems*, University of Warsaw, Research Report R.R.I.14, II.5.2, Warsaw 1990.
- [73] M. Peszyńska, S. Bryant, S. Sun (**), T. LaForce, S. Snider, *Modeling of Complex1 case with IPARS TRCHEM module*, TICAM Report 01-31, 2001.
- [74] M. Peszyńska, S. Sun, *Multiphase Reactive Transport Module TRCHEM in IPARS*, TICAM Report 01-32, 2001.
- [75] Q. Lu (**), M. Peszyńska and Gai Xiuli (**), *Implicit Black-oil Model in IPARS Framework*, TICAM Report 01-33, 2001.
- [76] M. Peszyńska, A. Doud (**), and M. F. Wheeler, *Stochastic reservoir simulations with GSLIB and two-phase and black-oil models under IPARS*, TICAM Report 03-30, 2003.
- [77] Circe Verba, Andrew Thurber, Yvan Alleau, Dipankar Koley, Malgorzata Peszynska, Frederick Colwell, Marta Torres, *“Feasibility of Biogeochemical Sealing of Wellbore Cements: Lab and Simulation tests”*, (NETL-PUB-20070, DOE-NETL), August 2015.
- [78] Cumulative Evaluation of Spatial Risk & Uncertainty in Support of CO2 Storage Evaluation, L. Madsen, J. Nelson (**), M. Ossiander, M. Peszynska, J. Bauer, J. Mbuthia, K. Rose, (Preliminary report, DOE-NETL Task 21), November 2014
- [79] L. Madsen, M. Ossiander, M. Peszynska, A. Goodman, G. Bromhal, W. Harbert, Risk reduction of CO2 storage with stochastic simulations, (Preliminary report, DOE-NETL Task 22), November 2014

(vi) Miscellaneous articles with my contribution

- [80] M. F. Wheeler, J. Saltz, M. Peszyńska, *Addressing Domestic Energy Shortages with Reservoir Simulations*, National Partnership for Advanced Computational Infrastructure (NPACI) Partnership Report 2002, Eds.: R. Graham.
- [81] M. F. Wheeler, S. Bryant, R. Martino, M. Peszyńska, A. Sussmann, J. Saltz, M. Parashar, *Exploiting Aging Oil Fields with Advanced Computational Tools*, *Envision* (Quarterly Science Magazine) **18**, No. 1, (2002), Eds.: R. Graham.
- [82] (featured in:) Nick Houtman, *The Glass Half Full (roughly speaking). It takes a model to measure subsurface water*, Oregon State University TERRA magazine, Summer 2007. <http://www.oregonstate.edu/terra>
- [83] (featured in:) Kat Kothen, *Solving the worlds real-life math problems*, Daily Barometer, Dec. 4, 2014. http://www.orangemedianetwork.com/daily_barometer/news/solving-the-world-s-real-life-math-problems/article_05e5fe70-8114-5e96-88d5-7607908dfc7d.html

PRESENTATIONS

The listing below is in reverse chronological order in all categories.

(i) Plenary talks, colloquia, and guest lectures, since 1998: 140–178

178. *Modeling Methane Hydrate across the Scales*, Energy Resources Engineering Seminar, Stanford University, Nov. 27, 2017.
177. *Methane hydrate modeling, analysis, and simulation: coupled systems and scales*. SIAM Geosciences 2017, invited plenary talk, Erlangen, Germany, Sep 11-14, 2017.
176. *Hybrid multiscale modeling of multicomponent adsorption for ECBM (Enhanced Coalbed Methane Recovery)*. Hydromechanics and Modelling of Hydrosystems Department, University of Stuttgart, Nov. 15, 2016.
175. (Guest Lecture) *Biofilm growth and other coupled processes: from imaging to numerical model at porescale and upscaling*, Department of Mathematics, University of Bergen, Nov. 10, 2016.
174. (Guest Lecture) *Computational modeling of adsorption*, Graduate program in Computational Engineering, University of Warsaw, Data Science Center, Nov. 3, 2016
173. (Colloquium) “*Adsorption: new mathematics and computations for multiple components*”, Maseeh Mathematics & Statistics Colloquium Series, Portland State University, Sep. 30, 2016
172. (University of Washington Applied PDE Colloquium) *Methane hydrate evolution: framework for analysis and modeling*, June 2, 2016
171. (Plenary talk) “*Multiscale modeling of Modeling, Analysis and Simulation of processes in Evolving Porous Media. Applications to Methane Hydrate and Biocementation*”, Oberwolfach Workshop on Reactive Flows in Deformable, Complex Media, September 21-26, 2014
170. (Plenary talk) *Computational Modeling of Methane Hydrates at Multiple Scales*, Workshop on Unconventional Reservoirs, Research Center of Petrobras, (CENPES) Rio de Janeiro, Brazil, August 27-28, 2014
169. (Plenary presentation) “*Computational Mathematics Modeling in Support of Observatories*”, 2014 Gordon Research Conference on Natural Gas Hydrate Systems, Galveston, Texas, USA, March 23-28, 2014
168. (Colloquium) *Hybrid Models and Interfaces*, University of Utah Mathematics Colloquium, Nov. 7, 2013
167. (Plenary presentation) “*Phase transitions in multiphase multicomponent models at core2pore2core*”, Gordon Research Conference, Les Diablerets, Switzerland, June 24-29, 2012
166. (Colloquium) “*Beyond numerical PDEs in subsurface modeling*”, Shell Lecture Series on Energy-Related Mathematics, Rice University, Computational & Applied Mathematics Department, April 16, 2012
165. (Colloquium) “*Mathematical modeling of methane in subsurface: toward hybrid models*”, Maseeh Mathematics & Statistics Colloquium Series, Portland State University, Jan. 27, 2012
164. (Colloquium) “*Mathematical and computational challenges in models of methane evolution in subsurface*”, Mathematics Department, Oregon State University, Nov. 7, 2011
163. (Colloquium) “*Analysis of mathematical and computational models of flow and transport processes*”, Warsaw University of Technology, Department of Mathematics and Information Science, June 13, 2011
162. (Invited plenary talk) “*Methane in subsurface: resource and hazard. Towards hybrid mathematical models and computational solutions*”, IMA Workshop on Societally

- Relevant Computing, April 11-15, 2011, IMA, University of Minnesota
161. (Colloquium), “*Flow and transport with adsorption hysteresis in porous media from porescale through mesoscale to reservoir scale: connecting Navier-Stokes, elliptic solvers, and Ising-like adsorption models*”, Institute of Fundamental Technological Research, Polish Academy of Sciences, June 30, 2010.
 160. (Plenary talk), “*Mathematical models of some coupled subsurface processes relevant to climate change*”, Interdisciplinary Centre for Modeling, University of Warsaw, High Performance Computing Retreat, Bartlowizna, April 14-17, 2010
 159. (Guest Lecture) “*Modeling CO₂ storage and sequestration*”, Mathematics Department, Technische Universität München, September 22, 2009
 158. (Guest lecture) “*Numerics for CO₂ storage and sequestration*”, Mathematics Department, Technische Universität München, September 23, 2009
 157. (Principal Speaker) *Computational multiscale methods for coupled phenomena in subsurface*, DOE Summer School on Multiscale Mathematics and High Performance Computing, WSU at Tri-Cities August 4-6, 2008
 156. (Principal Speaker) *Survey of new continuum numerical multiscale approaches and limitations*, DOE Summer School on Multiscale Mathematics and High Performance Computing, Oregon State University, June 29-July 3, 2007
 155. (Main speaker): Rocky Mountains Mathematics Consortium Summer School, 6/18-22/2007, 10h of talks:
 - i) *RMMC I: Flow and transport in porous media at multiple scales*
 - ii) *RMMC II: Well models, geostatistical simulations using wells*
 - iii) *RMMC III: How to include inertia and flow-rate dependent effects*
 - iv) *RMMC IV: Black oil model and total compressibility condition*
 - v) *RMMC V: Coupled processes in porous media*
 154. (Colloquium) *Nonlocal models of transport in multiscale porous media*, University of Pittsburgh, 4/19/2007,
 153. (Invited lead speaker) *Multiscale models of flow and transport in porous media: modeling and computational aspects*, Northwest Consortium in Multiscale Mathematics Workshop on Multiscale Modeling of Materials, May 25 - 30, 2006 Tacoma, WA
 152. (Invited principal speaker) *Nonlocal models of transport in multiscale porous media: something old and something new*, Mathematical and Numerical Treatment of Fluid Flow and Transport in Porous Media May 22-26, 2006 at University of Nevada, Las Vegas
 151. (Colloquium), Physics Colloquium, OSU, April 17, 2006, *Adaptive modeling of flow and transport in multiscale porous media*
 150. (Colloquium) *Adaptive modeling in porous media*, Mathematics Department, OSU, Nov 22, 2005
 149. (Plenary keynote speaker), Workshop on “Modeling Coupled Processes in Porous Media” in Utrecht, Sept. 19-20, 2005
 148. (Colloquium) *Adaptive numerical methods for flow in porous media*, New Mexico State University, Department of Mathematics, February 3, 2005
 147. (Colloquium) Portland State University, Dept. of Math., February 13, 2004
 146. (Colloquium) Oregon State University, Dept. of Math., February 27, 2003
 145. (Colloquium) University of Laramie, Math Dept., February 11, 2003
 144. (Colloquium) University of Colorado in Denver, June 17, 2002

143. (Colloquium) “*Coupling of models for multiphase flow and transport in porous media with multiple scales*”, Faculty of Mathematik and Informatik, University of Saarbrücken. April 11, 2002
142. (Invited Plenary Talk) *Coupling of models for multiphase flow and transport in porous media with multiple scales*, IMA Minisymposium: Numerical Methods in the Geosciences, March 13-15, 2002
141. (Colloquium) Schlumberger Research Center, Ridgefield, Connecticut, July 2000
140. (Colloquium) *Hysteresis in Porous Media*, Southwest Texas State University, February 1998
- (ii) Invited lectures, workshop and conference presentations since 1998: 71–139**
139. *Challenges of micro-meso-macro porous media* (M. Peszynska, T. Costa, K. Kennedy, A. Trykozko). SIAM Geosciences 2017, invited minisymposium talk, session on Advances and applications of periodic and stochastic homogenisation; Erlangen, Germany, Sep 11-14, 2017.
138. “*Phase transitions in porous media: new applications and results*”, AMS (Spring Western Sectional Meeting), April 22-23, 2017, Washington State University, Pullman, WA
137. “*Computational model of biofilm evolution with a Variational Inequality*”, AWM Research Symposium, Special Session WINASC on Recent Research Development on Numerical Partial Differential Equations and Scientific Computing, invited speaker, UCLA, April 7-8, 2017.
136. “*Pore2core modeling with evolving pore geometry*”, ICES, The University of Texas at Austin, March 31, 2017
135. *Bofilm growth: modeling, simulation, analysis, and upscaling from porescale*, Nonlinear Analysis seminar, Interdisciplinary Centre for Modeling, University of Warsaw, Nov. 22, 2016
134. “*Stochastic Reduced Model for Multiple Scales in Porous Media*”, minisymposium on “Multifidelity Simulation and Approximation in the Computational Sciences”, SIAM CSE, Atlanta, 2/27-3/3, 2017
133. *Reduced Order Hybrid Modeling from Pore-scale to Core-scale*, AIMS Conference, Orlando, FL, July 1-5, 2016
132. *Modeling biofilm evolution with a variational inequality*, (International conference on evolution equations), invited presentation in the session “Analysis and control of PDE evolutions with an interface”. Nashville, TN, May 2016
131. *Two-phase three-component model of methane hydrates*, (Interpore 2016), Cincinnati, Session on “Computational challenges in porous media”, May 2016
130. (CASCADE RAIN, Regional Applied, Interdisciplinary, and Numerical), Washington State University Vancouver, *Reduced models for methane hydrate evolution*, April 9, 2016
129. *From Micro-imaging across Multiple Scales*, SIAM PDE Conference in Scottsdale, Arizona, December 2015
128. “*Time-Stepping for Methane Hydrate Model with variable salinity*”, SIAM Geosciences 2015 in Stanford University June 28-July 2, 2015
127. (CASCADE RAIN, Regional Applied and Interdisciplinary, Computational and Applied Mathematics Seminar), Portland State University, *Weak and strong stability for transport with memory*, April 4, 2015

126. *Phase transitions without regularizations*, Finite Element Circus, IMA, Univ. of Minnesota, October 24-25, 2014
125. *Computational modeling of biofilms*, Pacific Northwest Numerical Analysis Seminar (PNWNAS), Portland State University, Oct. 18, 2014
124. *“Hybrid models of adsorption”*, CMWR XX International Conference on Computational Methods in Water Resources, June 13-27, 2014, University of Stuttgart.
123. *Evolution of methane hydrates*, (Interpore 2014), Milwaukee, Session on “Computational challenges in porous media”
122. (Physics Research Seminar), *“Methane Hydrates. Modeling, Analysis, and Simulation”*, OSU, April 30, 2014
121. (CASCADE Computational and Applied Mathematics Seminar), Oregon State University, *Time-stepping for methane hydrate model*, April 5, 2014
120. *“Phase Transitions Across the Scales”*, minisymposium on “Non-equilibrium Models for Flows in Porous Media”, SIAM Geosciences 2013 in Padova, Italy, June 17-20, 2013 (organizers: I. Sorin Pop, Florin Radu)
119. *“Coupled and Hybrid Models for Methane Evolution in Subsurface”*, minisymposium on “Coupled and Hybrid Models and Multiple Scales in Mathematical Geosciences”, SIAM Annual 2012 meeting in Minneapolis, July 8-12, 2012 (organizers: Lynn Bennethum, Son-Young Yi, M. Peszynska)
118. *“Modeling Flow and Coupled Transport with Adsorption from Pore to Core”*, with A. Trykozko, minisymposium on “Homogenization and Model Reduction Methods for Multiscale Phenomena”, SIAM Annual 2012 meeting in Minneapolis, July 8-12, 2012 (organizer: Yulia Gorb)
117. *“Continuum and discrete models of adsorption at pore2core”*, CMWR XIX International Conference on Computational Methods in Water Resources, June 17-21, 2012, University of Illinois at Urbana-Champaign.
116. *“Evolution Under Constraints: Fate of Methane in Subsurface”*, SIAM Meeting on Analysis of PDEs, San-Diego, CA, Nov 14-17, 2011, minisymposium on “Partial Differential Equations for Non-linear Processes in Porous Media” (organizers: Akif Ibragimov, Luan Hoang, M. Peszynska)
115. *“Numerical approximation of scalar conservation law with hysteresis, relaxation, and double-porosity”*, AMS Western Section Fall Meeting, Salt Lake City, Utah, October 22-23, 2011, special session on “Recent Progress in Numerical PDEs” (organizers: Jichun Li, S. Chow)
114. *“PDEs with inequality constraints”*, Warsaw University of Technology, Department of Mathematics and Information Science, June 13, 2011
113. *“Phase Transitions in Coupled Models: Equilibrium and Kinetic Models”*, SIAM Geosciences 2011, Long Beach, CA, March 21-24, 2011, Minisymposium on Modeling Coupled Phenomena at Multiple Scales for New Technologies (3 parts, organizers: M. Peszynska, R. Helmig)
112. *“Modeling and analysis of coupled multiscale processes in porous media. What, why, and how”*, PDE Seminar, Mathematics Department, University of Warsaw, August 27, 2010
111. *“Sensitivity to anisotropy in non-Darcy flow model from porescale through mesoscale”*, CMWR XVIII International Conference on Computational Methods in Water Resources, June 21-24, 2010, Barcelona, Spain

110. “*Adaptive modeling of methane hydrates*”, ICCS 2010 Conference in Amsterdam, 7th Workshop on Simulation of Multiphase Multiscale problems, May 31-June 2, 2010, Amsterdam
109. “*A-posteriori error analysis: flow and transport problems*”, Numerical Analysis Seminar, Mathematics Department, University of Warsaw, May 20, 2010.
108. “*Adsorption and adsorption hysteresis: modeling and analysis*”, Mathematical Physics Seminar, Mathematics Department, University of Warsaw, April 8, 2010
107. “*Modeling multiphase flow with dynamic capillary pressure in heterogeneous media*”, Mathematical Physics Seminar, Mathematics Department, University of Warsaw, March 25, 2010
106. “*Upscaling in flow through porous media from porescale to mesoscale and beyond*”, Faculty of Materials Science, Warsaw University of Technology) Feb. 25, 2010
105. “*Upscaling for flow*”, March 2, 2010, Phd-MATH seminar, Interdisciplinary Centre for Modeling, University of Warsaw
104. “*Flow and transport in subsurface with multiple scales*”, *MathFest*, Portland, Oregon. August 8, 2009 Invited Papers Session on Fluids Modeling (organizer: K. Socha)
103. “*Multiscale Adaptive Modeling of Inertia and Non-equilibrium Processes*” SIAM Geosciences in Leipzig, June 15-19, 2009. Minisymposium on Modeling of Inertia and Non-Equilibrium Processes
102. “*Upscaling inertia effects in flow*” Minisymposium on Upscaling and Multiscale Techniques for Subsurface Flow and Transport, SIAM Geosciences in Leipzig, Germany, June 15-19, 2009
101. “*Computational upscaling from porescale to mesoscale*”, Minisymposium on Multiscale, Multiphysics Applications, International Conference on Computational Science in Baton Rouge, Louisiana, May 25-27, 2009
100. *Upscaling non-Darcy flow*, Minisymposium on Multiscale Solution Algorithms with Applications to Earth Science (organizer: Sue Minkoff). SIAM Annual in San-Diego, July 7-11, 2008
99. *Multiscale modeling of preferential flow, Part I*, Workshop on Multiscale Nonlinear Systems, Oregon State University, June 25-29, 2007
98. *A-posteriori error estimator for mortar mixed methods for flow in porous media*, Finite Element Circus, University of Maryland) 4/21/2007
97. *How to remove a logarithmic singularity from a numerical solution and to maximize the number N_c* , University of Pittsburgh (Applied Math Seminar), 4/19/2007
96. *Adaptive multiscale methods for flow and transport in porous media*, Pacific Northwest Numerical Analysis Seminar (PNWNAS), Simon Fraser University, Sept. 30, 2006
95. *Adaptive modeling and upscaling*, AMS Regional Meeting, University of Oregon, Minisymposium on PDEs and applications, Nov. 12-13, 2005
94. *Geostatistical simulations with a black-oil model*, SIAM Annual Meeting, Portland, July 12-16, 2004
93. (Hydrophiles Seminar Invited Talk), Oregon State University, March 10, 2004
92. SIAM Conference on Mathematical and Computational Issues in the Geosciences (GS03), March 17-20, 2003
 - *Multiscale and adaptive modeling for multiphase multicomponent flow*
 - *Breaking the “input-run-output” paradigm in reservoir simulation*
91. *Co-processing Viz for IPARS: Interactive Demo*, Industrial Affiliates. Meeting, Cen-

- ter for Subsurface Modeling, The university of Texas at Austin, October 23, 2002
90. *Dynamic Data-Driven Reservoir Simulation with IPARS*, Industrial Affiliates Meeting, Center for Subsurface Modeling, The University of Texas at Austin, October 23, 2002
 89. “*Nonlinear solver for phase transitions with capillary effects in an implicit three-phase three-component black-oil model of flow in porous media*”, Minisymposium on “Numerical Methods for Fully Implicit Formulations of Nonlinear Systems” SIAM 50’t^h Anniversary Meeting, Philadelphia, July 8-12, 2002
 88. “*Coupling of models for multiphase flow and transport in porous media with multiple scales*”, Minisymposium on “Mathematical Modeling and Simulation in the Geosciences”, SIAM 50’t^h Anniversary Meeting, Philadelphia, July 8-12, 2002
 87. Computational Methods in Water Resources XIV, Delft, June 2002
 86. “*Coupling of models for multiphase flow and transport in porous media with multiple scales*”, International Conference on Multifield Problems, University of Stuttgart, April 8-10, 2002
 85. *Upscaling and boundary conditions for multiphase flow in IPARS multiphysics*, Industrial Affiliates Meeting, Center for Subsurface Modeling, The University of Texas at Austin, October 30, 2001
 84. *Numerical issues for hysteresis in porous media*, Minisymposium on “Modeling, Analysis and Simulation of Hysteresis in Porous Media” at Sixth SIAM Conference on Mathematical and Computational Issues in the Geosciences, SIAM Geosciences, Boulder, CO, June 10-14 2001
 83. *Modeling with multiphysics couplings for multiphase flow*, Minisymposium on “Multiphysics Couplings for Geosciences” at Sixth SIAM Conference on Mathematical and Computational Issues in the Geosciences, Boulder, CO, June 10-14 2001
 82. *Parallel Clusters and Subsurface Modeling*, Session “The Future of Massively Parallel PC Clusters in Supercomputing” at NPACI All-Hands Meeting, San Diego, CA, February 6-9, 2001
 81. *Developments in IPARS Multimodel, Multiphysics and Visualization Tools*, Industrial Affiliates Meeting, Center for Subsurface Modeling, The University of Texas at Austin, October 11, 2000
 80. *Mathematical Issues in the Coupling of Multiphase Flow Models*, Minisymposium on “Mathematical Modeling and Numerical Simulation of Subsurface and Surface Flow Problems” at SIAM Annual Meeting, July 10-14, 2000, Puerto Rico
 79. *Multiphysics Coupling of Codes*, XIII International Conference on Computational Methods in Water Resources, Calgary, Alberta, Canada, June 25-29, 2000
 78. *Coupling of different fluid flow codes for multiphase flow and transport*, Conference “Finite Elements in Flow 2000”, Austin, TX, April 30-May 4, 2000
 77. *Mathematical Issues in the Coupling of Single Phase Flow and Two-Phase Flow Models*, Texas PDE, March 25-26, 2000
 76. *Coupling of different multiphase flow models in IPARS framework*, Institute of Mathematics and Applications, Workshop on Resource Recovery, February 2000, Minneapolis
 75. Industrial Affiliates Meeting, Center for Subsurface Modeling, The University of Texas at Austin, October 27, 1999
 74. *Multimodel Multiphysics Implementation under IPARS framework*, Minisymposium

on “Computational Methods in Geoscience Applications” at the Society for Engineering Science 36th Annual Technical Meeting, Austin, TX, Oct. 25-27, 1999

73. *Domain Decomposition for Multiphase Flow: Interface Coupling of Different Numerical and Physical Models*, Mathematics of Finite Elements and Applications, MAFELAP 1999, Brunel University, June 1999
72. *Multiple Numerical Methods in a Multiblock Framework*, SIAM Conf. on Geosciences in San Antonio, March 24-28, 1999
71. *IPARS Multiblock Multi-Model*, Industrial Affiliates Meeting, Center for Subsurface Modeling, The University of Texas at Austin, October 27, 1998

(iii) Seminar talks since 2004: 29–70

70. (Applied Mathematics and Computation Seminar), Oregon State University, *Hydrate modeling across the scales*, February 9, 2018
69. (Applied Mathematics and Computation Seminar), Oregon State University, *Phase field models: an introduction.*, January 12, 2018
68. (Applied Mathematics and Computation Seminar), Oregon State University, *Symmetrization and rescaling give (strong) stability easily*, February 11, 2017
67. (Applied Mathematics and Computation Seminar), Oregon State University, *Hybrid modeling of adsorption = conservation laws coupled to statistical mechanics. Analysis and simulations*, October 14, 2016
66. (Applied Mathematics and Computation Seminar), Oregon State University, *From X-ray Images to Doubly Nonlinear PDEs: Biofilm Model* October 2, 2015
65. (Analysis Seminar), Oregon State University, “*Parabolic Variational Inequalities: what they are, and a new application*”, June 1, 2015
64. (Applied Mathematics and Computation Seminar), Oregon State University, *Multi-scale modeling of flow and transport*, April. 24, 2015
63. [(Mathematics Graduate Seminar)], “*Interdisciplinary Mathematics = Modeling + Analysis + Simulation*”, OSU, February 18, 2015
62. (Invited talk) *Computational modeling of biofilms*, Mathematical Biology Seminar, Nov. 20, 2014
61. (Analysis Seminar), Oregon State University, “*Analysis of degenerate and singular reaction-diffusion equations*”, June 2, 2014
60. [(Mathematics Graduate Seminar)], “*Interdisciplinary Mathematics = Modeling + Analysis + Simulation*”, OSU, April. 30, 2014
59. (Applied Mathematics and Computation Seminar), Oregon State University, *Modeling from porescale to Darcy scale: then, now, and next*, Feb. 14, 2014
58. (Applied Mathematics and Computation Seminar), Oregon State University, *Memory effects=Subscale diffusion. Numerical approximation*, Nov. 8, 2013
57. [(Mathematics Graduate seminar)], “*Hybrid modeling*”, OSU, Feb. 20, 2013
56. (Applied Mathematics and Computation Seminar), Oregon State University, “*Discrete and continuum models of adsorption at multiple scales*”, Jan. 25, 2013
55. (Applied Mathematics and Computation Seminar), Oregon State University, “*Numerical solution of nonlinear evolution equations*”, Oct. 12, 2012
54. (Analysis Seminar), Oregon State University, “*Smoothness in fractional conservation laws II*”, March 12, 2012
53. (Analysis Seminar), Oregon State University, “*Smoothness in fractional conservation*

- laws I*", Feb. 27, 2012
52. (Applied Mathematics and Computation Seminar), Oregon State University, "*Solving problems with inequality constraints II*", Feb. 17, 2012
 51. (Applied Mathematics and Computation Seminar), Oregon State University, "*Solving problems with inequality constraints I*", Dec. 2, 2011
 50. [(Mathematics Graduate seminar)], "*Mathematical modeling, analysis, and simulation of flow and transport problems*", OSU, Nov. 30, 2011
 49. (Applied Mathematics and Computation Seminar), Oregon State University, "*Flow with inertia and coupled transport: from porescale up to mesoscale*", April 29, 2011
 48. [(Mathematics Graduate seminar)], "*Mathematical analysis, and simulation of problems relevant to environment and energy resources*", OSU, March 2, 2011
 47. (Applied Mathematics and Computation Seminar), Oregon State University, "*Mixed methods for linear problems: variational and numerical point of view*", October 15, 2010
 46. (Applied Mathematics and Computation Seminar), Oregon State University, "*ABCO2: modeling CO2 sequestration*", November 13, 2009.
 45. (Applied Mathematics and Computation Seminar), Oregon State University, "*Upscaling of inertia terms from porescale to mesoscale and from mesoscale to macroscale*" (with A. Trykozko, K. Augustson), May 29, 2009
 44. (Applied Mathematics and Computation Seminar), Oregon State University, "*Modeling, analysis, and simulation of adsorption and adsorption hysteresis*", Mar 13, 2009
 43. (Applied Mathematics and Computation Seminar), Oregon State University, "*Modeling liquid-gas phase transitions in an implicit black-oil model*", November 21, 2008
 42. (Applied Mathematics and Computation Seminar), Oregon State University, "*Overview of numerical multiscale methods*", May 23, 2008.
 41. (Applied Mathematics and Computation Seminar), Oregon State University, "*Upscaling for linear and nonlinear elliptic problems with finite element methods. Part II*", Jan. 11, 2008
 40. (Applied Mathematics and Computation Seminar), Oregon State University, "*Upscaling for linear and nonlinear elliptic problems with finite element methods. Part I*", Nov. 30, 2007
 39. (Applied Mathematics and Computation Seminar), Oregon State University, April 13, 2007, "*A-posteriori error estimate framework in finite element and finite difference methods*
 38. (Applied Mathematics and Computation Seminar) Oregon State University, March 16, 2007, "*Wells continued: large scale computing, geostatistical simulations and optimization*
 37. (Applied Mathematics and Computation Seminar) Oregon State University, March 2, 2007 "*Peaceman and Thiem well models or how to remove a logarithmic singularity from your numerical solution*
 36. (Applied Mathematics and Computation Seminar) Oregon State University, June 9, 2006, "*Pore-scale simulations with a vorticity-stream function solver for Navier-Stokes equations*", shared with Kyle Augustson
 35. (Applied Mathematics and Computation Seminar) Oregon State University, June 2, 2006, "*Nonlocal models of flow and transport: something old and something new, something borrowed ...*", with R. E. Showalter

34. (Applied Mathematics and Computation Seminar), OSU, Dec. 2, 2005 and Jan. 13, 2006, “*Lagrange multipliers and LBB condition in discrete mixed methods for Darcy and Stokes flow. Part I and Part II*”
33. (Seminar), Applied Mathematics and Computation Seminar, Oregon State University, June 3, 2005, *Secondary diffusion*
32. (Seminar), Applied Mathematics and Computation Seminar, Oregon State University, April 29, 2005, “*Primer on domain decomposition methods for flow and transport*”
31. (Applied Mathematics and Computation Seminar) Oregon State University, January 28, 2005, “*Nonlocal (memory) terms in flow and transport*”
30. (Applied Mathematics and Computation Seminar) Oregon State University, November 5, 2004 “*Introduction to heterogeneous multiphase flow*”
29. (Applied Mathematics and Computation Seminar) Oregon State University, October 1, 2004 “*Introduction to porous and fractured media*” (shared with Ralph Showalter).

(iv) Undergraduate and outreach talks since 2004: 11–28

28. PUMP program at California State University Northridge, July 25, 2017, Mathematics Graduate Program at Oregon State presentation
27. MTH 599 Mathematics Graduate Seminar, April 2017
26. MTH 599 Mathematics Graduate Seminar, April 2016
25. (OSU Honors College-Science thesis event) , February 25, 2016
24. (OSU Honors College-Science matching event) , January, 2016
23. (OSU Mathematics undergraduate talk) “*Undergraduate research and Interdisciplinary Mathematics*”, Dec. 1, 2015
22. (OSU Mathematics undergraduate talk) “*Interdisciplinary mathematics (discrete and continuous) needs you*”, Nov. 5, 2012
21. (Math REU talk) “*What can differential equations (not) do for climate change ?*”, Mathematics, OSU, July 18, 2011
20. (Graduate Seminar), Oregon State University, “*10,000 hours of modeling, analysis, and simulation*”, November 23, 2009
19. (REU talk) (OSU Mathematics), July 21, 2008, *Upscaling elliptic PDEs*
18. (OSU Academy of Lifelong Learning, invited talk) *From Copernicus and Sklodowska-Curie to Banach, Schauder and Ulam*, 4/26/2007
17. (Mathematics REU at OSU program), *Multi-* Mathematics and Careers*, Oregon State University, Aug.8, 2006
16. (Seminar, Introduction to Mathematics Research at OSU), April 26, 2006, *The purpose of Numerical Analysis is insight, not movies*
15. (Undergraduate Colloquium), Lewis and Clark University, April 19, 2006, *Multi-* Mathematics in Subsurface*
14. (Mathematics REU talk), *Mathematics of Adsorption*, Oregon State University, July 27, 2005
13. (Math. Grad. Students Research Seminar, OSU), *Multi-* Mathematics*, Oregon State University, February 9, 2004
12. (REU talk) *Mathematics of Adsorption*, Mathematics REU at OSU, Oregon State University, July 21, 2004
11. (Math. Grad. Students Research Seminar), Oregon State University, June 1, 2004

(v) Posters and demonstrations, since 2000: 1–10

10. (Poster) *“Tired of Delta T? Reduced models overcome the complexity of transport simulations in evolving pore-scale geometries* 2016 Gordon Research Conference on Flow and Transport in Porous Media, Girona, Spain, August 1-5, 2016
9. (Poster) *“Progress in Computational Mathematics Modeling of Methane hydrates”*, 2016 Gordon Research Conference on Natural Gas Hydrate Systems, Galveston, Texas, USA, February, 2016
8. (Poster) *“Hybrid Pore-scale Modeling with Three Scales”* (joint with A. Trykozko, K. Kennedy, T. Costa, M. Prodanovic, and D. Wildenschild), SIAM Geosciences 2015, Stanford University, June 28-July 2, 2015
7. (Poster) *“Hybrid Pore-scale Modeling with Three Scales”* (joint with A. Trykozko, K. Kennedy, T. Costa, M. Prodanovic, and D. Wildenschild), IMA Workshop on Hydraulic Fracturing, May 11-14, 2015, University of Minnesota
6. (Poster) *“Stochastic parametrizations and simulations in porous media”* (joint with M. Osslander and V. Vasylykivska), poster at IMA Workshop “Computing with Uncertainty: Mathematical Modeling, Numerical Approximation and Large Scale Optimization of Complex Systems with Uncertainty”, Oct. 18-22, 2010, University of Minnesota
5. (Poster) *Numerical modeling of dynamic capillary pressure (joint with S.-Y. Yi)* Workshop on Multiscale Nonlinear Systems, Oregon State University, June 25-29, 2007
4. (Poster) *Upscaling non-Darcy flow* (joint with C. Garibotti), (Workshop on Multiscale Nonlinear Systems, Oregon State University, June 25-29, 2007)
3. (Poster) *Nonlocal models of flow and transport* (joint with R. E. Showalter), Workshop on Multiscale Nonlinear Systems, Oregon State University, June 25-29, 2007
2. (Demonstration) *NPACI and TACC booths*, Supercomputing 2002, Baltimore, Nov. 16-22, 2002
1. (Demonstration) *“Visualize to optimize (oil production)”*, National Science Foundation ACCESS center, Sept. 2000

SERVICE

SERVICE TO THE PROFESSION

- **Editorial boards:**
 - Associate Editor of *SIAM Journal on Numerical Analysis*
 - Member of the Editorial Board of *Computation*
 - Associate Editor of *Journal of Applied Mathematics*
 - Associate Editor of *International Journal of Numerical Analysis & Modeling*
- **Other editorial work:**
 - Co-editor of *White Paper from Forward Looking Workshop on Mathematical Geosciences* November 13, 2011, Editors: Frank Giraldo, Michel Kern, Malgorzata Peszynska, Ivan Yotov, at
<http://wiki.siam.org/siag-gs/images/siag-gs/8/88/ForwardLookingWorkshopWhitePaper.pdf>
 - Co-editor of Proceedings of Workshop on Multiscale Nonlinear Systems, published in *International Journal of Numerical Analysis & Modeling*, (13 papers accepted), Issue 5, September, 2008
 - Guest Editor of *Concurrency and Computation: Practice and Experience, Special issue on “High Performance Computing in Geosciences”*, **17**, 2005, M. Peszynska, M. F. Wheeler, <http://onlinelibrary.wiley.com/doi/10.1002/cpe.896/pdf>, DOI: 10.1002/cpe.896
 - Co-Editor of refereed conference proceedings volume: *Modelling and optimization of distributed parameter systems*. Eds: K. Malanowski, Z. Nahorski, M. Peszyńska, Chapman & Hall, New York, 1996, 387 pages
- **Review panelist for National Science Foundation:** (15x since 2002-) *Information Technology Research, Applied Analysis, Collaboration in Mathematical Geosciences, Computational Fluids, RTG (EWSM21), Numerical Methods and Applications, Numerical Partial Differential Equations, Computation and Data Enabled Science and Engineering*.
- **Reviewer of grant proposals and panelist for funding agencies:**
 - National Science Foundation: DMS Computational Math, Applied Analysis, Computation and Data Enabled Science and Engineering, Research Training Groups, Collaboration in Mathematical Geosciences, Numerical PDEs, NSF Information Technology Research, NSF-Hydrology (dates confidential)
 - Deutsche Forschungsgemeinschaft (DFG) review panel for Collaborative Research Center CRC 1313, “Interface-Driven Multi-Field Processes in Porous Media - Flow, Transport and Deformation”, University of Stuttgart, July 2017
 - Fulbright - CIES, Peer Reviewer Summer 2017
 - CRDF (Cooperative Grants Program of the U.S. Civilian Research and Development Foundation)
 - Israeli Science Foundation
 - Portuguese Science and Technology Foundation (FCT)
 - Netherlands Organisation for Scientific Research (NWO)
 - United States Department of Energy
 - Army Research Office
 - American Chemical Society (Petroleum Research Fund)
- **Review and referee service:**

- Referee for journals (average 10 articles per year, since 1996-): *Advances in Water Resources*, *AIMS Material Science*, *Annales Polonici Mathematici*, *Applicable Analysis*, *Applied Numerical Mathematics*, *Applied Mathematical Modeling*, *Computational Geosciences*, *Communications in Numerical Methods in Engineering*, *Computer Methods in Applied Mechanics and Engineering*, *Computers & Mathematics with Applications*, *Computing and Visualization in Science*, *Concurrency and Computation: Practice and Experience*, *Electronic Journal of Differential Equations*, *European Journal of Applied Mathematics*, *G-cubed (Geochemistry, Geophysics, Geosystems)*, *International Journal of Heat and Mass Transfer*, *International Journal of Mathematics and Mathematical Sciences*, *International Journal for Numerical Methods in Engineering*, *International Journal for Numerical Methods in Fluids*, *International Journal of Thermal Sciences*, *Journal of Computational Physics*, *Journal of Mathematical Analysis and Applications*, *Journal of Petroleum Science and Engineering*, *Mathematical Methods in the Applied Sciences*, *Mathematics & Computers in Simulation*, *Multiscale Modeling & Simulation (SIAM)*, *Numerical Methods for Partial Differential Equations*, *Oil & Gas Science and Technology*, *Progress in Computational Fluid Dynamics*, *SIAM Journal on Scientific Computing*, *SIAM Journal on Numerical Analysis*, *SPE Journal*, *Transport in Porous Media*, *Water Resources Research*, *Zeitschrift fuer Angewandte Mathematik und Physik*.
- Referee of Conference Proceedings in refereed volumes: 5x since 1995
- Reviewer for *Mathematical Reviews*: over 129 reviews 1998-present.
- **External referee for tenure and promotion process:** (8 cases since 2008) = 5 Associate Professor + tenure & 3 Full Professor
- **Committees, highlights:**
 - SIAM Pacific Northwest Section, **President**; May 2018-April 2020 (elected)
 - SIAM Pacific Northwest Section, **Vice-President**; May 2016-April 2018
 - **Chair of Organizing Committee**, SIAM Pacific Northwest Section biennial conference co-located with PNWNAS, October 27-29, 2017, at Oregon State University.
 - **Chair** for SIAM Activity Group on Geosciences, January 1, 2011-December 31, 2012. (elected)
 - **Chair of the Organizing Committee** of SIAM Geosciences (GS11), March 21-24, 2011, held at Long Beach, CA.
 - **Program Officer** for SIAM Activity Group on Geosciences, January 1, 2009-December 31, 2010. (elected)
- **Committees:** (full list)
 - SIAM-JMM Committee, member, 2018-19-20
 - SIAM Committee on Programs and Conferences, member, 2017-18-19
 - SIAM Geosciences Officer Nominating Committee, 2014
 - **Chair of Organizing Committee**, CASCADE Computational and Applied Mathematics Seminar 2014, OSU Campus, Corvallis, OR, April 5, 2014
 - Program Committee of Interpore 2014, Milwaukee, May 27-30, 2014
 - SIAM Annual 2014 Organizing Committee, Geosciences track organizer, 2013-14
 - Program Committee of Interpore 2013, Prague, May 22-24, 2013
 - SIAM Geosciences Prize Committee for Career and Junior Scientist prizes, awarded

- at SIAM-GS Conference, 2013
- **Chair** of Organizing Committee, Forward Looking Workshop in Mathematical Geosciences in connection with evaluation of NSF program on Collaboration in Mathematical Geosciences, sponsored by NSF-DMS and SIAM Activity group on Geosciences, Crystal City, Sept. 16-17, 2011 at http://wiki.siam.org/siag-gs/index.php/Forward_Looking_Workshop
- International Program Committee, *SIMULTECH* 2011 International Conference on Simulation and Modeling Methodologies, Technologies and Applications, Noordwijkerhout, The Netherlands, 29-31 July, 2011.
- Program Committee, *Computer Aspects of Numerical Algorithms (CANA'10)*, Wisla, Poland, October 18-20, 2010
- Panelist at DOE Computational Subsurface Science Workshop, panel on Priority Research Directions in Coupled Phenomena, Bethesda, MD, Jan. 9-12, 2007
- Hiring Committee: Applied Analysis and Reservoir Mechanics/Industrial Mathematics, Department of Mathematics, University of Bergen, June–December 2004
- Secretary of Organizing Committee of the IFIP Conference “Modelling and Optimization of Distributed Parameter Systems with Application in Engineering”, Warsaw, July 17-21, 1995
- **Other significant professional service:**
 - Geosciences, January 1, 2009-December 31, 2010. (elected)
- **Committees:** (full list)
 - SIAM-JMM Committee, member, 2018-19-20
 - SIAM Committee on Programs and Conferences, member, 2017-18-19
 - SIAM Geosciences Officer Nominating Committee, 2014
 - **Chair of Organizing Committee**, CASCADE Computational and Applied Mathematics Seminar 2014, OSU Campus, Corvallis, OR, April 5, 2014
 - Program Committee of Interpore 2014, Milwaukee, May 27-30, 2014
 - SIAM Annual 2014 Organizing Committee, Geosciences track organizer, 2013-14
 - Program Committee of Interpore 2013, Prague, May 22-24, 2013
 - SIAM Geosciences Prize Committee for Career and Junior Scientist prizes, awarded at SIAM-GS Conference, 2013
 - **Chair** of Organizing Committee, Forward Looking Workshop in Mathematical Geosciences in connection with evaluation of NSF program on Collaboration in Mathematical Geosciences, sponsored by NSF-DMS and SIAM Activity group on Geosciences, Crystal City, Sept. 16-17, 2011 at http://wiki.siam.org/siag-gs/index.php/Forward_Looking_Workshop
 - International Program Committee, *SIMULTECH* 2011 International Conference on Simulation and Modeling Methodologies, Technologies and Applications, Noordwijkerhout, The Netherlands, 29-31 July, 2011.
 - Program Committee, *Computer Aspects of Numerical Algorithms (CANA'10)*, Wisla, Poland, October 18-20, 2010
 - Panelist at DOE Computational Subsurface Science Workshop, panel on Priority Research Directions in Coupled Phenomena, Bethesda, MD, Jan. 9-12, 2007
 - Hiring Committee: Applied Analysis and Reservoir Mechanics/Industrial Mathematics, Department of Mathematics, University of Bergen, June–December 2004
 - Secretary of Organizing Committee of the IFIP Conference “Modelling and Op-

timization of Distributed Parameter Systems with Application in Engineering”, Warsaw, July 17-21, 1995

• **Other significant professional service:**

- Session organizer, CMWR (Computational Methods in Water Resources XXII) 2018; June 3-7, 2018; Saint Malo, France.
- Organizer of minisymposium at SIAM GS 2017 “*In memory of Jim Douglas, Jr.*”, Erkangen, Germany, Sep 11-14, 2017
- Math Alliance F-GAP mentor, 2016; 2017-
- Computation Travel Award 2017; evaluation committee, Spring 2017
- Poster judge, AWM Research Symposium, April 7-8, 2017
- Mentor and Student Opportunities Lab Volunteer, Broader Engagement program sponsored by Sustainable Horizons Institute, SIAM CSE 2017, Atlanta, 2/27-3/3, 2017
- Organizer of minisymposium at SIAM CSE “*New Approaches to Complex Coupled Multiscale Systems*”, Atlanta, 2/27-3/3, 2017
- Women in Data Science ambassador, local satellite event organizer, at Oregon State University, February 3, 2017
- Co-organizer of session “*Computational challenges in porous media*” (joint with Chaozhong Qin, Utrecht University), Interpore 2016
- Co-organizer of session “*Hybrid modeling and Reconstruction in Porous Media*” (joint with A. Trykozko), SIAM Geosciences 2015, Stanford University, June 28-July 2, 2015
- Co-organizer of a minisymposium at SIAM Geosciences (GS13), *Coupled Phenomena and Scales for Greener Energy Resources* (2 parts, with Lynn Bennethum and Rainer Helmig), June 17-21, 2013, Padova, Italy
- Co-organizer of a minisymposium at SIAM Geosciences (GS13), *Advances in Pore-Scale Modeling and Upscaling* (4 parts, with Tim Scheibe, Matt Balhoff, Masa Prodanovic, Ken Sorbie, Pavel Tomin), June 17-21, 2013, Padova, Italy
- Co-organizer of a minisymposium at SIAM Annual 2012 (with L. Bennethum and S.-Y. Yi), *Coupled and hybrid models at multiple scales in geosciences*, Minneapolis, MN, July 9-13, 2012,
- Co-organizer of a minisymposium at SIAM UQ 2012 (with M. Ossiander and N. Gibson), *Random Media: Models, Simulations, and Applications*, Raleigh, NC, April 2-5, 2012
- (Invited) convener of the session “Multiphase and pore-scale modeling: challenges and perspectives” (with Vahid Joekar-Niasar, Utrecht University), Computational Methods for Water Resources 2012, University of Illinois, Urbana-Champaign.
- Co-organizer of Porescale Benchmark at <http://www.porescalebenchmark.pbworks.com> (with Masa Prodanovic, Dorthie Wildenschild), initiated Fall 2011.
- Co-organizer of a minisymposium at SIAM PDE 2011 (PD11) (with A. Ibraguimov and L. Hoang), *PDEs for Nonlinear Processes in Porous Media*, November 14-17, San Diego, CA
- Co-organizer of a minisymposium at SIAM Geosciences (GS11), *Modeling Coupled Phenomena at Multiple Scales for New Technologies* (3 parts, with Rainer Helmig), March 21-24, 2011, Long Beach, CA

- Organizer of a minisymposium at SIAM Geosciences (GS09), *Modeling of Inertia and Non-Equilibrium Processes*, June 14-18, 2009, Leipzig, Germany
- Organizer (with R. Showalter and Son-Young Yi) of Workshop on “Modeling, Analysis and Simulation of Multiscale Nonlinear Systems” in cooperation with Society of Industrial and Applied Mathematics (SIAM) Activity Group on Geosciences, Oregon State University, June 25-29, 2007
- Co-organizer (with S. Minkoff) of a minisymposium at SIAM Conference on Mathematical and Computational Issues in the Geosciences (GS05), *Multiscale Modeling in the Earth Sciences*, Avignon, France, June 7-10, 2005
- ICES, University of Texas at Austin, Computer Committee (2003)
- Organizer of a minisymposium at SIAM Conference on Mathematical and Computational Issues in the Geosciences (GS03), *Electronic Fields of the Future: Mathematical and Computational Challenges*, March 17-20, 2003, Austin, Texas
- Organizer of a special session “Mathematical and Numerical Modeling for Subsurface and Surface Problems” at CMWR (Computational Methods in Water Resources), Delft, June 2002
- Organizer of two minisymposia at Sixth SIAM Conference on Mathematical and Computational Issues in the Geosciences, June 10-14 2001, Boulder, CO
 - * “*Modeling, Analysis and Simulation of Hysteresis in Porous Media*”
 - * “*Multiphysics Couplings for Geosciences*” (with C. Dawson, Mary F. Wheeler)
- Coordinator of multiblock multiphysics simulator IPARS (Integrated Parallel Accurate Reservoir Simulator) framework, Austin, Texas, 1998-2003
- Coordinator of REU NPACI (National Partnership for Advanced Computational Infrastructure), Austin, TX, Summer 2000
- Member of a Committee for selection of textbooks, Math Dept UT Austin, Spring 96
- Member of Scientific Council of the Systems Research Institute, Polish Academy of Sciences, 1993-1994

UNIVERSITY SERVICE

- **Mathematics Department committees**

- **Graduate Committee Chair 2015-**
- **(Co-)organizer of Applied Mathematics and Computation Seminar:** an interdisciplinary weekly seminar at Oregon State University, Fall 2004-09, Fall 2010-current, meets Fridays 12:00-12:50.
http://www.math.oregonstate.edu/amc_seminar
The AMC seminar has been attended by a large audience from across campus, consisting of faculty and students from OSU Physics, Geosciences, Forestry, COAS, and Engineering, as well as by colleagues from nearby universities and other visitors. Its program consists of expository and technical presentations as well as short tutorials given by the participants on their research or current topics of interest.
- **Organizer, Applied Mathematics and Computation Journal Club:** a bi-weekly event for graduate students of mathematics and other disciplines at Oregon State University, Fall 2010, Winter 2011, Winter–Spring 2012, Winter–Spring 2013, Winter 2014, Winter 2017.

http://www.math.oregonstate.edu/amc_journal

In addition to registered mathematics graduate students, the journal club has been attended by mathematics faculty and engineering students.

- Graduate Advisor and Graduate Committee member, 2006-2009, 2010-2011, 2013-15
- Advisory Committee, 2012-2014
- Mid-Tenure Faculty Review Committee, 2014-15
- Promotion and Tenure (Dossier Preparation) Committee, 2013-14
- Undergraduate Advisor, 2005-2006, 2010-2011
- **Undergraduate Task Force, Applied and Computational Mathematics Option, 2013-14**
- Teaching committee 2004-2005, 2011-2012
- Faculty Search Committee for IGERT positions, 2004-2005; 2005-2006
- Computer committee 2003-2006, 2007-2009 [**Chair 2007-2009**]
- Website committee 2003-2009, [**Chair 2004-2009**]
- Foreign language examiner 2003-2005
- **Oregon State University committes:**
 - Faculty Senate Computing Resources Committee, 2016- [**Chair 2017-**]
 - Water Resources Task Force, June 2015-May 2016
 - College of Science OSU Associate Dean Search committee, 2013-2014
 - OSU Faculty Senate Bacc-core committee, 2013-2016
 - Member, OSU President’s Commission on the Status of Women 2013-2016. [Leadership 13-15, Mentoring and Creer Advancement 13-14, Scholarships and Awards 14-15]
 - Internal Advisory Committee on the “NSF ADVANCE” grant (PI: Susan Shaw), May 2013-
- **Graduate Council Representative** on committees: Ren Dakai (Wood Sci, MSc April 2005), Mike Stewart (Nucl Engrg, MSc April 2005), Jacob Zechmann (EECS, MSc June 2005), Zac Gonsior (MSc in Geology, 3/06), Tao Xu (EECS, PhD committee), Yu Zhang (PhD in EECE, 9/06), Alison Ainsworth, (M.Sc. in Fish and Wildlife, 3/13/2007), Carlos Sierra (PhD Forest Engineering, 2007-2009), Razvan Nes (PhD in Nuclear Engineering, October 7, 2013).
- **OIMT 2007:** wrote an exam for Oregon Invitational Mathematics Tournament (Pre-calculus part), May 2007
- **OIMT 2011:** wrote an exam for Oregon Invitational Mathematics Tournament (Calculus part), May 2011
- **Convener of STOMP short course:** organized a short course on OSU Campus of STOMP (Subsurface Transport over Multiple Phases, software developed at Pacific Northwest National Laboratory), May 24-25, 2007. Course open to 11 OSU faculty/students and 7 external participants.

PROFESSIONAL MEMBERSHIPS

Current: American Association for Advancement in Science; Association for Women in Mathematics; Interpore; Society for Industrial and Applied Mathematics (SIAM) [Activity

Groups on Geosciences, Partial Differential Equations, Computational Science and Engineering, Uncertainty Quantification].

Past: American Geophysical Union, American Mathematical Society, Association for Women in Mathematics, Society for Engineering Science, SIAM AG on Supercomputing.

PROFESSIONAL EXPERIENCE

Travel support and grants obtained from host institution are marked with ()*

- Visitor, ICES, The University of Texas at Austin, March 31-April 3, 2017
- Participant and presenter (*), Workshop on Sustainable Research Pathways, Lawrence Berkeley Lab, Dec 6-7, 2016
- Participant, ESSAM-ICM School on Data Science, University of Warsaw, Dec 1, 2016.
- Visitor (*), University of Stuttgart, Institute for Hydromechanics and Modelling of Hydrosystems, Nov. 14-18, 2016
- Visitor, Interdisciplinary Centre for Modeling, University of Warsaw, November 2016
- Visitor (*), University of Bergen, Dept. of Mathematics, Nov. 7-11, 2016
- Visitor, Data Science Center, Interdisciplinary Centre for Modeling, University of Warsaw, August 2016.
- Participant, IMA Special Workshop Mathematics and Mechanics in the 22nd Century: Seven Decades and Counting..., Eugene, OR, October 23-25, 2015
- Participant, PNWNAS 2015, Bellingham, WA, October 17, 2015
- Participant (*), IMA Special Workshop, Structure-Preserving Discretizations of Partial Differential Equations, October 22-24, 2014
- Visitor (*), Laboratorio Nacional de Computacao Cientifica (LNCC), Petropolis, Brazil, August 2014
- Visitor, Interdisciplinary Centre for Modeling, University of Warsaw, July 2014
- Marine Gas Hydrate Community Workshop (*), Consortium for Ocean Leadership, Washington, DC, June 3-6, 2013
- Center for Teaching and Learning workshop at Oregon State University, Nov. 7, 2011 “Using Social Media for Teaching & Learning”
- Habilitation at Warsaw University of Technology, Department of Mathematics and Information Science, March 2010-June 2011
- Participant (*), IMA Workshop “Large-scale Inverse Problems and Quantification of Uncertainty”, IMA, University of Minnesota, June 6-10, 2011
- Professional visit: AGH University of Science and Technology, Energy and Fuels Department, Cracow, May 15, 2010
- Participant (*), IMA Workshop “Hot Topics Workshop: Uncertainty Quantification in Industrial and Energy Applications: Experiences and Challenges” IMA, University of Minnesota, June 2-4, 2011
- IMA short-term visitor (*), “Simulating our complex world” thematic program, IMA, University of Minnesota, April 11-21 and June 1-11, 2011
- Participant (*), IMA Workshop “Computing with Uncertainty: Mathematical Modeling, Numerical Approximation and Large Scale Optimization of Complex Systems with Uncertainty”, Oct. 18-22, 2010, University of Minnesota

- Sabbatical visitor (*, Fulbright Research Scholarship): Interdisciplinary Centre for Mathematical and Computational Modeling (ICM), University of Warsaw, December 28-August 28, 2010
- Visitor (*), Department of Mathematics, Technical University of Munich, Munich, Germany, December 14-18, 2009
- NVIDIA Research Summit at GPU Technology Conference, San Jose, CA, Sep.28-Oct.2, 2009
- Visitor (*), Department of Mathematics, Technical University of Munich, Munich, Germany, September 20-25, 2009
- Participant, Institute for Mathematics and its Applications (IMA) Workshop “Molecular Simulations: Algorithms, Analysis, and Applications” May 18-22, 2009, University of Minnesota
- Participant (*), NSF Knowledge and Distributed Intelligence workshop “Research Study of Scientific Collaboration”, April 26-28, 2002 in New Orleans
- Participant (*), ACTS (DOE Advanced Computational Software Collection) Collection Workshop, Robust and High Performance Tools for Scientific Computing, Lawrence Berkeley National Laboratories, Sep. 4-7, 2002
- InterChange Meeting (*), Schlumberger and Sema, Houston, May 15-16, 2001
- Society of Actuaries, Actuarial examination: Course 100, 110 (Grade 10), February 1997
- Teaching Workshop, The University of Texas at Austin, August 1995
- Teaching Workshop, Purdue University, May 1995

TEACHING, ADVISING AND OTHER ASSIGNMENTS

GRADUATE, UNDERGRADUATE, AND POSTDOCTORAL TRAINEES

- **Postdoc supervision**

- David Foster, 2010-2014 (co-)advisor (with Guenter Schneider, OSU Physics), supported by the grant NSF DMS-1035513.
(Foster is currently employed by Rincorp, Arizona).
- Son-Young Yi, 2006-09 (co-)advisor (with R.E. Showalter, OSU Mathematics) partially supported from DOE 98089.
Assistant (2009-2015) and Associate (2015-) Professor, University of Texas at El Paso.

- **Major professor of graduate students**

- In progress:
 1. Choah Shin (PhD in progress), expected 2021.
 2. Azhar Alhamali (PhD in progress), expected 2020.
 3. Joseph Umhoefer (PhD in progress), expected 2019.
 4. Diana Gonzalez (MS in progress), expected 2018
 5. Lisa Bigler (MS in progress), expected 2018
 6. Zackary Barry (MS in progress), expected 2018
- Completed PhD:
 5. Ken Kennedy (PhD in mathematics, May 30, 2017), “Model Adaptivity and Numerical Solutions Using Sensitivity Analysis”.
Self-employed farm owner, North Plains, OR.
 4. Timothy Costa (PhD in Mathematics, May 30, 2016), “Hybrid Multiscale Methods with Applications to Semiconductors, Porous Media, and Materials Science”;
Intel Portland, Math Kernel Library team (software enngr), June 2016-17; Machine Learning team, July 2017- (Senior Software Engineer);
 3. F. Patricia Medina, PhD in Mathematics, (5/13/2014), “Mathematical treatment and simulation of methane hydrates and adsorption models”
Instructor at OSU 2014-16. Post-doc at WPI, 2016-2019
 2. Veronika Vasylykivska (co-advising with M. Ossiander), PhD in Mathematics (9/6/2012) “Stochastic analysis of flow and transport in porous media”.
First position: postdoctoral associate at Oregon State University funded partially by Bonneville Power Administration. Current position: DOE NETL ORISE fellow, Albany OR.
 1. Viviane Klein, PhD in Mathematics (5/26/2011) “Two-grid a-priori and a-posteriori error analysis for coupled elliptic and parabolic systems with applications to flow and transport problems”.
Current position: tenure track at Federal University of Rio Grande do Norte (UFRN), Natal, Rio Grande del Norte, Brasil. First positions: postdoc at Mathematics Dept., University of Sao Paulo in San Carlos, Brasil, Asst. Prof. at UFSC (Universidade Federal de Santa Catarina, Brasil). Asst. Prof. at UFRN, Natal, Brasil.

– Completed MS:

9. Joseph Umhoefer MS in Mathematics (March 2016). “Interpolation Schemes for Two Dimensional Flow with Applications”,
working towards PHD in Mathematics at Oregon State
 8. Adriana Mendoza, MS in Mathematics, (7/23/2014), “Numerical Modeling of Biofilms”,
Current position: tenure track Instructor at Green River College
 7. Natasha McClellan (MSc in Mathematics), (6/5/2014), “Nonlinear Finite Difference Schemes for the Klausmeier System”,
Instructor, Lassen Community College
 6. Timothy Costa, MSc in Mathematics (2/27/2014) “ Analysis of Domain Decomposition Methods for the Simulation of Charge Transport in Semiconductor Structures with Heterojunctions”
continuing in PhD program in Mathematics at OSU
 5. Yi Zhang, MSc in Mathematics (3/14/2013) “A heterogeneous flow numerical model based on domain decomposition methods”,
PhD in Engrg. December 2013, postdoc at School of Civil Construction Engineering at OSU’13-’14; Altair Engineering’14-
 4. Kenneth Kennedy, MSc Defense (10/23/2009), by examination.
Continuing at OSU towards a PhD
 3. Cheryll Woodall, MSc Defense (9/14/2008), expository paper “Time Discretization for Double-Diffusion Models”.
Current position: Bonneville Power Administration.
 2. Shannon Biedermann, MSc Thesis Defense (2/8/2007) “Nonlinear Solvers for a Model Problem of Fluid Flow in Subsurface”.
Current position: Instructor at LBCC.
 1. Cristiano Garibotti, MSc Thesis Defense (3/8/2007) “Upscaling Non-Darcy Flow using Mixed Finite Element Method”.
First position: PhD, Federal University of Santa Catarina. Current position: Asst. Prof. at Institute of Mathematics Statistics and Physics (IMEF) at the Federal University of Rio Grande (FURG), Brazil
- **Undergraduate research, papers, and theses supervised**
10. Zach Barry Spring (BS in Mathematics, ACM option, 2016-2017, “Reactive transport and monotone operators”
 9. Ian Goode, (BS in Physics-Mathematics), Spring 2016, “Introduction to statistical mechanics”
 8. Erik Theirheimer, Spring 2016, “Working with kernels”
 7. Malgorzata Tyczynska (exchange student from Denmark), research paper “Numerical Simulation of the Chemotaxis Model for Dispersal of Biological Species”, Winter-Spring 2015.
 6. Clarice Mottet, research paper “Modeling with ODE systems”, Winter 2015
 5. Jessica Armstrong, Honors Thesis, BSc in Math, “Modeling and Simulation of Reaction-Diffusion Problems Applied to Biofilm Growth”, presented Dec. 2, 2014
 4. Scott Clark “Finite Element Modeling of Uncertain Interfaces”, (September 2007-June 2008) under NSF 0511190 and OSU grant URISC, Senior Thesis in Mathematics presented June 6, 2008.

I was a Faculty Advisor and Co-Sponsor of Clark's URISC (Undergraduate Research, Innovation, Scholarship and Creativity) award "Finite Element Modeling of Uncertain Interfaces", Oregon State University, Winter-Spring 2008

3. Kyle Augustson "Pore-scale simulations with a vorticity-stream function solver for Navier-Stokes equations", senior paper presented in June 2006. (research project under NSF 0511190 and DOE 98089), Mathematics Department OSU, Summer 2005–Spring 2006
 2. Jessica Kincaid (honors thesis, committee member), completed May 2005
 1. Doug Fettig (development of MATLAB-based tools for numerical linear algebra, DeLoach Honors Scholarship, OSU, Winter 2005)
- **Committee member of graduate students: past**
 29. Abbas Abdollahi (PhD in Civil and Construction Engineering), March 2017
 28. Jason Albright (PhD Mathematics, University of Utah, 2017), External member
 27. Matthew Robinson (PhD Nuclear Engrg), completed March 10, 2016
 26. Doug Woods (MS Nuclear Engrg), completed Winter 2016
 25. Sooie Hoe Loke (PhD Mathematics), completed Fall 2015.
 24. Liz Berg (MS in Mathematics), completed June 2015.
 23. Minji Zhu (PhD in Civil, Construction & Environmental Engineering), completed Nov. 2014.
 22. Chelsea Hall (MSc in Mathematics), completed Dec. 13, 2013
 21. Mark Mueller (PhD Mathematics, University of Colorado at Denver), prelim Winter 2013, External member
 20. Yi Zhang (PhD in Civil, Construction & Environmental Engrg), completed Dec. 3, 2013
 19. Duncan McGregor (MSc in Mathematics), completed April 29, 2013
 18. Justin Finn (PhD in Mechanical Engrg), completed April 2013
 17. Maryam Alarfaj (MSc in Mathematics), completed Dec. 7, 2012
 16. Paul Talbot (MSc in Nucl. Engrg.), completed Sept. 28, 2012
 15. Karlan Wolfkill (MSc in Mathematics), completed June 13, 2012
 14. Brian McKenzie (MSc in Mathematics), completed Dec. 1, 2011
 13. Fernando Morales (PhD in Mathematics), completed May 2011
 12. Anna Kirk (MSc in Mathematics), completed May 24, 2011
 11. Nick Myers (MSc in Nucl. Engrg), completed May 2011
 10. Seshu Nimmala (PhD in Civil, Construction & Environmental Engineering, minor in Mathematics), completed Sep. 2010
 9. Ben Dickinson (PhD in Mechanical Engineering), completed August 12, 2009
 8. Mark Porter (PhD in Water Resources), completed June 13, 2008
 7. Scott Henderson (MSc in Mathematics), completed June 10 2008
 6. John Osborne (MSc in Mathematics), completed September 21, 2007
 5. Fernando Morales (MSc in Mathematics), completed February 2007
 4. Andrew Coe (MSc in Mathematics), completed June 1, 2005
 3. Clark Musselmann (MSc in Mathematics), completed July 26, 2005
 2. Roman Androsov (MSc in Mathematics), completed July 27, 2005
 1. Bertrand Laubsch (PhD candidate in Physics, 2004-2006)
 - **Committee member of graduate students: current**
 1. Enrico Facca (University of Padova), external reviewer, expected 2018

2. Anthony Alberti (PhD Nuclear Engrg), expected 2018
3. Doug Woods (PhD Nuclear Engrg), expected 2018
- **Graduate students supervised during research projects other than advisees**
 10. Michael Renne (OSU mathematics), Summer 2017, from NSF 1522734
 9. Jake Nelson (OSU CEAOS), Winter-Summer 2014, under NETL Task 21-22
 8. John Osborne (OSU Mathematics) Summer 2006, under DOE 98089
 7. Nicholas Stanford (OSU Mathematics) Summer 2006, under DOE 98089
 6. Bahareh Momken (Ph. D., Math. Dept. UT, Dec. 2000)
 5. Qin Lu (Ph. D., Petroleum and Geosystems Eng., UT Austin, May 2000)
 4. Xiuli Gai (Ph. D., Petroleum and Geosystems Eng., Ph. D. UT Austin, 2003)
 3. Shuyu Sun (Ph. D., Computational and Applied Math., Ph.D. UT Austin, 2003)
 2. Ryan Martino (Computational and Applied Math., M.Sc. UT Austin, 2002)
 1. Andrew Doud (M. Sc., Computational and Applied Math., UT Austin, 2003)

CREDIT COURSES

In the listing of courses below, '*u*' and '*g*' denote the number of undergraduate and graduate students enrolled in class, respectively, and '*a*' denotes the number of students or faculty auditing class.

Oregon State University 2017-18

Numerical Linear Algebra (MTH 4/551)	19u+19g	Fall 2017
Numerical ODEs (MTH 4/552)	Winter 2018	
Numerical PDEs (MTH 4/553)	Spring 2018	
Introduction to Mathematics as Profession(MTH 599) 18	Winter 2017	
Introduction to Mathematics as Profession(MTH 599) 15	Spring 2017	
Applied Math and Computation Seminar (MTH 607)		

Oregon State University 2016-17

Finite Element Methods (MTH 655/9)	12+4+1g	Winter 2017
Introduction to Mathematics as Profession(MTH 599) 18	Winter 2017	
Introduction to Mathematics as Profession(MTH 599) 15	Spring 2017	
Applied Math and Computation Seminar (MTH 607)		

Oregon State University 2015-16

Advanced Calculus(MTH 311)	33	Fall 2015
Differential and Integral Equations of Math. Physics (MTH 621,657)	14g+3g+1a	Fall 2015
Differential and Integral Equations of Math. Physics (MTH 622)	11g	Winter 2016
Introduction to Mathematics as Profession(MTH 599)	19	Winter 2016
Numerical Functional Analysis (MTH 655/9)	10g+4g	Winter 2016
XSEDE (Special online class) (MTH 699)	4g	Winter 2016
Differential and Integral Equations of Math. Physics (MTH 623,657)	8g	Spring 2016
Models and Methods of Applied Math (MTH 420/520)	30u+1g	Spring 2016
Applied Math and Computation Seminar (MTH 607)		

Oregon State University 2014-15

Numerical Linear Algebra (MTH 451-551)	25u+13g	Fall 2004
Mathematical Methods for Engineers and Scientists (MTH 481/581)	6u+15g+1(UO)	Fall 2014
Applied Partial Differential Equations (MTH 482/582)	2u+15g	Winter 2015
Models and Methods of Applied Math (MTH 420/520)	21u+5g	Spring 2015

Applied Math and Computation Seminar (MTH 607)
Applied Math and Computation Journal Club (MTH 607)

Oregon State University 2013-14

Discrete Math (MTH 355)	26u	Fall 2013
Finite Elements (MTH 654/9)	9g+1u+1f+2(UO)	Fall 2013
Systems of ODEs (MTH 480)	31u	Winter 2014
Models and Methods of Applied Math (MTH 499/599)	12u+9g	Spring 2014

Applied Math and Computation Seminar (MTH 607)
Applied Math and Computation Journal Club (MTH 607)

Oregon State University 2012-13

Advanced Calculus (MTH 311)	23u	Fall 2012
Advanced Calculus (MTH 312)	26u	Winter 2013
Large Scale Scientific Computing (MTH 655/9)	11g+1g	Winter 2013
Numerical Solution of ODEs (MTH 452-552)	6u+10g	Winter 2013
Numerical Solution of PDEs (MTH 453-553)	6u+7g	Spring 2013

Applied Math and Computation Seminar (MTH 607)
Applied Math and Computation Journal Club (MTH 607)

Oregon State University 2011-12

Differential and Integral Equations of Math. Physics (MTH 621,657)	15+4g	Fall 2011
Finite Elements (MTH 654/9)	16g+3g	Fall 2011
Differential and Integral Equations of Math. Physics (MTH 622)	13g	Winter 2012
Multivariate Calculus (MTH 254)	74u	Winter 2011
Differential and Integral Equations of Math. Physics (MTH 623)	7g	Spring 2012

Applied Math and Computation Seminar (MTH 607)
Applied Math and Computation Journal Club (MTH 607)

Oregon State University 2010-11

Numerical Functional Analysis (MTH 654/9)	11g	Winter 2011
Multivariate Calculus (MTH 254)	79u	Winter 2011
Intro. Num. Anal. (MTH 351)	24u	Winter 2011

Applied Math and Computation Seminar (MTH 607) co-teach 14g+10g Fall'10-Winter'11
Applied Math and Computation Journal Club (MTH 607) 5g+7a Winter'11

Oregon State University 2009-10

Large Scale Scientific Computing (MTH 654)	19g	Fall 2009
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Applied Math and Computation Seminar (MTH 607) co-teach 14g Fall'09

Oregon State University 2008-09

Differential and Integral Equations of Math. Physics (MTH 621)	10g	Fall 2008
Linear Algebra (MTH 341)	30u	Fall 2008
Differential and Integral Equations of Math. Physics (MTH 622)	13g	Winter 2009
Differential and Integral Equations of Math. Physics (MTH 623)	7g	Spring 2009
Applied Math and Computation Seminar (MTH 607) co-teach	12g	Fall'08-Winter'09
Applied Math and Computation Seminar (MTH 607) co-teach	10g	Spring'09

Oregon State University 2007-08

Multivariate Calculus (MTH 254)	68u	Fall 2007
Numerical Linear Algebra (MTH 551)	10g	Fall 2007
Numerical Solution of ODEs (MTH 452-552)	8u+9g	Winter 2008
Numerical Solution of PDEs (MTH 453-553)	4u+5g	Spring 2008
Finite Elements (MTH 655)	g+u+a	Winter 2008
Applied Math and Computation Seminar (MTH 607) co-teach	10g+1u	Fall 2007
	7g	Winter 2008
	8g	Spring 2008

Oregon State University 2006-07

Advanced Calculus (MTH 311)	31u	Fall 2006
Thesis (MTH 503)	2g	Fall 2006
Advanced Calculus (MTH 312)	17u	Winter 2007
Large Scale Scientific Computing (MTH 655)	13g+4a	Winter 2007
Applied Math and Computation Seminar (MTH 607) co-teach	7g	Fall 2006
	9g	Winter 2007
	10g	Spring 2007

Oregon State University 2005-06

Intro. Num. Anal. (MTH 351)	20u	Fall 2005
Finite Elements (MTH 655)	13g	Winter 2006
Applied Differential Equations (MTH 256)	100u	Winter 2006
Intro. Num. Anal. (MTH 351)	35u	Spring 2006
Applied Math and Computation Seminar (MTH 607) co-teach	8g	Fall 2005
	11g	Winter 2006
	8g	Spring 2006

Oregon State University 2004-05

Numerical Linear Algebra (MTH 451-551)	10u+10g	Fall 2004
Multivariate Calculus (MTH 254)	56u	Winter 2005
Numerical Solution of ODEs (MTH 452-552)	1u+10g	Winter 2005
Numerical Solution of PDEs (MTH 453-553)	5u+13g	Spring 2005
Applied Math and Computation Seminar (MTH 607) co-teach	2g	Fall 2004
	5g	Winter 2005
	5g	Spring 2005

Oregon State University 2003-04

Advanced Calculus (MTH 311)	35u	Fall 2003
Advanced Calculus (MTH 312)	20u	Winter 2004
Intro. Num. Anal. (MTH 351)	35u	Winter 2004
Intro. Num. Anal. (MTH 351)	35u	Spring 2004
Intro. Math. Asp. Fin. Elem. (MTH 659)	11g	Spring 2004

The University of Texas at Austin 1995-97

Vector Calculus	2x120u	Fall 95, Spring 96
Introduction to Probability	5x35u	Fall 95, 2xSumm. 96
		Spring and Fall 97
Discrete Math (Intro to Proofs)	25u	Spring 96
Calculus II for Business	135u	Fall 96
Diff. and Int. Calculus for Sci. and Eng.	2x120u	Spring and Fall 97
Linear Algebra with Applications	120u	Summer 97
Student Supervision: Essential Writing Component	3u	Fall 95-Fall96

Purdue University 1994-95

Introduction to Analysis I	2x40u	2 sem., 94
Diff. Equations for Eng. and the Sciences (incl. PDEs)	40u	Spring 95
Multivariate Calculus	40u	Spring 95

SUMMER SCHOOLS and NON-CREDIT COURSES

- Summer School lecturer, Multiscale Mathematics and High-Performance Computing Summer School (for graduate and post-graduate participants) sponsored by Department of Energy, Richmond, WA, August 4-6, 2008, see Presentation # 157
- Summer School lecturer, Multiscale Mathematics and High-Performance Computing Summer School (for graduate and post-graduate participants) sponsored by Department of Energy, Oregon State University, June 29-July 3, 2007, see Presentation # 156
- Lead Speaker (10h lectures) at Rocky Mountain Mathematics Consortium (for graduate and post-graduate participants), University of Wyoming, Laramie, June 18-23, 2007, see Presentation # 155
- Introduction to Scientific Computing (4g), Nov. 2005, Mathematics Department at OSU

CURRICULUM DEVELOPMENT

- Co-developed “Applied and Computational Math Option” to be offered within Mathematics undergraduate major at Oregon State
- Developed a new class “*Models and Methods of Applied Mathematics (MMAM)*” taught as MTH 499/599 (Spring 2014). The class was approved as a Category II proposal by Oregon State University Curriculum Council, and will run as MTH 420/520 in subsequent years.

The content of the class is: discrete and continuous mathematical models and methods for analysis, including linear analysis, equilibrium and minimum principles, calculus of variations, principal component analysis and orthogonal expansions, asymptotic and Fourier analysis, least squares, constrained and unconstrained optimization, inverse problems, and Monte Carlo techniques. The class includes a weekly lab on guided projects.

- Developed curriculum for the graduate course MTH 659 (Spring 2004, Winter 2006, Winter 2008, Fall 2011) on “*Introduction to Mathematical Aspects of Finite Elements*”.

Finite Element Method is a classical topic in numerical analysis and is the basis for most advanced computational techniques in engineering design, fluid dynamics, and many other disciplines. The class covers the basic mathematical background and algorithmic aspects of finite element method and is designed for Mathematics students as well as others from EECE, Physics, ME, Civil Engrg, Nucl. Engrg., Forest Engineering, COAS and other departments.

- Developed curriculum for the graduate course MTH 655/659 (Winter 2007, Fall 2009) on “*Large Scale Scientific Computing*”.

The class is attended by students from Mathematics, Physics, Mechanical and Nuclear Engineering, Civil Engineering, and EECE, as well as by several Mathematics and Engineering faculty. The class covers iterative methods for large linear and nonlinear systems and introduces the basics of parallel and distributed computing. A mandatory computational projects lab runs once a week. In Fall 2009 the class included a special module on GPU (Graphic Processing Unit) computing.

- Developed curriculum for the graduate course MTH 655/659 (Winter 2011) on “*Numerical Functional Analysis with Applications*”

This class develops functional analysis background necessary for the study of advanced topics in numerical analysis. It is oriented at the theory rather than at the applications and thus is best suited for Mathematics students.

- Initiated the Applied Mathematics and Computation Journal Club MTH 607 (F'10-W'11, W-S'12, W-S'13, W'14).

This activity is designed to help the students interested in applied and computational mathematics to read research articles in and outside their primary research focus area.

INTERNATIONAL TEACHING

Warsaw University of Technology 1993-94

Programming Languages I/II	2x20u	3 sem., 93-94
Multiprocessor and Multiprocessing	40g	Fall 93
Environments and Applications		
Student Supervision: PVM System	2g	Spring 94
