

## PERSONAL INFORMATION

Family name, First name: Pettersson, Per  
Date of Birth: 14.04.1981  
Sex: Male  
Nationality: Sweden

## KEY QUALIFICATIONS

Uncertainty Quantification; Scientific Computing; Numerical analysis;  
Computational Fluid Dynamics; Porous Media.

## EDUCATION

2013 **PhD** **Disputation date:** 11.12.2012  
Institute of Computational and Mathematical Engineering, Stanford University,  
USA  
2013 **PhD** **Disputation date:** 08.02.2013  
Department of Information Technology, Uppsala University, Sweden  
2008 **M.Sc.** Sociotechnical Systems Engineering, Uppsala University, Sweden

## CURRENT AND PREVIOUS POSITIONS

2014 – 2019 **Senior researcher**  
Norwegian Research Centre, Norway (until 2018: Uni Research)  
2013 – 2014 **Postdoctoral scholar**  
Department of Energy Resources Engineering, Stanford University, USA.

## FELLOWSHIPS AND AWARDS

2018, June-July The Bi-annual Summer Program, Center for Turbulence Research,  
Stanford/NASA, USA. Award granted by Stanford University.

## MOBILITY - SEE EDUCATION ABOVE

2008 – 2012 Center for Turbulence Research, Stanford University, USA  
Award received from Stanford University (Research Assistantship  
for PhD via G. Iaccarino)  
2013 – 2014 Department of Energy Resources Engineering, Stanford, USA  
Award received from SUPRI-B via H. Tchelepi.

## SUPERVISION OF GRADUATE STUDENTS AND RESEARCH FELLOWS

2018 – 2019 Main advisor for Yafee Ishraq, Master student  
Department of Mathematics, University of Bergen.  
2015 – 2018 Main advisor for Daniel S. Olderkjær, PhD student  
Department of Mathematics, University of Bergen and Uni Research.  
2014 – 2018 Co-advisor for Markus Wahlsten, PhD student  
Department of Mathematics, Linköping University (First advisor: Jan Nordström)

## TEACHING AND COURSE DEVELOPMENT

- 2020 Development of lectures for the course Introduction to Data Science with R (STAT100), University of Bergen. 10 ECTS credits.
- 2016 Uncertainty Quantification for Partial Differential Equations, PhD course. Linköping University, Sweden (joint with Jan Nordström). Sponsored by the Swedish e-Science Education (SeSE), 160 kSEK.
- 2013 Introduction to Numerical Methods for Engineering, graduate course CME 206/ME300C Stanford University. Duties: lectures, exams and problem sessions.

## PROFESSIONAL EDUCATION

- 2016 Research Supervision (UPED622), Program for University Pedagogy, University of Bergen, 5 ECTS.
- 2014 Project leader course, Uni Research (internal course 2 days for new project leaders).

## ORGANIZATION OF SCIENTIFIC MEETINGS

- 2019 Organizer of international workshop on uncertainty quantification for nonlinear problems. Finse, Norway, March 26-28. 16 participants from six countries.

## COMMISSION OF TRUST

- 2017 Scientific reviewer for NWO, Netherlands' Organisation for Scientific Research
- 2019 Scientific reviewer for DFG, German Research Foundation

## REVIEW WORK:

Reviewer for the following journals:

Stochastic Environmental Research and Risk Assessment, Acta Mathematica Scientia, Communications in Computational Physics, Applied Mathematics and Computation, International Journal for Numerical Methods in Fluids, Applied Mathematical Modeling, BIT Numerical Mathematics, Oil & Gas Science and Technology, International Journal of Heat and Fluid Flow, Journal of Computational Physics, Computational Geosciences, SIAM/ASA Journal on Uncertainty Quantification, Reliability Engineering and System Safety, Computers & Fluids, Mathematics and Computers in Simulation, International Journal of Greenhouse Gas Control, International Journal for Uncertainty Quantification.

## MEMBERSHIP OF SCIENTIFIC SOCIETIES

- 2012 – present Member, Society for Industrial and Applied Mathematics (SIAM).

## TRACK RECORD

1. 14 publications in peer-review journals, a number of conference proceedings, 1 edited book, 344 citations and h-Index 9 (Google Scholar).
2. Research monographs and any translations thereof: see publication 1 below.

## JOURNAL PUBLICATIONS AND MONOGRAPHS

1. P. Bonnaire, **P. Pettersson**, C.F. Silva Intrusive generalized polynomial chaos with asynchronous time integration for the solution of the unsteady Navier-Stokes equations *Computers & Fluids* 223: 104952, 2021.
2. C.F. Silva, **P. Pettersson**, G Iaccarino, M Ihme. Uncertainty quantification of combustion noise by generalized polynomial chaos and state-space models *Combustion and Flame* 217: 113-130, 2020.
3. J Shaw, G Kesserwani, **P. Pettersson**. Probabilistic Godunov-type hydrodynamic modelling under multiple uncertainties: robust wavelet-based formulations *Advances in Water Resources* 137, 103526, 2020.
4. D. Landa-Marbán, G. Bødtker, . F. Vik, **P. Pettersson**, I. S. Pop, K. Kumar, F. A. Radu. Mathematical Modeling, Laboratory Experiments, and Sensitivity Analysis of Bioplug Technology at Darcy Scale. *SPE Journal* 25 (06),

3120–3137, 2020.

5. D. Landa-Marbán, N. Liu, I. S. Pop, K. Kumar, **P. Pettersson**, G. Bødtker, T. Skauge, F. A. Radu. A pore-scale model for permeable biofilm: Numerical simulations and laboratory experiments *Transport in porous Media*, 3:643–660, 2019.
6. **P. Pettersson**, H.A. Tchelepi. Stochastic Galerkin framework with locally reduced bases for nonlinear two-phase transport in heterogeneous formations. *Computer Methods in Applied Mechanics and Engineering*, 310: 367–387, 2016.
7. **P. Pettersson**, J. Nordström, Alireza Doostan, A well-posed and stable stochastic Galerkin formulation of the incompressible Navier-Stokes equations with random data. *Journal of Computational Physics*, 306 C: 92–116, 2016.
8. **P. Pettersson**. Stochastic Galerkin formulations for CO<sub>2</sub> transport in aquifers: numerical solutions with uncertain material properties. *Transport in Porous Media*, 114(2): 457–483, 2016.
9. **P. Pettersson**, G. Iaccarino, J. Nordström. *Polynomial Chaos Methods for Hyperbolic Partial Differential Equations: Numerical Techniques for Fluid Dynamics Problems in the Presence of Uncertainties*, Springer International Publishing, ISBN 978-3-319-10714-1, 2015.
10. **P. Pettersson**, G. Iaccarino, J. Nordström. A stochastic Galerkin method for the Euler equations with Roe variable transformation. *Journal of Computational Physics*, 257 A: 481–500, 2014.
11. **P. Pettersson**, G. Iaccarino, J. Nordström. An Intrusive hybrid method for discontinuous two-phase flow under uncertainty. *Computers and Fluids*, 86: 228–239, 2013.
12. **P. Pettersson**, A. Doostan, J. Nordström. On stability and monotonicity requirements of finite difference approximations of stochastic conservation laws with random viscosity. *Computer Methods in Applied Mechanics and Engineering*, 258: 134–151, 2013.
13. **P. Pettersson**, J. Nordström, G. Iaccarino. Boundary procedures for the time-dependent Burgers’ equation under uncertainty. *Acta Mathematica Scientia*, 30B(2): 539–550, 2010.
14. **P. Pettersson**, Q. Abbas, G. Iaccarino, J. Nordström. Efficiency of shock capturing schemes for Burgers’ equation with boundary uncertainty. In G. Kreiss, P. Lötstedt, A. Målqvist, M. Neytcheva, editors, *Numerical Mathematics and Advanced Applications 2009*, 737–745, Springer, Berlin, 2010.
15. **P. Pettersson**, G. Iaccarino, J. Nordström. Numerical analysis of the Burgers’ equation in the presence of uncertainty. *Journal of Computational Physics*, 228(22): 8394–8412, 2009.

## OTHER JOURNAL PAPERS, REPORTS, PROCEEDINGS, ETC.

1. **P. Pettersson**, S. Krumscheid. Adaptive stratified sampling for non-smooth problems ArXiv preprint, <https://arxiv.org/pdf/2107.01355.pdf>, 2021.
2. S. Gasda, S. Tveit, **P. Pettersson**. Dynamic Assessment of Basin-scale Pressure Dissipation and Impact on Storage Capacity Using Accelerated Methodology Proceedings of the 15th Greenhouse Gas Control Technologies Conference 15-18 March 2021
3. S. Tveit, **P. Pettersson**, D. L. Marban. Optimizing sealing of CO<sub>2</sub> leakage paths with microbially induced calcite precipitation under uncertainty ECMOR XVII 2020 (1), 1–12.
4. C. F. Silva, **P. Pettersson**, G. Iaccarino, M. Ihme. Generalized chaos expansion of state space models for uncertainty quantification in thermoacoustics. Proceedings of the Summer Program 2018, 339–348, Center for Turbulence Research.
5. A. Nissen, **P. Pettersson**, S. Tveit. A stable and efficient domain decomposition method for Maxwell’s equations with uncertainty, VII International Conference on Computational Methods for Coupled Problems in Science and Engineering COUPLED PROBLEMS 2017 M. Papadrakakis, E. Onate and B. Schrefler (Eds).
6. **P. Pettersson**, H. Tchelepi. Stochastic Galerkin method for the Buckley-Leverett problem in heterogeneous formations, ECMOR XIV-14th European Conference on the Mathematics of Oil Recovery, 2014, Catania, Italy.
7. A. Nissen, **P. Pettersson**, E. Keilegavlen, J. M. Nordbotten. Incorporating geological uncertainty in error control for linear solvers, SPE Reservoir Simulation Symposium 2015, Houston, USA.