

## Eirik Valseth

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CONTACT INFORMATION	Peter O'Donnell, Jr. Building 6.420 Oden Institute for Computational Engineering and Sciences The University of Texas at Austin 201 E. 24th Street, Austin, Texas 78712-122	Voice: (605) 389-1241  E-mail: eirik@utexas.edu WWW: <a href="https://evalseth.github.io">https://evalseth.github.io</a>
RESEARCH INTERESTS	Applied and computational mechanics and mathematics, finite element methods, multiscale modeling, error estimation, storm surge modeling.	
EDUCATION	<b>South Dakota School of Mines and Technology</b> , Rapid City, South Dakota USA Ph.D., Mechanical Engineering, December 2019 <ul style="list-style-type: none"><li>• Dissertation Title: Automatic Variationally Stable Analysis for Finite Element Computations.</li><li>• Advisor: Albert Romkes</li></ul> <b>South Dakota School of Mines and Technology</b> , Rapid City, South Dakota USA M.S., Mechanical Engineering, May 2015  <b>Østfold University College</b> , Fredrikstad, Norway B.Sc., Mechanical Engineering, June, 2013	
HONORS AND AWARDS	<ul style="list-style-type: none"><li>• Outstanding student organization member - SDSM&amp;T Graduate Student Society April 2018.</li><li>• Travel award to represent SDSM&amp;T at the Catalyzing and Advocacy in Science and Engineering (CASE) workshop in Washington, DC. March 2018.</li><li>• Travel award to attend Scientific Software Days at the University of Texas at Austin, April 2018.</li><li>• Fellowship award to attend Texas Advanced Computing Center summer institute - "Applied Parallel Programming" July 2020</li></ul>	
SOCIETIES	Member of Pi Tau Sigma - mechanical engineering honor society.  Member of The United States Association for Computational Mechanics (USACM)  Member of The Society for Industrial and Applied Mathematics (SIAM)  Member of The Nordic Association of Computational Mechanics (NoACM)  Member of The Norwegian Society of Graduate Technical and Scientific Professionals, Tekna	
EXPERIENCE	<b>The University of Texas at Austin</b> , Austin, Texas USA  <i>Postdoctoral Fellow</i> , <b>April, 2020 - Present</b> Mathematical modeling of storm surge and rainfall runoff and software engineering for model coupling in the group of professor Clint Dawson - Computational Hydraulics Group.  <b>South Dakota School of Mines and Technology</b> , Rapid City, South Dakota USA  <i>Postdoctoral Researcher</i> , <b>December, 2019 - March 2020</b> Development and implementation of inverse finite element methods.	

*Graduate Research Assistant, August, 2018 - December, 2019*

Development and implementation of finite element simulations for mineral beneficiation systems. NSF Grant 1805550 - Sustainable System for Mineral Beneficiation. PI Jon Kellar, Co-PIs William Cross and Albert Romkes.

*Graduate Teaching Assistant, August, 2015 - May, 2018*

- ME 316 Solid Mechanics.
- ME 528 Applied Finite Element Analysis.
- ME 216 Intro to Solid Mechanics.
- ME 322 Machine Design.
- ME 221 Dynamics of Mechanisms.

*Graduate Research Assistant, October, 2015 - May, 2016*

Development and implementation of finite element simulations of electromagnetic fields.

**Østfold University College**, Fredrikstad, Norway

*Teaching Assistant, August, 2011 - December, 2012*

- Introductory Real Analysis.
- Classical Physics.
- Introductory Material Science, Ferrous Materials.
- Fluid Mechanics, Aerodynamics.

CONFERENCES  
ORGANIZED OR  
CHAired

Co-organizer of minisymposium 418: Computational Methods in Environmental Fluid Mechanics, USNCCM 2019, July 25 - July 29, 2021, Chicago, Illinois.

Organizer of minisymposium: Stabilized and Unconditionally Stable FE Methods for Challenging Problems in Engineering and Science, ECCOMAS Young Investigator's conference - ECCOMAS YIC 2021, July 7 - 9, 2021, Valencia, Spain.

Program Committee Member International Conference on Computational Science 2020 - d.d.

PUBLICATIONS

Valseth, E., Romkes, A., Kaul, A.R., Dawson, C., An Unconditionally Stable Mixed FE Method for Nearly Incompressible Linear Elastostatics. To be submitted.

Valseth, E., Dawson, C., An Adaptive Stable Space-Time FE Method for the Shallow Water Equations. Submitted arXiv preprint arXiv:2010.00057 [math.NA] (2020).

Valseth, E., Behnoudfar, P., Dawson, C., Romkes, A., Automatic Variationally Stable Analysis for Finite Element Computations: Transient Convection-Diffusion Problems. Preprint, submitted to Computer Methods in Applied Mechanics and Engineering, arXiv preprint arXiv:2010.00057 [math.NA] (2020).

Valseth, E., Dawson, C., An Unconditionally Stable Space-Time FE Method for the Korteweg-de Vries Equation. Computer Methods in Applied Mechanics and Engineering 371 (2020), DOI: <https://doi.org/10.1016/j.cma.2020.113297>.

Valseth, E., Romkes, A., Kaul, A.R., A Stable FE Method For The Space-Time Solution of the Cahn-Hilliard Equation. Preprint, submitted to Journal for Computational Physics, arXiv preprint arXiv:2006.02283 [math.NA] (2020).

Valseth, E., Romkes, A., Goal-Oriented Error Estimation for the Automatic Variationally Stable

FE Method for Convection-Dominated Diffusion Problems. Preprint, accepted in Computers and Mathematics With Applications, arXiv preprint arXiv:2003.10904 [math.NA] (2020).

Calo, V.M., Romkes, A., and Valseth, E., Variationally Stable Analysis for Finite Element Computations: An Introduction. Lecture Notes in Computational Science and Engineering, Springer Verlag (2018) DOI: [https://doi.org/10.1007/978-3-030-41800-7\\_2](https://doi.org/10.1007/978-3-030-41800-7_2).

#### PRESENTATIONS

Valseth, E., Dawson, C., A DPG Method for the Shallow Water Equations Using Continuous Trial Functions. SIAM CSE 2021, March 1-5, 2021, Fort Worth, Texas.

Valseth, E., Dawson, C., An unconditionally stable space-time FE method for the Shallow Water Equations. 3rd Annual Meeting of the SIAM Texas-Louisiana Section. SIAM, October 16-18, 2020, College Station, Texas.

Valseth, E., Dawson, C., A space-time FE method for the Shallow Water Equations. TACC Symposium for Texas Researchers 2020, September 17-18, 2020, Austin, Texas.

Valseth, E., Dawson, C.N., Romkes, A., Calo, V.M., Automatic Variationally Stable Analysis for FE Computations. WCCM ECCOMAS 2020, July 19-24, 2020, Paris, France. *Cancelled due to COVID-19*

Behnoudfar, P., Valseth, E., Calo, V.M., Romkes, A., Stabilized FE Methods for Time-Dependent Problems. WCCM ECCOMAS YIC Special Track 2020, July 19-24, 2020, Paris, France. *Cancelled due to COVID-19*

Valseth, E., Romkes, A., Calo, V.M., Automatic Variationally Stable Analysis for FE Computations. Invited Seminar, Department of Computer Science, AGH University, September 4, 2019, Krakow, Poland.

Valseth, E., Romkes, A., Calo, V.M., Automatic Variationally Stable Analysis for FE Computations. ECCOMAS YIC 2019, September 1 - 6, 2019, Krakow, Poland.

Valseth, E., Romkes, A., Calo, V.M., Automatic Variationally Stable Analysis for FE Computations of Convection-Dominated Diffusion Problems. USNCCM 2019, July 28 - August 1, 2019, Austin, Texas.

Romkes, A., Valseth, E., Calo, V.M., Automatic Variationally Stable FE and Goal-Oriented A Posteriori Error Analyses of Convection-Dominated Boundary Value Problems. FEF 2019, March 31 - April 3, 2019, Chicago, Illinois.

Valseth, E., Romkes, A., Calo, V.M., Paszynski, M., Automatic Variationally Stable Analysis for FE Computations. PDE Seminar, Faculty of Mathematics and Natural Sciences, university of Oslo, Jan 7 2019, Oslo, Norway.

Romkes, A., Calo, V.M., Paszynski, M., Los, M., Valseth, E., Automatic Variationally Stable Analysis for FE Computations Based on the DPG Framework. USACM IGA 2018: Integrating Design and Analysis, October 10-12, 2018, Austin, Texas, USA.

Calo, V. M., Collier, N., Kirby, R., Los, M., Niemi, A., Paszynski, M., Romkes, A., Valseth, E., "Automatic Variationally Stable Discretizations", II International Conference Multiscale Methods and Large-Scale Scientific Computing, August 15-17, 2018, Moscow, Russia.

Valseth, E., Romkes, A., Calo, V.M., and Kirby, R.C., A First Order System Discontinuous Petrov-Galerkin Method Using Continuous Trial Spaces. WCCM 2018, July 22-27, 2018, New York City,

USA.

Calo, V. M., Collier, N., Demkowicz, L., Gopalakrishnan, J., Los, M., Niemi, A., Paszynski, M., Romkes, A., Valseth, E., “Stabilization of convection-dominated diffusion with optimal test functions”, International Conference on Boundary and Interior Layers (BAIL 2018) , June 18-22, 2018, Glasgow, Scotland.

Romkes A., Valseth, E., and Calo, V.M., A Hybrid Continuous-Discontinuous Petrov-Galerkin Method for Second Order PDEs. 5th Int’l Congress on Multiphysics, Multiscale, and Optimization Problems, May 24-25, 2018, BCAM, Bilbao, Bizkaia, Spain

Romkes A., Moody, T.C., and Valseth, E., Multi-Scale Modeling of Heterogeneous Elastic Solids based on the Control of Modeling Error through Local Error Estimation. 4th Int’l Congress on Multiphysics, Multiscale, and Optimization Problems, May 27, 2016, BCAM, Bilbao, Bizkaia, Spain

#### SERVICE

**South Dakota School of Mines and Technology**, Rapid City, South Dakota USA

*Faculty search committee*, **September, 2018 - May, 2019**

Graduate student representative in the search for the “Stensaas Endowed Chair” in the Mechanical Engineering department.

**Østfold University College**, Fredrikstad, Norway

*University Research and Development Council*, **August, 2011 - June, 2012**

Student representative on the university research and development council.

#### Journal Reviewer

*Computer Methods in Applied Mechanics and Engineering*

*Computer Science*

#### PROGRAMMING AND SOFTWARE SKILLS

- Parallel programming: OpenMP and MPI.
- Languages: C++, C, FORTRAN, Python and MATLAB.
- FEM software: Firedrake, FEniCS, ANSYS, and Abaqus.
- Text editors: L<sup>A</sup>T<sub>E</sub>X, MS Office
- Operating Systems: Unix/Linux, Windows, and MACOS