

Contact Information

Name: **Daniel Vogler**
Address: Sonneggstr. 5, 8092 Zurich, Switzerland
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Education

2016 **Dr. sc. ETH Zurich** - ETH Zurich (Switzerland)
Thesis ([link](#)): Hydro-Mechanically coupled processes in heterogeneous fractures:
Experiments and Numerical Simulations

2013 **Diplom-Ingenieur**, Environmental Engineering - University of Stuttgart (Germany)
Thesis ([link](#)): A comparison of different model reduction techniques for model calibration
and risk assessment
Supported by the NUPUS Cooperation and the German National Merit Foundation

2012 **Master of Science**, Chemical Engineering - Oregon State University (USA)
Thesis ([link](#)): Investigation of transport phenomena in a highly heterogeneous porous media
Supported by the German-American Fulbright Commission
and the German National Merit Foundation

2009 Prediploma, Environmental Engineering - University of Stuttgart (Germany)

Work Experience

since 2019 **Senior Research Assistant** - ETH Zurich, Zurich, Switzerland
Chair of Geothermal Energy and Geofluids, Institute of Geophysics

2016 - 2018 **Postdoctoral Researcher** - ETH Zurich, Zurich, Switzerland
Chair of Geothermal Energy and Geofluids, Institute of Geophysics, and
Transport Processes and Reactions Laboratory, Institute of Process Engineering

2013 - 2016 **Doctoral Researcher** - ETH Zurich, Zurich, Switzerland
Chair of Engineering Geology

2012 **Intern** - Dynamore GmbH, Stuttgart, Germany
Gesellschaft für FEM Ingenieurdienstleistungen mbH

2011, 2012 **Research Assistant** - Oregon State University, Corvallis, OR, USA
The School of Chemical, Biological, and Environmental Engineering

2009 - 2010 **Research Assistant** - University of Stuttgart, Stuttgart, Germany
2011 - 2012 Institute for Modelling Hydraulic and Environmental Systems,

2008 - 2010, 2011- **Teaching Assistant** - University of Stuttgart, Stuttgart, Germany
2012, 2012 - 2013 Department of Mathematics, Faculty of Mathematics and Physics

Scholarships and Awards

2012 - 2013 NUPUS Cooperation - Student Thesis Scholarship

2010 - 2013 German National Merit Foundation (“Studienstiftung des deutschen Volkes”)

2010 - 2011 German-American Fulbright Commission

2009 - 2013 Prediploma in top 5% of program. Exemption from tuition fees for remainder of program

Extended Research Visits

2019, 2020 Monash University, Melbourne, Australia
Department of Civil Engineering, Faculty of Engineering

2014, 2015, 2016, Lawrence Livermore National Laboratory, Livermore, CA, USA
2017, 2018 Computational Geosciences Group, Atmospheric, Earth, and Energy Division

2018 Università della Svizzera italiana, Lugano, Switzerland
Chair for Advanced Scientific Computing, Institute of Computational Science

2018 University of New South Wales, Sydney, Australia
School of Minerals and Energy Resources Engineering, UNSW Engineering

2017 Idaho National Laboratory, Idaho Falls, ID, USA
Nuclear Science & Technology Modeling and Simulation, Nuclear Science & Technology

2014 Pennsylvania State University, University Park, PA, USA
Prof. Derek Elsworth, Center for Geomechanics, Geofluids, and Geohazards

Student Supervision and Co-Supervision

Doctoral students (3), M.Sc. students (8) and B.Sc. student (1).

Refereed Publications - submitted and in preparation

- [1] P. Deb, S. Salimzadeh, **D. Vogler**, S. Düber, C. Clauser, and R.R. Settgest. Verification of coupled hydraulic fracturing simulators using laboratory-scale experiments, 2020
- [2] H. Javanmard, A. Ebigbo, S.D.C. Walsh, M.O. Saar, and **D. Vogler**. No-flow fraction (nff) permeability model for rough fractures under normal stress, 2020
- [3] M.M. Grimm Lima, H. Javanmard, **D. Vogler**, M.O. Saar, and X.-Z. Kong. Flow-through drying during CO₂ injection into brine-filled natural fractures: A tale of effective normal stress, 2020a
- [4] Z. Li, X. Ma, X.-Z. Kong, M.O. Saar, and **D. Vogler**. Permeability evolution during induced shear slip events in saw-cut and natural granite fractures, 2020
- [5] S. Cremonesi, B.M. Adams, M.O. Saar, and **D. Vogler**. Sedimentary geothermal electricity potential for the Netherlands, 2020
- [6] M. Ezzat, **D. Vogler**, M.O. Saar, and B.M. Adams. Simulating the plasma formation in microcracks under short electric pulses for plasma pulse geo-drilling, 2020

Refereed Publications

- [1] B.M. Adams, **D. Vogler**, T.H. Kuehn, J.M. Bielicki, N. Garapati, and M.O. Saar. Heat depletion in sedimentary basins and its effect on the design and electric power output of CO₂ plume geothermal (CPG) systems. *Renewable Energy*, (in press), 2020. doi: 10.1016/j.renene.2020.11.145

- [2] M.M. Grimm Lima, P. Schädle, C.P. Green, **D. Vogler**, M.O. Saar, and X.-Z. Kong. Permeability impairment and salt precipitation patterns during CO₂ injection into single natural fractures. *Water Resources Research*, 56(8):e2020WR027213, 2020b. doi: 10.1029/2020WR027213
- [3] **D. Vogler**, S.D.C. Walsh, and M.O. Saar. A numerical investigation into key factors controlling hard rock excavation via electropulse stimulation. *Rock Mechanics and Geotechnical Engineering*, 12(4):793–801, 2020b. doi: 10.1016/j.jrmge.2020.02.002
- [4] C. von Planta, **D. Vogler**, P. Zulian, M.O. Saar, and R. Krause. Solution of contact problems between rough body surfaces with non matching meshes using a parallel mortar method. *International Journal of Rock Mechanics and Mining Sciences*, 133:104414, 2020b. doi: 10.1016/j.ijrmms.2020.104414
- [5] C. von Planta, **D. Vogler**, X. Chen, M.G.C. Nestola, M.O. Saar, and R. Krause. Modelling of hydro-mechanical processes in heterogeneous fracture intersections using a fictitious domain method with variational transfer operators. *Computational Geosciences*, 2020a. doi: 10.1007/s10596-020-09936-7
- [6] S.D.C. Walsh and **D. Vogler**. Simulating electropulse fracture of granitic rock. *International Journal of Rock Mechanics and Mining Sciences*, 128:104238, 2020. doi: 10.1016/j.ijrmms.2020.104238
- [7] **D. Vogler**, S.D.C. Walsh, P. Rudolf von Rohr, and M.O. Saar. Simulation of rock failure modes in thermal spallation drilling. *Acta Geotechnica*, 15(8):2327–2340, 2020a. doi: 10.1007/s11440-020-00927-7
- [8] M.M. Grimm Lima, **D. Vogler**, L. Querci, C. Madonna, B. Hattendorf, M.O. Saar, and X.-Z. Kong. Thermally driven fracture aperture variation in naturally fractured granites. *Geothermal Energy*, 7(1):1–28, 2019. doi: 10.1186/s40517-019-0140-9
- [9] C. von Planta, **D. Vogler**, X. Chen, M.G.C. Nestola, M.O. Saar, and R. Krause. Simulation of hydro-mechanically coupled processes in rough rock fractures using an immersed boundary method and variational transfer operators. *Computational Geosciences*, 23(5):1125–1140, 2019. doi: 10.1007/s10596-019-09873-0
- [10] P. Schädle, P. Zulian, **D. Vogler**, S.R. Bhopalam, M.G.C. Nestola, A. Ebigbo, R. Krause, and M.O. Saar. 3d non-conforming mesh model for flow in fractured porous media using lagrange multipliers. *Computers & Geosciences*, 132:42–55, 2019. doi: <https://doi.org/10.1016/j.cageo.2019.06.014>
- [11] M.L.T. Dambly, M. Nejati, **D. Vogler**, and M. O. Saar. On the direct measurement of shear moduli in transversely isotropic rocks using the uniaxial compression test. *International Journal of Rock Mechanics and Mining Sciences*, 113:220–240, 2019. doi: <https://doi.org/10.1016/j.ijrmms.2018.10.025>
- [12] M.A. Perras and **D. Vogler**. Compressive and tensile behavior of 3d printed and natural sandstones. *Transport in Porous Media*, 129(2):559–581, 2019. doi: 10.1007/s11242-018-1153-8
- [13] A. Hobé, **D. Vogler**, M.P. Seybold, A. Ebigbo, R.R. Settgest, and M.O. Saar. Estimating flow rates through fracture networks using combinatorial optimization. *Advances in Water Resources*, 122:85–97, 2018. doi: 10.1016/j.advwatres.2018.10.002
- [14] T. Kling, **D. Vogler**, L. Pastewka, F. Amann, and P. Blum. Numerical simulations and validation of contact mechanics in a granodiorite fracture. *Rock Mechanics and Rock Engineering*, 51(9):2805–2824, 2018. doi: 10.1007/s00603-018-1498-x
- [15] **D. Vogler**, S. Ostvar, R. Paustian, and B.D. Wood. A hierarchy of models for simulating experimental results from a 3d heterogeneous porous medium. *Advances in Water Resources*, 114:149–163, 2018a. doi: 10.1016/j.advwatres.2018.02.009

- [16] **D. Vogler**, R.R. Settgast, C. Annavarapu, C. Madonna, P. Bayer, and F. Amann. Experiments and simulations of fully hydro-mechanically coupled response of rough fractures exposed to high pressure fluid injection. *Journal of Geophysical Research: Solid Earth*, 123(2):1186–1200, 2018b. doi: 10.1002/2017JB015057
- [17] **D. Vogler**, S.D.C. Walsh, P. Bayer, and F. Amann. Comparison of surface properties in natural and artificially generated fractures in a crystalline rock. *Rock Mechanics and Rock Engineering*, 50(11):2891–2909, 2017b. doi: 10.1007/s00603-017-1281-4
- [18] **D. Vogler**, S.D.C. Walsh, E. Dombrowski, and M.A. Perras. A comparison of tensile failure in 3d-printed and natural sandstone. *Engineering Geology*, 226:221–235, 2017c. doi: 10.1016/j.enggeo.2017.06.011
- [19] **D. Vogler**, F. Amann, P. Bayer, and D. Elsworth. Permeability evolution in natural fractures subject to cyclic loading and gouge formation. *Rock Mechanics and Rock Engineering*, 49(9):3463–3479, 2016a. doi: 10.1007/s00603-016-1022-0

Conference Proceedings

- [1] E. Rossi, B.M. Adams, **D. Vogler**, P. Rudolf von Rohr, B. Kammermann, and M.O. Saar. Advanced drilling technologies to improve the economics of deepgeo-resource utilization. In *2nd Applied Energy Symposium: MIT A+B (MITAB 2020) (virtual)*, Boston, MA, USA, pages 1–6, 2020. doi: <https://doi.org/10.3929/ethz-b-000431684>
- [2] S.D.C. Walsh, T. Czaszejko, and **D. Vogler**. Electropulse stimulation of rock: insights from grain-scale experimental studies and numerical models. In *ISRM International Symposium - EUROCK 2020*, pages 1–8, 2020. URL <https://www.onepetro.org/conference-paper/ISRM-EUROCK-2020-070>
- [3] N. Hassanjanikhoshkroud, M.G.C. Nestola, P. Zulian, C. von Planta, **D. Vogler**, H. Köstler, and R. Krause. Thermo-fluid-structure interaction based on the fictitious domain method: Application to dry rock simulations. In *PROCEEDINGS, 45th Workshop on Geothermal Reservoir Engineering*, pages 1–12, 2020
- [4] M.M. Grimm Lima, P. Schädle, **D. Vogler**, M.O. Saar, and X.-Z. Kong. Impact of effective normal stress on capillary pressure in a single natural fracture. In *European Geothermal Congress 2019*, pages 1–9, 2018
- [5] C. von Planta, **D. Vogler**, X. Chen, M.G.C. Nestola, M.O. Saar, and R. Krause. Variational parallel information transfer between unstructured grids in geophysics - applications and solution methods. In *CouFrac2018*, pages 1–4, 2018a
- [6] P. Deb, **D. Vogler**, S. Düber, P. Siebert, S. Reiche, C. Clauser, R.R. Settgast, and K. Willbrand. Laboratory fracking experiments for verifying numerical simulation codes. In *80th EAGE Conference and Exhibition 2018*, pages 1–4, 2018. URL <http://www.earthdoc.org/publication/publicationdetails/?publication=92553>
- [7] C. von Planta, **D. Vogler**, M. Nestola, P. Zulian, and R. Krause. Variational parallel information transfer between unstructured grids in geophysics-applications and solutions methods. In *PROCEEDINGS, 43rd Workshop on Geothermal Reservoir Engineering, Stanford, CA*, volume SGP-TR-213, pages 1–13, 2018b. URL <https://pangea.stanford.edu/ERE/db/GeoConf/papers/SGW/2018/Von.pdf>
- [8] **D. Vogler**, R.R. Settgast, V.S. Gischig, M. Jalali, J. Doetsch, B. Valley, K.F. Evans, C.S. Sherman, M.O. Saar, and F. Amann. Modeling the hydraulic fracture stimulation performed for reservoir permeability enhancement at the grimsel test site, switzerland. In *PROCEEDINGS, 42nd Workshop on Geothermal Reservoir Engineering, Stanford, CA*, volume SGP-TR-212, pages 1–9, 2017a. URL <https://pangea.stanford.edu/ERE/db/GeoConf/papers/SGW/2017/Vogler.pdf>

- [9] **D. Vogler**, R.R. Settgast, C. Annavarapu, P. Bayer, and F. Amann. Hydro-mechanically coupled flow through heterogeneous fractures. In *PROCEEDINGS, 41st Workshop on Geothermal Reservoir Engineering, Stanford, CA*, volume SGP-TR-209, pages 1–6, 2016b. URL <https://pangea.stanford.edu/ERE/db/GeoConf/papers/SGW/2016/Vogler.pdf>