

Curriculum Vitae: Hideaki Yasuhara

Nationality: JAPAN
Date of birth: Nov.27.1975
Position: Professor, Civil and Environmental Engineering,
Ehime University, Japan
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EDUCATIONAL DETAILS

2005.8. **Ph.D. Engineering** The Pennsylvania State University, University Park, PA
2000.3. **M.S. Civil Engineering** Kyoto University, Kyoto, Japan
1998.3. **B.S. Civil Engineering** Kyoto University, Kyoto, Japan

DISSERTATION

Title: “**Thermo-Hydro-Mechano-Chemical Couplings that Define the Evolution of Permeability in Rock Fractures**” The dissertation examines the coupled THMC behavior that affects the evolution in fracture aperture (or related permeability).
Dissertation Advisor: Derek Elsworth (The Pennsylvania State University)

PROFESSIONAL DETAILS

2016.4. – Present **Professor**
Civil and Environmental Engineering, Ehime University, JAPAN
2007.10. – 2016.3. **Associate Professor**
Civil and Environmental Engineering, Ehime University, JAPAN
2005.11. – 2007.9. **Assistant Professor**
Civil and Environmental Engineering, Ehime University, JAPAN
2005. 5.- 2005.10. **Graduate Lecturer**
Geo-Environmental Engineering, The Pennsylvania State University

RESEARCH INTERESTS

Rock mechanics and engineering, earth physics, geochemistry, fault mechanics, computational mechanics, flow and transport in porous fractured rocks, under coupled thermal, hydraulic, mechanical, and chemical processes to address issues on sequestration of high level radioactive wastes and CO₂ and recovery of underground energy from unconventional reservoirs.

AWARDS

- 2006: **2006 N. G. W. Cook Award** for Ph.D. Thesis in Rock Mechanics
Awarded by American Rock Mechanics Association
- 2007: **Best Paper Award** in the 36th Rock Mechanics Symposium in JAPAN
Manuel Rocha Medal 2007 Awarded by International Society for Rock Mechanics
- 2009: **Best Poster Award** in the 38th Rock Mechanics Symposium in JAPAN
Best Paper Award Awarded by The Japanese Committee for Rock Mechanics
Best Paper Award, Intl Sympo. on Ground Improvement Technologies and Case Histories
- 2010: **Best Paper Award for Young Professionals** Awarded by The Japanese Society of Civil Engineering
- 2011: **The Young Scientists' Prize**, The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology
- 2012: **Best Paper Award** Awarded by The Japanese Geotechnical Society
- 2014: **Best Paper Award** Awarded by The Japanese Geotechnical Society
- 2016: **Best Poster Award** in the 44th Rock Mechanics Symposium in JAPAN
Best Paper Award Awarded by The Japanese Society for Rock Mechanics

SELECTED PUBLICATIONS (IF: Impact factor)

- (1) Yasuhara, H., D. Elsworth, and A. Polak (2003), A mechanistic model for compaction of granular aggregates moderated by pressure solution, *J. Geophys. Res.* 108(11), 2530, doi:10.1029/2003JB002536. (IF: 2.784)
- (2) Polak, A., D. Elsworth, H. Yasuhara, A. Grader, and P. Halleck (2003), Permeability Reduction of a Natural Fracture Under Net Dissolution by Hydrothermal Fluids, *Geophys. Res. Lett.*, 30(20), 2020, doi:10.1029/2003GL017575. (IF: 2.491)
- (3) Yasuhara, H., D. Elsworth, and A. Polak (2004), Evolution of permeability in a natural fracture: The significant role of pressure solution, *J. Geophys. Res.* 109(B3), B03204, doi:10.1029/2003JB002663. (IF: 2.784)
- (4) Yasuhara, H., C. Marone, and D. Elsworth (2005), Fault Zone Restrengthening and Frictional Healing: The Role of Pressure Solution, *J. Geophys. Res.*, 110(6), B06310, doi:10.1029/2004JB003327. (IF: 2.784)
- (5) Yasuhara, H., A. Polak, Y. Mitani, A. Grader, P. Halleck, D. Elsworth (2005), Evolution of fracture permeability through reactive flow at elevated temperatures, *Geothermal Resources Council transactions*, 29, 437-441.
- (6) Liu, J., J. Sheng, A. Polak, D. Elsworth, H. Yasuhara, and A. Grader (2006), A fully coupled HMC model for fracture sealing and preferential opening, *Int. J. Rock Mech. Min. Sci.*, 43, 23-36. (IF: 0.799)
- (7) Yasuhara, H., A. Polak, Y. Mitani, A. Grader, P. Halleck, and D. Elsworth (2006), Evolution of fracture permeability through fluid-rock reaction under hydrothermal conditions, *Earth Planet. Sci. Lett.* 244, 186-200. (IF: 3.434). Selected in the list of "Interesting papers in other journals"(2006), 101-1, pp.1-22 in Economic Geology.
- (8) Elsworth, D. and H. Yasuhara (2006), Short-timescale chemo-mechanical effects and

their influence on the transport properties of fractured rock, *Pure Appl. Geophys.*, 163, 2051-2070. (IF: 0.975)

- (9) Yasuhara, H., D. Elsworth, A. Polak, J. Liu, A. Grader, and P. Halleck (2006), Spontaneous Permeability Switching in Fractures in Carbonate: Lumped Parameter Representation of Mechanically- and Chemically-Mediated Dissolution, *Transp. Porous Media.* 65, 385-409. (IF: 0.966)
- (10) Yasuhara, H. and D. Elsworth (2006), A numerical model simulating reactive transport and evolution of fracture permeability, *Int. J. Numer. Anal. Meth. Geomech.* 30, 1039-1062. (IF: 0.758)
- (11) Conrad, C., G. Icopini, H. Yasuhara, J. Bandstra, P. Heaney, S. Brantley (2007), Modeling the kinetics of silica nanocloid formation and precipitation in geologically relevant aqueous solutions, *Geochim. Cosmochim. Acta.* 71, 531-542. (IF:3.897) Selected in the list of "Interesting papers in other journals"(2007), 102, pp.1013-1020 in Economic Geology, 1091-1100.
- (12) Yasuhara, H. and D. Elsworth (2008), Compaction of a rock fracture moderated by competing roles of stress corrosion and pressure solution, *Pure Appl. Geophys.*, 165, 1289-1306. (IF: 0.86)
- (13) Yasuhara, H., M. Okamura, and Y. Kochi (2008), Experiments and predictions of soil desaturation by air-injection technique and the implications mediated by multiphase flow simulation, *Soils and Foundations*, 48, 6, 791-804. (IF: 0.564)
- (14) Elsworth, D. and H. Yasuhara (2010), Mechanical and transport constitutive models for fractures subjected to dissolution and precipitation, *Int. J. Numer. Anal. Meth. Geomech.*, 34, 533-549. (IF: 1.135)
- (15) D. S. Lee, D. Elsworth, H. Yasuhara, J. D. Weaver, and R. Rickman (2010), Experiment and modeling to evaluate the effects of proppant-pack diagenesis on fracture treatments, *Journal of Petroleum Science and Engineering*, 74, 67-76. (IF: 1.065)
- (16) Kinoshita, N. and H. Yasuhara (2011), Thermally-induced behavior of the openings in rockmass effected by high temperatures, *International Journal of Geomechanics*, 11, 124-130.
- (17) Kishida, K., Y. Kawaguchi, S. Nakashima, and H. Yasuhara (2011), Estimation of shear strength recovery and permeability of single rock fractures in shear-hold-shear type direct shear tests, *International Journal of Rock Mechanics and Mining Sciences*, 48(5), 782-793. (IF: 1.390)
- (18) Okamura, M., M. Takebayashi, K. Nishida, N. Fujii, M. Jinguji, T. Imasato, H. Yasuhara, and E. Nakagawa (2011), In-situ desaturation test by air injection and its evaluation through field monitoring and multiphase flow simulation, *Journal of Geotechnical and Geoenvironmental Engineering*, 137, 643-652. (IF: 0.453)
- (19) H. Yasuhara, N. Kinoshita, H. Ohfuji, D. S. Lee, S. Nakashima, and K. Kishida (2011), Temporal alteration of fracture permeability in granite under hydrothermal conditions and its interpretation by coupled chemo-mechanical model, *Applied Geochemistry*, 26, 2074-2088. (IF: 2.017)
- (20) H. Yasuhara, D. Neupane, K. Hayashi, and M. Okamura (2012), Experiments and predictions of physical properties of sand cemented by enzymatically-induced carbonate precipitation, *Soils and Foundations*, 52, 539-549. (IF:0.453)
- (21) K. Kishida, A. Sawada, H. Sato, H. Yasuhara, and T. Hosoda (2013), Estimation of fracture flow considering the inhomogeneous structure of single rock fractures, *Soils and*

Foundations, 53, 105-116. (IF:0.453)

- (22) Dae Sung Lee and Hideaki Yasuhara (2013), An evaluation of the effects of fracture diagenesis on hydraulic fracturing treatment, Geosystem Engineering, <http://dx.doi.org/10.1080/12269328.2013.780762>.
- (23) Debendra Neupane, Hideaki Yasuhara, Naoki Kinoshita, and Toshiyasu Unno (2013), Applicability of enzymatic calcium carbonate precipitation as a soil-strengthening technique, ASCE, Journal of Geotechnical and Geoenvironmental Engineering, 139(12), 2201-2211. (IF:1.02)
- (24) Debendra Neupane, Hideaki Yasuhara, Naoki Kinoshita, and Yuji Ando (2015), Distribution of mineralized carbonate and its quantification method in enzyme mediated calcite precipitation technique, Soils and Foundations, 55, 447-457. (IF:0.512)
- (25) Yasuhara, H., N. Kinoshita, H. Ohfuji, M. Takahashi, K. Ito, and K. Kishida (2015), Long-term observation of permeability in sedimentary rocks under high-temperature and stress conditions and its interpretation mediated by microstructural investigations, Water Resour. Res., 51, doi:10.1002/2014WR016427. (IF: 3.709)
- (26) Debendra Neupane, Hideaki Yasuhara, Naoki Kinoshita, Heriansyah Putra (2015), Distribution of grout material within 1-m sand column in insitu calcite precipitation technique, Soils and Foundations, 55, 1512-1518. (IF:0.512)
- (27) Hideaki Yasuhara, Naoki Kinoshita, Sho Ogata, Dae-Sung Cheon, and Kiyoshi Kishida (2016), Coupled thermo-hydro-mechanical-chemical modeling by incorporating pressure solution for estimating the evolution of rock permeability, International Journal of Rock Mechanics and Mining Sciences, 86, 104-114, doi: 10.1016/j.ijrmms.2016.030015 (IF: 1.686).
- (28) Heriansyah Putra, Hideaki Yasuhara, Naoki Kinoshita, Debendra Neupane and Chih-Wei Lu (2016), Effect of Magnesium as Substitute Material in Enzyme-Mediated Calcite Precipitation for Soil-Improvement Technique, Frontiers in Bioengineering and Biotechnology, 4, 37, doi: 10.3389/fbioe.2016.00037.
- (29) Alexander E. Bond · Ivan Brusky · Neil Chittenden · Xia-Ting Feng · Olaf Kolditz · Philipp Lang · Renchao Lu · Christopher McDermott · Ivars Neretnieks · Peng-Zhi Pan · Jan Šembera · Hua Shao · Hide Yasuhara · Hong Zheng (2016), Development of approaches for modelling coupled thermal-hydraulic-mechanical-chemical processes in single granite fracture experiments, Environmental Earth Sciences, 75, 1-21, DOI 10.1007/s12665-016-6117-0 (IF: 1.765).
- (30) Hideaki Yasuhara, Naoki Kinoshita, Dae Sung Lee, Junhyung Choi, Kiyoshi Kishida (2017), Evolution of mechanical and hydraulic properties in sandstone induced by simulated mineral trapping of CO₂ geo-sequestration, International Journal of Greenhouse Gas Control, 56, 155-164 (IF: 4.064).
- (31) Heriansyah Putra, Hideaki Yasuhara, Naoki Kinoshita and Akira Hirata (2017), Optimization of Enzyme-Mediated Calcite Precipitation as a Soil-Improvement Technique: The Effect of Aragonite and Gypsum on the Mechanical Properties of Treated Sand, Crystals, 7, 59; doi:10.3390/cryst7020059 (IF: 2.075).
- (32) Heriansyah Putra, Hideaki Yasuhara, Naoki Kinoshita and Akira Hirata (2017), Application of magnesium to improve uniform distribution of precipitated minerals in 1-m column specimens, Geomechanics and Engineering, 12, 803-813. (IF: 1.085).
- (33) Mamoru Kikumoto, Vu Pham Quang Nguyen, Hideaki Yasuhara, Kiyoshi Kishida (2017), Constitutive model for soft rocks considering structural healing and decay, Computers

and Geotechnics, 91, 93-103 (IF: 2.358).

- (34) Heriansyah Putra, Hideaki Yasuhara, and Naoki Kinoshita (2017), Applicability of Natural Zeolite for NH-Forms Removal in Enzyme-Mediated Calcite Precipitation Technique, Geosciences, 7, 61; doi:10.3390/geosciences7030061.