Hongyang Cheng | Ph.D.

Multi Scale Mechanics, Faculty of Engineering Technology
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Research Interests

- **Multiscale** characterization of geotextile-reinforced granular soils using DEM and coupled FEM/DEM
- **Bayesian** parameter estimation and uncertainty quantification for DEM simulations of granular media
- **Constitutive** modeling of geotextile-reinforced granular soils based on insights from multiscale analyses
- Hydro-micromechanical modeling of **wave propagation** in dry and saturated granular media
- Image processing for 3D **morphological** characterization of granular materials

Education

- **Hiroshima University, Japan** — **Ph.D.**
  Graduate School for International Development and Cooperation — *2013–2016*
  Thesis: Multiscale characterization of geotextile-reinforced granular soil
- **Hiroshima University, Japan** — **M.Eng.**
  Graduate School for International Development and Cooperation — *2011–2013*
  Thesis: Seismic response of buildings with soilbag-reinforced foundations
- **Shenyang Jianzhu Univeristy, China** — **B.Eng.**
  School of Civil Engineering — *2007–2011*
  Thesis: An experimental study of the settlement behaviors of composite foundations with different pile length configurations

Employment

- **Hiroshima University, Japan**
  Graduate School for International Development and Cooperation — *2013.10–2016.9*
  Research assistant
- **University of Twente, The Netherlands**
  Multi Scale Mechanics, Faculty of Engineering Technology — *2016.11–present*
  Postdoctoral researcher

Collaboration

Dr. Klaus Thoeni
Research Associate, University of Newcastle, Australia — *2014–present*
Discrete element modeling of deformable wires, fibers and geotextiles

Dr. Takayuki Shuku
Associate Professor, Okayama University, Japan — *2015–present*
Bayesian calibration of discrete element models of granular materials

Dr. Ning Guo
Assistant Professor, Carleton University, Canada *2016–present*
Concurrent multiscale modeling of granular soils with geosynthetic inclusions

Dr. Nicolás Rivas
Postdoctoral researcher, HIERN for Renewable Energy (IEK-11), Germany *2017–present*
LB-DEM modeling of elastic wave propagation in saturated granular media

Dr. Haruyuki Yamamoto
Professor, Hiroshima University, Japan *2013–present*
Multiscale modeling and characterization of geosynthetic-reinforced granular soils

Selected Award

- Japanese Government (Monbukagakusho: MEXT) Scholarship, *2011, 10*
- Best student paper award at the 7th International Conference on Discrete Element Methods, *2016, 08*

Programing Skills and Softwares

Operating system:	Linux (Ubuntu)
Programming language:	C++, Fortran, Python, LaTeX, Matlab
Simulation package:	YADE (DEM), Escript (FEM), LB3D (LBM)
Post-processing package:	Paraview, Blender

Languages

Chinese:	Mother	English:	Fluent
Japanese:	Intermediate		

Journal Papers (* corresponding author)

1. **Cheng, H.***, Guo, N., Thoeni, K. & Yamamoto, H. (2018). Concurrent multiscale modeling of granular soils with geosynthetic inclusions using coupled FEM and DEM. *Computers and Geotechnics*. (in preparation)
2. **Cheng, H.***, Luding, S., Saitoh, K. & Magnanimo, V. (2018). Elastic wave propagation in dry granular media: effects of probing methods and stress history. *International Journal of Solids and Structures*. (under review)
3. **Cheng, H.***, Luding, S., Rivas, N., Harting, J. & Magnanimo, V. (2018). Hydro-micromechanical modeling of wave propagation in saturated granular media. *International Journal for Numerical and Analytical Methods in Geomechanics*. (under review)
4. **Cheng, H.***, Shuku, T., Thoeni, K., Tempone, P., Luding, S. & Magnanimo, V. (2018). An iterative Bayesian filtering framework for fast and automated calibration of DEM models. *Computer Methods in Applied Mechanics and Engineering*. (under review)
5. Shuku, T.*, **Cheng, H.**, Suzuki, K., Nishiyama, E. & Kusagaya, T. (2018). Geophysical tomography based on sparse modeling. *International Journal of Civil Engineering*. (in press)
6. **Cheng, H.***, Shuku, T., Thoeni, K. & Yamamoto, H. (2018). Probabilistic calibration of discrete element simulations using the sequential quasi-Monte Carlo filter. *Granular Matter* 20(1) 11.
7. **Cheng, H.***, Yamamoto, H., Thoeni, K. & Wu, Y. (2017). An analytical solution for geotextile-wrapped soil based on insights from DEM analysis. *Geotextiles and Geomembranes* 45(4): 361–376.
8. **Cheng, H.***, Yamamoto, H. & Thoeni, K. (2016). Numerical study on stress states and fabric anisotropies in soilbags using the DEM. *Computers and Geotechnics* 76: 170–183.

Book Chapters

1. **Cheng, H.** & Yamamto, H. (2016). Evaluating the performance of geotextile wrapped/layered soil: a comparative study using the DEM. *Geo-China 2016: Geosynthetic Civil Infrastructure, Disaster Monitoring, and Environmental Geotechnics*: 122–130.
2. **Cheng, H.*** & Yamamoto, H. (2016). Modeling microscopic behavior of geotextile-wrapped soil by discrete element method. *Japanese Geotechnical Society Special Publication* 2(65): 2215–2220.
3. **Cheng, H.**, Yamamoto, H., Jin, S. & Okano, S. (2013). Soil reinforcement using soilbags—a preliminary study on its static and dynamic properties. *Geotechnics for Sustainable Development*: 569–578.

Conference Papers

1. **Cheng, H.**, Shuku, T., Thoeni, K., Tempone, P., Luding, S. & Magnanimo, V. (2018). An iterative sequential Monte Carlo filter for Bayesian calibration of DEM models. In *9th European Conference on Numerical Methods in Geotechnical Engineering*. Porto, Portugal. (forthcoming)
2. **Cheng, H.**, Shuku, T., Thoeni, K., Tempone, P., Luding, S. & Magnanimo, V. (2018). *Grain* learning: Bayesian calibration of DEM models and validation against elastic wave propagation. In *China Europe Conference on Geotechnical Engineering*. Vienna, Austria. (forthcoming)
3. **Cheng, H.**, Luding, S., Rivas, N., Harting, J. & Magnanimo, V. (2018). Coupled subpore-scale hydromechanical modeling of wave propagation in saturated granular media. In *micro to MACRO mathematical modelling in soil mechanics*. Reggio Calabria, Italy. (forthcoming)
4. **Cheng, H.**, Shuku, T., Thoeni, K. & Yamamoto, H. (2017). Calibration of micromechanical parameters for DEM simulations by using the particle filter. In *EPJ Web of Conferences*: 140 12011. Montpellier, France.
5. **Cheng, H.**, Pellegrino, A. & Magnanimo, V. (2017). Bayesian calibration of microCT-based DEM simulations for predicting the effective elastic response of granular materials. In *PARTICLE-BASED METHODS V Fundamentals and Applications*. Hanover, Germany.
6. **Cheng, H.**, Yamamoto, H., Guo, N. & Huang, H. (2016). A simple multiscale model for granular soils with geosynthetic inclusion. In *Proceedings of 7th International Conference on Discrete Element Methods (DEM7)*: 445–453. Dalian, China.
7. **Cheng, H.** & Yamamoto, H. (2015). Discrete modeling of geotextile-wrapped soil under simple shear. In *PARTICLE-BASED METHODS IV Fundamentals and Applications*: 485–496. Barcelona, Spain.
8. Yamamoto, H. & **Cheng, H.** (2012). Development study on device to reduce seismic response by using soil-bags assembles. In *Research, Development and Practice in Structural Engineering and Construction*: 597–602. Perth, Australia.

Oral Presentation

1. **Cheng, H.**, Shuku, T., Thoeni, K., Tempone, P., Luding, S. & Magnanimo, V. (2018). A Bayesian calibration toolbox for YADE. In *2nd YADE Workshop*. Aix-en-Provence, France.
2. **Cheng, H.**, Luding, S. & Magnanimo, V. (2017). Fast and automated uncertainty quantification for DEM simulations of dense granular media. In *Twentieth Engineering Mechanics Symposium*. Arnhem, the Netherlands.
3. **Cheng, H.**, Guo, N. & Yamamoto, H. (2017). Multiscale modeling of large deformation in geosynthetic-reinforced granular soils. In *ALERT Workshop 2017*. Aussois, France.
4. **Cheng, H.**, Shuku, T. & Yamamoto, H. (2016). Parameter identification for DEM models of cohesionless granular soil using the particle filter. In *Proceedings of 51th Japanese Geotechnical Engineering Society Annual Meeting*. Okayama, Japan.

5. **Cheng, H.** & Yamamoto, H. (2016). A multiscale approach for modeling soil-geosynthetic interaction. In *Proceedings of Annual Research Meeting Chugoku Chapter, Architectural Institute of Japan*, 39: 365–368.
6. **Cheng, H.** & Yamamoto, H, (2014). Hysteretic behaviors of soil-bag layer under irregular cyclic shear. In *Proceedings of Annual Research Meeting Chugoku Chapter, Architectural Institute of Japan*, 37: 61–64.
7. **Cheng, H.** & Yamamoto, H. (2013). Dynamic analysis of base isolation with soilbags. In *Proceedings of Annual Research Meeting Chugoku Chapter, Architectural Institute of Japan*, 36: 183–186.