Yu-Han Wang

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Education

ETH Zürich **February 2023 – present**
PhD of Geophysics *Zürich, Switzerland*

- Thesis title: Unravelling Fluid-Fault Interactions Through a Physics-Based Multiscale Numerical Framework
- Supervised by Prof. Elías Rafn Heimisson and co-supervised by Prof. Stefan Wiemer

Tongji University **September 2019 – March 2022**
Master of Engineering in Geological Engineering *Shanghai, Mainland of China*

- GPA 92.20/100, Ranking 1/38
- Thesis title: CFD-DEM investigation on debris flow impact on the slit dams and the role of earthquakes
- Supervised by Wuwei Mao and co-supervised by Zhen Guo

Central South University **September 2015 – June 2019**
Bachelor of Engineering in Civil Engineering *Changsha, Hunan Province, Mainland of China*

- GPA 88.22/100, Ranking 4/30
- Thesis title: Micromechanical investigation on rockbursts based on DEM
- Supervised by Nhu H.T. Nguyen and co-supervised by Lianhen Zhao

Working Experience

OptFuture Co., Ltd **September 2022 – October 2022**
CAE Algorithm Engineer *Beijing, Mainland of China*

- Finite element method algorithm implementation with an emphasis on the simulation application in industrial design.
- Digital twin of engineering structures with the help of topology optimisation methods.

Big Data Centre, SGIDI Engineering Consulting (Group) Co., Ltd **May 2021 – July 2021**
Machine Learning Engineer Intern *Shanghai, Mainland of China*

- Encapsulated the machine learning library (scikit-learn) in a website platform which aims to help civil engineers use machine learning methods to predict earth deformation like real-time ground surface settlement, where the project development was based on PyCharm.
- Manipulated back-end structured and unstructured data using MySQL and MongoDB, respectively.

Research Experience

University of Warwick **July 2022 – October 2022**
Research Assistant *Remote*

- Underground rockburst simulation and prediction with hybrid numerical and data-driven methods.
- Made use of the physics-informed neural network to reveal the relationship between micro-parameters and fracturing path for hard rock.

Tongji University **September 2019 – July 2022**
Research Assistant *Shanghai, Mainland of China*

- Simulated debris flow interaction with the basal and slit dams with the semi-resolved CFD-DEM method, in which a non-Newtonian rheological model is first implemented in OpenFOAM.
- Utilised the OpenMP to parallelise the numerical code and achieved a higher computational efficiency. Learnt the usage of compilation toolkits like CMake.

Monash University **December 2018 – May 2019**
Visiting Research Student *Melbourne, Victoria, Australia*

- Carried out mesoscopic study on the mechanism of rockbursts with the Discrete Element Method (DEM). Grasped the theory of DEM and learnt the usage of Particle Flow Code (PFC).
- Revealed the effects of multiple mesoscale parameters on both rockburst strength and failure behaviour. Research results have been accepted by a top peer-reviewed international journal (JCRQ1).

Central South University **March 2018 – Febraury 2019**
Undergraduate Innovation Research Project Leader *Changsha, Hunan Province, Mainland of China*

- Applied image-processing method to reconstruct Barton rough fractures. Cast rock models containing rough fractures and conducted direct shear tests.
- Gained skills on rock joint model development and laboratory experience.

Publications

[1] **Yuhan Wang**, Ping Yang, Zhitang Li, Shaojie Wu, Zixin Zhao, Experimental-numerical investigation on grout diffusion and washout in rough rock fractures under flowing water, Computers and Geotechnics, Volume 126, 2020, 103717, doi:10.1016/j.compgeo.2020.103717.
[2] **Yuhan Wang**, Nhu H.T. Nguyen, Lianheng Zhao, Micromechanical study on hard rock strainburst using the discrete element method, Tunnelling and Underground Space Technology, Volume 109, 2021, 103793, doi:10.1016/j.tust.2020.103793.
[3] **Yuhan Wang**, Nhu H.T. Nguyen, The effects of rock-infill interfacial properties on the compressive damage behaviour of flawed rocks: results from a DEM study, Theoretical and Applied Fracture Mechanics, doi:10.1016/j.tafmec.2021.103166.
[4] **Yuhan Wang**, Wuwei Mao, Ping Yang, Hu Zheng, Yu Huang, CFD-DEM study on the entrainment induced by debris flows with the HBP rheological model. ARMS-11, the 11th Asian Rock Mechanics Symposium 2021 (with Oral Report), doi:10.1088/1755-1315/861/7/072012.
[5] Ping Yang, Zhao Zixin, Li Zhicheng, **Yuhan Wang**, Experimental study on long-term performance of new urban green space soil for sponge city construction. Urban Forestry and Urban Greening, Volume 58, 2021, doi:10.1016/j.ufug.2020.126906.
[6] **Yuhan Wang**, Wuwei Mao, Ping Yang, Dynamics of granular debris flows against slit dams based on the CFD-DEM method: effect of grain size distribution and ambient environments. Acta Geotechnica, Volume 18, 5811-5838, doi:10.1007/s11440-023-01944-y
[7] **Yuhan Wang**, Wuwei Mao, Ping Yang, Yu Huang, Review on CFD-DEM application in debris flow modelling: a multiscale perspective. (in Preparation)

Technical Skills

Programming Languages: Python, C++, MATLAB, SQL, Bash Shell
Open Source Code: CFDEM, OpenFOAM, LIGGGHTS
Software: PFC$^{2D/3D}$, FLAC$^{2D/3D}$, Fluent, Abaqus, EDEM, Origin, SketchUp
Toolkits: CMake, OpenMP, PyCharm, VS Code, LaTeX, Markdown

Awards/ Distinctions

Best Thesis Award for Postgraduates, Tongji University, 2022.
Outstanding Graduate Student Award, Tongji University, 2022.
National Scholarship for Postgraduates, Awarded by Ministry of Education of the People's Republic of China, 2021.
National Scholarship for Postgraduates, Awarded by Ministry of Education of the People's Republic of China, 2020.
Graduate Full Scholarship, Tongji University, September 2019-March 2022.
Outstanding Undergraduate Project Scholarship, Awarded by China Scholarship Council, 2019.
Honourable Winner of Interdisciplinary Contest in Modelling and Interdisciplinary Contest in Modelling, Awarded by the Consortium for Mathematics and Its Application (United States), 2018.
First Reward of Central South University in China Undergraduate Physics Tournament, Awarded by Central South University, 2018.
Jiang Weiying Scholarship, Awarded by a Hong Kong Entrepreneur (Notable Alumni of Central South University), 2017.

English Proficiency

IELTS Listening: 7.5 Reading: 7.5 Writing: 6.5 Speaking: 6.0 Overall: 7.0 (Test Date: 6 August 2021)

Other Mastered Languages

Chinese Mandarin: Native speaker
Cantonese: Fluent