Gengchao Yang | Curriculum Vitae

No. 66, Gongchang Road, Guangming, Shenzhen, Guangdong 518107, China
✉ yanggch8@mail.sysu.edu.cn • personal website

Education

The University of Hong Kong — **Hong Kong**
Ph.D. in Geotechnical Engineering, *Best PhD Thesis* — *2015–2019*

The University of Hong Kong — **Hong Kong**
M.Sc. in Geotechnical Engineering, *Distinction* — *2014–2015*

The University of Hong Kong — **Hong Kong**
B.Eng. in Civil Engineering, *First Class Honours* — *2012–2014*

Sun Yat-sen University — **Guangzhou**
B.Eng. in Civil Engineering, *Rank First in GPA* — *2010–2012*

Employments

Sun Yat-sen University — **Shenzhen**
Associate Professor in the School of Aeronautics and Astronautics — *2024.04–present*

Sun Yat-sen University — **Shenzhen**
Assistant Professor in the School of Aeronautics and Astronautics — *2020.06–2024.03*

The University of Hong Kong — **Hong Kong**
Postdoctoral Research Fellow in the Department of Civil Engineering — *2019–2020*

Awards

2022: Excellent Teacher of the 10th Teaching Competition in English, SYSU

2021: Shenzhen Overseas High-Caliber Personnel, Shenzhen

2019: Ringo Yu Prize for Best PhD Thesis in Geotechnical Studies, HKIE

2013, 2014: Civil Engineering Scholarships for Mainland Students, HKU

2011, 2012: The Giordano Scholarship and other miscellaneous scholarships, SYSU

Teaching Activities

(UG: Undergraduate; PG: Postgraduate)

AA332 Computational Fluid Dynamics — **UG**
School of Aeronautics and Astronautics, Sun Yat-sen University — *2024–present*

AA331 Specialized English for Mechanics — **UG**
School of Aeronautics and Astronautics, Sun Yat-sen University — *2022–present*

AA306 Structural Mechanics — **UG**
School of Aeronautics and Astronautics, Sun Yat-sen University — *2022–present*

ISE233 Engineering Mechanics — **UG**
School of Intelligent Systems Engineering, Sun Yat-sen University — *2020–2023*

AA116 Probability and Statistics **UG**
School of Aeronautics and Astronautics, Sun Yat-sen University *2021*

Grants

(PI: Principal Investigator; Co-PI: Co-Principal Investigator; Co-I: Co-Investigator)

External

Guangdong Basic and Applied Basic Research Foundation, 2024 **PI**
Fast super-resolution LBM-DEM modelling of fluid-solid interactions ¥100,000

Harbin Institute of Technology, 2024 **PI**
Impact characteristics and motion stability of cross-medium amphibious unmanned aerial vehicles during water entry ¥100,000

China Construction Second Engineering Bureau Ltd., 2023 **PI**
Numerical simulation and analysis of deep shaft excavation by blasting and tunnel water inrush ¥40,000

Guangdong Basic and Applied Basic Research Foundation, 2022 **Co-I**
On structure preserving discretization schemes and large-scale parallel algorithms for hypersonic flight ¥1,000,000

Guangdong Basic and Applied Basic Research Foundation, 2022 **PI**
Heterogeneous LBM-DEM modelling non-homogeneous debris flows ¥100,000

National Natural Science Foundation of China, 2021 **PI**
Heterogeneous lattice Boltzmann modelling of unsteady granular avalanches ¥300,000

Guangdong Basic and Applied Basic Research Foundation, 2020 **PI**
Transport characteristics and the pore pressure feedback mechanism of high-velocity and long-runout debris flows ¥100,000

National Key Research and Development Program of China, 2020 **Co-I**
Large-scale complex dynamic graph algorithm for flight route planning ¥5,810,000

Internal

Fundamental Research Funds for Central Universities, 2022 **Co-I**
Numerical modelling of ablative heat protection via phase transition for recoverable hypersonic vehicles ¥210,000

Sun Yat-sen University, 2020 **PI**
Start-up fund for the Hundred Talents Program ¥600,000

Talks

2023: "Principles and applications of lattice Boltzmann method for complex fluid flows", Institute for Ocean Engineering, Shenzhen International Graduate School, Tsinghua University

2023: "Multiscale modeling and analysis of granular flows based on the Lattice Boltzmann method", Research Center of Coastal and Urban Geotechnical Engineering, Zhejiang University

2022: "Towards multiscale lattice Boltzmann modeling of granular flows", 14th Summer Workshop in Mathematics, Universidade de Brasília, Online (`https://www.youtube.com/watch?v=beLJSVTrWYY`)

Publications

English Journal Articles

[1] J. L. Zhou, B. Peng, Q. H. Yao, and **G. C. Yang**. "Predicting delayed stability of metals at constant high temperatures". In: *Materials Science and Engineering: A* 931 (2025), p. 148163.

[2] J. L. Zhou, Q. H. Yao, and **G. C. Yang**. "Nonlinear viscoelasticity of incompressible isotropic solids". In: *International Journal of Mechanical Sciences* 296 (2025), p. 110330.

[3] Z. C. Jiang, Z. L. Wang, Q. H. Yao, **G. C. Yang**, Y. Zhang, and J. Y. Jiang. "A neural network-based Poisson solver for fluid simulation". In: *Neural Processing Letters* 56.5 (2024), p. 233.

[4] A. N. Shi, **G. C. Yang**, C. Y. Kwok, and M. J. Jiang. "Enhanced mobility of granular avalanches with fractal particle size distributions: Insights from discrete element analyses". In: *Earth and Planetary Science Letters* 642 (2024), p. 118835.

[5] Z. L. Wang, Z. C Jiang, Y. Zhang, **G. C. Yang**, T. H. Kwan, Y. H. Chen, and Q. H. Yao. "A moving least square immersed boundary method for SPH with thin-walled rigid structures". In: *Computational Particle Mechanics* (2024).

[6] **G. C. Yang**, F. Qiao, Y. Lu, Q. H. Yao, and C. Y. Kwok. "Discrete element modeling of rock-filled gabions under successive boulder impacts". In: *Computers and Geotechnics* 167 (2024), p. 106092.

[7] Z. C. Jiang, J. Y. Jiang, Q. H. Yao, and **G. C. Yang**. "A neural network-based PDE solving algorithm with high precision". In: *Scientific Reports* 13.1 (2023), p. 4479.

[8] **G. C. Yang**, Y. J. Huang, Y. Lu, C. Y. Kwok, Y. D. Sobral, and Q. H. Yao. "Frictional boundary condition for lattice Boltzmann modelling of dense granular flows". In: *Journal of Fluid Mechanics* 973 (2023), A21.

[9] **G. C. Yang**, S. C. Yang, L. Jing, C. Y. Kwok, and Y. D. Sobral. "Efficient lattice Boltzmann simulation of free-surface granular flows with $\mu(I)$-rheology". In: *Journal of Computational Physics* 479 (2023), p. 111956.

[10] X. Y. Chen, **G. C. Yang**, Q. H. Yao, Z. S. Nie, and Z. C. Jiang. "A compressed lattice Boltzmann method based on ConvLSTM and ResNet". In: *Computers & Mathematics with Applications* 97 (2021), pp. 162–174.

[11] **G. C. Yang**, L. Jing, C. Y. Kwok, and Y. D. Sobral. "Size effects in underwater granular collapses: Experiments and coupled lattice Boltzmann and discrete element method simulations". In: *Physical Review Fluids* 6.11 (2021), p. 114302.

[12] **G. C. Yang**, L. Jing, C. Y. Kwok, and Y. D. Sobral. "Pore-scale simulation of immersed granular collapse: Implications to submarine landslides". In: *Journal of Geophysical Research: Earth Surface* 125.1 (2020), e2019JF005044.

[13] L. Jing, **G. C. Yang**, C. Y. Kwok, and Y. D. Sobral. "Flow regimes and dynamic similarity of immersed granular collapse: A CFD-DEM investigation". In: *Powder Technology* 345 (2019), pp. 532–543.

[14] **G. C. Yang**, L. Jing, C. Y. Kwok, and Y. D. Sobral. "A comprehensive parametric study of LBM-DEM for immersed granular flows". In: *Computers and Geotechnics* 114 (2019), p. 103100.

[15] L. Jing, **G. C. Yang**, C. Y. Kwok, and Y. D. Sobral. "Dynamics and scaling laws of underwater granular collapse with varying aspect ratios". In: *Physical Review E* 98.4 (2018), p. 042901.

[16] **G. C. Yang**, C. Y. Kwok, and Y. D. Sobral. "The effects of bed form roughness on total suspended load via the Lattice Boltzmann Method". In: *Applied Mathematical Modelling* 63 (2018), pp. 591–610.

Chinese Journal Articles

[1] B. H. Huang, Z. C. Jiang, Z. L. Wang, X. Luo, Y. Zhang, Q. H. Yao, and **G. C. Yang**. "Vortex structure analysis of vortex ring collision process based on direct numerical simulation". In: *Chinese Journal of Theoretical and Applied Mechanics* 56.7 (2024), pp. 2004–2014.

[2] R. Y. Luo, Q. Z. Li, G. B. Zu, Y. J. Huang, **G. C. Yang**, and Q. H. Yao. "A super-resolution lattice Boltzmann method based on convolutional neural network". In: *Chinese Journal of Theoretical and Applied Mechanics* 56.12 (2024), pp. 3612–3624.

[3] H. J. Ran, B. H. Huang, **G. C. Yang**, Z. L. Wang, M. Y. Li, and Q. H. Yao. "The compressive properties of flax fiber reinforced biobased materials". In: *Acta Scientiarum Naturalium Universitatis Sunyatseni* 63.5 (2024), pp. 140–147.

[4] R. Y. Luo, Q. Z. Li, Y. J. Huang, **G. C. Yang**, M. M. Yu, G. B. Zu, and Q. H. Yao. "Numerical simulation and safety analysis of foundation pit blasting based on PFC". In: *Acta Scientiarum Naturalium Universitatis Sunyatseni* 62.05 (2023), pp. 107–114.

[5] Z. L. Wang, J. Y. Jiang, **G. C. Yang**, Q. H. Yao, Z. C. Jiang, and Y. Zhang. "An MPS algorithm accelerated by neural network on edge computing". In: *Acta Scientiarum Naturalium Universitatis Sunyatseni* 62.05 (2023), pp. 67–77.

[6] L. Zhang, Z. C. Jiang, Y. H. Chen, Y. Zhang, **G. C. Yang**, and Q. H. Yao. "Numerical simulation of thermal convection of PTT viscoelastic fluid with discontinuous solution". In: *Acta Scientiarum Naturalium Universitatis Sunyatseni* 62.05 (2023), pp. 136–144.

[7] Z. S. Nie, X. Y. Chen, **G. C. Yang**, Z. C. Jiang, and Q. H. Yao. "Lattice Boltzmann method based on U-Net". In: *Acta Scientiarum Naturalium Universitatis Sunyatseni* 63.3 (2022), pp. 101–109.

[8] X. Y. Chen, Z. S. Nie, Z. C. Jiang, **G. C. Yang**, and Q. H. Yao. "Lattice Boltzmann method based on deep neural network". In: *Acta Scientiarum Naturalium Universitatis Sunyatseni* 60.5 (2021), pp. 39–49.

[9] Z. C. Jiang, J. Y. Jiang, Q. H. Yao, and **G. C. Yang**. "A fast solver based on deep neural network for difference equation". In: *Chinese Journal of Theoretical and Applied Mechanics* 53.7 (2021), pp. 1912–1921.

Conference Proceedings

[1] J. C. Gu, F. Qiao, Y. J. Huang, **G. C. Yang**, and Yao Q. H. "Effects of slope and particle size on granular column collapses by discrete element simulations". In: *Chinese Congress of Theoretical and Applied Mechanics*. Chengdu, China, 2022, pp. 235–244.

[2] Y. J. Huang, F. Qiao, J. C. Gu, **G. C. Yang**, and Yao Q. H. "Heterogeneous lattice Boltzmann modelling of granular flows". In: *Chinese Congress of Theoretical and Applied Mechanics*. Chengdu, China, 2022, pp. 598–606.

[3] F. Qiao, J. C. Gu, Y. J. Huang, **G. C. Yang**, and Yao Q. H. "Effect of Particle Shape on Cushioning Performance of Rock filleded Gabion". In: *Chinese Congress of Theoretical and Applied Mechanics*. Chengdu, China, 2022, pp. 652–659.

[4] **G. C. Yang**, L. Jing, C. Y. Kwok, and Y. D. Sobral. "A guideline for quick LBM-DEM simulations". In: *DEM8 - 8th International Conference on Discrete Element Methods*. Enschede, Netherlands, 2019, p. 225.

[5] **G. C. Yang**, L. Jing, C. Y. Kwok, and Y. D. Sobral. "A question of scaling in immersed granular collapses". In: *2nd International Conference on the Material Point Method for Modelling Soil-Water-Structure Interaction*. Cambridge, United Kingdom, 2019, pp. 229–233.

[6] L. Jing, **G. C. Yang**, C. Y. Kwok, and Y. D. Sobral. "Coupled fluid-particle modeling of submerged granular collapse". In: *Micro to MACRO Mathematical Modelling in Soil Mechanics*. Reggio Calabria, Italy, 2018, pp. 187–194.

[7] **G. C. Yang**, L. Jing, C. Y. Kwok, and Y. D. Sobral. "Effects of Dilation and Contraction on Immersed Granular Column Collapse". In: *Micro to MACRO Mathematical Modelling in Soil Mechanics*. Reggio Calabria, Italy, 2018, pp. 391–399.

[8] **G. C. Yang**, L. Jing, C. Y. Kwok, and Y. D. Sobral. "Simulation of pore pressure effects on granular flow dynamics". In: *Second JTC1 Workshop Triggering and Propagation of Rapid Flow-like Landslides*. Hong Kong, China, 2018, pp. 153–157.

[9] **G. C. Yang**, C. Y. Kwok, and Y. D. Sobral. "The role of fluid viscosity in an immersed granular collapse". In: *Powders and Grains 2017 - 8th International Conference on Micromechanics on Granular Media*. Vol. 140. Montpellier, France, 2017, p. 09037.

Supervisions

Ph.D. Students

Baolin Han: Lattice Boltzmann modeling of water entry problems *2025*

Yunjin Huang: LBM-DEM modeling of particle-laden flows *2024–present*

Master Students

Xiangsen Wen: SRLBM for efficient modeling of fluid-structure interactions *2025*

Qinglin Yang: Learning LBM collision operator for complex flows *2024–present*

Wengeng Chen: LBM-DEM modeling of internal erosion *2024–present*

Hao He: Supervised learning of PIV for granular flows *2023–present*

Tianyi Han: Constitutive modelling of granular flows with ML *2023–present*

Renyu Luo: Super-resolution reconstruction of complex fluid flows *2022–present*

Yunjin Huang: Continuum simulation of granular flows using LBM *2021–2024*

Feng Qiao: DEM modelling of rock-filled gabions under successive impacts *2020–2023*

Undergraduate Final Year Project Students

- 2020–2021 **1**
- 2021–2022 **3**
- 2022–2023 **3**
- 2023–2024 **4**
- 2024–2025 **3**