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| **Shuaiwen CUI**  *Ph.D. Student at Nanyang Technological University| Digitization and Automatization in AEC industry* |  | | | | | | | |
| **Research Gate:** [www.researchgate.net/profile/Shuaiwen-Cui](https://www.researchgate.net/profile/Shuaiwen-Cui) | | | | +86 182-0192-3138 (CHN) | | | | |
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| **RESEARCH FOCUS AND INTERESTS** | | | | | | | | |
| * **Digitization and Automatization in AEC** (architecture, engineering & construction) industry | | | | | | | | |
| * **Perception:** Internet of Things, Wireless Sensing Network, Edge Intelligence | | | | | | | | |
| * **Cognition:** Digital Twin, Cyber-Physical System, Control Theory, Visualization | | | | | | | | |
| * **Actuation:** Robot-based Inspection & Construction | | | | | | | | |
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| **EDUCATION** | | | | | | | | |
| **Nanyang Technological University** | | | **Singapore, SG** | | | | | |
| *Ph.D. Student Civil Engineering* | | | 08/2022-Now | | | | | |
| * Internet of Things | | * Edge Intelligence | * MEMS Sensors | | | * Control Algorithm | | |
| * Digital Twin | | * Computer Vision | * Structural Health Monitoring | | | | | |
| **Tongji University** | | | **Shanghai, CHN** | | | | | |
| *M.Eng. Architectural and Civil Engineering* | | | 09/2018-06/2021 | | | | | |
| * Underground Tech | | * Tunnelling | * Geotechnical | | | * DEM | | |
| **Tongji University** | | | **Shanghai, CHN** | | | | | |
| *B.Eng. Major in Civil Engineering, Minor in Mathematics and Applied Mathematics* | | | | | 09/2014-07/2018 | | | |
| * Mathematics | | * Physics and Mechanics | * Engineering | | | * Computer | | |
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| **SKILL SETS** | | | | | | | | |
| * **Languages:** Chinese (native); English (TOEFL 106, GRE 322+4.0); Japanese (beginner) | | | | | | | | |
| * **Embedded System:** Arduino, ESP32, Raspberry Pi; C, C++; FreeRTOS; Keil, PlatformIO | | | | | | | | |
| * **Programming：**Matlab (skilled); Python; C++; SQL; ROS (Robot Operating System) | | | | | | | | |
| * **Front-end:** HTML5; CSS3; Javascript; React | | | | | | | | |
| * **Computer Aided Design:** Auto CAD; Rhinoceros; Sketchup; Revit | | | | | | | | |
| * **Mechanical Analysis:** Ansys; Particle Flow Code (skilled); Openfoam | | | | | | | | |
| * **Internet of Things:** MQTT; EMQ X | | | | | | | | |
| * **Digital Twin and platforms:** Autodesk Forge; BIMFace; Digital Space; Welink; AliOS Things; EMQX | | | | | | | | |
| * **Others:** Origin; Axure RP (rapid prototyping); Iconion; Processon; Xmind | | | | | | | | |
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| **PUBLICATION & PATENT** | | | | | | | | |
| * **Journal Article: Cui, S.**, Tan, Y., & Lu, Y. (2020). **Algorithm for generation of 3D polyhedrons for simulation of rock particles by DEM and its application to tunneling in boulder-soil matrix.** *Tunnelling and Underground Space Technology*, 106, 103588. (IF 5.915) <https://doi.org/10.1016/j.tust.2020.103588> | | | | | | | | |
| * **Journal Article:** Song, X., **Cui, S.**, Tan Y. & Zhang Y. (2021). **Influence of water pressure on deep subsea tunnel buried within sandy seabed.** *Marine Georesources & Geotechnology.*(IF 2.673)   <https://doi.org/10.1080/1064119X.2021.1961954> | | | | | | | | |
| * **Patent** (No. 202011585928.2, China): **Random 3D Polyhedron Generator Based on a Hybrid Extension Method**, an application coded with *Matlab App Designer* to generate random polyhedrons (both convex and non-convex) for simulation of granular materials. | | | | | | | | |
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| **WORK & INTERNSHIP EXPERIENCE** | | | | | | | | |
| **ArcTron Data & Innovation Technology Co., Ltd.** | | | | | | | **Shanghai, CHN** | |
| *Product Manager, R&D* | | | 08/2021-07/2022 | | | | | |
| * Led the prototype development of ArcOS (building operating system) GUI for interactive project configuration. | | | | | | | | |
| * Spearheaded the modulization of the ArcOS work flow for project configuration. | | | | | | | | |
| * Engaged in ArcOS-API design for data importation (from IoT & IBMS) and exportation (for applications). | | | | | | | | |
| * Engaged in algorithm development for ArcOS, e.g., energy conservation, invasion detection. | | | | | | | | |
| * Conducted building performance analyses for the memorial hall of the first national congress of the CPC. | | | | | | | | |
| **Nantong Urban Rail Transportation Co., Ltd.** | | | **Nantong, CHN** | | | | | |
| *Engineer Assistant* | | | 09/2020-10/2020 | | | | | |
| * Conducted field investigation to evaluate the influence of metro construction on surrounding buildings. | | | | | | | | |
| * Assisted in the numerical analysis and prediction of ground settlement caused by water pumping. | | | | | | | | |
| **Shanghai West Bund Media Port Development and Construction Co., Ltd.** | | | | | | | **Shanghai, CHN** | |
| *Engineer Assistant* | | | 07/2017-08/2017 | | | | | |
| * Engaged in the construction of diaphragm wall, excavation, and supporting systems. | | | | | | | | |
| * Installed sensors and collected monitoring data from the wireless sensor network (WSN) for structural analysis. | | | | | | | | |
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| **RESEARCH EXPERIENCE** | | | | | | | | |
| **Algorithm for Generation of 3D Random Morphology of Granules and Its Application** | | | | | | | **Shanghai, CHN** | |
| 09/2018-06/2021 | | | | | | | | |
| * Proposed an **algorithm** for automatic generation of 3D random polyhedrons using a hybrid extension method. | | | | | | | | |
| * Developed a 2-step **convexity control** method that can be used to check the convexity of polyhedron in generation process. | | | | | | | | |
| * Improved the **GJK algorithm** and applied it to **collision detection** in the generation of non-convex polyhedron. | | | | | | | | |
| * Coded a graphical-user-interface (GUI) application that can automatically generate 3D random polyhedrons using the proposed algorithm. | | | | | | | | |
| * Designed and manufactured a TBM model for physical test using 3D printer and servo motors. | | | | | | | | |
| * Conducted parametric studies to explore the boulder motion and ground motion in the tunnel boring machine (TBM) construction process in boulder-soil strata by discrete element method (DEM), where the boulders were simulated by the polyhedrons that was generated in the GUI application. | | | | | | | | |
| * The study found that: (1) the size of ground motion is closely related to the size of boulder but insensitive to the boulder shape; (2) boulder motion is closely related to its morphology, position and orientation; (3) potential geohazards can be mitigated by exploding boulders and grouting in advance. | | | | | | | | |
| **International Conference on Construction Technology in Tunnelling and Underground** | | | | | | | **Melbourne, AUS** | |
| 01/2020 | | | | | | | | |
| * Delivered a presentation titled *Algorithm for Generation of 3D Polyhedrons for Simulation of Rock Particles by DEM and Its Application to Tunneling in Boulder-Sand Matrix* | | | | | | | | |
| **Study on Design of Suspended Waterproof Curtain for Deep Foundation Pit in Soft Soil** | | | | | | | **Shanghai, CHN** | |
| * Completed a report analyzing different aspects of suspended waterproof curtain including the concept and common forms, major concerns in designing, influences on drainage, ground settlement prediction, controlling and monitoring. | | | | | | | | |
| **Microminiature Aerial Vehicle Manufacturing and Testing** | | | | | | **Shanghai, CHN** | | |
| *Team Leader* | | | 09/2016-01/2017 | | | | | |
| * Designed and created a **quadcopter** with wheels which provided proper protection and enabled the quadcopter to move in an energy-saving way. | | | | | | | | |
| * Assembled and tested the quadcopter that exhibited a good performance while flying in the air and rolling on the ground. | | | | | | | | |
| **Shanghai Undergraduate Innovation Program** | | | | | | **Shanghai, CHN** | | |
| *Team Member* | | | 05/2015-05/2017 | | | | | |
| * Invented a new type of clotheshorse which was safer and stronger than the common clotheshorse installed on the old building walls in Shanghai and easier to use. | | | | | | | | |
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| **AWARDS & COMPETITIONS** | | | | | | | | |
| **Excellent Graduate & Excellent Dissertation of Tongji University** | | | | | | | | 06/2021 |
| **Shimao-Jiangxin-China Scholarship for Academic Excellent (Top 3% in China)** | | | | | | | | 11/2020 |
| **Third Prize in the 15th China Post-Graduate Mathematical Contest in Modelling (Top 30%)** | | | | | | | | 12/2018 |
| **Honorable Mention in the Interdisciplinary Contest in Modelling (Top 20%)** | | | | | | | | 2016&2017 |
| **Third Prize of Tongji Scholarship of Excellence (Top 20% of the school)** | | | | | | | | 2015&2017 |
| **Second Prize in the 5th Future Aircraft Designing Contest of Tongji University (3rd/22)** | | | | | | | | 11/2016 |
| **First Prize in the 6th Applied Mechanics Innovation Contest of Tongji University** | | | | | | | | 04/2016 |
| **Third Prize in the 7th China Undergraduate Mathematical Contest (Top 15%)** | | | | | | | | 11/2015 |