Zhanwei Wang

Gender: Male. Date of birth: 1995.05.

wzw_vacuum@outlook.com

Bd de la Plaine 2, 1050 Ixelles, Brussels, Belgium

Work

2024.09 – **Interuniversity Microelectronics Centre (IMEC)**
Title: Postdoctoral researcher
Job: Soft robotics, vacuum gripper, multiphase flow and fluid-structure interactions in robotics

Education

2020.10 – 2024.10 Robots & Multibody Mechanics (R&MM) - BruBotics, Department of Mechanical Engineering, **Vrije Universiteit Brussel**
Degree: Doctor of Engineering Sciences
Major: Mechanical Engineering

2017.09 – 2020.01 Institute of Vacuum and Fluid Engineering, School of Mechanical Engineering and Automation, **Northeastern University** (CN)
Degree: Master of Engineering
Major: Chemical Process Equipment

2013.09 - 2017.06 Institute of Vacuum and Fluid Engineering, School of Mechanical Engineering and Automation, **Northeastern University** (CN)
Degree: Bachelor of Engineering
Major: Process Equipment and Control Engineering

Research Experience

2020-2024 Self-healing soft robots

2019 Fast-mixing and Spraying Microfluidic Chip for Cryo-EM

2018 Design and Simulation of Gas Collecting Device for Low-orbit Aircraft

2017 Microfluidic Chip Research on Cells Medication Dosing

Projects

Funding for continuous investigation to the research output of vacuum grippers

2024-2026 Belgium Builds Back Circular: SNAP (Self-closing sustaiNable vAcuum cuPs). Amount: 795580 Euros

2022-2025 EU EIC: Self HealINg soft materials for susTainable prOducts: ShINTO (101057960)

2020-2024 EU Horizon: International Training Network on Soft, Self-responsive, Smart MAterials for RoboTs (860108).

2017-2019 NSFC: Pulse-type neuron single-cell administration chips micro-nainer flow and diffusion quality characteristics. (No 51376039).

Thesis

Doctoral Thesis: Encoding Physical Intelligence into Soft Robots with Smart Materials and Continuum Mechanics

Master Thesis: Fast-mixing and Spraying Microfluidic Chip for Cryo-EM

Bachelor Thesis: Design of VHVDP-400 Vertical High Vacuum Dry Pump

Publications and Patents

2025 **Wang, Z.,** Chen, H., Shadab, Z., Roels, R., Cools, H., Vanderborght, B., Terryn, S., 3D printable crease-free origami vacuum bending actuators for soft robots. IEEE Transactions on Robotics. ***Accepted.***

2025 **Wang, Z.,** Cools, H., Beckers, S., Cornellà, A., Vanderborght, B., Terryn, S., Self-closing suction cups for vacuum grippers. IEEE Robotics and Automation Practice. ***Under review.***

2025 **Wang, Z.,** Chen, H., Cools, H., Vanderborght, B., Terryn, S., Integrating Software-Less Reflex Mechanisms Into Soft Robots and a Versatile Gripper: A New Bistable Method. IEEE Robotics and Automation Magazine, DOI: 10.1109/MRA.2025.3537831.

2025 **Wang, Z.,** Chen, H., Wang, K., Vanderborght, B., Terryn, S., A Variable Sensing Range Electrical Impedance Tomography Sensor for Robot Electric Skins," in IEEE Robotics and Automation Letters, doi: 10.1109/LRA.2025.3533964.

2025 Chen, H., **Wang, Z.,** et al., A Self-healing Electrical Impedance Tomography Sensor for the Selective Localization of Compression and Damage Based on a Diels-Alder Conductive Composite, IEEE Transactions on Instrumentation & Measurement. ***Major revision.***

2024 Chen, H., **Wang, Z.,** Langlois, K., et al., A Structure Modality Enhanced Multimodal Imaging Method for Electrical Impedance Tomography Pressure Distribution Measurement. IEEE Transactions on Instrumentation & Measurement, vol. 73, pp. 1-13, 2024, Art no. 4507713.

2024 Wang, Y., **Wang, Z.,** Terryn, S., et al., Sub-zero self-healable and fatigue resistant conductive ionoelastomers for sensorized soft pneumatic robots. Journal of Materials Chemistry A. https://doi.org/10.1039/d4ta04081c

2023 **Wang, Z.,** Terryn, S., Wang, H., et al. (2023), Self-Closing and Self-Healing Multi-Material Suction Cups for Energy-Efficient Vacuum Grippers. Adv. Intell. Syst. 2300135.

2023 Wang, H., Terryn, S., **Wang, Z.,** Van Assche, G., Iida, F. and Vanderborght, B. (2023), Self-Regulated Self-Healing Robotic Gripper for Resilient and Adaptive Grasping. Adv. Intell. Syst. 2300223.

2023 Safaei, A.; Brancart, J.; **Wang, Z.,** et al. Fast Self-Healing at Room Temperature in Diels–Alder Elastomers. Polymers 2023, 15, 3527.

2022 **Wang Z,** Terryn S, Legrand J, et al. Topology optimized multi-material self-healing actuator with reduced out-of-plane deformation [C]//2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2022: 5448-5455.

2019 **Wang Z,** Kun Liu*, Shulei Chen, et al. Air-blast atomization simulation and experiment study based on a microfluidic chip, 14th International Conference on Vacuum Science and Engineering Application**.**

2018 **Wang Z**, Kun Liu*, Jiuxin Ning, et al. Effects of Pulse Interval and Dosing Flux on Cells Varying the Relative Velocity of Micro Droplets and Culture Solution, Processes, Volume 6, 7 August 2018, 119.

2017 Naiheng Yang*****, Dechun Ba, Xiaodong Wang, **Wang Z**, et al. Development of Molten Steel Vacuum Degassing and Secondary Refining Technology. Vacuum (4).

2023 **Wang, Z.**, Terryn, S., Vanderborght, B. A Self-closing Valve: Europe, EP 23191748.5.

2019 Kun Liu, Ming Hao, Yue Jiang, Shulei Chen, Jingyi Xu, **Wang Z**, et al. A Single-cell capture microfluidic chip: China, CN201910281813.5[P]. 2019-04-09

2017 Kun Liu, **Wang Z**, et al. A Multi-stages Composited High Vacuum Dry Pump: China, CN201711487620.2[P]. 2018-06-01.

2016 Hui Li, Fei Lv, Chunyu Zhao, Xuebin Ni, Shanqing Li, Mingyu Hu, **Wang Z**, et al. A Universal Intelligent Vibration Isolation system and Vibration Test Method for Automatically Adjusting Damping: China, CN105650181A[P]. 2016-06-08.

2016 Hui Li, Wei Sun, Huanjun Li, He Li, **Wang Z**, et al. Machine tool spindle cutting alarm device and method based on non-contact displacement sensor: China, CN105500113A[P]. 2016-04-20.

Conferences and academic events

2024 Pfizer Innovation Day 2024

2024 IMEC ITF World 2024

2023 International Symposium on Smart Materials at the PCCL in Leoben

2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

2022 SMART training school on the “Applications of smart materials and soft robotics” at the Sant’ Anna (Pisa)

2021 Winter School on Smart Materials for Soft Robotics at the University of Cambridge

2017-2019 13th / 14th International Conference on Vacuum Science and Engineering Application

19th Annual Conference of Chinese Society of Micro-Nano Technology

2014-2016 National Innovation Training for College Students

- EHPS High-Efficiency Energy-Saving Steering Power System Design and Manufacture
- Design and Manufacture of Portable Miniature Roots Vacuum Pump

2017, 2015 Internship in Scientific Instrument Co., Ltd., Chinese Academy of Sciences

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Research Interests

Soft robotics; Simulations; Additive Manufacturing; Stimulus responsive materials

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Relevant Skills

- 3D Printing (Hardness 90D – 23A)
- Finite element analysis (FEA) and Computational Fluid Dynamics (CFD).
- Computer-aided Design (CAD).
- Python, Arduino, MATLAB.

Awards

2020-2024 Funding from China Scholarship Council (CSC).

2018-2019 Awarded the first-class scholarship by Northeastern University.

2018 Awarded a JCHX naming scholarship by Northeastern University and JCHX Mining Management CO., LTD.

2015 Awarded as a model student of the School of Mechanical Engineering and Automation.

2014-2016 Awarded the third-class scholarship by Northeastern University.

Student Supervision

2024-2025 Massenzio Stefano Y Argurio, 18/20 (**Greatest distinction**), Title: Enhancing soft vacuum actuators with layer jamming.

2024-2025 Emil Akariou, 17/20 (**Greatest distinction**), Title: A self sensing and self closing vacuum gripper.

2023-2024 Yiming Yuan, 10/20 (Passes), Title: Complex motions in a soft robotic octopus tentacle using a single controlled negative pressure source.

2022-2023 Oumaima Achkif, 16/20 (**Great distinction**), Title: Soft contact triggered vacuum gripper.

Evaluation criteria:

10/20～13.6/20 Passes；13.6/10～15.4/20 Distinction；15.4/20～17/20 Great distinction；17/20～20/20 Greatest distinction

References

Prof. Bram Vanderborght
Vrije Universiteit Brussel, Department of Mechanical Engineering
Pleinlaan 2, 1050 Brussels, Belgium
Bram.Vanderborght@vub.be

Prof. Guy Van Assche
Vrije Universiteit Brussel, Department of Materials and Chemistry
Pleinlaan 2, 1050 Brussels, Belgium
Guy.Van.Assche@vub.be

Prof. Seppe Terryn
Vrije Universiteit Brussel, Department of Mechanical Engineering
Pleinlaan 2, 1050 Brussels, Belgium
Seppe.Terryn@vub.be