

# Zhanwei Wang

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## Work

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

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## 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

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## 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

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## Projects

### Funding for continuous research 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 HeallNg 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).

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## 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 VHVP-400 Vertical High Vacuum Dry Pump

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## Publications and Patents

2024 **Wang, Z.**, et al., 3D printable crease-free origami vacuum bending actuators for soft robots. IEEE Transactions on Robotics. **Conditionally 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.

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., <b>Wang, Z.</b> , Terryn, S., et al., Sub-zero self-healable and fatigue resistant conductive ionoelastomers for sensorized soft pneumatic robots. Journal of Materials Chemistry A. <a href="https://doi.org/10.1039/d4ta04081c">https://doi.org/10.1039/d4ta04081c</a>
2023	<b>Wang, Z.</b> , 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., <b>Wang, Z.</b> , 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.; <b>Wang, Z.</b> , et al. Fast Self-Healing at Room Temperature in Diels–Alder Elastomers. Polymers 2023, 15, 3527.
2022	<b>Wang Z</b> , 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	<b>Wang Z</b> , Kun Liu*, Shulei Chen, et al. Air-blast atomization simulation and experiment study based on a microfluidic chip, 14 <sup>th</sup> International Conference on Vacuum Science and Engineering Application.
2018	<b>Wang Z</b> , 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, <b>Wang Z</b> , et al. Development of Molten Steel Vacuum Degassing and Secondary Refining Technology. Vacuum (4).
2023	<b>Wang, Z.</b> , Terryn, S., Vanderborght, B. A Self-closing Valve: Europe, EP 23191748.5.
2019	Kun Liu, Ming Hao, Yue Jiang, Shulei Chen, Jingyi Xu, <b>Wang Z</b> , et al. A Single-cell capture microfluidic chip: China, CN201910281813.5[P]. 2019-04-09
2017	Kun Liu, <b>Wang Z</b> , 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, <b>Wang Z</b> , 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, <b>Wang Z</b> , et al. Machine tool spindle cutting alarm device and method based on non-contact displacement sensor: China, CN105500113A[P]. 2016-04-20.

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### 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	13 <sup>th</sup> / 14 <sup>th</sup> 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 <ul style="list-style-type: none"> <li>EHPS High-Efficiency Energy-Saving Steering Power System Design and Manufacture</li> <li>Design and Manufacture of Portable Miniature Roots Vacuum Pump</li> </ul>
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.

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### 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.

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## References

Prof. Bram Vanderborght  
 Vrije Universiteit Brussel, Department of Mechanical Engineering  
 Pleinlaan 2, 1050 Brussels, Belgium  
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Prof. Guy Van Assche  
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