Fan Wang

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Summary

I am an aspiring master student working on interdisciplinary projects at the intersection of mechanical engineering, materials science and biology, and like working on hands-on laboratory experiments with the desire to try out many novel ideas. Currently, I am creating new self-powered paradigms for Electro-tactile neural interfacing and wearable electronic with skin-like bioelectronic and Triboelectric Nanogenerator (TENG).

Research Interests

TENG, Bioinspired sensor, Miro/Nano-robotic, Microfluidics, Liquid Metal, Flexible Piezoelectrics, Wearable Electronics, Bioinspired Materials, Electrospinning, photolithography, Neuroengineering.

Education

09/2018-07/2021 University of Chinese Academy of Sciences (UCAS)| Concentration: **Nanogenerator**
Degree: Master of Engineering, ***GPA 3.56/4.0***

09/2016-07/2018 University of Science & Technology Beijing (USTB)| Concentration: **Robotics**

09/2014-07/2018 Beijing Information & Science Technology University(BISTU)
Major in **Mechanical Engineering**; Minor in **Intelligent Robotic Technology**
Degree: Bachelor of Engineering, ***GPA 80.2/100***

Research Experience

11/2020 - **Bioinspired soft micro-robot with environmental camouflage colors** |Leader

09/2020 - **Liquid metal–enabled cybernetic electronics based on TENG** |Leader

01/2020-11/2020 **High Current Output of TENGs and Management toward Self-powered Systems** |Leader

06/2019-02/2020 **Self-powered Electro-tactile Interface for Experiencing Tactile Virtual Reality** |Leader

07/2018-09/2019 **Self-powered Wearable Sensor for Identifying Noncontact Motions** |Leader

- Inspired by the cockroach antennae and designed a bionic-antennae-array sensor

04/2018-08/2018 Environmental Energy Harvesting in Different Weather Conditions | Membership

- Designed integrated TENG array to collect energy from both wind and rain drops.

12/2017-06/2018 The Program of Rehabilitation Robot |Leader

10/2015-10/2016 Intelligent Wheelchair controlled by Brain Wave |Membership

Publications and Patents

[1] **Wang, F.**; Ren, Z.; Nie, J.; Tian, J.; Ding, Y.; Chen, X., Self-Powered Sensor Based on Bionic Antennae Arrays and Triboelectric Nanogenerator for Identifying Noncontact Motions. ***Advanced Materials Technologies*** 2020, 5, 1900789.

[2] Shi, Y.#; **Wang, F.#(co-first author)**; Tian, J.; Ding, Y.; Chen, X.; Wang, Z. L., Self-powered Electro-tactile System for Virtual Tactile Experiences. ***Science Advances*** 2021,7 (6), eabe2943. DOI: 10.1126/sciadv.abe2943

[3] **Wang, F.**; Tian, J.; Ding, Y.; Shi, Y.; Tao, X.; Chen, X.; Wang, Z. L., A universal managing circuit with stabilized voltage for maintaining safe operation of self-powered electronics system. ***iScience*** (Accepted).

[4] Tian, J.; **Wang, F.**; Ding, Y.; Lei, R.; Shi, Y.; Tao, X.; Yang, Y.; Chen, X., Self-powered room-temperature ethanol sensor based on brush-shape triboelectric nanogenerator. ***Research*** 2021, 2021(47),1-11.

[5] Ren, Z.; Wang, Z.; **Wang, F.**; Li, S.; Wang, Z.L., Vibration behavior and excitation mechanism of ultra-stretchable triboelectric nanogenerator for wind energy harvesting. ***Extreme Mechanics Letters*** 2021, 45, 101285.

[6] Li, S; Nei, J.; Shi, Y.; Tao, X.; **Wang, F.**; Tian, J.; Lin, S.; Chen, X.; Wang, Z.L., The contribution of different functional groups to the contact electrification of polymers. ***Advanced Materials*** 2020, 202001307.1.

[7] Zhong, W.; Xu, L.; Zhan, F.; Wang, H.; **Wang, F.**; Wang, Z. L., Dripping Channel Based Liquid Triboelectric Nanogenerators for Energy Harvesting and Sensing. ***ACS Nano*** 2020, 4 (8), 10510-10517.

[8] Lei, R; She, Y. X.; Ding, Y. F.; Nie, J. H.; Li, S. Y.; **Wang, F.**; Zhai, H.; Chen, X. Y.; Wang, Z.L., Sustainable High Voltage Source based on Triboelectric Nanogenerator with Charge Accumulation Strategy. ***Energy & Environmental Science*** 2020, 13, 2178-2190.

[9] Lin, Y.; Nie, J.; Bai, Y.; Li, S.; Xu, L.; **Wang, F.**; Ding, Y.; Tian, J.; Li, Y.; Chen, X.; Shen, H., Anodic bonding driven by the pulse current signal of triboelectric nanogenerator. ***Nano Energy*** 2020,73, 104759.

[10] Ren, Z.; Ding, Y.; Nie, J.; **Wang, F.**; Xu, L.; Lin, S.; Chen, X.; Wang, Z. L., Environmental Energy Harvesting Adapting to Different Weather Conditions and Self-Powered Vapor Sensor Based on Humidity-Responsive Triboelectric Nanogenerators. ***ACS Appl Mater Interfaces*** 2019, 11 (6), 6143-6153.

[11] Ding, Y.; Shi, Y.; Nie, J.; Ren, Z.; Li, S.; **Wang, F.**; Tian, J.; Chen, X.; Wang, Z. L., Thermochromic triboelectric nanogenerator enabling direct visualization of temperature change during operation. ***Chemical Engineering Journal*** 2020, 388.

[12] **Wang, F.**, An Efficient Twin-Turbine Structure Triboelectric Nanogenerator for Harvesting Arbitrary Water Wave Energy. The 4th International Conference on Nanoenergy and Nanosystems 2019, Beijing, June 15-17,2019[C].

[13] **Wang, F**.; Chen, X., Mechanical Structure Design of Rehabilitation Robot.2018. (Undergraduate)

[14] **Wang, F.**; Han, Y. F., Path Planning of Soccer Robot based Robot Operating System (ROS). (Undergraduate)

[15] Wang, Z. L., Chen, X. Y., **Wang, F.**, Self-Powered Sensor Based on Bionic Antennae Arrays and Triboelectric Nanogenerator for Identifying Noncontact Motions (Chinese Patent)

[16] Wang, Z. L., Chen, X. Y., **Wang, F.**, A universal managing circuit for improving current of Triboelectric Nanogenerator (Applying for Chinese Patent)

Working Experience

06/2017-08/2017 **Horizon Robotics in Beijing| Internship**

- Debugged and managed the Robotic vision analysis data

Honors and Distinctions

10/2020 **Director Excellence Scholarship**

10/2019 **2019-2021 National Scholarship for Graduate Students** (Merit-based)

07/2019 Holder of Third Prize of 2019 UCAS Innovation and Entrepreneurship Training Competition

05/2019 **The Poster of the 4th International Conference on Nanoenergy and Nanosystems 2019**

06/2018 **Outstanding Graduates Awards in BISTU in 2018th**

10/2017 Holder of **First Prize LabView Programming Contest of BISTU**

03/2017 Holder of Second Prize of Beijing University Technology Innovation Project

07/2017 **Champion of RoboCup Middle Size League Nagoya, Japan**

06/2016 Holder of Third Prize of China Undergraduate Mathematical Contest in Modeling

12/2015 **Special Award of North China Five Robots Competition**

Technical Skills

Fabrication and Characterization:

Fabrication: **Photolithography, Transferprinting, ICP, PVD, Laser direct writing**, **SonoPlot**.

Microscopy: **SEM, AFM,** Confocal Microscopy, TEM.

Electrical Characterization: Cascade, UltraFIex, **KEITHLEY 6514/2450.**

Optical Characterization: **UV-Vis**, XRD, **Raman and PL -Horiba**, Ellipsometry.

Software Skills:

Programming: C/C++, Python, **Matlab, LabView, PLC**

Open-Source: **Git, Paraview**.

OS: Unix, **Ubuntu,** Windows, macOS.

Software Applications: **COMSOL, Mathematic, Wolfram Alpha,** 3DMax, Solidworks, SEMulator 3D.

Hardware Skills:

Prototyping and PCB: Eagle.

Machinofacture: **Numerical Control Tools.**

MCUs and MPUs: **Arduino,** Raspberry Pi，**MSP430 , Nordic nRF,** BLE Bluetooth &Wi-Fi (**wireless devices**)