Qinliang Wang

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RESEARCH INTERESTS

Wearble, Motion Capture, E-textile Skin, Human Computer Interaction, Human health, ...

EDUCATION

Shenzhen University, Shenzhen, China — Sept. 2020 — Jul. 2023
Master of Science in Sports — GPA: 3.28/4.0
Master's supervisor: Ying Gao & Tailin Xu
Thesis Title: Table Tennis Footwork Training System Based on Serious Game Interaction

Shenzhen University, Shenzhen, China — Sept. 2014 — Jul. 2018
Bachelor of biotechnology — GPA: 2.65/4.0
Thesis Title: Preparation of ternary concrete repair agent and its oxygen release properties

EMPLOYMENT EXPERIENCE

Biocentury Transgene (China) Co. Ltd. — Shenzhen, China
Laboratory assistants (internship) — Jul. 2017 — Sept. 2017

- cotton leaf screening and classification, DNA extraction, plasmid digestion, electrophoresis, PCR amplification, and cloning.

Fitness Club — Shenzhen, China
fitness coach — Oct. 2018 — Apr. 2019

- fat loss, body contouring, muscle building, Postural Alignment Therapy.

PUBLICATIONS

- Zhang, J. L., Wang, C. G., Wang, Q. L., ... & Deng, X. (2016). A binary concrete crack self-healing system containing oxygen-releasing tablet and bacteria and its Ca 2+-precipitation performance. Applied microbiology and biotechnology, 100, 10295-10306. Third Author,Published

- Liu Y, Zhang X, Wang Q, et al. Colorimetric Detection of Electrolyte Ions in Blood Based on BiphasicMicrodroplet Extraction[I], Analytica Chimica Acta, 2024: 342661. Co-first Author,Published

- Q.Wang, G.Zhong, Y.Gao, T.Xu, Fully Integrated Flexible Inertial Sensors for Guiding the Standard Table Tennis Teaching First Author, Submited to Nature Communications(Under review)

AWARDS

Graduate Academic Scholarship — Shenzhen University
Second Class.(Double times) — 2021 & 2022

Innovation and Entrepreneurship Incubation Program — Department of PE,Shenzhen University First Class. Project: a sports intelligent venues can be spliced electronic display floor in the "AR" trend. 2021

TECHNICAL COMPETENCIES

- **Programming Languages:** Python (Data Analysis, ML/DL), C/C++ (Embedded Systems), Java (Application Development)
- **Hardware Development:** Circuit Design, Sensor Fabrication (Flexible Electronics, Microfluidics), Wearable Device Prototyping
- **Software & Algorithms:** UI/Game Design, Machine/Deep Learning (Motion Recognition, Health Diagnostics)
- **Simulation & Analysis:** Finite Element Modeling (Structural/Fluidic Systems)
- **Research Tools:** Scientific Illustration, Technical Writing (Multiple SCI Publications)

Follow-up study

- Design and Fabrication of Biomimetic Flexible Exoskeletons Powered by Artificial Muscle Networks

  My primary research ambition is to pioneer a new class of biomimetic flexible exoskeletons that move and feel like a natural extension of the human body. Moving beyond rigid counterparts, these systems will utilize soft artificial muscles as their core actuators, enabling compliant, safe, and lightweight human augmentation and rehabilitation. The fundamental challenge this research addresses is the integration of sensing, actuation, and control within a entirely soft, continuously deforming structure. This work aims to revolutionize physical therapy and human performance by creating exoskeletons that move with life-like grace and adaptability, ultimately merging human and machine into a cohesive synergistic system.

- Rapid-Response Liquid Crystal Elastomer (LCE) Artificial Muscle via Synergistic Thermal Management with Bidirectional Functional Films

  Research Objective: This project will overcome this bottleneck by integrating LCE fibers with a novel bidirectional functional film for synergistic thermal management. This film will combine a Joule heating layer for instantaneous activation with a active cooling layer (e.g., via microfluidic or Peltier effects) for rapid heat dissipation. The goal is to achieve ultra-fast actuation with a full cycle time below 0.1 seconds and a operational frequency exceeding 10 Hz, while maintaining large strain (>40%) and high energy density (>1 kJ/m^3). This breakthrough in artificial muscle performance is critical for powering the next generation of responsive and agile soft robotic exoskeletons.

- A superstretchable conductor with zero resistance-strain coupling for strain-irrelevant high-speed data communication in soft robotic systems

  Building directly on the aforementioned application, this study will delve into the core material science challenge that enables it: achieving flawless communication within a deforming system. I plan to investigate the synthesis and manufacturing of a novel composite material that exhibits zero resistance-strain coupling. This conductor must maintain metallic-level conductivity (>10^5 S/m) even under extreme deformations (>500% strain). The key focus will be on ensuring this stability enables strain-irrelevant high-speed data communication (e.g., SPI, I^2C protocols) within a soft robotic body. This will involve rigorous characterization of signal integrity through eye diagram and bit-error-rate (BER) analysis under dynamic stretching. Success here is critical for creating truly autonomous soft robots where control units, sensors, and actuators can communicate reliably at high speeds regardless of the robot's shape or movement, overcoming a major bottleneck in the field.

- Wearable sensors for AI-driven assessment of specialized sports skills and biomechanics

  Research Objective: This project aims to develop a next-generation sports biomechanics analysis system by seamlessly integrating fully flexible garment-embedded circuitry with advanced artificial intelligence. The primary goal is to create a ubiquitous sensing platform that can capture complete human kinematic data with minimal movement restriction, enabling the precise, quantitative, and real-time assessment of complex athletic skills outside the constraints of a laboratory environment.

- Integration of physical and chemical sensors on E-Texile platforms

  Research Objective: This project aims to transcend the current state of the art in wearable sensing by creating a seamless "lab-on-a-shirt" E-Textile platform that synergistically integrates physical and chemical sensors. The ultimate goal is to achieve comprehensive, multimodal physiological intelligence by simultaneously capturing biomechanical motion, vital signs, and biochemical markers from sweat during dynamic activity. This holistic data fusion will unlock unprecedented insights into human performance, metabolic state, and health status in real-time and in real-world environments.

RESEARCH EXPERIENCE

Research Assistant Supervised by Prof.TaiLin Xu
The Institute for Advanced Study (IAS), Shenzhen University, China Feb. 2023 — -

- Colorimetric Detection of Electrolyte Ions in Blood Based on BiphasicMicrodroplet Extraction

  In this project, I contributed to both the experimental aspects and the development of smartphone software for a biphasic microdroplet-based colorimetric sensor. My work included optimizing sensor parameters for electrolyte ion detection in blood and developing a mobile application to process colorimetric data semi-quantitatively. This integration allowed for rapid, accurate detection of key electrolytes (K, Na, Cl) directly from blood samples, facilitating real-time biomarker monitoring with minimal equipment.
- Fully Integrated Flexible Inertial Sensors for Guiding the Standard Table Tennis Teaching

  In this project, I led and completed the development of a flexible AI-enhanced inertial sensor for table tennis training, covering sensor design, algorithm development, data collection, mobile app development, and manuscript writing. My work involved integrating MEMS sensors on flexible circuits, achieving high-precision motion detection, and implementing algorithms like LDTW and MAFFT for movement analysis. This system enables accurate, real-time motion evaluation, with potential applications in telerehabilitation and advanced human-computer interaction.

Student Assistant Supervised by Prof.Xu Deng
College of Life Sciences and Oceanography, Shenzhen Key Laboratory of Marine Bioresource and Eco-environmental Science, Shenzhen University, China Mar. 2015 Jun. 2018

- A binary concrete crack self-healing system containing oxygen-releasing tablet and bacteria and its Ca 2+-precipitation performance. Applied microbiology and biotechnology

  In this project, I contributed to the experimental implementation and data collection, gaining essential laboratory skills in bacterial cultivation, solution preparation, and concentration measurement using a spectrophotometer, along with general lab protocols. My role involved supporting the investigation into oxygen-enhanced microbial calcium precipitation, which contributed to developing a binary self-healing system for potential concrete crack repair.

RESEARCH COMPETENCIES

- **Innovation:** Skilled at identifying new research ideas.
- **Learning:** Quick to acquire and adapt to new knowledge.
- **Practical Execution:** Proficient in planning specific research tasks and hands-on implementation.
- **Gratitude:** Appreciative of every hard-earned opportunity; values and reciprocates support from others.
- **Teamwork:** Embraces inclusivity and effective communication; demonstrates a friendly and approachable demeanor.