DR YITONG SUN

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RESEARCH INTERESTS

1. **HCI** | Comment Bot | Micro-expression Capturing and Embedding for LLM | Pupil Oscillation and Brain Arousal
2. **Immersive System** | Digital Twin | Color Rendering | Non-Image-Forming Vision | Eye Monitoring | Meta Human
3. **Disaster Simulation** | Earthquake Modelling | Material Behaviour | Immersive Training | Realistic Visualisation

EDUCATION

PhD in Computer Science *2021 - 2024*
Computer Science Research Centre, Royal College of Art, UK [Link]
Area: HCI, VR Lighting, Colour Rendering, Human Perception, NIF Vision, Eye Information Decoding
Thesis: Optimising VR Lighting System for Enhanced User Experience and Eye Health

MSc in Design *2014 - 2017*
Politecnico di Milano, IT [Link]
Area: HCI, XR, Full Immersive Experience, Audiovisual Space Generation

Honours BSc in Design *2009 - 2013*
Central Academy of Fine Arts, CN [Link]
Area: HCI, Full Immersive Experience, Data Visualisation, Embedded Programming

EXPERIENCE

Visiting Scholar *Jul 2025 - Present*
MIT Computer Science & Artificial Intelligence Lab (MIT CSAIL), Prof. Stefanie Mueller group. [Link]

- Develop intelligent interface based on conductive flexible fabrics for human body state capturing.
- Develop cellular automata-based predictions of fungal behaviour for natural self-grown fabrics production.

Editor-in-Chief & Technical Founder *Jun 2025 - Present*
[interactives] (ISSN 2755-6336), an experimental journal focused on HCI, game studies, and new media.

- Lead the journal's editorial vision and policy; oversee peer-review quality and research ethics.
- Build the platform from scratch (React + PostgreSQL; ~160k LOC), supporting online collaborative authoring, automated submission, and a timeline-style review workflow.
- Embed interactive demos and media into papers, including videos, GIFs, music, and itch.io games.
- Develop a self-evolving LLM-based comment bot and inline comment system to boost engagement.
- Implement an AI assistant for submission checks, review support, and editorial coordination.

Postdoctoral Research Associate (Co-authored Grant) *Oct 2024 - Jun 2025*
Royal College of Art, cooperate with Foster + Partners and UNSW Sydney
Title: Development of a High-Fidelity Earthquake Simulation Environment for VP Based on UE [Link]
Funding body: XR Network+, funded by the EPSRC, UKRI [Link]

- Focused on real-time, high-fidelity urban earthquake damage simulation within game engine.
- Developed reinforcement learning models to translate ANSYS material fracture behaviour into UE.
- Created an open-source scientific material library to support multi-purpose disaster preparedness.
- Implemented dynamic ground deformations in UE and transmitting stress responses to buildings.
- Developed a zero-code, cross-platform interface to support integration with multi-devices.

**Selected as an Outstanding Project by funding body. Workshop: [London] , [Sydney]*

Mentor *14 - 16 Aug 2024*
XR Hackathon 2024 London, sponsored by Meta, Logitech et al., hosted by PWC and Innovate UK [Link]
Invited as one of 12 mentors to provide VR development technical guidance to 200+ participants.

Research Assistant
Royal College of Art, PolyU, AiDLab Projects; funded by GovHK
1. Project RP1-6 "3D Modelling for Wellbeing" [Link] *Feb 2023 - Aug 2024*

- Developed a sensor that combines capacitive pressure and EMG for posture detection.

- Designed and prototyped a BLE PCB to monitor and transmit posture data.
- Built a time series forecasting AI model to estimate human posture from sensor data.
- Developed edge computing algorithms and a secure cloud database for data transmission.

2. Project RP2-7 "Spatial AI Modelling Emulator" [Link] *Mar 2023 - Jan 2024*

- LLM workflow: prompt library, tool routing, JSON function calling.
- Unity pipeline: NL → scene graph → prefab instantiation (layout/physics).
- Typed function tools (spawn/move/scale, lighting/camera, NavMesh); validation & retries.
- Multi-turn dialogue with state/memory for planning, disambiguation, repair.
- User studies on language behaviour; metrics on tool-call accuracy, completion, corrections.

College Lecturer *Oct 2017 - Oct 2020*

School of Design, Central Academy of Fine Arts, CN [Link]

- Design workshop - "Biomaterials and Design Future"
- Design course - "Interaction Design, HCI and Programming"
- Design course - "Design Methodology and Critical Thinking"
- Laboratory - "Virtual reality and Immersive Experience"
- Served as a supervisor for undergraduate final year projects.

HCI Researcher *Aug 2016 - Aug 2017*

Piaggio & C. SpA - Milan, IT [Link]

Explored novel concepts of HCI and human behaviour for the new Vespa series, "The Next 100 Years".

PUBLICATIONS AND PATENTS

12. K. Wang, **Y. Sun**, T. Sethapakdi, T. Yu, Y. Wang, and S. Mueller, "*!InteractivesPub: Redistributing Author and Reader Effort through Interactive Academic Authoring*", CHI 2026 Poster. (submitted)

11. S. Li, K. Wang, M. Fang, D. Huang, A. Asadipour, H. Mi and **Y. Sun***, "*Participatory Evolution of Artificial Life Systems via Semantic Feedback*", SIGGRAPH Asia 2025. [Link]

10. **Y. Sun**, H. Wang, C. Diels and A. Asadipour*, "*Reducing Light-Stimulation with Preserved Color Fidelity: A Color Shifting Method for VR Displays*", IEEE Transactions on Visualization and Computer Graphics (TVCG) 2025. (accepted, forthcoming)

9. K. Wang, I. He, J. Li, A. Asadipour and **Y. Sun***, "*Exploring Fungal Morphology Simulation and Dynamic Light Containment from a Graphics Generation Perspective*", SIGGRAPH Asia 2024. [Link]

8. **Y. Sun**, H. Wang, Z. Zhang, C. Diels and A. Asadipour*, "*Executing Realistic Earthquake Simulations in Unreal Engine with Material Calibration*" Computers & Graphics 2024. [Link]

7. **Y. Sun**, Z. Zhou, C. Diels and A. Asadipour*, "*DeepMetricEye: Metric Depth Estimation in Periocular VR Imagery*", IEEE International Symposium on Mixed and Augmented Reality (ISMAR) 2023. [Link]

6. **Y. Sun**, H. Wang, Z. Zhang, C. Diels and A. Asadipour*, "*RESenv: A Realistic Earthquake Simulation Environment based on Unreal Engine*", International Conference on Interactive Media, Smart Systems and Emerging Technologies (IMET) 2023. **Best Paper Award** [Link]

5. **Y. Sun**, H. Wang, P. Satilmis, N. Pourshahrokh, C. Harvey and A. Asadipour*, "*Predicting the Light Spectrum of Virtual Reality Scenarios for Non-Image-Forming Visual Evaluation*", IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR) 2023. [Link]

4. N. Pourshahrokh, **Y. Sun** and A. Asadipour*, "*Commercial and Research-based Wearable Devices in Spinal Postural Analysis: A Systematic Review*" EAI International Conference on Wearables in Healthcare (EAI HealthWear) 2023. [Link]

3. **Y. Sun**, "*Decoding Pupillary Oscillations to Infer Brain Arousal*", UK Patent Application Pending, 2024.

2. **Y. Sun**, H. Wang, "*Delta-E Colour Adjustment*", UK Patent Application No. 2411463.9, 2024.
(Represented by Innovation RCA [Link] , Licensing to Meta Quest VR OS and TÜV Rheinland®)

1. A. Asadipour, **Y. Sun**, and N. Pourshahrokhi, "*Remote posture mentoring in delivering personalised disruptive interventions*", Chinese invention Patent Pending, 2024.

HONOURS & FELLOWSHIPS

Fellow of the Higher Education Academy (FHEA) *2025 - Present*
Fellow of the Royal Society of Arts (FRSA) *2024 - Present*

AWARDS AND FUNDINGS

IRCA Enterprise Ltd's Design & Impact S/EIS Research Seed Fund (£250k) *2024*
EPSRC XR Network+ Embedded Research and Development Grants (£60k) *2024*
IRCA Startup Pitch Deck Competition "Winner" and "Special Mention Award" *2024*
Japan Media Arts Festival "New Face Award" *2019*
Prix Ars Electronica "Honorary Mentions" *2018*
Milan Design Week, Design satellite "Special Mention Award" *2016*
Project "HUI" Permanently Collected by CAFA Art Museum *2013*
CAFA Graduation Exhibition First Prize (¥15k) *2013*
Experimental film "One Fourth" featured at EXIN Asia Experimental Cinema Forum *2013*
Featured Interview in *ILOOK World Cities* Magazine *2012*
CAFA Annual First Prize Scholarship (¥35k) *2012*

PUBLIC ENGAGEMENTS

Invited Presentations and Talks

SIGGRAPH Asia, Tokyo *2024*
DLX Lab, University of Tokyo *2024*
teamLab, Tokyo *2024*
London Office of Technology & Innovation *2024*
Sony, Tokyo *2024*
Meta, XR hackathon *2024*
Apple, Vision Pro Development Team *2024*
University College London, XR Team *2024*
ISMAR, Sydney *2023*
IMET, Barcelona *2023*
Sony Interactive Entertainment (SIE) *2023*
Imperial College London, ZhenFund x SparkX *2023*
UNSW, iCinema Research Centre *2023*
Bath, Exeter and KCL Universities *2023*
Immerse UK *2023*
Surrey University, 5G / 6G Team *2023*
AidLAB Team *2023*
EPFL+ECAL Lab *2023*
Aston Vision Science *2023*
Nvidia, Higher Education & Research *2023*
IEEE VR, Shanghai *2023*
HTC, HTC Europe Webinar *2022*
Foster + Partners, Specialist Modelling Group *2022*
Birmingham City University, DMT Lab *2022*

Open Source Contributions

Bevy Game Engine (Shader & AI plugin dev) [Github]
Godot Game Engine (Rust GDExtension dev) [Github]
KiCad EDA (Auto Routing Algorithm dev) [GitLab]
Awesome Embedded Rust (Esp32, RP2040) [Github]
OPSX - Polaroid SX-70 Core Board [Github]
DPDG - Periocular Depth Estimation [Github]

Reviewer

SIGGRAPH 2023 | SIGGRAPH Asia 2023/2024/2025 | IMET 2023 | IEEE VR 2024 | ISMAR 2024 | ACM TOG

SKILLS

Coding

Python (expert) | Rust (expert) | C# | C++ (Unreal Engine) | C | R | TypeSctipt | HLSL | Verilog | Pytorch | OpenCV

LLMs & Agents

Local deployment (vLLM / llama.cpp / Ollama) | Fine-tuning (LoRA / QLoRA / PEFT) | RAG (FAISS / pgvector) | Function calling (JSON schema & tool APIs) | Prompt engineering | Text-to-3D (Unity pipeline)

Game Engine

Unity (expert) | Unreal Engine (expert) | Bevy (contributor, capable of low-level modification for scientific use)

Embedded System

High Speed PCB Design & Prototype | Signal Simulation | RTOS | Linux Kernel & Driver Development

Machine Learning

U-Net | SAM | PatchTST | Transformer | Diffusion | LSTM | TCN

3D Modeling
Grasshopper | Houdini | Fusion | OpenCAD | Blender | C4D

Sensor Fabrication
Nitinol artificial muscle | Capacitive pressure sensor | Piezoelectric sensor | Triboelectric nanogenerator