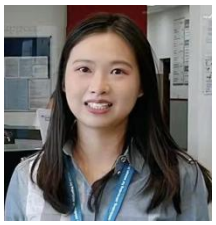
Utrecht University

Boyu Xu



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*My research interests focus on integrating **large language models** and **knowledge graphs** to **accelerate knowledge learning and discovery** in complex domains, such as neuroscience and chemistry.*

EDUCATION

Utrecht University, the Netherlands, Prof. Lynda Hardman and Dr. Wolfgang Hürst — Nov 2021 – Jan 2026
PhD Candidate, Department of Information and Computing Sciences

Nanjing University of the Arts, China — Sep 2016 – Jun 2019
MA in Artistic Design

University of Glasgow, UK — Sep 2017 – Aug 2018
MSc in Serious Games and Virtual Reality

Nanjing University of the Arts, China — Sep 2012 – Jun 2016
BA in Artistic Design

PROFESSIONAL EXPERIENCE

PhD Candidate, Utrecht University, Centrum Wiskunde & Informatica

Dissertation title ***Exploring Indirect Relations Between Topics in Neuroscience Literature Using Augmented Reality to Inform Experimental Design***

Before conducting a costly experiment, neuroscientists need to identify potentially useful hypotheses. Given the vast amount of neuroscience literature, it is essential to gain a bird's-eye view of the field to understand what knowledge is already established and what insights may guide future experiments. To address this, I constructed knowledge graphs (https://kgbs-sparql.project.cwi.nl/login, username: admin, password: 2PeAaDaEaDKFhAL) to represent structured connections among neuroscience topics and developed a 3D AR prototype (https://www.projects.science.uu.nl/ics-datar/) to visualise these connections. This prototype enables the exploration of hundreds of thousands of publications simultaneously and facilitates the identification of promising hypotheses between brain regions and brain diseases.

- An overview of my PhD research was presented as a Doctoral Consortium paper at CHIIR 2024.
- This research has been published in two papers at MMM 2024 and IEEE VR 2025.

Guangzhou Shiyuan Electronic Technology Co., Ltd., Guangzhou, China — Jul 2019 – Aug 2021

Research & Development in Mixed Reality (MR)

- Helped establish the MR Glasses Research Team and investigated interaction perception and information transmission in MR by extending a 2D desktop using gestures to access 3D MR toolbars in real time.
- Helped build MR tools in the SDK, including plane detection and tracking, 3D object positioning, and light estimation.
- Designed and developed an MR demo to enhance books for children aged 7-12 with educational 3D images in MR.

PROJECT EXPERIENCE

Knowledge Graph-Based Analysis of Sustainable Aviation Fuel Production Using Zeolite Catalysts — July 2025 – Nov 2025

- Developed knowledge graphs for sustainable aviation fuel (SAF-KG) (https://boyu-xu-projects.github.io/Knowledge-Graph-for-Sustainable-Aviation-Fuel/, password: saf2025).
- Enabled knowledge discovery and optimisation of catalytic processes for SAF production through an interactive and interpretable framework.

Knowledge Graph for Methane Selective Conversion: Revisiting and Predicting Product Selectivity and Methane Conversion — May 2024 – Aug 2025

Utrecht University

- Collaborated with three chemistry researchers to analyse experimental information on methane selective conversion.
- Developed a knowledge graph of methane selective conversion experiments using LLMs and DNNs.
- This knowledge graph supports chemistry researchers in experimental design through an intuitive interface and predictive modelling.

Making an Accurate Acupuncture Feedback Platform in a Virtual Teaching Environment Jun 2018 – Aug 2018

- ***Glasgow MSc project*** built a feedback platform for accurate acupuncture using HTC VIVE (VR device) and Phantom Omni (haptic device).

CONFERENCES AND SEMINARS

The 32nd IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR 2025) Mar 8 - Mar 12, 2025

- ***Presented the poster*** *Exploring Indirect Relations between Topics in Augmented Reality to Inform the Design of a Neuroscience Experiment*

The 2024 ACM SIGIR Conference on Human Information Interaction and Retrieval (CHIIR 2024) Mar 10 - Mar 14, 2024

- ***Delivered the oral presentation*** *Supporting Neuroscience Literature Exploration by Utilising Indirect Relations between Topics in Augmented Reality*, outlining the structure of the studies in my doctoral research.

The 30th International Conference on Multimedia Modelling (MMM 2024) Jan 29 - Feb 2, 2024

- ***Presented the AR demo (HoloLens 2)*** *DatAR: Supporting Neuroscience Literature Exploration by Finding Relations Between Topics in Augmented Reality*

Dagstuhl Seminar 25442 Augmenting Human Creativity with AI Oct 26 – Oct 29, 2025

- Collaborating with five co-authors on a perspective paper *How can AI systems relate to the uniqueness of creative practices? Is AI a tool or a resource?*

Dagstuhl Seminar 24301 Art, Visual Illusions, and Data Visualization Jul 21 – Jul 26, 2024

- Collaborating with five co-authors on the paper *AI Impact on Creativity in Art and Visualisation*.
- Coordinating a workshop proposal on *AI-Inspired Creativity: The Creative Pipeline for Visual Art and Design*.

AWARDS

China Scholarship Council (CSC) Scholarship	2021 - 2025
Best Sound Award, Global Game Jam (Glasgow Competition Area)	2018
Scotland's Saltire Scholarships for international students, UK (top 50)	2017, 2018
Global 100 Poster Design Award for Age-Friendly Living, EU (top 100 out of 2701)	2017
Excellent BA Graduate, Nanjing University of the Arts (top 1%)	2016
Second Class Feng Jianqin Excellent Bachelor's Thesis Scholarship (top 1.5% of year)	2016
National Encouragement Scholarship, Nanjing University of the Arts (top 1% of year)	2015
Merit Student & First Class Scholarship, Nanjing University of the Arts (top 1% of year)	2013, 2014, 2015

SKILLS

Languages: English (fluent in speaking and writing), Chinese (native)
Development: Unity 3D (C#), Python
Experience with AR/VR Devices: HoloLens 1/2, HTC VIVE, Oculus, Action One, Kinect, Leap Motion
Applications: ZBrush, Illustrator, Photoshop, InDesign, Axure RP, Flash

PUBLICATIONS

Published:

[1] Xu, B., Li, G., Wang, B., Bian, J., Pan, H., Min, Y., ... & Wang, Z. (2025, October). Knowledge Graph for Methane Selective Conversion: Revisiting and Predicting Product Selectivity and Methane Conversion. ***Advanced Science***, e14601. DOI: https://doi.org/10.1002/advs.202514601

[2] Xu, B., Hardman, L., & Hürst, W. (2025, March). Exploring Indirect Relations between Topics in Augmented Reality to

Inform the Design of a Neuroscience Experiment. In ***2025 IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR 25)*** (pp. 1248-1249). IEEE. DOI: https://doi.ieeecomputersociety.org/10.1109/VRW66409.2025.00270

[3] Xu, B. (2024, March). Supporting Neuroscience Literature Exploration by Utilising Indirect Relations between Topics in Augmented Reality. In ***Proceedings of the 2024 Conference on Human Information Interaction and Retrieval (CHIIR 2024)*** (pp. 457-460). DOI: https://doi.org/10.1145/3627508.3638312

[4] Xu, B., Tanhaei, G., Hardman, L., & Hürst, W. (2024, January). DatAR: Supporting neuroscience literature exploration by finding relations between topics in augmented reality. In ***International Conference on Multimedia Modeling (MMM 24)*** (pp. 295-300). Cham: Springer Nature Switzerland. DOI: https://doi.org/10.1007/978-3-031-53302-0_24

Under review:

Journal submission: *Elsevier Chinese Journal of Catalysis*

[5] Xu, B., Li, P., Wang, B., Xiao, C., Fu, Z., Pan, H., Qi, G., Xu, J., Deng, F., Hui, S., Ling, H., & Ju, F., Knowledge Graph-Based Analysis of Sustainable Aviation Fuel Production Using Zeolite Catalysts

Journal submission: *PeerJ Computer Science*

[6] Xu, B., Hardman, L., & Hürst, W. Informing the Design of a Neuroscience Experiment by Exploring Indirect Relations Between Topics in Augmented Reality

Journal submission: *Springer Virtual Reality*

[7] Xu, B., Hardman, L., & Hürst, W. Informing the Design of a Neuroscience Experiment by Exploring the Evolution of Indirect to Direct Relations Between Topics in Augmented Reality Using a Timeline. DOI: https://doi.org/10.21203/rs.3.rs-6327352/v1