Tonglin Yan

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Research Interests

Computational Consciousness Modeling, Human-AI Social Interaction, Large Language Models, Virtual Reality, and Multi-Agent Systems

Education

Université Paris-Saclay | Orsay, France — Oct. 2023 – present
PhD in Psychology

- Advisors: David Rudrauf (CIAMS, Université Paris-Saclay), Alain Finkel (LMF, ENS Paris-Saclay), Grégoire Sergeant-Perthuis (LCQB, Sorbonne Université)
- Title: Integration of advanced multimodal machine learning models in the Projective Consciousness Model for the study of non-verbal and verbal social behaviors in virtual reality.

University of Rouen Normandy | Rouen, France — Sept. 2021 – Sept. 2022
M.S. in Data Science and Engineering (Double degree with INSA Rouen Normandie)

INSA Rouen Normandie | Rouen, France — Sept. 2017 – Sept. 2022
Engineering degree in Mathematical and Software Engineering

Professional and Research Experience

Algorithm Engineer, GuanYun Technology (IMU Motion Capture / VR) — Jan. 2023 – Jun 2023

- Developed a motion capture system using 9-axis IMU sensors.
- Simulated human movement in Unity3D for real-time motion analysis.

Research Assistant, ISIR, Sorbonne University (NLP / QA Systems) — Mar. 2022 – Sept. 2022

- Designed a pipeline for constructing a biology-focused dataset.
- Fine-tuned a pipeline with BERT and T5 models for data-to-text tasks, improving accuracy by 15%.
- Evaluated pipeline efficiency and scalability.

Research Assistant, New York University (Time Series Modeling) — June 2021 – Sept. 2021

- Predicted animal trajectories (ants/birds) using time-series analysis.
- Cleaned and imputed data via linear regression; extracted features with random forests.

Part-Time Assistant, Deloitte China (Data Analytics) — July 2020 – Sept. 2020

- Conducted a case study on retail markdown strategies, analyzing promotional impacts.
- Delivered client recommendations via data-driven presentations.

Conferences and Workshops

Tonglin Yan, Grégoire Sergeant-Perthuis, Kenneth Williford, David Rudrauf. PCM-LLM: Bridging Non-Verbal Consciousness Modeling and Language Processing to Make Intelligent Social Virtual Agents Closer to Human Beings. ASSC28, July 2025, Crete, Greece *(link to poster)*

Nils Ruet, **Tonglin Yan**, Dimitri Ognibene, Kenneth Williford, David Rudrauf, Grégoire Sergeant-Perthuis. Exploring how the geometry of the representation space influences curiosity-based exploration. ASSC27, July 2024, Tokyo, Japan. *(link to poster)*

David Rudrauf, **Tonglin Yan**, Nils Ruet, Kenneth Williford, Grégoire Sergeant-Perthuis. Integrated Information Theory (IIT) with Simple Maths. ASSC27, July 2024, Tokyo, Japan. *(link to presentation)*

Grégoire Sergeant-Perthuis, Nils Ruet, **Tonglin Yan**, Kenneth Williford, David Rudrauf. Dualities in G-Spaces May Underly Pre-Reflective Self-Consciousness. ASSC27, July 2024, Tokyo, Japan. *(link to poster)*

Lemona Xinxuan Zhang, **Tonglin Yan**, Ken Takeda, Matteo Paganin. Optimal Transport of Hallucinatory Colors. Post-ASSC Satellite Symposium, July 2024, Kyoto, Japan. *(link to poster)*

Preprints

Tonglin Yan, Grégoire Sergeant-Perthuis, Kenneth Williford, David Rudrauf. Integrating Machine Consciousness Simulation and LLMs Toward Verbal and Non-Verbal General Intelligence in Artificial Agents. 2025. *(submitted to AGI-25, to be resubmitted)*

Tonglin Yan, Grégoire Sergeant-Perthuis, David Rudrauf. PCM-LLMS: a hybrid architecture to enhance human-like social intelligence in virtual agents. 2025. *(submitted to IVA 2025, to be resubmitted)*

Grégoire Sergeant-Perthuis, **Tonglin Yan**, Nils Ruet, Kenneth Williford, David Rudrauf. Integrated Information Theory (IIT) with Simple Maths. 2024. (*preprint*)

Academic Training

Qualia Structure Summer School | Osaka and Awaji, Japan June 2024

- **Theme:** Explored interdisciplinary approaches to the structure of consciousness, integrating philosophy, cognitive science, neuroscience, mathematics, and artificial intelligence.

Supervision experiences

Co-supervised Yannick Zelle (M1 intern, ENS), with David Rudrauf 2025

Co-supervised Germain Poloudenny (M2 intern, Université d'Artois), with David Rudrauf 2024

Skills

Programming & Frameworks: Python (PyTorch, TensorFlow), C#, Java, C++, R, Unity3D
Languages: Mandarin (native), English (intermediate), French (intermediate)
Interests: Tennis, Calligraphy, Bouldering, Travel