

Dimitris Gkoumas

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RESEARCH INTERESTS

My research has drawn on topics of Generative AI, Multimodal Representation Learning, Computational Linguistics (NLP), and Quantum Information Theory, particularly for representation learning. My research interests lie in the fields of human-centric, geometric, and evolutionary representation learning, human-preference LLM-judge evaluation ecosystems, as well as unaligned multimodal representation learning.

EDUCATION

The Open University, UK <i>Ph.D. in Artificial Intelligence</i> <ul style="list-style-type: none">Thesis: Quantum Cognitively Motivated Context-Aware Multimodal Representation Learning for Human Language Analysis	Milton Keynes, UK 2017 – 2021
Aristotle University of Thessaloniki <i>M.Sc. in Information Technology, Grade 9.34/10</i>	Thessaloniki, Greece 2012 – 2014
Technical University of Crete <i>B.Sc. in Computer Science, Grade 8.5/10</i>	Crete, Greece 2001 – 2005

PROFESSIONAL APPOINTMENTS

Queen Mary University of London <i>School of Electronic Engineering and Computer Science</i> <ul style="list-style-type: none">Worked on centred around representation alignment, leveraging human preference data algorithms for aligning Large Language Models (LLMs) with human preferences and values, LLMs functioning as self-judge ecosystems for evaluation purposes, and evolutionary dynamics within longitudinal linguistics, with a particular focus on applications in mental health and life sciences.	Jan 2021 – Current Postdoc
Huawei <i>Ireland Research Centre</i> <ul style="list-style-type: none">Worked on semantic programming language representation utilizing computational models and learning-based techniques to capture the meaning of code in an explicit and structured manner with applications in program analysis and compiler design.	Jun 2021 – Nov 2023 AI consultant
Corvinno Technology Transfer Centre <i>Hungary</i> <ul style="list-style-type: none">Engaged in ontology development to improve language adaptation and evolution by creating structured representations of semantic changes and capturing semantic relationships with applications in domains such as education and policy making.	Jan 2016 – Sep 2017 Early stage researcher
My glass studio (industry) <i>Department of IT</i> <ul style="list-style-type: none">Developed a bespoke web-based ERP-CRM system from scratch.	Sep 2013 – Dec 2015 Senior software developer

RESEARCH PROJECTS

Creating time sensitive sensors from language & heterogeneous user generated content <i>Awarded by UKRI/EPsrc Turing AI Fellowship (Grant: EP/V030302/1)</i> <ul style="list-style-type: none">Role: Postdoc	2021-
Memory Safe Trustworthy Programming Languages <i>Awarded by Huawei, Ireland Research Centre</i> <ul style="list-style-type: none">Role: AI Consultant	2021-2023
Quantum Information Access and Retrieval Theory (QUARTZ) <i>Awarded by EXCELLENT SCIENCE - Marie Curie Actions. (No: 721321)</i> <ul style="list-style-type: none">Role: Early stage researcher	2017-2020

EDUWORKS: An EU-wide investigation of labour market matching processes.

Awarded by European Commission - Marie Curie ITN - FP7-PEOPLE- 2012-ITN (No. 608311)

2016-2017

- Role: Early stage researcher

INTERNATIONAL RESEARCH VISITS

University of Montreal, Canada

Jan 2020 - Apr 2020

Advisor: Prof. Jian-yun Nie

- Worked on quantum-inspired models for conversational emotion recognition

University of Copenhagen, Denmark

Aug 2019 - Dec 2020

Advisor: Prof. Christina Lioma

- Worked on multimodal models for sentiment analysis

University of Padua, Italy

Jan 2019 - Mar 2019

Advisor: Prof. Massimo Melucci

- Worked on tensor-based fusion representation learning

Tianjin University, China

Oct 2017 - Dec 2019

Advisor: Prof. Dawei Song

- Worked on information retrieval

SELECTED PUBLICATIONS

- * **Gkoumas, D.** (2024). Feedback-aligned LLMs for Machine Language-Molecule Translation. **NeurIPS**
- * **Gkoumas, D.** (2024). ALMol: Aligned Language-Molecule Translation with Contrastive Preference Optimisation. **ACL**
- * **Gkoumas, D.**, Wang, B., Tsakalidis, M., Zubiaga, A., Purver, M., and Liakata, M. (2024). A longitudinal multimodal dataset for dementia monitoring and diagnosis. **Springer Nature (LRE)** [\[Read\]](#)
- * **Gkoumas, D.**, Purver, M. & Liakata, M. (2023). Reformulating NLP tasks to Capture Longitudinal Manifestation of Language Disorders in People with Dementia **EMNLP**. [\[Read\]](#)
- * **Gkoumas, D.**, Tsakalidis, A. & Liakata, M. (2023). A Digital Language Coherence Marker for Monitoring Dementia. **EMNLP** [\[Read\]](#)
- * **Gkoumas, D.**, Li, Q., Yu, Y., & Song, D. (2021). An Entanglement-driven Fusion Neural Network for Video Sentiment Analysis. **IJCAI** [\[Read\]](#)
- * **Gkoumas, D.**, Li, Q., Dehdashti, S., Melucci, M., & Song, D. (2021). A Quantum Cognitively Motivated Decision Fusion Framework for Video Sentiment Analysis. **AAAI** [\[Read\]](#)
- * Li, Q., **Gkoumas, D.**, Sordoni, A., Nie, J.Y. & Melucci M. (2021) Quantum-inspired Network for Conversational Emotion Recognition. **AAAI** [\[Read\]](#)
- * **Gkoumas, D.**, Li, Q., Lioma, C., & Song, D. (2020). What makes the difference? An empirical comparison of fusion strategies for multimodal language analysis. **International Journal of Information Fusion**. [\[Read\]](#)
- * Li, Q., **Gkoumas, D.**, Lioma, C., & Melucci, M. (2020). Quantum-inspired multimodal fusion for video sentiment analysis. **International Journal of Information Fusion**. [\[Read\]](#)
- * Vas, R., Weber, C., & **Gkoumas, D.** (2018). Implementing connectivism by semantic technologies for self-directed learning. **International Journal of Manpower**. [\[Read\]](#)

SKILLS

- Large scale deep learning, generative models, graph neural networks, deep learning for life sciences, deep learning with reinforcement learning, deep learning for multi modalities.
- Experience using ML frameworks such as PyTorch, scientific software such as NumPy, SciPy, and Pandas, and ML on accelerators.
- Strong knowledge of linear algebra, calculus and statistics and experience working in a scientific environment across disciplines (particularly maths, biology, and physics).

PRIZES AND AWARDS

- ◇Marie-Curie Early Stage Researcher Scholarship (2017-2020), ◇Marie-Curie Early Stage Researcher Scholarship (2016-2017), ◇Awarded university-sponsored scholarship for excellent academic performance, leading to waived tuition fees in final semester (2013), ◇Awarded the Greek State Scholarships Foundation (IKY) Scholarship for Academic Excellence during Bachelor's studies(2004-2005)