Eleftherios Triantafyllidis, PhD

Postdoctoral Researcher and Technical Lead at ETH Zurich
PhD in Neurobiologically-Inspired AI and Generative-AI for Embodied Intelligence

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ABOUT ME

My research lies at the intriguing intersection of **Artificial Intelligence (AI), Human-Centric AI, Robotics,** and **Human Factors**. My research interests revolve around the human sensorimotor system as the basis of inspiration for deriving **AI-inspired algorithms from biological principles** and endow embodied intelligence, most notably AI assistants and robots, with intricate and adaptive behaviour. The aim is to address the growing need to solve intricate real-life tasks in both domestic and industrial environments, with the growing need of democratising AI, its interpretability and acceptance. I have published papers in **Nature Machine Intelligence** and the **International Conference on Robotics and Automation (ICRA).**
I have presented in international settings (UK, London and Edinburgh; North America, United States as well as Asia, Japan), publicly engaging with the scientific community. I have also been part of **AI startups** (*Telexistence*, Japan, Tokyo) familiarising myself with fast-paced environments in industry and tackling **real-life challenges** beyond theoretical research contributions. As part of my daily responsibilities, I do independent research, **supervise** a team of PhD students, coordinate with funders and stakeholders, **manage grants**, participate in hiring practises within ETH Zurich and collaborate with multidisciplinary teams.

ACADEMIC EXPERIENCE

ETH Zürich, Switzerland   **Mar. 2024 - Ongoing**
Postdoctoral Researcher in Computer Science (Human Factors, AI and Robotics)   *Zürich, Switzerland*
- **Leading** the development of an extensible Human-Centric AI platform in a multidisciplinary team, funded by the **Albert Lück Foundation (ALS)** for a net-zero carbon infrastructure in Switzerland's construction sector
- **Supervising a team of PhD students** all of whom passed their annual reviews, **cross-departmental coordination** with academics and Swiss industry stakeholders and **actively recruiting** candidates joining ETH
- **Democratising** and researching the use of **Robotics**, **Human Factors** and **AI** (Reinforcement/Supervised and Imitation Learning alongside Gen-AI entailing LLMs and Vision-LLMs) as transformative tools for domestic and industrial challenges
- Member of the multidisciplinary **Robotic Fabrication Laboratory (RFL), Design++** and **Immersive Design Lab (IDL)**
- **Teaching** core HCI/Robotics and Human-Centric AI modules to M.Sc. students and collaborating with industry partners

The University of Edinburgh   **Sep. 2019 – Feb. 2024**
Ph.D. in Computer Science (Robotics and AI)   *Edinburgh, United Kingdom*
- **Awarded without revisions or corrections**
- **Doctoral Thesis:** Advancements in Sensory-Motor Perception and Biologically-Inspired Hierarchical Learning for Embodied Intelligence. **Supervisory Team:** Dr. Zhibin Li and Prof. Taku Komura
- **EPSRC Full-Time Scholarship Awardee (2019/24) ~£15k+/annum with £5k+/annum procurement**

The University of Edinburgh   **Sep. 2018 – Sep. 2019**
M.Sc. by Research in Computer Science (Robotics and AI)   *Edinburgh, United Kingdom*
- **Awarded with distinction** – 1st class honours /GPA equivalent: 4.0 (180 ECTS)
- **EPSRC Full-Time Scholarship Awardee (2018/19) ~£15k+/annum with £5k+/annum procurement**

University of Applied Sciences Kavala   **Sep. 2011 – Sep. 2016**
B.Sc. in Computer Science   *Kavala, Greece*
- **Thesis:** Fully Autonomous Navigation, Localisation and Landing of a Quadcopter with a Monoscopic Camera
- **Outstanding Project Award:** Fully Autonomous Fire Detection Rover Vehicle
- Awarded with very good – 7.37/10 (240 ECTS)

PROFESSIONAL EXPERIENCE

Robotics Startup, Telexistence Inc., Tokyo   **Jul. 2022 – Oct. 2022**
Software Engineer and Programmer (Researcher in Robotics and AI)   *Tokyo, Japan*
- Responsible, solely, for the transition from a real-world company-built robot for drink replenishing purposes operating in the wider metropolitan Tokyo area, to a fully simulated robot learning environments (**NVIDIA's ISAAC Sim/Gym**)
- Minimisation of the **Sim2Real** gap in simulation via appropriate emulation and tuning of physical quantities to accurately match real-world pick and place tasks and increase learning-based skill transfer with dynamic and adaptive behaviour
- **Presented** the system at the **IROS 2022** conference in Kyoto, Japan **publicly engaging with industrial partners**

The University of Edinburgh   **Sep. 2019 – May. 2024**
Teaching and Support   *Edinburgh, United Kingdom*
- Taught a variety of computer science courses and a subset of the field, including Robotics, XR and AI (Machine Learning)
- Supervised and taught MSc students how to write comprehensive literature reviews and compelling research proposals

Obligatory Military Service at the Hellenic Army   **Nov. 2016 – Jul. 2017**
- Responsible for military time and service management tools and classified digital document correspondence

Audi AG   **Nov. 2015 – May. 2016**
Software Engineer and Programmer (Research Internship in XR and Human-Centred Development)   *Ingolstadt, Germany*
- Development of an innovative and ergonomic, state-of-the-art, virtual reality project in the Unity3D engine
- Integration of the latest XR technologies and wearable haptic devices into one system
- Demo presentation to internal and external industry partners Google XR, META/Oculus and Microsoft (HoloLens)
- Deployed a centralised monitoring environment to gather user performance metrics

TEACHING EXPERIENCE

My teaching philosophy is rooted in the belief that education should be an immersive, transformative experience that equips students with both theoretical knowledge and practical skills. I focus on experiential learning, inclusivity and accessibility.

- **Informatics Project Proposal (IPP)**, Teaching Assistant, The University of Edinburgh, UK
- **Informatics Research Review (IRR)**, Teaching Assistant, The University of Edinburgh, UK
- **Robotics: Science and Systems (R:SS) - Theory**, Teaching Assistant, The University of Edinburgh, UK
- **Robotics: Science and Systems (R:SS) - Practical**, Laboratory Assistant, The University of Edinburgh, UK
- **Digital Creativity for Circular Construction (XR/AI-Based Human-Centric Module)**, Module Organiser and Lead Teaching Assistant for the Module, ETH Zurich, Switzerland
- **Digital Transformation for Circular Construction (XR/AI-Based Human-Centric Assembly Tools and Methods)**, Module Organiser and Lead Teaching Assistant for the Module, ETH Zurich, Switzerland

ACADEMIC PUBLICATIONS

- E. Triantafyllidis, F. Acero, Z. Liu and Z. Li, **"Hybrid Hierarchical Learning for Solving Complex Sequential Tasks Using the Robotic Manipulation Network - ROMAN",** Volume: 5, Pages: 991–1005, 2023, *Nature Machine Intelligence*. DOI: 10.1038/s42256-023-00709-2

- E. Triantafyllidis, F. Christianos, and Z. Li, "**Intrinsic Language-Guided Exploration for Complex Long-Horizon Robotic Manipulation Tasks**", *International Conference on Robotics and Automation (ICRA)*, 2024, Yokohama, Japan, pp. 7493-7500, DOI: 10.1109/ICRA57147.2024.10611483

- E. Triantafyllidis (2024). "**Advancements in Sensory-Motor Perception and Biologically-Inspired Hierarchical Learning for Embodied Intelligence**", *Doctoral Dissertation, PhD*. The University of Edinburgh, February, 2024. Edinburgh, United Kingdom. https://era.ed.ac.uk/handle/1842/41453

- E. Triantafyllidis and Z. Li, **"The Challenges in Modeling Human Performance in 3D Space with Fitts' Law",** *in CHI Conference on Human Factors in Computing Systems (CHI '21).* Association for Computing Machinery, May 8–13, 2021, Yokohama, Japan. ACM, New York, NY, USA. DOI: 10.1145/3411763.3443442

- E. Triantafyllidis and Z. Li, **"Considerations and Challenges of Measuring Operator Performance in Telepresence and Teleoperation Entailing Mixed Reality Technologies",** *in CHI Conference on Human Factors in Computing Systems Workshop CHI '21 (Evaluating User Experiences in Mixed Reality).* Association for Computing Machinery, May 7, 2021, Yokohama, Japan. ACM, New York, NY, USA.

- E. Triantafyllidis, W. Hu, C. McGreavy and Z. Li, "**Metrics for 3D Object Pointing and Manipulation in Virtual Reality: The Introduction and Validation of a Novel Approach in Measuring Human Performance**", *in Robotics & Automation Magazine (RAM) & International Conference on Robotics and Automation (ICRA) 2021*, DOI: 10.1109/MRA.2021.3090070.

- E. Triantafyllidis, C. McGreavy, J. Gu and Z. Li, "**Study of Multimodal Interfaces and the Improvements on Teleoperation**", *in IEEE Access*, vol. 8, pp. 78213-78227, 2020, DOI: 10.1109/ACCESS.2020.2990080.

- E. Triantafyllidis, C. Yang, C. McGreavy, W. Hu and Z. Li, "**Robot Intelligence for Real-World Applications: AI for Emerging Verticals: Human-Robot Computing, Sensing and Networking**", *IET Computing and Networks, 2020*, Chapter DOI: 10.1049/PBPC034E_ch4, ISBN: 9781785619823

- Yu, W., Yang, C., McGreavy, C., E. Triantafyllidis, G. Bellegarda, M. Shafiee, A. J. Ijspeert and Z. Li, **"Identifying Important Sensory Feedback for Learning Locomotion Skills"**, *Nature Machine Intelligence*, 5, 919–932 (2023). https://doi.org/10.1038/s42256-023-00701-w

- C. De Wolf, B. S. Byers, D. Raghu, M. Gordon, V. Schwarzkopf and E. Triantafyllidis. "**A 5D Digital Circular Workflow: Digital Transformation Towards Matchmaking of Environmentally Sustainable Building Materials through Reuse from Disassembly**", *Nature - NPJ Materials Sustainability*, 2024, 2, 36, https://doi.org/10.1038/s44296-024-00034-8

- W. Hu, F. Acero, E. Triantafyllidis, Z. Liu and Z. Li, "**Modular Neural Network Policies for Learning In-Flight Object Catching with a Robot Hand-Arm System**", *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Detroit, MI, USA, 2023, pp. 944-951, DOI: 10.1109/IROS55552.2023.10341463.

- B. Önalan, E. Triantafyllidis, I. Mitropoulou and C. De Wolf. "**From Waste to Resource: Design Optimization and Augmented Fabrication for the Reuse of Concrete Waste**", *Future of Construction (FoC) Symposium* - Workshop, 2024

- B. Byers, E. Triantafyllidis, T. Menny, M. Schulte and C. De Wolf. *"Assessing User Experience of Extended Reality Devices for (Dis)Assembly, a Classroom Study"*, European Conference on Computing in Construction, CIB W78 Conference on IT in Construction, 2025

- B. Önalan, E. Triantafyllidis, I. Mitropoulou and C. De Wolf. "**From Waste to Resource: Deep Learning Enhanced Design Optimization for the Reuse of Concrete Cutting Waste using XR Assembly**" (Being Repurposed for Conference)

- Önalan B, Mitropoulou I, Triantafyllidis E, Hunhevicz J, De Wolf C. "**Computational methods for circular design with non-standard materials: Systematic review and future directions**", *International Journal of Architectural Computing*. 2025;0(0). doi:10.1177/14780771251316125

ACADEMIC SUPERVISIONS

Note: Every PhD student below has successfully passed their annual review, also known as an aptitude colloquium.

- **Dr. Brandon Byers**, PhD Student at ETH Zurich, 2024/25, Graduated (Now Researcher at Michigan State University)
- **Dr. Deepika Raghu**, PhD Student at ETH Zurich, 2024/25, Graduated (Now Postdoctoral Researcher at ETH Zurich)
- **Beril Önalan**, PhD Student at ETH Zurich, 2024/25, Ongoing Supervision
- **Zain Karasan**, PhD Student at ETH Zurich, 2024/25, Ongoing Supervision
- **Durand-Maniclas Oceane Clemence**, PhD Student at ETH Zurich, 2025, Ongoing Supervision

LANGUAGES & CITIZENSHIPS

English: Proficient, **German**: Proficient, **Greek**: Native. **Citizenship(-s):** Greek and British

SKILLS & INTERESTS

- **General Skills:** Problem-solving; quantitative evaluation analysis; grant management; statistical evaluations; quality assurance; outreach and transferability of skills; ability to work in a team with leadership roles; effective use of language and concise transferability of research ideas; effective use of presentation slides in research meetings; managerial skills; coordinating intricate project and research-related topics with internal and external partners, researchers and funders.
- **Programming:** C#, Python, C++, Visual C++/CLI (.NET), LaTeX.
- **Simulation and Physics Engines:** Unity3D, Nvidia's ISAAC Sim/Gym, Unreal Engine, MuJoCo, CryEngine, Rhino.
- **Familiarity with Libraries and SDKs:** ROS**,** Oculus SDK, OVR, LeapMotion, TensorFlow, Matplotlib, OpenCV, ML-Agents.
- **Interests:** Running (Ask me for my Strava!); Swimming; Occasionally video games and *excessive* Reddit scrolling.