

EVRIPIDIS GKANIAS

Research Scientist in Bio-inspired Artificial Intelligence & Computational Neuroethology

✉ ev.gkanias@gmail.com 🔗 evgkanias.github.io 🔗 uk.linkedin.com/in/evgkanias 🌐 evgkanias 📍 University of Edinburgh, UK

WORK EXPERIENCE

Research Fellow in Computational Sensory Biology

Lund University

📅 January 2025 – present 📍 Sweden

👤 Advisor: Prof. Marie Dacke

🔧 Expand my celestial to a multi-modal compass model

🔧 Adjust the compass to the eyes and processing of dung beetles

Research Associate in Comp. & Neuromorphic Modelling

University of Edinburgh

📅 June 2022 – Dec 2024 📍 United Kingdom

👤 Advisor: Prof. Barbara Webb

🔧 Explore the effectiveness of different forms of working memory constrained by the biology and nanotechnology hardware

🔧 Build an anatomically-accurate polarised light compass circuit

Research Associate in Computational Modelling

University of Sheffield & University of Edinburgh

📅 Mar 2017 – Aug 2018 📍 United Kingdom

👤 Advisors: Dr Michael Mangan & Prof. Barbara Webb

🔧 Investigate the celestial properties in context of animal navigation

🔧 Design a novel anatomically-constrained celestial compass

Research Assistant in Bio-robotics

University of Edinburgh

📅 Sep 2016 – Feb 2017 📍 United Kingdom

👤 Advisor: Prof. Barbara Webb

🔧 Study the learning mechanism of *Drosophila* larva

🔧 Build a robot that tries to find the gustatory source following the gradients of the associated odour

Research Assistant in Machine Learning

Centre for Research and Technology - Hellas (CERTH)

📅 June 2014 – Aug 2015 📍 Greece

👤 Advisor: Dr Petros Daras

🔧 Real-time evaluation of athletes' technique from gestures captured using multiple Microsoft Kinects and WIMUs or the Vicon system

🔧 Integrate into a video game using C# and Unity3D

SELECTED PUBLICATIONS

📄 Pabst, K., Gkanias, E., Webb, B., Homberg, U., & Dominik, E. 2024. *A computational model for angular velocity integration in a locust heading circuit*. PLoS Comput Biol 20 (12), e1012155.

📄 Gkanias, E., Mitchell, R., Stankiewicz, J., Khan, S. R., Mitra, S., & Webb, B. 2023. *Celestial compass sensor mimics the insect eye for navigation under cloudy and occluded skies*. Commun Eng 2, 82.

EDUCATION

PhD in Bio-inspired Robotics & Autonomous Systems

University of Edinburgh

📅 Mar 2023 📍 United Kingdom

📄 Insect neuroethology of reinforcement learning

👤 Supervisor: Prof. Barbara Webb

MSc in Artificial Intelligence

University of Edinburgh

📅 Aug 2016 📍 United Kingdom

🎓 with Distinction

📄 Data-driven adaptation of the evasion behaviour in fiddler crabs

👤 Supervisor: Prof. Barbara Webb

BSc (Hons) in Computer Science

Aristotle University of Thessaloniki

📅 Jul 2013 📍 Greece

🎓 Grade: first-class

📄 Deep learning algorithms for multi-label data

👤 Supervisor: Prof. Grigorios Tsoumakas

FUNDING & AWARDS

Percy Sladen Memorial Fund Grant

The Linnean Society of London

📅 Jun 2019 📍 Seville, Spain

🔧 Fieldwork experiments on desert ants

🔧 Test for vector-sequence memories during path integration

Robotics and Autonomous Systems - Centre for Doctoral Training Grant

Engineering and Physical Sciences Research Council (EPSRC)

📅 Sep 2018 📍 Edinburgh, UK

🏆 Awarded to the top 10 applicants

UK/EU Master's Scholarship

University of Edinburgh

📅 Sep 2015 📍 Edinburgh, UK

🏆 Awarded to the top 100 UoE entries

- 📖 Gkaniats, E., McCurdy, L. Y., Nitabach, M. N. & Webb, B. 2022. An incentive circuit for memory dynamics in the mushroom body of *Drosophila melanogaster*. eLife 11, e75611.
- 📖 Schwarz, S., Clement, L., Gkaniats, E. & Wystrach, A. 2020. How do backward-walking ants (*Cataglyphis velox*) cope with navigational uncertainty? Anim Behav 164, 133–142.
- 📖 Gkaniats, E., Risse, B., Mangan, M. & Webb, B. 2019. From skylight input to behavioural output: a computational model of the insect polarised light compass. PLoS Comput Biol 15, e1007123.

SELECTED ORAL PRESENTATIONS

- 📖 Multimodal skylight information improves the estimation of the celestial compass: insights from a hardware implementation. At the International Conference on Invertebrate Vision. August 2023. Bäckaskog Slott, Sweden
- 📖 Memory dynamics in *Drosophila*'s mushroom body: a computational view. At the Neural Circuits and Behaviour of *Drosophila*. June 2023. Orthodox Academy of Crete, Greece
- 📖 How flies acquire, forget and assimilate memories: a computational perspective. At the Mushroom body meeting. June 2021. Online
- 📖 From skylight input to behavioural output: a computational model of the insect polarised light compass. At the International Navigation Conference. October 2019. Edinburgh International Conference Centre, United Kingdom
- 📖 Predator evasion by a Robocrab. The Living Machines. July 2017. Stanford University, CA, USA

SELECTED POSTER PRESENTATIONS

- 📖 How the fan-shaped body can integrate differential familiarity for route following in desert ants. At the conference on Structure and function of the insect central complex. October 2022. Janelia Research Campus, VA, USA
- 📖 How could the mushroom body and central complex combine for visual homing in insects. At International Congress of Neuroethology. July 2022. Lisbon, Portugal
- 📖 An anatomically accurate circuit for short- and long-term motivational learning in fruit flies. At the Cosyne Conference. March 2022. Lisbon, Portugal

SELECTED TRAINING

Workshop on Insect Bio-inspired Technologies

Royal Society of Edinburgh

📅 17-18 Nov 2022 📍 Edinburgh, United Kingdom

ASAB Winter 2022: Animal Movement

Society for the study of Animal Behaviour

📅 6-7 Dec 2022 📍 Edinburgh, United Kingdom

CapoCaccia: Neuromorphic Engineering Workshop

University of Zurich, ETH Zurich and the iniForum

📅 Apr 2018 – May 2018 📍 Sardinia, Italy

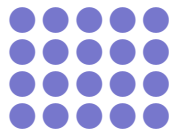
- 🔧 Work on the neuromorphic SLAM project using Brian2
- 🔧 Attach a DYNAPs neuromorphic chip on a robot and programme it to learn a map using a bumper sensor

RESEARCH INTERESTS

- 🧠 Biologically plausible mechanisms of **learning** and **memory** that allow interpretive **behaviour** in artificial agent
- 🧠 **Computational intelligence** that allows artificial agents to **navigate** in the challenging real-world
- 👁️ Processing **perception** in order to **maximise information** and create hierarchical representations

STRENGTHS

Bio-accurate AI
Computational Modelling
Information Theory
Python



Probabilistic Machine Learning

Reinforcement Learning

Robotics

Computer Vision

OpenCV

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TEACHING POSTS

Supervision of BSc & MSc projects

University of Edinburgh

📅 Sep 2016 - present 📍 United Kingdom

🎓 **Nash Xu** (MSc - 2024):
"An insect-inspired celestial compass for robotic navigation"

🎓 **Jiewen Deng** (BSc - 2021, MInf - 2022):
"Building a hexapod robot platform to test a vision-based insect navigation algorithm" — co-supervised

🎓 **Yijie Chen** (MSc - 2020):
"Classifying individual ants from raw video data"

🎓 **Komal Afzal** (MSc - 2019):
"Mimicking visual motion processing model of escape behaviour of a fiddle crab" — co-supervised

Tutor, Demonstrator & Marker

University of Edinburgh

📅 Sep 2018 - 2022 📍 United Kingdom

📖 Introductory Applied Machine Learning

🔧 Reinforcement Learning

QA & Computer Vision Expert

University of Edinburgh

📅 Jan - Apr 2020 📍 United Kingdom

🔧 Systems Design Project