EVRIPIDIS GKANIAS

PhD student in Computational Neuroscience

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MY PHILOSOPHY

"By living we learn."

— Patrick Geddes

WORK EXPERIENCE

Research Associate in Computational Modelling

University of Edinburgh & University of Sheffield

- Mar 2017 – Aug 2018   United Kingdom
- Advisors: **Prof. Barbara Webb** & **Dr Michael Mangan**
- 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

PUBLICATIONS

- **Gkanias, E.**, McCurdy, L. Y., Nitabach, M. N. & Webb, B. *The incentive circuit: memory dynamics in the mushroom body of Drosophila melanogaster*. bioRxiv (2021)

- Schwarz, S., Clement, L., **Gkanias, E.** & Wystrach, A. *How do backward-walking ants (Cataglyphis velox) cope with navigational uncertainty?* Anim Behav 164, 133–142 (2020)

- **Gkanias, E.**, Risse, B., Mangan, M. & Webb, B. *From skylight input to behavioural output: a computational model of the insect polarised light compass*. PLoS Comput Biol 15, e1007123 (2019)

- Stouraitis, T., **Gkanias, E.**, Hemmi, J. M. & Webb, B. *Predator Evasion by a Robocrab*. in 6th International Conference on Biomimetic and Biohybrid Systems (eds. Mangan, M. et al.) vol. 10384 428–439 (Springer, 2017)

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**

TEACHING POSTS

Tutor & Demonstrator

University of Edinburgh

- Sep 2018 - present   United Kingdom
- Introductory Applied Machine Learning
- Reinforcement Learning
- Systems Design Project

EDUCATION

PhD in Computational Modelling

University of Edinburgh

- Sep 2018 - present   United Kingdom
- **Memory dynamics in the insect brain**
- Supervisor: **Prof. Barbara Webb**
- Robotics and Autonomous Systems CDT

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**
- EU/UK Masters Scholarship

BSc in Computer Science

Aristotle University of Thessaloniki

- Jul 2013   Greece
- **First-class Honours**
- **Deep learning algorithms for multi-label data**
- Supervisor: **Prof. Grigorios Tsoumakas**

ORAL PRESENTATIONS

How flies acquire, forget and assimilate memories: a computational perspective. At the Mushroom body meeting. Jun 2021. Online

From skylight input to behavioural output: a computational model of the insect polarised light compass. At the International Navigation Conference. Oct 2019. Edinburgh International Conference Centre, United Kingdom

Predator evasion by a Robocrab. The living Machines. July 2017. Stanford University, CA, USA

POSTER PRESENTATIONS

Robustness of a model of the insects' celestial compass in realistic conditions. At the International Conference on Invertebrate Vision. August 2019. Bäckaskog Slott, Sweden

Imitating the Drosophila larval learning behaviour on a robot. At the Maggot Meeting. Oct 2018. University of Edinburgh, United Kingdom

UNIVERSITY THESES

Memory dynamics in the insect brain

Thesis — Doctor of Philosophy

📅 Sep 2018 - Aug 2022 (expected)   📍 University of Edinburgh

We come up with a computational model of the insect mushroom body, constrained by biological findings of the insect brain. This model is able to acquire, forget and assimilate (transfer from short- to long-term) associative memories, represent a spectrum of motivation for the animal and drive its behaviour. We examine the capabilities of this model as an olfactory conditioning system and as part of the insect visual navigation mechanism.

Robocrab: data-driven adaptation of the evasion behaviour in fiddler crabs

Dissertation — Master of Science

📅 Jun 2016 - Aug 2016   📍 University of Edinburgh

We create a semi-supervised structure of neural network, inspired by the physiology of neurons in fiddler crabs, and train it to adapt the evasion behaviour of fiddler crabs on potential predators, solving a complicated visuomotor problem (developed in Python using the Theano/Tensorflow-based 'keras' library)
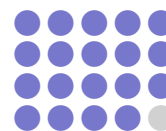
Deep learning algorithms for multi-label data

Honours Thesis — Bachelor of Science

📅 Oct 2012 - Jul 2013   📍 Aristotle University of Thessaloniki

We extended a Java library implementing Restricted Boltzmann Machines and Deep Belief Networks and we used it to examine how

STRENGTHS

Research
Computational Modelling
Computer Vision
Information Theory

Probabilistic Machine Learning

Reinforcement Learning   Robotics

NumPy   PyTorch   OpenCV   Keras

Theano   TensorFlow

C#   C/C++   R   Java

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

🏆 Funding award for my PhD

UK/EU Master's Scholarship

University of Edinburgh

📅 Sep 2015   📍 Edinburgh, UK

🏆 Scholarships for the top 100 students

ACTIVITIES

Hacker

Junction Hackathon

📅 Nov 2016   📍 Helsinki, Finland

Ⓢ Winning price of the Skype's "Artificial Intelligence Driven Bots" challenge

Coastal Sailing Diploma

Nautical Club of Thessaloniki

📅 Apr 2015   📍 Thessaloniki, Greece

⚓ 2nd best performance in school

Linear and freehand drawing

Ergastiri

📅 Jun 2008   📍 Thessaloniki, Greece

🏆 4th best performance in school