

KOSMAS DELIGKARIS

CONSERVATION AI · EDGE AI · BIOACOUSTICS · BIODIVERSITY INFORMATICS

PhD, Frontier Biosciences (Osaka University) · MSc, Electrical Engineering (University of Twente)
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Biological Physics Theory Unit, OIST, Okinawa, Japan · English, Greek, Japanese (daily conversational)
Permanent resident of Japan, no visa sponsorship required · Open to relocation anywhere in Japan

PROFILE

Applied AI and R&D scientist with a PhD in Frontier Biosciences, an MSc in Electrical Engineering, and over a decade of experience developing intelligent sensing, machine learning, and scientific data systems. Currently leading a competitively funded Edge AI project for automated biodiversity monitoring, including the development of a 66.6 KB neural network for real-time frog detection on low-power microcontrollers (mean F1: 0.87). Experienced in technical R&D leadership, biodiversity informatics, computer vision, and translating scientific research into practical technologies and validated prototypes. Beyond technical R&D, I have experience in technology commercialization through customer discovery, market exploration, and pitching to businesses as part of OIST's Proof of Concept program.

CORE EXPERTISE

Edge AI / tinyML	TensorFlow Lite INT8 models on microcontrollers (Sony Spresense), Edge Impulse, quantization, real-time acoustic classification, low-power sensors
Machine learning	TensorFlow, CNNs, neural architecture search, evolutionary computation, particle swarm optimization
Bioacoustics	Detection of vocalizing species, incl. *Rhinella marina* and *Polypedates leucomystax*; cross-site model validation, on-hardware bioacoustics
Machine vision	Three-camera 3D tracking, SLEAP pose estimation, idTracker, social behavior quantification
Biodiversity informatics	Database administration of Okinawa Environmental Observation Network (24 sites, 9 years of data)
Computing	Python, R, Bash, Git, GitHub, Linux; High-Performance Computing cluster with Slurm, PostgreSQL, Miniconda
R&D leadership & commercialization	Principal Investigator; ¥6.6M + US$10,000 in competitive funding; technical project leadership; supervision and mentorship; customer discovery and business pitching

OPEN-SOURCE SOFTWARE AND DATA

Lightweight invasive-frog detector — **GITHUB**
A lightweight, quantized Convolutional Neural Network (33K parameters, 66.6 KB TFLite) detecting *Rhinella marina* and *Polypedates leucomystax* in real time on low-power microcontrollers: trained model and cross-continental evaluation code.
github.com/deligkarisk/lightweight_detector_anurans_release

Zebrafish 3D Tracking Workflow — **GITHUB**
Multi-camera pipeline turning 2D SLEAP pose predictions from three synchronized views into 3D trajectories of interacting zebrafish (*Scientific Data*, 2026).
github.com/deligkarisk/Zebrafish_3D_Tracking_Workflow

Fine-grained zebrafish interactions dataset — **ZENODO · DATASET**
173 recordings of interacting wild-type, *mecp2* and *fgfr1a* zebrafish: 3D tracks, source videos and metadata.
doi.org/10.5281/zenodo.17190142

PROFESSIONAL EXPERIENCE

Research Scientist / Engineer **2019 – present**
Okinawa Institute of Science and Technology (OIST) Okinawa, Japan

Edge AI biodiversity monitoring (Principal Investigator & Technical Lead)

- Conceived and led **FrogAI**, a ¥6M-funded Proof of Concept project developing an AI-based biodiversity monitoring system on low-power microcontrollers. Defined the system architecture, hardware platforms, technical milestones, and research direction; supervised a research technician.
- Developed a custom neural architecture search (NAS) workflow and a lightweight INT8 CNN (33K parameters, 66.6 KB) for real-time acoustic species detection on low-power microcontrollers, achieving a mean invasive-species F1 of 0.87 with independent validation in Japan and Australia.
- Directed end-to-end AI development, from model design, training, and evaluation to quantization and embedded deployment, taking the system from research concept to validated prototype.
- Secured additional competitive funding through the WILDLABS Award 2026 (US$10,000 plus technical collaboration with Arm) and an FDSF research subsidy (¥600,000); initiated coordination with Japan's Ministry of the Environment and Okinawa Prefectural Government toward field validation.
- Conducted customer discovery interviews, explored potential markets and applications, and developed and delivered business pitches through OIST's Proof of Concept commercialization program.

Machine vision for animal behavior

- Led the development of a multi-camera animal behavior quantification workflow, integrating SLEAP-based pose estimation and 3D tracking. Coordinated dataset development and public release, resulting in 173 zebrafish interaction recordings in an open-access publication in *Scientific Data* (2026) and the open-sourced code on GitHub.

Biodiversity informatics

- Built and maintained antmaps.org, a public ant-biodiversity platform with 9,000+ monthly users.
- Primary administrator of the Okinawa Environmental Observation Network informatics systems (24 sites, 9 years of data).

Senior Public Health Analyst **2017 – 2019**
UK Government: Public Health England / Newcastle City Council London & Newcastle, UK

- Led the development of the UK government statistics on national drug and alcohol treatment for 2016–2017, published as Official Government Statistics. Worked with hospital managers and senior policymakers to identify disparities in treatment outcomes and inform improvements in healthcare services. Supervised one junior analyst.

Research Associate **2015 – 2017**
Institute of Neurology, University College London London, UK

- Developed a novel electrophysiological recording system; designed laboratory databases and knowledge-management systems.

FUNDING, GRANTS AND AWARDS

2026	WILDLABS Award, with a private collaboration with Arm on low-power acoustic sensors	**US$10,000**
2026	FDSF Research Subsidy (Future Design Initiative by Science and Finance)	**¥600,000**
2025	OIST Proof of Concept Grant (PI): real-time anuran classification on microcontrollers	**¥6M + 1 technician**
2012	RIKEN International Program Associate: competitive doctoral fellowship (2012 – 2015)	**PhD fellowship**
2011	European Study Program in Neuroinformatics (EU), Bernstein Center Freiburg	**6 months stipend**

SUPERVISION AND MENTORSHIP

Melika S. T., Research Technician, OIST (2025 – 2026) · **Alicia J.**, Junior Data Analyst, Public Health England (2017 – 2018) · **Freddy G.**, Research Intern, RIKEN (2013 – 2014) · **Steve W.**, Research Intern, RIKEN (2012 – 2013)

EDUCATION

PhD, Frontier Biosciences **September 2015**
Osaka University, Japan

MSc, Electrical Engineering **January 2011**
University of Twente, The Netherlands

SELECTED PUBLICATIONS

AI for ecology and animal behavior

1. **Deligkaris K**, Tabrizi MS, Stephens G. A lightweight deep-learning detector for the real-time monitoring of the invasive frogs *Rhinella marina* and *Polypedates leucomystax*. *bioRxiv* (preprint), 2026. doi:10.64898/2026.10.05.756611 Paper
2. **Deligkaris K**, Neiman R, Hiroi M, et al. A dataset of fine-grained zebrafish interactions in health and disease. *Scientific Data*, 2026. doi:10.1038/s41597-026-06953-6 Paper
3. Kawano A, O'Shaughnessy L, Neiman R, **Deligkaris K**, et al. Decomposing predictive information in social dynamics. *bioRxiv* (preprint), 2025. doi:10.1101/2025.05.16.654393 Paper

Machine learning and optimization (neural architecture search)

4. **Deligkaris K**. Particle swarm optimization and random search for convolutional neural architecture search. *IEEE Access* 12:91229–91241, 2024. doi:10.1109/ACCESS.2024.3420870 Paper

Engineering and Neuroscience

5. **Deligkaris K**, Bullmann T, Frey U. Extracellularly recorded somatic and neuritic signal shapes and classification algorithms for high-density microelectrode array electrophysiology. *Frontiers in Neuroscience* 10:421, 2016. doi:10.3389/fnins.2016.00421 Paper
6. Bullmann T, Radivojevic M, Huber ST, **Deligkaris K**, Hierlemann A, Frey U. Large-scale mapping of axonal arbors using high-density microelectrode arrays. *Frontiers in Cellular Neuroscience* 13, 2019. Paper
7. Obien MEJ, **Deligkaris K**, Bullmann T, Bakkum DJ, Frey U. Revealing neuronal function through microelectrode array recordings. *Frontiers in Neuroscience* 8:423, 2015. Paper
8. **Deligkaris KV**, Zaharis ZD, Kampitaki DG, Goudos SK, Rekanos IT, Spasos MN. Thinned planar array design using Boolean PSO with velocity mutation. *IEEE Transactions on Magnetics* 45(3):1490–1493, 2009. Paper