

# PANOS KOULOUNTZIOS

## AI Engineer (Agentic Systems & Computer Vision)

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Google Scholar LinkedIn Profile GitHub



## PROFESSIONAL SUMMARY

AI Engineer with a **PhD in Imaging Systems**, specializing in production-grade multimodal AI systems. I architect **end-to-end AI platforms** that integrate validated **Computer Vision** pipelines with **AI agents**, with a strong emphasis on system reliability, architectural clarity, and scalable AI infrastructure. I work across the full lifecycle — from model design and inference optimization to containerized deployment, CI/CD, and scalable microservice architectures. Seeking a Senior / Lead role defining AI architecture and delivering robust, real-world AI systems.

## WORK EXPERIENCE

### AI Engineer / Computer Vision Engineer

#### Reach Industries

September 2023 – Present Bristol, UK

AI Engineer (July 2024 – Present) – promoted  
Computer Vision Engineer (September 2023 – June 2024)

- Owned production-grade, end-to-end pipetting automation platform: 3D pipette-tip localization + volume estimation + temporal hand-object reasoning to infer lab actions from long-duration video streams.
- Built agentic LLM pipeline (planner-splitter-refiner) producing JSON-constrained protocols from complex chemical procedures, with schema validation, bounded retries, and explicit failure handling.
- Integrated RAG workflows enabling agents to retrieve and reason over domain-specific PDFs and structured documents during execution, improving procedural accuracy and contextual grounding.
- Architected hybrid multimodal reasoning: deterministic perception (detection/tracking/depth/geometry) → LLM semantic layer for protocol alignment and decision validation.
- Implemented instance segmentation pipelines YOLOv11-based instance segmentation models on laboratory vessel datasets, achieving ~87% mAP (custom lab-vessel dataset).
- Built perception pipelines resilient to occlusions, latency variance, and long-horizon drift using deferred label propagation, temporal smoothing, and multi-modal tracker fusion, reducing interaction inference errors by ~25% (occlusion-heavy runs).
- Deployed multimodal AI systems as containerized microservices (Docker, Docker Compose; Nuclio where applicable), enabling scalable, independently deployable, 24/7 production-ready PoCs.
- Designed inference pipelines with latency-aware architectures (asynchronous execution, batching, temporal aggregation) and evaluated deployment backends for portability and performance, including GPU-enabled and ONNX-compatible paths.
- Took architectural ownership across multiple subsystems, defining module interfaces, validation strategies, and system-level failure handling; mentored junior engineers and contributed to technical planning and client-facing PoCs.

## SKILLS

Agentic AIMulti-Agent Systems

Tool-Using AgentsRAG Systems

Schema Validation

3D CVMultimodal AI

Object Detection & Tracking

Instance Segmentation

Pose & Keypoint Estimation

Latency-Aware Inference

ONNX / OpenVINO

2D/3D Reconstruction

Computational Geometry

Tomography & Inverse Problems

PythonC++Microservices

DockerNuclioCI/CD

MLflowAWS / GCP

## EDUCATION

### Ph.D. in Electronics & Electrical Engineering

#### University of Bath

April 2018 – April 2022

- Thesis title: Ultrasound Tomography for control of Batch Crystallization.
- (Funded by European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 764902.)

### M.Eng. in Electrical & Computer Engineering

#### Technical University of Crete

Sept 2009 – April 2017

- Upper second-Class Honours (2:1) – Very Good
- Thesis title: Reconstruction and graphical modelling of aorta from MRI images.

## MOST PROUD OF

- Best Paper Student Award  
2017 Imaging Systems & Techniques IEEE conference.
- Marie Skłodowska-Curie  
Early-Stage Researcher (ESR)  
Distinction.

## Software Developer

### Generative Parametrics

March 2023 – July 2023

Melksham, UK

- Developed a 3D CAD modeling tool in C++ with UWP and **DirectX11**, enabling real-time rendering and parametric geometry manipulation.

## Machine Learning & Tomography Research Scientist

### Finden Ltd

April 2022 – March 2023

Oxford, UK

- Designed and deployed scalable data augmentation pipelines for industrial tomography, increasing labeled dataset volume by 40% and accelerating annotation workflows.
- Trained and benchmarked object detection models (**YOLOv3**, **Faster R-CNN**) for high-variance electronics datasets, achieving 86% accuracy.
- Developed robust Python workflows for **3D XRD-CT (X-ray Diffraction Computed Tomography)**, enabling high-resolution imaging of heterogeneous materials.
- Led 3D model voxelization efforts to build a comprehensive dataset of electronic boards for training 3D input CNNs.

## Research Associate

### University of Bath - ETL

April 2018 – September 2021

Bath, UK

- Designed and implemented advanced **2D/3D/4D USCT (Ultrasound Computed Tomography)** algorithms using non-linear inversion, regularization, and DL segmentation techniques (MATLAB & Python).
- Developed real-time USCT systems for in-process monitoring in chemical crystallization reactors under the **EU Horizon 2020 TOMOCON** project.
- Conducted and analyzed crystallization experiments, combining **acoustic forward/inverse modeling** with process control insights.
- Supervised undergraduate research projects and contributed to "Image and Signal processing" course delivery.

## R&D Engineer (Intern)

### Geomiso

May – October 2016

Athens, Greece

- Developed computational geometry modules for **B-spline** and **NURBS** modeling, contributing to an advanced isogeometric analysis platform.

# VISITING RESEARCH EXPERIENCE

## Visiting Researcher (Remote)

### Sulzer Chemtech Dept.

Sep – Oct 2021

Allschwil, Switzerland

- Presented findings on crystallization measurement and industrial tomography applications.

## Visiting Researcher

### R&D NETRIX S.A.

Sep – Nov 2019

Lublin, Poland

- Worked on Deep Learning classification for ultrasound-based digit recognition.

## Research Assistant

### Digital Image & Signal Processing Lab, TUC

Mar – Oct 2017

Chania, Greece

- Developed a novel algorithm (MATLAB) of image processing & computational geometry methods for the generation of individual patients' aortic NURBS models from MRI/ CT scans (DICOM).
- Wrote Research Grant Proposal in collaboration with "FORTH", Greece's national research institute, private hospital "HYGEIA" and company "Geomiso" for funding over EU's ESPA (Partnership for Growth Framework) 2014-2020.