# TREND Research Group

National and Kapodistrian University of Athens

industry X.0 Twins, REality and Network eDge technologies

# X-TREND: industry X.0 Twins, REality and Network eDge technologies research group

HELLENIC REPUBLIC
National and Kapodistrian University of Athens
EST. 1837


**Prof. Dionysis Xenakis, NKUA**
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## FOCUS AREAS

- **AI-driven 5G/6G** and **edge computing** applications
- **Cybersecurity** and **XAI**
- **Digital Twins** & AR/VR apps
- **3D mapping & reconstruction** of industrial assets/setups
- **Traceability 4.0** | Digital Threads
- **Blockchain-backed** systems
- Algorithmic design, protocol design and performance analytics
- Academia/Industry synergies

## MEET THE TEAM [2026]



Ioannis Stamoulias
**Candidate PhD, NKUA**
**Specialty:** Embedded Software, Drones, Blockchains



Maria Melina Dolapsaki
**Candidate PhD, NKUA**
**Specialty:** Computer Vision, 3D Point Clouds, AI



Anastasia Tsiota
**Candidate PhD, NKUA**
**Specialty:** Performance Analysis, Blockchain, Network Security



Dimitra Manoura
**Researcher**
**Specialty:** Computer Vision, AI, 6D Object Detection



Ioannis Vittorakis
**Candidate PhD, NKUA**
**Specialty:** Computer Vision, Digital Twins, 3D HPE



Aias Sotiropoulos
**Game Developer**
**Specialty:** Immersive Apps, Digital Twins



Dimitris Papadimitriou
**Candidate PhD, NKUA**
**Specialty:** AI, Edge/Cloud Ops, Network Slicing, 6G



Prof. Dionysis Xenakis
**Group Leader, NKUA**



Manousos Manouras
**Candidate PhD, NKUA**
**Specialty:** Neurosymbolic AI, ORAN, 6G



Klearchos Palias
**Candidate PhD, NKUA**
**Specialty:** Edge Computing, AR/VR systems, Indoor



Cosmina Stalidi
**Candidate PhD, NKUA**
**Specialty:** AI, Cybersecurity, SLM, XAI



GENOME DC3
**Candidate PhD, NKUA**
**Specialty:** AI Resilience, Differential Privacy DRL



Panagiotis Theodoropoulos
**Candidate PhD, NKUA**
**Specialty:** Blockchain, Software, Network Security



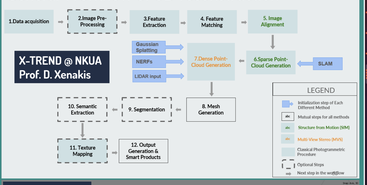
Ioanna Friki
**Linguistics**
**Specialty:** Discourse Analysis, Social Media



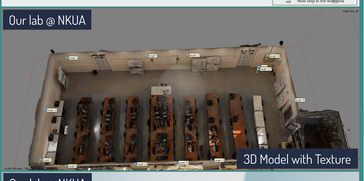
Dafne Panopoulou
**Candidate PhD, NKUA**
**Specialty:** Explainable AI (XAI), Medical data analytics

## 3D Mapping and Reconstruction

General Workflow of 3D reconstruction




Our lab @ NKUA




Our lab @ NKUA

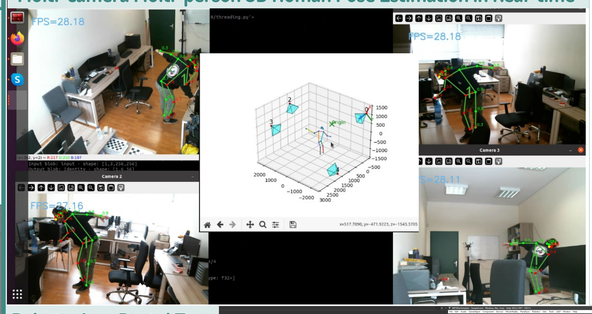



Our lab @ NKUA



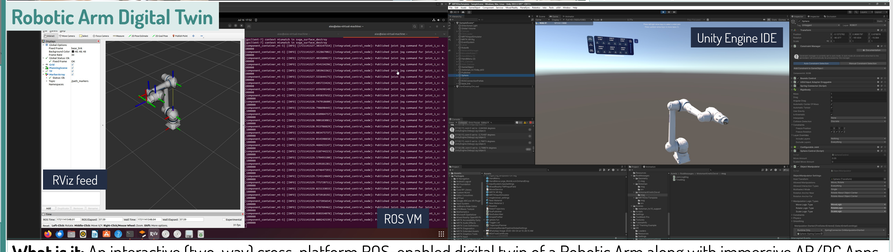

## APPLIED RESEARCH TOPICS [Highlights for 2025]

### Multi-camera Multi-person 3D Human Pose Estimation in Real-time



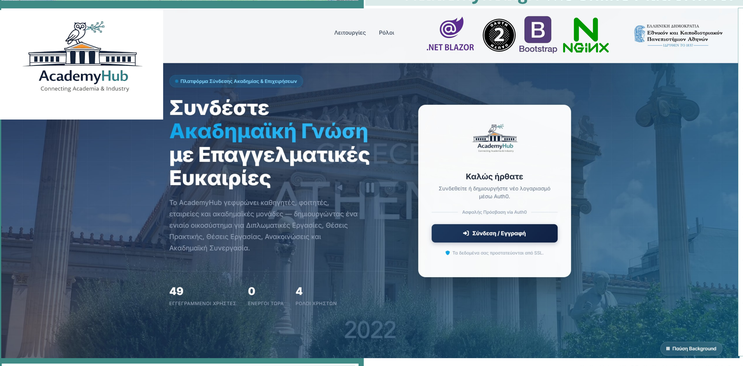

**What is it:** combines computer vision, AI and geometric techniques to estimate the location of multiple persons in the 3D space, using input from calibrated cameras dispersed around an area of interest
**Why it matters:** robust against occlusion, lightning, and texture effects, minimum invasion to existing infrastructures/setups, enhances human-robot interaction
**Applications:** Motion Capture / Actions Understanding in working setups (safety, well-being, productivity, etc.), Healthcare and Rehabilitation, Smart Retail and Crowd Monitoring, Surveillance and Security, Sports Analytics and Biomechanics

### Robotic Arm Digital Twin




**What is it:** An interactive (two-way) cross-platform ROS-enabled digital twin of a Robotic Arm along with immersive AR/PC Apps
**What it can do:** Be attached to ROS-enabled robotic assets. Currently demonstrated with full-stack ROS VMs, Moveit2 and RViz.
**Why it matters:** It provides *enhanced visibility* and seamless remote control of robotic assets. We currently use it to create isolated, deceptive fully-fledged virtual counterparts of real-life Industry X.0 assets to mislead threat actors, divert ongoing attacks and gather critical information on the attackers' profile, the attack surface, the attack patterns, and the intrusion point.

## Academyhub.gr: The **Online Platform for online and asynchronous Industry – Academia synergies**




- **Secure role-based access** (OAuth2.0): Enterprise, Professor, Student
- **Profile creation** (privacy-perseverance, social media, video, enterprise figures, statistics, CV, Areas/Skills/Techs of Interest)
- **Keyword-based search** for everyone (only for 'open' profiles')
- **Announcements** and live feeding from websites
- **Joint calendar** and **online event management** (posting, expression of interest, transport matching, Google maps integrated)
- **Internship management** (posting, expression of interest, acceptance /rejection, 3-way agreements)
- **Job management** (posting, expression of interest, acceptance /rejection, 3-way agreements)
- **Theses management** (posting, expression of interest, acceptance /rejection, 3-way agreements)
- **HR and coaching resources** for students
- **Funding Opportunities Search** / Automated Academic Unit Website
- **Online asynchronous collaboration/interest matching**

## ACTIVITIES INVOLVED

Networking Academy

**Head/Contact point** of the **CISCO Networking Academy @ NKUA**

ΑΔΑ: 6ΗΕΦ46ΨΖ2Ν-110

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SVSE
ASSOCIATION OF INDUSTRIES OF CENTRAL GREECE

**Coordinator** of a 6-member industry/academia committee implementing the **MoU between NKUA and the Association of Industries of Central Greece**

ΑΔΑ: 6Δ6846ΨΖ2Ν-ΜΕΩ

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Εθνικόν και Καποδιστριακόν Πανεπιστήμιον Αθηνών
ΙΔΡΥΘΕΝ ΤΟ 1837

ΑΡΧΙΜΗΔΗΣ
ΕΘΝΙΚΟ ΚΑΙ ΚΑΠΟΔΙΣΤΡΙΑΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ

**Committee member** of the **Innovation and Business Accelerator program @ ARCHIMEDES, NKUA**

ΑΔΑ: Ψ9Π046ΨΖ2Ν-ΥΔΣ

## NATIONAL AND EU-FUNDED ACTIONS [2026]

| Logo | [Framework] [Grant Agreement] Title | Timing | Budget \| Role |
|---|---|---|---|
| ECHO 5.0 | [HORIZON-MSCA-2025-SE] [GA 101299331]<br>**ECHO 5.0:** mission-ori**E**nted, semanti**C**s-aware technological framework for the secure s**H**aring **O**f I**5.0**-ready digital threads | 1/2027 - 12/ 2030 | **1 803 600,00€** Project Coordinator UOA Principal Investigator |
| NHYΣ | [GSRI-INNOVATE]<br>**NEPSIS:** a digital twi**N**s platform for robot-as-a-servic**E** su**P**port optimized by advanced augmented reality interface**S** and pred**I**ctive maintenance service**S** | 10/09/2026 – 09/09/2029 | **1 150 469,70€** Project Coordinator UOA Principal Investigator |
| GENOME | [HORIZON-MSCA-2024-DN-01] [GA 101226860]<br>**GENOME: GEN**erative and connected intelligence for 6G **O**pen **M**anagem**E**nt | 1/2026 – 12/2029 | **4 258 518,48** € UOA Principal Investigator / 3 DCs |
| EXARCH | [HORIZON-MSCA-2024-SE] [GA 101236244]<br>**EXARCH:** sErvitization of Industry X.o Assets powered by secure, Resilient and immersive digital twin teCHnologies | 11/2025 – 10/2029 | **1 803 600,00€** Project Coordinator UOA Principal Investigator |
| AeroNet | [HORIZON-MSCA-2024-SE] [GA 101236523]<br>**AeroNet:** In-flight Broadband Connectivity and Experimentation for Beyond 5G Networks | 10/2025 – 9/2029 | **1 803 600,00€** UOA Deputy Principal Investigator |
| SOVEREIGN | [HORIZON-MSCA-2022-SE] [GA: 101131481]<br>**SOVEREIGN:** distributed ledger technologies and user-driven automation towards self-SOVEREIGN mobile data access in beyond 5G network. | 01/2024 – 12/2028 | **1 656 000,00€** Project Coordinator UOA Principal Investigator |
| ELIXIRION | [HORIZON-MSCA-2022-DN] [GA: 101120135]<br>**ELIXIRION:** rEaLIzing healthcare 4.0 eXploiting the 6G network evolution | 11/2023 – 10/2027 | **2 536 970,40€** UOA Principal Investigator / 2 DCs |
| AIAS | [HORIZON-MSCA-2022-SE] [GA: 101131292]<br>**AIAS: AI-AS**sisted cyber security platform empowering SMEs to defend against adversarial AI attacks | 01/2024 – 12/2028 | **1 564 000,00€** Principal Investigator |

