

Professional Experience

- Nov. 2024 - Today **Research Fellow**, *Università Campus Bio-Medico di Roma*, Italy
- Nov. 2021 – Oct. 2024 **Doctoral Researcher**, *Humanitas University*, Italy
- Sept. 2019 – Sept. 2021 **Research Assistant**, *Middle East Technical University Northern Cyprus Campus*, Turkey

Education

- 2021 – Today **PhD in Artificial Intelligence (Health and Life Sciences)**, *Università Campus Bio-Medico di Roma*, Italy
- **Thesis title:** A Multimodal Approach for Histological Subtype Classification in NSCLC Using PET and CT Images (tentative)
 - **Supervisors:** Prof. Letterio Salvatore Politi, Prof. Arturo Chiti, Prof. Paolo Soda
- 2019 – 2021 **MSc in Electrical and Electronics Engineering**, *Middle East Technical University Northern Cyprus Campus*, Turkey
- Taught in English
 - **Final mark:** 3,86/4,00
 - **Thesis title:** Person Re-identification Using Convolutional Neural Networks
 - **Supervisor:** Assoc. Prof. Cem Direkoğlu
- 2011 – 2019 **BSc in Electrical and Electronics Engineering**, *Middle East Technical University Northern Cyprus Campus*, Turkey
- Taught in English
 - **Final mark:** 2,65/4,00
 - **Thesis title:** Autonomous UAV Navigation Using a Monocular Camera
 - **Supervisor:** Assoc. Prof. Cem Direkoğlu

Post-master Courses

- July 6-9, 2024 **OxML 2024: Oxford Machine Learning Summer School**, AI for Global Goals
- Feb. 13-27, 2024 **Federated Learning: How it will protect our privacy in everyday life**, *Università Campus Bio-Medico di Roma*
- Sept. 25-29, 2023 **PhD School on AI in Health and Life Sciences**, *Università Campus Bio-Medico di Roma*
- July 13-16, 2023 **OxML 2023: Oxford Machine Learning Summer School**, AI for Global Goals
- March 13-17, 2023 **Introduction to Neuromorphic Computing**, *Università degli Studi di Roma Tor Vergata*
- Oct. 17-Nov. 10, 2022 **Can we trust AI? Opening the black box**, *Università Campus Bio-Medico di Roma*
- Sept. 26-30, 2022 **PhD School on AI in Health and Life Sciences**, *Università Campus Bio-Medico di Roma*

Grants and Scholarships

- 2024 **Research Grant**, *Università Campus Bio-Medico di Roma*, Duration: 2 years
Research title: "Artificial Intelligence Methods for the Development of Predictive Tools in Lung Cancer"
- 2021 **Grant for the XXXVII Italian National PhD Program in Artificial Intelligence**, *Università Campus Bio-Medico di Roma*, Duration: 3 years
- 2019 **Grant for the Master's degree in Electrical and Electronics Engineering**, *Middle East Technical University Northern Cyprus Campus*, Duration: 2 years
- 2011 **100% Tuition fee waiver for Bachelor's degree in Electrical and Electronics Engineering**, *Middle East Technical University Northern Cyprus Campus*, Duration: 5 years

Awards

- July 2023 **Winner of the MLxCases Health Competition**, Oxford Machine Learning Summer School 2023, AI for Global Goals

Teaching

Teaching Assistanship

- 2024 – Today **Fundamentals of Computer Science**, 10 ECTS, Bachelor's Degree in Biomedical Engineering, Faculty of Engineering, *Università Campus Bio-Medico di Roma*
- 2023 – Today **Fundamentals of Computer Science**, 5 ECTS, Master's Degree in MedTech, Faculty of Medicine and Surgery, *Università Campus Bio-Medico di Roma*

Academic Service

Program Committee Member

- 2023 – Today **IEEE International Symposium on Computer-Based Medical Systems (CBMS)**

Research Interests

My research focuses on AI, specifically deep learning methods applied to biomedical domains, with an emphasis on the diagnosis and prognosis of non-small cell lung cancer (NSCLC). From a methodological standpoint, my work can be divided into two main areas:

- **Medical Foundation Models:** I investigated the application of 3D medical vision foundation models for NSCLC subtype classification by leveraging their embeddings from 3D CT scans, enhancing representation learning [S3].
- **Multimodal Deep Learning:** By integrating diverse data types, deep learning algorithms have advanced through multimodal approaches, enhancing the robustness and accuracy of predictive models. To investigate the benefits of multimodal deep learning in biomedical research, we reviewed the literature on its use, particularly focusing on the intermediate fusion approach [S1]. Additionally, I implemented a novel intermediate fusion method to combine CT and PET images for the classification of histological subtypes in NSCLC [C6, S2].
- **Resilient AI:** In the medical field, the privacy of sensitive data and the limited size of datasets present significant challenges for AI models. In this context, I explored triplet networks and federated learning methods. I examined the advantages of triplet loss over traditional cross-entropy loss, particularly in scenarios involving small datasets [C3]. Furthermore, I investigated federated learning techniques to enhance privacy while expanding dataset sizes by combining data from multiple institutions, also integrating these methods with triplet networks [C5].

Publications

Journals

- [J1] **Aksu, F.** and Direkoğlu, C., 2020. Person Re-Identification in Surveillance Videos using Deep Learning based Body Part Partition and Gaussian Filtering. *Avrupa Bilim ve Teknoloji Dergisi*, pp.291-296.

Conferences

- [C6] **Aksu, F.**, Gelardi, F., Chiti, A. and Soda, P., 2024, December. Toward a Multimodal Deep Learning Approach for Histological Subtype Classification in NSCLC. In *2024 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)* (pp. 6327-6333). IEEE.
- [C5] **Aksu, F.**, Cordelli, E., Gelardi, F., Chiti, A., Soda, P., 2024. Enhancing NSCLC Histological Subtype Classification: A Federated Learning Approach Using Triplet Loss. In *3rd International Workshop on Artificial Intelligence for Healthcare Applications (AIHA), 27th International Conference on Pattern Recognition (ICPR)*. **In print.**
- [C4] **Aksu, F.**, Bria, A., Caragliano, A.N., Caruso, C.M., Chen, W., Cordelli, E., Coser, O., Francesconi, A., Furia, L., Guarrasi, V. and Iannello, G., 2024. Towards AI-driven Next Generation Personalized Healthcare and Well-being. In *Ital-IA 2024, 4th National Conference on Artificial Intelligence, organized by CINI, May 29-30, 2024, Naples, Italy* (pp. 360-365). CEUR-WS.
- [C3] **Aksu, F.**, Gelardi, F., Chiti, A. and Soda, P., 2023, June. Early Experiences on using Triplet Networks for Histological Subtype Classification in Non-Small Cell Lung Cancer. In *2023 IEEE 36th International Symposium on Computer-Based Medical Systems (CBMS)* (pp. 832-837). IEEE.
- [C2] Guarrasi, V., Tronchin, L., Caruso, C.M., Rofena, A., Manni, G., **Aksu, F.**, Paolo, D., Iannello, G., Sicilia, R., Cordelli, E. and Soda, P., 2023. Building an AI-enabled metaverse for intelligent healthcare: opportunities and challenges. In *Ital-IA 2023, Italia Intelligenza Artificiale Thematic Workshops, co-located with the 3rd CINI National Lab AIIS Conference on Artificial Intelligence (Ital IA 2023), Pisa, Italy, May 29-30, 2023* (pp. 134-139). CEUR-WS.
- [C1] **Aksu, F.** and Direkoğlu, C., 2021, June. Lightweight Convolutional Neural Networks for Person Re-Identification. In *2021 3rd International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA)* (pp. 1-5). IEEE.

Submitted works

- [S3] **Aksu, F.**, Gelardi, F., Chiti, A. and Soda, P., 2025. NSCLC histological subtype classification from CT scans using generalist 3D medical foundation models. *Submitted to IEEE ICHI 2025*
- [S2] **Aksu, F.**, Gelardi, F., Chiti, A. and Soda, P., 2024. Multi-stage intermediate fusion for multimodal learning to classify non-small cell lung cancer subtypes from CT and PET. *Submitted to Pattern Recognition Letters. arXiv preprint arXiv:2501.12425*
- [S1] Guarrasi, V., **Aksu, F.**, Caruso, C.M., Di Feola, F., Rofena, A., Ruffini, F. and Soda, P., 2024. A Systematic Review of Intermediate Fusion in Multimodal Deep Learning for Biomedical Applications. *Submitted to Information Fusion. arXiv preprint arXiv:2408.02686.*

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Rome – Italy

✉ fatih.aksu@unicampus.it •  **Fatih Aksu** •  [aksufatih](https://github.com/aksufatih)
in [aksu-fatih](https://www.linkedin.com/company/aksu-fatih)