

Erasmus+ Internship Experience Report

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1. General Information

As part of the Erasmus+ Internship Programme, I completed a research traineeship at Karadeniz Technical University (KTU), located in Trabzon, Turkey. My stay lasted from April 1, 2026 to June 12, 2026 — a total of approximately 10 weeks.

I am enrolled as a 4th semester student in the Masters of Information Technology programme at TH OWL (Technische Hochschule Ostwestfalen-Lippe), Lemgo, Germany, in the Department of Electrical Engineering and Computer Science. The internship was hosted by the Computer Engineering Department at KTU, under the direct supervision of Prof. Dr. Güzin ULUTAŞ, and was classified as a research internship focused on IoMT (Internet of Medical Things) Network Intrusion Detection.



Figure 1: With the Erasmus+ Exchange Programme team at Karadeniz Technical University

2. Preparation: Planning, Organisation and Application Process

The preparation process began several months before my departure. I identified KTU as a suitable host institution because of its strong Computer Engineering department and the active IoMT security research conducted by Prof. Dr. Güzin ULUTAŞ, whose work aligned closely with my own research interests.

The application involved coordinating with the International Office at TH OWL, completing the Learning Agreement, and obtaining approval from both my home and host institutions. The process was smooth and well-supported by TH OWL's International Office. I also arranged travel, visa documentation, and accommodation well in advance, ensuring a stress-free arrival in Trabzon.

I received an Erasmus+ grant of €2,739 for the full duration of the traineeship, which supported my costs throughout the stay.

3. Accommodation

I stayed in the official Erasmus student dormitory provided by Karadeniz Technical University. The accommodation was a shared room within a student housing facility located on or near the university campus, making it extremely convenient to commute to the research department daily without any need for public transportation.

The dormitory was well-maintained and offered a comfortable environment for both work and rest. Sharing the room with fellow students also created a warm social atmosphere. I would strongly recommend future Erasmus interns to apply for university dormitory housing early, as it is the most affordable and convenient option available in Trabzon.

4. Research Internship: Activities and Achievements

The primary focus of my internship was conducting a cybersecurity research project titled:

"IoMT Network Intrusion Detection System using Dual-Channel GASF-GADF Image Fusion with MobileNetV2 and Grad-CAM Explainability"

This project was conducted on the CICIoMT2024 dataset from the Canadian Institute for Cybersecurity and involved the following tasks:

- Data preprocessing and cleaning of multi-protocol IoMT network traffic data
- Handling class imbalance using SMOTE (Synthetic Minority Oversampling Technique)

- Converting time-series network features into dual-channel GASF and GADF images
- Training MobileNetV2 protocol-wise: WiFi (96.27%), MQTT (99.72%), Bluetooth (89.52%)
- Implementing Grad-CAM explainability to visually highlight attack detection decisions
- Conducting cross-protocol zero-day generalization test — 100% correct classification
- Cross-dataset validation on BoT-IoT dataset using the same GASF-GADF pipeline
- Developing professional visualizations, graphs, and a complete research presentation
- Maintaining all code and scripts on GitHub for version control

The research produced results of publishable quality and is being prepared for submission to MDPI Sensors or IEEE Access upon return to TH OWL. This project represents a novel contribution, as no prior work has combined GASF-GADF dual-channel imaging with MobileNetV2 specifically on the CICIoMT2024 dataset.



Figure 2: Presenting the completed research project to Prof. Dr. Güzin ULUTAŞ at the Computer Engineering Department, KTU

5. Finances: Cost of Living

The total Erasmus+ grant received was €2,739, equating to approximately €1,000 per month. This was sufficient to cover core living expenses, although daily costs in Trabzon were somewhat higher than expected.

- Accommodation: Subsidised university dormitory — affordable through Erasmus+ housing
- Food and groceries: Moderately expensive — supermarket prices comparable to German cities
- Local transport: Very affordable — public buses and taxis readily available
- Leisure and tourism: Reasonably priced — most natural attractions are free or low cost

Overall monthly expenditure was approximately €1,000. Future students should budget carefully for groceries, as supermarkets in Trabzon can be surprisingly costly.

6. Everyday Life and Leisure

Life in Trabzon was a wonderfully enriching experience. The city sits on the shores of the Black Sea surrounded by lush green mountains, creating a breathtaking natural landscape. The local people are notably polite, kind, and hospitable — everyday interactions were consistently warm and pleasant.

During weekends and free evenings, I explored several of Trabzon's most famous attractions:

- Sümela Monastery — a stunning ancient monastery carved into the Pontic Mountain cliffs; one of the most memorable visits of the trip
- Black Sea coastline — long walks along the seafront with beautiful sunsets
- Local bazaars and markets — authentic Turkish food, tea culture, and traditional cuisine
- KTU campus surroundings — a beautiful green campus ideal for evening walks and relaxation

One of the most valuable aspects of everyday life was the vibrant international student community at KTU. Erasmus students from across Europe and Asia quickly formed a close-knit and supportive group, organising weekend trips and activities together that made the experience socially rich and memorable.



Figure 3: Beautiful Black Sea coastline at sunset — one of Trabzon's most stunning natural attractions



Figure 4: Visiting the historic Sümela Monastery — a highlight of the Trabzon experience

7. Insider Tips for Future Students

- Apply for university dormitory accommodation as early as possible — it is the most convenient and affordable option in Trabzon
- Learn a few basic Turkish phrases before arriving — many locals outside the university do not speak English, which can make daily tasks like shopping or asking directions challenging
- Use the Google Translate camera feature frequently — it is invaluable for reading Turkish menus, signs, and product labels
- Do not miss Sümela Monastery — it is one of the most remarkable historical and natural sites in the entire region
- Connect with the international Erasmus student community as early as possible — fellow students quickly become your social support network
- Budget approximately €1,000 per month — grocery costs are higher than many students expect

- Explore the Black Sea coast and surrounding mountains on weekends — the natural beauty of Trabzon is truly extraordinary and should not be missed

8. Conclusion

My Erasmus+ internship at Karadeniz Technical University was an exceptionally positive and transformative experience — both professionally and personally. From a research perspective, I successfully completed a full IoMT cybersecurity research project under the expert supervision of Prof. Dr. Güzin ULUTAŞ. The results are of publishable quality and will be submitted to an international journal, representing a significant academic milestone.

Professionally, the internship strengthened my technical skills in deep learning, data preprocessing, explainable AI, and research methodology. Working independently on a complex project also significantly enhanced my project management, analytical, and problem-solving abilities.

On a personal level, living in Trabzon introduced me to a rich culture, extraordinary natural environment, and genuinely warm and hospitable people. The friendships formed with fellow international students were among the highlights of the entire experience. The only challenge encountered was the language barrier with local residents, as English is not widely spoken outside the university — manageable with patience and translation tools.

I would wholeheartedly recommend this Erasmus+ internship destination to future TH OWL students, particularly those interested in cybersecurity, AI, or computer engineering research. The combination of high-quality academic supervision, a welcoming international environment, and the unique beauty of Trabzon makes it an outstanding choice for a research internship abroad.