



## Roland Bolboaca

**Nationality:** Romanian    **Email address:** [roland.bolboaca@umfst.ro](mailto:roland.bolboaca@umfst.ro)

### WORK EXPERIENCE

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#### Assistant lecturer

**"George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology** [ 2021 – Current ]

City: Targu Mures

Country: Romania

#### Activities:

Bachelor thesis supervision.

Part of the Electrical Engineering and Information Technology department, focusing on assembling lab materials and exercises for bachelor level students, focusing on the following disciplines:

- Programming Fundamentals
- Information Systems Security
- Computer Systems Architecture
- Design of Algorithms
- Advanced Programming Methods
- Advanced Programming Techniques
- Scientific and Professional Writing and Communication
- Data Structures and Algorithms

#### Software developer

**Bitdefender Romania** [ 2022 – 2023 ]

City: Targu Mures

Country: Romania

#### Research Assistant

**"George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology** [ 2019 – 01/11/2023 ]

City: Târgu Mureș

Country: Romania

Part of **Horizon 2020 DIAS project (Smart Adaptive Remote Diagnostic Antitampering Systems)**

Main responsibilities:

- Writing scientific papers
- Research, design and implement methods, algorithms and communication protocols. Mainly focused on network security protocols and anomaly detection methods.
- Design, implement and conduct experiments to verify the validity of the developed protocols, using tools such as: CANoe/CANalyzer simulator, Matlab and integrated boards with their tool-chains.
- Integrate technologies required in experimental environments, meaning, testing and compilation of third party libraries, setting up linux environments for experiments
- Management of project wikis and code repositories, documenting the current work and maintaining the source code for the projects.

## ICT application developer

**Thingsmaze Solutions** [ 2020 – 2022 ]

City: Targu Mures

Country: Romania

- Compiling, installing, and troubleshooting developed security solutions.
- Testing and integration of IoT equipment.
- Software development using python, SQLite, MongoDB and ZMQ.
- Collaboration in troubleshooting, integration and testing of software / hardware solutions.
- Maintenance of the code base of the GIT, SVN project

## Software developer

**Thingsmaze Solutions** [ 2019 – 2020 ]

City: Targu Mures

Country: Romania

Part of **Horizon 2020 GHOST project (Safe-Guarding Home IoT Environments with Personalized Real-time Risk Control)**

Main responsibilities:

- Compilation, installation and debugging of the developed security solutions.
- Integrating smart home protocols into the core middleware, mainly focused on the
- Z-Wave protocol
- Smart sensor testing and behavior debugging
- Software development focused using python, SQLite, MongoDB and ZMQ
- Administrative responsibilities including hosting weekly meetings, document translations, communication with the users involved in the GHOST project.

## EDUCATION AND TRAINING

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### PhD student, Informatics

**"George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology** [ 01/10/2021 – Current ]

City: Targu Mures

Country: Romania

### Professional Course: IBM Machine Learning Professional Certificate

**Coursera** [ 2023 – 2023 ]

- Exploratory Data Analysis for Machine Learning
- Supervised Machine Learning: Regression
- Supervised Machine Learning: Classification
- Unsupervised Machine Learning
- Deep Learning and Reinforcement Learning
- Machine Learning Capstone

### Professional Course: Sequences, Time Series and Prediction

**Coursera** [ 2023 – 2023 ]

- Time series and forecasting problems in TensorFlow
- Prepare data for time series learning using best practices
- Explore how RNNs and ConvNets can be used for predictions
- Build a sunspot prediction model using real-world data

### Professional Course: An Intuitive Introduction to Probability

**Coursera** [ 2023 – 2023 ]



Basic, intuitive and practical introduction into Probability Theory.

Topics covered:

- Probability
- Conditional Probability
- Applications
- Random Variables
- Normal Distribution

### **e-Media Specialist - COR 251303**

***"George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology*** [ 2023 – 2023 ]

City: Targu Mures

Country: Romania

Digital competences in the use of e-learning platforms

### **Psycho-pedagogical (Teacher) Course DPPD Level II**

***"Dimitrie Cantemir" University*** [ 2022 – 2022 ]

### **Psycho-pedagogical (Teacher) Course DPPD Level I**

***"Dimitrie Cantemir" University*** [ 2021 – 2021 ]

City: Targu Mures

Country: Romania

### **MSc in Information Technology**

***"George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology*** [ 2019 – 2021 ]

City: Targu Mures

Country: Romania

### **Bachelor's degree in Informatics**

***"George Emil Palade" University of Medicine, Pharmacy, Sciences and Technology*** [ 2016 – 2019 ]

City: Targu Mures

Country: Romania

### **High school Diploma, Assistant Programmer**

***Constantin Brancusi High School*** [ 2001 – 2005 ]

City: Targu Mures

Country: Romania

## **LANGUAGE SKILLS**

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Mother tongue(s): **Romanian**

Other language(s):

#### **English**

**LISTENING B2 READING B2 WRITING B2**

**SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2**

#### **Hungarian**

**LISTENING B1 READING B1 WRITING A2**

**SPOKEN PRODUCTION A2 SPOKEN INTERACTION B1**

#### **French**

**LISTENING A2 READING A2 WRITING A2**

**SPOKEN PRODUCTION A2 SPOKEN INTERACTION A2**

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user*



## DIGITAL SKILLS

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### Software Development

C, C++, C# / HTML, CSS, JS / Java / Visual Basic / Microsoft SQL / embedded software / Python / SQL (PostgreSQL) / OpenCV / Tensorflow, Keras, Pytorch, sklearn

### Web Software Development

Frontend developer - HTML5, CSS, JS / Back-End Web Development

### Software

Microsoft Office / Android Studio / MATLAB / Vector CANoe/CANalyzer / LaTeX / Visual studio / R / Simulink / Unity

### Audio/Video Processing

Adobe Photoshop, Adobe Premiere / Adobe Lightroom / DaVinci Resolve

### OS

Windows, macOS, Chrome OS și GNU/Linux / Embedded Systems / Embedded Applications: Arduino, MPLAB

## PUBLICATIONS

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### Feature Analysis and Ensemble-based Fault Detection Techniques for Nonlinear Systems

[2024]

Bolboaca Roland, Haller Piroska, Genge Bela

Neural Computing and Applications (Springer)

### Evaluation Techniques for Long Short-Term Memory Models: Overfitting Analysis and Handling Missing Values

[2024]

Roland Bolboaca, Bela Genge

The 37th International Conference on Industrial, Engineering & Other Applications of Applied Intelligent Systems.

### Unsupervised Outlier Detection in Continuous Nonlinear Systems: Hybrid Approaches with Autoencoders and One-Class SVMs

[2023]

Roland Bolboaca, Bela Genge

International Conference INTER-ENG 2023 Interdisciplinarity in Engineering, Targu Mures, Romania.

### Performance Analysis of Long Short-Term Memory Predictive Neural Networks on Time Series Data

[2023]

Bolboaca Roland, Haller Piroska

Mathematics 2023, 11 (6), 1432 ( ISSN: 2227-7390, FI: 2.592, Q1), DOI: <https://doi.org/10.3390/math11061432>

### Adaptive Ensemble Methods for Tampering Detection in Automotive Aftertreatment Systems,

[2022]

Roland Bolboacă

IEEE Access, vol. 10, pp. 105497-105517, 2022, DOI: 10.1109/ACCESS.2022.3211387

### Tampering Detection for Automotive Exhaust Aftertreatment Systems using Long Short-Term Memory Predictive Networks

[2022]

Bolboacă, R, Haller, P, Kontses, D, Papageorgiou, A, Doulgeris, S, Zingopis, N, Samaras, Z



## **A Statefull Firewall and Intrusion Detection System Enforced with Secure Logging for Controller Area Network**

[2021]

Teri Lenard, Roland Bolboacă

European Interdisciplinary Cybersecurity Conference, Targu Mures, Romania, 2021

## **Locality Sensitive Hashing for Tampering Detection in Automotive Systems**

[2020]

Roland Bolboaca, Teri Lenard, Bela Genge and Piroska Haller

ARES: The 15th International Conference on Availability, Reliability and Security, 2020, Dublin, Irlanda

## **LOKI: A Lightweight Cryptographic Key Distribution Protocol for Controller Area Networks**

[2020]

Teri Lenard, Roland Bolboaca, Bela Genge and Piroska Haller

International Conference on Intelligent Computer Communication and Processing ICCP 2020, Cluj, Romania

## **MixCAN: Mixed and Backward-Compatible Data Authentication Scheme for Controller Area Networks**

[2020]

Teri Lenard, Roland Bolboaca, Bela Genge and Piroska Haller

IFIP Networking 2020 Conference (IFIP Networking 2020), Paris, Franța

## **Tampering detection for in-vehicle systems**

[2020]

Roland Bolboaca, Bela Genge and Piroska Haller

Fourth International Conference on Applied Informatics, Imagination, Creativity, Design, Development - ICDD, 2020, Sibiu, Romania.

## **Using Side-Channels to Detect Abnormal Behaviour in Industrial Control Systems**

[2019]

Bolboaca Roland, Genge Bela, Haller Piroska

International Conference on Intelligent Computer Communication and Processing ICCP 2019, Cluj, Romania

## **Detecting anomalies in Industrial Control Systems by leveraging side-channel information**

[2019]

Bolboaca Roland, Genge Bela, Haller Piroska

EMT - XXIX. SzamOkt International Conference on Computer Science 2019, Timisoara, Romania

## **DRIVING LICENCE**

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**Driving Licence:** B

## **CONFERENCES AND SEMINARS**

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### **Continental Hackathon Maze Solving Competition**

[ George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, 29/11/2023 – 29/11/2023 ]

- Part of the organizing Team.
- Team Mentor.

Link: <https://u2b.umfst.ro/hackathoncontinental/>



## **International Conference INTER-ENG 2023 Interdisciplinarity in Engineering**

[ George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, 2023 ]

Reviewer

Link: <https://inter-eng.umfst.ro/2023/>

## **UMFST Scholarships for Scientific Performance 2023**

[ George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, 2023 – 2023 ]

Reviewer member of the scholarship awarding committee.

## **International Conference of PhD Students and Young Doctors 2022**

[ George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, 2022 – 2022 ]

Organizing Committee.

University Days

December 5 - 9, 2022,

Targu Mures, Romania

Link: <https://zilele.umfst.ro>

## **Scientific Workshop: Operations Twin in the Industrial value chain**

[ George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, 2022 – 2022 ]

Organizer.

Invited speaker: Victor Spita,

Associate Director at Accenture Romania

Link: <https://zilele.umfst.ro/3d-flip-book/program-general-zumfst-2022/>

## **UMFST Scholarships for Scientific Performance 2022**

[ George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, 2022 – 2022 ]

Reviewer member of the scholarship awarding committee.

## **European Interdisciplinary Cybersecurity Conference 2021**

[ Targu Mures, Romania., 2021 – 2021 ]

Part of the organizing Team

Link: <https://www.fvv.um.si/eicc2021/>

## **HONOURS AND AWARDS**

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### **Best Paper Award**

European Interdisciplinary Cybersecurity Conference [ 2021 ]

Lenard, Teri, and Roland Bolboaca. "A statefull firewall and intrusion detection system enforced with secure logging for controller area network." In *European Interdisciplinary Cybersecurity Conference*, pp. 39-45. 2021.

## **FIELDS OF RESEARCH**

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Anomaly detection systems, cyber-physical systems security, outlier analysis, fault detection.

Machine learning, Artificial Intelligence.

Data analysis. Automotive Systems.



Computer networks, Automotive networks, sensor/IoT networks, Industrial IoT systems, Industrial Control Systems.

Cryptography, security protocols, lightweight security protocols, data authentication, application security.

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