Oleksandr Mostovyi

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PROFILE

PhD candidate in Computer Science at the V.M. Glushkov Institute of Cybernetics (National Academy of Sciences of Ukraine), working on neurosymbolic intrusion detection for satellite communication systems. Sixteen years of professional software engineering experience in high-load web platforms and distributed systems, now applied to research in applied cybersecurity, formal verification, and machine learning for security.

EDUCATION

PhD in Computer Science. V.M. Glushkov Institute of Cybernetics, National Academy of Sciences of Ukraine. *Oct 2023 – present*
Research topic: *Neurosymbolic intrusion detection systems for satellite communication networks.*
Supervisor: Oleksandr Letychevskyi. Expected defence: 10.2027

MSc in Computer Software Engineering. American University Kyiv (program delivered jointly with Arizona State University). *2022 – 2024*. Summa Cum Laude.

MSc in System Engineering, Robotics. Kremenchuk University of Economics, Information Technologies and Management. *2011 – 2012*. Summa Cum Laude.

BSc in System Engineering, Robotics. Kremenchuk University of Economics, Information Technologies and Management. *2007 – 2011*. Summa Cum Laude.

AWARDS AND RECOGNITION

ActInSpace 2026 — 5th place (international ranking), sponsor prize. *30 January 2026*
International space innovation challenge organised by CNES (French National Centre for Space Studies) and the European Space Agency (ESA). Project: *"Neurosymbolic Intrusion Detection System for Satellite Systems"* — an application of the PhD research line to satellite cyber-defence.

RESEARCH

The PhD research is structured around two connected lines of work in applied cybersecurity, both combining machine learning with symbolic and formal methods.

The first line addresses detection of attacks on satellite communication networks through neurosymbolic intrusion detection, combining LSTM-based sequence models with graph-based logical inference. The objective is a detection pipeline that is both data-driven and explainable, with detection logic that can be formally checked against a defined threat model.

The second line addresses binary-level vulnerability analysis, combining symbolic execution, SMT-based reasoning, and distributed execution on HPC infrastructure. Recent work includes control flow graph recovery for dynamically loaded code via symbolic library resolution, with applications in malware analysis and software supply-chain security.

Current directions:

- Protocol-level analysis of satellite link and ground-segment traffic
- Hybrid neurosymbolic architectures (deep sequence models combined with rule-based reasoning)
- Formal verification of detection logic and adversarial robustness of learning-based IDS
- Symbolic execution and SMT-based vulnerability analysis of ARM64 binaries
- Distributed binary analysis pipelines on HPC clusters

PUBLICATIONS (PEER-REVIEWED)

Mostovyi, O. (2026). *Control flow graph recovery for dynamically loaded code via symbolic library resolution*. Bulletin of National Technical University "KhPI". Series: System Analysis, Control and Information Technologies, **(1)15**, 74–79. DOI: 10.20998/2079-0023.2026.01.12. Indexed in DOAJ and ICI; sole-authored. Source code: github.com/smander/dynpathresolver.

Mostovyi, O. S. (2024). *Neurosymbolic approach for attack detection in satellite communication systems*. Problems in Programming, **(2–3)**, 223–230. ISSN 1727-4907. DOI: 10.15407/pp2024.02-03.223. Open access; sole-authored. Presented at UkrPROG-2024.

[add any further peer-reviewed journal articles here using the same format]

MANUSCRIPTS UNDER REVIEW

Mostovyi, O.. (2026). *A quantized deep learning approach to intrusion detection in narrowband IoT non-terrestrial networks*. Submitted to ICTERI 2026 (PhD Symposium). Under review.

Mostovyi, O., & Biloborodova, T.. (2026). *A knowledge-graph-based neuro-symbolic approach to network intrusion detection*. Submitted to ARTIIS 2026. Under review.

Mostovyi, O.. (2026). *Neural constraint-dependency graphs for the automated security analysis of embedded firmware*. Submitted to DESSERT 2026 (IEEE). Under review.

Mostovyi, O.. (2026). *Symbolic digital twin for intrusion detection in satellite communication systems*. Submitted to iTest 2026, Cherkasy State Technological University. Under review.

CONFERENCE PRESENTATIONS

XI International Scientific and Technical Conference "Information and Computer Technologies", *April 2–3, 2026, Ukraine*.

Paper: *"Distributed SMT-based vulnerability analysis of ARM64 binary files on HPC clusters"*.

III (IX) International Scientific and Practical Conference "Information Technologies: Theory and Practice", *March 25–27, 2026, Ukraine*.

Paper: *"Digital twin for ARM64 symbolic state modeling and vulnerability detection"*.

15th International Scientific and Practical Conference on Programming — UkrPROG-2025, *2025, Kyiv, Ukraine*.

Paper: *"Neurosymbolic approach to intrusion detection based on LSTM networks and graph-based logical inference methods"*.

CERTIFICATIONS

"Open Science: FAIR Data, the DataverseUA Open Data Repository of the NAS of Ukraine, and the European Open Science Cloud (EOSC)"

Kyiv Academic University (KAU), National Academy of Sciences of Ukraine. *March 26–27, 2026*. 12 hours / 0.4 ECTS credits. Certificate No. PDC-26 No. 224/01-6/251, issued 7 April 2026.

Topics covered: Open Science and the European Open Science Cloud (EOSC); FAIR data and research data management; the DataverseUA repository for data curators and depositors; practical use of DataverseUA.

LANGUAGES

Ukrainian — native

English — *C1*

TECHNICAL SKILLS

Research and security: Python (primary research language), machine learning and deep learning (LSTM and related sequence models), symbolic reasoning and rule-based systems, graph databases for threat modelling (Neo4j), Linux, Docker, Kubernetes.

Software engineering (industry stack, 16 years of practice):

- Languages: Python (Django, Flask), PHP (Laravel, Symfony, Zend Framework), Java (Spring), Go (Echo), JavaScript (Node.js, Vue.js, React)
- Databases: MySQL, PostgreSQL, MongoDB, Redis, Neo4j, AeroSpike, ClickHouse
- Caching: Memcached, Memcache
- Messaging: RabbitMQ, ElasticMQ, AWS SQS
- Search: ElasticSearch, Sphinx
- Architecture: microservices, WebSockets, RPC, real-time systems

PROFESSIONAL EXPERIENCE

PhD Researcher. V.M. Glushkov Institute of Cybernetics, NAS of Ukraine, Kyiv. *Oct 2023 – present*

- Research on neurosymbolic intrusion detection for satellite communication networks
- Focus areas: cybersecurity, formal verification, LSTM-based models, symbolic reasoning, protocol analysis

Senior Web Developer. Killing Kittens Limited, UK. *March 2018 – present*

- Built a dating platform with social network features from scratch

- Developed a real-time notification service used across several products
- Built a recommendation engine for profile matching
- Worked on the CCN profile verification service

Team Lead. Woact LLC. *Oct 2014 – March 2018*

- Led a development team building applications on Laravel and Yii
- Integrated AngularJS into an existing platform; wrote custom AngularJS modules and jQuery extensions
- Built a payment module for the Epay DK service
- Developed an image processing module exposed as a REST API

Senior Web Developer. Empower Network LLC. *Aug 2012 – Oct 2014*

- Built web applications on Zend Framework 2 and led a small developer team
- Developed a drag-and-drop application on Yii Framework and jQuery UI
- Integrated additional payment processors into existing products
- Built a REST API for a blog platform on Zend Framework 2
- Integrated social network sign-in and email subscription services
- Developed a FAQ search engine on Sphinx
- Built a Viddler OVP API client on Laravel
- Wrote tests with PHPUnit and Selenium

Web Developer. Frontex LLC. *Aug 2012 – March 2013*

- E-commerce applications on Magento
- Web applications on Drupal and Zend Framework 2
- Functional modules, plugins, and frontend integration
- Performance optimization module

Web Developer. Cupid PLC. *March 2012 – Aug 2012*

- Optimized code across dating sites
- Built the multi-site platform for WomenWeb
- Built an HR portal web application
- Developed components and modules for dating products
- Built a search module using the Neo4j graph database
- Applications in PHP and Ruby on Rails

Web Developer. WebProService LLC. *Feb 2008 – March 2012*

- E-commerce solutions, landing pages, administration panels, CRM
- PHP scripts for custom CMS systems
- Modules for Drupal, Joomla, WordPress
- 24/7 high-volume availability on Linux, Apache, PHP, MySQL
- Database normalization and query optimization
- Sites in PHP, MySQL, HTML, CSS, JavaScript, Perl