

## Buse G. A. Tekgül

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EDUCATION	<i>Doctor of Science (Technology)</i> (GPA - 4.00/5.00) Aalto University, Espoo, Finland	January 2019 - August 2022
	<ul style="list-style-type: none"><li>• Doctoral thesis: Securing Machine Learning: Streamlining Attacks and Defenses Under Realistic Adversary Models</li><li>• Key courses: Reinforcement Learning, Mobile Systems Security, Network Security, Object Oriented Programming with C++, Programming Parallel Computers, Research Seminar on Security and Privacy of Machine Learning</li></ul>	
	<i>Master Of Science (Technology)</i> (GPA - 4.46/5.00) Aalto University, Espoo, Finland	September 2015 - October 2017
	<ul style="list-style-type: none"><li>• Master's thesis: Anomaly-Based Intrusion Detection by Modeling Probability Distributions of Flow Characteristics</li><li>• Key courses: Artificial Intelligence, Convex Optimization for Engineers, Basic Principals of Machine Learning, Kernel Methods in Machine Learning, Machine Learning and Neural Networks, Machine Learning : Advanced Probabilistic Methods, Principals of Pattern Recognition, Algorithmic Methods of Data Mining, Statistical Signal Processing, Statistical Natural Language Processing, Information Security</li></ul>	
	<i>Bachelor of Science</i> Middle East Technical University (METU), Ankara, Turkey	September 2006 - June 2011

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TECHNOLOGY SKILLS	<i>Programming Languages:</i> Python (2.X & 3.X), PyTorch, Tensorflow, Keras, Theano, C++ <i>Software Engineering Practices:</i> Version control (Git), Trello, Scrum, CppLint, Doxygen. <i>Computing and Software:</i> Jupyter Notebook, Google Collab, PySyft, MuJoCo, OpenArgus, Rational Rhapsody, Eclipse IDE, Visual Studio.
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*Language:* English (Full professional proficiency), Turkish (Native), Finnish (Intermediate proficiency)

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## EXPERIENCE

*Security Researcher* November 2022 -  
Nokia Bell Labs, Espoo, Finland

- Part of Network Security Team led by Yoan Miche

*Graduate Intern* July 2022 - October 2022  
Intel Corporation, Espoo, Finland

- Part of Secure Intelligence Team led by Jason Martin
- Cost analysis of machine learning (ML) model extraction attacks and defenses

*Doctoral Researcher* October 2018 - August 2022  
Aalto University, Espoo, Finland

- Part of Secure Systems Group led by Prof. N. Asokan.
- Adversarial modelling of attacks against ML applications.
- Model evasion attacks via adversarial examples & defense mechanisms in image classification and deep reinforcement learning.
- ML model theft, model extraction attacks, and IP protection in realistic adversary models.
- Ownership resolution and ML model watermarking in federated learning applications
- Dataset watermarking and IP protection for public & private databases.

*Research Assistant* October 2017- October 2018  
Aalto University, Espoo, Finland

- Efficient and effective adversarial example generation methods for evading image classifiers
- Implementation of various neural network-based anomaly detection mechanisms in network traffic data.

*Trainee in IoT Security Research* May 2017-October 2017  
Nokia Bell Labs, Espoo, Finland

- Online feature ranking module via Support Vector Machines (SVM) in machine learning based intrusion detection systems.
- Application of neural networks for intrusion detection on rare application protocols that run on TCP.

*Thesis Worker* March 2016- March 2017  
Nokia Bell Labs, Espoo, Finland

- Evaluation of network traffic datasets, data preprocessing and sanitization by converting packet-level information to flow-level information, feature extraction, and hierarchical clustering.
- Modeling the statistical characteristics of sequential network flow data via Extreme Learning Machines (ELM).
- Detection of malicious network traffic based on the approximated statistical information within clustered data.

*Software Engineer*

June 2011 - August 2015

ASELSAN, Ankara, Turkey

- Design and implementation of image and video enhancement algorithms in thermal camera products: Contrast Limited Adaptive Histogram Equalization (CLAHE), multiple-camera image stitching, bad pixel detection and mitigation)
- Implementation of automatic focusing in thermal cameras.
- Design and implementation of communication infrastructure between submodules of hand-held cameras.

*Candidate Engineer*

December 2010 - July 2011

ASELSAN, Ankara, Turkey

- Adaptive contrast enhancement techniques in thermal images
- Graphical user interface, software testing, client-server setup for various defense products.

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## TEACHING

*CS-E4001 Research Seminar on Security and Privacy of Machine Learning  
Course Assistant, Aalto University (Spring 2021, Fall 2019)*

*CS-E4000 Seminar in Computer Science: Internet, Data and Things  
Student Tutor, Aalto University (Spring and Fall 2021, Spring 2019)*

*CS-E4310 Mobile Systems Security  
Course Assistant, Aalto University (Spring 2020)*

*CS-E4800 Artificial Intelligence  
Course Assistant, Aalto University (Spring 2018)*

*CS-E4800 Deep Learning  
Course Assistant, Aalto University (Spring 2017)*

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## PATENTS

*Sparse Sampling Video Contrast Enhancement Apparatus and Method  
March 2015*

Video contrast enhancement algorithm for low power processors by sparse

sampling the original histogram with the help of a massively parallel coprocessor. Patent filed on March 2015 as a part of POCS Based Depth Super-Resolution (POCS-DSR) project funded by European Commission.

## VISION PAPER

*Private AI Collaborative Research Institute, Vision, Challenges & Opportunities*  
2021

Co-author of the vision paper owned by Private AI Collaborative Institute.  
Contributed to section 3.5: *Protecting the Intellectual Property and Forensic*.

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## RESEARCH EFFORTS

### Publications

- **Atlı Tekgül, Buse Gül.** *Securing Machine Learning: Streamlining Attacks and Defenses Under Realistic Adversary Models..* Doctoral Thesis, Aalto University. (2022).
- **Tekgul, Buse G. A.,** Shelly Wang, Samuel Marchal, and N. Asokan. *Real-time Adversarial Perturbations against Deep Reinforcement Learning Policies: Attacks and Defenses* arXiv preprint arXiv:2106.08746, will appear in the proceedings of ESORICS 2022.
- **Tekgul, Buse G. A.,** and N. Asokan. *On the Effectiveness of Dataset Watermarking.* In Proceedings of the 2022 ACM on International Workshop on Security and Privacy Analytics. 2022.
- Szyller, Sebastian, **Buse Gul Atli,** Samuel Marchal, and N. Asokan. *DAWN: Dynamic Adversarial Watermarking of Neural Networks.* In Proceedings of the 29th ACM International Conference on Multimedia (pp. 4417-4425). 2021
- **Tekgul, Buse G. A.,** Yuxi Xia, Samuel Marchal, and N. Asokan. *WAFFLE: Watermarking in Federated Learning.* In 40th International Symposium on Reliable Distributed Systems (SRDS), pp. 310-320. IEEE, 2021.
- **Atli, Buse Gul,** Sebastian Szyller, Mika Juuti, Samuel Marchal, and N. Asokan. *Extraction of Complex DNN Models: Real Threat or Boogeyman?* In International Workshop on Engineering Dependable and Secure Machine Learning Systems, pp. 42-57. Springer, Cham, 2020.
- Juuti, Mika, **Buse Gul Atli,** and N. Asokan. *Making Targeted Black-box Evasion Attacks Effective and Efficient.* In Proceedings of the 12th ACM Workshop on Artificial Intelligence and Security, pp. 83-94. 2019.
- Monshizadeh, Mehrnoosh, Vikramajeet Khatri, **Buse Gul Atli,** Raimo Kantola, and Zheng Yan. *Performance Evaluation of a Combined Anomaly Detection Platform.* IEEE Access 7 (2019): 100964-100978.
- **Atli, Buse Gul,** Yoan Miche, Aapo Kalliola, Ian Oliver, Silke Holtmanns, and Amaury Lendasse. *Anomaly-based Intrusion Detection Using Extreme Learning Machine and Aggregation of Network Traffic Statistics in Probability Space.* Cognitive Computation 10, no. 5 (2018): 848-863.

- Monshizadeh, Mehrnoosh, Vikramajeet Khatri, **Buse Atli**, and Raimo Kantola. *An Intelligent Defense and Filtration Platform for Network Traffic*. In International Conference on Wired/Wireless Internet Communication, pp. 107-118. Springer, Cham, 2018.
- **Atli, Buse Gul**, Yoan Miche, and Alexander Jung. *Network Intrusion Detection Using Flow Statistics*. In 2018 IEEE Statistical Signal Processing Workshop (SSP), pp. 70-74. IEEE, 2018.
- Kalliola, Aapo, Yoan Miche, Ian Oliver, Silke Holtmanns, **Buse Atli**, Amaury Lendasse, Kaj-Mikael Bjork, Anton Akusok, and Tuomas Aura. *Learning Flow Characteristics Distributions with ELM for Distributed Denial of Service Detection and Mitigation*. In Proceedings of ELM-2016, pp. 129-143. Springer, Cham, 2018.

### Supervisions

- Master's thesis advisor to MSc. Shelly Wang, 2022  
*Title:* Security and Ownership Verification in Deep Reinforcement Learning  
*Supervisor:* Prof. N. Asokan (Aalto University, Espoo, Finland & University of Waterloo, Canada)
- Master's thesis advisor to MSc. Minh Hoang, 2021  
*Title:* Dataset Watermarking  
*Supervisor:* Prof. N. Asokan (Aalto University, Espoo, Finland & University of Waterloo, Canada)
- Master's thesis advisor to Yuxi Xia, 2020  
*Title:* Watermarking Federated Deep Neural Network Models  
*Supervisor:* Prof. N. Asokan (Aalto University, Espoo, Finland & University of Waterloo, Canada)
- Advisor for summer internship, MSc. Yujia Guo, 2022  
*Topic:* Integrating watermarking feature into Intel OpenFL, watermarking in adversarial settings in federated learning

### EXTRA-CURRICULAR ACTIVITIES

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Bilkent University Musical Club, <i>Actress, vocal, and vocal coach</i>	August 2014 - January 2015
Company Musicals, <i>Actress, vocal and assistant director</i>	August 2011 - September 2014
METU Science Fiction and Fantasy Club (SFFS), <i>Active member, vice president</i>	September 2006 - June 2011