

Willian T. Lunardi

AI Research Scientist at TII

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EDUCATION

University of Luxembourg	Luxembourg
<i>Ph.D. in Computer Science (with Highest Distinction & Thesis Award)</i>	2016 – 2020
Pontifical Catholic University of Rio Grande do Sul	RS, Brazil
<i>M.Sc. in Computer Science</i>	2014 – 2016
University of Passo Fundo	RS, Brazil
<i>B.Sc. in Computer Science</i>	2010 – 2014

PROFESSIONAL EXPERIENCE

Research Scientist	Jun 2021 – Present
<i>Technology Innovation Institute</i>	Abu Dhabi, UAE
Principal Researcher	Jan 2023 – Present
<ul style="list-style-type: none">Drove research in AI safety, image segmentation, graph regression, out-of-distribution (OOD) detection, and anomaly detection, with emphasis on developing novel models and advancing the state of the art.Worked closely with academic partners on joint research projects, shaping technical direction, co-authoring publications, and aligning efforts with a shared long-term vision.Built and deployed ML systems that translated research into practical applications.	
Senior Researcher	Jun 2021 – Jan 2023
<ul style="list-style-type: none">Conducted research in OOD detection, anomaly detection, and AI safety.Worked on significant projects such as:<ul style="list-style-type: none">- Designing contrastive learning methods to enhance in-distribution representation learning.- Implementing adversarial training techniques for robust anomaly detection.- Developing hyperspherical models for voice verification.Optimized machine learning models for deployment on resource-constrained devices.Collaborated with cross-disciplinary teams to design and implement AI systems.	
Research Associate	Jun 2020 – Jun 2021
<i>University of Luxembourg</i>	Luxembourg
<ul style="list-style-type: none">Researched neural combinatorial optimization to address complex logistical and industrial optimization challenges.Developed predictive maintenance models that enhanced fault detection accuracy and efficiency.Collaborated with industry partners to translate research into practical solutions for optimization/maintenance.	
Doctoral Researcher	Jun 2016 – Jun 2020
<i>University of Luxembourg</i>	Luxembourg
<ul style="list-style-type: none">Developed advanced combinatorial optimization models for complex scheduling and logistics problems, including neural optimization methods.Published in top-tier journals and conferences, contributing novel approaches in optimization/operations research.Applied research in collaboration with academia and industry, delivering practical solutions.	

TECHNICAL SKILLS

Languages: Python, C++, Javascript, C#, and Java.

Libraries and Frameworks: PyTorch, Transformers, PyTorch Geometric, Torchaudio, Torchvision, PyTorch Lightning, Scikit-learn, SciPy, Numpy, Pandas, tsai, Matplotlib, Plotly, Seaborn, Albumentations, Optuna.

Others: OpenMP, Boost (C++), Unity 3D (C#), p5js (JS), processing (Java).

ADDITIONAL INFORMATION

Dual Citizenship: Brazil and Italy.

Languages: Portuguese (native), English (fluent).

Relocation: Open to relocation globally.

SELECTED PUBLICATIONS

- [2025] **W. T. Lunardi**, A. Banabila, D. Herzalla, *et al.*, “Contrastive Representation Modeling for Anomaly Detection,” in *European Conference on Artificial Intelligence (ECAI)*, 2025.
- [2025] D. Herzalla, **W. T. Lunardi**, and M. Andreoni, “Graph Neural Networks for Jamming Source Localization,” in *Machine Learning and Knowledge Discovery in Databases (ECML PKDD)*, 2025.
- [2025] G. Gebrehans, N. Ilyas, K. Eledlebi, *et al.*, “Generative Adversarial Networks for Dynamic Malware Behavior: A Comprehensive Review, Categorization, and Analysis,” *IEEE Transactions on Artificial Intelligence*, 2025.
- [2025] X. Tan, J. Sundar, R. Bruzzone, *et al.*, “Secure Safety Filter: Towards Safe Flight Control under Sensor Attacks,” in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2025.
- [2025] H. Wang, Z. Yang, S. Park, *et al.*, “SoundBoost: Effective RCA and Attack Detection for UAV via Acoustic Side-Channel,” in *IEEE/IFIP International Conference on Dependable Systems*, 2025.
- [2024] M. Andreoni, **W. T. Lunardi**, G. Lawton, *et al.*, “Enhancing Autonomous System Security and Resilience with Generative AI: A Comprehensive Survey,” *IEEE Access*, 2024.
- [2024] A. S. Ali, G. Singh, **W. T. Lunardi**, *et al.*, “RF Jamming Dataset: A Wireless Spectral Scan Approach for Malicious Interference Detection,” *IEEE Communications Magazine*, 2024.
- [2023] **W. T. Lunardi**, M. A. Lopez, and J.-P. Giacalone, “ARCADE: Adversarially Regularized Convolutional Autoencoder for Network Anomaly Detection,” *IEEE Transactions on Network and Service Management, Special Issue on Machine Learning and Artificial Intelligence*, vol. 20, no. 2, pp. 1305–1318, 2023, [URL].
- [2023] M. Gallacher, M. A. Sankar, **W. T. Lunardi**, *et al.*, “Towards speaker identification on resource-constrained embedded devices,” in *Proceedings of the ACM Conference on Embedded Networked Sensor Systems*, 2023, [URL].
- [2023] D. Herzalla, **W. T. Lunardi**, and M. Andreoni, “TII-SSRC-23 Dataset: Typological Exploration of Diverse Traffic Patterns for Intrusion Detection,” *IEEE Access*, 2023, [URL].
- [2022] A. R. B. Nabila, E. K. Viegas, and **W. T. Lunardi**, “A Generative Adversarial Network-based Attack for Audio-based Condition Monitoring Systems,” in *Proceedings of the IEEE Consumer Communications & Networking Conference*, 2022, [URL].
- [2022] A. S. Ali, **W. T. Lunardi**, L. Bariah, *et al.*, “Deep Reinforcement Learning Based Anti-Jamming Using Clear Channel Assessment Information in a Cognitive Radio Environment,” in *Proceedings of the IEEE International Conference on Advanced Communication Technologies and Networking*, 2022, [URL].
- [2022] A. S. Ali, M. Baddeley, L. Bariah, *et al.*, “JamRF: Performance Analysis, Evaluation, and Implementation of RF Jamming Over Wi-Fi,” *IEEE Access*, vol. 10, pp. 133 370–133 384, 2022, [URL].
- [2022] A. S. Ali, M. Baddeley, L. Bariah, *et al.*, “Performance Analysis and Evaluation of RF Jamming in IoT Networks,” in *Proceedings of the IEEE Global Communications Conference*, 2022, [URL].
- [2021] **W. T. Lunardi**, E. G. Birgin, D. P. Ronconi, *et al.*, “Metaheuristics for the Online Printing Shop Scheduling Problem,” *European Journal of Operational Research*, vol. 293, no. 2, pp. 419–441, 2021, [URL].
- [2021] M. A. Lopez, M. Baddeley, **W. T. Lunardi**, *et al.*, “Towards Secure Wireless Mesh Networks for UAV Swarm Connectivity: Current Threats, Research, and Opportunities,” in *Proceedings of the IEEE International Conference on Distributed Computing in Sensor Systems*, 2021, [URL].
- [2020] **W. T. Lunardi**, E. G. Birgin, P. Laborie, *et al.*, “Mixed Integer Linear Programming and Constraint Programming Models for the Online Printing Shop Scheduling Problem,” *Computers & Operations Research*, vol. 123, p. 105 020, 2020, [URL].
- [2019] **W. T. Lunardi**, H. Voos, and L. H. Cherri, “An Effective Hybrid Imperialist Competitive Algorithm and Tabu Search for an Extended Flexible Job Shop Scheduling Problem,” in *Proceedings of the ACM Symposium on Applied Computing*, 2019, [URL].
- [2019] H. de Faria Jr, **W. T. Lunardi**, and H. Voos, “A Parallel Multi-Population Biased Random-Key Genetic Algorithm for Electric Distribution Network Reconfiguration,” in *Proceedings of the ACM Genetic and Evolutionary Computation Conference*, 2019, [URL].
- [2018] **W. T. Lunardi** and H. Voos, “An Extended Flexible Job Shop Scheduling Problem with Parallel Operations,” *ACM SIGAPP Applied Computing Review*, vol. 18, no. 2, pp. 46–56, 2018, [URL].
- [2018] **W. T. Lunardi**, H. Voos, and L. H. Cherri, “An Imperialist Competitive Algorithm for a Real-World Flexible Job Shop Scheduling Problem,” in *Proceedings of the IEEE International Conference on Emerging Technologies & Factory Automation*, 2018, [URL].
- [2018] **W. T. Lunardi**, L. H. Cherri, and H. Voos, “A Mathematical Model and a Firefly Algorithm for an Extended Flexible Job Shop Problem with Availability Constraints,” in *Proceedings of the Springer International Conference on Artificial Intelligence and Soft Computing*, 2018, [URL].
- [2018] **W. T. Lunardi** and H. Voos, “Comparative Study of Genetic and Discrete Firefly Algorithm for Combinatorial Optimization,” in *Proceedings of the ACM Annual Symposium on Applied Computing*, 2018, [URL].

- [2016] **W. T. Lunardi**, L. Amaral, S. Marczak, *et al.*, “Automated Decision Support IoT Framework,” in *Proceedings of the IEEE International Conference on Emerging Technologies & Factory Automation*, 2016, [URL].
- [2016] L. A. Amaral, E. De Matos, R. T. Tiburski, *et al.*, “Middleware Technology for IoT Systems: Challenges and Perspectives Toward 5G,” in *Internet of Things (IoT) in 5G Mobile Technologies*. Springer, 2016, pp. 333–367, [URL].
- [2015] E. de Matos, L. A. Amaral, R. Tiburski, *et al.*, “Context-Aware System for Information Services Provision in the Internet of Things,” in *Proceedings of the IEEE Conference on Emerging Technologies & Factory Automation*, 2015, [URL].
- [2015] **W. T. Lunardi**, E. de Matos, R. Tiburski, *et al.*, “Context-Based Search Engine for Industrial IoT: Discovery, Search, Selection, and Usage of Devices,” in *Proceedings of the IEEE Conference on Emerging Technologies & Factory Automation*, 2015, [URL].

TO APPEAR

- [2025] M. Hull, H. Yang, P. Mehta, *et al.*, “3D Gaussian Splat Vulnerabilities,” *arXiv preprint arXiv:2506.00280*, 2025.
- [2025] M. Hull, H. Wang, M. Lau, *et al.*, “RenderBender: A Survey on Adversarial Attacks Using Differentiable Rendering,” *arXiv preprint arXiv:2411.09749*, 2025.
- [2025] M. Lau, H. Wang, A. Helbling, *et al.*, “Non-Robust Features are Not Always Useful in One-Class Classification,” *arXiv preprint arXiv:2407.06372*, 2025.