

# Willian T. Lunardi

AI Research Scientist at TII

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## EDUCATION

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

## PROFESSIONAL EXPERIENCE

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

## 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

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- [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].

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## 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.