Willian T. Lunardi

Principal Researcher at TII

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EDUCATION

Ph.D. in Computer Science, Thesis with Distinction — 2016 – 2020
University of Luxembourg — Luxembourg

M.Sc. in Computer Science — 2014 – 2016
Pontifical Catholic University of Rio Grande do Sul — RS, Brazil

B.Sc. in Computer Science — 2010 – 2014
University of Passo Fundo — RS, Brazil

PROFESSIONAL EXPERIENCE

Principal Researcher — Apr 2023 – Present
Technology Innovation Institute — Abu Dhabi, UAE

- Lead research initiatives in AI safety, out-of-distribution detection, anomaly detection, and graph learning, defining technical direction across multiple projects.
- Technical lead for teams of researchers and engineers, driving research execution from conceptualization to publication and deployment.
- Produced publications in premier venues including IJCAI, ECAI, ECML-PKDD (Best Paper Award), IEEE TAI.
- Designed and deployed ML systems translating theoretical advances into real-world applications.

Senior Researcher — Jun 2021 – Apr 2023
Technology Innovation Institute — Abu Dhabi, UAE

- Led development of contrastive learning and adversarial training methods for out-of-distribution and anomaly detection.
- Designed and implemented hyperspherical and robust representation models with extensive empirical validation.
- Contributed to peer-reviewed publications and collaborated with cross-disciplinary research teams.

Research Associate — Jun 2020 – May 2021
University of Luxembourg — Luxembourg

- Conducted independent research in neural combinatorial optimization for complex logistical/industrial systems.
- Developed predictive maintenance and optimization models deployed in real industrial settings.
- Co-supervised PhD and MSc students, providing technical guidance on model development, experimentation, and publications.
- Led collaboration with industry partners, translating operational challenges into research problems and aligning project deliverables with stakeholder needs.

Doctoral Researcher — Jul 2016 – Jun 2020
University of Luxembourg — Luxembourg

- Developed advanced mathematical models for scheduling problems, including neural combinatorial methods.
- Published in top-tier journals and conferences, contributing novel approaches in optimization/operations research.
- Applied research in collaboration with academia and European industry, delivering practical solutions.

TECHNICAL SKILLS

Programming: Python, C++, Java.
ML Frameworks: PyTorch, PyTorch Lightning, PyTorch Geometric, Transformers.
Scientific Computing: NumPy, SciPy, Scikit-learn, Pandas.

ADDITIONAL INFORMATION

Dual Citizenship: Brazil and Italy.
Languages: Portuguese (native), English (fluent), Italian (basic).
Relocation: Open to relocation globally.

PUBLICATIONS

†*Equal contribution.*

[2025] M. Hull, H. Wang, M. Lau, *et al.*, "RenderBender: A Survey on Adversarial Attacks Using Differentiable Rendering," in *International Joint Conference on Artificial Intelligence (IJCAI)*, 2025, [URL].

[2025] **W. T. Lunardi**, A. Banabila, D. Herzalla, *et al.*, "Contrastive Representation Modeling for Anomaly Detection," in *European Conference on Artificial Intelligence (ECAI)*, 2025, [URL].

[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)*, **Best Paper Award**, 2025, [URL].

[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, [URL].

[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, [URL].

[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, [URL].

[2025] M. Hull, H. Yang, P. Mehta, *et al.*, "3D Gaussian Splat Vulnerabilities," *arXiv preprint arXiv:2506.00280*, 2025, [URL].

[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, [URL].

[2024] G. Ghebrehans, **W. T. Lunardi**, and E. Damiani, "Boosting GAN Performance: Feature Transformation for Heavy-Tailed Malware Data Generation," in *International Conference on Security and Privacy in Communication Systems*, 2024, [URL].

[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, [URL].

[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, [URL].

[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*, 2023, [URL].

[2023] M. Gallacher, M. A. Sankar, **W. T. Lunardi**, *et al.*, "Towards Speaker Identification on Resource-Constrained Embedded Devices," in *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. Banabila, E. K. Viegas, and **W. T. Lunardi**, "Generative Adversarial Network-based Attack for Audio-based Condition Monitoring Systems," in *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 *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*, 2022, [URL].

[2022] A. S. Ali, M. Baddeley, L. Bariah, *et al.*, "Performance Analysis and Evaluation of RF Jamming in IoT Networks," in *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*, 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 *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*, 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 *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 *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*, 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 *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 *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 *ACM Annual Symposium on Applied Computing*, 2018, [URL].

[2016] **W. T. Lunardi**, L. Amaral, S. Marczak, *et al.*, "Automated Decision Support IoT Framework," in *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*. 2016, [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 *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 *IEEE Conference on Emerging Technologies & Factory Automation*, 2015, [URL].