Tiago Tamagusko

Postdoctoral Researcher & Assistant Professor (PhD in Transport Systems)

Specializing in AI-driven transportation safety, computer vision, edge AI, and geospatial analytics.

Profile

Postdoctoral Researcher at University College Dublin and Assistant Professor at the Military Institute of Engineering (IME), Brazil. Specializing in active transportation safety and AI-driven multimodal traffic monitoring, with expertise in computer vision, edge AI, spatio-temporal modeling, and geospatial analytics. Research integrates transportation engineering with artificial intelligence and privacy-preserving analytics to advance safety assessment for pedestrians, cyclists, and micromobility users.

Research Interests

- Active transportation safety: AI-driven detection and risk assessment using computer vision and vision-language models
- Computer vision and edge AI for transportation: real-time multimodal traffic monitoring, privacy-preserving on-device analytics
- Spatio-temporal modeling and sensor fusion: traffic cameras, LiDAR, telemetry, and GIS data
- Translational research and pilot deployments: AI systems with transportation agencies, evidence-based policy
- Machine learning for infrastructure systems: deep learning, transfer learning, synthetic data generation

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Experience

2025 Assistant Professor (non-permanent), *Military Engineering Institute (IME), Brazil.*
(Ongoing, remote from Ireland)

- Doctoral-level courses: *Artificial Intelligence Applied to Transportation* and *Urban Data Science and Deep Learning*
- Curriculum integrating civil engineering with advanced computational methods, hands-on AI implementation

2024 Postdoctoral Research Fellow, *University College Dublin, Ireland.*
(Ongoing)

- AI analytics and data science for EU Horizon Europe project (REALLOCATE): 10+ European cities, 16 living labs.
- Lead developer of CAMINA: open-source edge AI framework for real-time multimodal traffic counting on Raspberry Pi (pedestrians, cyclists, e-scooters, freight vehicles)
- Developing vision-language model algorithms for urban environment analysis (COLOURWAYS): cycling risk, school commute safety, building vacancy detection
- Supervised undergraduate research students; developed EIT Urban Mobility MOOC on Geospatial Data Science (100+ learners)

2024 Researcher & Facilitator, *The Alan Turing Institute, United Kingdom.*
(1 month)

- Facilitating a multidisciplinary team of researchers with Transport for London; LiDAR point cloud processing and computer vision for underground railway safety monitoring

2020-2024 PhD Researcher, *CITTA Research Centre, University of Coimbra, Portugal.*

- Machine learning for infrastructure performance prediction; transfer learning and synthetic data generation for civil engineering
- Deep learning architectures for accident detection; optimization frameworks for pavement maintenance

2020-2022 Data Scientist & Technology Coordinator, *JEST, Portugal.*

- Coordinated 4+ applied data science projects including real-time computer vision monitoring and GDPR-compliant NLP solutions
- Managed multidisciplinary teams; translated research methods into operational systems

2013-2018 Road Infrastructure Engineer & Researcher, *LabTrans/UFSC, Brazil.*

- Co-developed Brazilian national standard for high-speed weigh-in-motion (HS-WIM) technology
- Design, deployment, and commissioning of 35 HS-WIM stations across Brazil's federal highway network
- Spatial analysis and systems modeling for transport infrastructure monitoring; collaboration with DNIT

Teaching

2025 Doctoral Course Instructor, *Military Engineering Institute (IME), Brazil*
Courses: *AI Applied to Transportation*; *Urban Data Science and Deep Learning*

2024-2025 Undergraduate Supervisor, *University College Dublin, Ireland*
Research projects in sustainable mobility and infrastructure

2024 Online Course Developer, *EIT Urban Mobility*
8-hour MOOC on Geospatial Data Science for Sustainable Urban Mobility — 100+ international learners

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Projects

2025–present CAMINA — Multimodal Traffic Monitoring Framework, *UCD*
Lead Developer. Open-source edge AI framework for real-time traffic counting on Raspberry Pi. Privacy by design — all inference on-device. Targeting 50+ deployments with real-time dashboard.

2024–present REALLOCATE Mobility, *UCD / EU Horizon Europe*
Researcher. Sustainable mobility interventions across 10+ European cities. Spatial analysis and evidence-based evaluation of street space reallocation. reallocatemobility.eu

2024–present COLOURWAYS, *UCD*
Researcher. Vision-language model algorithms for urban environment analysis: cycling risk, school commute safety, building vacancy. sdl-buildingstories.vercel.app

2024–2025 Bike Library, *NTA Ireland*
Data Scientist. Behavioral change evaluation for modal shift to active transport; spatial analysis and survey research. bikelibrary.eu

2024 Transport for London — Underground Railway Safety, *Alan Turing Institute*
Researcher & Facilitator. Computer vision + 3D spatial analysis for underground railway safety monitoring.

2023 CycleAI — Lisboa+, *VoxPop Lisboa / EU*
Scientific Advisor & Data Scientist. Computer vision system mapping cycling safety in Greater Lisbon. voxpoplisboa.pt

2013–2018 HS-WIM PIAF, *LabTrans / DNIT Brazil*
Transport Systems Engineer. 35 HS-WIM station deployments; Brazilian national WIM standard. labtrans.ufsc.br

Education

2020-2024 Ph.D., Transport Systems, *University of Coimbra*, Portugal. Awarded with Highest Distinction.
Thesis: “Artificial Intelligence applied to Transport Infrastructure Management”

2018-2020 M.Sc., Urban Mobility Management, *University of Coimbra*, Portugal.
Dissertation: “Airport Pavement Design”

2008-2013 B.Sc., Civil Engineering, *Federal University of Santa Catarina*, Brazil.

2003-2004 Technical Degree, Telecommunications, *IFSC*, Brazil.

2002-2003 Technical Degree, Computer Networking, *IFSC*, Brazil.

Publications

Galaktionova, A., Istrate, A.-L., Tamagusko, T., & Carroll, P. (2026). Street vitality and traffic risk: A multiscale analysis of Barcelona and Warsaw. *Accident Analysis & Prevention*, *228*, 108393. https://doi.org/10.1016/j.aap.2026.108393

Tamagusko, T., & Ferreira, A. (2026). Asphalt pavement performance prediction using ensemble learning methods. In *Lecture Notes in Mobility* (pp. 153–159). Springer Nature Switzerland.

Tamagusko, T., & Ferreira, A. (2025). Pavement performance prediction using machine learning: Supervised learning with tree-based algorithms. *Transportation Research Procedia*, *82*, 2521–2531. https://doi.org/10.1016/j.trpro.2024.12.202

Tamagusko, T., Gomes Correia, M., & Ferreira, A. (2024). Machine learning applications in road pavement management: A review, challenges, and future directions. *Infrastructures*, *9*(12). https://doi.org/10.3390/infrastructures9120213 — *Cited: 45*

Tamagusko, T., & Ferreira, A. (2023). Machine learning for prediction of the international roughness index on flexible pavements: A review, challenges, and future directions. *Infrastructures*, *8*(12), 170. https://doi.org/10.3390/infrastructures8120170 — *Cited: 54*

Tamagusko, T., Gomes Correia, M., Rita, L., Bostan, T.-C., Hasselwander, M., & Ferreira, A. (2023). Data-driven approach for urban micromobility enhancement through safety mapping and intelligent route planning. *Smart Cities*, *6*(4), 2035–2056. https://doi.org/10.3390/smartcities6040094 — *Cited: 28*

Rita, L., Peliteiro, M., Bostan, T.-C., Tamagusko, T., & Ferreira, A. (2023). Using deep learning and Google Street View imagery to assess and improve cyclist safety in London. *Sustainability*, *15*(13), 10270. https://doi.org/10.3390/su151310270 — *Cited: 22*

Tamagusko, T., & Ferreira, A. (2023). Optimizing pothole detection in pavements: A comparative analysis of deep learning models. *Engineering Proceedings*, *36*(1), 11. https://doi.org/10.3390/engproc2023036011 — *Cited: 19*

Tamagusko, T., Correia, M., Huynh, M., & Ferreira, A. (2022). Deep learning applied to road accident detection with transfer learning and synthetic images. *Transportation Research Procedia*, *64*, 90–97. https://doi.org/10.1016/j.trpro.2022.09.012 — *Cited: 53*

Hasselwander, M., Tamagusko, T., Bigotte, J. F., Ferreira, A., Mejia, A., & Ferranti, E. J. S. (2021). Building back better: The COVID-19 pandemic and transport policy implications for a developing megacity. *Sustainable Cities and Society*, *69*, 102864. https://doi.org/10.1016/j.scs.2021.102864 — *Cited: 139*

Tamagusko, T., & Ferreira, A. (2020). Data-driven approach to understand the mobility patterns of the Portuguese population during the COVID-19 pandemic. *Sustainability*, *12*(22), 9775. https://doi.org/10.3390/su12229775 — *Cited: 47*

Tamagusko, T., & Ferreira, A. (2020). Software tools for airport pavement design. In *WorldCIST 2020, AISC* (Vol. 1160). Springer. https://doi.org/10.1007/978-3-030-45691-7_7 — *Cited: 8*

Scientific Community

- Peer Reviewer (30+ papers): Springer, Springer Nature, Elsevier, ICE, MDPI journals
- Conference Reviewer: TRA2026 (Transport Research Arena)
- COST Action Member: CA24141 — CRIPI (Climatic Resilience Initiative for Pavement Infrastructure)

Awards

2024 PhD awarded with Highest Distinction, University of Coimbra

2020-2024 PhD Fellowship, Portuguese Foundation for Science and Technology (FCT)

2023 2nd Place — Location Intelligence Hackathon

2022 3rd Place — Transatlantic AI Hackathon

2022 Top Team / Finalist — Nordic AI & Open Data Hackathon

2019-2020 Merit Board — Top 5% students, University of Coimbra

2018-2019 Merit Board — Top 5% students, University of Coimbra

Skills

Transportation: Active transportation safety assessment, ITS deployment, traffic simulation (PTV Vissim/Visum), pavement engineering
Computer Vision & Edge AI: YOLO, OpenCV, LiDAR point clouds, Raspberry Pi/ESP32 edge inference, vision-language models
Data Science & ML: Python, R, SQL, scikit-learn, XGBoost, TensorFlow, PyTorch, Docker, AWS, GitHub Actions
Geospatial: QGIS, ArcGIS, PostGIS, geopandas, spatial statistics, transport network analysis
Languages: Portuguese (native), English (fluent)

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