André Luiz Barbosa Nunes da Cunha, Ph.D.

Assistant Professor of Civil Engineering

1 PERSONAL DETAILS

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Research Keywords Transport Modelling, Artificial Intelligence, Computer Vision, Urban Mobility, Accessibility, Vulnerability, Smart Cities, Simulation, Logistics

2 EXECUTIVE SUMMARY

André Luiz Barbosa Nunes da Cunha, Ph.D. is an Assistant Professor of Civil Engineering at the University of São Paulo (USP), Brazil. He specializes in Transport Modelling, Artificial Intelligence, Urban Mobility, and Traffic Simulation. His career blends academic rigor with practical industry consultancy, specifically in highway safety and infrastructure design.

2.1 Key Highlights

Academic Leadership Tenured-track professor at USP with international visiting positions in Australia (UniMelb), Croatia (UNIZG), Portugal (UMINHO), and Germany (TUM). *All list of positions on Sec.* **??**
Research Funding Secured over BRL 18.6 million (approx. USD 3.38M) in research grants for projects spanning intelligent transport systems and sustainable mobility solutions. *All list of research funding at Sec.* **??**
Industry Impact Serves as a technical consultant for major highway concessionaires in Brazil (CCR, ARTERIS), focusing on the design and validation of truck escape ramps.
Supervision Has supervised over 60 students, including 6 PhD and 15 MSc candidates, alongside numerous undergraduate projects.
Technical Expertise Proficient in AI tools (OpenCV, CrewAI), programming (Python, R, C++), and traffic simulation software (VISSIM, AIMSUN, TSIS-CORSIM).

2.2 Selected Key Publications

1. E-Bikes & Network Impacts (2026): "How Do E-Bikes Measure Up? Analyzing Speed Differences and Network Impacts of São Paulo's Bikesharing System" — Transportation.
2. Accessibility & Equity (2025): "E-bikes' impact on job accessibility and equity in São Paulo and Rio" — Transportation Research Part D: Transport and Environment.
3. AI & Crash Prediction (2023): "Integrating a non-gridded space representation into a graph neural networks model for citywide short-term crash risk prediction" — Urban Informatics.
4. Network Vulnerability (2021): "Measuring urban road network vulnerability to extreme events: An application for urban floods" — Transportation Research Part D: Transport and Environment.

3 EDUCATION

1. **Ph.D. in Transportation Engineering** Nov. 2013
   University of São Paulo (USP), São Carlos School of Engineering (EESC), Brazil
   Thesis: "`Automatic system for vehicular traffic parameters using OpenCV`"
   Advisor: Prof. José Reynaldo Anselmo Setti
   DOI: 10.11606/T.18.2013.tde-19112013-165611
   Funded by National Council for Scientific and Technological Development (CNPq), Brazil.
2. **M.Sc. in Transportation Engineering** Oct. 2007
   University of São Paulo (USP), São Carlos School of Engineering (EESC), Brazil
   Thesis: "`Evaluation of performance measurement impact on truck passenger car equivalents`"
   Advisor: Prof. José Reynaldo Anselmo Setti
   DOI: 10.11606/D.18.2007.tde-27112007-094400
   Funded by National Council for Scientific and Technological Development (CNPq), Brazil.
3. **B.S. in Civil Engineering** Feb. 2004
   Federal University of Mato Grosso do Sul (UFMS), Campo Grande, Brazil
   GPA: 3.79/4.00 → (9.5/10.0)

4 EXPERIENCE

4.1 Academic Appointments

1. **University of São Paulo (USP-EESC)** Jul. 2014 – present
   Assistant Professor (MS-3.2) *São Carlos, Brazil*
   Tenured-track position, Full Dedication to Teaching and Research Regime (RDIDP)
2. **University of Zagreb (UNIZG)** Apr. 2022
   Visiting Lecturer *Zagreb, Croatia*
   ERASMUS+ Program: Virtual Teaching Mobility Agreement (Workload: 8h)
3. **University of Melbourne (UniMelb)** Jan. 2020 – Dec 2020
   Visiting Professor *Melbourne, Australia*
   CAPES-Print Program – Junior Visiting Professor No. 88887.371506/2019-00
4. **University of Zagreb (UNIZG)** Jun. 2018
   Visiting Lecturer *Zagreb, Croatia*
   ERASMUS+ Program: Higher Education Mobility Agreement (UNIZG/USP-EESC) (Workload: 13h)
5. **University of São Paulo (USP)** Sep. 2017
   Visiting Professor *São Paulo, Brazil*
   TUM-USP `Workshop on Sustainable Mobility` funded by BAYLAT/FAPESP Call
6. **University of Minho (UMINHO)** Jul. 2017
   Visiting Professor *Guimarães, Portugal*
   Mission funded by CAPES-FCT n. 39/2014
7. **Technical University of Munich (TUM)** Nov. 2016 – Dec. 2016
   Visiting Professor *Munich, Germany*
   TUM-USP `Workshop on Sustainable Mobility` funded by BAYLAT/FAPESP Call
8. **São Paulo State University (UNESP)** Mar. 2010 – Dec. 2010
   Adjunct Professor *Bauru, Brazil*
   College of Engineering Bauru (FEB), Civil Engineering undergraduate course.
9. **University of São Paulo (USP-EESC)** Feb. 2009 – Jun. 2009
   Graduate Assistant *São Carlos, Brazil*
10. **University of São Paulo (USP-EESC)** Feb. 2006 – Jun. 2006
    Graduate Assistant *São Carlos, Brazil*

4.2 Professional Experience

1. **CCR Highway RioSP (Via Dutra)** Apr. 2025 – Nov. 2025
   Technical Consultant – Transportation Engineering Projects *São Paulo, Brazil*
   Validate the operational speed of trucks on Via Dutra's new descending lane, in Rio de Janeiro (BR-116 highway).

2. **CCR Highway RioSP (Via Dutra)** Jun. 2023 – Dec. 2023
   Technical Consultant – Transportation Engineering Projects *São Paulo, Brazil*
   Evaluated site conditions to determine optimal placement of truck escape ramps on Via Dutra's new descending lane, in Rio de Janeiro (BR-116 highway). Simulated operational scenarios to validate design effectiveness.

3. **ARTERIS Autopista Litoral Sul (ALS)** Nov. 2019 – Dec. 2019
   Technical Consultant – Transportation Engineering Projects *Curitiba, Brazil*
   Directed field testing of BR-376's km 667 truck escape ramp, developing protocols and analyzing performance metrics for loaded vehicles at multiple approach speeds, with findings implemented in concessionaire safety standards[1]. Delivered a detailed technical assessment of ramp functionality under real-world conditions.

4. **University of São Paulo (USP-EESC)** Feb. 2013 – Jun. 2014
   Research Assistant (Laboratory Specialist) *São Carlos, Brazil*
   Develop scientific research in projects led by faculty, with didactic-scientific and extension focus.

5. **Transport Engineering Consultants Ltd. (TECTRAN)** Apr. 2012 – Dec. 2012
   Consultant in Transport Planning and Engineering *Belo Horizonte, Brazil*
   Led the development and integration of structured databases to support EPELT, the Transport Logistics Planning Office of the Minas Gerais State Secretariat.

6. **Institute of Mathematical and Computer Sciences (ICMC-USP)** Mar. 2012 – Apr. 2012
   Civil Engineer *São Carlos, Brazil*
   Executed AutoCAD-based infrastructure digitization, oversaw routine building maintenance, and participated in the supervision of ongoing construction projects at ICMC.

5 TEACHING EXPERIENCE

5.1 Lecturer at the University of São Paulo (USP)

5.1.1 Undergratuate

1. **STT0618 - Air Transport** **2014**
   4th year elective transport course in Civil Engineering curriculum. Designed the lecturers, exercise and lab sessions. Small classroom of 10+ students.

2. **STT0403 - Airports, Ports and Waterways** **2015–present**
   5th year compulsory transport course in Civil Engineering curriculum. Designed the lecturers and exercise sessions. Taught in classes of 50+ students.

3. **STT0408 - Fundamentals of Transportation Engineering** **2015–present**
   3rd year compulsory transport course in Civil Engineering curriculum. Designed and delivered this core transport course, integrating lectures, exercises, and applied lab sessions. Taught classes of 50+ students using inverted classroom strategies and project-based learning, fostering active student engagement and applied problem-solving. The course received an average student rating of 4.5/5.0, reflecting strong satisfaction and engagement.

4. **STT0628 - Traffic Engineering and Road Traffic Simulation** **2015–present**
   3rd year elective transport course in Civil Engineering curriculum. Designed the lecturers, exercise and lab sessions. Small classroom of 10+ students. Presents the fundamental theory of traffic simulation, while equipping students to apply concepts in practice and develop key technical skills.

5. **1800093 - Final Undergraduate Project** **2016–present**
   5th year compulsory transport course in Civil Engineering curriculum. My role involves supervising and guiding students through the development of their final engineering projects, with a focus on applying transport engineering concepts to real-world problems. I support students in defining research questions, conducting technical analyses, and producing professional-grade reports, while fostering independent learning and critical thinking. I have supervised 25+ projects in this course.

[1] Interview featured on Rede Globo's Jornal Hoje program (https://globoplay.globo.com/v/8165879/).

6. **STT0412 - Computational Tools Applied to Civil Engineering** **2016–present**
   2nd year elective transport course in Civil Engineering curriculum. I designed and implemented this course to introduce students to computational thinking and practical toolsets for engineering problem-solving. The course encourages students to develop programming skills and apply digital tools—such as spreadsheets, CAD, GIS, and programming languages—to real-world challenges in civil and transport engineering. Small classroom of 20+ students.

7. **1800122 - Supervised Internship** **2019–present**
   5th year compulsory transport course in Civil Engineering curriculum. My role involves supervising and evaluating student internships conducted in professional engineering environments. I oversee each student's engagement with the host company, assess their performance, and ensure that the internship experience aligns with academic and professional learning objectives. I have supervised 15+ students.

8. **STT0610 - Logistics and Transportation** **2024–2025**
   4th year elective transport course in Civil Engineering curriculum. Redesigned course curriculum to address contemporary logistics and supply chain challenges: AI-driven logistics tools, GIS-based route planning, and Green logistics best practices. Small classroom of 10+ students.

9. **STT0631 - Logistics in construction** **2026–present**
   This elective course integrates theory and practice to prepare students for the efficient management of logistical chains in civil construction projects. Over the semester, students will develop an understanding of the fundamental supply concepts, grasp the scope and challenges of providing the necessary resources based on each project's scale and characteristics, and learn to identify the factors that impact construction logistics — from cost and scheduling concerns to environmental and regulatory constraints.

10. **1800123 - Technical Drawing** **2026–present**
    1st year compulsory course in Civil Engineering curriculum. The objective of this course is to elucidate the concept and standards of design, as well as to present digital tools for Engineering projects and the use of georeferenced maps, as well as the use of BIM and 3D visualization software. Classroom with 60 students.

5.1.2 Graduate

1. **STT5874 - Advanced Topics in Traffic Engineering** **2015–present**
   Elective course in the Transportation Engineering Program. Coordinate the course, designed the lectures and lab sessions. Small classroom of 10+ students. Provides a foundation in traffic simulation theory and engages students in applying concepts through real-world scenarios and hands-on technical training.

2. **STT5898 - Applied Statistics for Transportation Engineering** **2015–present**
   Elective course in the Transportation Engineering Program. Coordinate the course, designed the lectures and exercises. Small classroom of 15+ students. This course serves as a foundational milestone, equipping students with the core statistical methods required for graduate-level study and research.

3. **STT5900 - Multivariate Data Analysis Applied to Transportation Engineering** **2015–present**
   Elective course in the Transportation Engineering Program. Coordinate the course, designed the lectures and exercises. Small classroom of 15+ students. Course introducing AI techniques using R—such as neural networks, clustering, PCA, decision trees, and genetic algorithms—applied to each student's own dataset. The course culminates in the submission of an article presenting the dataset, methodology, and preliminary results.

4. **STT5859 - Transport Technology** **2016–present**
   Compulsory course in the Transportation Engineering Program. This core course is jointly taught by four professors and provides a comprehensive foundation in transportation planning and operations. Designed for students at all levels, it offers a structured, level-based approach to essential concepts and methodologies in the field. Small classroom of 15+ students.

5. **STT5905 - Bibliographic Research for Transportation Systems** **2017–present**
   Compulsory course in the Transportation Engineering Program. A core course that guides and encourages students to develop a comprehensive literature review, fostering critical analysis and familiarity with key academic sources in the field. Small classroom of 15+ students.

6. **STT5909 - Data Analysis Laboratory with Open-Source Software R** **2017**
   Elective course in the Transportation Engineering Program. Coordinate the course, designed the lectures and exercises. Small classroom of 10+ students. This course was designed to provide a foundational introduction to R programming for solving transport engineering problems.