



Curriculum Vitae of Paulo César Pellanda

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DISTINCTIONS, HONORS, AND PROFESSIONAL RECOGNITION

- Recipient of the CNRS Best Doctoral Thesis Award in Automatic Control (France, 2003).
- Full Member of the Brazilian National Academy of Engineering.
- CNPq Research Productivity Fellow (2009–2016).
- President of the Brazilian Society of Inertial Engineering (2015–2018).
- President of the Brazilian Academy of Military Engineering (2009–2012).
- Winner of the IV Brazilian Ministry of Defense Thesis Competition in the military dissertation category (2010).
- Recipient of 16 military and civil honors and distinctions for contributions to engineering, science, and technology.

ACADEMIC EDUCATION AND ADVANCED TRAINING

Paulo César Pellanda holds a B.Sc. in Electrical Engineering from the Federal University of Technology–Paraná (1985), an M.Sc. in Electrical Engineering from the Military Institute of Engineering (IME, 1993), and a Ph.D. in Automatic Control from the French Higher Institute of Aeronautics and Space / ISAE-SUPAERO (2001). He also completed advanced professional education in military sciences, defense, policy and strategy, large-scale project management, and innovation management.

ACADEMIC LEADERSHIP

Professor Pellanda has built a long academic career at IME as both a faculty member and institutional leader. He currently serves as Dean of Graduate Studies, Coordinator of the Graduate Specialization Program in Power Systems Protection developed in cooperation with the Brazilian National System Operator (ONS), and Manager of the Cybersecurity Laboratory for Cyber-Physical Systems (LaSC). He previously served as Head of the Electrical Engineering Department and as the founding coordinator of the Graduate Program in Defense Engineering (PGED) at the master's and doctoral levels. During his doctoral period in France, he also taught undergraduate courses in Aeronautical Engineering at ISAE.

RESEARCH AREAS AND SCIENTIFIC PROFILE

His scientific work lies at the intersection of sustainable energy systems, power-system dynamics and protection, advanced control, critical infrastructure cybersecurity, innovation management, and building information modeling (BIM). His research includes robust and optimal control, parameter-robust control, linear parameter-varying control, nonlinear control, and automation and control applications in electric power systems, aerospace systems, flexible structures, and defense systems. His recent scholarly record also includes contributions related to digital social innovation for the Sustainable Development Goals (SDGs) and sustainable business model innovation.

MAJOR SCIENTIFIC, TECHNOLOGICAL, AND INSTITUTIONAL CONTRIBUTIONS

Renewable Energy and Electrification in the Amazon

Earlier in his engineering career, Professor Pellanda participated in feasibility studies for the deployment of alternative and renewable energy sources in isolated areas of the Amazon, including solar photovoltaic and hydropower solutions for military bases and Indigenous communities. During this period, he also designed and supervised dozens of low- and medium-voltage electrical works in several Brazilian states and contributed, within the Calha Norte Program, to the construction of five micro-hydroelectric plants in the Amazonian border region. This body of work represents a direct contribution to renewable electrification, territorial inclusion, and sustainable regional development.

Hydropower, Large-Scale Generation, and Power-System Stability

In cooperation with Itaipu Binacional and CEPEL, he coordinated field tests on the generators of the Itaipu Hydroelectric Power Plant, resulting in an innovative world-level methodology for testing large multi-generator plants and assessing control performance. His publication record also includes contributions on power system stabilizers, field testing in power plants, electromechanical mode estimation, TCSC stabilizer design, and large nonlinear power-system simulation, reinforcing his profile in sustainable electricity generation and grid stability.

Power-System Operation, Protection, and Energy Resilience

At IME, he teaches and supervises research in power systems, automation, and control, and currently coordinates a graduate specialization program in Power Systems Protection in cooperation with ONS. His broader technical contributions include work related to battery energy storage systems with grid-forming control, harmonic filter protection for wind farms, cybersecurity of electric power systems, and critical infrastructure studies involving generation, transmission, and distribution systems. These activities place his work within the domains of energy resilience, reliability, and the sustainable operation of electric power systems.

Cybersecurity of Critical Energy Infrastructure

Professor Pellanda serves as the technical-scientific coordinator, on behalf of the Brazilian Army, of the LaSC R&D project, a large-scale hardware-in-the-loop real-time simulation environment for cybersecurity studies involving electric power systems and

software-defined radio communication systems. The project supports scientific research, analysis, and experimentation related to the cybersecurity of critical infrastructures, including energy systems, linking sustainable energy production to resilience, operational continuity, and national security.

Energy Efficiency, Water Use, and Sustainability in Thermal Power

His project experience also includes work on the efficiency improvement of the cooling tower of the Norte Fluminense Thermal Power Plant, including studies on improved water use, emergency reserve strategies based on rainwater, and the feasibility of solar and wind energy to support associated energy needs. This contribution adds an important dimension of resource efficiency, environmental management, and sustainability in thermal power systems.

Sustainable Infrastructure, BIM, and Lifecycle Management

As a senior engineering manager in the Brazilian Army, he contributed to the development and consolidation of a digital system for managing the lifecycle of the Army's built environment, based on BIM, Infrastructure Lifecycle Management (ILM), collaborative virtual environments, data visualization, spatial mapping, and cloud technologies. This system supported the management of more than 80,000 built assets across approximately 1,800 federal properties, promoting transparency, interoperability, and more efficient long-term infrastructure governance. His scholarly work in BIM and collaborative workflows further reinforces the sustainability-oriented dimension of his career.

Sustainability, Innovation, and the SDGs

His recent academic output includes the paper "A Systematic Review to Investigate the Role of Digital Social Innovations to Address SDGs", as well as publications on sustainable business model innovation and innovation management in strategic sectors. These contributions broaden his profile beyond engineering control and energy systems, connecting his work to the wider framework of sustainability science, technological innovation, and the Sustainable Development Goals.

Broader Energy-Related Contributions

In addition to his strongest and most sustained contributions in renewable energy, hydroelectric generation, electric power systems, and energy infrastructure resilience, his broader publication record also includes work related to industrial and infrastructure systems connected to the energy sector. These contributions complement his profile as an engineer working across multiple dimensions of sustainable energy production and infrastructure.

SCIENTIFIC OUTPUT AND IMPACT

Professor Pellanda has maintained sustained scientific activity in control systems, electric power systems, cybersecurity of cyber-physical systems, innovation management, and BIM, with publications in journals, conference proceedings, technical reports, and applied R&D outputs. His work combines theoretical development, experimental validation,

technology-oriented research, and interdisciplinary applications in energy, defense, infrastructure, and sustainability.

MENTORSHIP AND HUMAN RESOURCE DEVELOPMENT

Throughout his academic career, he has supervised and co-supervised numerous doctoral theses, master's dissertations, undergraduate research projects, and final-year engineering projects, contributing to the education of highly qualified professionals in electrical engineering, defense engineering, control systems, power systems, and related areas. His career reflects a sustained commitment to graduate education, scientific mentoring, and capacity building in strategic technological sectors.

RESEARCH PROJECT LEADERSHIP AND TECHNOLOGY TRANSFER

Over the course of his career, he has coordinated multiple R&D projects of strategic relevance to the Brazilian Army and national critical infrastructure, with funding from FINEP, CNPq, FAPERJ, Petrobras, Itaipu Binacional, and the Brazilian Army Department of Science and Technology (DCT). These projects have included power systems control, alternative energy sources, cyber-physical systems cybersecurity, defense technologies, and innovation management. He also coordinated the implementation of the Army Technology-Based Business Incubator (IETEx), which supported technology-based companies focused on security and defense.

ENGINEERING, MANAGEMENT, AND PUBLIC-SECTOR EXPERIENCE

Beyond academia, Professor Pellanda held senior engineering and management positions in the Brazilian Army. As Subdirector of Military Works and as a senior planning and programming official, he coordinated strategic planning, budgeting, and oversight for large architecture and civil engineering contracts throughout Brazil. He also managed major engineering portfolios in São Paulo state, including infrastructure, airport-related planning, and construction oversight. Earlier in his career, he worked in electrical installations and infrastructure, combining practical engineering experience with long-term institutional management and public-sector project governance.

INTERNATIONAL ENGAGEMENT AND PROFESSIONAL SERVICE

Professor Pellanda has maintained sustained international engagement through doctoral studies and teaching activities in France, publications and presentations in international conferences, and collaborations in control systems, power systems, innovation, BIM, and sustainability-related themes. He has served as reviewer for major international journals and as an ad hoc consultant to CNPq, CAPES, FINEP, and the Brazilian Space Agency.

PROFESSIONAL STATEMENT

Professor Paulo César Pellanda's career reflects sustained leadership in engineering education, sustainable energy systems, scientific research, technological innovation, and institutional development. His strongest contributions are in renewable and large-scale electricity generation, power-system dynamics and protection, critical energy infrastructure resilience, and sustainability-oriented innovation, complemented by expertise in advanced control, cyber-physical systems security, and digital lifecycle management of infrastructure. Combining academic achievement, strategic project

leadership, and practical engineering experience, he has contributed to the advancement of sustainable energy production, infrastructure reliability, and science-based technological development in Brazil.