

Ing. Félix Badilla Murillo, PhD

Industrial Engineer — Professor and Researcher — Process Improvement Consultant

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Location: San Ramón, Alajuela, Costa Rica

Professional Profile

Industrial Engineer with a PhD and more than 10 years of experience in teaching, applied research, and continuous process improvement consulting. Professor and researcher at the Costa Rica Institute of Technology, specializing in industrial automation, process simulation, and digital transformation. Specialist in the development of strategic projects integrating Industry 4.0 technologies to drive resource optimization and innovation in the educational, industrial, and healthcare sectors.

Extensive experience advising companies in the pharmaceutical, metal-mechanical, and hospital sectors, achieving significant improvements in operational process quality and efficiency.

Skilled in leading interdisciplinary research projects, managing resources, and coordinating multicultural work teams. Committed to teaching and developing practical solutions that positively impact organizations.

Education

- **PhD in Modeling and Experimentation of Science and Technology**
University of Extremadura, Spain. 2022
 - **Master's in Modern Manufacturing Systems**
Costa Rica Institute of Technology. 2010
 - **Bachelor's in Industrial Engineering**
University of Costa Rica. 2005
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Skills

- Process Simulation
 - Industrial Automation
 - 3D Modeling
 - CNC, 3D Printing, Arduino
 - Reliability Engineering
 - Design of Experiments
 - Applied Statistics
 - Lean Six Sigma
 - Project Management
 - Critical Thinking
 - Teamwork
 - Lean Manufacturing
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Languages

- **Spanish:** Native
- **English:** Advanced

Professional Experience

Costa Rica Institute of Technology

University Professor

San Carlos Campus — 2015 - Present

- Coordinator of the Industrial Production Engineering program.
- Development of research projects focused on **process simulation in healthcare services**, improving installed capacity and hospital response times.
- Taught specialized courses in **manufacturing automation**, operations management, and continuous improvement, integrating technologies like CNC, 3D printing, and Arduino.
- Coordinator of the Industry 4.0 Student Community.
- Coordinator of the Industrial Advisory Project FUNDATEC.
- Responsible for Arena software license for discrete event simulation.
- Coordinator of the Curriculum Improvement Commission.
- Advisor for undergraduate and postgraduate graduation projects.
- Organizing Committee of the I, II, III, IV International Congress of Industrial Production Engineering (EIIPI).
- Organizing Committee of the 1st and 2nd Congress of Graduates of the Industrial Production Engineering Program

Various Institutions

Postgraduate Professor

2017 - Present

- Lecturer in the Master's Program in Modern Manufacturing Systems and the Master's in Supply Chain Management at the Costa Rica Institute of Technology (TEC).
- Advisor for graduation projects in the Master's in Science and Technology for Sustainability with a focus on Environmental Management at TEC.
- Lecturer in the Master's in Industrial Engineering with emphasis on Manufacturing and Quality at the University of Costa Rica (UCR).
- Lecturer in the Master's in Business Administration at the National University of Distance Education (UNED).

Costa Rican Social Security Fund (CCSS)

Process Engineer

2008 - 2017

- Conducted capacity analysis of hospital services such as pathology, dentistry, radiotherapy, clinical laboratories, hemodynamics, and human resources, among others. Key responsibilities included:
 - Process simulation using Arena and Excel.
 - Statistical analysis of processes.
 - DMAIC-based Six Sigma projects.
 - Lean healthcare process analysis.
 - Regional location study for dialysis services.
 - FMEA applied to radiotherapy and emergency services.

- Facility layout studies in clinical laboratories.
- Evaluation of technological conditions (equipment, connectivity, human resources) across 104 health areas and over 1000 primary healthcare units (EBAIS).
- Design and application of electronic surveys for research in areas such as health records, ICT, contracted medical time, and others.
- Participation in multidisciplinary commissions for institutional information systems development in areas like organ transplants and medical availabilities.

CVG Alunasa

Warehouse Manager/Production Planning and Control

2006 - 2007

- Managed the supply of materials, consumption statistics, and purchase tracking.
- Developed procurement plans and the annual maintenance budget.
- Controlled weekly budget expenditures for completed tasks.
- Served as interim department head during the absence of the primary manager.
- Negotiated with national and international suppliers (Italy, Germany, USA).
- Supervised staff responsible for inventory receipt and delivery for production, spare parts, and maintenance supplies 24/7.
- Designed and implemented a barcode system for inventory identification and transactions.
- Generated reports using data mining in the ERP system.
- Participated in the company's strategic planning workshops.

RAVEN Laboratory S.A.

Quality Assurance Assistant

2005 - 2006

- Prepared and designed documented procedures based on GMP to ensure drug integrity, purity, safety, and efficacy.
 - Handled process documentation (forms, manuals, instructions, procedures) according to ISO 9001 standards.
 - Conducted statistical analyses for process validation: normalization, control charts, and variance analysis.
 - Developed Visual Basic applications to automate processes, including production order creation.
 - Analyzed quality tests such as trace analysis, analytical balance validation, water conductivity and acidity tests, water ionization system maintenance, and stability chamber checks.
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Internships, Certifications, and Training

Internships

- Internship at high-tech centers in **Mexico**: High-Level Human Resources Specialization Center for the Automotive Sector (CERHAN), High-Tech Training Center (CENALTEC), and Engineering and Industrial Development Center (CIDESI) on Industry 4.0 topics (2018).
- Internship at the School of Industrial Engineering, University of Extremadura, **Spain** (2019, 2022, 2024).
- Development of mirror classes and Collaborative Online International Learning (COIL) projects with universities in **Colombia** such as Uniminuto, Unicompensar, Unicolmayor, ECCI, and Area Andina (2020-2024).

Certifications

- **Semiconductor Faculty Certification (SFC)**, Arizona State University. 2025
- **Test and Data Analysis for Quality and Reliability**, Arizona State University. 2024
- **2D Packaging Assembly**, Arizona State University. 2024
- **Application of Electrical Thermo-Mechanical Modeling**, Arizona State University. 2024
- **Introduction to Electrical Concepts in Semiconductor Packaging**, Arizona State University. 2024
- **Introduction to Packaging Materials, Manufacturing, Test, and Reliability**, Arizona State University. 2024
- **Oxford Test of English - Certificate of Proficiency**, University of Oxford. 2021
- **Mechanical Design**, Dassault Systemes. 2017
- **Introduction to Data Science: Statistical Programming with R**, Autonomous University of Mexico. 2016

Training

- **Discrete Event Simulation Using Flexsim Software**, Costa Rica Institute of Technology. 2025
 - **Digital entrepreneurship**, Costa Rica KLAB. 2025
 - **Medical image processing with deep learning**, Costa Rica KLAB. 2025
 - **Introduction to LaTeX**, Costa Rica Institute of Technology. 2024
 - **Introduction to Design of Experiments (DOE)**, Costa Rica Institute of Technology. 2019
 - **Process Modeling**, Bizagi. 2019
 - **Intermediate Simulation Techniques with Arena**, Paragon. 2020
 - **Fundamentals of Simulation with Arena**, Paragon. 2020
 - **Minitab Quality Trainer**, Blackberry Cross. 2014
 - **Internal Auditor ISO 9001:2008**, Costa Rican Institute of Technical Standards (INTECO). 2014
 - **Black Belt Six Sigma Training**, Costa Rica Institute of Technology. 2010
 - **Advanced Pivot Tables: Design and Application**, Costa Rican Chamber of Industry. 2006
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Research Projects

- Design of a decision-making model for organizing resources based on their availability, using discrete event simulation (Coordinator).
 - Business logistics dynamics with a focus on perspectives in Bogotá.
 - Optimization methodology for installed capacity in healthcare services through discrete event simulation models (Coordinator).
 - Analysis of the key factors that impact overall equipment efficiency (OEE) in a flexible manufacturing cell (Coordinator)
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Publications and Conferences

Books

- Montealegre, D., Vera, G. and Badilla, F. (2025). TCHLORELLA VULGARIS: STATE OF THE ART IN BIOTECHNOLOGICAL, ENERGY, AND ENVIRONMENTAL APPLICATIONS. Lozano, C; Daza, J; Orduy, J; Barón, I; Human Geography, Science, Technology and Industry in Globalization. Vol. 2 (pp. 54-72). Editorial TEINCO. <https://doi.org/10.21892/9786287515420.4>
- Lemos, J., Montealegre, D., and Badilla, F. (2024). The Importance of Developing Collaborative International Activities in the Teaching-Learning Process. In Liliana Álvarez-Ruíz, Mónica Herazo Ch., Luisa Fernanda Echeverría K., Tania Lafont C., and Jorge Luis Barboza (Eds.), Experiences of Internationalization in Higher Education Institutions in Latin America. Vol. 2 (pp. 76-96). Editorial CECAR. <https://doi.org/10.21892/9786287515420.4>

Scientific Articles

- Badilla-Murillo, F., Vargas-Vargas, B., Viquez-Acuña, O., García-Sanz-Calcedo, J. "Analysis of the Installed Productive Capacity in a Medical Angiography Room through Discrete Event Simulation," Processes. DOI: 10.3390/pr8060660. Vol. 8, No. 60, 2020.
- Badilla-Murillo, F., Vargas-Vargas, B., Viquez-Acuña, O., García-Sanz-Calcedo, J. "Reduction of the Cycle Time in the Biopsies Diagnosis Through Simulation Based on the Box Muller Algorithm," Frontiers. DOI: 10.3389/fpubh.2022.809534. Vol. 10, No. 809534, 2022.
- Sánchez-Barroso, G., González-Domínguez, J., Badilla-Murillo, F., et al. "Implementation of Project-Based Learning through BIM Technology," Advances in Building Education. DOI:10.20868/abe.2020.2.4462. Vol. 4, No. 2, 2020.
- Badilla-Murillo, F., Fernández-Chávez, R. "Development of a Practical Case for Failure Mode and Effects Analysis (FMEA) as a Reliability Learning Methodology," Ventana. ISSN: 1659-3308. No. 1, 2021.
- Marín-Brenes, J. F., Villalta-Pérez, G., Vargas-Hidalgo, M. N., Osés-Soto, M., Badilla-Murillo, F. E. (2024). Development of Passive Protective Orthosis Prototypes Using Additive Manufacturing. Revista Tecnología En Marcha, 37(3). <https://doi.org/10.18845/tm.v37i3.6839>
- Orozco-Irola, C., Badilla-Murillo, F. (2022). Analysis of the Banana Packing Process for Water Resource Optimization through Discrete Event Simulation. Revista Tecnología En Marcha, 35(4), pp. 175–187. <https://doi.org/10.18845/tm.v35i4.5763>
- Badilla-Murillo, F. (2025).Development of an Excel-based simulator for teaching ware house management systems in industrial engineering. Proceedings from the International Congress on Project Management and Engineering. DOI: <https://doi.org/10.61547/2509001>
- Badilla-Murillo, F. (2025).Analysis and optimization of installed capacity in medical services through discrete event simulation and continuous improvement.Proceedings from the International Congress on Project Management and Engineering. DOI: <https://doi.org/10.61547/2503001>

Conference Presentations

- J. González-Domínguez, G. Sánchez-Barroso, J. García-Sanz-Calcedo, F. Badilla-Murillo, et al. "Applicability of Statistical Techniques Based on Markov Chains in Engineering," 5th International Conference on Technological Innovation in Building. ISBN: 978-84-182-5504-5. March 25-April 8, 2020. Madrid (Spain).
- P. Garrido-Píriz, M. Botejara-Antúnez, F. Badilla-Murillo, et al. "Fundamentals of Resilience Applied to Healthcare Infrastructures in Smart Cities: A Review," 6th International Conference on Technological Innovation in Building. ISBN: 978-84-182-5534-2. March 24-26, 2021. Madrid (Spain).
- Badilla-Murillo, F., Vargas-Vargas, B., et al. "Increasing Installed Capacity in Cytology Services Through Process Improvements Based on Lean Healthcare Principles," 25th International Congress on Project Management and Engineering. July 6-9, 2021. Valencia (Spain).

- Vargas-Vargas, B., Badilla-Murillo, F., et al. “Design of a Specialized Medical Services Building Using BIM Methodology,” 6th International Conference on Technological Innovation in Building. ISBN: 97-84-182-5534-2. March 24-26, 2021. Madrid (Spain).
- Barroso, G. S., Domínguez, J. G., Badilla-Murillo, F., et al. “Implementing Project-Based Learning through BIM Technology,” 3rd International Conference of Educational Innovation in Building. March 6-8, 2020. Madrid (Spain).
- Sánchez-Barroso, G., Carrasco-Amador, J. P., et al. “Application of the Flipped Learning Methodology as an Educational Innovation Tool in Project Engineering,” 24th International Congress on Project Engineering. July 7-9, 2020. Valencia (Spain).
- Badilla-Murillo, F., González-Domínguez, J., et al. “Analysis of Functional Area Layouts in Hospital Processes to Improve Patient Flow,” 24th International Congress on Project Engineering. July 7-9, 2020. Valencia (Spain).
- Carrasco-Amador, J. P., Canito-Lobo, J. L., Badilla-Murillo, F., et al. “Flipped Learning Methodology Adapted for Application in Graphical Engineering,” 3rd International Conference of Educational Innovation in Building. March 6-8, 2020. Madrid (Spain).
- Badilla-Murillo, F. Development of an Excel-based simulator for teaching ware house management systems in industrial engineering. International Congress on Project Management and Engineering. July 16-17, 2025. Ferrol (Spain)
- Badilla-Murillo, F. Analysis and optimization of installed capacity in medical services through discrete event simulation and continuous improvement. Proceedings from the International Congress on Project Management and Engineering. July 16-17, 2025. Ferrol (Spain).
- Badilla Murillo, F., Hernández Cordero, K., DeMartí, I., Barboza, J., et al. “Implementation of the OEE Indicator in a Flexible Manufacturing Cell through Operational Planning and Standardization.” 3rd International Meeting of Research Seedbeds “Abriendo Fronteras,” Fundación Universitaria Navarra (UNINAVARRA), October 28, 2025, Neiva (Virtual), Colombia.
- Badilla Murillo, F., Hernández Cordero, K., DeMartí, I., Barboza, J., et al. “Morphological Design of Corn Kernels Using 3D Printing for Dosification Improvement in an Educational Flexible Manufacturing Cell.” 3rd International Meeting of Research Seedbeds “Abriendo Fronteras,” Fundación Universitaria Navarra (UNINAVARRA), October 28, 2025, Neiva (Virtual), Colombia.
- Badilla Murillo, F., Hernández Cordero, K., DeMartí, I., Barboza, J., et al. “Software Modernization and Optimization in a FESTO Flexible Manufacturing Cell Using Siemens S7-300 PLC.” 3rd International Meeting of Research Seedbeds “Abriendo Fronteras,” Fundación Universitaria Navarra (UNINAVARRA), October 28, 2025, Neiva (Virtual), Colombia.
- Badilla Murillo, F., Hernández Cordero, K., DeMartí, I., Barboza, J., et al. “OEE Analysis Model in a Flexible Manufacturing Cell as a Learning Tool and Productivity Improvement Strategy in Agroindustrial Environments.” 3rd International Meeting of Research Seedbeds “Abriendo Fronteras,” Fundación Universitaria Navarra (UNINAVARRA), October 28, 2025, Neiva (Virtual), Colombia.
- Badilla Murillo, F., Hernández Cordero, K., DeMartí, I., Barboza, J., et al. “Implementation of Improvements in the FESTO AFB Flexible Manufacturing Cell for Academic Strengthening in Industrial Engineering.” 3rd International Meeting of Research Seedbeds “Abriendo Fronteras,” Fundación Universitaria Navarra (UNINAVARRA), October 28, 2025, Neiva (Virtual), Colombia.

Opinion Articles

- Badilla-Murillo, F. (August 5, 2020). “University Regionalization as a Mechanism for Development and New Opportunities for Costa Rican Society,” *Semanario Universidad*.
- Badilla-Murillo, F. (November 16, 2021). “Technical Legacy of Productive Systems in Costa Rica,” *Semanario Universidad*.
- Badilla-Murillo, F. (February 4, 2021). “Costa Rica’s Fiscal Deficit in Retrospect: A General Analysis of GDP, Public Spending, and Tax Revenues,” *Hoy en el TEC*.

- Badilla-Murillo, F. (March 29, 2023). "10th Anniversary of the Industrial Production Engineering Program at the San Carlos Local Technological Campus of Costa Rica Institute of Technology," *Semanario Universidad*.
 - Badilla-Murillo, F. (December 02, 2025). "When a country stops producing, it stops deciding: a warning for Costa Rica". *La Nacion*
 - Badilla-Murillo, F. (October 23, 2025). "A blank check: that's what they're asking of the citizens.". *La Nacion*
 - Badilla-Murillo, F. (January 30, 2026). "The Assembly is not the problem; the problem is the way we integrate it". *La Nacion*
 - Badilla-Murillo, F. (February 18, 2026). "The myth of public spending: investing to rebuild the country". *Semanario Universidad*.
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Links

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Google Scholar: <https://scholar.google.com/citations?user=cYGlnJ8AAAAJhl=es>

YouTube: https://www.youtube.com/channel/UCCGj9g3VjgkD3GV_FdvcTaw/featured