Carlos Durán Cañas

Mechanical Engineer MSc.

Carlos Durán Cañas | carlosaduranc | carlosduranc@protonmail.com | +1 (908) 848-3263

Summary

A dedicated individual driven by genuine passion and hard work to achieve goals. Excelled in fields like thermodynamics, fluid dynamics, and optimal control. Thrives in collaborative environments, adapting seamlessly and contributing with a proactive mindset.

Work Experience

Development Engineer - Heat Pump Control **Sep 2023 - Dec 2024**
Daikin Europe NV Ghent, Belgium

- Specialized in developing and testing thermodynamic system controllers for heat pump installations with air, ground source, and water-to-water setup capabilities, delivering space heating, cooling, and domestic hot water.
- Utilized Model-in-the-Loop simulations with MathWorks' Simulink Test to provide crucial input, detailed reports, and design tailored test scripts, ensuring reliability and performance of new system functionalities.
- Collaborated closely with controller designers and unit testers, directly contributing to the implementation of controller logic and quickly assuming significant responsibilities in a dynamic development environment.

Academic Co-Creation **Mar 2020 - Jan 2021**
Mercedes-Benz Group AG Sindelfingen, Germany

- Implemented a Semantic Data Model within the Mercedes Operation 360 environment, enabling communication between legacy and evolving data storage systems. This involved extensive research in database technologies, big data processing, and graph technologies, and was successfully pitched to a senior executive on the Board of Management overseeing Production, Quality & Supply Chain Management.
- Awarded the "Problem Solving Heroes" Award for outstanding contributions to the project.

Internship Program **Sep 2019 - Nov 2019**
Gildan Honduras Trading S. de R.L. Rio Nance, Honduras

- Participated in all stages of the steam generation process in a biomass plant within the industrial park, from biomass delivery logistics and quality checks to boiler controls for steam delivery to multiple park plants.
- Executed maintenance procedures and conducted routine furnace rotations for steam generation.
- Established a comprehensive maintenance database for a knitting plant, covering maintenance procedures, safety protocols, schedules, and asset management.

Education

2021 - 2023 **Mechanical Engineering (MSc.)** **Katholieke Universiteit Leuven (KUL)**
Thermotechnical Sciences Track cum laude

Relevant Courses: Thermal Systems, Optimization, Numerical Modeling, Energy Challenges and Economics, Sensors and Measurement Systems, Turbomachinery 2, Control Theory, etc.

2017 - 2021 **Mechanical Engineering (BSc.)** **Karlsruher Institut für Technologie (KIT)**
Energy Specialization

Relevant Courses: Fundamentals of Energy Technologies, Heat and Mass Transfer, Mechanical Design, Thermodynamics 1 & 2, Fluid Mechanics 1 & 2, Systems Theory, etc.

Publications

Durán Cañas, Carlos et al. (2023). "Parameter Estimation of Modelica Building Models Using CasADi". In: *Modelica Conferences*, pp. 301–310. URL: https://ecp.ep.liu.se/index.php/modelica/article/view/938.

Skills

Languages

Spanish	*Native Speaker*
English	*Fluent (TOEFL 115/120)*
Dutch	*Conversational (B1)*
German	*Conversational (A2.2)*

Software

Python	Matlab + Simulink
Git	JIRA
Solid Edge	Solidworks
SimaPro	Ansys Fluid
LaTeX	PTC Creo
LabVIEW	MS Office
Modelica	

Projects

Model identification and MPC application for a thermal zone **Oct 2022 - Dec 2022**

Developed a thermal network model for a small apartment with the goal of identifying its thermal properties by means of a trajectory optimization problem. Once the model was accurately identified, two different approaches towards a model predictive control (MPC) application were developed with the goal of automizing the heat deployment into the thermal zone and minimizing the energy use. Both approaches resulted in significant energy use reduction (42% and 49%) for the investigated time period.

CFD analysis for duct airflow pressure drop in bend configuration **Feb 2022 - Jun 2022**

Conducted an investigation by means of CFD using Ansys Fluid into the pressure drop experienced by an air duct for multiple bend configurations. Multiple analyses and simulations were ran using 2D and 3D models with varying details. This project was a part of the Integrated Project course which served as a solution for members of the Belgian company Sweco.

Experimental investigation into optimal particle image velocimetry parameters for a centrifugal fan **Nov 2020 - Mar 2021**

Investigated the flow characteristics of a centrifugal fan by means of Particle Image Velocimetry (PIV) used to validate CFD data. Developed a general procedure used to achieve high quality results for the given PIV setup with respect to its flow characteristics. This project was conducted as my Bachelor thesis project at the University of Karlsruhe where I received a grade of 1,0 (100% German scale).

References available upon request - No sponsorship required

Last updated: November 21, 2024