

BRUNO YUJI KIMURA DE CARVALHO

Mechanical Engineer

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EXPERIENCE

04/2016 – 08/2022 ACRC – Air-Conditioning and Refrigeration Center, Urbana, IL
The University of Illinois at Urbana-Champaign

Ph.D. Student

- Experimental/analytical investigation on control strategies (superheating/subcooling) in residential AC and HP systems to optimize performance and balance refrigerant charge distribution between both operating modes.

03/2013 – 11/2015 POLO – Research Laboratories for Emerging Technologies in Cooling and Thermophysics, Florianopolis, SC, Brazil

Master's student (The Coca-Cola Company Project)

- Investigated the influence of two-stage variable capacity compressors in carbon dioxide light commercial refrigerating systems
- Built experimental facility, calibrated instruments, performed tests, analyzed data and wrote reports.

09/2012 – 02/2013 POLO – Research Laboratories for Emerging Technologies in Cooling and Thermophysics, Florianopolis, SC, Brazil

Research Engineer

- Performed tests and investigated the influence of defrost heaters and frost formation in a domestic refrigerator's power consumption

02/2012 – 08/2012 LIEBHERR GROUP, Karlsruhe, BW, Germany

Intern at ITTK (Institut für Technische Thermodynamik und Kältetechnik) in the KIT (Karlsruher Institut für Technologie)

- Assisted on the study of isobutane flow through capillary tubes
- Helped in the assembly of the experimental apparatus and improved the data acquisition program
- Calibrated measurement instruments, performed tests and analyzed the data

08/2011 – 02/2012 POLO – Research Laboratories for Emerging Technologies in Cooling and Thermophysics, Florianopolis, SC, Brazil

Undergraduate intern for a BSH project

- Investigated the expansion induced noise in household refrigeration systems
- Prepared the instrumentation and data acquisition for thermodynamic tests and vibration and acoustics tests
- Performed tests in a controlled chamber at POLO and an anechoic chamber to verify possible causes

08/2009 – 08/2011 POLO – Research Laboratories for Emerging Technologies in Cooling and Thermophysics, Florianopolis, SC, Brazil

Undergraduate Intern for a Ph.D. student

- Performing tests in an experimental apparatus for the investigation of CO2 cycle architectures
- Maintenance and modification of the experimental rig
- Assisting in the development of the data analysis software
- Support developing an EES program to simulate the CO2 refrigeration cycles tested in the experimental setup

08/2008 – 08/2009 POLO – Research Laboratories for Emerging Technologies in Cooling and Thermophysics, Florianopolis, SC, Brazil

Undergraduate Intern at application laboratory

- Programming data acquisition software (VEE)
- Calibration and maintenance of data acquisition systems
- Assisting in the standard power consumption tests for domestic refrigeration systems

SPECIAL SKILLS/ABILITIES

- Ability to design and build testing facilities (experience building HVAC research experimental setups). Knowledge on the calibration and installation of sensors (thermocouples, pressure transducers, etc.)
- Experience with modeling thermal systems and components
- Extensive experience with EES, MatLAB, Python, LabVIEW, VEE, Maple, Photoshop, Ansys Fluent, Microsoft Office Suite. Some experience with Ansys Icepak, FI SolidWorks, C programming, AutoCAD

EDUCATION

03/2013 – 11/2015 Federal University of Santa Catarina (UFSC), Florianopolis, SC, Brazil
Master in Thermal Sciences and Engineering

08/2007 – 08/2012 Federal University of Santa Catarina (UFSC), Florianopolis, SC, Brazil
Bachelor in Mechanical Engineering

LANGUAGES

English	Fluent (2015 TOEFL score 117/120, graduated high school in Simcoe, ON, Canada)
German	Basic (3 years course and 5 months internship in Germany)
Japanese	Basic (3.5 years course)
Spanish	Intermediate (3 years course in Brazil, can comprehend due to similarities to Portuguese)
Portuguese	Native

PUBLICATIONS

CARVALHO, B.Y.K., HRNJAK, P., 2021. Experimental and Theoretical Analysis of Subcooling Control in Residential Air Conditioning Systems. In: Proceedings of the 18th International Refrigeration and Air Conditioning Conference at Purdue. West Lafayette, USA.

CARVALHO, B.Y.K., HRNJAK, P., 2021. Effect of Subcooling Control on Residential Heat Pump Systems' Performance. In: Proceedings of the 18th International Refrigeration and Air Conditioning Conference at Purdue. West Lafayette, USA.

CARVALHO, B.Y.K., HRNJAK, P., 2019. Performance Characteristics of a Residential Air Conditioning System with Subcooling Control. In: Proceedings of the 25th IIR International Congress of Refrigeration. Montreal, Canada.

CARVALHO, B.Y.K., HRNJAK, P., 2019. Performance Evaluation and Strategies of Subcooling Control in Residential Heat Pump Systems. In: Proceedings of the 25th IIR International Congress of Refrigeration. Montreal, Canada.

CARVALHO, B. Y. K., MELO, C., PEREIRA, R.H., 2019. An experimental study on the use of variable capacity two-stage compressors in transcritical carbon dioxide light commercial refrigerating systems. Int. J. of Refrig.: Special Issue on the current status of CO2 as a refrigerant (R744).

CARVALHO, B. Y. K., MELO, C., PEREIRA, R.H., 2016. A Study on the Use of Liquid Separators in Variable Speed Small-Scale Carbon Dioxide Refrigerating Systems. 12th IIR-Gustav Lorentzen Conference on Natural Refrigerants. Edinburgh, Scotland.

CARVALHO, B. Y. K., MELO, C., PEREIRA, R.H., 2014. Experimental Investigation on the Use of Internal Heat Exchangers in Variable-Capacity Carbon Dioxide Refrigerating Systems. In: Proceedings of the 24th IIR International Congress of Refrigeration. Yokohama, Japan.

CARVALHO, B. Y. K., MELO, C., PEREIRA, R.H., 2014. A Study on the Performance Characteristics of Carbon Dioxide Refrigerating Systems with Multi-Speed Two-Stage Compression. In: Proceedings of the 11th IIR-Gustav Lorentzen Conference on Natural Refrigerants. Hangzhou, China.