

BRUNO YUJI KIMURA DE CARVALHO

Mechanical Engineer

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EXPERIENCE

04/2016 - Present 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

- Knowledge on the calibration of instruments (thermocouples, pressure transducers, coriolis, etc.)
- Experience with Microsoft Office Suite, Python programming, EES, MatLAB, LabVIEW, VEE, Maple, Photoshop
- Some experience with C programming, CFD, FI SolidWorks, 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

IMPORTANT PUBLICATIONS

[ACCEPTED] 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.

[ACCEPTED] 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.