

J. Steven Brown, Ph.D., P.E.
Professor of Mechanical Engineering
Vice Provost and Dean of Graduate Studies
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EDUCATION

June 1991 **Ph.D. in Mechanical Engineering**
"Vapor Condensation on Turbulent Liquid"
Massachusetts Institute of Technology, Cambridge, Massachusetts

June 1987 **Bachelor of Mechanical Engineering**
Georgia Institute of Technology, Atlanta, Georgia

PROFESSIONAL

6/16 – present **Vice Provost and Dean of Graduate Studies**, – The Catholic University of America (CUA)

9/15 – present **Ordinary Professor**, Mechanical Engineering Department – CUA

9/02 – 8/15 **Associate Professor**, Mechanical Engineering Department – CUA,
Tenured – September 2003

8/13 – 5/16 **Associate Dean**, School of Engineering – CUA

7/10 – present **Associate Editor**, *Science and Technology for the Built Environment*
(previously known as *HVAC&R Research*)

9/08 – 8/09 **Sabbatical Leave**, University of Padova, Italy

9/02 – 8/08 **Chairperson**, Mechanical Engineering Department – CUA

6/01 – 8/02 **Acting Chairperson**, Mechanical Engineering Department – CUA

1/98 – 8/02 **Assistant Professor**, Mechanical Engineering Department – CUA
Original Appointment – January 1998

1/99 – present **Guest Researcher**, National Institute of Standards and Technology

Summer '05, '06 **ASEE Faculty Fellow**, NASA-Goddard

1/96 – 5/97 **Adjunct Lecturer**, Mechanical Engineering Dept., Univ. of Michigan-Dearborn

5/92 – 1/98 **Product Design Engineer**, Climate Control Operations, The Ford Motor Company

1/91 – 5/91 **Teaching Assistant**, Mechanical Engineering Department, MIT

9/86 – 6/87 **Undergraduate Teaching Assistant**, Mechanical Engineering Dept., Georgia Tech

6/83 – 9/86 **Cooperative Student**, Major Appliance Division, General Electric Company

MEMBERSHIPS:

- American Society of Engineering Education (ASEE)
- American Society of Mechanical Engineering (ASME)
- American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
- International Institute of Refrigeration (IIR)

HONORS AND AWARDS

- Elected Fellow of ASHRAE, July 2013. Note: ASHRAE has over 54,000 members of which only 459 are Fellows (roughly 0.8 % of the membership).
- ASHRAE Distinguished Service Award, January 2015
- International Journal of Refrigeration Best Paper Award for ones published in 2013/2014
- Provost Award for Overall Teaching Excellence, The Catholic University of America, November 2011
- ASHRAE Journal Paper Award, June 2010
- Kaman Award for Excellence in Teaching, School of Engineering, The Catholic University of America, May 2004
- Ralph Teetor Educational Award, Society of Automotive Engineers, March 2001
- Named DuPont Young Professor, Summer 2001
- Outstanding Faculty Teaching Achievement Award, School of Engineering, The Catholic University of America, February 1999
- Warren M. Rohsenow Fellowship (first recipient of this fellowship), Massachusetts Institute of Technology, September 1990 – June 1991

STATE(S) REGISTERED AS A PROFESSIONAL ENGINEER: Maryland,
License 27068

PUBLICATIONS

Archival Journal Publications

1. **Brown, J.S.**, Khoo, B.C., Sonin, A.A. 1990. Rate correlation for condensation of pure vapor on turbulent, subcooled liquid. *International Journal of Heat and Mass Transfer*, 33(9): 2001-2018.
2. Mead, P.F., Moore, D., Natishan, M., Schmidt, L., **Brown, S.**, Lathan, C., Goswami, I., Mouring, S. 1999. Faculty and student views of engineering student team effectiveness. *Journal of Women and Minorities in Science and Engineering*, 5(4): 351-363.
3. **Brown, J.S.**, Domanski, P.A. 2000. Semi-theoretical simulation model for a transcritical carbon dioxide mobile A/C system. *SAE Transactions*, 109(6): 1576-1586.
4. Ratts, E.B., **Brown, J.S.** 2000. An experimental analysis of the effect of refrigerant charge level on an automotive refrigeration system. *International Journal of Thermal Sciences*, 39, 592-604.

5. Ratts, E.B., **Brown, J.S.** 2000. Experimental analysis of cycling in an automotive air conditioning system. *Applied Thermal Engineering*, 20(11): 1039-1058.
6. Ratts, E.B., **Brown, J.S.** 2000. Generalized analysis for cascading single fluid vapor compression refrigeration cycles using an entropy generation minimization method. *International Journal of Refrigeration*, 23(5): 353-365.
7. **Brown, J.S.**, Rashad, A. 2001. Creating cooling from the 'hot' sun. *International Journal of Mechanical Engineering Education*, 29(3): 201-213.
8. Didion, D.A., **Brown, J.S.** 2001. Challenges in developing environmentally safe heat pumping systems. *Strojniski Vestnik/Journal of Mechanical Engineering*, 47(8): 356-365.
9. **Brown, J.S.**, Kim, Y., Domanski, P.A. 2002. Evaluation of carbon dioxide as R-22 substitute for residential air-conditioning. *ASHRAE Transactions*, 108(2): 954-963.
10. **Brown, J.S.**, Yana-Motta, S.F., Domanski, P.A. 2002. Comparitive [sic] analysis of an automotive air conditioning systems operating with CO₂ and R134a. *International Journal of Refrigeration*, 25(1): 19-32.
11. Carr, M., **Brown, J.S.** 2002. Container handling crane: a first year engineering student project. *International Journal of Mechanical Engineering Education*, 30(4): 298-306.
12. **Brown, J.S.** 2003. Transcritical carbon dioxide refrigeration cycle model with visual interface. *International Journal of Modelling and Simulation*, 23(3): 143-152.
13. Nguyen, U.D., **Brown, J.S.**, Chang, I.A., Krycia, J., and Mirotznik, M.S. 2004. Numerical evaluation of heating of the human head due to magnetic resonance imaging. *IEEE Transactions on Biomedical Engineering*, 51(8): 1301-1309.
14. **Brown, J.S.** 2007. Predicting performance of refrigerants using the Peng-Robinson Equation of State. *International Journal of Refrigeration*, 30(8): 1319-1328.
15. **Brown, J.S.** 2007. Preliminary selection of R-114 replacement refrigerants using fundamental thermodynamic parameters (RP-1308). *HVAC&R Research*, 13(5): 697-709.
16. **Brown, J.S.**, 2008. Potential R-114 replacement refrigerants. *ASHRAE Transactions*, 114(2): 588-596.
17. **Brown, J.S.** 2008. Methodology for estimating thermodynamic parameters and performance of alternative refrigerants. *ASHRAE Transactions*, 114(1): 230-238.
18. **Brown, J.S.** 2009. HFO's: New, low global warming potential refrigerants. *ASHRAE Journal*, 51(8): 22-29.
19. **Brown, J.S.**, Zilio, C., Cavallini, A. 2009. The fluorinated olefin R-1234ze(Z) as a high-temperature heat pumping refrigerant. *International Journal of Refrigeration*, 32(6): 1412-1422.
20. **Brown, J.S.**, Zilio, C., Cavallini, A. 2010. Thermodynamic properties of eight fluorinated olefins. *International Journal of Refrigeration*, 33(2): 235-241.
21. Cavallini, A., **Brown, J.S.**, Del Col, D., Zilio, C. 2010. In-tube condensation performance of refrigerants considering penalization terms (exergy losses) for heat transfer and pressure drop. *International Journal of Heat and Mass Transfer*, 53(13-14): 2885-2896.
22. **Brown, J.S.** 2011. Refrigerants: Energy and environmental impacts. *HVAC&R Research*, 17(2): 131-132.

23. Fedele, L., Bobbo, S., Groppo, F., **Brown, J.S.**, Zilio, C. 2011. Saturated pressure measurements of 2,3,3,3-tetrafluoroprop-1-ene (R1234yf) for reduced temperatures ranging from 0.67 to 0.93. *Journal of Chemical and Engineering Data*, 56(5): 2608-2612.
24. Zilio, C., **Brown, J.S.**, Schiochet, G., Cavallini, A. 2011. The refrigerant R1234yf in air conditioning systems. *Energy*, 36(10): 6110-6120.
25. **Brown, J.S.**, Nicola, G.D., Zilio, C., Fedele, L., Bobbo, S., Polonara, F. 2012. Subcooled liquid density measurements and PvT measurements in the vapor phase for trans-1,3,3,3-tetrafluoroprop-1-ene (R1234ze (E)). *Journal of Chemical & Engineering Data*, 57(12): 3710-3720.
26. Di Nicola, G., **Brown, J.S.**, Fedele, L., Bobbo, S., Zilio, C. 2012. Saturated pressure measurements of trans-1,3,3,3-tetrafluoroprop-1-ene (R1234ze (E)) for reduced temperatures ranging from 0.58 to 0.92. *Journal of Chemical & Engineering Data*, 57(8): 2197-2202.
27. Fedele, L., **Brown, J.S.**, Colla, L., Ferron, A., Bobbo, S., Zilio, C. 2012. Compressed liquid density measurements for 2,3,3,3-tetrafluoroprop-1-ene (R1234yf). *Journal of Chemical & Engineering Data*, 57(2): 482-489.
28. **Brown, J.S.**, Di Nicola, G., Fedele, L., Bobbo, S., Zilio, C. 2013. Saturated pressure measurements of 3,3,3-trifluoroprop-1-ene (R1243zf) for reduced temperatures ranging from 0.62 to 0.98. *Fluid Phase Equilibria*, 351: 48-52.
29. **Brown, J.S.** 2013. Fourth ASHRAE/NIST Refrigerants Conference: "Moving Towards Sustainability". *HVAC&R Research*, 19(2): 101-102.
30. **Brown, J.S.**, Zilio, C., Brignoli, R., Cavallini, A. 2013. Heat transfer and pressure drop penalization terms (exergy losses) during flow boiling of refrigerants. *International Journal of Energy Research*, 37(13): 1669-1679.
31. **Brown, J.S.**, 2013. Introduction to hydrofluoro-olefin alternatives for high global warming potential hydrofluorocarbon refrigerants. *HVAC&R Research*, 19(6): 693-704.
32. Kedzierski, M., Carr, M., **Brown, J.S.** 2013. Measurement and prediction of vapor-space condensation of refrigerants on trapezoidal-finned and Turbo-C geometries. *Journal of Enhanced Heat Transfer*, 20(1): 59-71.
33. Di Nicola, G., **Brown, J.S.**, Fedele, L., Securo, M., Bobbo, S., Zilio, C., 2013. Subcooled liquid density measurements and PvT measurements in the vapor phase for 3,3,3-trifluoroprop-1-ene (R1243zf). *International Journal of Refrigeration*, 36(12): 2209-2215.
34. Cavallini, A., Zilio, C., **Brown, J.S.** 2014. Sustainability with prospective refrigerants. *International Journal of Energy Research*, 38(3): 285-298.
35. Longo, G.A., Zilio, C., Righetti, G., **Brown, J.S.**, 2014. Condensation of the low GWP refrigerant HFO1234ze(E) inside a brazed plate heat exchanger. *International Journal of Refrigeration*, 38: 250-259.
36. **Brown, J.S.**, Zilio, C., Brignoli, R., Cavallini, A., 2014. Thermophysical properties and heat transfer and pressure drop performance potentials of hydrofluoro-olefins, hydrochlorofluoro-olefins, and their blends. *HVAC&R Research*, 20(2): 203-220.
37. Domanski, P.A., **Brown, J.S.**, Heo, J., Wojtusiak, J., McLinden, M.O. 2014. A thermodynamic analysis of refrigerants: Performance limits of the vapor compression cycle. *International Journal of Refrigeration*, 38: 71-79.

38. McLinden, M.O., Kazakov, A.F., **Brown, J.S.**, Domanski, P.A., 2014. A thermodynamic analysis of refrigerants: Possibilities and tradeoffs for low-GWP refrigerants. *International Journal of Refrigeration*, 38: 80-92.
39. Fedele, L., Di Nicola, G., **Brown, J.S.**, Bobbo, S., Zilio, C., 2014. Measurements and correlations of *cis*-1,3,3,3-tetrafluoroprop-1-ene (R1234ze(Z)) saturation pressure. *International Journal of Thermophysics*, 35(1): 1-12.
40. **Brown, J.S.**, Domanski, P.A., 2014. Review of alternative technologies. *Applied Thermal Engineering*, 64(1-2): 252-262.
41. Longo, G.A., Zilio, C., Righetti, G., **Brown, J.S.**, 2014. Experimental assessment of the low GWP refrigerant HFO-1234ze(Z) for high temperature heat pumps. *Experimental Thermal and Fluid Science*, 57: 293-300.
42. Fedele, L., **Brown, J.S.**, Di Nicola, G., Bobbo, S., and Scattolini, M. 2014. Measurements and correlations of *cis*-1,3,3,3-tetrafluoroprop-1-ene (R1234ze(Z)) subcooled liquid density and vapor phase PvT. *International Journal of Thermophysics*, 35(8): 1415-1434.
43. **Brown, J.S.**, Brignoli, R., Daubman, S. 2014. Methodology for estimating thermodynamic parameters and performance of working fluids for organic Rankine cycles. *Energy*. 73: 818-828.
44. Kedzierski, M.A., **Brown, J.S.**, and Koo, J. 2014. Performance ranking of refrigerants with low global warming potential. *Science and Technology for the Built Environment* 21(2): 207-219.
45. **Brown, J.S.**, Corvaro, F., Di Nicola, G. Giuliani, G., and Pacetti, M. 2014. PvT measurements of *trans*-1,3,3,3-tetrafluoroprop-1-ene + methane and *trans*-1,3,3,3-tetrafluoroprop-1-ene + nitrogen binary pairs. *Journal of Chemical & Engineering Data*, 59(11): 3798-3804.
46. Brignoli, R. and **Brown, J.S.** 2015. Organic Rankine cycle model for well-described and not-so-well-described working fluids. *Energy*, 86: 93-104.
47. **Brown, J.S.**, Brignoli, R., Quine, T. 2015. Parametric investigation of working fluids for organic Rankine cycle applications. *Applied Thermal Engineering*, 90: 64-74.
48. **Brown, J.S.**, Fedele, L., Di Nicola, G., Bobbo, S., Coccia, G. 2015. Compressed liquid density and vapor phase PvT measurements of *cis*-1,2,3,3,3-pentafluoroprop-1-ene (R1225ye(Z)). *Journal of Chemical & Engineering Data*, 60(11): 3333-3340.
49. Fedele, L., Di Nicola, G., **Brown, J.S.**, Colla, L., Bobbo, S. 2016. Saturated pressure measurements of *cis*-1,2,3,3,3-pentafluoroprop-1-ene (R1225ye(Z)). *International Journal of Refrigeration*, 69(9): 243-250.
50. Lago, S., Giuliano Albo, P.A., **Brown, J.S.** 2016. Compressed liquid speed of sound measurements of *cis*-1,3,3,3-tetrafluoroprop-1-ene (R1234ze(Z)). *International Journal of Refrigeration*, 65: 55-59.
51. **Brown, J.S.**, Coccia, G., Di Nicola, G., Pierantozzi, M., Polonara, F., 2016. Vapor phase PvTx measurements of binary blends of 2,3,3,3-tetrafluoroprop-1-ene + propane and *cis*-pentafluoroprop-1-ene + propane. *Journal of Chemical & Engineering Data*, 61(9): 3346-3354.
52. **Brown, J.S.**, Zilio, C., Akasaka, R., Higashi, Y., 2016. Low-GWP refrigerants. *Science and Technology for the Built Environment*, 22(8): 1075-1076.
53. **Brown, J.S.** 2016. Response to Kristin Heyer. *Integritas*, 7.1: 21-24.

54. **Brown, J.S.** 2016. Energy, environment, and the fundamental task of the person. *Integritas*, 8.1: 1-16.
55. McLinden, M.O., **Brown, J.S.**, Brignoli, R., Kazakov, A.F., Domanski, P.A., 2017. Limited options for low-global-warming-potential refrigerants. *Nature Communications*, 8: 14476.
56. Kedzierski, M.A., Brignoli, R., Quine, K.T., **Brown, J.S.**, 2017. Viscosity, density, and thermal conductivity of aluminum oxide and zinc oxide nanolubricants *International Journal of Refrigeration*, 74: 3-11.
57. Romeo, R., Giuliano Albo, P.S., Lago, S., **Brown, J.S.**, 2017. Experimental liquid densities of cis-1,3,3,3-tetrafluoroprop-1-ene (R1234ze(Z)) and trans-1-chloro-3,3,3-trifluoropropene (R1233zd(E)). *International Journal of Refrigeration*, 76: 176-182.
58. Brignoli, R., **Brown, J.S.**, Skye, H., Domanski, P.A., 2017. Refrigerant performance evaluation including effects of transport properties and optimized heat exchangers. *International Journal of Refrigeration*, 80: 52-65.
59. Di Nicola, G., Fedele, L., **Brown, J.S.**, Bobbo, S., Coccia, G., 2017. Saturated pressure measurements of *trans*-1-chloro-3,3,3-trifluoroprop-1-ene (R1233zd(E)). *Journal of Chemical & Engineering Data*, 62: 2496-2500.
60. **Brown, J.S.**, Coccia, G. Tomassetti, S., Pierantozzi, M., Di Nicola, G., 2017. Vapor phase PvTx measurements of binary blends of 2,3,3,3-tetrafluoroprop-1-ene + isobutane and *trans*-1,3,3,3-tetrafluoroprop-1-ene + isobutane. *Journal of Chemical & Engineering Data*, 62: 3577-3584.
61. Domanski, P.A., Brignoli, R. **Brown, J.S.**, Kazakov, A.F., McLinden, M.O., 2017. Low-GWP refrigerants for medium and high-pressure applications. *International Journal of Refrigeration*, 84: 198-209.
62. **Brown, J.S.**, Coccia, G. Tomassetti, S., Pierantozzi, M., Di Nicola, G., 2018. Vapor phase PvTx measurements of binary blends of *trans*-1-chloro-3,3,3-trifluoroprop-1-ene + isobutane and *cis*-1,3,3,3-tetrafluoroprop-1-ene + isobutane. *Journal of Chemical & Engineering Data*, 63: 169-177.
63. Fedele, L., Pierantozzi, M., Di Nicola, G., **Brown, J.S.**, Bobbo, S., 2018. Compressed liquid density and vapor phase PvT measurements of *trans*-1-chloro-3,3,3-trifluoroprop-1-ene [R1233zd(E)]. *Journal of Chemical & Engineering Data*, 63: 225-232.
64. Bobbo, S., Di Nicola, G., Zilio, C., **Brown, J.S.**, Fedele, L., 2018. Low GWP halocarbon refrigerants: A review of thermophysical properties. *International Journal of Refrigeration*, 90: 181-201.

Book Chapters

1. Bobbo, S., Fedele, F., **Brown, J.S.** 2017. Thermodynamic properties of refrigerants with Low GWP. In A.A. Minea (Ed.), *Advances in New Heat Transfer Fluids: From Numerical to Experimental Techniques* (pp. 427-461). Boca Raton, Florida: Taylor and Francis.

Conference Proceedings Papers

1. Helmick, M.R., Khoo, B.C., **Brown, J.S.**, Sonin, A.A. 1988. Vapor condensation rate at a turbulent liquid interface for application to cryogenic hydrogen. *AIAA 26th Aerospace Sciences Meeting*. Reno, Nevada, Paper AIAA-88-0559.
2. **Brown, J.S.**, Helmick, M.R., Sonin, A.A. 1989. Vapor condensation rate at a turbulent liquid surface in systems with possible space-based applications. *AIAA/ASME/SAE/ASEE 25th Joint Propulsion Conference*. Monterey, California, Paper AIAA-89-2846.
3. **Brown, J.S.**, Terry, J.L., Hutter, R.J. 1994. An analytical prediction of water droplet travel when discharged from the face of an evaporator core. *1994 SAE International Congress and Exposition*. Detroit, Michigan, Paper SAE 940501.
4. Busch, J., Pien, W.S., AbdulNour, B., **Brown, J.S.**, Doroudian, M. 1994. Computational fluid dynamics and validation for a HVAC duct design. *1994 SAE International Congress and Exposition*. Detroit, Michigan, Paper SAE 949597.
5. Tsantis, A.P., **Brown, J.S.**, Hutter, R.J., Singh, T. 1994. Prediction and actual in-vehicle heater performance using a latent heat storage battery. *Subzero Engineering Conditions Conference*. Brainerd, Minnesota, Paper SAE 940089.
6. **Brown, J.S.**, Graham, E.T., Walunas, J.B. 1997. A novel low air flow rate measuring device. *1997 SAE International Congress and Exposition*. Detroit, Michigan, Paper SAE 970117.
7. **Brown, J.S.**, Jones, B.W. 1997. A new transient passenger thermal comfort model. *1997 SAE International Congress and Exposition*. Detroit, Michigan, Paper SAE 970528.
8. Jones, B.W., **Brown, J.S.** 1997. Evaluating thermal comfort in the virtual test trip. *5th International Conference: The Virtual Automobile and the Role of Experimentation*. Florence, Italy.
9. **Brown, J.S.** 1998. Role of faculty in career guidance: perspective of a new faculty member with recent industrial experience. *ASEE Middle Atlantic Conference*. Washington, DC, 82-85.
10. **Brown, J.S.** 1999. Book discussion as part of freshmen orientation at The Catholic University of America. *ASEE Middle Atlantic Conference*. West Long Branch, New Jersey, 35-37.
11. Nguyen, U., **Brown, S.**, Chang, I., Krycia, J., and Mirotznik, M.S. 2003. Numerical evaluation of heating in the human head due to magnetic resonance imaging (MRI). *Medical Imaging 2003*. International Society for Optics and Photonics, San Diego, California, 627-638.
12. **Brown, J.S.**, Domanski, P.A. 2003. Fundamental aspects of the application of carbon dioxide in comfort cooling. *21st International Congress of Refrigeration*. Washington, DC.
13. **Brown, J.S.**, and Carr, M.A. 2004. Internal combustion engine demonstrator for first year introduction to engineering laboratory course. *ASEE Annual Conference*, Salt Lake City, Utah, 8157-8165.
14. Ratts, E.B., and **Brown, J.S.** 2004. Laminar entropy generation over a flat plate with isothermal and constant heat flux boundary conditions using the von Karman integral method. *ASME 2004 Heat Transfer/Fluids Engineering Summer Conference*, Charlotte, North Carolina, 61-69.

15. **Brown, J.S.**, 2005. A new micro-channel heat exchanger model, *2nd Conference on Thermophysical Properties and Transfer Processes of Refrigerants*, Vicenza, Italy.
16. **Brown, J.S.** 2007. Evaluation of potential R-22 substitute refrigerants using fundamental thermodynamic parameters. *22nd International Congress of Refrigeration*. Beijing, China.
17. **Brown, J.S.**, Domanski, P.A., and Lemmon, E.W. 2009. CYCLE_D Version 4.0: Theoretical vapor compression cycle design program. *3rd Conference on Thermophysical Properties and Transfer Processes of Refrigerants*. Boulder, Colorado.
18. **Brown, J.S.**, Zilio, C., and Cavallini, A. 2009. Estimations of the thermodynamic and transport properties of R-1234yf using a cubic equation of state and group contribution methods. *3rd Conference on Thermophysical Properties and Transfer Processes of Refrigerants*. Boulder, Colorado.
19. Zilio, C., **Brown, J.S.**, and Cavallini, A. 2009. Simulation of R-1234yf performance in a typical automotive system. *3rd Conference on Thermophysical Properties and Transfer Processes of Refrigerants*. Boulder, Colorado.
20. **Brown, J.S.**, Zilio, C., and Cavallini, A. 2010. Critical Review of the Latest Thermodynamic and Transport Property Data and Models, and Equations of State for R-1234yf. *13th International Refrigeration and Air Conditioning Conference at Purdue*. West Lafayette, Indiana.
21. **Brown, J.S.**, Polonara, F., Di Nicola, G., Fedele, L., Bobbo, S., and Zilio, C. 2010. Vapor pressure of hydrofluoroolefins: Critical review of experimental data and models. *13th International Refrigeration and Air Conditioning Conference at Purdue*. West Lafayette, Indiana.
22. Cavallini, A., Zilio, C., and **Brown, J.S.** 2010. Sustainability with prospective refrigerants. *IIR Sustainable Refrigeration and Heat Pump Technology*. Stockholm, Sweden.
23. **Brown, J.S.**, and Domanski, P.A. 2011. Alternative Cooling Technologies. *The 23rd IIR International Congress of Refrigeration*. Prague, Czech Republic.
24. **Brown, J.S.**, and Zilio, C. 2011. Flow Boiling Performance of Refrigerants Considering Penalization Terms (Exergy Losses) For Heat Transfer and Pressure Drop. *The 23rd IIR International Congress of Refrigeration*. Prague, Czech Republic.
25. Zilio, C., Brignoli, R., and **Brown, J.S.** 2011. Experimental Analysis of a Minichannel Air Cooled Condenser Operating with R1234yf. *The 23rd IIR International Congress of Refrigeration*. Prague, Czech Republic.
26. **Brown, J.S.** 2012. Introduction to alternatives to high-GWP HFC refrigerants. *Fourth ASHRAE/NIST Refrigerants Conference*. Gaithersburg, MD.
27. Cavallini, A., Zilio, C., and **Brown, J.S.** 2012. Thermophysical properties, heat transfer, and pressure drop of HFOs. *Fourth ASHRAE/NIST Refrigerants Conference*. Gaithersburg, MD.
28. McLinden, M., Domanski, P.A., Kazakov, A., Heo, J.H., and **Brown, J.S.** 2012. Possibilities, limits, and tradeoffs for refrigerants in the vapor compression cycle. *Fourth ASHRAE/NIST Refrigerants Conference*. Gaithersburg, MD.
29. Di Nicola, G., **Brown, J.S.**, Fedele, L., Securo, M., Bobbo, S., Zilio, C. 2013. Subcooled liquid density measurements and PvT measurements in the vapor phase for

- 3,3,3-trifluoroprop-1-ene (R1243zf). *4th Conference on Thermophysical Properties and Transfer Processes of Refrigerants*. Delft, The Netherlands.
30. Domanski, P.A., **Brown, J.S.**, Heo, J., Wojtusiak, J., McLinden, M.O. 2013. A thermodynamic analysis of refrigerants. I. Thermodynamic limits of the vapor compression cycle. *4th Conference on Thermophysical Properties and Transfer Processes of Refrigerants*. Delft, The Netherlands.
 31. Longo, G.A., Zilio, C., Righetti, G., **Brown, J.S.** 2013. HFO1234ze(E) condensation inside a brazed plate heat exchanger. *4th Conference on Thermophysical Properties and Transfer Processes of Refrigerants*. Delft, The Netherlands.
 32. McLinden, M.O., Kazakov, A.F., **Brown, J.S.**, Domanski, P.A. 2013. A thermodynamic analysis of refrigerants. II. Possibilities and tradeoffs for low-GWP refrigerants. *4th Conference on Thermophysical Properties and Transfer Processes of Refrigerants*. Delft, The Netherlands.
 33. McLinden, M.O., **Brown, J.S.**, Kazakov, A.F., Domanski, P.A. 2015. Hitting the bounds of chemistry: Limits and tradeoffs for low-GWP refrigerants. *The 24th IIR International Congress of Refrigeration*. Yokohama, Japan.
 34. Fedele, L., Di Nicola, G., **Brown, J.S.**, Colla, L., Bobbo, S. 2015. Saturated pressure measurements of cis-pentafluoroprop-1-ene (R1225ye(Z)). *The 24th IIR International Congress of Refrigeration*. Yokohama, Japan.
 35. Zilio, C., Mancin, S., **Brown, J.S.**, Longo, G.A. 2015. Saturated pressure measurements of cis-pentafluoroprop-1-ene (R1225ye(Z)). *The 24th IIR International Congress of Refrigeration*. Yokohama, Japan.
 36. Brignoli, R., **Brown, J.S.** 2015. Vapor compression cycle model capable of simulating well-described and not-so-well-described refrigerants. *The 24th IIR International Congress of Refrigeration*. Yokohama, Japan.

Graduate Advisor: Ain Sonin, Department of Mechanical Engineering, MIT

Collaborators:

- Prof. Alberto Cavallini, University of Padova, Italy
- Dr. David Didion, Retired NIST Fellow
- Dr. Piotr Domanski, NIST
- Dr. Andrei Kazakov, NIST
- Dr. Mark Kederzski, NIST
- Dr. Eric Lemmon, NIST
- Dr. Mark McLinden, NIST
- Dr. Eric Ratts, University of Michigan-Dearborn
- Prof. Davide Del Col, University of Padova, Italy
- Prof. Giovanni Longo, University of Padova, Italy
- Prof. Claudio Zilio, University of Padova, Italy
- Dr. Sergio Bobbo, CNR, Padova, Italy
- Dr. Laura Fedele, CNR, Padova, Italy
- Prof. Fabio Polonara, Polytechnic Univ of Marche, Ancona, Italy
- Prof. Giovanni DiNicola, Polytechnic Univ of Marche, Ancona, Italy
- Dr. Simona Lago, Nat Inst of Metrological Research, Torino, Italy
- Dr. Alberto Albo, Nat Inst of Metrological Research, Torino, Italy

Edited Books

1. Pope Benedict XVI, *A Reason Open to God*, edited by J. Steven Brown (Washington, DC: Catholic University of America Press, 2013).

Software

1. Brown, J.S., P.A. Domanski, and E.W. Lemmon. 2009. CYCLE_D: NIST Vapor Compression Cycle Design Program, Version 4.0, NIST Standard Reference Database 49. <https://www.nist.gov/srd/nist-standard-reference-database-49>
2. Brown, J.S., P.A. Domanski, and E.W. Lemmon. 2012. CYCLE_D: NIST Vapor Compression Cycle Design Program, Version 5.0, NIST Standard Reference Database 49. <https://www.nist.gov/srd/nist-standard-reference-database-49>
3. Brown, J.S., P.A. Domanski, and E.W. Lemmon. 2016. CYCLE_D: NIST Vapor Compression Cycle Design Program, Version 5.1, NIST Standard Reference Database 49. <https://www.nist.gov/srd/nist-standard-reference-database-49>
4. Brown, J.S. and P.A. Domanski. 2016. REFLEAK: NIST Leak/Recharge Simulation Model for Refrigerant Blends, Version 5.0, NIST Standard Reference Database 73. <https://www.nist.gov/srd/nist-standard-reference-database-73>
5. Domanski, P.A., J.S. Brown, and R. Brignoli. 2018. CYCLE_D-HX: NIST Vapor Compression Cycle Model Accounting for Refrigerant Thermodynamic and Transport Properties. <https://www.nist.gov/services-resources/software/cycled-hx-nist-vapor-compression-cycle-model-accounting-refrigerant>

General Audience

1. **Brown, J.S.** Education: A Precious Gift, *Freshman Convocation Address*, The Catholic University of America, September 10, 2003. <http://publicaffairs.cua.edu/RDSpeeches/04FreshConvoSpeechBrown.cfm>
2. **Brown, J.S.** The Cardinal Virtue of Prudence, *The Tower*, The Catholic University of America, March 18, 2011.
3. **Brown, J.S.** What does faith have to do with the intellectual life? *Faculty Roundtable as part of President Garvey's Inauguration Activities*, The Catholic University of America, January 18, 2011. <http://president.cua.edu/inauguration/faculty-roundtable-remarks.cfm#Brown>
4. **Brown, J.S.** *No Matter How We Calculate*, First Year Experience, The Catholic University of America, June 17, 2013. <https://www.youtube.com/watch?v=YRS1qI5Rnt8>

TEACHING

- Four teaching awards:
 - Provost Award for Overall Teaching Excellence, November 2011
 - Kaman Award for Excellence in Teaching, School of Engineering, May 2004
 - Ralph Teetor Educational Award, Society of Automotive Engineers, March 2001
 - Outstanding Faculty Teaching Achievement Award, School of Engineering, February 1999
- Taught seven different undergraduate courses and eight different graduate courses.
- Lifetime average teacher rating of 9.1/10.0.

INSTITUTIONAL AND PROFESSIONAL SERVICE

Department

- Served as Acting Chairperson of Mechanical Engineering, June 2001 – August 2002
- Served as Chairperson of Mechanical Engineering, September 2002 – August 2008
- Completely renovated and upgraded thermal sciences laboratory, 1998-1999, 2011
- Maintained thermal sciences laboratory, 1998-2001, 2011-2016
- Served on twelve mechanical engineering faculty search committees, Fall 1998-2016
- ASME Faculty Advisor, AY 1998-1999 through AY 2000-2001
- Mechanical Engineering Faculty Secretary, AY 1999-2000, AY 2000-2001
- Led undergraduate recruiting efforts, 1998-2016
- Advised/mentored from roughly 25 % to nearly 100 % (varied academic year to academic year) of undergraduate students over the timeframe 1999-2013
- Have written many dozens of recommendation letters
- Led all ABET-related activities, 2001-2016
- Finalized ABET self-study report, 2001
- Prepared ABET self-study report, 2007, 2013
- Successfully led department through ABET site visits, 2001, 2007, 2013
- Participated in comprehensive examinations, Spring 1999-2016
- Undergraduate committee, 2001-2016
- Regularly provide tutoring to students for a wide range of undergraduate courses, including ones that I do not teach, 1998-2016

School

- Participated in engineering summer programs for high school students, 1998-2001, 2014
- Served on search committee for chairperson of civil engineering, AY 2002-2003
- Served on search committee for chairperson of electrical engineering and computer science, AY 2003-2004
- Served on three separate electrical engineering and computer science search committees, AY 2009-2010
- Served on biomedical engineering faculty search committee, AY 2009-2010
- Executive Committee, 2001-2008, 2013-2016
- Space Committee, 2001-2008, 2013-2016
- Undergraduate Committee, 2001-2008, 2013-2016

- Graduate Committee, 2001-2008, 2013-2016
- Strategic Planning Committee, 2001-2008, 2013-2016
- Chair of Ad-hoc Core Curriculum Committee, AY 2009-2010, AY 2010-2011, AY 2014-2015
- ABET Director, AY 2012-2013
- Member of CAP Committee, 2007-2010, 2014-2016
- Alternate member of CAP Committee, 2011-2013
- Associate Dean, 2013-2016

University

- Participated in University-Wide Reader's Program, AY 1998-1999, AY 1999-2000
- Freshmen Convocation Speaker, AY 2002-2003
- McDonald House Faculty Fellow, AY 2001-2002, AY 2002-2003
- Faculty Welfare Committee, AY 2002-2003
- Middle States Periodic Review Report Committee, AY 2004-2005, AY 2013-2015
- Educational Policy Committee, AY 2005-2006 through AY 2012-2013
- Chair of Educational Policy Committee, AY 2005-2006 through 2012-2013
- Academic Senator, AY 2003-2004 through AY 2007-2008, AY 2016-present
- Executive Committee of the Academic Senate, AY 2007-2008
- Committee to establish University Goals for General Education, AY 2007-2008, AY 2014-2016
- Student Learning and Outcomes Assessment Council, AY 2009-2010 through AY 2011-2012
- Fulbright Committee, AY 2011-2012, AY 2012-2013, AY 2013-2014
- Provost Search Committee, AY 2006-2007, AY 2014-2015
- Dean of Arts and Sciences Search Committee, AY 2013-2014
- Patent Committee, AY 2012-2016
- Participant in faculty roundtable as part of inauguration activities of President Garvey, January 2011
- Goldwater Scholarship Committee, AY 2014-2016
- Honors Program Advisory Committee, AY 2014-2016
- Online Education Advisory Committee, AY 2014-2015

Profession

- ABET Program Evaluator, 2006-present
- Associate Editor, *Science and Technology for the Built Environment* (previously known as *HVAC&R Research*), 2010-present
- Member of Advisory Board, Department of Engineering, Benedictine College, 2013-2016
- External reviewer of tenure and promotion package, Oklahoma State University, AY 2011-2012
- External reviewer of reappointment package, College of Staten Island, The City University of New York, AY 2003-2004
- Paper Reviewer:

- *Applied Thermal Engineering*
- *ASHRAE Journal*
- *ASHRAE Transactions*
- *Energy*
- *Energy Management and Conversion*
- *Fluid Phase Equilibria*
- *Science and Technology for the Built Environment* (previously known as *HVAC&R Research*)
- *Industrial and Engineering Chemistry Research*
- *International Journal of Air Conditioning and Refrigeration*
- *International Journal of Energy Research*
- *International Journal of Heat and Mass Transfer*
- *International Journal of Modeling and Simulation*
- *International Journal of Refrigeration*
- *International Journal of Thermophysics*
- *Journal of Chemical and Engineering Data*
- *Journal of Physical and Chemical Reference Data*
- *Journal Thermal Analysis and Calorimetry*
- *Kuwait Journal of Science and Engineering*
- *SAE Transactions*
- Session Chair, ASME – ZSITS International Thermal Science Seminar, Bled, Slovenia, June 2000
- Session Chair, ASHRAE Annual Meeting, Honolulu, HI, June 2002
- Session Chair, 22nd IIR International Congress of Refrigeration, Washington, DC, August 2003
- Session Chair, 3rd IIR Conference on Thermophysical Properties and Transfer Processes of Refrigerants, Boulder, CO, June 2009
- Co-chaired and organized the annual meeting of the Mechanical Working Group of the Interagency Advanced Power Group, Washington, DC, May 2011
- Session Chair, 23rd IIR International Congress of Refrigeration, Prague, Czech Republic, August 2011
- Session Chair, 18th Symposium on Thermophysical Properties, Boulder, CO, June 2012
- Session Chair, ASHRAE Winter Meeting, Dallas, TX, January 2013
- Session Chair, 24th IIR International Congress of Refrigeration, Yokohama, Japan, August 2015
- Session Chair (2 sessions), ASHRAE Winter Meeting, Las Vegas, NV, January 2017
- ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers):
 - Member TC 1.1 – Thermodynamics and Psychometrics, July 2007 – June 2011
 - Corresponding Member TC 1.1 – Thermodynamics and Psychometrics, July 2011 – present
 - Member TC 1.3 – Heat Transfer and Fluid Flow, July 2011 – present
 - Corresponding Member TC 1.3 – Heat Transfer and Fluid Flow, January 1998 – June 2011

- Member TC 2.1 – Physiology and the Human Environment, July 2000 – June 2004
- Secretary of TC 2.1 – Physiology and the Human Environment, July 2001 – June 2004
- Member TC 7.6/8.11 – Unitary and Room Air Conditioners and Heat Pumps, July 2000 – June 2004
- Corresponding Member TC 9.3 – Transportation Air Conditioning, January 1998 – June 2007
- Corresponding Member 3.1 – Refrigerants and Secondary Coolants, July 2013 – present
- Corresponding Member 8.4 – Air-to-Refrigerant Heat Transfer Equipment, July 2013 – present
- Corresponding Member 8.5 – Liquid-to-Refrigerant Heat Exchangers, July 2013 – present
- ASME (American Society of Mechanical Engineers)
 - Executive Board Member – ASME Washington DC Section (2000-2001)
 - ASME Student Section Faculty Advisor (1998-2001)
- IIR (International Institute of Refrigeration)
- IIR, Board of Directors the United States National Committee, 2012-present
- IIR, Secretary of the United States National Committee, 2012-2015
- IIR, Vice Chair of the United States National Committee, 2016-present
- IIR, Commission Member for the United States, Commission B1 – Thermodynamics and Transfer Processes, 2011-present
- Member of ASEE (American Society of Engineering Education)