J. Steven Brown, Ph.D., P.E.
Professor of Mechanical Engineering
Senior Vice Provost and Interim Dean of the College of Engineering, Physics, and Computing
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LinkedIn: https://www.linkedin.com/in/steve-brown-28389213/

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

7/25 – present	**Senior Vice Provost and Interim Dean of the College of Engineering, Physics, and Computing** – The Catholic University of America (CUA)
1/19 – 6/25	**Senior Vice Provost for Academic Administration and Dean of Graduate Studies** – CUA
6/16 – 12/18	**Vice Provost and Dean of Graduate Studies** – 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 – 6/18	**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 – 3/20	**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 Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)

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, not being maintained as of January 2020

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-tetrauoroprop-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-end [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.
65. Lago, S., Albo, P.A.G., **Brown, J.S.**, Bertinetti, M., 2018. High pressure speed of sound measurements of trans-1-chloro-3,3,3-trifluoropropene (R1233zd(E)) in liquid region for temperature from (273.15 to 353.15) K. *Journal of Chemical & Engineering Data*, 63: 4039-4045.
66. Tomassetti, S., Pierantozzi, M., Di Nicola, G., Polonara, F., **Brown, J.S.**, 2019. Vapor-Phase *PvTx* Measurements of Binary Blends of *cis*-1,2,3,3,3-Pentafluoroprop-1-ene + Isobutane and 3,3,3-Trifluoropropene + Isobutane. *Journal of Chemical & Engineering Data*, 64: 688-695.
67. Tomassetti, S., Coccia, G., Pierantozzi, M., Di Nicola, G., **Brown, J.S.**, 2020. Vapor phase and two-phase *PvTz* measurements of difluoromethane + 2,2,2,3-tetrafluoroprop-1-ene. *The Journal of Chemical Thermodynamics*, 141: 105966.

68. Longo, G.A., Mancin, S., Righetti, G., Zilio, C., **Brown, J.S.**, 2020. Assessment of the low-GWP refrigerants R600a, R1234ze(Z) and R1233zd(E) for heat pump and organic Rankine cycle applications. *Applied Thermal Engineering*, 167: 114804.
69. Longo, G., Righetti, G., Zilio, C., Ortombina, L., Zigliotto, M., **Brown, S.**, 2020. Application of an artificial neural network (ANN) for predicting low-GWP refrigerant condensation heat transfer inside herringbone-type brazed plate heat exchangers (BPHE). *International Journal of Heat and Mass Transfer*, 156: 119824.
70. Tomassetti, S., Di Nicola, G., Pierantozzi, M., **Brown, J.S.**, 2020. Two-phase and vapor phase *PvTz* properties of difluoromethane + *cis*-1,3,3,3-tetrafluoroprop-1-ene binary system. *Journal of Chemical & Engineering Data*, 64: 688-695.
71. Longo, G., Mancin, S., Righetti, G., Zilio, C., **Brown, S.**, 2020. Assessment and optimisation of low-GWP refrigerants during two-phase heat transfer inside small-diameter smooth tubes. *International Journal of Refrigeration*, 117: 61-70.
72. Tomassetti, S., Di Nicola, G., Pierantozzi, M. **Brown J.S.**, 2020. Two-phase and vapor phase *PvTx* properties of the difluoromethane + *cis*-1,3,3,3-tetrafluoroprop-1-ene binary system. *Journal of Chemical & Engineering Data*, 65: 4326-4334.

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-trifluorop-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.* Yokahama, 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.* Yokahama, 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.* Yokahama, 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.* Yokahama, 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
6. Brown, J.S., P.A. Domanski, and E.W. Lemmon. 2018. CYCLE_D: NIST Vapor Compression Cycle Design Program, Version 6.0, NIST Standard Reference Database 49. https://www.nist.gov/srd/nist-standard-reference-database-49
7. Brown, J.S. and P.A. Domanski. 2018. REFLEAK: NIST Leak/Recharge Simulation Model for Refrigerant Blends, Version 5.1, NIST Standard Reference Database 73. https://www.nist.gov/srd/nist-standard-reference-database-73
8. Brown, J.S., P.A. Domanski, R. Brignoli, and Y.J. Yoon. 2020. REFLEAK: NIST Leak/Recharge Simulation Model for Refrigerant Blends, Version 6.0, NIST Standard Reference Database 73. https://www.nist.gov/srd/nist-standard-reference-database-73
9. Brown, J.S., Brignoli, R., Domanski, P.A., Yoon, Y.J., 2021. CYCLE_D-HX: NIST Vapor Compression Cycle Model Accounting for Refrigerant Thermodynamic and Transport Properties; Version 2, User's Guide. https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2134.pdf

General Audience

1. **Brown, J.S.** Education: A Precious Gift, *Freshman Convocation Address*, The Catholic University of America, September 10, 2003.
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.
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, 2006-2018
- Associate Editor, *Science and Technology for the Built Environment* (previously known as *HVAC&R Research*), 2010-2018
- 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, Yokahama, 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, 2012-2019
- IIR, Secretary of the United States National Committee, 2012-2015
- IIR, Vice Chair of the United States National Committee, 2016-2019
- IIR, Commission Member for the United States, Commission B1 – Thermodynamics and Transfer Processes, 2011-present