Dr.-Ing. Eckhard A. Groll
William E. and Florence E. Perry Head of Mechanical Engineering
Reilly Professor of Mechanical Engineering
Purdue University
School of Mechanical Engineering
585 Purdue Mall
West Lafayette, IN 47907-

December 31, 2022

John Mengelt
Managing Director
Breckenridge Partners
2415 Moores Mill Road
Auburn, AL 36830

Re.: My Application for the position of Dean, Samuel Ginn College of Engineering, Auburn University

Dear John:

In response to our web meeting on Thursday, December 15, 2022, I would like to apply for the position of Dean of the Samuel Ginn College of Engineering at Auburn University. I consider myself extremely well qualified for this position based on my significant successes and experiences in all areas of the academic profession, including research, teaching, service, and in particular administration, as well as my personal growth by participation in academic leadership programs.

Jerry Garcia once said, "*You do not merely want to be considered just the best of the best. You want to be considered the only ones who do what you do*." Too often, university administrators refer to university rankings, such as the ones provided annually by the U.S. World and News Report, as a means to position their educational and research programs among peers. Typically, academic programs similar in nature are compared by well-defined metrics and survey tools. Instead of concentrating on these benchmarking activities, I have spent most of my academic career focusing on providing unique and distinctive learning, discovery, and engagement activities to engineering students, faculty and staff. These activities cannot be found at any other institutions and therefore, clearly distinguishing our graduates from anyone else. By being unique, we are automatically number one.

For example, together with my research team, we were the first to develop unique simulation models for positive displacement hermetic compressors that include all energy flows and losses inside the hermetic shell. In addition, we have investigated truly unique and novel compression mechanisms that have not been studied elsewhere and with two of them finding commercial successes at this time. Based on my research on compressors, I have received arguably the highest international honor in my field of research, namely the 2018 J&E Hall International Gold Medal in Refrigeration by the Institute of Refrigeration. Furthermore, we have conducted groundbreaking research on unique cycle architectures for cold-climate heat pumps, which led to two patents and my receiving the 2017 Peter Ritter von Rittinger International Heat Pump Award by the IEA Heat Pump Centre, also considered one of the highest international honors in my field of research.

Similarly, I have developed and implemented several unique educational programs as part of my administrative activities as well. Most notable, together with a few of my colleagues, I have been instrumental in globalizing the engineering education at Purdue University for the last two decades. I am a founding member of the award-winning GEARE program, which integrates a minimum of 12 credit hours of language studies, a domestic internship, a subsequent international internship, one semester of study abroad, and a global design team project into a regular four-year undergraduate curriculum.. Founded in 2003, this is still a one-of-a-kind educational program in the US to date. Based on our efforts in operating global programs and expanding the network of international partner universities, the percentage of Purdue ME students, who have a significant international experience upon graduation, has increased from 1% in

2000 to more than 30% in 2019, until the global COVID19 pandemic significantly limited international travel. At the same time, the percentage of Purdue Engineering students with a significant international experience upon graduation has increased from 3% in 2000 to more than 20% in 2019. Both 2019 percentages were significantly above the U.S. averages in engineering disciplines, which had increased to approximately 7.5% during the same time.

In the next paragraphs, I would like to discuss my experiences as they relate to the seven strategic goals of the Samuel Ginn College of Engineering at Auburn University.

Provide transformative engineering education programs

I have a passion for academic programs. I have a record of accomplishment of developing unique student experiences both for undergraduate and graduate students. I was the first person to be appointed as the combined Associate Dean for Undergraduate and Graduate Education in the College of Engineering at Purdue University. After I left the Dean's Office to take on the headship in ME, the position was split and each associate dean continued to refer to the initiatives we started during my time in this office for quite a while longer. E.g., we started "Do More in Four," where we integrated a 3-session Co-Op into a four-year curriculum. We also initiated the experiential learning program of GRIT, where each student is expected to conduct a **G**lobal, **R**esearch, **I**ndustry, and **T**eam project experience by the time they graduate. I am continuing this effort as the Head of ME where we are "in pursuit of 100% GRIT." In addition, I developed several unique graduate programs, including a new summer program called Int'l Refrigeration and Compressor Course (IRCC), a collaborative education program between the Technical University of Dresden, Germany, and Purdue University during each summer, which today also includes Oklahoma State University and the Karlsruhe University of Applied Sciences. I developed a graduate co-operative education program that combines online courses, on-campus courses, four work rotations, and two research experiences within a three-year MS degree program. Furthermore, I was instrumental in developing our Professional Master's degree (a combined single-year Business/Engineering program) in the School of ME and changing the delivery and reward mechanisms of our existing online MSME degree program, which led to our current #1 ranking of this program. This #1 ranking has been held for the past three years.

Significantly grow the college's research enterprise to meet global challenges

During my current tenure as the head of the School of ME at Purdue, we have increased the third-party research expenditures to close to $49M and raised third-party research funding of almost $50M during the Fiscal Year 2021-22. These amounts were in the range of $26M and $32M, respectively, just four years ago. Both of the FY22 amounts are all-time highs for the School. We accomplished this growth by pursing three main activities that are equally relevant for the operation of the College, as follows:

1. The School provides seed funding for cross-disciplinary collaborations to initiate and develop academic communities and research teams that ultimately lead to major centers of scholarly endeavor.
2. The School fosters the development of cross-disciplinary proposals through academic incentives, such as releasing faculty, who are developing large, center-type proposals, from teaching.
3. The School carefully evaluates its own research strengths and build on them to identify a selected number of overarching engineering research initiatives that will address the most pressing issues facing our nation and the world, including issues associated with autonomy, communication, energy, food, medicine, space exploration, transportation, waste, and water, to name a few.

Strengthen engagement and partnerships to advance the college's programs

During my first three years as the Head of ME, we have raised approximately $15 million each year in private donations through various development activities. Even during the pandemic, we were able to surpass our yearly fund raising goals. We achieved this by pursuing novel development methods. E.g., we sent coffee and chocolate care packages to alumni and then conducted a web-based coffee hours with the Head. Currently, the School of ME is in a major fundraising campaign to renovate the original ME Building, which is approximately 90 years old and has not seen any major renovation. This campaign started in August 2021 and we have raised more than $13 million to date. We have done this by conducting several Heads Events, each with 12 to 18 alumni of high potential giving capacity, across the nation,

including events at Naples, FL, Houston, TX, San Francisco Bay Area, CA, Detroit, MI, Chicago, IL, and Indianapolis, IN. During the same time, I traveled with the development team members on numerous occasions making individual donor visits. I significantly changed the structure and make-up of our external advisory council, including introducing term limits and increasing gender and URM diversity. These measures have resulted in a vibrant, engaging and gift giving council. Furthermore, I started an early professional advisory council of alumni, who are 4 to 6 years post-graduation, with the main goal to provide feedback on our curriculum and a secondary goal of connecting rising professional stars to the School and developing them into loyal and gift-giving alumni. All of these advancement experiences will help me in effectively developing resources to advance the college's programs.

Recruit, develop, support, recognize, reward and retain exceptional faculty and staff

During the first three recruiting cycles as the Head of ME, I have hired 18 faculty members to join the School of ME. Nine of them (50%) are women, one is African American, one is Hispanic, and one is an NAE member. In 15 of the 18 cases, I was able to recruit the #1 choice suggested by the search committee. In addition, I have negotiated three successful faculty retention offers so far and made four rising star appointments of mid-career faculty members as preemptive retention measures. I significantly altered how we nominate faculty and staff for internal and external awards, resulting in the School of ME being seen as the model to follow within the College of Engineering at Purdue when it comes to recognizing their faculty and staff members.

Within the School of ME, I have established the following guidelines. Recruiting and retaining diverse faculty and staff relies on a commitment by all involved in the search and retention processes. We start by creating a supportive and inclusive community with strong core values where people want to belong so that external people are excited to join our community and internal people are excited to stay. We need critical masses of faculty and staff working in areas of relevance, who provide opportunities for collaboration and support. Such "people clusters" are supplemented by exceptional research and educational facilities that are the envy of peer institutions. All people in the School need to be involved in identifying young exciting talent as well as movable senior talent. We established avenues that allow recruiting outside traditional norms so that we are efficient and effective in making targeted offers. Above all, we make competitive offers by understanding offers made by peer institutions and clearly outlining what our institution has to offer.

Accelerate the college's recruitment of high-caliber undergraduate and graduate students

I have significant experiences in recruiting undergraduate and graduate students as part of my administrative appointments as the Director of the Office of Professional Practice, as the Associate Dean for Undergraduate and Graduate Education, and as the Head of ME. In all cases, I have excelled in the recruitment of students by providing unique and desirable educational programs, by creating a culture of support and belonging, by outstanding mentoring and advising, and by providing financial resources via undergraduate scholarships, graduate fellowships, and research and teaching assistantships.

In addition, as the Head of ME, I established two different task forces related to increasing the percentage of women students and the percentage of African American students in the School with implementation of activities to start this fall. I strive to foster an environment of diversity, equity, inclusion, access, and belonging by asking faculty, staff and students to be empathetic, positive, encouraging, and to treat others well. I ask the ME community to respect all voices and firmly acknowledge that each contribution matters. We value diverse backgrounds and perspectives, and strongly support people from all cultures, religions, and sexual orientations. We are anti-racist, seeking equity and inclusion for all.

Strengthen the college's culture of continuous improvement across college operations

The No.1 core values of the School of ME is "*persistently pursue excellence. ME faculty, staff and students are forward-thinking, competitive, rigorous, and driven. We go above and beyond the regular call of duty and exhibit excellence in all that we do. We continuously improve and strive for innovation in our research, teaching and professional services, and our outcomes are second to none.*" We developed the ME core values during a strategic planning event that was attended by faculty, staff, graduate students, and

undergraduate students to have buy-in from all. We are making our written core values a living document by referring to a core value at the opening of each of our standing committee meetings. Persistently pursuing excellence is by far the most common referred to core value.

Throughout my academic career, I have pursued excellence in every aspect of the academic profession, including research (as evident by receiving the previously mentioned highest research awards in my fields of research), learning (as evident by receiving the Murphy Award – the highest teaching award at Purdue – and by being inducted into the Book of Great Teachers at Purdue), and engagement (as evident by receiving the highest service awards in two professional organizations, i.e. the Exceptional Service Award from ASHRAE and the Pentzer Award from the IIR).

Elevate awareness and promote the college's programs to improve visibility and reputation

As Head of ME, I reorganized the School in seven academic areas (formerly six areas) and 15 research areas exposing the great research variety conducted by ME faculty. Using the structure of the newly formed research areas, I initiated a distinguished ME seminar series consisting of 7 to 8 seminars per semester with the goal to increase the reputation of the School by inviting high-ranking academics from peer institutions to campus for a day of show and tell. I am also working very closely with our ME communication specialist on social media announcements of major awards, latest research highlights, student successes and any other noteworthy items related to our academic activities, including a monthly newsletter that we send to the entire ME community.

In summary, based on my accomplishments to date, I consider myself extremely well qualified for the position of the next Dean of the Samuel Ginn College of Engineering at Auburn University. I am confident that I have the motivation, professional goals, and experiences necessary to be an effective, efficient and visionary leader of the College. Please contact me if you have any questions or need additional information. Thank you very much for considering my application.

Sincerely,

Eckhard A. Groll

Enclosure: Full academic resume

Dr.-Ing. Eckhard A. Groll
Reilly Professor of Mechanical Engineering
William E. and Florence E. Perry Head of Mechanical Engineering

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School of Mechanical Engineerring
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RESUME – December 2022

EDUCATION:

02/94 "Doktor-Ingenieur" (Doctor of Engineering) in Mechanical Engineering
University of Hannover, Hannover, Germany
11/89 "Diplom-Ingenieur" (Diploma of Engineering) in Mechanical Engineering
Ruhr-University of Bochum, Bochum, Germany
10/86 "Diplom-Vorprüfung" (Pre-Diploma of Engineering) in Mechanical Engineering
Ruhr-University of Bochum, Bochum, Germany

ACADEMIC FACULTY AND RESEARCH APPOINTMENTS:

05/13 – present	**Reilly Professor of Mechanical Engineering**, Purdue University, Ray W. Herrick Laboratories, West Lafayette, Indiana, USA
04/07 – 07/07	**Guest Professor**, University of Karlsruhe, Institute of Turbomachinery, Karlsruhe, Germany
08/05 – 05/13	**Professor of Mechanical Engineering**, Purdue University, Ray W. Herrick Laboratories, West Lafayette, Indiana, USA
01/03 – 07/03	**Guest Professor**, University of Karlsruhe, Institute of Technical Thermodynamics, Karlsruhe, Germany
08/00 – 07/05	**Associate Professor of Mechanical Engineering**, Purdue University, Ray W. Herrick Laboratories, West Lafayette, Indiana, USA
07/94 – 07/00	**Assistant Professor of Mechanical Engineering**, Purdue University, Ray W. Herrick Laboratories, West Lafayette, Indiana, USA
12/91 – 06/94	**Faculty Research Assistant**, University of Maryland, Center for Environmental Energy Engineering, Dept. of Mechanical Engineering, College Park, MD
01/90 – 11/91	**Research Assistant**, University of Hannover, Institute of Refrigeration, Hannover, Germany
03/89 – 10/89	**Research Assistant**, Hoechst AG, Technical Examination, Frankfurt, Germany
01/88 – 12/88	**Research Assistant**, Texas A&M University, Dept. of Mechanical Engineering, College Station, Texas, USA
04/87 – 12/87	**Research Assistant**, Ruhr-University of Bochum, Institute of Energy Plant Technology, Bochum, Germany

ACADEMIC ADMINISTRATIVE APPOINTMENTS:

07/19 – present **William E. and Florence E. Perry Head of Mechanical Engineering,** Purdue University, College of Engineering, West Lafayette, Indiana, USA

- Oversee all operations of the School of Mechanical Engineering and provide direction to School faculty, staff, and students
- Set agendas and promote the highest academic standards in instruction, research and engagement
- Oversee all undergraduate and graduate educational programs in the School for approximately 1,800 undergraduate and 1000 graduate students
- Identify the School's enrollment goals for undergraduate and graduate students and recruit outstanding and diverse students
- Facilitate the review and approval process for establishing new undergraduate and graduate educational programs and for overseeing the curricular planning and development within the School
- Lead and organize working with accrediting bodies, such as ABET
- Ensure excellence in student advising during their education and oversee student success services and experiential learning activities within the School
- Promote, support, and develop outstanding and diverse faculty and staff
    - Oversight of 92 Tenured/Tenure-Track Faculty Members
    - Oversight of 4 Research Faculty Members, 3 Faculty Member of Engineering Practice, and 8 Continuing Lecturers
    - Oversight of approximately 80 Staff Members
- Identify the School's needs for faculty and staff positions, establish hiring priorities, and recruit exceptional and diverse faculty and staff
- Mentor faculty, particularly junior faculty, and assist with their scholarly development
- Manage annual operating budget of the School of approximately $64 million; provide oversight for the financial affairs, including budget development and allocation
- Foster nationally and internationally leading research programs that generate strong external funding revenues
- Cultivate partnerships with other departments and schools within and outside Purdue University in the development of interdisciplinary academic and research programs
- Develop industry and corporate partnerships with the School
- Forge partnerships with state, national, and international institutions of higher education to enhance education, research, and economic development programs for faculty, staff, and students
- Create opportunities of mutual benefit among students, faculty, community, and industry leaders
- Guide short and long-range planning of capital improvement projects
- Cultivate local, national, and global relations and sources of support, working closely with the development officers to cultivate major gifts and to promote the image of the School
- Enhance, promote, and develop the School's alumni networks

- Participate as a member of the Engineering Leadership Team
- Work with campus administration, the University Senate, and other campus offices on the implementation and development of campus-wide decisions and policy development and strategic directions
- Oversight of instructional and research facilities in main ME Building, Ray W. Herrick Laboratories, and Maurice J. Zucrow Laboratories

01/18 – 06/19 **Associate Dean for Undergraduate and Graduate Education,** Purdue University, College of Engineering, West Lafayette, Indiana, USA

- Responsible for all undergraduate and graduate education programs within the College of Engineering (total of approximately 13,000 students)
- Manages annual operating budget of $5 million+
- Oversight of 12 Direct Reports
- Oversight of 8 Program Offices with 38 Staff Members

01/12 – 07/12 **Interim Assistant Dean of Engineering for Research**, Purdue University, College of Engineering, West Lafayette, Indiana, USA

- Oversight of Summer Undergraduate Research Fellowship (SURF) program
- Conduct ranking of limited submission research proposals
- Evaluate cost share requests and approval of research proposals
- Represent College of Engineering to other organizations

09/10 – 05/11 **ACE Fellow**, Georgia Institute of Technology, Office of the Vice Provost on International Initiatives, Atlanta, Georgia

- Shadow Georgia Tech President on numerous occasions
- Evaluate operation of global satellite campuses
- Make recommendations to increase student participation in global programs

08/08 – 12/17 **Director of the Office of Professional Practice,** Purdue University, College of Engineering, West Lafayette, Indiana, USA

- Oversight of 7 FTE Staff Members
- Managed annual operating budget of $500k+
- Responsible for cooperative education programs in 46 academic disciplines located within 8 colleges
- Responsible for the GEARE program and global research experiences
- Responsible for interactions with more than 300 employers participating in various programs
- Increased overall student participation in Professional Practice Programs from approximately 650 students during academic year 2007-08 to more than 1500 students during academic year 2016-17.
- Founded new G-PAL program (Global Partners in Apprenticeship Learning), Master-level Co-Op program, and Parallel Co-Op program
- Introduced corporate partnership program raising approximately $50k per year
- Raised $200k for lobby renovation project in Potter Engineering Center
- Raised $100k endowment to offer engineering courses to on-campus co-op students during summer sessions
- Raised $200k gift money to support better delivery of on-line course for Professional Practice students while away from campus
- Raised $200k gift money to support travel assistantships for students participating in the undergraduate GEARE program

09/07 – 07/08 **Interim Director of the Office of Professional Practice,** Purdue University, College of Engineering, West Lafayette, Indiana, USA
- Responsibilities were the same as outlined above under Director of the Office of Professional Practice

07/05 – 07/08 **Director of Global Initiatives, Cooperative Education and Professional Experiences**, Purdue University, School of Mechanical Engineering, West Lafayette, Indiana, USA
- Co-Op Coordinator for approximately 150 undergraduate ME students
- Major contributor to the development of the unique and award-winning undergraduate GEARE program
- Primary responsibility for developing the global design team projects that are part of the undergraduate GEARE program
- Advisor of ME students' participation in the undergraduate GEARE program

PERSONAL:

German Citizen; U.S. Permanent Resident; Bilingual (German, English).

PROFESSIONAL MEMBERSHIPS:

- American Council on Education: Fellow
- American Society of Engineering Education (ASEE): Member
- American Society of Heating, Refrig. and Air-Conditioning Engineers (ASHRAE): Fellow
- American Society of Mechanical Engineers (ASME): Fellow
- Deutscher Kälte- und Klimatechnischer Verein (German Society of Refrigeration and Climate Technology): Member
- Institution of Engineers in Scotland: Honorary Fellow
- International Institute of Refrigeration (IIF/IIR): President of Section B "Refrigeration and Thermodynamics"

PROFESSIONAL AWARDS:

- 2021 Fellow of ASME
- 2020 Honorary Fellow of the Institution of Engineers in Scotland, Glasgow, Scotland.
- 2020 Best Student Paper Award (with PhD student Junyoung Kim), 2020 Rankine Conf., Virtual Event, Glasgow, Scotland, July 27 - 31, 2020.
- 2019 Best Student Paper Award (with PhD student Xinye Zhang), 11th Int'l Conf. on Compressors and their Systems, City University London, UK, September 9-11, 2019.
- 2018 Silver Anniversary Needle for 25-Year Membership in the German Society of Refrigeration and Climate Technology (DKV)
- 2018 Inductee Cooperative Education Hall of Fame at Purdue University
- 2018 J&E Hall International Gold Medal of Refrigeration, Institute of Refrigeration, UK
- 2017 Shortlisted for Best Technical Paper, 10th International Conf. on Compressors and their Systems, City University of London, UK, Sept. 11-13.
- 2017 Peter Ritter von Rittinger International Heat Pump Award, IEA Heat Pump Centre.

- 2016 Honorary Faculty Member, Barbara Cook Chapter of Mortar Board at Purdue (National College Senior Honor Society)
- 2015 Top 10 HVAC Heating Professors, as named by HVACClasses.org, owned and operated by Sechel Ventures
- 2014-2017 Distinguished Overseas Professor, School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai, China
- 2014 Inductee into Purdue Innovator Hall of Fame
- 2014 DAAD Alumni Award (German Academic Exchange Service)
- 2014 ASHRAE Exceptional Service Award
- 2013 Discovery in Mechanical Engineering Award, School of Mech. Eng., Purdue University
- 2013 Global Impact Award, College of Engineering, Purdue University
- 2011 Purdue University Research Acorn Award
- 2011-present ASHRAE Distinguished Lecturer
- 2010-2011 ACE Fellow (American Council on Education)
- 2010 E. K. Campbell Award from ASHRAE in recognition of outstanding service and achievement in teaching and research in subjects relating to the industry and professions represented by ASHRAE.
- 2009-10 CIC-ALP Fellow (Committee on Institutional Collaboration – Academic Leadership Program)
- 2009 Faculty Advising Excellence Award, College of Engineering, Purdue University
- 2008 Inductee into Book of Great Teachers, Purdue University
- 2007 Ruth and Joel Spira Award for outstanding contributions to the School of Mechanical Engineering for inspiring students and fostering excellence in commercial or defense product realization.
- 2007 Purdue University Faculty Scholar Award
- 2006 ASHRAE Fellow
- 2005 Fellow of Purdue's Teaching Academy
- 2005 Wilbur T. Pentzer Achievement and Leadership Award for outstanding contributions to the growth and well-being of the International Institute of Refrigeration (IIR) and the U.S. National Committee of the IIR.
- 2005 Charles B. Murphy Award for outstanding undergraduate teaching for meritorious and effective performance in the instruction of undergraduate students at Purdue University.
- 2004 Team Excellence Award in the Schools of Engineering at Purdue University for outstanding innovation and interdisciplinary teamwork in creating and developing the Global Engineering Alliance for Research and Education (GEARE)
- 2003-2005 B.F.S. Schaefer Outstanding Young Faculty Scholar Award, School of Mechanical Engineering, Purdue University
- 2003 ASHRAE Distinguished Service Award
- 2003 DAAD (German Academic Exchange Service) Guest Professorship at the University of Karlsruhe, Germany, from January 1 to July 31
- 2002-2003 Senior Resource Faculty for Teacher for Tomorrow Award Program at Purdue University
- 2002 Solberg Award for Best Teacher in Mechanical Engineering at Purdue University
- 1997 ASHRAE New Investigator Award
- 1998 DAAD (German Academic Exchange Service) Six-Month International Scholarship for studies at Texas A&M University

BOARD ACTIVITIES:

- DAAD Alumni Association: Board Member 2014, Vice President (2015 – 2018)
- ASHRAE Board of Directors: Director-At-Large (2010 – 2013)
- Karlsruhe House of Young Scientists, KHYS: Advisory Board Member (2009 – 2011)
- Friends of Purdue Convocations: Advisory Board Member (2007 – 2012), Advisory Board Vice President (2012 – 2013)
- Purdue University Press: Editorial Board Member (1999 – 2003)

PROFESSIONAL SOCIETY ACTIVITIES:

- ASHRAE Standards Committee: Consultant (17 – 18)
- ASHRAE Tech Council: Member-At-Large (13 – 16)
- ASHRAE Data Center Working Group: Chair (12 – 13)
- ASHRAE Conferences and Exposition Committee (CEC): Member (08 – 10)
- ASHRAE Professional Development Committee (PDC): Member (07 – 10)
- ASHRAE Technical Activities Committee (TAC): Member (01 – 06), Head Section 4 (01-03), Head Section 8 (03-04), TTS Subcomm. Chair (02-04), Vice Chair (04-05), Chair (05-06)
- ASHRAE Course Development Committee: Member (99 – 01)
- ASHRAE TC 1.3: Corresponding Member (98 – present)
- ASHRAE TC 3.1: Corresponding Member (08 – present)
- ASHRAE TC 7.6: Research Subcommittee Chairman (96 – 00)
- ASHRAE TC 7.6: Project Monitoring Subcommittee Member of 1121-RP (99 – 01)
- ASHRAE TC 7.6: Member (98 – 02), Corresponding Member (95 – 98 and 02 – 03)
- ASHRAE TC 8.1: Corresponding Member (08 – present)
- ASHRAE TC 8.3: Handbook Subcommittee Chairman (96 – 98)
- ASHRAE TC 8.3: Member (98 – 02), Corresponding Member (95 – 98 and 02 – present)
- ASHRAE TC 8.4: Corresponding Member (01 – present)
- ASHRAE TC 8.11: Member (03 – 05 and 06 – 10), Corspd. Member (05 – 06 and 10 – present)
- ASHRAE TC 10.7: Program Subcom. Chair (96 – 98), Secretary (96 – 98), Chair (99 – 01)
- ASHRAE TC 10.7: Member (96 – 01), Corresponding Member (95 – 96 and 01 – present)
- USNC/IIR (U.S. National Committee of the Int'l Institute of Refrig.): Member (95 – present)
- USNC/IIR: Secretary (99 – 03), 2nd Vice-Chair (03 – 07), Chair (08 – 11)
- USNC/IIR: Board of Directors (99 – present)
- IIR: Chair of Task Group “Increasing the Involvement of Young People in the IIR” (04-05)
- IIR: Member of the IIR Strategic Planning Committee (2004)
- IIR: Commission E1 "Air Conditioning": Member (95 – 07)
- IIR: Commission B2 "Refrigeration Equipment": Member (07 – 11), VP (11 – 15), President (15 – 19)
- IIR: Section B "Refrigeration and Thermodynamics": President (19 – present)

CONFERENCE AND SHORTCOURSE ACTIVITIES:

- General Conference Chair: 26th Int’l Compressor Engineering Conference at Purdue, 19th Int’l Refrigeration and Air Conditioning Conference at Purdue, and 7th Int’l High Performance Buildings Conference at Purdue, July 11-14, 2022.

- General Conference Chair: 25th Int'l Compressor Engineering Conference at Purdue, 18th Int'l Refrigeration and Air Conditioning Conference at Purdue, and 6th Int'l High Performance Buildings Conference at Purdue, May 24-28, 2021.
- Session Chair: Session "Screw Compressor 1," 11th Int'l Conf. on Compressors and their Systems, City University London, UK, September 9-11, 2019.
- Scientific Committee Member: 11th Int'l Conf. on Compressors and their Systems, City University London, UK, September 9-11, 2019.
- Scientific Committee Member: 25th IIR Int'l Congress of Refrigeration, Montreal, Quebec, Canada, August 24-30, 2019.
- Chairman of Academic Committee: 9th Int'l Conference on Compressor and Refrigeration (ICCR 2019), Xi'an Jiaotong University, China, July 10-12, 2019.
- ASHRAE Advisory and Scientific Committee Member: 12th REHVA World Congress, CLIMA 2019, Bucharest, Romania, May 26-29, 2019.
- Scientific Committee Member: 10thInt'l Conference on Screw Machines, Dortmund, Germany, Sept. 18-19, 2018.
- Session Chair: Session "Screw Compressor Systems," 10thInt'l Conference on Screw Machines, Dortmund, Germany, Sept. 18-19, 2018.
- Scientific Committee Member: 1st IIR Int'l Conf. on the Application of HFO Refrigerants, Birmingham, UK, Sept. 2-5, 2018.
- General Conference Chair: 24th Int'l Compressor Engineering Conference at Purdue, 17th Int'l Refrigeration and Air Conditioning Conference at Purdue, and 5th Int'l High Performance Buildings Conference at Purdue, July 9-12, 2018.
- Co-Organizer: Short Course on "Compressor 103 – Generalized Simulation Framework for Positive Displacement Compressors and Expanders," at Purdue University, July 8, 2018.
- Scientific Committee Member: 13th IIR Gustav Lorentzen Natural Working Fluids Conference, Valencia, Spain, June 21-24, 2018.
- Session Chair: Session "CO2 System Applications," 13th IIR Gustav Lorentzen Natural Working Fluids Conference, Valencia, Spain, June 21-24, 2018.
- Scientific Committee Member: Cold Climate HVAC 2018, the 9th Int'l Cold Climate Conf. on Sustainable New and Renovated Bldgs in Cold Climates, Kiruna, Sweden, March 12-15, 2018.
- Steering Committee Member: 20th Annual Colloquium on International Engineering Education: "Proven Methods and New Frontiers," Northern Arizona Univ., Flagstaff, AZ, Nov. 2-3, 2017.
- Scientific Committee Member: Int'l Conf. on Compressors and their Systems, City University London, UK, September, 2017.
- Steering Committee Member: 19th Annual Colloquium on International Engineering Education: "Preparing the Global Workforce," Newport, Rhode Island, November 3-4, 2016.
- Scientific Committee Member: 12th IIR Gustav Lorentzen Natural Working Fluids Conference, Heriot- Watt University, Edinburgh, UK, August, 21-24, 2016.
- General Conference Chair: 23rd Int'l Compressor Engineering Conference at Purdue, 16th Int'l Refrigeration and Air Conditioning Conference at Purdue, and 4th Int'l High Performance Buildings Conference at Purdue, July 11-14, 2016.
- Co-Organizer: Short Course on "Oil Management in Compressors and Their Systems," at Purdue University, July 10, 2016.
- ASHRAE Advisory and Scientific Committee Member: 12th REHVA World Congress, CLIMA 2016, Aalborg, Denmark, May 22-25, 2016.
- Steering Committee Member: 18th Annual Colloquium on International Engineering Education:

"Building Strategic International Partnerships," hosted by IIE and the German Academic Exchange Service (DAAD) in New York City, New York, November 5-6, 2015.

- Scientific Committee Member: ASME ORC 2015 3rd International Seminar on ORC Power Systems, Brussels, Belgium, October 12-14, 2015.
- Session Chair: Session "Rotary Compressors," Int'l Conf. on Compressors and their Systems, City University London, UK, September 1-4, 2015.
- Co-Organizer, IEA HPP Annex 41 Workshop "Cold Climate Heat Pumps: Improving Low Ambient Temp. Performance of Air-Source Heat Pumps," Yokohama, Japan, August19, 2015.
- Co-Organizer 3rd Working Meeting, IEA HPP Annex 41 "Cold Climate Heat Pumps: Improving Low Ambient Temperature Performance of Air-Source Heat Pumps," Austria Institute of Technology (AIT), Vienna, Austria, May 7-8, 2015.
- Steering Committee Member: 17th Annual Colloquium on International Engineering Education, Providence, RI, November 7-10, 2014.
- General Conference Chair: 22nd Int'l Compressor Engineering Conference at Purdue, 15th Int'l Refrigeration and Air Conditioning Conference at Purdue, and 3rd Int'l High Performance Buildings Conference at Purdue, July 14-17, 2014.
- Co-Organizer, Short Course on "Experimental Techniques to Measure Compressor Performance and Reliability," at Purdue University, July 13, 2014.
- Co-Organizer 2nd Working Meeting, IEA HPP Annex 41 "Cold Climate Heat Pumps: Improving Low Ambient Temperature Performance of Air-Source Heat Pumps," Montréal, Quebéc, Canada, May 12, 2014.
- Scientific Committee Member: 1st International Conference on Energy and Indoor Environment for Hot Climates, Doha, Qatar, February 24-26, 2014.
- Steering Committee Member: 16th Annual Colloquium on International Engineering Education, Lexington, KY, November 6-9, 2013.
- Session Chair: Session 16 "Novel Compressors," Int'l Conf. on Compressors and their Systems, City University London, UK, September 9-10, 2013.
- Session Co-Chair: "Rotary, scroll and screw compressors I," 8th Int'l Conf. on Compressors and Coolants, Smolenice, Slowakia, September 2-4, 2013.
- International Scientific Committee Member: 8th Int'l Conf. on Compressors and Coolants, Smolenice, Slowakia, September 2-4, 2013.
- Co-Organizer 1st Working Meeting, IEA HPP Annex 41 "Cold Climate Heat Pumps: Improving Low Ambient Temperature Performance of Air-Source Heat Pumps," Ray W. Herrick Laboratories, Purdue University, July 1, 2013.
- Session Co-Chair: HVAC Systems Operation and Design, 11th CLIMA 2013 Congress, Prague Czech Republic, June 17, 2013.
- ASHRAE Advisory and Scientific Committee Member: 11th REHVA World Congress, CLIMA 2013, Prague, Czech Republic, June 16-19, 2013.
- Session Co-Chair: Oral Session F – Refrigeration Engineering 2, 5th Int'l Conf. on Cryogenics and Refrigeration (ICCR2013), Zhejiang University, Hangzhou, China, April 8, 2013.
- International Program Committee Member: 5th International Conference on Cryogenics and Refrigeration (ICCR2013), Zhejiang University, Hangzhou, China, April 6-9, 2013.
- Steering Committee Member: 15th Annual Colloquium on International Engineering Education, Newport, Rhode Island, November 1-3, 2012.

- Panel Moderator: "Why is there a difference in the dominant focus regarding refrigerants within Europe, North America and Asia?" ASHRAE/NIST Refrigerants Conference, NIST, Gaithersburg, MD, October 29-30, 2012.
- Steering Committee Member: ASHRAE/NIST Refrigerants Conference, NIST, Gaithersburg, MD, October 29-30, 2012.
- General Conference Chair: 21st Int'l Compressor Engineering Conference at Purdue, 14th Int'l Refrigeration and Air Conditioning Conference at Purdue, and 2nd Int'l High Performance Buildings Conference at Purdue, July 15-18, 2012.
- Co-Organizer, Short Course on "Advanced Compressor Modeling (Compressors 102)" at Purdue University, July 13-14, 2012.
- Steering Committee Member: 14th Annual Colloquium on International Engineering Education, "Educating Global Leaders," Provo, Utah, November 3-5, 2011.
- Steering Committee Member: 13th Annual Colloquium on International Engineering Education, Newport, Rhode Island, November 4-6, 2010.
- Member Scientific Committee: Joint UNEP-ASHRAE Conference on "Road to Climate Friendly Chillers: Moving Beyond CFCs and HCFCs," Cairo, Egypt, Sept. 30-Oct. 1, 2010.
- General Conference Chair: 20th Int'l Compressor Engineering Conference at Purdue, 13th Int'l Refrigeration and Air Conditioning Conference at Purdue and 1st Int'l High Performance Buildings Conference at Purdue, July 10-15, 2010.
- Co-Organizer, Short Course on "Introduction to Compressors (Compressors 101)" at Purdue University, July 10-11, 2010.
- Steering Committee Member: Joint ASHRAE/CIBSE Conference, Dubai, UAE, April 2010.
- Member International Advisory Committee: Engineering Congress on Alternative Energy Applications: Option or Necessity? Kuwait, November 3-5, 2009.
- Steering Committee Member: 12th Annual Colloquium on International Engineering Education, Iowa State University, Ames, IA, October 22-25, 2009.
- Roundtable Panelist: "In Times of Global Financial Crisis: Impacts on Cooperative Education & Industrial Partners," WACE (World Association of Cooperative Education) Conference, Vancouver, BC, June 23-27, 2009.
- Session Chair: "Defining Curriculum in Co-operative Education," WACE (World Association of Cooperative Education) Conference, Vancouver, BC, June 23-27, 2009.
- Session Chair: "Moments of Truth: An Expert Panel Faces the Toughest Issues for Co-op/Internship Professionals," WACE (World Association of Cooperative Education) Conference, Vancouver, BC, June 23-27, 2009.
- Steering Committee Member: 11th Annual Colloquium on International Engineering Education, Newport, Rhode Island, November 2-5, 2008.
- Session Chair: "General Knowledge 4," 8th IIR – Gustav Lorentzen Conference on Natural Working Fluids, Copenhagen, Denmark, September 10, 2008.
- Session Chair: "Heat Pumps 3," 8th IIR – Gustav Lorentzen Conference on Natural Working Fluids, Copenhagen, Denmark, September 9, 2008.
- Member Scientific Committee: 8th IIR – Gustav Lorentzen Conference on Natural Working Fluids, Copenhagen, Denmark, September 8-10, 2008.
- General Conference Chair: 19th Int'l Compressor Engineering Conference at Purdue and 12th Int'l Refrigeration and Air Conditioning Conference at Purdue, July 14-17, 2008.
- Chair of Organizing Committee, 10th Annual Colloquium on International Engineering Education, Purdue University, November 1-4, 2007.

- Session Chair, Panel Session 6: "Globalization Efforts of Engineering Programs at Int'l Institutions," 10th Annual Colloquium on International Engineering Education, Purdue University, November 3, 2007
- Session Co-Chair, Session B2-7 "Compressor I," 22st International Congress of Refrigeration, IIF/IIR, Beijing, China, August 25, 2007.
- Chair, 18th International Compressor Engineering Conference at Purdue, July 2006.
- Organizer, Short Course on "Analysis of Miniature-Scale Vapor Compression Refrigeration Systems for Electronics Cooling," 22nd Semi-Therm Symposium and Exposition, Dallas, TX, March 13, 2006.
- Session Chair, Session CR/TP-1 "Carbon Dioxide 1," IIR International Conferences on Commercial Refrigeration and Thermophysical Properties and Transfer Processes of Refrigerants, Vicenza, Italy, August 31, 2005
- Poster Session Co-Chair and Member of Organizing Committee, 8th IEA Heat Pump Conference, Las Vegas, NV, June 2005
- Chair, 10th Int'l Refrigeration and Air Conditioning Conference at Purdue, July 12-15, 2004
- Moderator of Panel Discussion on "Current Status and Future Trends of the Transcritical Carbon Dioxide Technology," 10th International Refrigeration and Air Conditioning Conference at Purdue, July 14, 2004
- Liaison to Organizing Committee for "Short Course on Simulation Tools for Vapor Compression System and Component Analysis," Purdue University, July 10-11, 2004
- Program Co-Chair, 21st International Congress of Refrigeration, IIF/IIR, Washington, DC, August 18-22, 2003
- Session Chair, Session B1-8 "A New Old Refrigerant: Carbon Dioxide – Heat Transfer," 21st International Congress of Refrigeration, IIF/IIR, Washington, DC, August 18-22, 2003
- Co-Organizer, Short Course on "Modeling and Design of Vapor Compression Systems" at Ingersoll-Rand, Davidson, NC, August 12-14, 2003
- Vice-Chair Scientific Committee, 5th IIR – Gustav Lorentzen Conference on Natural Working Fluids, Guangzhou, China, September 17-20, 2002
- Session Chair, Session 2 "Natural Working Fluids – CO_2 Experiments," 5th IIR – Gustav Lorentzen Conference on Natural Working Fluids, 2002
- Member of Technical/Scientific Committee, International Conference on New Technologies in Commercial Refrigeration, University of Illinois at Urbana-Champaign, July 22-23, 2002
- Chair, 9th Int'l Refrigeration and Air Conditioning Conference at Purdue, July 16-19, 2002
- Co-Organizer, Short Course on "Analysis and Design of Microchannel Heat Exchangers" at Purdue University, July 14-15, 2002
- Chair, Organizing Committee of the 4th IIR – Gustav Lorentzen Conference on Natural Working Fluids, Purdue University, July 25-28, 2000
- Co-Organizer, Short Course on "Fundamentals of the Transcritical Carbon Dioxide Cycle Technology" at Purdue University, July 24, 2000
- Session Chair, Session N-9 "Compressors II, Lubrication, and Expansion Devices," 4th IIR – Gustav Lorentzen Conference on Natural Working Fluids, 2000
- Panelist of Panel # 7 – "CO_2", IIAR 2000 Ammonia Refrigeration Conf. and Trade Show
- Co-Organizer, Short Course on "Modeling and Design of Vapor Compression Systems" at Purdue University, June 1-4, 1999
- Symposium Chair, Symposium CH-99-04 "Effects of Controlling Humidity on Energy Consumption of Supermarkets," 1999 ASHRAE Winter Meeting in Chicago

- Chair, 7th International Refrigeration Conference at Purdue, July 1998
- Session Chair, Session R-4 "Transcritical CO_2 Technology," 7th International Refrigeration Conference at Purdue, July 1998
- Session Chair, Session TS 5 "Gas Cycles," IIR – Gustav Lorentzen Conference on Natural Working Fluids '98
- Session Chair, Session 3 "Secondary Refrigerants," IIR Conference on Heat Transfer Issues in Natural Refrigerants at University of Maryland, 1997
- Co-Organizer, Short Course on "Modeling and Design of Vapor Compression Systems with an Emphasis on Refrigerant Mixtures" at Purdue University, July 21-23, 1997
- Forum Moderator, Forum 19 "Parasitic Losses in Supermarket Refrigeration Systems," 1997 ASHRAE Annual Meeting in Boston
- Program Chair, 6th International Refrigeration Conference at Purdue, July 1996
- Session Chair, Session R-11 "Refrigeration Systems for Supermarket Applications," 6th International Refrigeration Conference at Purdue, July 1996
- Session Chair, Session R-13 "R-502 and R-114 Replacements," 5th International Refrigeration Conference at Purdue, July 1994

EDITOR AND REVIEW ACTIVITIES:

- Regional Editor for the Americas, *International Journal of Refrigeration* (2008 – present)
- Editorial Board Member, Journal of International Engineering Education (2012 – present)
- Co-Editor, Special Issue on Compressor Technology, *Int'l J. Refrig.*, Vol. 36, No. 7, 2013.
- Guest Editor, "Making the Odd Couple Work: Combining Engineering and Language Education," Festschrift in honor of John Grandin, *Online Journal for Global Engineering Education* (2011 – 2012)
- Editor, Special Issue on Ejector Technology, *Int'l J. Refrig.*, Vol. 34, No. 8, 2011.
- Guest Editor, Topical Issue, *HVAC&R Research*, Carbon Dioxide Update, Vol. 13, No. 3, 2007.
- Advisory Board Member of International Journal of Refrigeration (2000 – 2007)
- Journal Reviewer for: AIAA J. Thermophysics & Heat Transfer, ASHRAE Trans., ASME J. Energy Resources & Technology, ASME J. Fluids Engineering, Int'l J. HVAC&R Research, Int'l J. Refrigeration, Int'l J. Thermal Sciences, Applied Thermal Engineering, J. Process Mechanical Engineering, IEEE Transactions on Components and Packaging Technologies, Heat Transfer Engineering
- Proposal Reviewer for: ASHRAE, DOE, Idaho Board of Education, Southern Technology Council, U.S. Civilian Research & Development Foundation, USDA

PROFESSIONAL CONTRIBUTIONS AT PURDUE UNIVERSITY:

- International Programs: International Liaison Officer (2018 – present)
- Global Competency Task Force, College of Engineering: Co-Chair (2014 – 2016)
- Corporate Partnerships Service Model - Working Group: Member (2014)
- School of ME Impact and Reputation Committee: Member (2014)
- Faculty Search Committee Member: Thermal/Fluid Sciences (2013 – 2014)
- Coop and Internship Fee Review Committee: Member (2012 – 2013)
- Purdue University Global Council: Member (2011 – 2013)
- Faculty Search Committee Member: Thermodynamics (2011)

- Faculty Search Committee Member: Herrick Professor of Engineering (2010)
- Campus Information Technology Planning Committee: Member (2010)
- Vice Provost of Global Affairs Search Committee: Member (2009)
- College of Engineering Strategic Plan Roadmap: Co-Captain of Team VIII A&B on Global Undergraduate Student Experiences (2009)
- Office of Professional Practice Search Committee: Chair for three Staff Positions (2008, 2012)
- Professional Practice Ambassadors: Faculty Advisor (2008 – 2017)
- GEARE Ambassadors: Faculty Advisor (2006 – 2017)
- GEARE (Global Engineering Alliance for Research and Education) – Graduate Program: Founding member (2005)
- ME Honors Committee: Member (2006 – 2008)
- Co-operative Engineering Education Committee: ME Co-op Coordinator (2005 – 2008)
- ME Leadership Team: Member (2005 – 2008)
- ME Cabinet: Member (2005 – 2008)
- Global Engineering Programs Team: Member (2005 – 2017)
- College of Engineering Curriculum Reform Task Force: Member (2004 – 2007)
- ME Program Review Committee: Member (Spring 2004)
- GEARE (Global Engineering Alliance for Research and Education) – Undergraduate Program: Founding member (2002 – 2003)
- Teaching for Tomorrow Group Activities (academic year 2002 – 2003)
- Committee for Faculty Relations (CFR): Member (1998 – 2003)
- Purdue Student Branch of ASHRAE: Faculty Advisor (1995 – present)
- ME Curriculum Committee: Member (1995 – 2008)
- Thermodynamics Ph.D. Area Exam Chair or Co-Chair: Spring 1997, Fall 1997, Spring 1998, Fall 2002, Spring 2006, Fall 2008, Fall 2011, Spring 2012, Fall 2015, Spring 2016.
- Faculty Search Committee Member: Thermal Systems/Heat Transfer (Oct. 1999 to May 2001)
- Faculty Search Committee Member: Herrick Professor of Engineering (Dec. 1998 to May 2001)
- Faculty Search Committee Member: Fluid Mechanics (Nov. 1997 to May 1998)
- Faculty Search Committee Member: Thermal/Fluid Sciences (Sept. 1996 to April 1997)
- Herrick Labs Staff Search Committee: member of search committees for one mechanical and two electrical staff, one electronic shop coordinator, two conference secretaries, and one administrative assistant
- Fulbright Scholar Evaluation Committee: Member (1997 – 2017)
- Study Abroad Student Evaluation Committee: Member (1995 – 2010)

TEACHING EXPERIENCE:

- Overall Teaching Evaluation (all courses and all students, 1810 students): 4.52/5.0
- ME 200 – Thermodynamics I, 645 Students (6 semesters), Teaching Evaluation: 4.4/5.0
- ME 263L – Sophomore Design Lab, 16 Students (1 sem.), Teaching Evaluation: 4.9/5.0
- ME 297G – Cultural Engineering Orientation, 25 Students (2 sem.), Teach. Eval.: 4.4/5.0
- ME 300 – Thermodynamics II, 310 Students (9 semesters), Teaching Evaluation: 4.5/5.0
- ME 315 – Heat and Mass Transfer, 50 Students (1 semester), Teaching Evaluation: 4.5/5.0
- ME 418 – Analysis and Design of HVAC&R Systems and Equipment, 44 Students (3 sem.), Teaching Evaluation: 4.6/5.0
- ME 463 – Senior Design, 133 Students (9 semesters), Teaching Evaluation: 4.5/5.0

- ME 497E – Energy in a Global Context, 20 Students (1 sem.), Teaching Eval.: 5.0/5.0
- ME 500 – Advanced Thermodynamics, 362 Students (10 sem.), Teaching Eval.: 4.6/5.0
- ME 518 – Analysis of Thermal Systems, 201 Students (7 sem.), Teaching Eval.: 4.8/5.0
- ME 597 – Int'l Refrig. and Compressor Course, 28 Students (4 sem.), Teaching Eval.: 5.0/5.0
- EPICS – SGSC Team, 40 Students (4 semesters), Teaching Evaluation: 4.4/5.0
- Developed new junior level course: ME 297G – Cultural Engineering Orientation
- Developed new senior level course together with Srinivas Garimella from Georgia Tech: ME 497E – Energy in a Global Context
- Developed new graduate level course with J.E. Braun: ME 518 – Analysis of Thermal Systems
- Developed new graduate level course with Prof. U. Hesse from TU Dresden, Germany: ME 597 – Int'l Refrigeration and Compressor Course (IRCC), a collaborative education program between the Technical University of Dresden, Germany, and Purdue University during each summer. Nowadays, it also includes Oklahoma State University and the Karlsruhe University of Applied Sciences.
- Short Course Lecturer on "Modeling and Design of Vapor Compression Systems with an Emphasis on Refrigerant Mixtures" (1 of 3 lecturers – taught 4 of 12 lectures), Evaluation for all lecturers by 20 participants: 4.7/5.0, July 1997.
- Short Course Lecturer on "Modeling and Design of Vapor Compression Systems" (1 of 3 lecturers – taught 3 of 18 lectures), Eval. for all lecturers by 42 participants: 4.7/5.0, June 1999.
- Short Course Lecturer on "Fundamentals of the Transcritical Carbon Dioxide Cycle Technology" (1 of 6 lecturers – taught 1 of 6 lectures), 72 participants, no evaluation, July 2000
- Short Course Lecturer on "Analysis and Design of Microchannel Heat Exchangers" (1 of 8 lecturers – taught 2 of 12 lectures), 50 participants, no evaluation, July 2002.
- Short Course Lecturer on "Analysis of Miniature-Scale Vapor Compression Refrigeration Systems for Electronics Cooling" (taught all lectures – 8 lectures), Evaluation by 18 Participants: 4.25/5.0, March 2006.
- Short Course Lecturer on "Latest Developments with Respect to the Transcritical CO_2 Cycle Tech." (1 of 5 Lecturers – taught 3 of 12 lectures), 52 participants, no evaluation, July 2006.
- Short Course Lecturer on "Introduction to Compressors (Compressors 101)" (1 of 9 Lecturers – taught 2 of 11 lectures), 52 participants, no evaluation, July 2010.
- Short Course Lecturer on "Advanced Compressor Modeling (Compressors 102)" (1 of 11 Lecturers – taught 2 of 14 lectures), 56 participants, no evaluation, July 2012.
- Short Course Lecturer on "Experimental Techniques to Measure Compressor Performance and Reliability," (1 of 8 Lecturers – taught 1 of 8 lectures), 53 participants, no evaluation, July 2014.
- Short Course Lecturer on "Oil Management in Compressors and Their Systems," (1 of 8 Lecturers – taught 1 of 8 lectures), 48 participants, no evaluation, July 10, 2016.
- Workshop Lecturer on "Energy Utilization and Refrigeration Technologies," (Only Lecturer – taught 5 lectures), 16 participants, no evaluation, Cuenca, Ecuador, June 22-23, 2017.

RESEARCH AND EDUCATION GRANTS
Total amount of grants received at Purdue University (including Co-PIs): $15,735,805

a.) Completed Research Grants ($12,172,978 total):

1. "Light Hydrocarbons as Replacements for Refrigerant R-22", sponsored by Copeland Corp. and Whirlpool Corp., 1/1/94 – 8/31/95, $100,000, Co-PIs: J.E. Braun, D.R. Tree.
2. International Travel Grant to attend 19th Intl. Congress of Refrig., The Hague, The Netherlands,

sponsored by the Purdue Research Foundation, $1,116, 8/96.

3. "Development of a Supplemental Diesel-Fired Automobile Passenger Compartment Heater", sponsored by Ford Motor Co., 9/31/95 – 12/31/95, $7,950, Co-PI: S. Ramadhyani.
4. "A Feasibility Study of Air-Cycle Technology for Air Conditioning Application", sponsored by Whirlpool Corp., 12/1/95 – 1/31/96, $9,900, Co-PIs: J.E. Braun, P.B. Lawless, S. Ramadhyani, W. Soedel.
5. "Capacity and Power Demand of Unitary Air Conditioners and Heat Pumps Under Extreme Temperature and Humidity Conditions", sponsored by ASHRAE (859-RP), 9/1/95 – 11/30/96, $58,885, Co-PI: J.E. Braun.
6. "Study of Oil Circulation in Vapor Compression Systems", sponsored by United Technologies Carrier Corp., 6/1/95 – 8/31/97, $51,000, Co-PI: V.W. Goldschmidt.
7. "Modeling of Transcritical Thermodynamic Cycle Technology", sponsored by the Purdue Research Foundation, 9/1/95 – 8/31/97, $20,400.
8. "Mathematical Modeling of Scroll Compressors", sponsored by Matsushita Electric Corp. of America, 9/1/95 – 9/30/97, $131,999, Co-PIs: J.E. Braun, D.R. Tree.
9. "Testing of Secondary Loop Refrigeration Systems for Supermarket Applications", sponsored by Tyler Refrig. Corp. and 3M Specialty Chemicals Division, 12/1/96 – 11/30/97, $46,308.
10. "Performance Comparison of Transcritical CO_2-Technology with CFC-, HCFC-, and HFC-Technology", sponsored by the U.S. Army Communications-Electronics Command, 9/1/97 – 11/30/98, $25,000.
11. "Evaluation of Secondary Refrigerants for Supermarket Applications", sponsored by ASHRAE as part of the 1997 ASHRAE New Investigator Award, 5/1/97 – 4/30/99, $45,000.
12. "Testing of Carbon Dioxide Fin-Tube Gas Coolers and Evaporators", sponsored by Modine Manufacturing Company, 8/1/98 – 5/31/99, $20,126.
13. "Effects of Application on Reliability and Performance of Unitary Split Systems", sponsored by United Technologies Carrier Corp., 9/1/97 – 9/30/99, $116,767, Co-PI: V.W. Goldschmidt.
14. "Heat Transfer and Pressure Drop Characteristics during In-Tube Gas Cooling of Supercritical Carbon Dioxide", sponsored by ASHRAE (913-RP), 5/1/97 – 01/31/00, $81,292, Co-PI: S. Ramadhyani.
15. "Transcritical Carbon Dioxide Cycle Efficiency", sponsored by The Trane Company, 9/1/99 – 12/31/99, $13,200.
16. "Feasibility Study of Air Cycle Technology for Domestic Tumbler Dryer Applications", sponsored by Whirlpool Corporation, 10/1/99 – 1/31/00, $18,000, Co-PI: J.E. Braun.
17. "Phase II of Mathematical Modeling of Scroll Compressors", sponsored by Matsushita Compressor Corp. of America, 12/1/97 – 07/31/00, $136,000, Co-PI: J.E. Braun.
18. "Modeling of Direct Expansion and Secondary Loop Refrigeration Systems for Supermarket Applications", sponsored by the Purdue Research Foundation, 9/1/98 – 8/31/00, $24,351.
19. "Experimental Investigation of Carbon Dioxide-Based Environmental Control Units to Replace HCFC-22 Units", sponsored by the U.S. Army Communications-Electronics Command, 10/1/99 – 12/31/00, $75,000.
20. "Supermarket Refrigeration System Consortium", sponsored by Sporlan Valve Company and Tyler Refrigeration Corporation, 3/1/99 – 2/28/01, $75,000.
21. "Accurate Modeling of Refrigerant Inventory in Unitary Air Conditioners and Heat Pumps", sponsored by the Trane Company, 8/1/99 – 4/30/01, $82,744, Co-PI: J.E. Braun.
22. "Analysis of Refrigerant Flow Devices", sponsored by Aeroquip Corporation, 7/1/99-8/31/01, $144,977, Co-PIs: J.E. Braun, S.H. Frankel.

23. "Performance of Plate Fin and Spine Fin Heat Exchanger after Contamination and Cleaning", sponsored by the Trane Company, 9/1/00 – 12/31/01, $33,440, Co-PI: J.E. Braun.
24. "Theoretical Investigation of the Feasibility of the Transcritical Carbon Dioxide Cycle for various AC&R Applications", sponsored by Tecumseh Products Inc., 10/2/00 – 12/31/01, $30,500.
25. "Development of a Carbon Dioxide-Based Field Deployable Environmental Control Unit to Replace HCFC-22 or HFC-134a Units", sponsored by the U.S. Air Force Research Laboratory, 3/1/00 – 3/31/02, $158,371, Co-PI: P.B. Lawless.
26. "Evaluation of the Performance Potential of CO_2 as a Refrigerant in Air-To-Air Air Conditioners and Heat Pumps: System Modeling and Analysis", sponsored by the Air Conditioning and Refrigeration Technology Institute (ARTI Project 610-10030), 5/1/00 – 5/31/02, $84,384.
27. "Model the Performance Characteristics of Environmental Control Units (ECUs) based on the Transcritical CO_2 Cycle to demonstrate its Feasibility over a wide Range of Air Conditioning and Heat Pumping Operating Conditions", sponsored by WhiteMoss, Inc. through a Phase I U.S. Army SBIR Grant, 2/1/02 – 7/31/02, $34,843.
28. "Phase Separator Optimization", sponsored by the Trane Company, 9/1/00 – 12/31/02, $79,000, Co-PI: J.E. Braun.
29. "Microchannel Heat Exchanger Defrost Performance and Reliability", sponsored by ASHRAE (1195-RP), 2/1/01 – 1/31/03, $90,123.
30. "Measurement of Performance of Carbon Dioxide Compressors", sponsored by the Air Conditioning and Refrigeration Technology Institute (ARTI Project 611-10070), 06/01/01 – 12/31/02, $99,075.
31. "Testing of a Carbon Dioxide Compressor for Automotive Heat Pump Applications," sponsored by Ford Motor Company, 05/18/01 – 05/31/03, $29,400.
32. "The Role of Filtration in Maintaining Clean Heat Exchange Coils", sponsored by the Air Conditioning and Refrigeration Technology Institute (ARTI Project 610-40050), 10/1/01 – 4/30/04, $159,908, Co-PI: J.E. Braun.
33. "Critical Literature Review of Lubricant Influence on Refrigerant Heat Transfer and Pressure Drop," sponsored by the Air Conditioning and Refrigeration Technology Institute (ARTI Project 611-20080), 5/1/02 – 5/31/03, $61,839.
34. "Capacity Control of Compressors", sponsored by Tecumseh Products Inc., 8/1/02 – 12/31/05, $33,000.
35. "Modeling and Testing of an Automotive Scroll Compressor", sponsored by Nanjing Aotecar Refrigerating Company, Ltd., 10/01/02 – 9/30/03, $79,193, Co-PI: J.E. Braun.
36. "Performance Evaluation of Duct Insulation Materials," sponsored by Reflectix, Inc., 01/01/03 - 10/31/03, $38,270, Co-PI: J.E. Braun.
37. "Miniature-Scale Vapor Compression Systems for Electronics Cooling," sponsored by Cooling Technologies Research Center (CTRC), 01/01/03 - 12/31/05, $134,628, Co-PI: S. Garimella.
38. "Analysis of Diaphragm Compressors for Electronic Cooling Applications," sponsored through the B.F.S. Schaefer Young Faculty Scholar Award, 11/01/03 – 04/30/05, $60,000.
39. "Electro-Pump for Residential Heating and Cooling Applications, Phase I: Refrigerant Selection and Initial Design," sponsored by Electro Industries, Inc., 01/01/04 - 07/31/04, $21,179.
40. "Electro-Pump for Residential Heating and Cooling Applications, Phase II: Construction and Simulation of Bread Board Heat Pump System," sponsored by Electro Industries, Inc., 08/01/04 – 12/31/05, $89,863.

41. “Testing of a Prototype Hermetic Carbon Dioxide Compressor”, sponsored by Tecumseh Products Inc., 10/1/04 – 12/31/04, $5,000.
42. “Testing of a Prototype Carbon Dioxide Compressor”, sponsored by Danfoss A/S, 3/1/04 – 4/30/04, $4,200.
43. “Modeling and Testing of a Hermetic Rotary Compressor, Phase I: Model Setup and External Compressor Measurements,” sponsored by LG Electronics Co., 01/03/03 - 02/29/04, $75,000, Co-PI: J.E. Braun.
44. “Modeling and Testing of a Hermetic Rotary Compressor, Phase II: Internal Compressor Measurements, Model Validation and Parametric Studies,” 03/01/04 - 09/30/04, $25,000, Co-PI: J.E. Braun.
45. “Development of a Miniature-Scale Refrigeration System for Electronics Cooling Phase I: Proof-Of-Concept,” sponsored by Intel Corporation, 09/20/04 – 06/31/05, $139,684, Co-PI: S. Garimella.
46. “Testing of a Prototype Hermetic Carbon Dioxide Compressor”, sponsored by Tecumseh Products Inc., 03/01/05 – 04/30/05, $6,000.
47. “Reliability Testing of Prototype Carbon Dioxide Compressors”, sponsored by Tecumseh Products Inc., 04/01/05 – 11/30/05, $39,533.
48. “Improvement and Validation of Unitary Air Conditioner and Heat Pump Simulation Models for R-22 and HFC Alternatives at Off-Design Conditions”, sponsored by ASHRAE (1173-RP), 9/1/02 – 1/31/06, $137,156, Co-PI: J.E. Braun.
49. “Experimental Investigation of a Carbon Dioxide-Based Reversible Heat Pump System,” sponsored by WhiteMoss, Inc. through a Phase II U.S. Army SBIR Grant, 1/21/04 – 1/20/06, $160,000.
50. “Analysis of Miniature-Scale Diaphragm Compressors for Electronic Cooling Applications,” sponsored by Purdue Research Foundation: XR Grant, 05/01/04 – 04/30/06, $29,694.
51. “R-410A Enthalpy Measurements in the Liquid Sub-Cooled Region,” sponsored by Copeland Corp., 11/01/05 – 07/31/06, $41,433, Co-PI: J.E. Braun.
52. “Effects of Dissolved Refrigerant on Oil Viscosity, Phase 1: Experimental Measurements of Dilution and Viscosity Inside the Compressor Crankcase,” sponsored by Copeland Corp., 05/01/05 – 07/31/06, $19,000.
53. “Modeling and Testing of a Twin Rotary Compressor,” sponsored by LG Electronics Co., 09/01/05 – 12/31/06, $84,906, Co-PI: J.E. Braun.
54. “Alternative Cooling Technologies”, sponsored by Tecumseh Products Inc., 8/1/02 – 12/31/06, $226,411.
55. “Miniature-Scale Diaphragm Compressors,” sponsored by Cooling Technologies Research Center (CTRC), 08/01/04 - 12/31/07, $140,000, Co-PI: S. Garimella.
56. “Refrigerant Flow Boiling Heat Transfer Correlations in Mini-Channel Cold Plate Evaporators for Electronics Cooling,” sponsored by Cooling Technologies Research Center (CTRC), 01/01/06 - 12/31/07, $80,000, Co-PI: S. Garimella.
57. “Recovery of Throttling Losses by a Two-Phase Ejector in a Vapor Compression Cycle,” sponsored by the Air Conditioning and Refrigeration Technology Institute (ARTI Project 616-10110), 10/01/06 – 03/31/08, $61,158.
58. “Optimizing Refrigerant Distribution in Evaporators,” sponsored by the Air Conditioning and Refrigeration Technology Institute (ARTI Project 616-06040), 05/01/07 – 02/29/08, $40,797, Co-PI: J.E. Braun.
59. “Testing of an Automotive A/C System,” sponsored by Visteon – Autopal, 05/01/07 - 04/30/08,

$26,400.

60. "Increasing the Energy Efficiency of Vapor Compression Systems by using "Smart" and Cost-effective Compressor," sponsored by California Energy Commission - Energy Innovations Small Grant (EISG) Program, 01/01/07 – 6/30/07, $94,999, Co-PI: S. Pekarek.
61. "Off-Design Performance of Residential Heat Pumps," sponsored by Ecotope, Inc., 09/01/06 – 08/31/08, $80,230, Co-PI: J.E. Braun.
62. "Technical Review and Thermal Modeling of a Hermetic CO_2 Scroll Compressor," sponsored by Hitachi Electrical Appliances Co. Ltd., 10/01/06 - 08/31/08, $64,894.
63. "Acoustical Enhancement of Heat Transfer," sponsored by Cooling Technologies Research Center (CTRC), 01/01/08 - 5/31/09, $40,000, Co-PI: S. Bolton.
64. "Analysis of a 0.5 HP Scroll Compressor for Oxygen Compression," sponsored by Sci-Tech Research and Service Co., 03/01/08-05/31/09, $40,000.
65. "Miniature-Scale Linear Compressor for Electronics Cooling," sponsored by Cooling Technologies Research Center (CTRC), 01/01/08 - 12/31/09, $90,000, Co-PI: S. Garimella.
66. "Performance of Microchannel and Plate Fin Heat Exchangers after Air-Side Fouling and Cleaning," sponsored by Guentner AG Co. KG, 03/01/08 - 12/31/09, $34,657.
67. "Alternative Cooling Technologies", sponsored by Herrick Foundation, 11/01/07 – 12/31/09, $144,000.
68. "Conduction Cooled Electronic/Electrical Modules in Liquid Cooled Cabinets," sponsored by The Boeing Company, 01/01/09-12/31/09, $70,571.
69. "Energy and Performance of Secondary Coolant Low-Temperature Refrigeration Systems," sponsored by ASHRAE, Inc. (1484-RP), 04/01/08-01/31/10, $71,259.
70. "Development of a System Design Methodology for Robust Thermal Control Systems to Support Operationally Responsive Space," sponsored by Space Vehicles Directorate of the U.S. Air Force Research Laboratory, 05/01/06 – 09/30/10, $205,961, Co-PI: J.E. Braun.
71. "Testing of a Prototype Hermetic Carbon Dioxide Compressor", sponsored by EcoThermics, 05/1/09 – 12/31/10, $19,000, Co-PI: W.T. Horton.
72. "Analysis of Heat Rejection Technologies and Waste Heat Recovery Options," sponsored by Hoosier Energy, 01/01/10-12/31/10, $169,336, Co-PI: S. Garimella.
73. "Conduction Cooled Electronic/Electrical Modules in Liquid Cooled Cabinets, Phase II: Experimental Analysis," sponsored by The Boeing Company, 02/23/10-02/28/11, $91,394.
74. "Performance Evaluation of Non-metallic Scroll Compressors," sponsored by Air Squared Inc., 09/01/10 - 12/31/10, $9,252.
75. "2007 Purdue University Faculty Scholar Award," sponsored by Purdue University, 09/01/06 – 08/31/11, $50,000.
76. "Compressor Research," sponsored by Torad Engineering LLC, 03/01/11 - 6/30/11, $5,000.
77. "Compressor Research," sponsored by Torad Engineering LLC, 08/15/11 - 12/31/11, $13,886.
78. "Optimizing Refrigerant Distribution in Evaporators," sponsored by the California Energy Commission, Building Energy Research Grant (BERG), 10/22/09-04/15/12, $249,729, Co-PI: J.E. Braun.
79. "Organic Rankine Cycle with Solution Circuit for Electronic Waste Heat Recovery," sponsored by Cooling Technologies Research Center (CTRC), 06/01/10 - 05/31/12, $80,000, Co-PI: S. Garimella.
80. "Annual Performance Comparison between Single Speed, Variable Speed, and Mini-Split Air Conditioners," sponsored by Trane Residential Systems, 01/01/11-12/31/12, $140,000, Co-PIs: J.E. Braun, W.T. Horton.

81. “Performance Comparison of Liquid-Loop Coolants for Electronics Cooling,” sponsored by Cooling Technologies Research Center (CTRC), 01/01/12-12/31/12, $40,000, Co-PI: S. Garimella.
82. “Organic Rankine Cycle with Solution Circuit for Waste Heat Recovery,” sponsored by The Herrick Foundation, 01/01/10-12/31/12, $149,600, Co-PIs: W.T. Horton, J.E. Braun.
83. “Air Source Cold Climate Heat Pump,” sponsored by the U.S. Department of Defense ESTCP, 02/18/2011-08/31/2013, $462,499, Co-PI: W. Hutzel.
84. “Development of a High Performance Cold Climate Heat Pump,” sponsored by U.S. Department of Energy, 07/01/10 - 09/30/13, $1,331,435, Co-PIs: W.T. Horton, J.E. Braun.
85. “Thermal Integration of Household Appliances and Solar Hot Water, Ph. 1,” sponsored by Whirlpool Corp., 08/01/13 - 12/31/13, $9,500.
86. “Cold Climate Heat Pump Commercialization - Phase I,” sponsored by Unico, Inc., 06/01/13-02/28/14, $25,000, Co-PI: W. Hutzel.
87. “Testing of Innovative CO_2 Compressors,” sponsored by Holekamp Foundation, 02/01/13-12/31/13, $33,000.
88. “Modeling of a Novel Rotating Spool Expander,” sponsored by Torad Engineering, LLC, 08/15/13-05/15/14, $26,000.
89. “Transcritical CO2 Refrigeration System using Oil-less, Integrated Expander/Compressor Unit,” sponsored by S-RAM Dynamics via U.S. Army SBIR Phase I Grant, 07/01/14 - 11/30/14, $20,000.
90. “Performance of Finned Heat Exchangers and Heat Sinks after Air-Side Fouling and Cleaning,” sponsored by Cooling Technologies Research Center (CTRC), 01/01/13-12/31/14, $80,000, Co-PI: S.V. Garimella.
91. “High COP Heat Pumps for Commercial Energy Applications,” sponsored by Cooling Technologies Research Center (CTRC), 01/01/14-12/31/14, $40,000, Co-PI: K. Yazawa.
92. “Innovative Cooling Equipment for Military Environmental Control Units (ECU),” sponsored by Adams Communication & Engr Tech, 01/01/14 – 12/31/15, $200,000.
93. “Thermal Integration of Household Appliances and Solar Hot Water, Ph. 2,” sponsored by Whirlpool Corp., 01/01/14 – 12/31/15, $100,000.
94. “New ORC Test Stand for Scroll Expander Performance Testing,” sponsored by Cummins Business Services, 09/01/13 – 05/31/15, $15,000.
95. “Regenerative Air Cycle Heat Pump for Commercial and Industrial Applications,” sponsored by S-RAM Dynamics, 01/01/14 – 05/31/15, $99,021.
96. “Modeling of a Novel Rotating Spool Expander,” sponsored by Torad Engineering, LLC, 08/15/14 – 07/31/15, $9,000.
97. “Oil Return Measurement of 2 Ton Refrigeration Unit Using Different Refrigerant/Oil Mixtures,” sponsored by BMP USA Inc., 01/01/15 – 04/30/15, $16,190. Co-PI: O. Kurtulus.
98. “ReNEWW House Modifications towards Net-Zero Water,” sponsored by Whirlpool Corp., 01/01/15 – 12/31/15, $75,000.
99. “Heat Exchanger Performance of Heat Pump Clothes Dryer,” sponsored by Whirlpool Corp., 01/01/15 – 12/31/15, $5,000.
100. “Characterization and Performance Testing of Natural Gas Compressors for Residential and Commercial Applications,” sponsored by BlackPak Inc. via ARPA-E SBIR Phase II Grant, 06/01/15 – 11/30/16, $199,725.
101. “Performance Testing of a "Level 1" Unitary Split-System Heat Pump,” sponsored by Electric Power Research Institute (EPRI), 12/04/15 – 12/31/16, $51,152.

102. "Updraft Tower Dry Cooling and Waste Heat Utilization for Power Plants," sponsored by Duke Energy Indiana, Inc., 12/04/15 - 11/30/16, $60,000, Co-PI: J. Weibel.
103. "Development of a simulation model predicting efficiency gains for residential appliances utilizing thermal integration," sponsored by Center for High Performance Buildings at Purdue, 01/01/16 - 12/31/16, $50,000.
104. "Optimizing Seasonal Cooling and Heating Performance of Unitary Heat Pumps using Variable Speed Compressors and Fans," sponsored by Center for High Performance Buildings at Purdue, 01/01/16 - 12/31/16, $60,000.
105. "Modeling of Roots Expanders and Organic Rankine Cycles in support of Eaton's "Affordable Rankine Cycle" Project," sponsored by Eaton Corp. via DOE Grant, 02/15/16 - 03/31/17, $130,000, Co-PI: J.E. Braun.
106. "Testing of an Automotive AC Compressor using a Tescor Compressor Calorimeter," sponsored by Den Black, 08/01/16 - 04/01/17, $9,000.
107. "Technical Review Assistance to the MOXIE Experiment on the Mars 2020 Mission," sponsored by Jet Propulsion Laboratory, 08/10/15 – 09/24/17, $45,008.
108. "Modeling and Analysis of the Meso-Scale Ericsson Power Generation System (MEPS)," sponsored by Inventherm via NASA SBIR Phase I Grant, 07/01/17 - 12/31/17, $25,000, Co-PI: J.E. Braun.
109. "Vapor Compression Refrigeration System for Cold Storage on Spacecrafts," sponsored by Air Squared Inc. via NASA SBIR Phase I Grant, 06/09/17 - 12/31/17, $20,000.
110. "Measurements of Discharge Gas Pulsations in Scroll Compressors," sponsored by Hi-Bar Blowers, Inc., 10/01/17-04/30/18, $10,000.
111. "Multi-Temperature Refrigerated Container System (MTRCS) Analysis, Part 1: Test Stand Design and System Simulations," sponsored by S-RAM Dynamics Inc. via U.S. Army SBIR Phase II Grant, 04/01/16 - 08/31/18, $160,000.
112. "Advanced Manufacturing of a Linear Compressor for Isothermal Compression with an Integrated Heat Pipe," sponsored by Oak Ridge National Laboratory, 05/15/17 - 09/30/18, $82,206, Co-PI: J.A. Weibel.
113. "Next Generation Unitary AC & HP Equipment," sponsored by United Technologies Carrier Corp., 01/01/16 - 12/31/18, $180,000, Co-PIs: J.E. Braun & W.T. Horton.
114. "Development of general purpose simulation tools for positive displacement compressors (PDsim)," sponsored by Center for High Performance Buildings (CHPB) at Purdue, 01/01/16 - 12/31/18, $160,000.
115. "Development of a Comprehensive Simulation Model to Predict the Performance of Bristol's Hermetic Reciprocating Compressors," sponsored by Bristol Compressors, Inc., 05/01/16 - 12/31/18, $43,000, Co-PIs: J.E. Braun & W.T. Horton.
116. "Modeling and Testing of an Automotive Scroll Compressor using Carbon Dioxide as the Refrigerant," sponsored by Nanjing Aotecar Refrigerating Co. LTD, 10/01/16 - 12/31/18, $106,000, Co-PI: J.E. Braun.
117. "Development of general purpose simulation tools for unitary equipment (ACHPsim)," sponsored by Center for High Performance Buildings (CHPB) at Purdue, 01/01/17 - 12/31/18, $110,000.
118. "Development of Residential Thermally Integrated Appliances (TIRA)," sponsored by Whirlpool Corp., 01/01/17 - 12/31/18, $100,000.
119. "Feasibility of Employing Polymers in Reciprocating Compressors," Sponsored by Solvay Specialty Polymers USA, LLC, 03/01/18 - 10/31/18, $62,855.

120. "Performance Testing for Unitary Split-System Heat Pump with Viper Expander," sponsored by Regal Beloit America, Inc, 06/01/14 – 12/31/19, $135,000.
121. "Organic Rankine Cycle as a Bottoming Cycle for Waste Heat Recovery from Internal Combustion Engines," sponsored by Air Squared, Inc. via ARPA-E SBIR Phase I, II, IIs Grants, 05/01/16 – 10/30/19, $273,750.
122. "Evaluating Adhesive Bonding of Aluminum and Copper in HVAC&R Applications," sponsored by Oak Ridge National Laboratory (ORNL), 01/25/17 – 03/05/20, $225,000, Co-PI: J.A. Weibel.
123. "Vapor Compression Refrigeration System for Cold Storage on Spacecrafts," sponsored by Air Squared, Inc. via NASA SBIR Phase II Grant, 05/01/18 – 04/30/20, $200,000.
124. "Theoretical Evaluation of Compressor Technologies for a Low-Pressure Refrigerant," sponsored by Honeywell, 05/15/18 – 02/28/20, $64,473, Co-PI: D. Ziviani.
125. "Screw Chiller/Compressor Long-Term Performance Degradation Study (Phase I – Experimental Study)," sponsored by Danfoss Turbocor Compressors, Inc., 06/01/18 - 05/31/19, $165,444, Co-PI: J.E. Braun.
126. "Integrated Electric Vehicle Battery Thermal Management," sponsored by Cooling Technologies Research Center (CTRC), 01/01/19 – 12/31/20, $85,000, Co-PI: J.A. Weibel.
127. "Feasibility Study on 40 kW Linear Air Compressor Technology," sponsored by Ingersoll-Rand, 02/01/19 - 8/31/19, $63,368, Co-PI: D. Ziviani.
128. "Detailed Modeling of a Cold-Climate Heat Pump," sponsored by IMBY Energy, 03/01/19 – 12/31/19, $16,700, Co-PI: D. Ziviani.
129. "Polymer Cylinder Head Pressure Testing," sponsored by Solvay Specialty Polymers USA, LLC, 05/01/19 – 10/31/19, $78,586, Co-PI: D. Ziviani.
130. "Theoretical and Experimental Analyses of a Dual-Evaporator Organic Rankine Cycle with Spinning Scroll Expander," sponsored by Air Squared, Inc. via NAVY STTR Phase I Grants, 07/01/19 – 12/31/19, $42,000.
131. "Development of a generalized single screw compressor model," sponsored by Daikin Applied Americas Inc, 11/01/19 – 09/30/20, $50,000, Co-PI: D. Ziviani.
132. "Optimization of a CO2 Ejector-Expansion Technology," sponsored by Bechtel Corporation, 01/01/19 – 12/31/19, $67,422, Co-PI: D. Ziviani.
133. "Design and Manufacturing of a Twin-Screw Compressor for Isothermal Compression by employing 3D-Printing Techniques," Ingersoll-Rand, 04/01/19 – 01/31/21, $127,282, Co-PI: D. Ziviani.
134. "Investigation of a Novel Ejector-Based Cycle Architecture – Phase II: R290," Bechtel Corporation, 01/01/20 – 12/31/21, $243,411, Co-PI: D. Ziviani.
135. "Off-Grid Refrigeration Design: Cold Storage Battery," Engineers Without Borders USA, 06/01/20 – 05/30/21, $47,390.
136. "Off-Grid Refrigeration Design: Combined Heating and Cooling," Engineers Without Borders USA, 06/01/20 – 05/30/21, $45,390.
137. "Vapor Compression Refrigeration System for Cold Storage on Spacecrafts," Air Squared, Inc. via NASA SBIR Phase II-E Grant, 07/14/20 – 07/13/21, $75,000.
138. "Energy Design and Scoping Tool for DC Distribution Systems," National Renewable Energy Laboratory (NREL), 10/01/20 – 09/30/21, $60,000.

b.) Current Research Grants ($1,183,748 total):

139. "Oil Return and Retention in Unitary Split System Gas Lines with HFC and HFO Refrigerants,"

sponsored by ASHRAE (1721-RP), 04/01/17 – 07/01/22, $120,714, Co-PI: J.E. Braun.

140. "Development of a mechanistic model for twin-screw compressors with detailed sub-models for estimating the bearing loads," sponsored by Johnson Controls Inc., 11/01/17 – 05/31/21, $93,254.
141. "The DC-Power House: Converting a Residential Building from AC to DC Power to Improve Energy Efficiency," sponsored by Center for High Performance Buildings (CHPB) at Purdue, 01/01/18 – 12/31/22, $290,000.
142. "Development and Optimization of a Packaged R-290 Cold-Climate Heat Pump," sponsored by Tri-State Generation and Transmission, 06/01/20 – 06/30/21, $93,629, Co-PI: D. Ziviani.
143. "Detailed Modeling to Obtain Compressor Motor Efficiency of a Residential Split-System Air Conditioning System," QM Power, 11/01/20 – 02/28/21, $20,000, Co-PI: D. Ziviani.
144. "Screw Chiller/Compressor Long-Term Performance Degradation Study (Phase II – Degradation Study)," sponsored by Danfoss, 12/01/20 – 11/30/22, $179,095, Co-PIs: J.E. Braun, D. Ziviani.
145. "Holistic Thermal Management for EV Ultrafast Charging," Cooling Technologies Research Center (CTRC), 01/01/21 – 12/31/21, $45,000, Co-PIs: J.A. Weibel, D. Ziviani.
146. "Multi-Scale Optimization and Testing of Ejector Designs for Vapor Compression Applications," Bechtel Corporation, 05/01/21 – 04/30/22, $89,316, Co-PI: D. Ziviani.
147. "In-situ oil circulation ratio (OCR) measurement using separation method in suction lines of systems running vapor compression cycle," sponsored by Trask Trust Fund, Purdue Research Foundation, 06/07/21 – 05/13/22, $37,740, Co-PI: J.E. Braun.
148. "Feasibility Study on Next Generation Lubricants for Vapor Compression Applications – Phase I: Current State-of-the-Art," sponsored by Evonik, 07/01/21 – 05/31/22, $50,000, Co-PI: D. Ziviani.
149. "Performance Testing of Refrigerant EXP21b as a Replacement for R410A in a Residential Split-System Heat Pump," sponsored by FluoroFusion Specialty Chemicals, 07/01/21 – 05/31/22, $20,000.
150. "Two-Phase Flow Work Recovery Expansion Device in a Transcritical Carbon Dioxide Refrigeration Cycle," sponsored by Tree Associates, 10/01/21 – 09/30/22, $100,000, Co-PI: D. Ziviani.

c.) Educational Grants ($2,379,079 total):

1. "NSF Trainee Assistantship for W. Travis Horton", sponsored by NSF, 9/1/96 – 8/31/98, $57,305, PI: R. Viskanta.
2. "ASHRAE Grant-In-Aid for Mr. Luis A. Rivera-Velez", sponsored by ASHRAE, 7/1/97 – 12/31/97, $3,750.
3. "Testing of R-407C and R-410A in Unitary Air Conditioners and Heat Pumps Under Extreme Operating Conditions", sponsored by ASHRAE's Undergraduate Senior Project Grant Program, 9/1/97 - 12/31/97, $5,000.
4. "Operating Expenses of the Purdue Student Branch of ASHRAE", sponsored by UTC Special Grants Program, 9/1/97 – 4/30/98, $1,415, Co-PI: W. Hutzel.
5. Robert and Barbara Popejoy Scholarship and Incentive Award for Melissa A. Myers, 9/1/97 – 12/31/97, $2,000.
6. Willis H. Carrier/ASHRAE Fellowship for Srinivas Pitla, 9/1/97 – 8/31/98, $20,000.
7. "ASHRAE Grant-In-Aid for Mr. Douglas M. Robinson", sponsored by ASHRAE, 7/1/98 - 6/30/99, $9,000.

8. “Testing of Frost Accumulation on Supermarket Display Case Air Coils”, sponsored by ASHRAE's Undergraduate Senior Project Grant Program, 9/1/98 - 12/31/98, $4,800.
9. “Operating Expenses of the Purdue Student Branch of ASHRAE”, sponsored by UTC Special Grants Program, 9/1/98 – 4/30/99, $1,515, Co-PI: W. Hutzel.
10. Willis H. Carrier/ASHRAE Fellowship for Daqing Li, 9/1/98 – 8/31/99, $20,000.
11. Robert and Barbara Popejoy Scholarship and Incentive Award for Brian S. Borke, 9/1/98 – 12/31/98, $2,000.
12. “ASHRAE Grant-In-Aid for Mr. W. Travis Horton”, sponsored by ASHRAE, 7/1/99 - 6/30/00, $7,500.
13. “Supplementing the Operating Expenses of the Purdue Student Branch of ASHRAE”, sponsored by Allied Signal Special Grants Program, 9/1/99 – 4/30/00, $500, Co-PI: W. Hutzel.
14. “Supplementing the Operating Expenses of the Purdue Student Branch of ASHRAE”, sponsored by UTC Special Grants Program, 9/1/99 – 4/30/00, $500, Co-PI: W. Hutzel.
15. Robert and Barbara Popejoy Scholarship and Incentive Award for Benjamin J. Huttsell, 9/1/99 – 12/31/99, $2,000.
16. “ASHRAE Grant-In-Aid for Mr. Todd M. Harms”, sponsored by ASHRAE, 7/1/00 - 6/30/01, $7,500.
17. “Promoting Careers in HVAC&R”, sponsored by Honeywell International in support of the Purdue Student Branch of ASHRAE, 9/1/00 – 4/30/01, $825, Co-PI: W. Hutzel.
18. “Promoting Careers in HVAC&R”, sponsored by UTC Special Grants Program in support of the Purdue Student Branch of ASHRAE, 9/1/00 – 4/30/01, $825, Co-PI: W. Hutzel.
19. Robert and Barbara Popejoy Scholarship and Incentive Award for Kurt Engelbrecht, 9/1/00 – 12/31/00, $2,000.
20. “Innovation Realization Lab: A New Educational Model for Tom Ortiz,” sponsored by NSF, 8/1/00 – 7/31/02, $48,744, PI: M.C. Thursby.
21. “ASHRAE Grant-In-Aid for Mr. Tomas M. Ortiz”, sponsored by ASHRAE, 7/1/01 - 6/30/02, $7,500.
22. “Promoting Careers in HVAC&R”, sponsored by UTC Special Grants Program in support of the Purdue Student Branch of ASHRAE, 9/1/01 – 4/30/02, $1,000, Co-PI: W. Hutzel.
23. Willis H. Carrier/ASHRAE Fellowship for Bo Shen, 9/1/01 – 8/31/02, $20,500.
24. “Purdue – Karlsruhe Global Education Program”, sponsored by Model International Department Grants, Purdue University, 1/1/02 – 12/31/02, $24,815, Co-PIs: E.D. Hirleman, T. Siegmund, J. Matthews.
25. Willis H. Carrier/ASHRAE Fellowship for Jason Hugenroth 9/1/02 – 8/31/03, $20,500.
26. Robert and Barbara Popejoy Scholarship and Incentive Award for Alexander Hamner, 9/1/02 – 12/31/02, $2,000.
27. Robert and Barbara Popejoy Scholarship and Incentive Award for Dustin Ballard, 9/1/02 – 12/31/02, $2,000.
28. GEARE/ME Senior Design Project “Four Person Trailer Carousel”, Spring Semester 2004, $5000.
29. “ASHRAE Grant-In-Aid for Mr. Jason Hugenroth”, sponsored by ASHRAE, 7/1/04 - 6/30/05, $7,500.
30. “ASHRAE Grant-In-Aid for Mr. Suwat Trutassanawin”, sponsored by ASHRAE, 7/1/04 - 6/30/05, $7,500.
31. Robert and Barbara Popejoy Scholarship and Incentive Award for Jason Billings, 9/1/04 – 12/31/04, $1,500.

32. Willis H. Carrier/ASHRAE Fellowship for Derek Hengeveld, 9/1/05 – 8/31/06, $20,500.
33. “Heat Transfer Measurements in Mini-Channel Cold Plate Evaporators”, sponsored by ASHRAE's Undergraduate Senior Project Grant Program, 09/01/06 - 04/30/07, $4,998.
34. “ASHRAE Grant-In-Aid for Mr. Stefan S. Bertsch”, sponsored by ASHRAE, 07/01/06 - 06/30/07, $10,000.
35. “ASHRAE Grant-In-Aid for Ms. Margaret Mathison”, sponsored by ASHRAE, 07/01/06 - 06/30/07, $10,000.
36. “ASHRAE Grant-In-Aid for Mr. Ian Bell”, sponsored by ASHRAE, 07/01/07 - 06/30/08, $10,000.
37. “Global-HUB: A Virtual Community for Global Engineering and Education,” sponsored by National Science Foundation (NSF 0742753-CBET), 10/01/07 - 09/30/08, $140,000, Co-PIs: E.D. Hirleman, Jan Helge Bøhn, Virginia Tech, Deba Dutta, University of Michigan, Juan Lucena, Colorado School of Mines.
38. “ASHRAE Grant-In-Aid for Mr. Craig Bradshaw”, sponsored by ASHRAE, 07/01/09 - 06/30/10, $10,000.
39. “IREE: Developing Globally Competent Engineering Researchers,” sponsored by NSF, 01/15/2010 - 03/31/2011, $959,736, Co-PIs: E. Daniel Hirleman, Brent Jesiek.
40. “ASHRAE Graduate Student Grant-In-Aid for Mr. Christian K. Bach,” sponsored by ASHRAE, 07/01/10 – 06/30/11, $10,000.
41. “Leadership Case Studies: Developing Leadership Capacity in Undergraduate Engineering Students,” sponsored by the College of Engineering “Purdue’s Engineer of 2020 Seed Grant Program”, 06/01/11-05/31/12, $40,000, Co-PIs: Monica Cox, Yating Chang, Beverly Davenport-Sypher.
42. “ASHRAE Graduate Student Grant-In-Aid for Mr. Abhinav Krishna,” sponsored by ASHRAE, 07/01/11 – 06/30/12, $10,000.
43. “ASHRAE Graduate Student Grant-In-Aid for Mr. Stephen Caskey,” sponsored by ASHRAE, 07/01/12 – 06/30/13, $10,000.
44. “Access to Cooperative Education Programs and the Academic and Employment Returns by Race, Gender, and Discipline,” sponsored by National Science Foundation (NSF 1329283-EEC), 8/15/13 - 07/15/16, $304,757, Co-PIs: Matthew Ohland, Joyce Main.
45. “Performance of Finned Heat Exchangers and Heat Sinks after Air-side fouling and Cleaning,” sponsored by ASHRAE's Undergrad Senior Project Grant Program, 8/1/13 - 5/31/14, $5,000.
46. “ASME Scholarship for KCORC Research of Mr. Davide Ziviane,” sponsored by ASME, 04/10/14 – 09/30/14, $13,600.
47. “Internships for Indiana (IFI) Cost Share for OPP – Thrust 3,” sponsored by Lilly Endowment Inc., 11/01/13 – 05/31/19, $523,493.71. Main PI: S.V. Garimella
48. “ASHRAE Graduate Student Grant-In-Aid for Mr. Riley B. Barta,” sponsored by ASHRAE, 08/01/18 – 05/31/19, $10,000, Life Member Club Distinction (one of the top two awardees).
49. “ASHRAE Graduate Student Grant-In-Aid for Mr. Vatsal Shah,” sponsored by ASHRAE, 08/01/18 – 05/31/19, $10,000.
50. “ASHRAE Graduate Student Grant-In-Aid for Mr. Jonathan P. Ore,” sponsored by ASHRAE, 08/01/19 – 05/31/20, $10,000, Life Member Club Distinction (one of the top two awardees).

PAST STUDENT AND SCHOLAR SUPERVISIONS:

a.) Ph.D. Thesis Students Supervised

1. Douglas M. Robinson, Ph.D., "Modeling of Carbon Dioxide Based Air-to-Air Air Conditioners," graduated May 2000.
2. Yu Chen, Ph.D., "Mathematical Modeling of Scroll Compressors using Refrigerant R-410A," graduated December 2000 (Co-Advisor: J.E. Braun).
3. W. Travis Horton, Ph.D., "Modeling of Secondary Loop Refrigeration Systems in Supermarket Applications," graduated May 2002.
4. Joo Seok Baek, Ph.D., "Development of a Carbon Dioxide Based Field Deployable Environmental Control Unit to Replace HCFC-22 or HFC-134a Units," graduated August 2002 (Co-Advisor: P.B. Lawless).
5. Thomas M. Ortiz, Ph.D., "Development of a new Model for Investigating of the Performance of Carbon Dioxide as a Refrigerant for Residential Air Conditioners," graduate August 2002.
6. Todd M. Harms, Ph.D., "Charge Inventory System Modeling and Validation for Unitary Air Conditioners," graduated August 2002 (Co-Advisor: J.E. Braun).
7. Satyam Bendapudi, Ph.D., "Development and Evaluation of Modeling Approaches for Transients in Centrifugal Chillers," graduated August 2004 (Co-Advisor: J.E. Braun).
8. Jun-Hyeung (Jay) Kim, Ph.D., "Capacity Control of Positive Displacement Compressors," graduated December 2005.
9. Bo Shen, Ph.D., "Improvement and Validation of Unitary Air Conditioner and Heat Pump Simulation Models at Off-Design Conditions," graduated May 2006 (Co-Advisor: J.E. Braun).
10. Daqing Li, Ph.D., "Investigation of an Ejector-Expansion Device in a Transcritical Carbon Dioxide Cycle for Military ECU Applications," graduated May 2006.
11. Jason J. Hugenroth, Ph.D., "Liquid Flooded Ericsson Cycle Cooler," graduated May 2006. (Co-Advisors: J.E. Braun and G.B. King).
12. Suwat Trutassanawin, Ph.D., "Evaluation of Miniature-Scale Vapor Compression Systems for Electronics Cooling," graduated August 2006. (Co- Advisor: S.V. Garimella).
13. Anthony F. Black, Ph.D., "Evaluation of Technology Options for Future Coal Based Power Plants," graduated December 2006. (Co-Advisor: T. Sparrow, Ind. Eng.).
14. Miguel Jovane, Ph.D., "Modeling and Analysis of a Novel Rotary Compressors," graduated August 2007 (Co-Advisor: J.E. Braun).
15. Abhijit Sathe, Ph.D., "Miniature-Scale Diaphragm Compressors for Electronics Cooling," graduated August 2008 (Co-Advisor: S.V. Garimella).
16. Stefan S. Bertsch, Ph.D., "Refrigerant Flow Boiling in Mini-Channels," graduated August 2008 (Co-Advisor: S.V. Garimella).
17. Derek Hengeveld, Ph.D., "Development of a System Design Methodology for Robust Thermal Control Subsystems to Support Responsive Space," graduated December 2010 (Co-Advisor: J.E. Braun).
18. Ian H. Bell, Ph.D., "Theoretical and Experimental Analysis of Liquid Flooded Compression in Scroll Compressors," graduated May 2011 (Co- Advisors: J.E. Braun and G.B. King).
19. Margaret M. Mathison, Ph.D., "Modeling and Evaluation of Advanced Compression Techniques for Vapor Compression Equipment," graduated August 2011 (Co-Advisor: J.E. Braun).
20. Craig R. Bradshaw, Ph.D., "A Miniature-Scale Linear Compressor for Electronics Cooling," graduated May 2012 (Co-Advisor: S.V. Garimella).
21. Bryce Shaffer, Ph.D., "Performance Analysis of Non-Metallic Dry Running Scroll Compressors," graduated May 2012.
22. Christian K. Bach, Ph.D., "Refrigerant Side Compensation for Air-Side Maldistribution of Evaporators and its Effect on Performance," graduated August 2014 (Co-Advisor: J.E. Braun).

23. Brandon J. Woodland, Ph.D., "Methods of Increasing Net Work Output of Organic Rankine Cycles for Low-Grade Waste Heat Recovery with a Detailed Analysis Using a Zeotropic Working Fluid Mixture and Scroll Expander," graduated Aug. 2015 (Co-Advisor: J.E. Braun).
24. Abhinav Krishna, Ph.D., "Analysis of a Rotating Spool Expander for Organic Rankine Cycle Applications," graduated December 2015.
25. Bin Yang, Ph.D., "Modeling of an Oil-Free Carbon Dioxide Compressor Using Sanderson-Rocker Arm Motion (S-RAM) Mechanism," graduated May 2017.
26. Ammar M. Bahman, Ph.D., "Analysis of Packaged Air Conditioning Systems for High Temperature Climates," graduated May 2018.
27. Harshad Inamdar, Ph.D., "Performance of Finned Heat Exchangers after Air-Side Fouling and Cleaning," graduated in August 2018 (Co-Advisor: S.V. Garimella).
28. Nelson A. James, Ph.D., "Investigation of Chemical Looping for High Efficiency Heat Pumping," graduated in May 2019 (Co-Advisor: J.E. Braun).
29. Stephen L. Caskey, Ph.D., "Analysis of Thermally Connected Residential Appliances" graduated in May 2019.
30. Xinye Zhang, Ph.D., "An Experimental and Numerical Study on Dynamic Characteristics of Linear Compressors," graduated in May 2020.
31. Riley B. Barta, Direct Ph.D., "Experimental and Numerical Analysis of Performance Enhancements to a Multi-Stage Two-Evaporator Transcritical Carbon Dioxide Refrigeration Cycle," graduated in December 2020.
32. Jonathan P. Ore, Ph.D., "Control Strategies for Energy Use in the DC Nano-Grid House," graduated in May 2021.
33. Vatsal M. Shah, Ph.D., ", Oil Return and Retention in Unitary Split System Gas Lines with HFC and HFO Refrigerants," graduated in August 2021 (Co-Advisor: J.E. Braun).
34. Haotian Liu, Ph.D., "Evaluation of Adhesive Bonding in HVAC&R Applications," graduated in August 2021 (Co-Advisor: J.A. Weibel).
35. Vanessa Restrepo Perez, Ph.D., "Self-Healing Architectured Interfaces Inspired by the Molecular Unfolding of Proteins," graduated in August 2021 (Co-Advisor: R. Martinez, IE).
36. Leon P.M. Brendel, Ph.D., "Vapor Compression Refrigeration System for Cold Storage on Spacecrafts," graduated in December 2021 (started in August 2017) (Co-Advisor: J.E. Braun).

b.) M.S. Thesis Students Supervised

1. Jonathan D. Douglas, M.S.M.E., "A Cost-Based Method for Comparing Alternative Refrigerants Applied to R-22 Systems," graduated December 1995 (Co-Advisors: J.E. Braun, D.R. Tree).
2. Jason T. LeRoy, M.S.M.E., "Performance Evaluation of Vapor Compression Systems under Extreme Operating Conditions," graduated August 1997 (Co-Advisor: J.E. Braun).
3. Nils P. Halm, M.S.M.E., "Mathematical Modeling of Scroll Compressors using the Refrigerant R-22," graduated December 1997 (Co-Advisors: J.E. Braun, D.R. Tree).
4. Eric B. Skowron, M.S.M.E., "Investigation of Refrigerant/Oil Flow through Suction Accumulators," graduated December 1998 (Co-Advisor: V.W. Goldschmidt).
5. Srinivas S. Pitla, M.S.M.E., "Heat Transfer during In-Tube Cooling of Supercritical CO_2," graduated August 1999 (Co-Advisor: S. Ramadhyani).
6. Bradley F. Marcus, M.S.M.E., "Effects of Application on Reliability and Performance of Unitary Split Systems," graduated December 1999 (Co-Advisor: V.W. Goldschmidt).

7. Matthew C. Comstock, M.S.M.E., "Development of Analysis Tools for the Evaluation of Fault Detection and Diagnostics in Chillers," graduated Dec. 1999 (Co-Advisor: J.E. Braun).
8. Daqing Li, M.S.M.E., "Performance Evaluation of Carbon Dioxide-Based Environmental Control Units," graduated May 2001.
9. Zeqiang Sun, M.S.M.E., "Carbon Dioxide Flow Boiling in Horizontal Tubes," grad. May 2001.
10. Gang Li, M.S.M.E., "Analysis of Refrigerant Flow Control Devices," graduated December 2001 (Co-Advisors: J.E. Braun and S.H. Frankel).
11. Jun-Hyeung Kim, M.S.M.E., "Performance Comparison of a Unitary Split System using Micro-channel and Fin-tube Outdoor Coils," graduated August 2002.
12. Beat Hubacher, M.S.M.E., "Experimental and Theoretical Performance Analysis of Carbon Dioxide Compressors," graduated in December 2003.
13. Yang Li, M.S.M.E., "The Role of Filtration in Maintaining Clean Heat Exchanger Coils," graduated August 2004 (Co-Advisor: J.E. Braun).
14. Rudy Chervil, M.S.M.E., "Energy Efficiency of Poultry Farm Buildings," graduated August 2005 (Co-Advisor: A. Heber and J.E. Braun).
15. Stefan S. Bertsch, M.S.M.E., "Electro Heat Pump for Residential Heating and Cooling Applications," graduated December 2005.
16. Robert A. Leffler, M.S.M.E., "Analysis of Heat Rejection Options for Power Plants," graduated May 2011 (Co-Advisor: S.V. Garimella).
17. Abhinav Krishna, M.S.M.E., "Organic Rankine Cycle with Solution Circuit for Low-Grade Heat Recovery," graduated August 2012 (Co-Advisor: S.V. Garimella).
18. Sugirdhalakshmi Ramaraj, M.S.M.E., "Vapor Compression Cycle Enhancements for Cold Climate Heat Pumps," grad. December 2012 (Co-Advisors: J.E. Braun and W.T. Horton).
19. Yuanpei Song, M.S.M.E., "Modeling and Experimental Validation of a Multi-Port Vapor Injected Scroll Compressor," grad. May 2013 (Co-Advisors.: J.E. Braun and W.T. Horton).
20. Stephen L. Caskey, M.S.M.E., "Cold Climate Field Test Analysis of an Air-Source Heat Pump with Two-Stage Compression and Economizing," graduated December 2013.
21. Nelson A. James, M.S.M.E., "High Temperature Flooded Expansion for Solar Thermal Power Generation," graduated August 2014 (Co-Advisors.: J.E. Braun and W.T. Horton).
22. Ularee Upathumchard, M.S.M.E., "Waste Heat Recovery Options in Natural Gas-Fired Combined Power Plant," graduated December 2014.
23. Supriya Dharkar, M.S.M.E., "CO_2 Heat Pumps for Commercial Building Applications with Simultaneous Heating and Cooling Demand," graduated August 2015.
24. Kunal Bansal, M.S.M.E., "Modeling and Evaluation of Scroll Expanders for a Liquid-Flooded Ericsson Power Cycle," graduated August 2015 (Co-Advisor: J.E. Braun).
25. Nicholas J. Czapla, M.S.M.E., "Performance Testing of a Unitary Split-System Heat Pump Utilizing an Energy Recovery Expansion Device," graduated August 2016.
26. Felipe A. Accorsi, M.S.M.E., "Experimental Characterization of Scroll Expander for Small-Scale Power Generation in an Organic Rankine Cycle," graduated August 2016.
27. Haotian Liu, M.S.M.E., "Performance Analysis of an Updraft Tower System for Dry Cooling in Large-Scale Power Plants," graduated May 2017.
28. Alejandro C. Lavernia, M.S.M.E., "Micro-Scale Waste Heat Recovery from Stationary Internal Combustion Engines by Sub-Critical Organic Rankine Cycle Utilizing Scroll Machinery," graduated May 2018.
29. Cai S. Rohleder, M.S.M.E., "Experimental Analysis of Positive Displacement Compressors for Domestic Refrigerator Freezer and Air Conditioning Application," graduated May 2019.

30. Tyler J. Shelly, M.S.M.E., "Parametric Analysis and Optimization of Long-Range Battery Electric Vehicle Thermal Management Systems," graduated in December 2020 (Co-Advisor: J.A. Weibel).
31. Joseph T. Hedspeth, M.S.M.E., "Energy and Exergy Based Impact of Avionics Thermal Management Systems on Tactical Aircraft Performance," graduated in December 2020 (Co-Advisor: D. Ziviani).
32. Andreas Hoess, M.S.M.E., "Performance Analysis and Reliability of Twin-Screw Compressors," graduated in May 2022, started in January 2020 (Co-Advisor: D. Ziviani).
33. John Brehm, M.S.M.E., "Evaluation and Controls of Variable Speed Motors and Drives for Compressors and Fans in Unitary HVAC Systems," graduated in August 2022, started in August 2020 (Co-Advisor: D. Ziviani).
34. Johannes F. Rueschen, M.S.M.E., "Mapping Strategies of Distance Information based on Continuous Vibrotactile Amplitude and Frequency Variation," graduated in December 2022, started in January 2021 (Co-Advisor: H. Tan, ECE).

c.) Non-Theses M.S. Students Supervised

1. Jeffrey A. Duren, M.S.M.E., "Performance of Air Coil Test Facility," graduated Dec. 1996.
2. Andrew E. Causey, M.S.M.E., "Supervisory Control of Scroll Compressor Load Stand," graduated May 1998.
3. Agustin R. Hernandez, M.S.M.E., "Vapor Compression Cycle Application in Electronic Chip Cooling," graduated December 2001.
4. Miguel Jovane, M.S.M.E., "Phase Separator Analysis," graduated August 2002 (Co-major professor: J.E. Braun).
5. Vicente Adum, M.S.M.E., "Analysis of Heat Recovery Heat Exchangers," graduated December 2002.
6. Suwat Trutassanawin, M.S.M.E., "Performance Evaluation of a Transcritical Carbon Dioxide Automotive Air Conditioning System," graduated December 2002.
7. David Bouffard, M.M.E.T., "Air-Source Heat Pump for Nordic Climates," graduated May 2005.
8. Nathanael L. Grauvogel, M.S.M.E., off-campus student – no project, graduated December 2006.
9. Christopher A. Parker, M.S.M.E., "Building Passive Cooling through Night Ventilation," graduated May 2007.
10. Anthony E. Wright, M.S.M.E., "Ignition delay time measurements for exhaust gas/fuel/air mixtures in a rapid compression machine," graduate December 2007.
11. Eric S. Lynch, M.S.M.E., "Fluidized-bed Combustion Analysis," graduated December 2009.
12. Jeffrey D. Munk, M.S.M.E., Off-Campus Professional Education Student, graduated December 2011.
13. Brett Leonard, M.S.M.E., "Clothes Dryer Energy Efficiency Improvements," graduated December 2011.
14. Matthew Vargo, M.S.M.E., "Analysis and Design of Psychrometric Chambers for the new Herrick Labs," graduated May 2011 (Co-major professor: J.E. Braun).
15. Thomas W. Faussett, M.S.M.E., "Performance Testing of a Large Room Cooling System," graduated May 2012.
16. Nicholas Kincaid, M.S.M.E., "Humidity Ratio Detection as a Means of Dryer Cycle Termination," graduated December 2012.

17. Harshad Inamdar, M.S.M.E., "Performance Comparison of Two-Phase Fluids in Heat Pipes for Electronics Cooling," graduated December 2012.
18. Gaurav Kulkarni, M.S.M.E., "MRV of CO_2 Emissions," graduated May 2013 (Co-major prof.: R. Lucht).
19. Brandon Hengesbach, M.S.M.E., "Infra-Red Broil System Development," graduated May 2013 (Co-major prof.: B. Han).
20. Keeley Kabala, M.S.M.E., "Thermal Modeling of Electric Motors," graduated May 2013.
21. Amanda Ruhno, M.S.M.E., "Thermal Modeling of Household Convection Ovens," graduated May 2013.
22. Thomas D. Spicer, M.S.M.E., "Enhanced Moisture Extraction," graduated May 2013.
23. Brent A. Rowland, M.S.M.E., "Sustainability in Industry," graduated December 2013 (Co-major prof.: F. Zhao).
24. Anchalika K. Pathak, M.S.M.E., "Expansion Turbine Analysis for Organic Rankine Cycles," graduated December 2013.
25. Nicholas L. Stuart, M.S.M.E., "Heat Exchanger Performance Optimization," grad. May 2014.
26. Matthew Quock, M.S.M.E., "Heat Exchanger Performance Optimization," grad. May 2014.
27. Chaitanya Wani, M.S.M.E., "Performance Analysis of Organic Rankine Cycle Expanders," graduated May 2015.
28. Nichloas Righetti, M.S.M.E., "Waste Heat Recovery from Residential Ovens," grad. May 2015.
29. Jason Schneemann, M.S.M.E., "Net-Zero Water Use in Residential Homes," grad. May 2015.
30. Joshua Whitman, M.S.M.E., "Countertop Cooking and Chilling Device for Residential Application," graduated May 2015.
31. Xinye Zhang, M.S.M.E., "Performance Improvements of Military Environmental Control Units," graduated May 2015.
32. Xiaoshen Wang, M.S.M.E., "Performance Analysis of Military Environmental Control Units," graduated December 2015.
33. Elizabeth Bourgeois, M.S.M.E., "Pedestal Rainwater Collection System," graduated May 2016.
34. Allison Graban, M.S.M.E., "Investigation of Hybrid Heat Pump Dryer Condensation Efficiency and its Effects," graduated May 2016.
35. Todd M. Graham, M.S.M.E., "Development of a Refrigerator Waste Heat Collection System," graduated May 2016.
36. Domenique R. Lumpkin, M.S.M.E., "Analysis of Air Cycle Heat Pumps," graduated May 2016.
37. Erica Roberts, M.S.M.E., "Design and Development of an In-Home Hydroponics Appliance," graduated in December 2016.
38. Suyash D. Bhangale, M.S.M.E., "Design of Expansion Devices," graduated May 2017.
39. Aaron Linden, M.S.M.E., "In-Home Hydroponics Appliance," graduated May 2017.
40. Sarah K. Small, M.S.M.E., "Thermally Integrated Thermal Appliances (TIRA) Heat Capture Design," graduated May 2017.
41. Andria R, Nyenhuis, M.S.M.E., "Rainwater Storage Appliance," graduated May 2017.
42. Shawn C. Gorman, M.S.M.E., "Net-Zero Energy Home Design," graduated Dec. 2017.
43. Robert R. Baer, M.S.M.E., "Water Reuse Applications," graduated May 2018.
44. Ryan Ebstein, M.S.M.E., "ReNEWW House Big Data Project," graduated May 2018.
45. Sarah M. Galea, M.S.M.E., "Thermally Integrated Res. Appliances," graduated May 2018.
46. Kylie McCollum, M.S.M.E., "Thermally Integrated Res. Appliances," graduated May 2018.
47. Grant Ridley, M.S.M.E., "Power Supply Conversion of Residential Appliances," graduated May 2018.

48. Skylar R. Soto, M.S.M.E., "Net-Zero Waste in Households," graduated May 2018.
49. Annie M. Wilson, M.S.M.E., "Residential Indoor Air Quality Study," graduated May 2018.
50. Francisco Montalvo, M.S.M.E., "Global Energy Sustainability," graduated in December 2018.
51. Xueyang Xu, M.S.M.E, "Performance Evaluation of Scroll Expanders in Organic Rankine Cycles," graduated May 2019.
52. Alexander R. Auer, M.S.M.E, "Power Supply Conversion of Residential Appliances," graduated May 2019.
53. Kevin Y. Zhang, M.S.M.E, "Appliance Scheduling Optimization for Demand Side Management," graduated May 2019.
54. Nicholas P. Salts, M.S.M.E., "Theoretical and Experimental Evaluation of Twin-Screw Compressors with Internal Rotor Cooling Options," graduated December 2019.
55. Felix Goemann, M.S.M.E., "Zero Gravity Refrigerator Analysis," graduated May 2020.
56. Daniel Gossen, M.S.M.E., "Bio-Inspired Robotics," graduated May 2020.
57. Brooke M. Gundersen, M.S.M.E., "Laundry Water Reuse and Filtration," graduated May 2020.
58. David A. Golfin, M.S.M.E., Online Student (No Project), graduated December 2020.
59. Camden M. Dimicco, M.S.E., Online Student (No Project), graduated December 2021 (started in August 2016).
60. Niklas K. Jobst, M.S.M.E., Dual MS Degree Student from Leibnitz University of Hannover, Germany, No Project, graduated December 2021 (started in January 2020).
61. Lukas Fischer, M.S.M.E., Dual MS Degree Student from Leibnitz University of Hannover, Germany, No Project, graduated in May 2022 (started in January 2021).
62. Junyan Ren, M.S.M.E., "Investigation of a Novel Ejector-Based R-290 Refrigeration Cycle Architecture," graduated in August 2022, started in August 2019 (Co-Advisor: D. Ziviani).

d.) Undergraduate Project Students Supervised

1. Matthew T. Tyler, B.S.M.E., Senior Honor's Thesis: "Construction of an Air Coil Test Facility," graduated December 1995.
2. Matthew C. Comstock, B.S.M.E., Senior Honor's Thesis: "Evaluation of R-290/R-227ea Mixtures as a Non-Flammable and Cost Effective Replacement for R-22," graduated May 1997 (Co-major professor: J.E. Braun).
3. Edwin B. Sharp, B.S.M.E., ME 497 Project (6 credits): "Testing of Secondary Loop Refrigeration Systems at Medium Temperature Level," Spring 1997.
4. Jeffrey P. Henkle, B.S.M.E., ME 497 Project (3 credits): "Two-phase Heat Transfer Coefficients of Refrigerant Mixtures," Spring 1997.
5. Melissa A. Myers, B.S.M.E., ME 497 Project (3 credits): "Testing of R-407C in Unitary Air Conditioners and Heat Pumps Under Extreme Operating Conditions," Fall 1997.
6. Alexander C.-Y. Wei, B.S.M.E., ME 497 Project (3 credits): "Testing of R-410A in Unitary Air Conditioners and Heat Pumps Under Extreme Operating Conditions," Spring 1998.
7. Brian S. Borke, B.S.M.E., ME 497 Project (3 credits): "Design of High Efficiency Ground Source Heat Pump System," Fall 1998.
8. Jeff T. Zwick, B.S.M.E., ME 497 Project (3 credits): "Testing of Secondary Loop Refrigeration Systems at Low Temperature Level," Fall 1998.
9. Benjamin J. Huttsell, B.S.M.E., ME 497 Project (3 credits): "Testing of Direct Expansion Supermarket Refrigeration Systems at Low Temperature Level," Fall 1999.
10. Brian W. Pfeiffer, B.S.M.E., ME 497 Project (3 credits): "Performance Evaluation of Alternative Working Fluids for Rankine Power Cycles," Spring 2000.

11. Kurt Engelbrecht, B.S.M.E., ME 497 Project (3 credits): "Testing of Spin Fin and Plate Fin Condensers," Fall 2000.
12. Jee Cha, B.S.M.E., ME 497 Project (3 credits): "Testing of Secondary Loop Supermarket Refrigeration Systems at Low Temperature Level," Fall 2000.
13. Ryan Rogers, B.S.M.E., ME 497 Project (3 credits): "Testing of Microchannel Heat Exchangers in Unitary Equipment," Spring 2002.
14. Dustin Ballard, B.S.M.E., ME 497 Project (3 credits): "Soda-Can Cooler Efficiency Testing," Fall 2002.
15. Alexander Hamner, B.S.M.E., ME 497 Project (3 credits): "Soda-Can Cooler Efficiency Testing," Fall 2002.
16. Beth A. Ritzert, B.S.M.E., ME 497 Project (3 credits): "Performance Evaluation of Fin-Tube Heat Exchangers in Residential Heat Pump Systems," Fall 2002.
17. Adam S. Sultan, B.S.M.E., ME 497 Project (3 credits): "Performance Evaluation of Fin-Tube Heat Exchangers in Residential Heat Pump Systems," Fall 2002.
18. Andrew Burgess, ME 497 Project (3 credits): "Carbon Dioxide-Based Environmental Control Unit," Summer 2004.
19. Jason Billings, ME 497 Project (3 credits): "Testing of an Ericsson Cycle Cooler," Fall 2004.
20. Anita Klimek, SURF Student: "Reliability Testing of Carbon Dioxide Prototype Compressors, Part I," Summer 2005.
21. Anita Klimek, ME 497 Project (3 credits): "Reliability Testing of Carbon Dioxide Prototype Compressors, Part II," Fall 2005.
22. Anita Klimek, ME 497 Project (3 credits): "Reliability Testing of Carbon Dioxide Prototype Compressors, Part III," Spring 2006.
23. Joseph R. Poland, ME 497 Project (3 credits): "Testing of Prototype Carbon Dioxide ECU for Military Applications," Summer 2006.
24. Himani A. Shah, SURF – GEARE Student: "Construction of Minichannel Heat Transfer Test Setup," Summer 2006.
25. Francisco Montalvo, SURF – GEARE Student: "Global Opportunities Fair Setup," Sum. 2006.
26. Joseph R. Poland, ME 497 Project (3 credits): "Testing of Prototype Carbon Dioxide ECU for Military Applications," Fall 2006.
27. Adriana Zegarra, SURF – GEARE Student: "Trends in World Energy Consumption between 1980 and 2004," Summer 2007.
28. Robert Johns, SURF Student: "Investigation of Liquid Flooded Ericsson Cooler and Optimization of the Compressor and Expander for Liquid Flooded Operation," Summer 2007.
29. Eric Bowler ME 497 Project (3 credits): "Compressor Performance Testing using Compressor Calorimeter," Spring 2008.
30. Devin M. Rohan, SURF Student: "Performance of Microchannel and Plate Fin Heat Exchangers after Air-Side Fouling and Cleaning," Summer 2008.
31. Robert A. Leffler, SURF Student: "Performance of Microchannel and Plate Fin Heat Exchangers after Air-Side Fouling and Cleaning," Summer 2008.
32. Vincent A. Lingle-Munos, SURF Student: "Possibilities of Carbon Dioxide Absorption during Fossil Fuel Combustion," Summer 2008.
33. Dale J. Szul Jr., ME 497 Project (3 credits): "Compressor Performance Testing using Compressor Calorimeter," Summer 2008.
34. Devin M. Rohan, ME 497 Project (3 credits): "Performance of Microchannel and Plate Fin Heat Exchangers after Air-Side Fouling and Cleaning," Fall 2008.

35. Matthew Vargo, ME 497 Project (6 credits): “Performance of Microchannel and Plate Fin Heat Exchangers after Air-Side Fouling and Cleaning” and “Compressor Performance Testing using Compressor Calorimeter,” Fall 2008.
36. Stephen Caskey, ME 497 Project (3 credits): “Radiant Heat Panel and Envelope Construction Analysis Project,” Summer 2009.
37. Nathan Taylor, ME 497 Project (3 credits): “Acoustic Heat Transfer Enhancement,” Sum. 2009.
38. Huan (Helen) Lian, ME 497 Project (3 credits): “Liquid-flooded compressor performance testing,” Fall 2009.
39. Nicholas J. Czapla, ME 497 Project (3 credits): “Testing of Organic Rankine Cycle with Solution Circuit,” Summer 2011.
40. Prateek Tayal, ME 497 Project (2 credits): “Analyzing Refrigerant Mal-Distribution in Evaporators,” Summer 2011.
41. Nicholas J. Czapla, CTRC Fellowship Student, “Organic Rankine Cycle with Solution Circuit,” Fall 2011.
42. Nadim Chakroun, ME 497 Project (3 credits): “Organic Rankine Cycle with Liquid Flooded Expansion,” Fall 2011.
43. Prateek Tayal, ME 497 Project (2 credits): “Analyzing Refrigerant Mal-Distribution in Evaporators (continued from summer 2011),” Fall 2011.
44. Nadim Chakroun, ME 497 Project (3 credits): “Analysis of an Organic Rankine Cycle with Flooded Expansion (continued from fall 2011),” Spring 2012.
45. Prateek Tayal, ME 497 Project (2 credits): “Heating and Cooling Systems Testing (continued from fall 2011),” Spring 2012.
46. Jizhou Xie, ME 497 Project (3 credits): “Transcritical Carbon Dioxide Cycle Modeling-Gas Cooler,” Fall 2012.
47. Manojkumar Lokanathan, ME 497 Project (3 credits): “Modelling & Calculation of a Compressor in a Transcritical CO_2 Refrigeration System,” Fall 2012.
48. Yucheng Chen, ME 497 Project (3 credits): “Transcritical Carbon Dioxide Cycle Modeling-Evaporator,” Fall 2012.
49. Curtis R. McClarin, ME 497 Project (3 credits): “Heat Exchanger Performance Optimization I,” Fall 2013.
50. Curtis R. McClarin, ME 497 Project (3 credits): “Heat Exchanger Performance Optimization II,” Spring 2014.
51. David Revoir, ME 497 Project (3 credits): “Evaluation of Liquid-Flooded Compression with Regeneration in Small Packaged Heat Pumps,” Fall 2014.
52. Branden Elkins, ME 497 Project (3 credits): “Testing of a Liquid-Flooded Scroll Expander,” Fall 2014.
53. Jeffrey Alperovich, ME 497 Project (3 credits): “Performance Analysis of Organic Rankine Cycle Expanders,” Spring 2015.
54. Haotian Liu, ME 497 Project (3 credits): “Tescor Compressor Calorimeter Commissioning,” Spring 2015.
55. Alec Smith, ME 497 Project (3 credits): “Tescor Compressor Calorimeter Commissioning,” Spring 2015.
56. Jeffrey Alperovich, ME 497 Project (3 credits): “Performance Analysis of Organic Rankine Cycle Expanders,” Fall 2015.
57. Riley Barta, ME 497 Project (3 credits): “High Temperature Air Conditioning using Vapor Injected Compression,” Fall 2015.

58. Alejandro Lavernia, ME 497 Project (3 credits): “Thermally Integrated Refrigerator-Dishwasher Pair,” Fall 2015.
59. Nicholas Salts, ME 497 Project (3 credits): “Heat Pump System Performance with Expansion Work Output Device,” Fall 2015.
60. Riley Barta, ME 497 Project (3 credits): “Multi-Temperature Refrigerated Container System (MTRCS) Analysis,” Spring 2016.
61. Alejandro Lavernia, ME 497 Project (3 credits): “Organic Rankine Cycle as a Bottoming Cycle for Waste Heat Recovery from Internal Combustion Engines,” Spring 2016.
62. Carsten Rabenhorst, ME 497 Project (3 credits): “Testing of Natural Gas Compressors,” Spring 2016.
63. Forrest Son, ME 497 Project (3 credits): “Performance Testing of a “Level 1” Unitary Split-System Heat Pump,” Fall 2016.
64. Vinayak Gupta, ME 497 Project (3 credits): “Thermal System Analysis,” Fall 2016.
65. Xueyang Xu, ME 497 Project (3 credits): “Compressor Performance Analysis,” Fall 2016.
66. Cai S. Rohleder, ME 497 Project (3 credits): “Heat Pump Performance Analysis,” Fall 2016.
67. Vinayak Gupta, ME 497 Project (3 credits): “Thermal System Analysis II,” Spring 2017.
68. Xueyang Xu, ME 497 Project (3 credits): “Compressor Performance Analysis II,” Spring 2017.
69. Quan Jun (Jimmy) Sun, ME SURF Student: “Thermal sciences as applied to HVAC&R systems and equipment,” Summer 2017.
70. Changkuan (Steven) Liang ME 497 Project (3 credits): “Thermal Science research,” Summer 2017.
71. Abdul Raheem A. Shaik, ME SURF Student: “Waste heat recovery from a vented electric clothes dryer utilizing a finned-tube heat exchanger,” Summer 2018.
72. Francisco X. Plaza, ME 498 Project (3 credits): “Screw Compressor Performance Study,” Spring 2019.
73. Meghavin C. Bhatasana, ME 498 Project (3 credits): “Oil Retention Study,” Spring 2019.
74. Jiawei Yang, ME 498 Project (3 credits): “CO2 Refrigeration Cycle Analysis,” Spring 2019.
75. Meghavin Bhatasana, ME SURF Student: “Oil Return and Retention in Unitary Split System Gas Lines with HFC and HFO Refrigerants,” Summer 2019.
76. Joshua Mason, ME SURF Student: “Conversion of power from AC to DC circuits in homes,” Summer 2019.
77. Paige E. Beck, ME 29700 Project (3 credits): “Transcritical Carbon Dioxide Cycle for Experimental Comparisons of Expansion Work Recovery Technologies,” Spring 2020.
78. John L. Folkers, ME 49800 Project (3 credits): “DC Nanogrid House Research,” Summer 2020.
79. Ivanka O. Carbajal, ME 49800 Project (3 credits): “Heat & Cooling AG Application,” Fall 2020.
80. Tyler D. Klein, ME 49800 Project (1 credit): “Cold Storage Battery,” Fall 2020.
81. Shannon J. Ellis, ME 49800 Project (2 credits): “EWB Challenge,” Fall 2020.
82. Paige E. Beck, ME 49800 Project (1 credits): “Parabolic Flight Fridge Tests,” Fall 2020.
83. Paige E. Beck, ME 49900 Project (3 credits): “Parabolic Flight Fridge Tests,” Spring 2021.
84. Skyler E. Harlow, ME 49800 Project (3 credits): “Two-Phase PD in Zero-G,” Spring 2021.
85. Smrithi P. Haran, ME 49800 Project (3 credits): “Two-Phase PD in Zero-G,” Spring 2021.
86. Smrithi P. Haran, ME 49900 Project (1 credit): “Start-Up Dynamics of VCC,” Fall 2021.
87. Francisca L. Mercado, ME 49800 Project (3 credits): “Affordable, Off-Grid Refrigeration,” Fall 2021.
88. Isha Reddy, ME 49800 Project (1 credits): “DC Nanogrid House,” Spring 2022.
89. Hannyi H. Lee, ME 49800 Project (3 credits): “Data Center Energy Analysis,” Spring 2022.

90. Isha Reddy, ME 49800 Project (1 credits): "DC Nanogrid House," Fall 2022.

e.) Post-Docs Supervised

1. Douglas M. Robinson, Ph.D. from Purdue University: May 1, 2000 to June 30, 2000.
2. Lorenzo Cremaschi, Ph.D. from University of Maryland: September 1, 2004 to July 31, 2006.
3. Josef Riha, Ph.D. from Technical Univ. of Dresden, Germany: May 1, 2007 to Jan. 10, 2008.
4. Fang Liu, Ph.D. from University of Hong Kong: October 1, 2006 to September 30, 2008.
5. Jun-Hyeung (Jay) Kim, Ph.D. from Purdue University: February 6, 2007 to December 31, 2008.
6. Ian H. Bell, Ph.D. from Purdue University: May 15 to June 30, 2011 (Co-Advisor: J.E. Braun).
7. Berhane H. Gebreslassie, Ph.D. from Universitat Rovira I Virgili, Tarragona, Spain: August 1, 2010 to October 31, 2011 (Co-Advisor: S.V. Garimella).
8. Craig R. Bradshaw, Ph.D. from Purdue University: June 1, 2012 to July 31, 2012.
9. Christian K. Bach, Ph.D. from Purdue University: June 1, 2014 to July 31, 2014.
10. Orkan Kurtulus, Ph.D. from Yildiz Technical University, Turkey: January 1, 2012 to December 31, 2018 (Co-Advisors: S.V. Garimella, 1st year, and J.E. Braun, 2nd to 7th year).
11. Davide Ziviane, Ph.D. from Ghent University, Belgium: October 1, 2017 to September 30, 2019 (Co-Advisor: J.E. Braun).

f.) Visiting Research Associates or Visiting Scholars Supervised

1. Jianyi Zhang, Senior Lecturer, Xiamen Fisheries College, China: Oct. 1, 1998 to Sept. 30, 1999.
2. Marc Paredes, Post-B.S. Student, NTB, Buchs, Switzerland: Feb. 1, 1999 to July 31, 1999.
3. Adrian Zingerli, Post-B.S. Student, NTB, Buchs, Switzerland: Feb. 1, 1999 to July 31, 1999.
4. Silke Goebel, Exchange Student, Georg-Simon-Ohm Fachhochschule Nuernberg, Germany: March 1, 1999 to July 31, 1999.
5. Pradeep Bansal, Associate Professor, University of Auckland, New Zealand, August 1, 1999 to December 31, 1999.
6. Georg Rieder, Exchange Student, Georg-Simon-Ohm Fachhochschule Nuernberg, Germany: March 1, 2000 to August 15, 2000.
7. Bock Choon Pak, Associate Professor, Chonbuk National University, Korea, July 20, 2000 to December 31, 2001.
8. Norbert Schmidt, Exchange Student, Technical University of Dresden, Germany, June 1, 2001 to November 30, 2001.
9. Beat Hubacher, Post-B.S. Student, NTB, Buchs, Switzerland: Sept. 1, 2001 to April 15, 2002.
10. Zhichao Wang, Lecturer, Tsinghua University, China: Oct. 1, 2001 to June 30, 2002, and August 1, 2002 to November 7, 2003.
11. Dominik Arnold, Exchange Student, Georg-Simon-Ohm Fachhochschule Nuernberg, Germany: March 15, 2002 to August 15, 2002.
12. Christian Hoffinger, Exchange Student, Georg-Simon-Ohm Fachhochschule Nuernberg, Germany: March 15, 2002 to August 15, 2002.
13. Frank Yi, Project Engineer, Nanjing Aotecar Refrigerating Company, China: October 1, 2002 to September 30, 2003.
14. Stefan S. Bertsch, Post-B.S. Student, NTB, Buchs, Switzerland: August 25, 2003 to December 31, 2003.
15. Marco Corradi, Ph.D. Exchange Student, Padova University, Padova, Italy: November 1, 2003 to May 31, 2004.
16. Gianpietro Piroddi, Post-B.S. Student, NTB, Buchs, Switzerland: Oct. 1, 2004 to May 31, 2005.

17. Thomas Christen, Post-B.S. Student, NTB, Buchs, Switzerland: April 1, 2005 to Dec. 31, 2005.
18. Tahsin Boyman, Professor, HTA Lucerne, Switzerland: April 1 to September 30, 2006.
19. Stefan Schwendener, Post-B.S. Student, NTB, Buchs, Switzerland: May 1 to October 31, 2006.
20. Andrea Vasel, Exchange Student, Fachhochschule Wolfenbuettel, Germany: September 1, 2006 to February 28, 2007.
21. Yang Jun, Project Engineer, Shanghai Hitachi, China: December 1, 2006 to June 30, 2007.
22. Vincent Lemort, Ph.D. Exchange Student, University of Liège, Belgium: January 2 to June 30, 2007.
23. Guido Mendes Barreto, Undergraduate Exchange Student, University of Applied Sciences, Karlsruhe, Germany: September 1, 2007 to February 28, 2008.
24. Li Yutong, Ph.D. Student, Department of Building Services Engineering, The Hong Kong Polytechnic University, Hunghom, Kowloon, Hong Kong: June 1, 2008 to August 13, 2008.
25. Zhang Li, Project Engineer, Shanghai Hitachi, China: February 1, 2008 to August 31, 2008.
26. Walid Chakroun, Professor and Department Chair of Mechanical Engineering, Kuwait University, Kuwait: June 1, 2008 to August 31, 2008.
27. Yong Li, Associate Professor, Institute of Refrigeration and Cryogenics, Shanghai Jiaotong University, China: September 1, 2008 to February 17, 2009.
28. Ting-Hau Ho, Research Engineer, Sci-Tech Research and Service Co., Chicago: March 1, 2008 to September 30, 2008.
29. Peng Bin, Post-Doc, Department of Mechanical and Electronical Engineering, Lanzhou University of Technology, China: June 1, 2008 to May 31, 2009.
30. Cord Tomforde, Exchange Student, Leibnitz University Hannover, Germany: August 15, 2008 to May 15, 2009.
31. Jan Schiefelbein, IAESTE Student, Technical University of Clausthal, Germany: May 18 to August 7, 2009.
32. Yang Bin, Ph.D. Exchange Student, Department of Refrigeration and Cryogenics, Xi'an Jiaotong University, China: September 1, 2008 to August 31, 2009.
33. Gerhard Frei, Diploma Thesis Student, Europäische Studienakademie Kälte-Klima-Lüftung, Maintal, Germany: May 1 to September 15, 2009.
34. Cao Feng, Associate Professor, Department of Refrigeration and Cryogenics, Xi'an Jiaotong University, China: February 1, 2009 to January 31, 2010.
35. Jiang Long, Exchange Student, Institute of Refrigeration & Cryogenics, Shanghai Jiao Tong University, China: February 1, 2010 to May 31, 2010.
36. Xu Zhenyuan, Exchange Student, Institute of Refrigeration & Cryogenics, Shanghai Jiao Tong University, China: February 1, 2010 to May 31, 2010.
37. Jiang Yu, Exchange Student, Institute of Refrigeration & Cryogenics, Shanghai Jiao Tong University, China: February 1, 2010 to May 31, 2010.
38. Shi Xinjie, Exchange Student, Institute of Refrigeration & Cryogenics, Shanghai Jiao Tong University, China: February 1, 2010 to May 31, 2010.
39. Evgenia Sikorski, Professor, Offenburg University of Applied Science, Germany: March 1 to August 13, 2010.
40. Carolin Dittmer, Diploma Thesis Student, Europäische Studienakademie Kälte-Klima-Lüftung, Maintal, Germany: May 1 to September 7, 2010.
41. Friedrich K.C. Welck, IAESTE Student, Technical University of Clausthal, Germany: May 18 to August 7, 2010.

42. Jian Li, Ph.D. Exchange Student, Department of Refrigeration and Cryogenic Engineering, Xi'an Jiaotong University, China: October 1, 2009 to September 30, 2010.
43. Stefan Surrey, Diploma Thesis student, Leibnitz University Hannover, Germany: September 1, 2010 to February 28, 2011.
44. Philipp Danecker, Diploma Thesis Student, Karlsruhe Institute of Technology (KIT), Germany: September 20, 2010 to March 31, 2011.
45. Tobias Menzi, M.S. Exchange Student, NTB, Buchs, Switzerland: April 1 to July 31, 2011.
46. Mira Weymann, Diploma Thesis Student, Europäische Studienakademie Kälte-Klima-Lüftung, Maintal, Germany: May 1 to September 7, 2011.
47. Fabian Moik, Bachelor Thesis Student, Karlsruhe Institute of Technology (KIT), Germany: September 16, 2011 to December 31, 2011.
48. Weining Wang, Exchange Student, Institute of Refrigeration & Cryogenics, Shanghai Jiao Tong University, China: February 1, 2010 to May 31, 2012.
49. Juncheng Zhu, Exchange Student, Institute of Refrigeration & Cryogenics, Shanghai Jiao Tong University, China: February 1, 2010 to May 31, 2012.
50. Emeline Georges, M.S. Student, Electromechanical Engineering, University of Liège, Belgium: February 1, 2012 to August 10, 2012 (Co-major professor: J.E. Braun).
51. Timo Mueller, Undergraduate Exchange Student, University of Applied Sciences, Karlsruhe, Germany: April 16 to July 31, 2012.
52. Andreas Gschwend, M.S. Exchange Student, NTB, Buchs, Switzerland: May 16 to July 31, 2012.
53. Shuai Deng, Ph.D. Exchange Student, Institute of Refrigeration & Cryogenics, Shanghai Jiao Tong University, China: September 1, 2011 to August 31, 2012.
54. Yijian He, Associate Professor, Institute of Refrigeration and Cryogenics, Zhejiang University, China: January 16, 2012 to December 21, 2012.
55. Frank Mauersberger, Diploma Thesis Student, Europäische Studienakademie Kälte-Klima-Lüftung, Maintal, Germany: May 21, 2012 to September 7, 2012.
56. Steffen Ebling, Diploma Thesis Student, Europäische Studienakademie Kälte-Klima-Lüftung, Maintal, Germany: May 1 to September 9, 2013.
57. Bernhard Vetsch, M.S. Exchange Student, NTB, Buchs, Switzerland: March 1, 2013 to November 30, 2013.
58. Nebojsa Niculovic, Diploma Exchange Student, Leibniz University Hannover, Germany: January 1 to April 30, 2014.
59. Anne Liebold, M.S. Exchange Student, NTB, Buchs, Switzerland: April 14 to July 31, 2014.
60. Florian Kautz, B.S. Exchange Student, Offenburg University of Applied Science, Germany: March 1 to August 31, 2014.
61. Sebastian Gross-Hardt, B.S. Thesis Exchange Student, Europäische Studienakademie Kälte-Klima-Lüftung (ESaK), Maintal, Germany: May 18 to August 31, 2014.
62. Giulia Marinello, Post-Graduate M.S. Student, KTH Stockholm, Sweden and DTU, Copenhagen, Denmark: November 1, 2012 to October 31, 2014.
63. Bensi Dong, Ph.D. Exchange Student, Beihang University, Beijing, China: November 1, 2013 to October 31, 2014.
64. Emeline Georges, Ph.D. Exchange Student, Electromechanical Engineering, University of Liège, Belgium: February 1 to October 31, 2014 (Co-major professor: J.E. Braun).
65. Davide Ziviane, Ph.D. Exchange Student, Ghent University, Belgium: May 1, 2014 to October 31, 2014.

66. Leona Schmidt-Speicher, Bachelor Thesis Student, Karlsruhe Institute of Technology (KIT), Germany: September 15 to December 19, 2014.
67. Stefan Hotz, Bachelor Thesis Student, Karlsruhe Institute of Technology (KIT), Germany: September 15 to December 19, 2014.
68. Damien Schyns, M.S. Exchange Student, Electromechanical Engineering, University of Liège, Belgium: February 1 to July 31, 2015 (Co-major professor: J.E. Braun).
69. Gabriel Feichter, M.S. Exchange Student, NTB, Buchs, Switzerland: April 13 to July 10, 2015.
70. Kai Roeder, B.S. Thesis Exchange Student, Europäische Studienakademie Kälte-Klima-Lüftung (ESaK), Maintal, Germany: May 1 to August 23, 2015.
71. Thomas Moesch, Diploma Thesis Student, Technical University of Dresden, Germany: June 1 to November 30, 2015.
72. Dr. Yefeng Liu, Associate Professor, University of Shanghai for Science and Technology, China: January 31, 2014 to January 31, 2016.
73. Fabian Schweisthal, B.S. Thesis Exchange Student, Europäische Studienakademie Kälte-Klima-Lüftung (ESaK), Maintal, Germany: May 9 to September 9, 2016.
74. Andreas Hoess, B.S. Thesis Exchange Student, Europäische Studienakademie Kälte-Klima-Lüftung (ESaK), Maintal, Germany: May 1, 2017 to August 31, 2017.
75. Davide Ziviane, Ph.D. Exchange Student, Ghent University, Belgium: February 1, 2016 to September 30, 2017.
76. Nigora Gafur, MS Exchange Student, Karlsruhe Institute of Technology, Karlsruhe, Germany: May 22, 2017 to September 30, 2017.
77. Shijie Zhu, Project Engineer, Nanjing Aotecar New Energy Technology Co., China: Nov. l, 2016 through March 31, 2018.
78. Florian Simon, MS Thesis Student, University of Applied Science, Karlsruhe, Germany: Sept. 1, 2017 through February 28, 2018.
79. Christian Seitz, M.S. Exchange Student, NTB, Buchs, Switzerland: April 9 to July 13, 2018.
80. Robin Weller, B.S. Thesis Exchange Student, Europäische Studienakademie Kälte-Klima-Lüftung (ESaK), Maintal, Germany: May 15, 2018 to August 31, 2018.
81. Francisco Xavier Plaza Calle, B.S. Exchange Student, Universidad San Francisco de Quito, Ecuador: May 21, 2018 to August 3, 2018.
82. Xiaotao Wang, Associate Professor, Technical Institute of Physics and Chemistry, Chinese Academy of Science, Beijing, China: October 15, 2017 through October 15, 2018.
83. Saverio Randi, Ph.D. Exchange Student, Engineering Science, University of Ferrara, Italy: July 1, 2018 – December 31, 2018.
84. Lennart Stania, M.S. Exchange Student, Leibniz University of Hannover, Germany: August 20, 2018 – December 16, 2018.
85. Ralph Kuster, M.S. Exchange Student, NTB, Buchs, Switzerland: March 1, 2019 to June 30, 2019.
86. Fatih Meral, M.S. Exchange Student, Institute of Technical Thermodynamics, University of Kassel, Germany: February 1, 2019 – December 13, 2019.
87. Oliver H. Obst, M.S. Exchange Student, Institute of Technical Thermodynamics, University of Kassel, Germany: February 1, 2019 – December 13, 2019.
88. Wenshan Zhang, Ph.D. Exchange Student, School of Energy and Power Engineering, Xi'an Jiaotong University, P.R. China: January 1, 2019 – December 31, 2019.

g.) Former Advisees hired into Faculty Positions

1. Dr. W. Travis Horton, Associate Professor, School of Civil Engineering, Purdue University, West Lafayette, IN.
2. Dr. Suwat Trutassanawin, Assistant Professor, Mechanical Engineering Department, Mahidol University, Bangkok, Thailand.
3. Dr. Lorenzo Cremaschi, Professor, Department of Mechanical Engineering, Auburn University, Auburn, AL.
4. Dr. Miguel Jovane, Facultad de Ingeniería Mecánica, Assistant Professor, Universidad Tecnológica de Panamá, Panama.
5. Dr. Stefan S. Bertsch, Professor, Department of Mechanical Engineering, NTB Interstaatliche Hochschule für Technik Buchs, Switzerland.
6. Dr. Fang Liu, Associate Professor, College of Energy and Mechanical Engineering, Shanghai University of Electric Power, 2103 Pingliang Road, Yangpu District, Shanghai 200090, China.
7. Dr. Margaret M. Mathison, Lecturer, Department of Mechanical Engineering, Iowa State University, Ames, IO.
8. Dr. Jun-Hyeung (Jay) Kim, Assistant Professor of Engineering, Doane University, Crete, NE.
9. Dr. Christian K. Bach, Associate Professor, Department of Mechanical and Aerospace Engineering, Oklahoma State University, Stillwater, OK.
10. Dr. Craig R. Bradshaw, Assistant Professor, Department of Mechanical and Aerospace Engineering, Oklahoma State University, Stillwater, OK.
11. Dr. Ammar M. Bahman, Assistant Professor, Department of Mechanical Engineering, Kuwait University, Kuwait.
12. Dr. Davide Ziviane, Assistant Professor, School of Mechanical Engineering, Purdue University.
13. Dr. Vanessa Restrepo Perez, Assistant Professor, Texas A&M University, College Station, TX.
14. Dr. Riley B. Barta, Assistant Professor, School of Mechanical Engineering, Purdue University (will start in August 2023).

CURRENT STUDENT AND SCHOLAR SUPERVISIONS:

a.) Ph.D. Thesis Students Supervision

1. Changkuan (Steven) Liang, Direct Ph.D., “High Performance Domestic Refrigerator Development,” started in June 2019 (Co-Advisor: J.E. Braun).
2. Allison R. Graban, Ph.D., “Energy Efficiency of Heat Pump Tumble Clothes Dryers,” started in January 2020 (Co-Advisor: D. Ziviani).
3. Fatih Meral, Ph.D., “Two-Phase Flow Expansion Work Producing Machines,” started in January 2021 (Co-Advisor: D. Ziviani).
4. Oliver H. Obst, Ph.D., “Investigation of Twin-Screw Compressor for Air Compression,” started in January 2022 (Co-Advisor: D. Ziviani).
5. Andreas Hoess, Ph.D., “Performance Analysis and Reliability of Twin-Screw Compressors,” started in May 2022 (Co-Advisor: D. Ziviani).
6. Junyan Ren, Ph.D., “Optimization of Ejectors for a Novel R-290 Refrigeration Cycle Architecture,” started in August 2022 (Co-Advisor: D. Ziviani).

b.) Master Thesis Students Supervision

1. Abhignan Saravana, “Twin-Screw Air Compressors with Internal Cooling,” started in June 2021 (Co-Advisor: D. Ziviani).

2. Mridul B. Rathi, M.S.M.E., "Development of a DC Wind Turbine for the DC Nanogrid House," started in June 2021 (Co-Advisor: D. Ziviani).
3. Aaron Farha, M.S.M.E., "DC House Energy Monitoring System," started in August 2022 (Co-Advisor: D. Ziviani).

c.) Non-Theses Master Students Supervision

1. Alexandru G. Boanta, M.S.M.E., "The DC Nanogrid House: Converting a Residential Building from AC to DC Power to Improve Energy Efficiency," started in June 2021 (Co-Advisor: D. Ziviani).

d.) Undergraduate Project Students Supervision

None

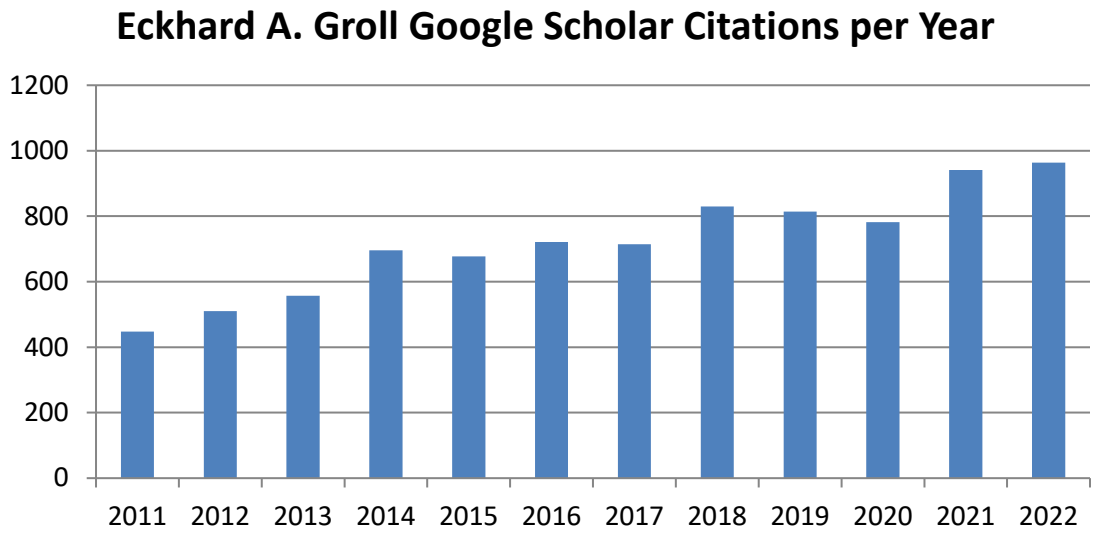
e.) Post-Docs and Research Scientists Supervision

1. Haotian Liu, Ph.D. from Purdue University: Aug. 1, 2001 to present (Co-Advisor: J.A. Weibel).

f.) Visiting Research Associates or Visiting Scholars Supervision

None

GOOGLE SCHOLAR CITATION INDICES (status December 31, 2022):



Citation Indices	All	Since 2017
Citations	10495	5066
h-index	49	35
i10-index	176	118

ARCHIVAL JOURNAL PUBLICATIONS:

1. L.S. Fletcher, G.P. Peterson, C.V. Madhusudana, and E.A. Groll, "Constriction Resistance in Bolted and Riveted Joints," *ASME Transactions, Journal of Heat Transfer*, Vol. 112, No. 4, November 1990, pp. 857-863.

2. E.A. Groll, and H. Kruse, "Kompressionskältemaschine mit Lösungskreislauf für umweltverträgliche Kältemittel: R23/DEGDME und CO_2/Aceton" ('Vapor Compression Cycle with Solution Circuit for Environmental Friendly Refrigerants'), *KK DIE KÄLTE und Klimatechnik*, 45. Jahrgang, Gentner Verlag Stuttgart, April 1992, pp. 206-218.
3. E.A. Groll, and R. Radermacher, "Vapor Compression Cycle with Solution Circuit and Desorber/Absorber Heat Exchange," *ASHRAE Transactions*, Vol. 100, Pt. 1, 1994, pp. 73-83.
4. S.W. Inlow, and E.A. Groll, "Analysis of Secondary-Loop Refrigeration Systems Using Carbon Dioxide as a Volatile Secondary Refrigerant," *Int'l J. HVAC&R Research*, Vol. 2, No. 2, April 1996, pp. 107-121.
5. R. Cohen, and E.A. Groll, "Update on Refrigerant Compressors in Light of CFC Substitutes," *Bulletin IIF/IIR*, Tome LXXVI, No. 5, August 1996, pp. 2-19.
6. E.A. Groll, "Modeling of Absorption/Compression Cycles Using Working Pair Carbon Dioxide/Acetone," *ASHRAE Transactions*, Vol. 103, Pt. 1, 1997, pp. 863-872.
7. E.A. Groll, "Current Status of Absorption/Compression Cycle Technology," *ASHRAE Transactions*, Vol. 103, Pt. 1, 1997, pp. 361-374.
8. J.T. LeRoy, E.A. Groll, and J.E. Braun, "Computer Model Predictions of Dehumidification Performance of Unitary Air Conditioners and Heat Pumps Under Extreme Operating Conditions", *ASHRAE Transactions*, Vol. 104, Pt. 2, 1998.
9. S.S. Pitla, D.M. Robinson, E.A. Groll, and S. Ramadhyani, "Heat Transfer from Supercritical Carbon Dioxide in Tube Flow: A Critical Review," *Int'l J. HVAC&R Research*, Vol. 4, No. 3, July 1998, pp. 281-301.
10. D.M. Robinson, and E.A. Groll, "Efficiencies of Transcritical CO_2 Cycles with and without an Expansion Turbine," *Int'l J. Refrig.*, Vol. 21, No. 7, 1998, pp. 577-589.
11. D.M. Robinson, and E.A. Groll, "Heat Transfer Analysis of Air-to-CO_2 Two-Phase Heat Absorption and Supercritical Heat Rejection," *Int'l J. HVAC&R Research*, Vol. 4, No. 4, October 1998, pp. 327-345.
12. J.D. Douglas, J.E. Braun, E.A. Groll, and D.R. Tree, "A Cost-Based Method for Comparing Alternative Refrigerants Applied to R-22 Systems," *Int'l J. Refrig.*, Vol. 22, No. 2, 1999, pp. 107-125.
13. E.N. de Andrade, E.B. Skowron, V.W. Goldschmidt, and E.A. Groll, "Oil Concentration in Liquid Refrigerants: In Situ Measurement", *Int'l J. Refrig.*, Vol. 22, No. 6, 1999, pp. 499-508.
14. J.T. LeRoy, E.A. Groll, and J.E. Braun, "Evaluating the Accuracy of Public Domain Simulation Model PUREZ in Predicting the Performance of Unitary Equipment", *ASHRAE Transactions*, Vol. 106, Pt. 1, 2000, pp. 200-215.
15. D.M. Robinson, and E.A. Groll, "Theoretical Performance Comparison of CO_2 Transcritical Cycle Technology Versus HCFC-22 Technology for a Military Packaged Air Conditioner Application," *Int'l J. HVAC&R Research*, Vol. 6, No. 4, October 2000, pp. 325-348.
16. T.M. Ortiz, E.A. Groll, and B.A. Meyer, "Thermodynamic Analysis of Heat Driven Metal Hydride Cogeneration Cycle", *Int'l J. Thermal Sciences*, Vol. 40, No. 2, 2000, pp. 165 – 172.
17. W.T. Horton, and E.A. Groll, "Analysis of a Medium-Temperature Secondary Loop Refrigerating System," *ASHRAE Transactions*, Vol. 107, Pt. 2, 2001, pp. 459-465.
18. M.C. Comstock, J.E. Braun, and E.A. Groll, "The Sensitivity of Chiller Performance to Common Faults," *Int'l J. HVAC&R Research*, Vol. 7, No. 3, July 2001, pp. 263 – 279.
19. S.S. Pitla, S. Ramadhyani, and E.A. Groll, "Convective heat transfer from in-tube flow of turbulent supercritical carbon dioxide: Part 1 – numerical analysis", *Int'l J. HVAC&R Research*, Vol. 7, No. 4, October 2001, pp. 345-366.

20. S.S. Pitla, E.A. Groll, and S. Ramadhyani, "Convective heat transfer from in-tube cooling of turbulent supercritical carbon dioxide: Part 2 – experimental data and numerical predictions", *Int'l J. HVAC&R Research*, Vol. 7, No. 4, October 2001, pp. 367-382.
21. Bansal, P.K., Braun, J.E., and E.A. Groll, "Improving the Energy Efficiency of Conventional Tumbler Clothes Drying Systems," *Int'l J. Energy Research*, Vol. 25, No. 15, 2001, pp. 1315-1332.
22. M.C. Comstock, J.E. Braun, and E.A. Groll, "A Survey of Common Faults for Chillers," ASHRAE Transactions, Vol. 108, Pt. 1, 2002, pp. 819-825.
23. Y. Chen, N.P. Halm, E.A. Groll, and J.E. Braun, "Mathematical Modeling of Scroll Compressors Part I: Compression Process Modeling," *Int'l J. Refrig.*, Vol. 25, No. 7, 2002, pp. 731-750.
24. Y. Chen, N.P. Halm, E.A. Groll, and J.E. Braun, "Mathematical Modeling of Scroll Compressors Part II: Overall Scroll Compressor Modeling," *Int'l J. Refrig.*, Vol. 25, No. 7, 2002, pp. 751-764.
25. S.S. Pitla, E.A. Groll, and S. Ramadhyani, "New correlation to predict the heat transfer coefficient during in-tube cooling of turbulent supercritical carbon dioxide", *Int'l J. Refrig.*, Vol. 25, No. 8, 2002, pp. 887-895.
26. Braun, J.E., Bansal, P.K., and E.A. Groll, "Energy Efficiency Analysis of Air Cycle Heat Pump Dryers," *Int'l J. Refrig.*, Vol. 25, No. 9, 2002, pp. 954-965.
27. T.M. Harms, E.A. Groll, and J.E. Braun, "Accurate Charge Inventory Modeling for Unitary Air Conditioners," *Int'l J. HVAC&R Research*, Vol. 9, No. 1, January 2003, pp. 55-78.
28. J.-H. Kim, and E.A. Groll, "Performance Comparisons of a Unitary Split System Using Microchannel and Fin-Tube Outdoor Coils," *ASHRAE Tran.*, Vol. 109, Pt. 2, 2003, 11 pages.
29. T.M. Harms, D. Li, E.A. Groll, and J.E. Braun, "A Void Fraction Model for Annual Flow in Horizontal Tubes," *Int'l J. Heat and Mass Transfer*, Vol. 46, 2003, pp. 4051-4057.
30. T.M. Harms, J.E. Braun, and E.A. Groll, "The Impact of Modeling Complexity and Two-phase Flow Parameters on the Accuracy of System Modeling for Unitary Air Conditioners," *Int'l J. HVAC&R Research*, Vol. 10, No. 1, January 2004, pp. 5-20.
31. Y. Chen, J.E. Braun and E.A. Groll, "Modeling of Hermetic Scroll Compressors: Model Development," *Int'l J. HVAC&R Research*, Vol. 10, No.2, April 2004, pp. 129-152.
32. Y. Chen, E.A. Groll, and J.E. Braun, "Modeling of Hermetic Scroll Compressors: Model Validation and Application," *Int'l J. HVAC&R Research*, Vol. 10, No.3, July 2004, pp. 307-329.
33. G. Li, J.E. Braun, S.H. Frankel, E.A. Groll, and Z. Wang, "Application of CFD Models to Two-Phase Flow in Refrigerant Distributors," *Int'l J. HVAC&R Research*, Vol. 11, No.1, January 2005, pp. 45-62.
34. S. Bendapudi, J.E. Braun, and E.A. Groll, "A Dynamic Model of a Centrifugal Chiller System - Model Development, Numerical Study and Validation," Paper No. 4754, *ASHRAE Transactions*, Vol. 111, Pt. 1, 2005, pp. 132-148.
35. B.C. Pak, E.A. Groll and J.E. Braun, "Impact of Fouling and Cleaning on Plate Fin and Spine Fin Heat Exchanger Performance," *ASHRAE Transactions*, Vol. 111, Pt. 1, 2005, pp. 496-504.
36. J.S. Baek, E.A. Groll, and P.B. Lawless, "Piston-Cylinder Work Producing Expansion Device in a Transcritical Carbon Dioxide Cycle, Part I: Experimental Investigation," *Int'l J. Refrigeration*, Vol. 28, No. 2, 2005, pp. 141-151.
37. J.S. Baek, E.A. Groll, and P.B. Lawless, "Piston-Cylinder Work Producing Expansion Device in a Transcritical Carbon Dioxide Cycle, Part II: Theoretical Model," *Int'l J. Refrigeration*, Vol. 28, No. 2, 2005, pp. 152-164.

38. B. Shen and E.A. Groll, "A Critical Review of the Influence of Lubricants on the Heat Transfer and Pressure Drop of Refrigerants, Part I: Lubricant Influence on Pool and Flow Boiling," *Int'l J. HVAC&R Research*, Vol. 11, No. 3, July 2005, pp. 341-359.
39. B. Shen and E.A. Groll, "A Critical Review of the Influence of Lubricants on the Heat Transfer and Pressure Drop of Refrigerants, Part II: Lubricant Influence on Condensation and Pressure Drop," *Int'l J. HVAC&R Research*, Vol. 11, No. 4, October 2005.
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9. N.P. Halm, E.A. Groll, J.E. Braun, and D.R. Tree, "Mathematical Modeling of Scroll Compressors," Master Thesis, Herrick Labs 97-31P, Report No. 3147-1, 1997.
10. A.E. Causey, E.A. Groll, and J.E. Braun, "Compressor Load Stand: Commissioning and Control Strategies," Herrick Labs 98-12, Report No. 3147-2, 1998.
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12. D.M. Robinson, and E.A. Groll, "Performance Comparison of Transcritical CO_2-Technology with CFC-, HCFC-, and HFC-Technology", Final Report, Herrick Labs 99-2, Report No. 1495-1, 1999.
13. S.S. Pitla, S. Ramadhyani, and E.A. Groll, "Heat Transfer from In-Tube Cooling of Supercritical Carbon Dioxide", Master Thesis, Herrick Labs 99-10, Report No. 3139-1, 1999.
14. J. Zhang, and E.A. Groll, "Energy Efficiency Survey and Recommendations for Public Refrigerated Warehouses," Final Report, Herrick Labs 99-14, Report No. 220, 1999.
15. B.F. Marcus, E.A. Groll, V.W. Goldschmidt, "Effects of Applications on Reliability and Performance of Unitary Split Systems", Master Thesis, Herrick Labs 99-23P, Report No. 3256-1, 1999.
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17. D.M. Robinson and E.A. Groll, "Modeling of Carbon Dioxide Based Air-to-Air Air Conditioners", Ph.D. Thesis, Herrick Labs 2000-7, Report No. 1644-1, 2000.
18. Y. Chen, E.A. Groll, and J.E. Braun, "Mathematical Modeling of Scroll Compressors", Ph.D. Thesis, Herrick Labs 2000-17P, Report No. 3147-1, 2000.
19. Z. Sun and E.A. Groll, "CO_2 Flow Boiling Heat Transfer in Horizontal Tubes", Master Thesis, Herrick Labs 2001-8, Internal Report No. 229, 2001.
20. D. Li and E.A. Groll, "Theoretical and Experimental Investigation of Carbon Dioxide Based Air Conditioning System", Master Thesis, Herrick Labs 2001-7, Report No. 1644-1, 2001.
21. G. Li, J.E. Braun, E.A. Groll, and S. Frankel, "A Numerical and Experimental Investigation of Refrigerant Flow Control Devices", Master Thesis, Herrick Labs 2001-19P, Report No. 5372-1, 2001.
22. W.T. Horton and E.A. Groll, "Modeling of Secondary Loop Refrigeration Systems in

Supermarket Applications," Ph.D. Thesis, Herrick Labs 2002-3, Report No. 5271-1, 2002.
23. J. S. Baek, E. A. Groll, and P. B. Lawless, "Development of a Carbon Dioxide Based Field Deployable Environmental Control Unit to Replace HCFC-22 or HFC-134a Units," Ph.D. Thesis, Herrick Labs 2002-10, Report No. 1662-1, 2002.
24. T. M. Harms, E. A. Groll, and J. E. Braun, "Charge Inventory System Modeling and Validation for Unitary Air Conditioners," Ph.D. Thesis, Herrick Labs 2002-13, Report No. 5288-2, 2002.
25. J.-H. Kim, and E.A. Groll, "Performance Comparisons of a Unitary Split System Using Microchannel and Fin-Tube Outdoor Coils," Master Thesis, Herrick Labs 2002-14, Report No. 5707-1, 2002.
26. T. M. Ortiz, and E. A. Groll, "Development of a New Model for Investigation of the Performance of Carbon Dioxide as a Refrigerant for Residential Air Conditioners," Ph.D. Thesis, Herrick Labs 2002-17, Report No. 1275-1, 2002.
27. B. Hubacher, E. A. Groll, "Measurement of Performance of Carbon Dioxide Compressors," Final Report (ARTI Project 611-10070), Herrick Labs 2002-24, Report No. 0140-1, 2002.
28. J.-H. Kim, and E.A. Groll, "Microchannel Heat Exchanger Defrost Performance and Reliability," Final Report (ASHRAE 1195-RP), Herrick Labs 2003-13, Report No. 5707-2, 2003.
29. T. M. Ortiz, D. Li, and E. A. Groll, "Evaluation of the Performance Potential of CO_2 as a Refrigerant in Air-To-Air Air Conditioners and Heat Pumps: System Modeling and Analysis", Final Report (ARTI Project 610-10030), Herrick Labs 2003-20, Report No. 1275-2, 2003.
30. B. Shen, and E.A. Groll, "Critical Literature Review of Lubricant Influence on Refrigerant Heat Transfer and Pressure Drop," Final Report (ARTI Project 611-20080), Herrick Labs 2003-21, Report No. 1249-1, 2003.
31. B. Hubacher, and E. A. Groll, "Experimental and Theoretical Performance of Carbon Dioxide Compressors," Master Thesis, Purdue University, Herrick Labs 2003-24, Report No. 0140-2, 2003.
32. L. Yang, J.E. Braun, and E.A. Groll, "The Impact of Fouling on the Performance of Filter-Evaporator Combinations and Rooftop Air Conditioners," Master Thesis, Purdue University, Herrick Labs 2004-13, Report No. 0106-1, 2004.
33. J.-H. Kim, and E.A. Groll, "Analysis of a Bowtie Compressor with Novel Capacity Modulation," Ph.D. Thesis, Purdue University, Herrick Labs 2005-14, Report No. 3572-1, 2005.
34. S.S. Bertsch, and E.A. Groll, "Theoretical and Experimental Investigation of a Two-Stage Heat Pump Cycle for Nordic Climates," Master Thesis, Purdue University, Herrick Labs 2005-13P, Report No. 7031-1, West Lafayette, Indiana, 2005.
35. B. Shen, E.A. Groll, and J.E. Braun, "Improvement and Validation of Unitary Air Conditioner and Heat Pump Simulation Models at Off-Design Conditions," Ph.D. Thesis, Herrick Labs 2006-1, Report No. 6304-1, 2006.
36. B. Shen, E.A. Groll, and J.E. Braun, "Improvement and Validation of Unitary Air Conditioner and Heat Pump Simulation Models at Off-Design Conditions," Final Report ASHRAE 1195-RP, ASHRAE, Inc. 1791 Tullie Circle, NE, Atlanta, GA 30329, 2006.
37. D. Li, and E.A. Groll, "Investigation of an Ejector-Expansion Device in a Transcritical Carbon Dioxide Cycle for Military ECU Applications," Ph.D. Thesis, Purdue University, Herrick Labs 2006-4, Report No. 0401-1, 2006.
38. S. Trutassanawin, E.A. Groll, and S.V. Garimella, "A Miniature-Scale Refrigeration System for Electronics Cooling," Ph.D. Thesis, Purdue University, CTRC Report #2006-02, 2006.

39. A.A. Sathe, E.A. Groll, and S.V. Garimella, "Miniature-Scale Diaphragm Compressor for Electronics Cooling," Ph.D. Thesis, Purdue University, CTRC Report #2008-01, 2008.
40. S. S. Bertsch, E.A. Groll, and S.V. Garimella, "Refrigerant Flow Boiling in Microchannel Evaporators," Ph.D. Thesis, Purdue University, CTRC Report #2008-03, 2008.
41. F. Liu and E.A. Groll, "Recovery of Throttling Losses by a Two-Phase Ejector in a Vapor Compression Cycle," Final Report, ARTI Project 10110-01, Arlington, Virginia, August 2008.
42. J. Poland, E.A. Groll, and W.T. Horton, "Energy and Performance of Secondary Coolant Low-Temperature Refrigeration Systems," Final Report ASHRAE 1484-RP, ASHRAE, Inc. 1791 Tullie Circle, NE, Atlanta, GA 30329, 2010.
43. Baxter, V. D., E. A. Groll, O. A. Abdelaziz, B. Shen, G. Groff, K. Sikes, and G. Khowailed, 2013, "IEA HPP Annex 41 – Cold Climate Heat Pumps: Task 1 Report – Literature and Technology Review – United States", ORNL Report, ORNL/TM-2013/472.
44. Baxter, V. D., E. A. Groll, and K. Sikes, 2013, "IEA HPP Annex 41 – Cold Climate Heat Pumps: Summary Interim Report", ORNL Report, ORNL/TM-2015/6.

SEMINARS AND INVITED LECTURES:

1. "Two Stage Vapor Compression Heat Pump with Solution Circuits: Catering to Simultaneous Chilling and Water Heating Needs," seminar presentation, 14th Industrial Energy Technology Conference, Houston, TX, April 22, 1992.
2. "Transcritical Cycle using pure Carbon Dioxide as the Refrigerant," seminar presentation, Workshop on Natural Refrigerants, Challenges and Opportunities, University of Maryland, College Park, MD, April 13, 1994.
3. "Carbon Dioxide in Mixture Applications," seminar presentation, Workshop on Natural Refrigerants, Challenges and Opportunities, University of Maryland, College Park, MD, April 13, 1994.
4. "Tests with R290/R600 Mixtures in Domestic Refrigerator/Freezer", seminar presentation, IIR Conf. on New Applications of Natural Working Fluids in Refrigeration and Air Conditioning, Hannover, Germany, May 12, 1994.
5. "Research Activities at the Ray W. Herrick Laboratories at Purdue University", Tech Session presentation, Central Indiana ASHRAE Chapter Meeting, Indianapolis, IN, April 11, 1995.
6. "Ammonia Vapor Compression and Secondary Loop Refrigeration Systems for Supermarket Applications," seminar presentation, Seminar 17: Ammonia Coil Design Considerations, 1995 ASHRAE Annual Meeting, San Diego, CA, June 27, 1995.
7. "Ammonia – Secondary Loop Refrigeration System as a Replacement for HCFC-22 in Supermarket Applications," seminar presentation, 1995 International CFC and Halon Alternatives Conference, Washington, D.C., October 24, 1995.
8. "Alternative Refrigerants in the USA with Respect to Vapor Compression Technology," invited lecture, Matsushita Electric Industrial Co., Ltd., Kusatsu Shiga-Ken, Japan, March 12, 1997.
9. "Thermal Systems Research at the Ray W. Herrick Laboratories at Purdue University," invited lecture, Matsushita Electric Industrial Co., Ltd., Kusatsu Shiga-Ken, Japan, March 13, 1997.
10. "Performance Comparison of Secondary Fluids," seminar presentation, Seminar 31: Experience with Secondary Coolants, 1997 ASHRAE Annual Meeting, Boston, MA, July 1, 1997.

11. "Secondary Refrigerant Developments and Use in Europe", seminar presentation, Seminar 31: Experience with Secondary Coolants, 1997 Annual ASHRAE Mtg., Boston, MA, July 1, 1997.
12. "The Potential of Using Carbon Dioxide in Refrigerant Mixtures for Refrigeration Applications," invited seminar presentation, Univ. of Illinois at Urbana-Champaign, April 23, 1998.
13. "Research on the Transcritical Carbon Dioxide Cycle at the Herrick Laboratories," invited lecture, UT Carrier Corporation, Syracuse, NY, June 6, 1998.
14. "What is ASHRAE?" Invited seminar presentation, Deutsche Kälte und Klima Tagung 1998, Wuerzburg, Germany, November 19, 1998.
15. "Secondary Loop Refrigeration Systems for Supermarket Applications," invited seminar presentation, Saint Louis ASHRAE Chapter Meeting, St. Louis, MO, January 11, 1999.
16. "Research on the Transcritical Carbon Dioxide Cycle Technology at the Ray W. Herrick Laboratories," invited lecture, The Trane Company, La Crosse, WI, July 16, 1999.
17. "Recent Applications of the Transcritical CO_2 Cycle Technology," invited seminar, 3rd International Congress on Refrigeration – Evolutions of Refrigeration Systems, Congress Centre Milanofiori, Assago (Milano), Italy, February 13, 2001.
18. "Heat Transfer Coefficient of Supercritical CO_2 during In-Tube Forced Convection Cooling," invited lecture, University of Paderborn, Germany, February 15, 2001.
19. "ASHRAE sponsored Research Activities at the Ray W. Herrick Laboratories", invited seminar presentation, Central Indiana ASHRAE Chapter Meeting, Indianapolis, IN, Nov. 13, 2001.
20. "Recent Developments in Automotive Air Conditioning Compressors," invited lecture, Nanjing Aotecar Refrigerating Company, Nanjing, China, Sept. 20, 2002.
21. "Research on the Transcritical Carbon Dioxide Cycle Technology at the Ray W. Herrick Laboratories," invited lecture, Visteon, Plymouth, MI, Nov. 22, 2002.
22. "Industrie-Kooperationen und Drittmitteleinwerbung an der Purdue Universität im Bereich der Kälte- und Klimatechnik" (Industry Cooperation and Research Support at Purdue University in the Area of Refrigeration and Air Conditioning), invited lecture, University of Applied Science, Karlsruhe, Germany, May 8, 2003
23. "Performance and Reliability of Microchannel Heat Exchangers in Unitary Equipment," invited lecture, University of Padova, Italy, June 11, 2003.
24. "Kältetechnik: Gestern, Heute und Morgen" (Refrigeration: Past, Present and Future), invited lecture, University of Karlsruhe, Germany, July 24, 2003.
25. "The Science of Refrigeration: Past, Present and Future," invited seminar, University of Notre Dame, September 16, 2003.
26. "Performance Testing of Carbon Dioxide Compressors," invited lecture, LG Electronics, Chong-won, Korea, October 15, 2003.
27. "Use of Scroll Compressors in Automotive Air-Conditioning," invited seminar, 4th International Automobile Air Conditioning Conference, Tianjin, China, October 17, 2003.
28. "Heat Transfer and Pressure Drop Characteristics of Supercritical CO_2 during In-Tube Forced Convection Cooling", invited lecture, Ruhr-University of Bochum, Germany, May 18, 2004.
29. "HVAC&R Research Activities at the Ray W. Herrick Laboratories at Purdue University" invited seminar, LG Electronics, Chong-won, Korea, July 28, 2005.
30. "Modeling of Unitary Air Conditioners and Heat Pumps," invited seminar, LG Electronics, Chong-won, Korea, July 28, 2005.
31. "Performance and Reliability of Microchannel Heat Exchangers as Outdoor Coils in Unitary

Heat Pumps," invited seminar, LG Electronics, Chong-won, Korea, July 28, 2005.

32. "Mathematical Modeling of Scroll Compressors," invited seminar, LG Electronics, Chong-won, Korea, July 29, 2005.
33. "Recent Advances with respect to the Transcritical CO_2 Cycle Technology," invited seminar, LG Electronics, Chong-won, Korea, July 29, 2005.
34. "Miniature-Scale Refrigeration Systems (MSRS) for Electronics Cooling," invited seminar, LG Electronics, Chong-won, Korea, July 29, 2005.
35. "Latest Developments with Respect to Refrigeration Compressors," invited lecture, IZW-IEA Symposium on Innovations in Refrigeration, Air Conditioning and Heat Pumping Technologies for the Reduction of CO_2 Emissions, IKK Hannover, Germany, Nov. 1, 2005.
36. "Experimental Performance of a Two-Stage Unitary Heat Pump with Economizing for Northern U.S. Climates", seminar presentation, Seminar 7: What System Components are Used Today in Unitary Air Conditioners, and What Changes Will Get Us to the Next Efficiency Level, 2007 ASHRAE Winter Meeting, Dallas, TX, January 28, 2007.
37. "Measurements of Flow Boiling Heat Transfer Coefficients in a Mini-Channel Evaporator for Electronics Cooling", seminar presentation, Seminar 50: Recent Developments in Microchannel Heat Transfer and Fluid Flow, 2007 ASHRAE Winter Meeting, Dallas, TX, January 30, 2007.
38. "Recent Research of Novel Compression Concepts for Refrigeration Applications," invited graduate seminar presentation, Texas A&M University, October 24, 2007.
39. "Performance of Microchannel Heat Exchangers as Outdoor Coils in Unitary Heat Pumps," seminar presentation, Seminar 28: Improving Performance in Air to Refrigerant Heat Exchangers, 2008 ASHRAE Winter Meeting, New York City, NY, January 21, 2008.
40. "Recent Research of Novel Compression Concepts for Refrigeration Applications," invited seminar presentation, KTH Stockholm, Sweden, June 4, 2008.
41. "ASHRAE sponsored Research Activities at the Ray W. Herrick Laboratories", invited seminar presentation, Fort Wayne Indiana ASHRAE Chapter Meeting, Ft. Wayne, IN, January 20, 2009.
42. Research Activities at the Ray W. Herrick Laboratories", seminar presentation, Harbin Institute of Technology, Harbin, China, May 22, 2009.
43. "Evaluation of a Novel Liquid-Flooded Ericsson Cycle Cooler for Vending Machine Applications," seminar presentation, Seminar 25: HVAC&R Research, 2009 ASHRAE Annual Meeting, Louisville, KY, June 22, 2008.
44. "ASHRAE sponsored Research Activities at the Ray W. Herrick Laboratories", invited seminar presentation, Central Indiana ASHRAE Chapter Meeting, Indianapolis, IN, October 13, 2009.
45. "State of the Art and Latest Research with Respect to Refrigeration Compressors," invited presentation at AiCARR Refrigeration Seminar, University of Padua, Italy, April 16, 2010.
46. "Trends in Compressor Development," invited colloquium presentation, Schaufler Honorary Colloquium – The Art of Compression, Sindelfingen, Germany, April 13, 2011.
47. "The School of Mechanical Engineering at Purdue University: Where do we go from here?" Seminar presentation, School of Mechanical Engineering, Purdue University, April 27, 2011.
48. "The Undergraduate GEARE Program," Innovation in Curriculum Panelist, ABET Annual Meeting, Baltimore, Maryland, October 27, 2011.
49. "Cold Climate Heat Pump Projects at Purdue University & the Living Lab at the new Herrick Labs Building," invited dinner presentation, IEA Heat Pump Program Executive Committee

Meeting, Atlanta, GA, November 9, 2011.

50. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Northern Indiana ASHRAE Chapter Meeting, South Bend, IN and Munster, IN, January 19, 2012.
51. "Analysis of Novel Compression Concepts," invited seminar presentation, Clemson University, March 14, 2012.
52. "Research on Cold Climate Heat Pumps," invited seminar presentation, Texas A&M University, April 4, 2012.
53. "Personal Experiences with Academic Career Development Activities," invited panel presentation, Annual Conf. of Engineering Deans Institute, April 15-18, 2012, Kauai Marriott Resort, Kauai, HI.
54. "Developing Global Engineering Competency Skills through Participation in the Undergraduate GEARE Program," invited seminar presentation, ABET Symposium, St. Louis, MO, April 21, 2012.
55. "Developing Global Engineering Competency through Participation in the Undergraduate GEARE Program," invited panel presenter, STEM Workshop, Washington DC, April 26, 2012.
56. "Cold Climate Heat Pump Research at the Ray W. Herrick Labs," invited seminar presentation, IEA Heat Pump Program Symposium, Chillventa Congressing, October 8, 2012.
57. "Novel Compressor Technologies for Net Zero Energy Buildings," invited seminar presentation, IEA Heat Pump Program National Team Meeting, Chillventa Congressing, October 9, 2012.
58. "Developing a Campus Portfolio of Global Engineering Competency Programs," invited panel presentation, 15th Annual Colloquium on International Engineering Education, Newport, Rhode Island, November 1, 2012.
59. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Fort Wayne Indiana ASHRAE Chapter Meeting, Fort Wayne, IN, January 8, 2013.
60. "Review of Novel Compression Concepts for HVAC&R Applications," Distinguished Lecture, Tyler Texas ASHRAE Chapter Meeting, Tyler, TX, January 24, 2013.
61. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Bluegrass ASHRAE Chapter Meeting, Lexington, KY, February 6, 2013.
62. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Nashville ASHRAE Chapter Meeting, Nashville, TN, March 12, 2013.
63. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, ASHRAE Region VI CRC, La Crosse, WI, May 3, 2013.
64. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Long Island ASHRAE Chapter Meeting, Long Island, NY, May 14, 2013.
65. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Cleveland ASHRAE Chapter Meeting, Cleveland, OH, January 15, 2014.
66. "Review of Novel Compression Concepts for HVAC&R Applications," Distinguished Lecture, Central Indiana ASHRAE Chapter Meeting, Indianapolis, IN, February 11, 2014.
67. "Review of Novel Compression Concepts for HVAC&R Applications," Distinguished Lecture, South Dakota ASHRAE Chapter Meeting, Sioux, SD, March 5, 2014.
68. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Iowa ASHRAE Chapter Meeting, Des Moines, IA, March 6, 2014.
69. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Akron ASHRAE Chapter Meeting, Fairlawn, OH, March 28, 2014.

70. "Recent Research on CO_2 Heat Pump Systems and Components," invited seminar presentation, Shanghai Jiao Tong University, Shanghai, China, July 24, 2014.
71. "Novel Compression and System Concepts for Cold Climate Air-Source Heat Pumps," invited seminar presentation, University of Shanghai for Science and Technology, Shanghai, China, August 5, 2014.
72. "Update on Refrigerants: Past, Present and Future," invited seminar presentation, University of Shanghai for Science and Technology, Shanghai, China, August 6, 2014.
73. "University Cooperation with Industry and ME Curriculum," invited seminar presentation, University of Shanghai for Science and Technology, August 7, 2014.
74. Performance of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications," Seminar Presentation, 2015 ASHRAE Winter Conference, Chicago, IL, January 27, 2015.
75. "Performance of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications," Invited Graduate Seminar Presentation, Kansas State University, Manhattan, KS, September 30, 2015.
76. "Organic Rankine Cycles Experimentation and Analysis," Seminar Presentation at Eaton Corporation, Detroit, MI, January 4, 2016.
77. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, New Mexico ASHRAE Chapter Meeting, Albuquerque, NM, January 19, 2016.
78. "Center for High Performance Buildings (CHPB)," Seminar Presentation, Central Indiana ASHRAE Chapter Meeting at Purdue University, West Lafayette, IN, March 8, 2016.
79. "Review of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications," Distinguished Lecture, Evansville ASHRAE Chapter Meeting, Evansville, IN, April 12, 2016.
80. "The School of Engineering Education at Purdue University: Laying the Educational Foundation for the Future," Seminar Presentation, School of Engineering Education, Purdue University, April 14, 2016.
81. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Malaysia ASHRAE Chapter Meeting, Kuala Lumpur, Malaysia, March 16, 2017.
82. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Thailand ASHRAE Chapter Meeting, Bangkok, Thailand, March 21, 2017.
83. "Review of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications," Distinguished Lecture, Thailand ASHRAE Chapter Meeting, Bangkok, Thailand, March 21, 2017.
84. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Hong Kong ASHRAE Chapter Meeting, Hong Kong, China, March 23, 2017.
85. "Review of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications," Distinguished Lecture, Hong Kong ASHRAE Chapter Meeting, Hong Kong, China, March 23, 2017.
86. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, ASHRAE Akron/Canton Chapter Meeting, Akron, Ohio, April 21, 2017.
87. "Review of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications," Distinguished Lecture, Long Island ASHRAE Chapter Meeting, Long Island, NY, May 9, 2017.
88. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Chile ASHRAE Chapter Meeting, Santiago De Chile, June 20, 2017.

89. "Review of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications," Distinguished Lecture, South Dakota ASHRAE Chapter Meeting, Sioux Falls, SD, April 4, 2018.
90. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, ASHRAE Research Triangle Chapter Meeting, Durham, NC, January 9, 2019.
91. "PDSim: A Generalize Modeling Platform to Predict the Performance of Positive Displacement Compressors," Invited Seminar, Institute of Refrigeration, London, UK, February 7, 2019.
92. "Update on Refrigerants: Past, Present and Future," Invited Seminar, Oak Ridge National Lab, Oak Ridge, TN, March 25, 2019.
93. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, ASHRAE East Tennessee Chapter Meeting, Knoxville, TN, March 27, 2019.
94. "Recent Developments in Refrigeration and Air-Conditioning Compressors," Invited Seminar, Honor Colloquium, The Schaufler Foundation, April 5, 2019.
95. "Towards High Efficient, Intelligent, and Flexible Building Technologies and their Equipment," Invited Seminar, University of Liège, Liège, Belgium, June 3, 2019.
96. "Towards High Efficient, Intelligent, and Flexible Building Technologies and their Equipment," Invited Seminar, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, P.R. China, July 15, 2019.
97. "Improving Vapor Compression System Efficiency through Advanced Vapor Compression Technologies," Invited Seminar, Department of Building Science, School of Architecture, Tsinghua University, Beijing, P.R. China, July 15, 2019.
98. "Improving Vapor Compression System Efficiency through Advanced Vapor Compression Technologies," Invited Seminar, Int'l Summer School, Shanghai Maritime University, Shanghai, P.R. China, July 16, 2019.
99. "Towards High Efficient, Intelligent, and Flexible Building Technologies and their Equipment," Invited Seminar, Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, Shanghai, P.R. China, July 18, 2019.
100. "Purdue University College of Engineering Undergraduate Education Activities Update," Invited Seminar, School of Energy and Power Engineering," University of Shanghai for Science and Technology, Shanghai, P.R. China, July 18, 2019.
101. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Central Indiana ASHRAE Chapter, Indianapolis, IN, February 18, 2020.
102. "Review of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications," Distinguished Lecture, ASHRAE Brazil Chapter Meeting, Virtual Seminar, September 4, 2020.
103. "Past, present and future of refrigeration: Pathways to the next generation heating and cooling technologies," Invited Virtual Seminar, IOR (Institute of Refrigeration) Member-Exclusive Event, October 8, 2020.
104. "Transcritical CO_2 Cycle Technology," Distinguished Lecture, ASHRAE Rajasthan Chapter Meeting, Virtual Seminar, October 29, 2020.
105. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, ASHRAE Pakistan Chapter, Virtual Seminar, December 18, 2020.
106. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, ASHRAE New Mexico Chapter, Virtual Seminar, January 20, 2021.
107. "Review of Novel Compression Concepts for Heat Pumping, Air Conditioning and

Refrigeration Applications," Distinguished Lecture, ASHRAE South Dakota Chapter, Virtual Seminar, February 3, 2021.

108. "Industrial Heat Pumps in the USA for Simultaneous Heating and Cooling Applications," IIR Webinar on High-Temperature Heat Pumps: New career opportunities for decarbonisation of the Industrial sector, Virtual Seminar, June 25, 2021.
109. "Update on Refrigerants: Past, Present and Future," Invited Seminar, University of Notre Dame, Dept. of Aerospace & Mechanical Engineering, South Bend, IN, September 14, 2021.
110. "The Macquorn Rankine Lecture: Cutting Edge Developments in Compressors," Invited Lecture, Institution of Engineers in Scotland, Virtual Lecture, October 12, 2021.
111. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, Lehigh Valley ASHRAE Chapter, Virtual Seminar, January 12, 2022.
112. "Cutting Edge Developments in Compressors," Distinguished Lecture, Central Indiana ASHRAE Chapter, Indianapolis, IN, February 8, 2022.
113. "Improving Vapor Compression System Efficiency through Advanced Vapor Compression Technologies," Invited Seminar, University of Illinois Urbana-Champaign, Dept. of Mechanical Sciences and Engineering, Urbana, IL, March 8, 2022.
114. "Update on Refrigerants: Past, Present and Future," Distinguished Lecture, South Brazil ASHRAE Chapter, Virtual Seminar, Sept. 14, 2022.

CONFERENCE KEYNOTE PRESENTATIONS:

1. "Recent Advances in the Transcritical CO_2 Cycle Technology," Keynote Lecture, 18th Nat'l & 7th ISHMT-ASME Heat and Mass Transfer Conf., IIT Guwahati, India, Jan. 6, 2006.
2. "Compressor Research at the Ray W. Herrick Laboratories," Keynote Lecture, 50 Years Anniversary Celebration, Institute of Refrigeration & Cryogenics, Shanghai Jiao Tong University, Shanghai, China, April 13, 2006.
3. "Recent Research of Novel Compression Concepts for Refrigeration Applications," Keynote Lecture, 22nd Int'l Congress of Refrigeration, Beijing, China, August 25, 2007.
4. "Experimental Investigation of Local Heat Transfer Coefficient for Refrigerant Flow Boiling in Microchannel Cold Plate Evaporators," Keynote Lecture, 22nd Int'l Congress of Refrigeration, Beijing, China, August 25, 2007.
5. "Novel Compression and System Concepts for Cold Climate Air-Source Heat Pumps," Keynote Lecture, 5th International Conference on Cryogenics and Refrigeration, ICCR2013, Hangzhou, China, April 7, 2013.
6. "Recent Research of Advanced Scroll Compressors and Expanders for Vapor Compression and Organic Rankine Cycles," Plenary Speaker, Int'l Conf. on Compressors and Coolants, Smolenice, Slowakia, September 2, 2013.
7. "Recent Research of Novel Compression Concepts for Vapor Compression Heat Pumping, Air Conditioning and Refrigeration Systems," Keynote Speaker, Int'l Conf. on Compressors and their Systems, City University London, UK, September 9, 2013.
8. "Recent Research of Novel Compression Concepts for Vapor Compression Heat Pumping, Air Conditioning and Refrigeration Systems," Plenary Speaker, Int'l Conf. on the Future of the Refrig. and Air Conditioning Industry – Are You Ready? Guangzhou, China, April 13, 2014.
9. "Novel Compression and System Concepts for Cold Climate Air-Source Heat Pumps," Plenary Speaker, Int'l Conf. on the Future of the Refrigeration and Air Conditioning Industry – Are You Ready? Guangzhou, China, April 14, 2014.

10. “The experience of Cooperation between US University with Industry,” Keynote Speaker, Nat’l Conf. on New Technologies in Refrigeration, Chengdu, China, July 30, 2014.
11. “Novel Compression and System Concepts to Achieve High-Efficiency Heat Pumps,” Keynote Speaker, Nat’l Conf. on New Technologies in Refrigeration, Chengdu, China, July 31, 2014.
12. “Performance of Novel Compression Concepts for Heat Pumping, Air Conditioning and Refrigeration Applications,” Keynote Speaker, XII. International HVAC+R & Sanitary Technology Symposium, Istanbul, Turkey, April 1, 2016.
13. “PDSim: A Generalized Simulation Tool for Predicting the Performance of Fixed Volume Ratio Expanders,” Keynote Speaker, The 4th Annual Engine Organic Rankine Cycle Consortium Workshop, Troy, MI, Nov. 16, 2017.
14. “Improving Vapor Compression System Efficiency through Advanced Vapor Compression Technologies,” Keynote Speaker, 9th Int’l Conf. on Compressors and Refrigeration (ICCR 2019), Xi’an, P.R. China, July 11, 2019.
15. “Past, present and future of refrigeration: Pathways to the next generation heating and cooling technologies,” Keynote Speaker, 2020 IIR Rankine Conf., Virtual Event, Glasgow, Scotland, July 29, 2020.
16. “Improving Vapor Compression System Efficiency through Advanced Compression Technologies,” Keynote Speaker, 2022 Int’l Conf. on Screw Machines (ICSM), TU Dortmund, Germany, Sept. 7, 2022.