

CHARLES E. BAUKAL, JR.

EDUCATION

Mechanical Engineering

Ph.D. Mechanical Engineering & Applied Mechanics, *University of Pennsylvania* (Philadelphia, PA), 1996
Thesis: Heat Transfer from Flames Impinging Normal to a Plane Surface
Thesis Advisor: Benjamin Gebhart

M.S. Mechanical Engineering, *Drexel University* (Philadelphia, PA), 1982

B.S. Mechanical Engineering, *Drexel University* (Philadelphia, PA), 1982

Education

Ed.D. Applied Educational Studies, *Oklahoma State University* (Stillwater, OK), 2014
Thesis: Learning Strategy Preferences, Verbal-Visual Cognitive Styles, and Multimedia Preferences for Continuing Engineering Education Instructional Design
Thesis Advisor: Lynna J. Ausburn

M.Ed. Adult & Higher Education, *University of Oklahoma* (Norman, OK), 2007

Religion

M.Div. Biblical Studies Cognate, *Liberty University* (Lynchburg, VA), 2022.
(90/93 hours completed as of December 2022)

M.A. Biblical Studies, *Dallas Theological Seminary* (Dallas, TX), 2001

Business

MBA *University of Tulsa* (Tulsa, OK), 2004

INDUSTRIAL EXPERIENCE

1998 to 2022 *John Zink Company, LLC* (Tulsa, OK)

2002 to 2022 Director of the Koch Engineered Solutions InstituteSM
Developed vision and business plan for continuing technical education program for training clients and employees. Curriculum expanded, facilities improved, and program accredited by the International Association for Continuing Education and Training (IACET) in 2003, by the American Petroleum Institute (API) in 2006, and by the Accrediting Council for Continuing Education and Training (ACCET) in 2011 which permitted the use of a .edu web address. Develop presentation materials and online training modules and teach in some of the courses. Revenue and attendance increased significantly. Innovative projects include using virtual and augmented reality simulations and conducting research on the learning preferences of both engineering students and working engineers.

- 2012 to 2022 Manage John Zink combustion scholarship program for combustion graduate students at multiple universities including delivering presentations and recruiting.
- 2004 to 2022 R&D Group
Manage division patent database and technical presentations and publications including writing and presenting.
- 2015 to 2021 Managed program for conducting U.S. Environmental Protection Agency (EPA) Maximum Achievable Control Technology (MACT) annual process heater inspections. Included writing proposals, conducting energy assessments, assisting on inspections, and writing final reports.
- 2003 to 2004 Director of R&D
Managed burner and flare R&D including staff of 6 researchers (5 with PhDs). Prepared and managed budgets and research activities.
- 1998 to 2004 Director, R&D Test Center
Managed a world class combustion test facility with 14 large pilot-scale furnaces, 2 research furnaces, a full-scale flare test pad, and a boiler burner test lab. Performance and R&D testing done for burners and flares used in the hydrocarbon, petrochemical, and power generation industries. Developed and implemented vision for facility improvements and personnel selection and development. Staff of up to 30 including engineers, technicians, and administrative personnel. Supervised over \$12M in equipment upgrades. Developed several ACCESS databases to manage operations. Some experience with certification processes for ISO 9001, ISO 14001, OHSAS 18001, and OSHA Voluntary Protection Program (VPP).
- 1985 to 1998 *Air Products and Chemicals, Inc.* (Allentown, PA)
Supervised three combustion laboratories and supporting research personnel including engineers and technicians. Conducted analytical and experimental research for developing new applications for oxygen in combustion applications. Development activities included computational fluid dynamic (CFD) modeling (FLUENT), laboratory experiments, and field demonstrations in customer facilities. Frequent customer contact and presentations. Projects included NO_x emissions from combustion processes, heat transfer from flames impinging on metals, gas injection into molten metals, fluid flow modeling of many types of gas flows in furnaces ranging from semiconductor manufacturing to primary metals production, and using gas blends to optimize heat transfer. Developed proposals, worked as an investigator, and managed several projects sponsored by the Gas Research Institute and the U.S. Dept. of Energy. These included research teams with universities, government labs, and industrial partners. Developed computer codes for lab automation. Designed equipment and process-related technology for the use and commercialization of industrial gases and chemicals. Worked primarily with the metals (both ferrous and non-ferrous), minerals (e.g., glass, cement), and waste incineration industries.

- 1980 to 1985 *Marsden, Inc.* (Pennsauken, NJ)
Designed custom industrial machinery including ovens and conveying equipment, specified components and subassemblies, interfaced with clients and vendors, and developed scientific software for engineering calculations. Supervised equipment start-ups and assisted in developing customer proposals and technical presentations. Supervised the drafting, fabrication, and computer departments. Worked primarily with the paper and textile industries.
- 1979 to 1980 *Stone & Webster Engineering Corp.* (Cherry Hill, NJ)
Performed stress analysis on nuclear power plant piping systems. Analyses were based on deadweight, thermal, and seismic load cases to determine if the piping systems met the ASME Section III allowable stresses. Drew piping isometrics, located pipe supports and wrote stress summary reports.
- 1978 to 1979 *Selas Corp. of America* (Dresher, PA)
Conducted lab tests on customer-supplied materials in a pilot-scale oven. Analyzed results using a computer model of the oven. Sized production units and wrote reports based on the test results and computer analyses.

ACADEMIC EXPERIENCE

- 2022 to present Oklahoma Baptist University (Shawnee, OK)
Founding Director of Engineering, Associate Professor of Engineering.
- 2021 to 2022 *John Brown University* (Siloam Springs, AR)
Adjunct instructor for Combustion Engineering, Turbine Power Generation, and Safety, Health, and the Environment.
- 2020 to 2021 *Purdue University* (W. Lafayette, IN)
Lead adjunct instructor for Combustion Engineering.
- 2019 to 2022 *University of Alabama* (Tuscaloosa, AL)
Lead adjunct instructor for Combustion Engineering.
- 2018 to 2022 *South Dakota School of Mines & Technology* (Rapid City, SD)
Lead adjunct instructor for Combustion Engineering.
- 2012 to 2022 *University of Oklahoma* (Norman, OK)
Lead adjunct instructor for Combustion Engineering.
- 2009 to 2022 *University of Tulsa* (Tulsa, OK)
Adjunct instructor for Thermodynamics, Heat Transfer, and Safety, Health, and Environmental Concepts for the Process Industry; lead adjunct instructor for Combustion Engineering.

- 2008 to present *Oral Roberts University* (Tulsa, OK)
Adjunct instructor for Applied Thermodynamics, Heat Transfer, Experimental Methods, Combustion Engineering, and Statistics for Engineers.
- 2002 to 2022 *Koch Engineered Solutions Institute* (Tulsa, OK)
Instructor for various modules related to combustion, pollution emissions, heat transfer, and testing.
- 2014, 2019 *Oklahoma State University* (Tulsa, OK)
Adjunct instructor for graduate education quantitative methods course and an undergraduate course in heat transfer.
- 2012 to 2013 *University of Utah* (Salt Lake City, UT)
Lead adjunct instructor for Combustion Engineering.
- 1997 to 1998 *Philadelphia College of Textile & Science* – now known as *Philadelphia University* (Philadelphia, PA)
Adjunct instructor for Pre-Calculus and Calculus III.
- 1992 to 1997 *University of Pennsylvania* (Philadelphia, PA)
Teaching assistant for senior mechanical engineering lab course. Grader for senior mechanical engineering course on energy conversion and utilization and for a course on statics and strength of materials.
- 1984 to 1990 *Burlington County College* (Pemberton, NJ)
Senior Adjunct Instructor for Algebra, Trigonometry, Pre-Calculus, Calculus I, Calculus II, and Business Calculus.

HONORS

Phi Kappa Phi - Honor Society
Tau Beta Pi - Engineering Honor Society
Pi Tau Sigma - Mechanical Engineering Honor Society
Sigma Xi – Research Scientist Honor Society
Beta Gamma Sigma – Business Honor Society
Gamma Beta Phi – Service Honor Society
Kappa Delta Pi – Education Honor Society
Golden Key Honour Society
Omicron Tau Theta – honorary professional graduate society in career-technical education
Graduated Dual Bachelors/Masters Program with High Honors
National Dean’s List
Oral Roberts University Outstanding School of Engineering Faculty Member of the Year for 2020 – 2021

PROFESSIONAL

Registered Professional Engineer (P.E.) in Pennsylvania
Qualified Environmental Professional (QEP) registration
U.S. Department of Energy Process Heating Assessment and Survey Tool
(PHAST) Qualified Specialist & Instructor
Formerly a registered Qualified Environmental Professional (QEP)
Expert witness in 8 combustion-related cases (2000-2005)
Reviewer for *American Career & Technical Education Research conference*
(2013-), *American Society for Engineering Education, Combustion &
Flame, Combustion Science and Technology* (2002-), *Energy* (2002-),
Energy & Fuels (2011-), *Environmental Engineering Science* (2008),
European Journal of Engineering Education (2009-), *Experimental
Thermal & Fluid Science, Fuel, International Journal of Energy for a
Clean Environment, International Journal of Heat and Mass Transfer*
(2004), *Journal of Air & Waste Management Association* (2006-2009),
Journal of Heat Transfer (2004), *Journal of Thermophysics and Heat
Transfer* (2017), *Learning and Individual Differences* (2014), and
Numerical Heat Transfer (2003)
Reviewer for the National Science Foundation and the U.S. Dept. of Energy
(2004)
Advisory Committee Member for California Energy Commission projects:
Implication of Natural Gas for California Gas Customers and Gas Fuel
Interchangeability Criteria Development

PUBLICATIONS/PATENTS

Approximately 250 publications/presentations in the fields of gas-fired
infrared heaters, gas injection into molten metals, oxygen-enhanced
combustion, heat transfer, pollution emissions, and engineering education
including many book chapters.

Author/editor of 17 books:

<u>Title</u>	<u># Pages</u>	<u>Publisher</u>	<u>Date</u>	<u>Function</u>
<i>Oxygen-Enhanced Combustion</i>	384	CRC Press	1998	Editor
<i>Heat Transfer in Industrial Combustion</i>	568	CRC Press	2000	Author
<i>Computational Fluid Dynamics in Industrial Combustion</i>	648	CRC Press	2001	Co-Editor
<i>John Zink Combustion Handbook</i>	800	CRC Press	2001	Editor
<i>Industrial Combustion Pollution & Control</i>	900	Marcel Dekker	2004	Author
<i>Industrial Burners Handbook</i>	808	CRC Press	2004	Editor
<i>Heat Transfer from Flame Impingement Normal to a Plane Surface</i>	172	VDM	2009	Author
<i>Industrial Combustion Testing</i>	784	CRC Press	2011	Editor
<i>John Zink Hamworthy Combustion Handbook (2/e), Vol. 1: Fundamentals</i>	651	CRC Press	2013	Editor
<i>John Zink Hamworthy Combustion Handbook (2/e), Vol. 2: Design and Operations</i>	572	CRC Press	2013	Editor
<i>John Zink Hamworthy Combustion Handbook (2/e), Vol. 3: Applications</i>	452	CRC Press	2013	Editor
<i>Coen Hamworthy Combustion Handbook</i>	561	CRC Press	2013	Co-Editor
<i>Oxygen-Enhanced Combustion (2/e)</i>	792	CRC Press	2013	Editor
<i>Learner Preferences for Continuing Engineering Education</i>	332	Lampbert	2017	Author
<i>Mechanical Engineering Education Handbook</i>	488	Nova Science	2020	Editor
<i>Gallery of Combustion and Fire</i>	190	Cambridge Univ. Press	2020	Editor
<i>Continuing Engineering Education Handbook</i>	365	Nova Science	2022	Editor

Eleven U.S. patents in the fields of enhanced gas cooling of metals, oxygen-enhanced combustion, gas injection into molten metals, and low NOx burners.

SERVICE

Member of engineering advisory boards for:

- John Brown University (2001 – 2022)
- Oral Roberts University (2009 – present)
- International Association of Continuing Education and Training (IACET) (2016 – present)

Board of directors of the following divisions of the American Society for Engineering Education:

- College Industry Partnership Division (past chair & current Program Chair)
- Continuing Professional Development Division
- Past board member of Mechanical Engineering Division

Board member of Air & Waste Management Association committees:

- Continuing Education Committee (including past chair) (2007-2011)
- Chair of Petroleum, Industry & Mining Technical Council Committee (2019 – present)
- Oklahoma Section (2022 – present)

Member of the Industry-Academia Communication team of the Combustion Institute (2014 – present)

Engineering Advisory Board for the International Association of Continuing Education and Training (IACET) (2016-present)

Past member of ASME NOx Control subcommittee 1993-96

Past member of the ASEE Mechanical Engineering Division Awards Selection Committee

Former member of Executive Leadership Institute for Technical Professionals & Engineers (ELITE), the University of Tulsa advisory board (2008 – 2018)

Past board of directors for the Central States Section of the Combustion Institute (2010 – 2021, 2013-2015 Secretary, 2015-2017 Chair-Elect, 2017-2019 Chair, 2019-2021 Past Chair)

Past Director of the Commission for Workforce and Professional Development of the American Association for Adult and Continuing Education (2015-2017)

Past member of Northern Oklahoma College PTEC advisory board (2010 – 2018)

Past member of University of Tulsa Master of Energy Business advisory board (2014 – 2018)

Judge for:

- University of Oklahoma Mechanical Engineering Senior Design projects (2004, 2010 – present)
- 2007 & 2010 ASME Graduate Student Research and Innovation Conference (Oral Roberts University, April 13, 2007 & March 26, 2010)
- TulsaTech Senior Pre-Engineering Students' Capstone: Engineering Design & Development Presentations (2011 – present)

- 2007 Air & Waste Management Association Annual Conf. & Exhibition Student Posters (Pittsburg, PA, June 26, 2007)
- American Society for Engineering Education College & Industry Education Collaboration conference (2019 – present)

Former presenter for Science and Engineering Careers Academy for High School sophomores, juniors and seniors sponsored by Tulsa Community College, Tulsa Technology Center, and Oklahoma State University (2003, 2004, 2006).

Sponsor for many engineering capstone projects at multiple universities.

ABET Program Evaluator for ASME and ASEE (2011 – present)

Coached girls basketball and soccer, taught child and teach adult Sunday School classes, former church small group leader, former Science Enrichment volunteer at local school.

Served meals once a month at John 3:16 (2011 – 2018).

MEMBERSHIPS

Air & Waste Management Association

American Association for Adult & Continuing Education

American Society for Engineering Education

American Society of Mechanical Engineers

Christian Engineering Society

Combustion Institute

Evangelical Theological Society