

THOMAS J. ZOLPER Ph.D.

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PROFILE

- Associate professor of mechanical engineering specializing in thermo-fluids design curriculum and related research areas.
- Doctoral research integrated chemical, rheological, and tribological modeling and design of synthetic silicone gear oils.
- Industrial experience includes design and quality engineering as well as project management for several collaborations.
- Research and consulting experience includes energy efficiency advising (IEPA), oil additive research (NU, DOE and ANL), aquatic invasive species deterrents (USGS and USACE), food rheology (WI Dairy), and energy security (Thompson Center).
- Academic experience at Northwestern University, Valparaiso University, and University of Wisconsin includes engineering course instruction as well as management of tribology and fluid dynamics laboratories.

EDUCATION

- **Northwestern University**, Evanston IL December 2012
 - Doctor of Philosophy in Mechanical Engineering: GPA 3.89/4.00
- **Northern Illinois University**, DeKalb IL May 2007
 - Master of Science in Mechanical Engineering: GPA 3.70/4.00
- **Northern Illinois University**, DeKalb IL December 2004
 - Bachelor of Science in Mechanical Engineering, Minor in Physics: GPA 3.65/4.00

TEACHING EXPERIENCE

University of Wisconsin, Platteville WI

Associate Professor of Mechanical Engineering and Sustainability (SRES) 2020 – Present

Assistant Professor of Mechanical Engineering 2014 – 2020

- Provide classroom and laboratory instruction in Fluid Dynamics, Senior Design, Thermal Systems Lab and Energy Systems
- Advise students in course selection, career planning, job applications, project management and interview skills

Valparaiso University, Valparaiso IN 2013 – 2014

Visiting Assistant Professor of Mechanical Engineering

- Provide classroom instruction in Introduction to Engineering, Mechanics of Materials and Senior Design courses
- Lead laboratory sessions covering Instrumentation and Measurements as well as Manufacturing Processes

Northwestern University, Evanston IL 2012

Manufacturing Processes Lab Instructor and Tutor

- Lead students in lab sessions including engine teardown/assembly, casting processes, and injection molding
- Instruct undergraduate students in CNC machining, 3-D modeling and G-code development

Haldex Hydraulics, Rockford IL 2005 - 2008

Project/Design/Manufacturing/Quality Engineer

- Instruct lab technicians and assemblers on proper procedures for assembly and testing of pumps
- Direct machinists and assemblers on proper statistical data acquisition techniques

Northern Illinois University, DeKalb IL 2004 - 2005

Engineering Teacher's Assistant

- Prepare and perform recitations covering problems in Statics, Dynamics and related material
- Provide academic support for courses including Materials Science, Thermodynamics, Fluid Mechanics, and Heat Transfer

Northern Illinois University, DeKalb IL 2003 – 2004

Math/Physics/Engineering Tutor

- Tutor engineering and science peers in advanced mathematics, physics and engineering courses

Ph.D. DISSERTATION

High Lubricity Siloxane Lubricant Design via Chemical-Rheological Analysis, Northwestern University

- Lead a student-post-doctoral group on an industry-supported siloxane-based lubricant design and synthesis project
- Construct a methodology to optimize data extraction of chemical, material, rheological and tribological properties
- Collaborate with Chemistry and Materials Science departments for the synthesis of custom polysiloxane structures
- Explore the effects of molecular variations on the rheological and tribological properties of polysiloxane structures
- Develop a molecular-rheological-tribological model based on nano-scale molecular polymer constituents
- Optimize lubricant molecular structure to enhance tribological performance with respect to frictional and wear
- Disseminate molecular-tribological models and optimization algorithms in peer review journal articles and conferences

PROFESSIONAL EXPERIENCE

- Independent Consultant**, Evanston, IL and Platteville, WI 2011 - Present
Petroleum Engineering, Invasive Species Management, Multiphase Flow, Non-Newtonian Fluids and Tribology
- Develop procedures, training, and repair methods for friction, wear, and film formation equipment (NU)
 - Recommend molecular structures and test conditions lubricant and additive research (ANL and NU)
 - Augment and prescribe tests for molecular-rheological modeling of polymer syntheses (ANL and Valvoline)
 - Specify data acquisition and control equipment for large two-phase fluid-mechanical equipment (USGS/USACE)
 - Develop machinery to apply piscicides and molluscicides to control aquatic invasive species (USGS/USACE)
 - Perform sensory and rheological research on dairy products using diverse statistical methods (State of Wisconsin)
 - Complete an energy audit for Wisconsin and recommend areas for enhancing grid resilience (Thompson Center)
- Northwestern University**, Evanston IL 2014
Visiting Scholar (May-August 2014)
- Support additive research with Northwestern University, Argonne National Lab, Valvoline and General Motors
 - Develop computational methods to extract important fluid parameters and compose relevant journal articles
- Northwestern University**, Evanston IL 2008 – 2013
Tribology Laboratory Manager and Researcher
- Maintain, calibrate, and repair tribological test equipment and upgrade supporting facilities
 - Develop and implement safety procedures and maintain chemical and emergency records
 - Direct undergraduate engineering students in undertaking different tribological research and experiments
 - Instruct post-doctoral students and visiting scholars on the tribology laboratory test equipment
 - Develop and apply to patent low friction, high stability lubricants for industrial and automotive use
 - Assist in the preparation of successful research proposals for Ashland, Valvoline, and Dow Corning
- Haldex Hydraulics**, Rockford IL 2005 – 2008
Project/Design/Manufacturing/Quality Engineer
- Design, prototype, and test electro-mechanical fuel and hydraulic pumps for a variety of manufacturers
 - Work with major OEM's to design parts and production processes to DVP&R requirements in the AIAG system
 - Lead teams of employees to perform failure analysis and corrective actions for mass production assemblies
 - Use statistical process control, FMEA's, and capability studies to improve part production to industry standards
- Illinois Environmental Protection Agency**, Springfield IL 2003 – 2004
Pollution Prevention Intern-Consultant
- Evaluate machinery and production methods in a variety of industries to enhance energy efficiency
 - Research and develop manufacturing process enhancements to minimize waste and prevent pollution
 - Present process improvement recommendations to a meeting of agency and company representatives

PATENTS AND APPLICATIONS

- US Patent No. 9,765,278 "Energy Efficient Temporary Shear-Thinning Siloxane Lubricants"
- US Patent No. 9,896,640 "Method of Reducing Friction and Wear Between Surfaces Under a High Load Cond."
- US Patent No. 10,765,102 "Variable Volume Flow Injection Nozzle"
- US Patent No. 10,933,390 "Microparticle Generation System"
- US Provisional Patent No. 2015-0307808 "Siloxane Traction Fluids with Ring-Shaped Branch Structures"
- Provisional Application: "Fish Flushing Lock – Floor Manifold" (DI-1215a Cup)
- Provisional Application: "Fish Flushing Lock – Wall Manifold" (DI-1215b Cup)
- Provisional Application: "Chemical Injector and Mixer" (T180004)
- Provisional Application: "Floor Manifold Injector and Mixer" (T180005)
- Provisional Application: "Wall Manifold Injector and Mixer" (T180006)

SELECTED RESEARCH PUBLICATIONS

- **Zolper, T.J.**, Chanez, V., Montgomery, T., and Roy, B., 2023, "*Measured Correlations of Ice-Cream Ingredients to Customer Satisfaction using Rheological Properties and Sensory Studies*" Dairy Science, **In Review**.
- **Zolper, T.J.** and Luoma, J., 2023, "*Rheological Characterizations of Zequanox®, a Biological Agent Used to Control Invasive Dreissenid Mussels*" Biofluids, **In Composition**.
- **Zolper, T.J.**, He, Y., Delferro, M., Shiller, P., Doll, G., LotfizadehDehkordi, B., Ren, N., Lockwood, F., Marks, T.J., Chung, Y.W., Greco, A., Erdemir, A., and Wang, Q., 2023, "*Use of Shear Viscometer and Elastohydrodynamic Film Thickness Measurements to Determine the Power-Law Exponent and Pressure-Viscosity Index*" Journal of Tribology, **In Composition**.
- **Zolper, T.J.**, Cupp, A., Smith, D., and Jackson, P.R., 2022, "*Performance of a Carbon Dioxide Injection System at a Navigation Lock to Control the Spread of Aquatic Invasive Species*" ASCE Journal of Environmental Engineering, **148(4)**.
- Waller, D.L., Bartsch, L., Bartsch, M., Meulemanns, M., Severson, T., and **Zolper, T.J.**, 2021, "*Use of Carbon Dioxide to Prevent Zebra Mussel Settlement and Effects on Native Mussels and Benthic Communities*" Management of Biological Invasions, **12(4)**, 927-951.
- **Zolper, T.J.**, Bair, S., and Horne, K., 2021, "*Revisiting the ASME Pressure-Viscosity Report Using the Tait-Doolittle Equation*" Journal of Tribology, **143(1)**, 061901.
- **Zolper, T.J.**, Cupp, A., Smith, D., and Jackson, P.R., 2020, "*Investigating the Performance of Liquid-to-Liquid Injection Manifolds in River Locks to Prevent the Spread of Aquatic Invasive Species*" Final Report to USGS and USACE.
- **Zolper, T.J.**, Cupp, A., and Smith, D., 2019, "*Investigating the Mixing Efficiencies of Liquid-to-Liquid Chemical Injection Manifolds For Aquatic Invasive Species Management*" Journal of Fluids Engineering, **141(3)**, 031302.
- **Zolper, T.J.**, He, Y., Delferro, M., Shiller, P., Doll, G., LotfizadehDehkordi, B., Ren, N., Lockwood, F., Marks, T.J., Chung, Y.W., Greco, A., Erdemir, A., and Wang, Q., 2017, "*Investigation of Shear-Thinning Behavior on Film Thickness and Friction Coefficient of Polyalphaolefin Base Fluids With Varying Olefin Content*" Journal of Tribology, **139 (3)**, 021504.
- He, Y., **Zolper, T.J.**, Liu, P., Zhao, Y., He, X., Shen, X., Sun, H., Duan, Q., and Wang, Q., 2015, "*Elastohydrodynamic Lubrication Properties and Friction Behaviors of Several Ester Base Stocks*" Friction, **3 (3)**, pp. 243-255.
- **Zolper, T.J.**, Shiller, P., Jungk, M., Marks, T.J., Chung, Y.W., Greco, A., Doll, G., LotfizadehDehkordi, B., and Wang, Q., 2015, "*Correlation of Polysiloxane Molecular Structure to Shear-Thinning Power-Law Exponent Using Elastohydrodynamic Film Thickness Measurements*" Journal of Tribology, **137 (3)**, 031503.
- **Zolper, T.J.**, Jungk, M., Marks, T.J., Chung, Y.W., and Wang, Q., 2014, "*Modeling Polysiloxane Volume and Viscosity Variations with Molecular Structure and Thermodynamic State*" Journal of Tribology, **136 (1)**, 011801.
- **Zolper, T.J.**, Jungk, M., Marks, T.J., Chung, Y.W., and Wang, Q., 2013, "*A Model to Relate Chemical Structure to Tribological Performance*", Proceedings of the 5th World Tribology Conference, Torino, Italy, paper 307.
- **Zolper, T.J.**, Seyam, A., Li, Z., Chen, C., Jungk, M., Stammer, A., Marks, T.J., Chung, Y.W., and Wang, Q., 2013, "*Friction and Wear Protection Performance of Synthetic Siloxane Lubricants*" Tribology Letters, **51**, pp. 365-376.
- **Zolper, T.J.**, Seyam, A., Chen, C., Jungk, M., Stammer, A., Stoegbauer, H., Marks, T.J., Chung, Y.W., and Wang, Q., 2013, "*Energy Efficient Siloxane Lubricants Utilizing Temporary Shear-thinning*" Tribology Letters, **49**, pp. 525-538.
- **Zolper, T.J.**, Li, Z., Jungk, M., Stammer, A., Stoegbauer, H., Marks, T.J., Chung, Y.W., and Wang, Q., 2013, "*Traction Characteristics of Siloxanes with Aryl and Cyclohexyl Branches*" Tribology Letters, **49**, pp. 301-311.
- **Zolper, T.J.**, 2012 "*Understanding Siloxane-Based Lubricants and Developing a Polymer Chemistry-Based Rheological-Tribological Model*" Ph.D. Dissertation, Northwestern University.
- **Zolper, T.J.**, Li, Z., Chen, C., Jungk, M., Marks, T.J., Chung, Y.W., and Wang, Q., 2012, "*Lubrication Properties of Poly-alpha-olefin and Polysiloxane Lubricants: Molecular Structure-Tribology Relationships*" Tribology Letters, **48**, pp. 355-365.
- **Zolper, T.J.**, Li, Z., Marks, T.J., Chung, Y.W., and Wang, Q., 2010, "*Chemical Analysis and EHL Characterization of Several Synthetic Lubricants*", Proceedings of the TAE 17th International Tribology Colloquium, Ostfildern, Germany, pp. 315-318.
- **Zolper, T.J.**, 2007, "*Theoretical and Experimental Analysis of Flow Characteristics of a Spatial Vortex*", Master's Thesis, Northern Illinois University.

SELECTED PRESENTATIONS

- *The Wisconsin Strategy: Infrastructure Independence*, University of Wisconsin – Platteville Engineering Seminar Series, Platteville, WI, February 2023
- *Defending the Great Lakes: Aquatic Invasive Species Deterrents*, University of Wisconsin – Platteville Engineering Seminar Series, Platteville, WI, November 2022
- *Correlation of Ice-Cream Ingredients to Rheological Properties and Sensory Characteristics*, Wisconsin Dairy Innovation Hub Conference, Madison, WI, November 2021
- *Performance of River Lock Carp Fences using CO₂ Infused Water*, Research Presentation to USGS, USACE, USDNR and USEPA, November 2020
- *Investigating the Mixing Efficiencies of Liquid-to-Liquid Chemical Injection Manifolds for Aquatic Invasive Species Management*, ASME/JSME/KSME Joint Fluids Engineering Conference, San Francisco, CA, July 2019
- *Use of Spray-Atomization and Cyclone Collection to Generate Algae-Sized Food Particles to Deter the Spread of Invasive Carp through US Waterways*, ASME/JSME/KSME Joint Fluids Engineering Conference, San Francisco, CA, July 2019
- *Innovative Maritime Equipment to Uniformly Distribute Molluscicide Over Expansive Areas of Zebra Mussel Infested Waterways*, ASME/JSME/KSME Joint Fluids Engineering Conference, San Francisco, CA, July 2019
- *Rheological Characterizations of Zequanox®, a Biological Agent Used to Control Invasive Dreissenid Mussels*, ASME/JSME/KSME Joint Fluids Engineering Conference, San Francisco, CA, July 2019
- *An Analytical Review of the ASME Pressure-Viscosity Report from the Perspective of the Tait-Doolittle Equation*, STLE Annual Conference, Minneapolis, MN, May 2018
- *Use of Elastohydrodynamic Film Thickness Measurements to Approximate the Power-Law Exponent and Pressure-Viscosity Index of Polyalphaolefin-Olefin Copolymer Mixtures*, STLE Annual Conference, Dallas, TX, May 2015
- *Use of Elastohydrodynamic Film Thickness Measurements to Determine the Power-Law Exponent of Several Polysiloxane Lubricants*, STLE Annual Conference, Dallas, TX, May 2015
- *An Integrated Model to Predict Siloxane Tribological Performance from Chemical Structure*, University of Wisconsin Office of Research and Sponsored Programs Faculty and Staff Research Day, Platteville, WI, September 2014
- *Understanding Lubricant Rheology and Tribology*, STLE Annual Conference, Lake Buena Vista, FL, May 2014
- *Siloxanes, from Molecular Structure to Rheology*, STLE Annual Conference, Lake Buena Vista, FL, May 2014
- *A Model to Relate Siloxane Chemical Structure to Tribological Performance*, World Tribology Congress, Torino, Italy, September 2013
- *Relating Siloxane Chemical Structures to Rheological Properties*, Chongqing University – Northwestern University Symposium on Advanced Mechanics, Chongqing, China, June 2013
- *Optimization of Siloxane Molecular Structure for Diverse Tribological Applications*, STLE Annual Conference, Detroit, MI, May 2013
- *A Chemical-Rheological-Tribological for Design of Siloxane-Based Lubricants*, CSET semiannual meeting, Evanston, IL December 2012
- *Traction Fluids Utilizing Siloxanes with Ring-Shaped Branch Structures*, ASME/STLE International Joint Tribology Conference, Denver, CO, October 2012
- *Siloxane Lubricants Utilizing Temporary Shear Thinning*, ASME/STLE International Joint Tribology Conference, Denver, CO, October 2012
- *Boundary Friction and Wear of Several Synthetic Lubricants*, STLE Annual Conference, St. Louis, MO, May 2012
- *Molecular Structure to Rheological Performance in Synthetic Lubricants*, Invited Speaker, Dow-Corning Chemical Company, Wiesbaden, Germany, June 2011
- *Chemical and Rheological Properties of Several Synthetic Lubricants*, STLE Annual Conference, Atlanta, GA, May 2011
- *Use of Molecular Structure to Project Viscosity, Film Formation and Traction Coefficient*, STLE Chicago monthly technical meeting, Willowbrook, IL, February 2011
- *Investigation of the Material and Rheological Properties of Polyalphaolefins (PAO) and their Relation to Molecular Structure*, CSET semiannual meeting, Evanston, IL, April 2010
- *Chemical Analysis and EHL Characterization of Several Synthetic Lubricants*, TAE 17th International Tribology Colloquium, Ostfildern, Germany, January 2010
- *Investigation of the Pressure-Viscosity Coefficient of Hydrocarbon and Siloxane Lubricants using EHL Data and Physical Properties*, CSET semiannual meeting, Evanston, IL Fall 2009
- *Elastohydrodynamic Characterization of Squalane with Lubricant/Fluid Rheology*, CSET semiannual meeting, Evanston, IL April 2009
- *Thermal and Electrical Energy Improvements for Industrial Cleaning Applications*, IEPA P2 Presentation, Pontiac, IL August 2004
- *A Summary of Energy Efficiency Recommendations to Industries*, IEPA P2 Presentation, Arlington Heights, IL August 2003

RESEARCH PROPOSALS

- Zolper, T.J., 2022, "*Research Equipment to Treat Waterways Benthic Zones with Carbon Dioxide*", Submitted to United States Geological Survey, \$8,968. Accepted.
- Zolper, T.J., 2022, "*Novel Toxicant Ballast Water Dosing System Continuation (Part II)*", Submitted to United States Geological Survey, \$24,407. Accepted.
- Zolper, T.J., 2021, "*The Wisconsin Strategy: Independent Infrastructure*", Submitted to the Gov. Tommy Thompson Center, \$49,448. Accepted.
- Zolper, T.J., 2021, "*Novel Toxicant Ballast Water Dosing System (Part I)*", Submitted to United States Geological Survey, \$10,000. Accepted.
- Zolper, T.J., 2021, "*Quantitative Evaluation of Sweeteners and Maturation on the Rheological Properties and Organoleptic Characteristics of Ice-cream*", Submitted to University of Wisconsin System Dairy Innovation Hub, \$41,779. Declined.
- Roy, B. and Zolper, T.J., 2020, "*Instrument Proposal for a Modular Compact Rheometer (MCR 302) from Anton-Parr*", Submitted to University of Wisconsin System Dairy Innovation Hub, \$50,000. Accepted.
- Roy, B. and Zolper, T.J., 2020, "*Measuring the Rheological Properties of Ice-Cream to Predict its Mouth-Feel Sensations*", Submitted to University of Wisconsin System Dairy Innovation Hub, \$77,843. Accepted.
- Zolper, T.J., 2019, "*Carbon Dioxide Fish Barrier Project: Engineering and Economic Assessment*", Submitted to United States Geological Survey, \$49,761. Accepted.
- Zolper, T.J., 2019, "*Use of Carbon Dioxide to Prevent Biofouling by Dreissenid Mussels*", Submitted to United States Geological Survey, \$10,008. Accepted.
- Zolper, T.J., 2018, "*Carbon Dioxide Fish Barrier Project: Engineering and Economic Assessment*", Submitted to United States Geological Survey, \$73,377. Declined.
- Zolper, T.J., 2018, "*Upgrade of water heating and chilling equipment for accelerated temperature change and precision temperature control*", \$14,000. Declined.
- Zolper, T.J., 2017, "*Development of Carbon Dioxide-to-Water Infusion Technologies to Deter the Spread of Aquatic Invasive Species*", Submitted to United States Geological Survey, \$108,884. Accepted.
- Zolper, T.J., 2016, Four combined grants Submitted to United States Geological Survey, Total \$65,525.
 - "*Research Support for Furthering Restoration via a New Approach to Invasive Mussel Control*" \$14,000. Accepted.
 - "*Research Supporting Control of Invasive Carp –Spray Atomizer for Microparticle Creation*" \$22,400. Accepted.
 - Faculty salary (1 month) and travel, \$12,232. Accepted.
 - Shear viscometer and supplies, \$12,000. Accepted.
- Zolper, T.J., 2016, "*Research for the Assessment of Carbon Dioxide as a Tool to Control Movement of Bigheaded Carps*", Submitted to United States Geological Survey, \$14,000. Accepted.
- Zolper, T.J., 2015, "*Optimizing the Chemical Structures and Rheological Properties of Siloxanes for Lubricity and Load-Carrying Capacity*", Submitted to Dow Corning Corporation, \$160,000. Declined.
- Zolper, T.J., 2015, "*Renewable Energy Numeration Using Effluent Waste*", Submitted to the National Science Foundation, \$1,000,000. Declined.
- Zolper, T.J., 2015, "*Cost Effective Determination of Lubricant Properties that Influence Film Formation and Energy Efficiency*", Submitted to the University of Wisconsin Scholarly Activity Improvement Fund, \$4000. Accepted.
- Zolper, T.J., 2015, "*Enhancing the Power Transfer Density and Material Durability of Continuously Variable Transmissions for Efficient Power Utilization*", Submitted to the University of Wisconsin grant proposal writing fund, \$4000. Accepted.
- Zolper, T.J., 2014, "*Quantitative Evaluation of Biogas for Renewable Electric Power Generation*", Submitted to the University of Wisconsin New Faculty Start-Up Program, \$10000. Accepted.

PROFESSIONAL SERVICE/MEMBERSHIP

Journal Reviewer: ASME Journal of Tribology (2015-2022), Physics of Fluids (2017), Lubricants (2015-2020)
Soft Matter (2014), Tribology Letters (2015-2019), Tribology Transactions (2017)
Nature Scientific Reports (2015), Bentham Sciences (2019) Royal Society of Chemistry (2017-2022)
American Chemical Society (2012-2018), Coatings (2019), Metals (2019) and Materials (2019)

Faculty Adviser: Society of Automotive Engineers (SAE) and Pi Tau Sigma Honor Society (2016-2023)

Women in Engineering, Math, and Science (WEMS): Career Day presenter 2014-2016

Society of Tribologists and Lubrication Engineers (STLE)

Order of the Engineer Member and Annual Participant

American Society of Mechanical Engineers (ASME)

American Society of Engineering Educators (ASEE)

AWARDS

Professor Dale Dixon Award	2022
Award to UW-Platteville faculty with a strong record of past and current research	
Thompson Center for Public Leadership Award	2021
Award to evaluate Wisconsin public infrastructure and propose security improvements	
ASME Journal of Tribology Best Paper Award	2015
Award for literature review and novel technique to extract important rheological property	
STLE Early Career Junior Faculty Award	2015
Award for innovative research and contributions to the field of tribology	
Predictive Science and Engineering Design Fellowship	2012
Award for interdisciplinary research using computer modeling with performance predictive capabilities	
Terminal Year Cabell Fellowship	2011
Award for doctoral candidates with conference presentations, publications and high academic achievement	
STLE Chicago Chapter 2010 Fellowship	2010
Award for original research on advanced low-friction lubricant development and synthesis	
Graduated Cum Laude, Dean's List and Honor Roll	2004-2007
Repeatedly attained academic recognitions throughout undergraduate and graduate studies	
Professional Engineer in Training (EIT)	2004
Passed the Engineer in Training exam in preparation for the Professional Engineer (PE) exam	
Edwards & Kelcey ACEC/Illinois State Scholarship	2004
Annual scholarship for engineering students with high academic achievement and strong work history	

PROFESSIONAL TRAINING

- KEEN ICE Training: Embedding the Entrepreneurial Mindset Throughout the Curriculum: Ohio Northern University, Ada, OH: June 6-8, 2023
- KEEN ICE Training: Integrating Curriculum with Entrepreneurial Mindset: Denver, CO: August 9-12, 2022
- CITI Training: Conflict of Interest and Engineering Responsible Conduct in Research: February 23, 2016
- Proposal Writing Institute: Council for Undergraduate Research, Minneapolis, MN: July 16-20, 2015
- Grant Writing Workshop, University of Wisconsin, Platteville, WI: January 6-7, 2015
- Wind Turbine Tribology Seminar, Argonne National Laboratory, Lemont, IL: October 29-31, 2014
- Six Sigma Green Belt Training, via CAT, Rockford, IL: June-November 2007
- NERAC Training, Rockford, IL: July 23, 2007
- Infinity QS Training and Administration, Entre, Rockford, IL: April 30-May 2, 2007
- Noise and Vibration Analysis, Bruel and Kjaer, Rockford, IL: March 26, 2007
- Caterpillar Global SPC Limited Production, Packard Plaza, Peoria, IL March 9, 2007
- SKF/CR Seal Technology Training, Elgin, IL: April 24-25, 2006
- Corrective Action Training, TRN, Rockford, IL: March 26-30, 2006
- Solid Works I & II Training, CATI, Rockford, IL: February 13-28, 2006
- Energy Efficiency Training, U.S. DOE, Pontiac, IL: June 25-27, 2003
- Pollution Prevention Training, IEPA, Springfield, IL: May 19-22, 2003

LEADERSHIP ROLES

Thompson Center – Energy Security Research , University of Wisconsin-Platteville	2021-2023
Coordinate energy and infrastructure data acquisition and analysis by several research assistants	
Dairy Innovation Hub – Ice Cream Rheology Research , University of Wisconsin-Platteville	2020-2023
Coordinate sensory and rheological studies between participating researchers and research assistants	
MEIE Industry Advisory Board , University of Wisconsin-Platteville	2016-2023
Steering Committee Chair: Coordinate monthly/annual meetings and interface with standing committees	
Aquatic Invasive Species Deterrents , University of Wisconsin-Platteville	2016-2023
Direct several teams of 10-12 mechanical engineering students in techniques to deter/destroy invasive species	
Research Experience for Teachers (RET) , Northwestern University	2009
Direct a high school chemistry teacher through tribology test procedures and analytical techniques	
Electric Fuel Pump Project Co-Manager , Haldex Hydraulics	2007-2008
Design multiple electric fuel pumps for several engine manufacturers with different flows, pressures and controls	
High Pressure and Electric Fuel Pumps Project Manager , Haldex Hydraulics	2005-2008
Coordinate prototype and mass production of high-pressure fuel pumps for several diesel engine manufacturers	
Ultra-Low Sulfur Diesel Transition Coordinator , Haldex Hydraulics	2005-2006
Work with quality engineers of several diesel engine manufacturers (Caterpillar, Cummins, John Deere, etc.) to ensure material compatibility in diesel fuel pump components due to a global reduction in diesel sulfur content	

QUALITY ENGINEERING TRAINING

- AIAG Automotive Standards and Methodology: Proposal Prototype Production
- Advanced Product Quality Planning (APQP), Pre-Production Planning and Approval Process (PPAP)
- Design, Process, Interface Failure Modes Effects Analysis (D/P/IFMEA)
- Geometric Design and Tolerance (GD&T)
- Measurements Systems Analysis (MSA), Initial Sample Inspection Result (ISIR)
- Statistical Process Control (SPC) and Document/Data Control
- Deviations, Quality Checks/Alerts, PSW, RMR, PCN, CMM reading and interpretation

SELECTED INDUSTRIAL COLLABORATIONS

- Trane Inc., La Crosse, WI: Multiple product development projects including variable orifice devices and instrumentation
- John Deere Corp., Dubuque, IA: Multiple product development projects including new castings and hydraulic coolers
- Unison Solutions, Dubuque, IA: Proposed an NSF biogas scrubber proposal with the company founder
- Dow-Corning Corp., Midland, MI: Provided consulting on molecular-rheological modeling for new product development
- Shaeffler Group, Troy, MI: Provided technical advice on modeling non-Newtonian properties of bearing grease
- MCHX LLC, Milwaukee, WI: Initiated Senior Design project to design and build a recuperator test stand
- Bending Branches, Osceola, WI: Extended Senior Design project to design and build a canoe paddle test stand
- 3DC of UW-Fox Valley, Menasha, WI: Began collaboration to mass produce a mechatronic goose decoy

SKILLS

Computational Software: Matlab, Maple/Mathematica, MathCAD, LabVIEW, C++, FORTRAN

Drafting/Machining Software: Solid Works, Pro Engineer, AutoCAD, NX-CAM, SURFCAM

Simulation Software: ANSYS, ABACUS, COSMOS, VMD, NAMD, Simulink, Working Model

Quality Engineering Software: Mini Tab, Infinity Quality System, Arena

Surface Analysis Equipment: SEM, AFM, Optical Profilometry, and Nano-Indentation

Tribological Instrumentation: PCS EHL, SKS seal tester, Traction/Force Transducers, UMT wear test

Machining Capabilities: CNC, lathe, mill, grind table, and CMM