

Work Assignment 4-22/5-22 under
CONTRACT 68HE0C18C0001

**EXTERNAL PEER REVIEW OF REPORT:
HEAVY-DUTY TECHNOLOGY RESOURCE USE
CASE SCENARIO (HD TRUCS) TOOL**

**FINAL PEER REVIEW SUMMARY REPORT
August 2023**

Submitted to:

**U.S. Environmental Protection Agency
Office of Transportation and Air Quality**
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Submitted by:

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1.0 INTRODUCTION

This report documents the results of an independent external peer review of the U.S. Environmental Protection Agency (EPA), Office of Transportation and Air Quality's (OTAQ) draft *Heavy-Duty Technology Resource Use Case Scenario (HD TRUCS) Tool: Used to analyze HD vehicle energy usage and associated component cost*.

ERG (a contractor to EPA) organized this review and developed this report. The report provides background about the review (Section 2.0), describes ERG's peer review process (Section 3.0), and provides a high-level summary of reviewers' comments (Section 4.0). Appendix A provides the charge to reviewers.

2.0 BACKGROUND

Within the transportation sector as a whole, onroad vehicles are the predominant source of greenhouse gas (GHG) emissions, principally CO₂ emissions. Heavy-duty (HD) vehicles, 2b/3 incompletes, classes 4-8 vocational vehicles and tractors produce 23% of transportation sector related GHG emissions. As EPA's Office of Transportation and Air Quality continues the regulation of CO₂ and other GHG emission control measures in onroad and nonroad vehicles and equipment, there is likewise a continuing need to evaluate the costs and benefits of any such regulations. As such, EPA has developed its Heavy-Duty Technology Resource Use Case Scenario (HD TRUCS) tool, to facilitate its analysis of the vehicle segment adoption rates via determination of vehicle energy use and associated costs of HD zero-emission vehicles (ZEV), both battery electric (BEV) and fuel cell (FCEV).

The HD TRUCS tool is used to estimate heavy-duty ZEV technology feasibility and adoption rates that are then used to calculate proposed standards for model years (MYs) 2027 through 2032. To conduct the analysis, a flexible spreadsheet-based framework was developed in-house at EPA. It evaluates design features needed to meet the power and energy demands of various heavy-duty conventional vehicles using ZEV technologies, as well as costs related to purchasing and operating conventional and zero-emission vehicles. HD TRUCS defines EPA's understanding of heavy-duty vehicle performance as well as the market, based on data and resources available to EPA as deemed appropriate for regulatory purposes.

In addition to technical feasibility, EPA evaluated costs in 2021 dollars to determine the payback period, or the number of years it would take to offset any upfront cost increase with the difference in operating costs between an internal combustion engine (ICE) vehicle and each ZEV equivalent. Cost estimates were applied to each vehicle component based on sizing to assess the difference in total powertrain costs between the ICE and ZEV powertrains. EPA also compared operating costs due to fuel consumption and maintenance and repair. In addition, EPA considered the costs to install and operate charging infrastructure for BEVs.

3.0 PEER REVIEW PROCESS

3.1 Reviewer Search and Selection

For this review, ERG identified, screened, and selected reviewers who had no conflict of interest in performing the review and who collectively met the following technical selection criteria provided by EPA:

- Technical familiarity with heavy-duty -
 - zero-emission vehicles (ZEV)
 - battery electric vehicles (BEVs)
 - fuel cell electric vehicles (FCEVs)
 - internal combustion engine (ICE) vehicles

- Expertise with the process of determining -
 - piece costs
 - infrastructure costs (e.g., charging units)
 - total cost of ownership

ERG initiated a search process, asking interested candidates to describe their qualifications and respond to a series of “Conflict of Interest” (COI) analysis questions. ERG carefully screened submissions to identify a pool of qualified, COI-free candidates. From the set of candidates who met the criteria, ERG proposed a pool of five candidates to EPA on April 4, 2023. From this pool, ERG selected four experts (listed below) who collectively best met the selection criteria. ERG contracted with and committed the following four experts to perform the review (see Appendix B for resumes):

- Baha Al-Alawi, Ph.D.; Market and Industry Analytics Programs Leader, CALSTART, Inc.
- Thomas H. Bradley, Ph.D.; Professor and Department Head, Systems Engineering, Colorado State University
- William de Ojeda, Ph.D., PE; Director of Engineering, WM International Engineering
- Efstathios E. Michaelides, Ph.D., PE; Professor, Department of Engineering, Texas Christian University

3.2 Conducting the Review

ERG provided reviewers with instructions for conducting the review, the Excel tool, the charge to reviewers prepared by EPA (see Appendix A), additional background materials, and a comment template (for insertion of written comments). ERG instructed reviewers that they should maintain the confidentiality of the review materials and not share the review materials or consult with anyone during the review process.

After receipt of the review materials and prior to the start of the review, ERG organized and facilitated a meeting between reviewers and EPA to provide reviewers an opportunity to clarify their responsibilities for the review on May 9, 2023. EPA provided background about the review materials and responded to reviewers’ clarifying questions. Reviewers then worked individually (i.e., without contact with other reviewers, colleagues, or EPA) to prepare written comments in response to the charge questions over a three-week period (from May 9 to May 30, 2023). There were no further clarifications or questions from reviewers throughout the review.

Upon receipt of the written comments from reviewers, ERG confirmed that all reviewers had responded clearly to all charge questions and provided the individual comments to EPA. ERG then compiled reviewers’ comments into a comment spreadsheet (MS Excel) sorted by charge question. Comments were presented exactly as submitted, without editing or correction of typographical errors (if any). The comment spreadsheet was provided to EPA as a separate deliverable on June 6, 2023, and is not provided in this report. Upon review of the submitted comments, EPA requested clarification from one reviewer and ERG contacted the reviewer for a response. The reviewer provided a reference in response to EPA’s clarification, which ERG provided to EPA. ERG then prepared this report, including the high-level summary of reviewers’ comments presented in Section 4.0.

4.0 SUMMARY OF REVIEWER COMMENTS

This section provides a high-level summary of the comments provided by the four peer reviewers, Dr. Baha Al-Alawi, Dr. Thomas Bradley, Dr. Efstathios Michaelides, and Dr. William de Ojeda. EPA’s charge to reviewers asked specific questions under the two main categories of methodology/results and editorial content. EPA’s charge also asked reviewers to distinguish between “recommendations for clearly defined improvements

that can be readily made, based on data or literature reasonably available to EPA” and “improvements that are more exploratory or dependent, which would be based on information not readily available to EPA.”

Dr. Bradley and Dr. de Ojeda provided overviews in which they commented positively on the tool, noting its complexity and completeness. The other two reviewers provided only specific responses to the charge questions and did not provide an overall impression of the work. All reviewers appeared to understand the model’s function well and provided very specific comments and suggestions. Most observations from the reviewers were detailed and unique to the individual; only a few topics were noted by multiple reviewers.

Methodology and Results

The topics that generated comments from multiple reviewers centered around assumptions for battery costs and charging efficiency, assumed fuel and electricity costs, and inconsistency in battery specification across vehicle platforms. Three of the four authors noted instances where assumptions biased the results in favor of Battery Electric (BEV) or Fuel Cell Vehicle (FCV) technologies, with Dr. Bradley noting that electrification components for heavy-duty vehicles may never reach high enough production levels to realize the cost discounts assumed, Dr. de Ojeda stating that the assumed battery specific energy and energy density improvement of 2% per year was likely optimistic, and Dr. Michaelides stating that the assumed efficiencies of the BEV and FCVs are likely overstated. Dr. de Ojeda elaborated that the assumption that BEV and FCV efficiencies will increase over time while diesel engine efficiencies will remain constant isn’t appropriate and disagreed with assumptions of future declines in electrification component pricing as these components will likely increase in price over time. These three commenters also indicated that the assumed costs of both fuel and electricity should be revisited; reviewers commented that the costs of both were underestimated and the assumption to hold them constant was not appropriate. Dr. Bradley noted that the sources of the assumed fuel and electric prices were inconsistent and may reduce the project’s defensibility, as modeled diesel and electric costs reference existing and projected costs (by EIA), while the hydrogen cost reference is optimistically modeled at rates significantly lower than current levels (by ANL).

Dr. Bradley and Dr. Michaelides also noted an inconsistency in battery assumptions across BEVs and FCVs. Dr. Bradley provided the most specifics on this subject, notably indicating an instance in which assumed FCV generation rates were lower than the energy required for steady-state cruise. Broadly, the comments indicated exception to the spreadsheet choosing to specify the FCV power output rating at the lesser of cycle power or 75 mph cruise, when the commenters thought it would be more appropriate to use the higher value. Dr. Michaelides and Dr. de Ojeda also commented that FCV maintenance costs were likely understated, and that more realistic values should be included along with downtime-related costs to the consumer.

Most other comments were unique to each reviewer. Dr. Al-Alawi suggested having different user-selectable alternative technology adoption rate scenarios and noted that the authors might consider the importance of non-rational factors in decisions around technology adoption rates. Dr. Bradley commented that the payback and adoption model was simplistic and inadequate compared to the complexity of the overall model and noted specific observed inconsistencies in adoption rates. Dr. Michaelides suggested that the model should consider a discount rate when accounting for future costs. He also commented that the model should utilize different sets of assumptions for light-heavy, medium-heavy and heavy-heavy duty vehicles as some of the current assumptions aren’t appropriate across all heavy-duty vehicle types. Dr. de Ojeda disagreed with the inclusion of tax credits or subsidies in the model, stating that the model is intended to model technology, efficiency, and true cost and that the “results are rather meaningless if the greatest contributor to the payback is provided by financial incentives.”

Reviewers did not specifically categorize their comments as those that can be readily implemented versus those that are exploratory. While comments were specific and clearly explained, more research would be needed to address most of them.

Editorial Content

There were two main subjects raised by reviewers in responses to editorial content: the mechanics of the spreadsheet and the documentation. Dr. Michaelides and Dr. de Ojeda both noted instances where spreadsheet links did not appear to work correctly and values did not appear to correctly affect model output. They also provided suggestions to make the spreadsheet more user friendly and intuitive, including allowing users to revert certain values to defaults.

There were opposing viewpoints in the comments regarding the model's documentation. Dr. Al-Alawi and Dr. Michaelides stated the need for a manual describing the model, data sources, and usage. However, Dr. Bradley indicated that the documentation provided by EPA was very complete and supported the model well.

APPENDIX A

CHARGE TO REVIEWERS

Technical Charge to External Peer Reviewers

Contract 68HE0C18C0001

Work Assignment 4-22

April 2023

**External Peer Review of Report: Heavy-Duty Technology Resource Use Case Scenario (HD TRUCS) Tool:
Used to analyze HD vehicle energy usage and associated component cost**

BACKGROUND

Within the transportation sector as a whole, onroad vehicles are the predominant source of greenhouse gas (GHG) emissions, principally CO₂ emissions. Heavy-duty (HD) vehicles, 2b/3 incompletes, classes 4-8 vocational vehicles and tractors produce 23% of transportation sector related GHG emissions. As EPA's Office of Transportation and Air Quality continues the regulation of CO₂ and other GHG emission control measures in onroad and nonroad vehicles and equipment, there is likewise a continuing need to evaluate the costs and benefits of any such regulations. As such, EPA has developed its Heavy-Duty Technology Resource Use Case Scenario (HD TRUCS) tool, to facilitate its analysis of the vehicle segment adoption rates via determination of vehicle energy use and associated costs of HD zero-emission vehicles (ZEV), both battery electric (BEV) and fuel cell (FCEV).

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REVIEW MATERIALS PROVIDED (focus of this review)

- HD TRUCS Tool (Excel spreadsheet tool)

BACKGROUND AND SUPPORTING MATERIALS

Background and supporting materials are provided to assist reviewers throughout the review and are not the focus of this review. You do not need to comment on these materials, however you may need to refer to these materials to answer specific charge questions.

- HD TRUCS Docket memo: Provides a short introduction to the tool

- Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles: Phase 3: Draft Regulatory Impact analysis (RIA) <https://www.epa.gov/system/files/documents/2023-05/420d23004.pdf>
 - Please see Chapter 2.2.7-HD TRUCS Functionality for a complete overview of the model's functionality, page 204.

CHARGE QUESTIONS

In preparing comments, please distinguish between **recommendations** for clearly defined improvements that can be readily made, based on data or literature reasonably available to EPA, and **improvements** that are more exploratory or dependent, which would be based on information not readily available to EPA.

Comments should be clear and detailed enough to EPA readers or other parties familiar with the tool to allow a thorough understanding of the comment's relevance to material provided for review. Additionally, EPA requests that the reviewers not release the peer review materials or their comments until the Agency makes its report/cost model and supporting documentation public.

No independent data analysis will be required for this review Instead, EPA is seeking the reviewer's expert opinion on the methodologies, cost inputs of this tool, and whether they are likely to yield an accurate assessment of the true cost of ownership of these vehicles and their subsystems. Reviewers should comment on all aspects of the tool.

Using the comment template provided in Attachment A of this charge, please organize all responses according to the charge questions for each of the two categories listed below.

1. Methodology/Results:

- 1a. Is the methodology documented in the report generally reasonable and likely to yield accurate results? Is any bias likely to be introduced to the results due to methodological issues? If so, please indicate the direction of this bias and potential remedies.
- 1b. Please identify any general flaws inherent in the scope of the tool. Do you feel the results would be altered if the scope were more limited or expanded? Please explain.
- 1c. Are all appropriate inputs for the tool being considered? Conversely, are all inputs considered in the tool appropriate? Please cite any particular inputs or assumptions made by the tool that you feel are inappropriate or likely to bias the results and how they could be remedied, with particular emphasis on sources of information used in determining material prices, manufacturing burdens and other key factors.
- 1d. Are the assumptions embedded in the tool that affect projected cost or performance reasonable? Such assumptions might include learning curve, economies of scale, scaling parameters such as weight and power, material costs, and infrastructure cost.
- 1e. Where EPA has concluded that applicable data is meager or unavailable, and consequently has made assumptions to frame approaches and arrive at solutions, do you agree that the assumptions are appropriate and reasonable? If not, and you are able to do so, please suggest alternative assumptions that might lead to more reasonable or accurate tool inputs.
- 1f. Are the results expected of the tool appropriate for the given scope, assumptions, and inputs? Is appropriate validation made on the costing methodology and results? Please expand on any recommendations that you would make for analyses of tool results.

2. Editorial content:

- 2a. Is sufficient detail provided in the body of the model for a reader familiar with the subject to understand the process and conclusions? Please specify any specific content that you recommend be added or removed.
- 2b. Please comment on any editorial issues that should be addressed in the tool, including any comments on general organization or grammar and wording.

APPENDIX B

RESUMES OF SELECTED REVIEWERS

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BAHA AL-ALAWI, PH.D

Denver, CO 80247

Global Sustainability Analytics and Clean Energy Lead

Highly experienced and dedicated leader Engineer with 20-plus years of global expertise managing programs in corporate analytics, energy, transportation, and technology industries. Well-versed with various operation research tools, systems engineering, and analytical approaches. Adroit leader, capable of adequately solving challenging problems and managing a team of high-level specialists. Expertise in Analytical-data related fields, including but not limited to solution implementation, strategy execution, modeling, decision-making, research, reporting, and development.

CORE COMPETENCIES

- Program/Project Management
- Transportation Electrification/Infrastructure
- Climate Change & Decarbonization
- Team Building & Talent Development
- Tool development and Mathematical Optimization
- Data analytics, life-cycle, and financial analysis
- Environmental analysis and life-cycle assessment
- Statistical Analysis and Modeling
- Excellent verbal and written communication skills
- Program & Incentive Management/Reporting

PROFESSIONAL EXPERIENCE**CALSTART Inc, Denver, CO, USA**

07/2018–present

Market and Industry Analytics Programs Leader

Leading high-impact clean transportation programs/projects through developing and managing market and industry research, policy, survey, modeling, commercialization pathway & forecasting activities.

- Support technology development, assessing and validating new technologies and products, accelerating market growth by supporting clean vehicle incentive programs, providing policy guidance and implementation;
- Established and lead Calstart Beachhead advanced vehicles market projection model design and development, including national and global ZEV market size and addressable market evaluation;
- Leading and managing CARB HVIP (California's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project) monthly reporting (vehicles and infrastructure status data, purchasers, dealers, operators, location, vehicles make and model, funding amount, and program,) including HVIP map, utility data share and providing internal and external CARB and public requests;
- Established and led CORE monthly reporting (developed an analytical tool to analyze the raw data and generate complete and refined data and final reports);
- Lead and manage HVIP Telematics OEM outreach, data collection, analysis, and reporting;
- G20/T20 PB#17 Task Force 2: Climate change and environment: Managed global team to produce T-20 policy brief. Presented and finalized the last draft and published it under the 2020 G20/T20 website;

- Support CSU and Colorado Energy Office in LCFS modeling and analysis: (comprehensive, detailed tool to estimate and evaluate Colorado vehicle fleet fuel consumption (LDV & HDV) and evaluate BEV and ALFV technologies complaints with LCFS);
- Established and lead ZIO in on ZET market reports & Established and conducted ZEV components cost studies (OEM engagement, research, data collection, and analysis)
- Established and lead Beachhead TRL (Technology Redness Level: ICE, HEV, BEV, CNG engines and off-road vehicles/equipment) analysis and engagement (advanced TRL tool) (data, engagement, research, CARB advise);
- Established and lead Commercial Vehicle Drive to Zero Targets reports (Database, analysis, analytical national and global market projection model). Established the target ZEV MHDV 2020-2050 market projection scenarios nationally and globally. International partner's engagement and target reporting (currently U.S., China, Canada, EU, and Mexico);
- CARB ACT Rule: Managed and developed the model to assist in evaluating ACT rule scenarios which ended in successfully approving the California ACT rule;
- Managed and developed Amazon MENA market assessment, data collection, and market projection;
- Managed and developed a business case and market projection scenarios over 18 vehicle types (Diesel, CNG, LPG, BEV, and FCEV) technologies across CT, NJ, NY, and PA states supporting the NYMTC TCO project;
- Managed BYD ZE Drayage Market Assessment: define Drayage market (Ports of LA, Long Beach, Oakland, and San Diego) support survey, develop a business case and market projection scenarios;
- Managed National ZE Truck volume cost Model (Developed the model to estimate the associated fuel consumptions, GHG, air emissions, and avoidance benefits);
- Established and Developed CARB InfoShed Tool: Advanced and user-friendly data entry form for CARB to collect vehicles, infrastructure, and reports data in one platform and generate 16 databases;
- Established and developed California HVIP TCO (MHDV Total cost of ownership model) to support fleets in understanding the cost and benefits of Zero Emission vehicles compared to existing ICE vehicles;
- Established and lead Calstart data collection, acquiring, and analysis to support CARB, fleets, Calstart regional offices, and internal teams (Truck team, Bus Team, V&A team Global Commercial Vehicle Drive to Zero Program team, and policy team);
- Developed EBCE utility database scenario tool (identify the market size, vehicle types, and electrification opportunities for EBCE customers' fleets);
- Established and lead the quantification of fuel, energy, GHG, and Air emissions savings;
- Simulate and understand fleet owners/consumers' behavior in Technology adoption;
- Established and led all Analytical, Techno-economic, TCO, and market projection tools, supporting market acceleration, policy, and charging infrastructure to derive meaningful results and insights.

TECHNOLOGY STRATEGY AND PLANNING, SAUDI ARAMCO, Saudi Arabia

2017–2018

Corporate Outlook & Technology Strategist

- Evaluation and decision-making of Aramco's critical multi-billion investment projects reporting to the CTO, Corporate Planning, Facility Planning, Environmental, Process Systems, and Technology Strategy Departments.

- Established and led a team designing, managing, and developing vehicle outlooks and provided insights on emerging technologies and trends. Explored analytic solutions in quantitative model development and analyzed best practices. Work with fleets and manufacturers to analyze data and help conduct industry-wide assessments.
- Established and led global energy/transportation projections and industry-wide assessments using survey tools to develop conclusions about the status of technologies and market demand;
- Identify new and novel data sources and explore their potential use in developing actionable business insights;
- Explore emerging transportation technologies and analytic solutions for use in quantitative model development;
- Analyze best practices to promote the deployment of advanced fuel efficiency vehicles, critically assessing the role of regulations, incentives, fueling infrastructure, and consumer outreach programs;
- Collaborate with industries, academics, government, and other departments on emerging needs-based projects.

RESEARCH AND DEVELOPMENT CENTER, SAUDI ARAMCO, Saudi Arabia 2014–2017*Research and Development Senior Scientist*

- Subject Matter Expert representative (Saudi Arabia) for CO₂ transport produces an ISO/TC265 (CCS).
- Energy projections modeling and analysis, including Life-Cycle Cost, GHG, and Air Emissions;
- Review academic/industry literature, develop and test models, and gain insights from research findings;
- Quantify energy-saving, emission-reduction, and cost implications of advanced efficiency vehicle technologies;
- Develop relationships with other international experts, government officials, and local organizations;
- Design, develop, and implement innovative data and analytical solutions to solve business problems;
- Part of a diverse, global cross-functional team working to develop ideas and execute business plans.

ENERGY INSTITUTE, Colorado State University, Fort Collins, CO

2012–2014

Energy and Transportation Consultant

- Life-Cycle emission tool development (Colorado Platt River Power Authority Utility);
- Analytical Life-Cycle Cost model development and analysis, including U.S. utility TOU rates (Rebound Technology Company);
- Impact assessment of advanced vehicles technologies on policy and market;
- Advanced transportation technologies econometric models (funded by US DOE & EPRI).

ENGINES LAB, Colorado State University, Fort Collins, CO

2007–2012

Research Scientist Engineer

- Transportation Policy modeling and analysis (US Corporate Average Fuel Economy);
- Energy and transportation decision support tools development;
- Analytical Techno-economic model (US light-duty Vehicles);

- Simulation and modeling of clean transportation technologies market diffusion in the U.S.

SOUTHERN AREA GAS OPERATIONS, SAUDI ARAMCO, Saudi Arabia

1999–2003

Process Control Systems Specialist (Shedgum Gas Plant, Berri Gas Plant, Abqaiq Oil Plant & Haradh Gas Plant)

- Responsible for all aspects of Control Systems and Instrumentation design and implementation;
- Designing, Maintaining, and repairing complex pneumatic, analog, and digital equipment and systems;
- Haradh Gas Plant Testing and commissioning. (Quality Analysis/Quality Checking, GE Gas Turbine Systems).

SKILLS AND EXPERTISE**Computational Tools**

- Python, R, SAS Statistics Software, Sales Force, MATLAB, Simulink, Minitab, Non/Linear Programming, GREET, Tableau, MS Office, MS Excel & Visual Basic

Miscellaneous

- ZEV forecasting & market projection modeling
- Machine learning, artificial intelligence Engineering Risk Management
- Decision Support Systems modeling

TRAINING

PM Essentials (2021), Say This, Not That (2021), Time-Series Analysis & Forecasting (NABE) (2019), Data Science (Galvanize) (2018), Speaking with Impact (2018), Leadership Challenges (2017), SH4 Safety Topics (2016), Environmental Protection (2016), Fire Safety Awareness (2016), Hazcom-Chemical Hazard Awareness Training (2016), Energy Integration Technology (2016), Planning Risks and Decision Analysis (2015), Project Management (2010), General Electric Mark 5 (2002), GE Gas Turbines (2002), Bentley Nevada (2002), TRICON (2002)

EDUCATION

Harvard University (Extension School), Cambridge, MA

Master in Sustainability Management | 01/2021 - 05/2023

MASSACHUSETTS INSTITUTE OF TECHNOLOGY MITx, Cambridge, MA

MicroMasters in Supply Chain Management | 07/2019 - 05/2021

COLORADO STATE UNIVERSITY, Fort Collins, CO

PHD. in Industrial Engineering and Operations Research | 05/2012

Master in Systems Engineering | 05/2012

Master in Mechanical engineering | 05/2007

B.S. in Electrical Engineering | 12/2005

PUBLICATIONS

- Baha Al-Alawi, Owen MacDonnell, Ricardo García Coyne, and Cristiano Façanha, **Technology and Commercialization Pathways for Zero-Emission Medium- and Heavy-Duty Vehicles in Mexico**, CALSTART, January 2023
- Baha Al-Alawi, Owen MacDonnell, Jeremy Orr, and Cristiano Façanha, **Technology and Commercialization Pathways for Zero-emission Medium- and Heavy-duty Vehicles in Canada**, CALSTART, October 2022
- Baha Al-Alawi, Owen MacDonnell, and Cristiano Façanha, **Global Sales Targets for Zero-Emission Medium- and Heavy-Duty Vehicles – Methods and Application**, CALSTART, February 2022
- Baha Al-Alawi, Owen MacDonnell, Ross McLane, and Kevin Walkowicz, **Market Update, Zeroing in on Zero-Emission Trucks**, CALSTART, July 2022
- Baha Al-Alawi, Owen MacDonnell, Ross McLane, and Kevin Walkowicz, **Zeroing in on Zero-Emission Trucks**, CALSTART, January 2022
- Michael Somers, Liaw Batan, Baha Al-Alawi and Thomas Bradley, **A Colorado-specific life cycle assessment model to support evaluation of low-carbon transportation fuels and policy**, Environmental Research: Infrastructure and Sustainability, December 2021
- Baha M. Al-Alawi, Thomas H. Bradley & Timothy C. Coburn, **Managing global transport energy use and emissions through technology, policy, and collaborative initiatives**, G20/T20 Saudi, November 2020
- Baha M. Al-Alawi, Alexander Coker, **Multi-Criteria Decision Support System with Negotiation Process for Vehicle Technology Selection**, Energy Volume 157, 278-296
- Baha M. Al-Alawi, Thomas H. Bradley, **Analysis of Corporate Average Fuel Economy Regulation Compliance Scenarios Inclusive of Plug-in Hybrid Vehicles**, Applied Energy, Volume 113, January 2014, 1323-1337
- Baha M. Al-Alawi, Thomas H. Bradley, **Review of Hybrid and Electric Vehicle Market Modeling Studies**, Renewable and Sustainable Energy Reviews, Volume 21, May 2013, 190-203
- Baha M. Al-Alawi, Thomas H. Bradley, **Total cost of ownership, payback, and consumer preference modeling of plug-in hybrid electric vehicles**, Applied Energy, Volume 103, March 2013, 488–506
- Baha M. Al-Alawi, **Techno-economic Analysis and Decision Making for PHEV Benefits to Society, Consumers, Policymakers and Automakers**, Ph.D. dissertation, CSU, Aug 2012, Fort Collins, CO

PROJECTS AND TOOLS

Organization	Project	Tool	Information
Colorado Energy Office	Colorado life cycle assessment model for the evaluation of low-carbon transportation fuels and policy	Colorado fleet model	LDV/HDV Model of Colorado vehicle fuel consumption with projections out to 2030 – Colorado Energy Office
CALSTART	Hybrid and ZEV Voucher Incentive Project (HVIP)	Data refinement tool, reporting tool & utility data tool	Data analysis, tool development & Reporting – CARB

CALSTART	Clean Off-Road Equipment (CORE)	Data refinement tool & reporting tool	Data analysis, tool development & Reporting – CARB
CALSTART	HVIP Telematics Reporting	Data Tool, email Tool & Report	OEM communication, data collection, and analysis – CARB
CALSTART	Technology Redness Level (TRL)	On/Off-road engine, HV, ZEV Tools	Tool development, stakeholder engagement, and analysis– CARB
CALSTART	InfoShed Advanced Data Entry Tool	16 Database with window entry (add, edit, delete) records	Methodology and Database entry Tools development – CARB
CALSTART	Battery Electric Vehicles components cost	BEV Battery and incremental cost estimation	OEM communication, data collection, and analysis – CARB
CALSTART	Technology and Commercialization Pathways for Zero-Emission Medium- and Heavy-Duty Vehicles in Mexico	Market Projection	Global market projection and Analysis
CALSTART	Technology and Commercialization Pathways for Zero-emission Medium- and Heavy-duty Vehicles in Canada	Market Projection	Global market projection and Analysis
CALSTART	Global Commercial Vehicle Drive to Zero (D2Z)	Market Projection	Global market projection and Analysis
CALSTART	NYMTC Clean Freight Corridor Planning Study	TCO, Market Projection, fuel, GHG, and Air emission Tool	Technology and market projection (NY, NJ, CT, PA)
CALSTART	BYD ZE Drayage Truck Market Assessment	Market Projection Tool	Research, Data analysis, and market projection
CALSTART	EBCE Utility Database		Fleet Technology, Database development, and analysis
CALSTART	California and National GHG Projection	Fleet GHG projection Tool	Tool development and analysis

CALSTART	SCE West Coast Clean Transit Corridor Initiative	Market Projection Tool – Electric Charging Infrastructure	Data, analysis, and projection modeling to support Infrastructure planning
CALSTART	SJVAPCD USPS Project		Survey and analysis
CALSTART	National Fleet-TCO-Emission business case tool development and analysis	Fleet, TCO, business, and emission Tool	
CALSTART	HVIP TCO Tool	TCO Tool	Research, data mining, methodology, and model development
CALSTART	California CARB ACT/ACF	ACT/ACF policy Tool	Policy/Market Projection modeling and analysis
CALSTART	National Electric Battery demand tool	BEV Battery demand Tool	Modeling the demand associated with BEV projection nationally
CALSTART	Sustainable Transportation Technology Landscape Research	Amazon BEV Global Market Projection Tool	MENA (the Middle East & Northern Africa) lead and Global modeling lead–Amazon
CALSTART	Federal Zero-Emission Vehicles Policy Tax/Incentives Tool	Policy assessment, TCO, Market Projection, GHG, and society benefits Tool	Policy and analytical model development in support of the Biden-Harris Administration's FY22 Budget
CALSTART	Zero Emission Truck Market Report		Market research, data mining, analysis, and reporting
CALSTART	BAE-KW Project		Ports Drayage Commercialization Roadmap
Saudi Aramco	Global Transportation outlook program	LDV/HDV Market Projection, Fleet and Fuel Demand Tools	Report to the CTO the threats and opportunities for Saudi Aramco in different regions
Saudi Aramco	Oil to Hydrogen Program		Pathway and last-mile cost evaluation

Saudi Aramco	Saudi Aramco's long-term technology investment plan	Multi-criteria decision-making system Tool	Report to the Corporate planning
Saudi Aramco	Saudi alternative technology option for light and heavy-duty vehicles	Saudi CAFE, Saudi TCO, and business case modeling	Report to the facility, corporate, environment, process systems, and strategy departments
Saudi Aramco	LDV market	TCO/NP Cash Flow Tool	TCO/NP Cash Flow calculator for Octane On-Demand infrastructure
Saudi Aramco	LDV market	Global LDV TCO with WTW emission Tool	Research and Development & company strategy planning
Saudi Aramco	LDV market	Advanced and Automated LDV Maintenance cost Calculator Tool	Research and Development & company strategy planning
Saudi Aramco	LDV market	Saudi Fleet mix Fuel economy calculator	Research and Development & company strategy planning
Colorado State University (Energy Institute)	Technology evaluation	Life-Cycle Cost model including U.S. utility Time-of-Use utility rates Models	Rebound Technology Company
Colorado State University (Energy Institute)	GHG Emission assessment	Coal and Natural Gas WTW LCA Model	Colorado Platt River Power Authority Utility
Colorado State University (Engines Lab)	Technology evaluation	LDV TCO Tool	EPRI
Colorado State University (Engines Lab)	Technology/regulation evaluation	LDV US CAFE Tool	DOE
Colorado State University (Engines Lab)	Technology preference evaluation	Decision Support System Tool	
Colorado State University (Engines Lab)	Technology assessment and evaluation	Fleet TCO, GHG, Air emission Model	

Thomas H. Bradley, Ph.D.

Woodward Professor of Systems Engineering Department Head of Systems Engineering
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EDUCATION

Doctor of Philosophy, **Mechanical Engineering**, Georgia Institute of Technology, 2008
Academic Advisors: David E. Parekh (ME), Thomas F. Fuller (ChBE), Dimitri N. Mavris (AE)
Master of Science, **Mechanical Engineering**, University of California at Davis, 2003
Academic Advisor: Andrew A. Frank (MAE)
Bachelor of Science, **Mechanical Engineering**, University of California at Davis, 2000

PROFESSIONAL POSITIONS

7/19-present **Woodward Endowed Professor of Systems Engineering Head of Systems Engineering Department, Walter Scott, Jr., College of Engineering, Colorado State University**

Served as Woodward Foundation Endowed Professor and Department Head for the newest department at Colorado State University. Grew student enrollments and revenues at >20% per year, hired 5 TT faculty and 4 CCA faculty, directed 14 faculty and 5 staff, grew the Department to be the largest PhD program at CSU, and the largest civilian systems engineering graduate program in the US.

7/19-present **Full Professor, Department of Systems Engineering Affiliate Professor, Department of Mechanical Engineering, Colorado State University**

- **Research on energy, environmental, economic and policy engineering** associated with the integration of new and advanced technologies in fields such as Automotive Engineering, Energy Systems, and Aerospace Systems. Development of advanced system design tools with experimental validation to advance the state of the art in practical, demonstrable systems.
- **Authored or coauthored 80+ peer reviewed archival papers**, including seminal contributions in the design and development of plug in hybrid electric vehicles, fuel cell powerplants for aircraft, and the lifecycle assessment of biofuels. Active member of the academic community as author of ~125 conference publications and academic reports.
- **Served as PI for \$9.7M of external funding, with \$24M in total awards (Co-PI and internal funding) since 8/2008.** Core research support is from US Department of Energy, the National Science Foundation, and the automotive industry with additional support from other industry, Department of Defense, and non-profit consortia. **PI, and Director for the CSU/USDOE/ARRA Vehicle Electrification Education and EcoCAR Programs**, a suite of research-integrated education programs that perform undergraduate and post graduate education, secondary school curriculum development, and technician and first responder training, in the subjects of hybrid, electric and fuel cell vehicles.
- Taught a full load of courses in the subjects of systems engineering, system dynamics, energy storage and automotive engineering. Developed completely new courses in *Systems Requirements Engineering*, *System Dynamics*, *Design of Energy*

Storage Systems for Vehicles, Transportation Electrification, Computational HEV Design, HEV Powertrains, Renewable Energy Systems, Modeling Simulation and Experimentation, Systems Architecture, Leadership and Innovation in Systems Engineering, and Systems Engineering Research Methods.

- Service to academic and local community through conference organization, committee membership, and extensive public outreach.
- Enabled, incited, and mentored for faculty and staff development within and across departments, colleges, CSU, and other Universities.
- Graduated 15 PhD students and 32 MS students. Supervised 6 post-doctoral scholars. Currently advising 15 graduate students.

- 7/15-7/19 **Associate Director of Systems Engineering**, a cross-college program of the College of Engineering offering graduate degrees and certificates in modern Systems Engineering theory and practice. Grew program revenues and enrollment at >20%/yr, hired 6 tenure track (TT), 2 non-TT faculty, and 1 Admin Pro. to the program, and started a new CSU-system-wide professional degree type (the Professional Doctorate, D. Engr.)
- 7/13-7/19 **Associate Professor, Department of Mechanical Engineering, Colorado State University**
- 8/18-4/19 **Resident Researcher, Electric Power Research Institute** Contributed to updates to REGEN II, EV cost of manufacturing modeling, and technical insights.
- 8/08-7/13 **Assistant Professor, Department of Mechanical Engineering, Colorado State University** (Granted early tenure and promotion)
- 8/04-12/08 **Graduate Research Assistant, Georgia Institute of Technology, Woodruff School of Mechanical Engineering and Georgia Tech Research Institute.** Developed multidisciplinary tools for analysis, design and optimization of long-endurance fuel cell powered aircraft. Validated design methodology and tools through construction of the largest compressed hydrogen fuel cell aircraft developed to date. Designed, constructed and tested PEM fuel cells for aircraft application and published seminal results regarding fuel cell design tradeoffs for the aircraft powerplant application. Non-thesis research includes development of numerical optimization scheme for feed-forward control of flexible systems with non-linearities, modeling and control of plug-in hybrid electric vehicles, and physics-based propeller modeling with application to advanced design of unmanned aerial vehicles.
- 11/02-3/07 **Independent Contractor.** Performed engineering analysis and system design for plug-in hybrid electric vehicles under contract to the Electric Transportation Division of the Electric Power Research Institute in Palo Alto, CA. Performed confidential dynamic simulation, control system design and fuel economy analysis for Ford Th!nk Research group regarding prototype Ford Escape hybrid vehicle. Worked with DaimlerChrysler KEN (Low Emissions Vehicle Group, Mannheim, Germany) to simulate, design, specify, and bring to production a proof-of-concept plug-in hybrid electric medium-duty truck. Partnered with DC engineers in Mannheim and EPRI engineers to design vehicle control algorithms and specify powertrain and energy system components. Contract Manager: Dr. Mark Duvall (Electric Power Research Institute)
- 6/00-11/02 **Graduate Research Assistant, University of California at Davis, Department of Mechanical and Aeronautical Engineering.** Mechanical group leader of DARPA funded project to design and evaluate a prototype medium-duty automotive chain Continuously Variable Transmission (CVT). Performed mechanical and electrical design, construction,

optimization, testing and evaluation of two design generations of a 240 Nm torque capacity custom servo-hydraulic controlled CVT. Mechanical group leader for design and construction of test stands designed to facilitate CVT controls development under contract to Visteon Corp. Wrote proposal, designed and conducted experiments to experimentally verify dynamic system response of servo-hydraulic CVT under contract to Nissan Motor Co., Ltd. Developed a multi-body model of CVT chain and friction dynamics in satisfaction of the requirements for Master of Science degree.

ARCHIVAL PUBLICATIONS

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2. Trinko, D., Horesh, N., Porter, E., Dunkley, J., Miller, E., and **Bradley, T.H.**, "Transportation and electricity systems integration via electric vehicle charging-as-a-service: a review of techno-economic and societal benefits," *Sustainable and Renewable Energy Reviews*, 2023
3. Birch, D., Narsinghani, J., Herber, D., and **Bradley, T.H.**, "Human Factors Hazard Modeling in the Systems Modeling Language," *Systems Engineering*, 2023, SYS-21-126
4. Ault, T., **Bradley, T.H.**, "Risk-based approach for managing obsolescence for automation systems in heavy industries." *Systems Engineering*, 2022, 10.1002/sys.21635.
5. Younse, P., Cameron, J., **Bradley, T.H.** "Comparative Analysis of Model-based and Traditional Systems Engineering Approaches for Simulating a Robotic Space System Architecture through Automatic Knowledge Processing", *Systems Engineering*, 2022, 1–27.
6. Trinko, D., Horesh, N., Zane, R., Song, Z., Kamineni, A., Konstantinou, T., Gkritza, K., Quinn, C., **Bradley, T.H.**, Quinn, J., "Economic Feasibility of In-Motion Wireless Power Transfer In A High-Density Traffic Corridor," *eTransportation*, 2022, 100154.
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9. Rabinowitz, A., Motellebi-Araghi, F., Gaikwad, T., Asher, Z., and **Bradley, T.H.**, "Development and Evaluation of Velocity Predictive Optimal Energy Management Strategies in Intelligent and Connected Hybrid Electric Vehicles," *Energies*, 2021, 14(18), 5713.
10. Trinko, D., Porter, E., Dunkley, J., **Bradley, T.**, Coburn, T., "Combining Ad Hoc Text Mining and Descriptive Analytics to Investigate Public EV Charging Prices in the United States," *Energies*, 2021, 14(17), 5240.
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12. Lunsford, I., and **Bradley, T.H.**, "Evaluation of Unmanned Aerial Vehicle Tactics through Metrics of Survivability," *Journal of Defense Modeling and Simulation*, 2021
<https://doi.org/10.1177/15485129211031672>
13. Younse, P., Cameron, J., **Bradley, T.H.** "Comparative Analysis of an MBSE Approach to a Traditional SE Approach for Architecting a Robotic Space System through Knowledge Categorization", *Systems Engineering*, 2021, <https://doi.org/10.1002/sys.21573>.
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15. Coburn, T., **Bradley, T.H.**, Kutcher, C., "Perspectives on Expanding EV Charging Infrastructure in the United States," *The Energy Journal* 30, 5-8, 2021.
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19. Asher, Z., Trinko, D., Payne, J., Geller, B., **Bradley, T.H.**, "Real Time Implementation of Optimal Energy Management in Hybrid Electric Vehicles: Globally Optimal Control of Acceleration Events," *ASME Journal of Journal of Dynamic Systems, Measurement and Control*, 142(8) February 2020.
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21. Baral, N., Neupane, P., Ale, B., Quiroz Arita, C., Manandhar, S., **Bradley, T.H.**, "Stochastic economic and environmental footprints of biodiesel production from *Jatropha curcas* Linnaeus in the different federal states of Nepal," *Sustainable and Renewable Energy Reviews*, Volume 120, March 2020, 109619.
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Electronic Systems (TODAES) Volume 24 Issue 6, September 2019 Article No. 63, doi: 10.1145/3355392.

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26. Quiroz-Arita, C., Sheehan, J., Hughes, A., Hodgson, B., Peers, G., Sharvelle, S., and **Bradley, T.H.**, "A Cyanobacterial Sidestream Nutrient Removal Process and its Life Cycle Implications," *BioEnergy Research*, 2019, 12, pages 217–228.
27. Baral, N., Davis, R., and **Bradley, T.H.**, "Supply and value chain analysis of mixed biomass feedstock supply system for lignocellulosic sugar production," *Biofuels, Bioproducts & Biorefining*, 2019, Volume13, Issue3 May/June 2019 Pages 635-659.
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32. Bucher, J.D., and **Bradley, T.H.**, "Modeling Operating Modes, Energy Consumptions, and Infrastructure Requirements of Fuel Cell Plug in Hybrid Electric Vehicles using Longitudinal Geographical Transportation Data," *International Journal of Hydrogen Energy*, <https://doi.org/10.1016/j.ijhydene.2018.04.159>, 2018.
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36. Kukkala, V.K., Tunnel, J., Pasricha, S., and **Bradley, T.H.**, "A Survey of Advanced Driver Assistance Systems and Current Challenges," *IEEE Consumer Electronics Magazine*, Volume: 7, Issue: 5, Sept. 2018.
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39. Quiroz-Arita, C., Sheehan, J., and **Bradley, T.H.** "Life cycle net energy and greenhouse gas emissions of photosynthetic cyanobacterial biorefineries: Challenges for industrial production of biofuels," *Algal Research, Sustainability Special Issue*, Volume 26, September 2017, Pages 445-452
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41. Borlase, S., Behboodi, S., **Bradley, T.H.**, Brandao, M., Chassin, D., Eslin, J., McCarthy, C., "Smart Energy Resources: Supply and Demand", In: Stuart Borlase, Ed. *Smart Grids: Infrastructure, Technology, and Solutions* 2nd Ed., CRC Press, 2017.
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45. **Bradley, T.H.**, and Melby, C.L, "Discussion: "Temperature of Food and Drink Intake Matters" (,ASME J. Energy Resour. Technol., 138(5), 054701)" *ASME Journal of Energy Resource Technology*, 2016, Vol. 139, 015501.
46. Nataf, K., and **Bradley, T.H.**, "An Economic Comparison of Battery Energy Storage to Conventional Energy Efficiency Technologies in Colorado Manufacturing Facilities," *Applied Energy*, Volume 164, 15 February 2016, Pages 133–139.
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50. Geller, B., and **Bradley, T.H.**, "Analyzing Drive Cycles for Hybrid Electric Vehicle Simulation and Optimization" *ASME Journal of Mechanical Design* 2015; 137(4):041401-041401-14.
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59. Stanton, K., and **Bradley TH.** "From Course Assessment to Redesign: A Hybrid Vehicle Course as a Case Illustration," *European Journal of Engineering Education*, 2013, Vol. 38, No. 6, Pages 687-699.
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112. Quinn, J., and **Bradley, T.H.**, "Microalgae Biomass Production Potential in the US," *International Conference CO2 Summit: Technology and Opportunity*, June 6-10, 2010, Vail, Colorado, USA.
113. Batan, L., Quinn, J., and **Bradley, T.H.**, "Net energy and greenhouse gas emissions evaluation of biodiesel derived from microalgae," *International Conference CO2 Summit: Technology and Opportunity*, June 6-10, 2010, Vail, Colorado, USA.
114. **Bradley, T.H.**, "The Effects of Aggregation on the Near-Term Economics and Scalability of Plug-in Hybrid Electric Vehicle to Grid Charging," invited presentation in *Plug in 2009 Conference*, August 12-14, 2009, Long Beach, California, USA.
115. **Bradley, T.H.** Moffitt, B.A., Parekh, D.E., Fuller, T.F., and Mavris, D.N., "Energy Management for Fuel Cell Powered Hybrid-Electric Aircraft, *ASME/SAE/AIAA 7th International Energy Conversion Engineering Conference*, 2 - 5 August 2009, Denver, Colorado. AIAA 2009-4590.
116. **Bradley, T.H.** "Modeling, Design and Energy Management of Fuel Cell Systems for Aircraft," PhD Dissertation, Georgia Institute of Technology, Woodruff School of Mechanical Engineering, 2008.
117. Fuller, T. F., **Bradley, T. H.** "Methodology for Robust Design of Small Fuel Cell Systems: Application to Unmanned Aerial Vehicles," Invited presentation in *10th Annual International Conference on Small Fuel Cells*, April 30-May 2, 2008, Atlanta, Georgia, USA.
118. **Bradley, T. H.**, Moffitt, B. A., Parekh, D. E., and Mavris, D. "Design Studies for Hydrogen Fuel Cell Powered Unmanned Aerial Vehicles," *26th AIAA Applied Aerodynamics Conference*, August 18-21, 2008, Honolulu, Hawaii. AIAA 2008-6413.
119. **Bradley, T. H.** and Parekh D. E. "Design, Applications and Commercialization of Fuel Cell Powered Aircraft," *Proceedings of the National Hydrogen Conference*, March 30-April 3 2008, Sacramento, California.
120. Moffitt, B. A., **Bradley, T. H.**, Parekh, D. E., and Mavris, D. "Vortex Propeller Model Generation and Validation with Uncertainty Analysis for UAV Design." in *46th AIAA Aerospace Sciences Meeting and Exhibit*, January 7-10, 2008, Reno, Nevada. AIAA 2008-406.
121. *Description of a Basic Vehicle Control Strategy for a Plug-In Hybrid Electric Vehicle*, EPRI, Palo Alto, CA: 2007. 1012460.

122. Moffitt, B. A., **Bradley, T. H.**, Mavris, D. and Parekh, D. E., "Reducing design error of a fuel cell UAV through variable fidelity optimization." in *7th AIAA Aviation Technology, Integration and Operations Conference*, September 2007, Belfast, N. Ireland. AIAA 2007-7793.
123. **Bradley, T. H.**, Moffitt, B. A., Parekh, D. E., and Mavris, D. "Flight Testing Results for a Fuel Cell Unmanned Aerial Vehicle." in *45th AIAA Aerospace Sciences Meeting and Exhibit*, January 8-11, 2007, Reno, Nevada. AIAA 2007-0032.
124. **Bradley, T. H.**, Hall, T., Quilin, X., Singhose, W., and Lawrence, J. "Input shaping for nonlinear drive systems." in *ASME International Mechanical Engineering Congress and Exposition*, November 5-10, 2006, Chicago, Illinois. IMECE2006-14396.
125. **Bradley, T. H.**, Moffitt, B., Thomas, R., Parekh, D. E., and Mavris, D. "Test Results for a Fuel Cell-Powered Demonstration Aircraft." in *Society of Automotive Engineers Power System Conference*, November 7-9, 2006, New Orleans, Louisiana. 2006-01-3092.
126. Moffitt, B., **Bradley, T. H.**, Mavris, D., and Parekh D. E. "Design Space Exploration of Small- Scale PEM Fuel Cell Long Endurance Aircraft." in *6th AIAA Aviation Technology, Integration and Operations Conference*, September 25-27, 2006, Wichita, Kansas. AIAA-2006-7701.
127. **Bradley, T. H.**, Moffitt, B. A., Parekh, D. E., and Mavris, D. "Validated Modeling and Synthesis of Medium-scale PEM Fuel Cell Aircraft." in *4th International ASME Conference on Fuel Cell Science, Engineering and Technology*, June 18-21 2006, Irvine, California. FUELCELL2006-97233.
128. Moffitt, B. A., **Bradley, T. H.**, Parekh, D. E., and Mavris, D., "Design and Performance Validation of a Fuel Cell Unmanned Aerial Vehicle." in *44th AIAA Aerospace Sciences Meeting and Exhibit*, January 9-12, 2006, Reno, Nevada. AIAA 2006-0823.
129. Graham, R., **Bradley, T. H.**, and Duvall, M. "Development of Plug-in Hybrid Electric Light- and Medium-duty Commercial Vehicles." in *Electric Vehicle Symposium 20*, November 15-19, 2003, Long Beach, California.
130. *Development and Modeling of Plug-in Hybrid Electric Vehicle Architectures Based on the Ford U293 Platform*, EPRI, Palo Alto, CA: 2003.
131. *Test Profile Development for the Evaluation of Battery Cycle Life for Plug-In Hybrid Electric Vehicles*, EPRI, Palo Alto, CA: 2003. 1002228.
132. **Bradley, T. H.** *Simulation of Continuously Variable Transmission Chain Drives with Involute Inter-element Contact Surfaces*. MS Thesis, University of California – Davis, Department of Mechanical Engineering, 2003.
133. **Bradley, T. H.** and Frank, A. A. "CVT Servo-hydraulic Control System Performance and Evaluation." in *Proceedings of the International Congress on Continuously Variable Power Transmission*, October 7-8, 2002, Munich, Germany, also published in *Verein Deutscher Ingenieure Berichte*, Nr. 1709, 2002, pp. 35-42.
134. Alexander, M., **Bradley, T. H.**, Huff, B., Hutchison, P., Kamisky, R., Loomis, G., McMahon, S., Meyr, N., Schurhoff, R. Vaughan, J., Duvall, M., and Frank, A., "Design and Development of the UC Davis FutureTruck." *Society of Automotive Engineers SP-1617*, 2001.

TEACHING EXPERIENCE

- **Instructor**, SYSE 780-A1 *Research Methods in Systems Engineering*, College of Engineering, Colorado State University (S-22, S-23)
- **Co-instructor**, CIVE 580-A2 *Food Energy Water Systems*, College of Engineering, Colorado State University (S-20, S-21, S-22, S-23 with S. Sharvelle)
- **Instructor**, ENGR 531 *Engineering Risk Analysis*, College of Engineering, Colorado State University (S-21, F-22)
- **Instructor**, SYSE 701 *Leadership and Innovation in Systems Engineering*, Systems Engineering, Colorado State University (F-19, F-20, F-21, F-22)
- **Co-instructor**, MECH 580-A2 *Systems Requirements Engineering*, College of Engineering, Colorado State University (F-17 with A. Batchelor)
- **Instructor**, MECH 513 *Modeling, Simulation and Experimentation*, Mechanical Engineering, Colorado State University (S-16, S-17, S-18, S-20)
- **Co-instructor**, MECH 200 *Introduction to Manufacturing Processes*, College of Engineering, Colorado State University (S-15, with S. Schaeffer)
- **Co-instructor**, MECH 402 *Introduction to Statistics*, College of Engineering, Colorado State University (F-13, with K. Catton)
- **Instructor**, ECE/ENGR 567 *Systems Architecture*, College of Engineering, Colorado State University (S-13, S-14)
- **Instructor**, ENGR 580-A-4 *Hybrid Electric Vehicle Systems Design*, College of Engineering, Colorado State University (F-12)
- **Instructor**, ENGR 680-A4 *Vehicle Electrification*, College of Engineering, Colorado State University (F-11, F-13)
- **Instructor**, ENGR 523 *Design of Energy Storage Systems for Vehicles*, College of Engineering, Colorado State University (F-11)
- **Instructor**, ENGR 527 *Hybrid Electric Vehicle Powertrains*, College of Engineering, Colorado State University (S-11, S-12, F-12, F-14, F-17)
- **Instructor**, MECH 529 *Advanced Mechanical Systems*, College of Engineering, Colorado State University (S-09, S-10, S-13, F-15, F-16)
- **Instructor**, MECH 324 *Dynamics of Machines*, College of Engineering, Colorado State University (F-08, F-09, F-10)
- **Co-instructor**, AGRI/ENGR 681 *Bioenergy Policy, Economics, and Assessment*, College of Natural Sciences and College of Engineering, Colorado State University (S-10, S-11, with K. Reardon, and K. Paustian)
- **Co-instructor**, ME 4823 *Renewable Energy Systems*, Woodruff School of Mechanical Engineering, Georgia Institute of Technology (S-07, with Comas L. Haynes)
- **Guest Instructor**, Variety of Programs and Instances
 - Guest lectured to REM 300 *Renewable Energy* (F-14, F-16, F-17 with K. Reardon and J. Sheehan)
 - Guest lectured to ISYE 8803F *Energy Technology and Policy* (S-08, with V. Thomas)
 - Guest lectured to ME 4823 *Fuel Cell Systems* (S-08, with C. L. Haynes)
 - Guest lectured to ME 4813 *Fuel Cell Systems* (F-07, with C. L. Haynes)
 - Guest lectured to Advanced Placement and Remedial Chemistry at Atlanta area high-school as part of the Georgia Intern-Fellowships for Teachers program (S-06, with C. L. Haynes)

- Guest lectured to numerous school groups as a component of informal Institute outreach efforts and the Georgia Tech Research Institute Foundations for the Future Program (S-06 to present, with C. L. Haynes)

Academic Advisor

- Colorado State University Senior Honors Thesis Advisor (~18 students) (2009-2018)
- McNair Scholars Program (for students of disadvantaged backgrounds) Advisor (May to August 2009)
- California Alliance for Minority Participation in Math, Science & Engineering (June 2001 to June 2002)

Senior Design Advisor

- Lightning eMotors EV Trailing Analysis (2021-2022) *Externally funded by Lightning eMotors*
- EcoCAR: Fuel Cell and Ethanol Hybrid Vehicle Design/Build (2011-2020) *Externally funded by US DOE and General Motors*
- Schneider Electric EVSE Cable Management, (2013-2018) *Externally funded by Schneider Electric*
- Air Force Office of Scientific Research University Engineering Design Challenge Program (2011-2014) *Externally funded by US Air Force Office of Scientific Research*
- Small Hybrid Propulsion System Demonstrator (2010-2014) *Externally funded by US Air Force Research Laboratory*
- Man-packable Unmanned Aerial Vehicle (2009-2010)
- Self-Contained Air Mobility Pack : Powered Air Purifying Respirator (2009-2010) *Externally funded by US Department of Homeland Security*

ACTIVITIES AND AWARDS

- PI, **Colorado DOT Office of Innovative Technology**, “ZEV Manufacturing and Engineering Workforce Development” \$100,000 (2023-2024).
- PI, **Woodward Inc.**, “Aero-actuation Research and Education Center, Phase 2” \$900,000 (2023-2026).
- PI, **Electric Power Research Institute Low Carbon Resource Initiative** Analysis of costs and performance of vehicles fueled by alternative energy carriers,” \$150,000 (2022-2024)
- PI, **Electric Power Research Institute**, “Light-duty and medium-duty electric vehicle data-driven insights,” \$144,122 (2022-2023)
- PI, **Lockheed Martin Sikorsky**, “Fuel Cell Powered UAV Testing” \$174,714 (2021-2022)
- PI, **US Department of Energy**, “Agent-Based, Bottom-Up Medium- and Heavy-duty Electric Vehicle Economics, Operation, Charging, and Adoption, \$292,541 (2021-2024)
- PI, **Colorado Department of Public Health and the Environment**, “Battery End of Life for Electric Vehicles in Colorado,” \$25,000 (2020-2021).
- PI, **Toyota Engineering and Manufacturing Americas**, “Phase VII of Prediction Signal Quality and Influences on Acceleration Event Scenario Control's Benefit to Hybrid Vehicle FE Improvements Fuel Economy for a Hybrid Vehicle,” \$68,854 (2020-2021).
- PI, **Electric Power Research Institute**, “Demand-Side Electricity System Modeling” \$100,000 (2020-2021).

- PI, **Woodward Inc.**, “Aero-actuation Research and Education Center” \$900,000 (2020-2023).
- Co-PI with Daily, J., Simske, S., **DARPA**, “Advanced Micro-patching” \$2,700,000 (2020-2024)
- Co-PI with Quinn, J., Simske, S., Field, J., Kern, J., Beal, C., **US Department of Energy**, “Agent-based Modeling for the Multi-objective Optimization of Energy Production Pathways,” \$1,250,000 (2019-2022).
- PI, **Colorado Department of Transportation**, “Autonomous Maintenance Technology Pooled Fund Management,” \$71,700 (2019-2021).
- PI, **US Department of Energy**, “Mobility and energy improvements realized through prediction-based vehicle powertrain control and traffic management,” \$1,040,000 (2018-2021).
- Co-Investigator, with Sharvelle, S., Reardon, K., Conant, R., Arabi, M., Shipianski, M., Malin, S., **National Science Foundation** “NRTINFEWS: Interdisciplinary Training, Education and Research for Food-Energy-Water Systems (InTERFEWS) in Semi-Arid Regions” \$2,999,981 (2018-2022).
- PI, **Electric Power Research Institute**, “EPRI Resident Agreement” \$73,953 (2018-2019)
- PI, **USDOT Mountain Plains Consortium**, “Experiments and Modeling for Infrastructure Data-Derived Fuel Economy and Safety Improvements” \$100,000 (2018-2019)
- PI, **Toyota Engineering and Manufacturing Americas**, “Phase IV of Prediction Signal Quality and Influences on Acceleration Event Scenario Control's Benefit to Hybrid Vehicle FE Improvements Fuel Economy for a Hybrid Vehicle,” \$130,000 (2018-2019)
- PI, **Xcel Energy Foundation**, “Veteran Student Support”, \$10,000 (2018)
- PI, **Woodward Inc.** “Modeling and Simulation Short Course,” \$19,972, (2018)
- PI, **US Department of Energy** and **General Motors** and **Mathworks**, “AVTC12” \$670,000 (>\$80M in-kind), (2018-2022)
- PI, **Sandia National Laboratory**, “Advancement of a Computation Model of Algal Growth,” \$67,470 (2017-2018)
- **CSU Faculty Excellence Award**, 2017, \$13,000.
- PI, **Lightning Hybrids**, “Short course - HV Electrical Systems for Vehicles” \$5,000, 2017.
- PI, **National Science Foundation**, “Veteran Research Support – EcoCAR 3”, \$20,000 (2017-2018)
- PI, **Toyota Engineering and Manufacturing Americas**, “Phase III of Prediction Signal Quality and Influences on Acceleration Event Scenario Control's Benefit to Hybrid Vehicle FE Improvements Fuel Economy for a Hybrid Vehicle,” \$70,000 (2017-2018)
- Co-PI, with Windom, B. and Marchese, A., **Honda R&D Americas**, “Onboard Refueling Vapor Recovery System Testbed and Simulation,” \$309,985 (2016-2018).
- PI, **Toyota Engineering and Manufacturing Americas**, “Phase II of Prediction Signal Quality and Influences on Acceleration Event Scenario Control's Benefit to Hybrid Vehicle FE Improvements Fuel Economy for a Hybrid Vehicle,” \$60,000 (2016-2017)
- PI, **NREL CEMAC**, “Economic Expertise to Support Development of CEMAC Benchmark Project”, \$20,000 (2016-2018)
- PI, **Lightning Hybrids**, “Phase 3- Colorado State University Graduate Research for Lightning Hybrids Inc.,” \$17,965 (2016)
- PI, **Starbucks Coffee Company**, “Heat Recovery and Mechanical Efficiency,” \$199,954 (2015-2016)

- Fellow, **US Department of Energy**, “Applied Automotive Engineering Fellowship,” \$10,000 (2015-2016).
- PI, **Toyota Engineering and Manufacturing Americas**, “Prediction Signal Quality and Influences on Acceleration Event Scenario Control's Benefit to Hybrid Vehicle FE Improvements Fuel Economy for a Hybrid,” \$82,000 (2015-2016)
- Co-PI, with Reardon, K., **National Science Foundation**, “EFRI Supplement – REM and EFW,” \$249,220 (2015-2017)
- PI, **Toyota Engineering and Manufacturing Americas**, “Study of Prediction Signal Quality and Controls Scenario Benefit Study for Hybrid Vehicle Fuel Economy Improvements,” \$61,112 (2014-2015)
- PI, **US Department of Energy** and **General Motors**, “EcoCAR 3” \$964,851 (>\$80M in-kind), (2014-2018)
- PI, **Electric Power Research Institute**, “Electrified Vehicle Data Analysis and Synthesis – Medium Duty” \$50,223 (2013-2015)
- PI, **Electric Power Research Institute**, “Electrified Vehicle Data Analysis and Synthesis – Light Duty” \$50,223 (2013-2015)
- Co-PI, with Zimmerle, D., **Platte River Power Authority**, “Greenhouse Gas Impacts of Switching from Coal to Natural Gas Fuel Supply Associated with Fuel Production and Delivery,” \$5,000 (2014)
- PI, **Toyota Engineering and Manufacturing Americas**, “Conceptual Design Comparisons Among Next-Next- Generation Toyota PEVs - Amendment 3,” \$13,000 (2013-2014)
- Fellow, **US Department of Energy**, “Applied Automotive Engineering Fellowship,” \$10,000 (2013-2014).
- PI, **Lightning Hybrids**, “Phase 2- Colorado State University Graduate Research for Lightning Hybrids Inc.,” \$16,871 (2013)
- PI, **Electric Power Research Institute**, “Non-Road Electric Transportation Matrix” \$30,000 (2013-2014)
- PI, **Air Force Research Laboratory**, “Take off Rotax Intercooler” \$15,000 (2013-2014)
- Faculty Advisor, **US Department of Transportation**, “Dwight Dwight David Eisenhower Transportation Fellowship Program – Shawn Salisbury,” \$5000 (2013)
- PI, **National Science Foundation**, “Outstanding Incoming Faculty Advisor Award, EcoCAR2,” \$10,000 (2013)
- Co-PI, with Reardon, K., Peebles, C., Peers, G., and Dandy, D., **National Science Foundation EFRI-Photosynthetic Biorefineries**, “Manipulating photosynthesis and photobioreactor mixing dynamics for enhanced yields of novel commodity products in cyanobacteria,” \$1,999,991 (2013-2017)
- Co-PI, with Paustian, K., Dunbar, B., Guggomos, A., France, R., and Anderson, C., **National Science Foundation: Partnerships for Innovation: Building Innovation Capacity**, “Carbon Footprint Metric in the Built Environment,” \$599,997 (2013-2015)
- PI, **Lightning Hybrids**, “Phase 1- Colorado State University Graduate Research for Lightning Hybrids Inc.,” \$20,571 (2013)

- PI, **Toyota Engineering and Manufacturing Americas**, “Conceptual Design Comparisons Among Next-Next-Generation Toyota PEVs,” \$59,800 (2013)
- **SAE International**, Ralph R. Teetor Award for Excellence in Engineering Education (2013)
- PI, **Electric Power Research Institute**, “Demonstration of a Plug in Hybrid Fuel Cell Vehicle,” \$5,000 (2013)
- PI, **American Public Power Association**, “Demand Response for Plug in Hybrid Electric Vehicles” \$7,500 (2013).
- Co-PI, with Carlson, K., and Catton, K., **RPSEA-Research Partnership to Secure Energy for America**, “Development of GIS-Based Tools for Optimized Fluid Management in Shale Gas Operations,” \$1,200,000 (2013-2015)
- Co-PI, with Hagen, C., **US Department of Energy - ARPAe**, “Methane Opportunities in Vehicles,” \$1,000,000 (2012-2014)
- PI, **Air Force Research Laboratory**, “Small Engine Propulsion System Demonstrator” \$10,000 (2012-2013)
- PI, **US Department of Energy**, “CSU Industrial Assessment Center,” \$1,407,337 (2011-2016)
- Co-PI, with S. DeLong, **CSU School of Global and Environmental Sustainability**, “Food, Energy, Waste Nexus,” \$15,000 (2011-2012)
- Co-PI, with D. Radford, **Stolle Manufacturing Company LLC.**, “Independent Energy Baseline Analysis and Senior Design of Stolle Standun Bodymaker,” \$120,000 (2011-2012)
- PI, **Air Force Research Laboratory**, “Small Hybrid Propulsion System Demonstrator, Follow-up” \$10,000 (2011-2012).
- PI, **Electric Power Research Institute**, “Real World Energy Use Modeling and Experiments for Conventional and Electrified Transportation, \$88,565 (2011-2012).
- PI, **US Department of Energy** and **General Motors**, “EcoCAR2” \$415,383 (>\$76M in-kind), (2011-2014)
- Co-PI, with Hagen, C., **US Air Force Research Laboratory**, “University Design Challenge,” \$60,000 (2011-2014)
- PI, **US Department of Energy National Renewable Energy Laboratory – Joint Institute for Strategic Energy Analysis**, “Financial Models for Utility Market Transformation,” \$44,925 (2010-2011)
- PI, **University of California at Davis / California Energy Commission**, “Bridge Study for Comparison of Costs and Benefits of Battery-to-Grid and Vehicle-to-Grid Systems,” \$48,000 (2010-2011)
- PI, **Electric Power Research Institute**, “Plug-In Hybrid Electric Vehicle Modeling and Decision Support – Follow-up,” \$100,000 (2010-2011).
- PI, **Air Force Research Laboratory**, “Small Hybrid Propulsion System Demonstrator,” \$35,000 (2010-2011).
- Faculty Advisor, **US Department of Transportation**, “Dwight Dwight David Eisenhower Transportation Fellowship Program – Eric Wood,” \$5000 (2010)
- PI, **Electric Power Research Institute**, “Economic and Environmental Analysis of Fuel Cell Powered Materials Handling Equipment,” \$20,000 (2010)

- Co-PI, with Zimmerle, D., **Colorado State University Engineering Student Technology Committee Grant**, “Electric Drivetrain Teaching Center,” \$24,950 (2010).
- Co-PI, with Williams, J., and Zimmerle, D., **Colorado State University Clean Energy Supercluster**, “Thin Film-based Thermoelectric Generators,” \$18,000 (2010-2011).
- PI, **Electric Power Research Institute**, “Plug-In Hybrid Fuel Cell Vehicle Evaluation Phase 0,” \$17,938 (2010)
- PI, **University of Colorado Boulder - C2B2**, “Lifecycle Sustainability Assessments for Microalgal Biofuel Production,” \$34,817 (2010)
- PI, **Federal Emergency Management Agency, Fire Prevention and Safety Grant**, “Development of an Integrated Super Critical Breathing Apparatus and Powered Air Purified Respirator,” \$916,923 (2009-2011).
- Author and Technical Lead, **US Department of Energy**, “ARRA - Advanced Electric Drive Vehicle Education Program,” \$5,136,101 (2009-2013), PI for CSU subcontract of \$750,000 (2009-2014).
- PI, **United Technologies Research Center**, “24 hour PEM Powered Fixed Wing Demonstration,” \$17,509 (2009-2010)
- PI, **Electric Power Research Institute**, “Plug-In Hybrid Electric Vehicle Modeling and Decision Support,” \$86,935 (2009)
- PI, **Colorado State University Space Grant Consortium** “24 hour PEM Powered Fixed Wing Demonstration,” \$8,000 (2009)
- Co-PI, with Troxell, W., **Spirae, Inc.** “Continuous Power Supply for Engineering Research Center” \$10,000 (2008)
- 1st Prize SAIC Georgia Tech Student Paper Competition (2007)
- Department of Energy Graduate Automotive Technology Education Fellowship Recipient (2001 to 2002)
- College of Engineering Outstanding Senior, University of California at Davis (2000)
- National Merit Scholar Semifinalist (1995)

ACADEMIC SERVICE

Professional Affiliations:

- Member, American Society of Mechanical Engineers (1995-present)
- Member, Society of Automotive Engineers (1999- present)
- Member, American Institute of Aeronautics and Astronautics (2005- present)
- Member, International Council on Systems Engineering (2016- present)

Peer Reviewer, 2017 DOE Hydrogen & Fuel Cells Program and Vehicle Technologies Office Annual Merit Review and Peer Evaluation Meeting.

Peer Reviewer, 2016,2018 NREL Strategic Energy Analysis and Transportation Research LDRD Peer Evaluation Meeting.

Organizer and Instructor, “Energy, the Environment and Transportation: a Professional Development Workshop Series for Teachers,” CSU Vehicle Electrification Education Program (2012-2013)

Technical Area Organizer, Energy Storage Systems and Technologies, ASME/SAE/AIAA International Energy Conversion Engineering Conference (2011-12)

Member, CSU ME Faculty Search Committee (2009-2011, 2014-2016)

Member, CSU SE Faculty Search Committee (2016-present)

Faculty Member, Engineering Student Technology Committee (2008-2010), College of Engineering Executive Committee (2015-present)

George W. Woodruff School of Mechanical Engineering Zeigler Outstanding Educator Award Committee (2008)

Reviewer for *Journal of Hazardous Materials* (2014), *Transportation Research Part D: Emerging Technologies* (2014, 2017), *Journal of Engineering Research* (2013-2014), *Algal Research* (2013-2018), *Transportation Research Part C: Emerging Technologies* (2013-2015), *Disruptive Science and Technology* (2013), *Journal of Power Sources* (2009-2021), *International Journal of Hydrogen Energy* (2007- present), *Journal of Industrial Ecology* (2022-present), *Energies* (2010-present), *Proceedings of the IEEE* (2010), *Applied Energy* (2009-10), *Environmental Science and Technology* (2009- present), *Transportation Research Part C* (2010), *International Journal of Vehicle Design* (2009), *IEEE Transactions on Industrial Electronics* (2009), *Transportation Research Part A: Policy and Practice* (2007-2018), *IEEE Transactions on Control Systems Technology* (2017-2018), *Journal of Applied Phycology* (2017), *Journal of Defense Modeling and Simulation* (2021), *Environmental Research Letters* (2021- present), *Systems Engineering* (2021-present)

Reviewer for *American Society of Engineering Education* (2015-2018), *Algal BBB Conference* (2012-2015), *SAE World Congress* (2011-present), *AIAA/SAE/ASME International Energy Conversion Engineering Conference* (2009-2012), *ASME Design, Engineering and Technology Conference* (2011), *ASME International Conference on Fuel Cell Science, Engineering and Technology* (2006)

Speaker, CSU College of Engineering, Engineering Breakfast Series, (October 2013)

Speaker, ASME Centennial Section, (May 2013)

Speaker, ASME Centennial Section, (May 2012)

Speaker, CSU College of Engineering, Engineering Breakfast Series, (November 2011)

Speaker, ASME Centennial Section, (August 2011)

Speaker, ASME Centennial Section, (November 2009)

Member, ASME Early Career Professor Task Force (October 2009)

Speaker, CSU College of Engineering, Engineering Breakfast Series, (December 2009)

Technical Reviewer, "Electric Vehicles in Colorado," Colorado State University Extension, Fact Sheet No. 10.630, 2012.

Public Testimony "The Role of Plug-in HEVs as Precursors to FCHEVs and Full-function BEVs," California Air Resource Board, March 27, 2003, Sacramento, California.

Advisor, McNair Scholars Program (for students of disadvantaged backgrounds) Advisor (May to August 2009)

Advisor, California Alliance for Minority Participation in Math, Science & Engineering (June 2001 to June 2002)

Member, Reimagine RTD Advisory Committee, (2020-present)

Technical Advisory Board Member, Colorado Energy Office Hydrogen Roadmap, (2019-2021)

Technical Advisory Board Member, Colorado Energy Office Low Carbon Fuels Standard Feasibility Study (2019-2021)

Joint Appointee, National Renewable Energy Laboratory, Mechanical and Thermal Systems Group (2020-present)

Co-Chair, Strong Plug in Hybrid Electric Vehicle Coalition (2020-present)

Technical Reviewer, Environmental Partners, “Xcel Energy Alamosa to Antonito Transmission Routing Study.” 2023

General Public Outreach Participation: Northern Colorado Clean Cities Coalition (Attended 2011), High School Exploration Days (Attended 2010-2011), Denver Auto Show (Lab Group Attended 2012), Colorado Electric Vehicle Day (Lab Group Attended 2012), Green Energy Summit (Lab Group Attended 2012), Peace in the Park (Lab Group Attended 2012), Bixbo (Lab Group Attended 2012), Colorado Global Climate Conference (2013), Girls Exploring Science Technology Engineering & Math (GESTEM) (Lab Group Attended, 2013, 2014), Ride & Drive at American Society of Mechanical Engineers (Attended 2013), Fort Collins Rotary Club (Attended 2013), Nelsen’s Old Town Car Show (Attended 2013), Fossil Ridge High School (Attended 2013), CSU Powerhouse Energy Campus (Attended 2013), Blevins Middle School (Lab Group Attended 2013), Drive Electric Northern Colorado Events (Attended 2013-2014), EcoCAR2 send off outreach event (2014), College of Engineering Advisory Board Meeting/Luncheon (2014), Denver Auto Show (2014), NREL Professional Outreach (2014), Powerhouse Campus Grand Opening(2014), Fort Collins Earth Day Fair(2014), CSU Earth Week Festival(2014), Greeley High School(2014), Northern Colorado Clean Cities (2014), CSU Engineering Days(2014), Presentation to CSU Board of Governors at Powerhouse Energy Campus(2014), CSU/Siemens Joint Event(2014), Arrow Electronics/CSU Joint Event(2014), PLI-Innovation Presentation (2014), Odyssey Alternative Fuel Day (2014-2018), PLI-Ethics Lecture(2014, 2015), Blevins Middle School Clean Energy Workshop (2014, 2015), National Drive Electric Week (2014), Preston Middle School (2015), Spark! (2015), Timnath STEM Festival (2015), NoCo Clean Cities (2015, 2016), Sheperdson Elementary STEM Night (2015, 2016), Range View High School (2016), NGC CyberSTEM Summer Program (2017,2018), Congressman Polis Listening Session (2018), CSU Energy Club Youth Outreach (2018), Colorado Energy Research Collaboratory 2020 Webinars (2020) Northern Colorado Clean Cities' and Xcel Energy's Partners EV Planning Workshop 4 (2021), North Front Range Metropolitan Planning Organization (2021), Connected & Autonomous Vehicles Energy & Mobility Improvements (Denver Metro Clean Cities, 2021), DRCOG Advanced Mobility Partnership (AMP) Working Group (2021), 21st Century Energy Transition Symposium (2021), She’s in Power (2021), Colorado Department of Public Health and the Environment Pollution Prevention Board (2021), EPRI Electrification Conference, Charlotte, NC (2022), Colorado Environmental Management Society (CEMS) (2022), Power Magazine Conference Denver, CO (2022), Colorado Bar Association (2022), Lockheed Martin Sikorsky Lunch and Learn (2022), DARPA Risers Reviewer (2022), Testimony CARB ACCII (2022), DHS CISA Table Top Exercise (2022).

GRADUATE STUDENTS ADVISED

Primary Advisor, Expected Graduation Date (Current Affiliation, S 2023) *Dissertation/Thesis Title*

1. David Trinko, PhD 2023 (EPRI) TBD
2. Aaron Rabinowitz, PhD 2023 (CSU), TBD
3. Dan Johnston, D.Eng., 2023 (Ball Aerospace)
4. Kyle Blond, D.Eng., 2024 (GTRI)
5. Kent Lambert, D.Eng., 2024 (BlockFrame)
6. Jose Alvarado, PhD., 2024 (USAF)
7. Todd Spierling, PhD., 2024 (Collins Aviation)

8. Harold Kleinwaks, D.Eng., 2024 (Space Development Agency)
9. Sarah Shaw, PhD, 2024, (Aerospace Corporation)
10. Eric Herbert, PhD 2024, (Aerospace Corporation)
11. Fletcher Ouren, MS 2024 (CSU) TBD
12. Alexander Lynch, MS 2024 (CSU) TBD

Graduated

1. Samantha White, MS 2022 (Lightning E Motors) *Physical validation of predictive acceleration control on a parallel hybrid electric vehicle.*
2. Chon Ang Chia, MS 2022 (Keysight Technologies) *Sensing and data fusion to characterize vehicle behavior surrounding autonomous vehicles.*
3. Christopher Roberts, PhD 2022 (NASA Goddard), *Space Communications Responsive to Events Across Missions (SCREAM): An Investigation of Network Solutions for Transient Science Space Systems*
4. Dustin Birch, PhD 2021 (Weber State University) *Development of human factors hazard model for use in systems safety analysis*
5. Trevor Ault, PhD 2021 (Chevron), *Modernizing automation in industrial control/cyber physical systems through the systems engineering lifecycle*
6. Ian Lunsford, PhD 2021 (CACI), *Aircraft survivability modeling, evaluation and optimization for multi-UAV operational scenarios*
7. Gregory Marzolf, PhD 2021 (CSU), *Systems Engineering Analysis and Application to the Emergency Management System*
8. Clinton Knackstedt, MS 2021 (General Motors), *System Identification of GM 8L65 8 Speed Automatic Transmission*
9. Derek Adelmann, MS 2021 (United Launch Alliance), *Post transmission parallel hybrid vehicle design and validation for predictive acceleration event energy management strategies*
10. Paulo Younse, PhD 2021 (NASA JPL) *Comparative analysis of model-based systems engineering and traditional systems engineering approaches for architecting robotics space systems through knowledge categorization automatic information transfer, and automatic knowledge processing measures*
11. Ben McKenney, MS 2021 (Wolf Robotics) *Comparison of design and implementation of hybrid systems in prototype vehicles*
12. Aaron Rabinowitz, MS 2020 (CSU) *Towards Enabling predictive optimal energy management system with real-world considerations*
13. David Trinko, MS 2019 (EPRI) *Dataset Processing and Control Type Classification for Acceleration Events*
14. Gabriel DiDomenico, MS 2019 (General Motors) *In vehicle validation of energy consumption modeling and simulation*
15. Matthew Knopf, MS 2019 (Ball Aerospace), *Comprehensive concept phase system safety analysis for hybrid electric vehicles utilizing automated driving functions*
16. Jennifer Kurtz, PhD 2019 (National Renewable Energy Laboratory), *Innovative Hydrogen Station Operation Strategies to Increase Availability and Decrease Cost*

17. Carlos Quiroz-Arita, PhD 2018 (Sandia National Laboratory), *Sustainability tradeoffs within photoautotrophic cultivation systems: integrating physical and lifecycle modeling for design and optimization.*
18. Bao Nguyen, MS., 2018 (Lockheed Martin) *Low Work Function Filament Cathodes for Electron Beam Additive Manufacturing*
19. Zach Asher, PhD 2018 (Western Michigan University) *Prediction and Sensing Algorithms for HEV fuel economy improvement*
20. David Baker, MS, 2018 (Lightning Systems), *Development of Predictive Energy Management Strategies for Hybrid Electric Vehicles*
21. Charlie Quann, MS, 2017 (Antea Group), *Renewables Firming Using Grid-Scale Battery Storage in a Real-Time Pricing Market*
22. Thomas Decker, MS, 2017 (FactorE) *A Modeling Tool for Household Biogas Burner Flame Port Design*
23. Cody Pickering, MS, 2016 (Purestream Services) *Methane emissions from gathering pipeline networks, distribution systems, agriculture, waste management and natural sources.*
24. Eric Jambor, MS 2016 (Janicki Industries), *Manufacturing and testing of spline geometry using carbon reinforced composite*
25. Spencer Vore, MS 2016 (Booz Allan), *Acquisition and Analysis of Charging and Driving Behavior Data for a Fleet of PHEVs*
26. Christopher Anderson, MS, 2017 (LBNL), *Investigation of indirect (secondary loop) refrigeration systems in commercial food service buildings.*
27. Clay Bell, PhD 2015 (CSU), *State-based engine models for transient applications with a scalable approach to turbocharging*
28. Ray Duthu, PhD 2015 (Quantitative Scientific Solutions) *Financial and environmental impact of new technologies in the energy sector*
29. Zaker Syed, MS 2015 (Clemson University) *A real-time building HVAC model implemented as a tool for decision making in early stages of design*
30. Jake Bucher, MS 2014 (Rivian Automotive, Inc.) *Analyzing the Real World Integration of Fuel Cell Plug-in Hybrid Electric Vehicles and their Effect on Hydrogen Refueling Locations*
31. Mohammad Malakoutirad, MS 2014 (Ford Motor Company) *Design Considerations for an Engine-Integrated Natural Gas Compressor*
32. Shawn Salisbury, MS 2014 (Idaho National Laboratory), *Understanding Fuel Cell Plug-in Hybrid Electric Vehicle Use, Design, and Functionality.*
33. Justin Wagner, MS 2014 (Boeing), *Evaluation of Power Assist Hydraulic and Electric Hybrids for Medium and Heavy Duty Vehicle Applications*
34. Benjamin Geller, MS 2010, PhD 2014 (Toyota Motor Engineering & Manufacturing North America), *Objective Comparison of Hybrid Vehicles through Simulation Optimization*
35. Liaw Batan, PhD 2014 (National Renewable Energy Laboratory), *Life Cycle and Technoeconomic Analysis of Microalgae-based Biofuels*
36. Kiran Kambly, PhD 2014 (Advanced Energy Industries, Inc.), *Real World Energy Use for Conventional and Electrified Transportation*

37. Kristina Armstrong, MS 2013 (Oak Ridge National Laboratory), *Analysis of Lifecycle Assessment of Food/Energy/Waste Systems and Development and Analysis of Microalgae Cultivation/Wastewater Treatment Inclusive System*.
38. Matthew Fox, MS 2013 (Tesla Motors), *Assessment, Design and Control Strategy Development of a Plug-in Fuel Cell Hybrid Electric Vehicle for CSU's EcoCAR2*
39. Jacob Renquist, MS 2013 (General Motors), *Economic and Environmental Analysis of Fuel Cell Powered Materials Handling Equipment*
40. Nicholas Wagner, MS 2012 (Amazon Robotics) *Servo blower control for powered air purifying respirators*
41. Brian Johnston, MS 2012 (Lightning E-Motors), *Assessment of V2G for Department of Defense Applications*.
42. Nicholas Echter, MS 2012 (CZero) *Design of Hydraulic Accumulator Systems to Improve Fuel Economy in Industrial-Vehicle Hydraulic Work Circuits*.
43. Baha Al-Alawi, PhD 2012 (CalStart), *Decision support tools for policy development to support market penetration of plug-in vehicles*
44. Timothy Campbell, MS 2012 (Lightning E-Motors), *Dynamic Modeling and Control of Battery-to-Grid Energy Storage Systems*
45. Casey Quinn, MS 2011 (CSU) *State of Charge Resolved Modeling of Vehicle to Grid Systems*
46. Jason Quinn, PhD 2011 (Colorado State University), *Experimental and theoretical models of the microalgae-to-biofuels process for geographic and climactic optimization of bioreactor design*
47. Markus Lutz, MS 2011 (BMW Munich), *Development of an Electric-drive Powertrain Test Stand and Battery-to-Grid Storage Test Stand*
48. Eric Wood, MS 2011 (National Renewable Energy Laboratory), *Investigation of Battery End-of-Life Conditions for Plug-in Hybrid Electric Vehicles*
49. Barbara Morgan Davis, MS 2010 (Pacific Gas and Electric Company), *Understanding the Effects and Infrastructure Needs of Plug-in Electric Vehicle (PEV) Charging*

Thesis Committee Member

Committee Member for 53 additional M.S., Ph.D. and M.E students.

POST-DOCTORAL FELLOWS

1. Liaw Batan, PhD. 2020-2022, CSU
2. Nawa Baral, PhD. 2017-2018, Lawrence Berkeley National Laboratory
3. Brian Dickman, PhD. 2010-2011, Associate Professor, West Virginia University – Institute of Technology
4. Jason Quinn, PhD. 2011-2012, Associate Professor, Department of Mechanical Engineering, Colorado State University
5. Kenneth Stanton, PhD. 2010-2012, Dean of Academic and Student Affairs, Dr. Kiran C. Patel High School, Institute for Innovation, Tampa, FL
6. Baha Al-Alawi, PhD. 2012, CalStart, Boulder, CO

William de Ojeda, PhD, PE

Darien, IL 60561

EDUCATION**Illinois Institute of Technology** Ph.D. Mechanical and Aerospace Engineering, '96**University of Virginia** M.Sc. Mechanical and Aerospace Engineering, '92**The Cooper Union** B.S. Mechanical Engineering, '90Awarded **Stefano Excellence Award** for Capstone Design**INDUSTRIAL EXPERIENCE****WM International Engineering, Darien****2014-Present****Director of Engineering**

Responsible for development of fuel injection and charge air systems for advanced Diesel, Gasoline, Natural Gas, Propane and DME fuel Powertrains. Work includes design, prototyping, controls and benchmarking. Projects include:

- Fuel System Design and Integration on ARMY Ruggedized Field Generator. Provided fuel system hardware for advanced generator unit, supporting system development and validation.
- Commercialization of 1st DME FUELED GENSET. GENSET integrates a Diesel and DME fuel system that can be selected by user. It features mechanical and electronic fuel injectors, dedicated control unit, and user interface software. GENSET can be purchased with a special instrumentation kit to measure and record combustion and injection pressure, cycle base performance (e.g. indicated and brake efficiencies).
- Design lead of DME fuel supply system. In support of project "Ignition and Combustion Characteristics of Transportation Fuels under Lean Burn Conditions for Advanced Combustion Engines", sponsored by DOE/NSF grant **NSF-CBET-1258720**.
- Development of the combustion system on the E300 Series DELTAHAWK engine. Primary responsibility over the design of fuel injection system and piston geometry. Work encompassed detailed modeling and experimental studies on dedicated bench tests and engine dynamometers. Work led to the launch of a new set of injectors and pumps for Jet Fuel on an advanced engine platform.
- Development of Engine Control Unit, strategy and software coordination for HYUNDAI advanced engine. Engine controller deployed to run baseline Diesel and advanced multi-combustion mode engines. Work is coordinated with the DOE office under program DOE program Project "Co-optimized Mixed-Mode Engine and Fuel Demonstrator for Improved Fuel Economy while Meeting Emission Requirements", Program number DOE-1919-1741.

Navistar, Lisle**1997-2014****Technical lead on the SCR engine deployment (2013-14)**

Lead system integration and execution of air and fuel strategies and OBDII features on new HD product.

Manager, Advanced Combustion and Controls (2005-2012)**Principal Investigator on DOE Supertruck program (2010-2012)**

Responsible for integration of new technologies onto engine and vehicle platform. Vehicle adopted two electrification options ranging from 80 to 300kW-hr. Engine integration included Variable Valve Actuation, new High-Pressure Common Rail, Turbo-compounding and Organic Rankine Cycle, base engine improvements, aftertreatment systems such as DPF, SCR and LNT Supervised staff across multi-disciplinary specialties, multiple engine dynamometer cells, and subcontractors including ANL, Federal

Mogul, and BOSCH. Program sponsored by DOE grant **DE-EE0003303** High Efficiency Engine and Vehicles.

Principal Investigator on Low Temp Comb Demonstrator (2005-2010)

Directed redesign of 6.4L engine to meet 2010 emissions based on low temperature combustion. Scope and major milestones of program included design of injectors, combustion chamber, turbocharger and EGR system, and a new electro-hydraulic variable valve actuation system. Developed prototype ECU to run all engine functions including combustion feedback. Responsibilities included the assembly of a team of engineers in the areas of controls, fuel injection, CAD, combustion, and electro-hydraulics. Supervised subcontractors including LLNL, UC Berkeley, Borg Warner, Siemens, and Ricardo. Program sponsored by DOE grant **DE-FC26-05NT42413** High Engine Efficiency and Clean Combustion Program.

Sr. Product Engineer, Advanced Technologies (2001-2005)

Responsible for dSPACE/Matlab Simulink software and integration into the early Siemen's EDU prototypes. Models focused in air-fuel management strategies on 2007MY V8 engine product and the transition to MAF and TQ control structures. Specific contributions included: coordinated EGR-VNT-BYPASS actuation (patented algorithms and modeling for coordinated control during transients of EGR and two-stage turbocharger units with bypass); fast EGR estimator (developed accurate EGR estimation based on oxygen sensors); developed injection timing compensator for enhanced combustion control over transients.

Engineer, Advanced Technologies (1997-2001)

Responsible for Variable Displacement (inlet throttle) fuel injection pump development: Contributed to design of flow and pressure control valve with simulation and testing on bench and on engine. Worked with valve (INVENSYS) and pump (SHEPPARD) manufacturers to deliver product to the I6 and V8 engine lines.

Design of a direct throttle control to optimize flow losses incurred in the pressure regulator. Implemented design in pump and demonstrated performance improvements in bench. Special control system was developed to apply this to fast transients to match performance response to the fast acting pressure regulator.

Lead design for Variable Valve actuation Program - Navistar's Camless engine. Responsible for extensive design, benchmarking, electronic interface, prototype procurement and engine implementation.

APTEK-Air Force Contract Work, Colorado Springs**1996****Design engineer for Air Force flight control project**

Designed wind tunnel imaging and controls to capture turbulent effects on lift-reduction on aircraft.

AWARDS

Stefano Excellence Capstone Design Award for "A Microcomputer-Interfaced Steam Turbine Test Stand", 1990.

Distinguished Paper-Presentation "Effect of Variable Valve Timing on Combustion Characteristics", SAE 2010.

TEACHING

Lecturer of Graduate Level **Fundamentals of Combustion** at the Illinois Institute of Technology (Fall 2010).

Lecturer of Undergraduate Level **Fluid Dynamics** at the Illinois Institute of Technology (Spring 2017).

SAE instructor C1332 **“Variable Valve Actuation: Design and Performance Impact on Advanced Powertrains”**

Instructor Speaker at the University of Toronto NSERC CREATE **Clean Combustion Engines Summer School**.

PROFESSIONAL AFFILIATIONS AND REGISTRATION

Member of the SAE, ASME

Licensed Professional Engineer from the State of Illinois no. 062-053677

Regular Reviewer on DOE Merit Review, ARPA-E, and NSERC Panels

Designing On-Board Diagnostics for Light and MD Emissions Control Systems, SAE Course Mastered, 2014

PATENTS

US no. 9599042	Start of Injection timing , Raj Kumar, W de Ojeda, James Popp, March 21, 2017
US no. 9322339	Internal Combustion Engine Operating on Different Reactivity Fuels , W de Ojeda, M Zheng, April 26, 2016.
US2015/0113961	Diesel Engine NOx Reduction , William de Ojeda, Ming Zheng, Xiaoye Han, Marko Jeltic, Meiping Wang, April 30, 2015.
US2015/0068490	Multi-fuel engine with variable valve timing , W de Ojeda, I Sagalovich, March 12, 2015.
US2014/0373530	Multi-fuel Engine , W. de Ojeda, Dec15, 2014.
US2014/0358405	Internal Combustion engine Operating on different Reactivity Fuels , W de Ojeda, M Zheng, Dec 4, 2014
US2014/0053811	System and method of controlling combustion in an engine having an in-cylinder pressure sensor , W de Ojeda, Raul Espinosa, 27 Feb 2014.
US2013/0218439	Controlling Variable Valve Actuation System , Raj Kumar, W de Ojeda, James Popp, Daniel Cornelius, 22 Aug 2013
US2011/0079008	Strategy for Control of Recirculated Exhaust Gas to Null Turbocharger Boost Error , 7 April 2011, W de Ojeda, J Popp
US no. 8,069,828	Intake Valve Closing Hydraulic Adjuster , 6 Dec 2011, W de Ojeda, Daniel Cornelius
US no. 7,184,877	Model-Based Controller for Auto-Ignition Optimization in a Diesel Engine , 27 Feb 2007, W de Ojeda
US no. 7,168,396	Variable Compression Ratio Strategy for Improving Combustion Processes in Alternative Combustion Compression Ignition engines , 30 Jan 2007, Bulicz, Gui, de Ojeda
US no. 7,013,212	Air Management Strategy for Autoignition in CI Engine , 14 Mar 2006, W de Ojeda, X Yang
US no. 7,004,123	Unit Trigger Actuator , W de Ojeda, 28 February 2006
US no. 6,786,186	Unit Trigger Actuator , W de Ojeda, 7 September 2004
US no. 6,763,790	Poppet Valve Actuator , J.P. Watson and W de Ojeda, 20 July 2004
US no. 6,681,743	Pressure Control Valve with Flow Recovery , W de Ojeda, 27 Jan. 2004
US no. 6,338,320	Hydraulically-assisted engine valve actuator , W de Ojeda, 15 Jan. 2002
US no. 6,263,842	Hydraulically-assisted engine valve actuator , W de Ojeda, P. Das, 24 July 2001
US no. 6,044,815	Hydraulically-assisted engine valve actuator , W de Ojeda, 4 April 2000

Selected Publications

1. "Development of a High-Pressure Fuel Injection System for use with Propane-DME Mixtures", W de Ojeda, H Wu, 2023-01-0403, WCX SAE 2023.
2. "High Speed Data Acquisition for Real Time Feedback in a Light Duty Engine Combustion-Mode Switching Application", W de Ojeda, H Wu, 2023-01-0732. WCX SAE 2023.
3. "Performance review of the WG-M-DDME-05 Dual Fuel Diesel-DME Stationary Power Generator", International DME Conference, Sacramento, Sept 2018
4. "Study of Heat Release Shaping via Dual-Chamber Piston Bowl Design to Improve Ethanol-Diesel Combustion Performance", Xiaoye Han, Prasad Divekar, Meiping Wang, Ming Zheng, Jimi Tjong, William De Ojeda, 2017-01-0762, SAE 2017, World Congress and Exhibition.
5. "Characteristics of Formaldehyde (CH₂O) Formation in Dimethyl Ether (DME) Spray Combustion using PLIF Imaging", Kahn Cung, Xiuncheng Zhu, Ahmed Addul Moiz, SY Lee, William de Ojeda, 2016-01-0864, SAE 2016 World Congress and Exhibition.
6. "HEUI Injector Modeling and ROI Experiments for High Injection Pressure of Diesel and Dimethyl Ether (DME)", Xiucheng Zhu, Sanjeet Limbu, Khanh Cung, **William de Ojeda**, Seong-Young Lee, 2016-01-0855, SAE 2016 World Congress and Exhibition.
7. "Impact of Fuel Cetane Number on Combustion of a Gasoline-Diesel Dual-Fuel Heavy-Duty Multi-Cylinder Engine", Andrew Ickes, Thomas Wallner, Yu Zhang, **William de Ojeda**, 2014-0101309, SAE 2014 World Congress and Exhibition.
8. "Development of Dual-Fuel Low Temperature Combustion Strategy in a Multi-Cylinder Heavy-Duty Compression Ignition Engine Using Conventional and Alternative Fuels", Yu Zhang, Ilya Sagalovich, **William De Ojeda**, Andrew Ickes, Thomas Wallner, David D. Wickman, 2013-01-2422, SAE 2013 Commercial Vehicle Engineering Congress, Chicago.
9. "Ignition Control of Gasoline-Diesel Dual Fuel Combustion", Xiaoye Han, Kelvin Xie, Ming Zheng, **William de Ojeda**, 2012-01-1972, SAE 2012 Commercial Vehicle Engineering Congress, Chicago.
10. "Engine Technologies for Clean and High Efficiency Heavy Duty Engines", **William de Ojeda**, Raj Kumar, 2012-01-1976, SAE 2012 Commercial Vehicle Engineering Congress, Chicago.
11. "Computational Study of Combustion Optimization in a Heavy-Duty Diesel Engine Using In-Cylinder Blending of Gasoline and Diesel Fuels", Yu Zhang, **William de Ojeda**, David Wickman, 2012-01-1977, SAE 2012 Commercial Vehicle Engineering Congress, Chicago.
12. "A High Efficiency, Dilute Gasoline Engine for the Heavy-Duty Market", Shinhyuk Michael Joo, Terrence Alger, Christopher Chadwell, **William de Ojeda**, Jacob Zuehl, Raphael Gukelberger, 2012-01-1979, SAE 2012 Commercial Vehicle Engineering Congress, Chicago.
13. "Exhaust Hydrocarbon Speciation from a Single-Cylinder Compression Ignition Engine Operating with In-Cylinder Blending of Gasoline and Diesel Fuels", **William De Ojeda**, Yu Zhang, Kelvin Xie, Xiaoye Han, Meiping Wang, Ming Zheng, 2012-01-0683, SAE 2012 World Congress and Exhibition.
14. "The Impact of Fuel Properties on Diesel Low Temperature Combustion", **William de Ojeda**, Tytus Bulicz, Xiaoye Han, Kelvin Xie, and Ming Zheng, Fred Cornforth, 2011-01-0329, SAE 2011 World Congress and Exhibition.
15. "Effect of Variable Valve Timing on Low-Load Diesel Combustion Characteristics", **William de Ojeda**, Dan Cornelius, 2010-01-1124, SAE 2010 World Congress and Exhibition.

16. "Development of a Fuel Injection Strategy for Partially Premixed Compression Ignition Combustion", **William de Ojeda**, Philip Zoldak, Raul Espinosa, Raj Kumar, 2009-01-1527, SAE 2009 World Congress and Exhibition.
17. "Development of a Fuel Injection Strategy for Diesel LTC", **William de Ojeda**, Phil Zoldak, Raul Espinosa, Raj Kumar, 2008-01-0057, SAE 2008 World Congress and Exhibition
18. "Design of a Model Based Controller for Regulation of Autoignition", **William de Ojeda**, IMECE2005-80594, ASME 2005 Congress, November 5-11, Orlando, FL.
19. "An Electronic Controlled Throttle for Torque and Stability Optimization in a Fuel Injection Pump", **William de Ojeda** and Christer Fjellgren, FEDSM2005-77003, ASME Fluids Congress, June 19-23, Houston, TX.
20. "Stability of a Pressure Compensated Circuit for an Inlet Throttled Pump", **William de Ojeda** and Arturo Hernández, FEDSM2005-77086, ASME Fluids Congress, June 19-23, Houston, TX.
21. "The Needle Valve Actuator", **William de Ojeda** and Jorge Fernández, IMECE 2003-43607 Congress, Washington DC.
22. "A Microcomputer-Interfaced Steam Turbine Test Stand for an Undergraduate Thermo/Fluids Laboratory", Joel Hollenberg and **William de Ojeda**, 1990 ASEE Annual Conference, Toronto, Canada.

Journal Publications

1. "Impact of Cetane Number on Combustion of a Gasoline-Diesel Dual-Fuel Heavy-Duty Multi-Cylinder Engine," Ickes, A., Wallner, T., Zhang, Y., and **de Ojeda, W.**, *SAE Int. J. Engines* 7(2): 2014.
2. "Development of Dual-Fuel Low Temperature Combustion Strategy in a Multi-Cylinder Heavy-Duty Compression Ignition Engine Using Conventional and Alternative Fuels," Zhang, Y., Sagalovich, I., **de Ojeda, W.**, Ickes, A. et al., *SAE Int. J. Engines* 6(3): 2013
3. "Emission and Ignition Control for a Gasoline Diesel Dual Fuel Engine", Submitted to the Journal of Energy Research, 2013, X Han, K Xie, W de Ojeda, M Zheng
4. "Engine Technologies for Clean and High Efficiency Heavy Duty Engines", **W de Ojeda**, R Kumar, *SAE Int. J. Engines* 5(4) 1759-1767: 2012
5. "A High Efficiency, Dilute Gasoline Engine for the Heavy-Duty Market", Shinhyuk Michael Joo, Terrence Alger, Christopher Chadwell, William de Ojeda, Jacob Zuehl, Raphael Gukelberger, 2012-01-1979, *SAE Int. J. Engines* 5 (4) 1768-1789: 2012
6. "The Impact of Fuel Properties on Diesel Low Temperature Combustion", **William de Ojeda**, Tytus Bulicz, Xiaoye Han, Kelvin Xie, and Ming Zheng, Fred Cornforth, 2011-01-0329, *SAE Int. J. Engines* June 2011 4:188-201
7. "Development of a Fuel Injection Strategy for Partially Premixed Compression Ignition Combustion", **William de Ojeda**, Philip Zoldak, Raul Espinosa, Raj Kumar, *SAE Int. J. Engines* October 2009 2:1473-1488.
8. "Hydraulic Flow Compensator for Fast Switch Device", William de Ojeda and Francisco Ruiz, *ASME Journal of Dynamics, Systems, Measurements and Controls*, Vol. 125, pp. 509–514, September 2003

Conferences and Guest Speaker Events

1. "Development of a High-Pressure Fuel Injection System for use with Propane-DME Mixtures", W de Ojeda, H Wu, 2023-01-0732, WCX SAE 2023.

2. "High Speed Data Acquisition for Real Time Feedback in a Light Duty Engine Combustion-Mode Switching Application", W de Ojeda, H Wu, 2023-01-0732. WCX SAE 2023.
3. "Live Demonstration of the WG-M-DDME-05 Generator", FORD POWERTRAIN WORKSHOP. Windsor, ON, Canada, 5 December 2019.
4. "Performance review of the WG-M-DDME-05 Dual Fuel Diesel-DME Stationary Power Generator", **8th International DME Conference**, Sacramento, 10-12 Sept 2018
5. "Fuel System Components Enabling DME Applications in Power Generation and Transportation: Commercialization of DME products", **7th International DME Conference**, Houston, 14-16 Sept 2016
6. NSF/DOE Partnership on Advanced Engine Combustion: DME Multi-hole Spray Combustion and Engine Performance, Seong-Young Lee and William de Ojeda, **2016 AEC Program Review Meeting, Sandia National Labs.**
7. "Development of a High Pressure Fuel Injection System and Application to Engine", **9th Asian DME Conference, Wuzhen, China, October 2015.**
8. "High-pressure Oil Intensified DME Fuel Injection System Development for Engine-Conditions Spray Combustion", **6th International DME Conference**, San Diego, 7-9 October 2014
9. "Critical Research Needs Relevant to Field of Heavy-Duty Engine Combustion", **Advanced Engine Concepts MOU meeting at the SANDIA CRF**, February 2-7, 2013
10. "Development and Demonstration of a Fuel-Efficient HD Engine (Dept of Energy Supertruck Program)", **DOE DEER CONFERENCE**, October 16, 2012, Dearborn, Michigan.
11. "DOE Supertruck Program: High Efficiency Engine Technologies with Emphasis on Heat Transfer Systems and Components", **NARSA Heavy Duty Heating and Cooling Conference**, Ann Arbor, MI, Sep 20-22, 2012.
12. "IC Engine System Technologies for High Efficiency Heavy Duty Vehicles" Guest Speaker at **SAE Heavy Duty Vehicle Symposium**, Troy, Michigan, 30 Nov 2011.
13. "Development and Demonstration of a Fuel-Efficient HD Engine (Dept of Energy Supertruck Program)", **DOE DEER CONFERENCE**, October 3, 2011, Detroit, Michigan.
14. "Impact of Variable Valve Timing on Low Temperature Combustion", **DOE DEER CONFERENCE**, September 27-30, 2010, Detroit, Michigan
15. "Low Temperature Combustion Demonstrator for High Efficiency Clean Combustion", **DOE DEER CONFERENCE**, Dearborn, Michigan, August 3-6, 2009
16. "Low Temperature Combustion Demonstrator for High Efficiency Clean Combustion", **DOE DEER CONFERENCE**, 26 Feb 2008
17. "Development of a Multi-Cylinder Diesel Engine for HCCI Operation", **Homogeneous Charge Compression Ignition Symposium**, Sep 24-26 2006, San Ramon, California
18. "Performance of an Inlet Throttle Diesel Fuel Injection Pump", **SICFP Congress**, 2005, June 1-3, Linköping, Sweden.

STATHIS (EFSTATHIOS E.) MICHAELIDES

Professor and W. A. Tex Moncrief Chair of Engineering
Department of Engineering
Texas Christian University
Fort Worth TX 76129, USA

ADVANCED EDUCATION:

Ph.D., Engineering Science, Brown University, 1980.
M.S., Engineering Science, Brown University, 1979.
B.A.(honors) Engineering Science and Economics, Oxford University, England, 1977.
MBA (unfinished, 27 credits) University of Delaware, 1982-86.

PROFESSIONAL EXPERIENCE:

A. Permanent positions

2011-present, Professor and W. A. Tex Moncrief Chair of Engineering, Texas Christian University, Fort Worth.

2021-present, Professor, TCU-UNTHSC School of Medicine, Dept. of Medical Education.

2007- 2011 Professor and Chair, Mechanical Engineering. Also, Robert F. McDermott Chair in Engineering, University of Texas at San Antonio (UTSA).

2009-2011 Founding director of the NSF Center for Simulation, Visualization and Real-Time Computing (SiViRT) UTSA.

2006-2007 Professor and Founding Chair, Department of Mechanical and Energy Engineering, University of North Texas.

2002-2007, Director, Southcentral Research Center (SCRC) of the National Institute for Global Environmental Change (NIGEC) at Tulane University.

1992-2003 Associate Dean for Graduate Studies and Research, School of Engineering, Tulane University.

1990-1992, Professor and Head, Department of Mechanical Engineering, Tulane University.

1990-2006 Professor, Mechanical Engineering, Tulane University. The Department of Mechanical Engineering at Tulane was eliminated following the hurricane Katrina and the reorganization of the University.

1985-1990 Associate Professor, Mechanical Engineering, Univ. of Delaware.

November 1985- January 1987, Acting Chairman, Mechanical Engineering, Univ. of Delaware.

1980-1985 Assistant Professor, Mechanical and Aerospace Engineering, Univ. of Delaware.

1977 - 1980 Research Assistant, Brown University.

1978 - 1980 Supplementary Teaching Assistant, Brown University.

B. Short-term and sabbatical appointments:

September 2021-present, Professor of Medical Education, TCU School of Medicine.

September-December 2005, Courtesy professorial appointment, University of Louisville, KY.

June 2003, Lecturer, von Karman Institute for Fluid Dynamics, Brussels, Belgium.

July-August 2002, Visiting Professor at the Ecole Superior de Physique et Chimie Industrielles, Paris, France.

September-December 1997, Visiting Professor, Aristoteleion University, Thessaloniki, Greece.

July-August 1997, Visiting Professor, Université Claude Bernard de Lyon, France.

June 1991 and August 1998, Visiting Researcher at the European Atomic Energy Center, Ispra, Italy.

July-August 1995, Chercheur du Centre National de la Recherche Scientifique (CNRS), Paris, France.

June-July 1994, Chercheur du Centre National de la Recherche Scientifique (CNRS), Paris, France.

September 1989 - January 1990, Visiting Professor at the Escuela Tecnica Superior de los Ingenieros Industriales, Madrid, Spain.

September 1989 - January 1990, Visiting Professor at the Department of Applied Mathematics, Complutenses University, Madrid, Spain.

September 1989 - December 1989, Director – “Semester Program Abroad, Madrid”, University of Delaware.

July-August 1989, Chercheur Associé du Centre National de la Recherche Scientifique (CNRS), Paris, France.

January 1987 - July 1987, Chercheur Associé du Centre National de la Recherche Scientifique (CNRS), Paris, France.

Summers 1975, 1976 Esso Petroleum Co., (Exxon) Thessaloniki, Greece.

HONORS AND AWARDS:

American Society of Mechanical Engineers (ASME) Edwin F. Church Medal, 2021, “...for eminent service in increasing the value, importance and attractiveness of mechanical engineering education.”

American Society of Mechanical Engineers (ASME) 90th Anniversary of the Fluids Engineering Division Medal, 2016.

American Society of Mechanical Engineers (ASME) Fluids Engineering Award, 2014.

Fellow of the Heat Transfer Division, ASME, 2011.

W. A. (Tex) Moncrief Chair of Engineering, Texas Christian University, 2011.

Robert F. McDermott Distinguished Chair in Engineering, UTSA, 2009-2011.

ASME Distinguished Service Award, 2007.

ASME Distinguished Service Award as FED chair, 2006.

ASME Fellow, 2004.

ASME/pi-tau-sigma, Excellence in Teaching Award, Tulane University, 2004.

Lecturer at the von Karman Institute for Fluid Dynamics, Brussels, Belgium, 2003.

ASME Distinguished Lecturer, 2003

Outstanding Researcher Award, Tulane University, 2003.

Fellowship of the French Ministry of Research and Technology (July-August 2002) “...for outstanding researchers of international recognition.”

Freeman Scholar Award, ASME, 2002.

ASME/pi-tau-sigma, Excellence in Teaching Award, Tulane University, 2001.

Leo S. Weil Endowed Professorship, Tulane University, 1998-2007.

Senior Fulbright Fellow, Fall 1997.

Lee H. Johnson, Excellence in Teaching Award,” Society of Tulane Engineers, 1995.

Fellowship of the French Ministry of Research and Technology (June-July 1995) "...for outstanding researchers of international recognition."

American Society for Engineering Education (ASEE), Centennial Award for Exceptional Contributions to the Society and the Profession of Engineering, 1993.

ASME, Certificate of Appreciation for Services to the Society, 1993.

ASEE Centennial Award, 1993.

ASME/pi-tau-sigma, Excellence in Teaching Award, Tulane University, 1991.

Fellowship of the French Ministry of Research and Technology (July-August 1989) "...for outstanding researchers of international recognition."

Fellowship of the French Ministry of Research and Technology (January-June 1987) "...for outstanding researchers of international recognition."

M.A. Degree (honoris causa) Oxford University, England 1983.

Casberg Scholar, St. John's College, Oxford University, England, 1975-77

Schillizzi Scholar, St. John's College Oxford, 1973-77.

Listed in Who's Who in the world, Who's Who in America, Who's Who in American Men and Women in Science, Who's Who's in Engineering, Who's Who among Greek-Americans.

EDITORIAL ACTIVITIES:

Series Editor, CRC Press, Series in Mechanical and Aerospace Engineering, 2016- present.

Senior Editor, *Multiphase Flow Handbook*, 2017.

Editor: *Journal of Non-Equilibrium Thermodynamics*, 2009 –present.

Member of the Editorial Board: *Energies* 2018-present.

Member of the Editorial Board: *Powders*, 2021-present.

Member of the Editorial Board: *Highlights of Sustainability*, 2021-present.

Member of the Editorial Board: *Journal of Non-Equilibrium Thermodynamics*, 1997-2008.

Member of Editorial Board *AIMS Energy*, 2021-present.

Member of the Editorial Board: *Clean Energy and Sustainability*, 2022-present.

Associate Editor: *International Journal of Exergy*, 2003-2013.

Member of the Honorary Editorial Board: *Archives of Thermodynamics*, 1997-present.

Associate Editor: *Far East Journal of Applied Mathematics*, 2004-2012.

Guest editor *Journal of Fluids Engineering*, Special Issue: In Memoriam of Professor Clayton T. Crowe, volume 138, Issue 4, 2016.

Guest editor: *Powder Technology-An International Journal*, two special issues on selected papers from the 4th International Conference of Multiphase Flows, volume 125, issues 2-3 pp. 103-317.

Guest editor (with N. Thomas and Y. Matsumoto): *Experimental Fluid and Thermal Science*, special issue on selected papers from the 4th International Conference of Multiphase Flows, volume 26, pp. 593-869.

Guest editor: *Intern. Journal of Multiphase Flow*, papers from the 4th International Conference of Multiphase Flows published in two special issues, vol. 28 pp. 1823-2016.

Associate Technical Editor: ASME, *Journal of Fluids Engineering* (1988-94).

Associate Editor: *International Journal of Energy Systems* (1985-93).

OTHER PROFESSIONAL ACTIVITIES:

ASTFE, Honors and Awards Committee, 2018-2023.

ASTFE, Fellow Review Council, 2018-2023.

Chair, ASEE-GSW section, 2016-2017.

Program Chair, ASEE-GSW section, Annual Conference, 2016.

Vice-Chair, ASEE-GSW section, 2015-2016.

Member of the International Scientific Committee, International Conference on Multiphase Flow, ICMF-2016 (Florence, Italy).

ASME Freeman Scholar Awards Committee, ASME, (term 2013-2019, chair 2015-2017).

Chair of the Organizing Committee, 11th, 12th, 13th, 14th, 15th and 16th Intern. Gas-Solids Symposium, which takes place biennially within the ASME-FED annual meeting, 2005-2017.

Member of the International Scientific Committee, International Conference on Multiphase Flow, ICMF-2013 (Jeju, Korea).

Member of the International Organizing Committee, International Conference on Multiphase Flow, ICMF-2010 (Tampa, Florida).

Chair, Freeman Scholar Awards Committee, ASME, (2009-2011).

Member of the Organizing Committee, APS-DFD Annual Meeting – 2008 (in charge of the “Gallery of Fluids Motion”).

Chair of the Faculty Organizing Committee, *North American Energy Summit*, San Antonio, 2008.

Senior Advisory Board, American Society of Mechanical Engineers-Fluids Engineering Division, 2008-2018.

Past Chair of the Executive Committee, American Society of Mechanical Engineers-Fluids Engineering Division, 2006-2007.

ASME Freeman Scholar Awards Committee, ASME, (term 2007-2013, chair 2009-2011).

Chair of the Executive Committee, American Society of Mechanical Engineers-Fluids Engineering Division, (term: April 2005-November 2006).

Member of the Executive Committee, American Society of Mechanical Engineers-Fluids Engineering Division, (term 2002-2007).

Vice-Chair (elected) of the International Organizing Committee of the 5th International Conference of Multiphase Flows, Yokohama, Japan-2004.

Chair of the International Organizing Committee and General Conference Chair, 4th International Conference of Multiphase Flows – New Orleans, LA, 2001.

Corresponding Member of the International Information Center for Multiphase Flow (one of four USA members), 1999-present.

Elected to the Board of Governors for the International Conference of Multiphase Flow in June 1998 (1988-2004 as one of four delegates from North and South America)

Newcomb Fellow, Tulane University 1998-2006.

Founder and Director, Program of International Student Exchanges with University Claude Bernard of Lyon, 1994-present.

Vice Chairman (1994-96) and Chairman (1996-98) of the ASME Multiphase Flow Technical Committee.

Member of ASME-FED Honors Committee (1999-2002).

Member of Louisiana Committee on Rapid Modes of Transportation, 1999-2001 (appointed by the Governor of the State).

Co-Chairman, 32nd Society of Engineering Science Technical Meeting, November 1995.

Chairman, 1992, ASEE Southern Region, annual meeting.

Vice-President (1991-92) and President (1992-93), ASEE, Southern Region.

Registered Professional Engineering in Louisiana since 1991 and Texas since 2008.

One Patent, U.S. # 5,030,390

Chair or member of organizing committee of forty five ASME Symposia, four APS meetings, and six A.I.Ch.E. Symposia in the area of Multiphase Flow. Of these, the ASME Symposium on Gas-Particle Flows has been organized biennially since 1986 and attracts more than 200 attendees.

Participated in several NSF, DOE and DOD proposal review panels.

LANGUAGES:

Fluent English and Greek; conversational and reading knowledge of Spanish and French; reading knowledge of German, Italian and ancient Greek.

RESEARCH INTERESTS:

Multiphase Flow, Particular and Bubbly Flows, Geothermal Energy, Advanced Energy Systems, Energy Conversion and Conservation, Environmental Fluid Dynamics, Sediment Flow, Separation Processes, Nuclear Waste Materials Handling.

PROFESSIONAL ASSOCIATIONS:

- American Society of Mechanical Engineers (ASME).
- American Society of Thermal and Fluids Engineers (ASTFE).
- American Physical Society (APS).
- American Society of Heat Refrigeration and Air-conditioning Engineers (ASHRAE).
- American Society of Engineering Education (ASEE).
- Society of Hispanic Professional Engineers (SHPE; founding advisor of the UNT student chapter; chapter advisor at UTSA).
- Greek Technical Chamber.
- Oxford Union Society.
- Louisiana Society of Professional Engineers.
- Texas Society of Professional Engineers.
- Sigma Xi.
- Tau Beta Pi.
- Beta Gamma Sigma.

UNIVERSITY SERVICE (only major committee assignments listed):**A. At TCU**

Ad hoc Committee for the enhancement of graduate programs 2012.
University Senator 2011-2017.
College of Science and Engineering Advisory Committee, 2012-2017 (chair 2013, 2015 and 2017).
University Senate: Chair Elect, 2014, Chair 2015, Past Chair, 2016.
University Budget Advisory Committee, chair, 2014-2015.
Ad-hoc MD School Management Committee, 2015-16.
Ad-hoc MD School Budget Committee, 2015-16.
Ad-hoc Committee on MD-School Personnel, chair 2015-16.
University Compensation Advisory Committee 2014-2018 (co-chair 2017).
Committee on Sustainability, 2016-present.
University Budget Advisory Committee, chair, 2020-present.

B. At the University of Texas at San Antonio:

University Leadership Council (2009-2010 and 2010-2011).
College of Engineering Executive Committee (2007-2011).
Chairs Council (2007-2011).
Chairs compensation ad hoc committee (2008-2009).
Chair, Faculty Organizing Committee, *North American Energy Summit*, 2007-08.
College of Engineering Committee on Faculty Work-Load Management (2007-2008).

C. At the University of North Texas:

College of Engineering Executive Committee (2006-2007).
Chairs Council (as the engineering representative, 2006-2007).
Chairs compensation committee (2006-2007).
Provosts' ad hoc committee on graduate student recruitment and retention (2006-2007).
Search committee for Associate Dean for External Affairs (2006).
Search Committee for chair of ETEC Department (2006).

D. At Tulane University

School of Engineering Promotion and Tenure Committee (chair 2004-2006).
School of Engineering, Executive Committee, 1990-2003.
School of Engineering, Research and Graduate Studies Committee, (chair) 1992-2003.
Engineering-Business Liaison Committee (co-chair) 2000-2005.
Search Committee for the Dean of the School of Public Health and Tropical Medicine (2002).
School of Engineering Research Council (chair) 1998-2000.
School of Engineering, Grievance Committee, 1990-2003.
Tulane-Xavier Center for Bioenvironmental Research (member of faculty advisory board) 1998-2006.
School of Engineering, International Studies Committee, (chair) 1996-2001.
University Committee on Research (member) 1997-2000.
University Committee on Short-term Overseas Programs (chair) 1992-96.
University Provost Search Committee 1996 and 2000.
University ad hoc Committee on the re-training of Military Personnel (chair) 1993-94.
University ad hoc Committee on Materials Science and Engineering (chair) 1992-94.
University Subcommittee on Athletics Admissions 1994-95.
University Committee on Educational Policy, 1990-1993.

E. At the University of Delaware

Committee on Committees 1983-1985 (chair 1984-1985).

Chair, search committee for the faculty searches in 1983, 1986, 1988 and 1989.

Dean's Advisory Committee, 1985-87.

Committee on Programs Abroad, 1987-1989.

PUBLICATIONS

A. Books

1. Michaelides, E. E., *Particles, Bubbles and Drops – Their Motion, Heat and Mass Transfer*, World Scientific Publishers, New Jersey, 2006.
2. Michaelides, E. E., *Alternative Energy Sources*, Springer-Verlag, Heidelberg, 2012.
3. Michaelides, E. E., *Heat and Mass Transfer in Particulate Suspensions*, Springer, New York, 2013.
4. Michaelides, E. E., *Nanofluidics: Thermodynamic and Transport Properties*, Springer, New York, 2014.
5. Michaelides, E. E., Crowe, C. T., and Schwarzkopf, J. D. (editors), *Multiphase Flow Handbook, 2nd Edition*, CRC Press, Boca Raton, 2017.
6. Michaelides, E. E., *Energy, the Environment and Sustainability*, CRC Press, Boca Raton, 2018.
7. Michaelides, E. E. *Exergy and the Conversion of Energy*, Cambridge University Press, Cambridge, 2021.

B. Articles in Refereed Journals or Books

1. Michaelides, E. E., "Non-Conventional Energy Sources for Greece", *Economicos* (In Greek), May 1977 (special edition on the energy problems).
2. Michaelides, E. E., "Priorities in Energy Conservation", *Economicos* (In Greek), January 1979.
3. Michaelides, E. E., "Separation of Non-condensables in Geothermal Installations by Means of Primary Flashing", *Trans. Geothermal Resources Council*, 4, p. 515, 1980.
4. Michaelides, E. E., "The Energy Crisis", *Economicos* (In Greek), January 1981.
5. Michaelides, E. E., "Thermodynamic Properties of Geothermal Fluids", *Trans. Geoth. Resources Council*, 5, p. 361, 1981.
6. Michaelides, E. E., "The Effect of Magnus Force on the Deposition of the Geothermal Wells", *J. of Energy Resources Technology*, 103, p. 352, 1981.
7. Michaelides, E. E., "Some Remarks on the Energy Problem", in *"Energy Alternatives for Greece"*, (ed. K. Stefanakos), p. 239, Krikos, N.Y., 1981.
8. Michaelides, E. E., "The Rejection of Waste Heat in Geothermal Power Plants", *Geothermal Energy*, 10, 2, p. 14, 1982.
9. Michaelides, E. E., and F. Fakhre-Shafaie, "A New Binary-Flashing Plant for the Production of Electricity", *Trans. Geothermal Res. Council*, 5, p. 369, 1982.
10. Michaelides, E. E., "The Influence of Noncondensable Gases on the Net Work Produced by the Geothermal Steam Power Plants", *Geothermics*, 11, 3, p. 163, 1982.
11. Michaelides, E. E., "A Novel Approach for the Determination of Critical Two- Phase Flow", in *"The Advances in Two-Phase Flows and Heat Transfer"*, (ed. S. Kakac and M. Ishii) Martinus, Nijhoff, Boston, p. 465, 1983.

12. Michaelides, E. E., "Entropy Production in Geothermal Power Plants", in *"Alternative Energy Sources III"*, ed. T.N. Veziroglu, vol. 4, p. 487, Hemisphere, 1983.
13. Michaelides, E. E., and Parikh, S., "The Prediction of Critical Mass Flux by the Use of Fanno Lines", *Nuclear Engin. and Design*, 75, p. 117, 1983.
14. Zissis, K. L. and Michaelides, E. E., "The Velocity of Sound in Two-Phase Mixtures," *Int. J. of Heat and Fluid Flow*, 4, p. 79, 1983.
15. Michaelides, E. E., "The Utilization Potential of Geothermal Energy in Developing Countries", *Renewable Sources of Energy*, 1, #3, p. 181, 1983.
16. Michaelides, E. E., "A Model for the Flow of Solid Particles in Gases," *Int. J. of Multiphase Flow*, p. 61, 10, 1984.
17. Michaelides, E. E., "The Second Law of Thermodynamics As Applied to the Energy Conversion Processes", *Int. J. of Energy Research*, 8, 3 p. 241, 1984.
18. Michaelides, E. E., and L. K. Farmer, "The Application of Geothermal Energy in the Delaware Food Industry" in *Alternative Energy Sources IV*, ed. T.N. Veziroglu, 4, p. 373, Ann Arbor, 1984.
19. Michaelides, E. E., and Martin, J. "A Critical Review of Frictional Pressure Drop Correlation for Gas-Solid Flows" in *Multiphase Flow and Heat Transfer III*, eds Veziroglu and Bergles, Elsevier, Amsterdam, 1984.
20. Scott, G. J. and Michaelides, E. E., "A Binary-Flashing Geothermal Power Plant," *Energy, The International Journal*, 9, p. 323, 1984.
21. Michaelides, E. E., "Exergy and the Conversion of Energy", *Int. J. of Mech. Eng. Educ.*, 12, p. 65, 1984.
22. Farmer, L. K. and Michaelides, E. E., "A Model for Slurry Flows Based on the Equations of Turbulence," *J. of Pipelines*, 4, p. 185, 1984. Also in "Liquid- Solid Flows and Erosion Wear in Industrial Equipment", ed. M. C. Roco, FED-13, ASME, 1984.
23. Michaelides, E. E., "A Model for the Prediction of Time-Average Quantities in Fluid- Solid Mixtures", *Archives of Mechanics*, 36, p. 393, 1984.
24. Michaelides, E. E., and Fakhre-Shafaie, F., "A Numerical Study of Geothermal Well Flow with Salts and Non-Condensables Present," *ASME, J. of Energy Resources Technology*, 108, p. 140, 1986.
25. Chang, Y., Michaelides, E. E., and Bosworth, R. J., "Heat Transfer Coefficients and Friction Factors for Banks of Flexible Vibrating Tubes in Cross-Flow" in *Heat Transfer, 1986* 6, p. 2757, 1986.
26. Michaelides, E. E., "Heat Transfer in Particulate Flows" *Intern. J. of Heat and Mass Transfer*, 29, p. 256, 1986.
27. Michaelides, E. E., and Lai, F. C., "Pressure Loss Through Return Bends in Air-Solid Flows," *Int. Journal of Multiphase Flows*, 13, p. 269, 1987.
28. Michaelides, E. E. and Roy, I., "An Evaluation of Several Correlations Used For the Prediction of Pressure Drop in Particulate Flows," *Int. Journal of Multiphase Flows*, 13, p. 433, 1987.
29. Michaelides, E. E., "Motion of Particles in Gases: Average Velocity and Pressure Loss", *J. Fluids Engineering*, 109, p. 172, 1987.
30. Westman, M.A., Michaelides, E. E., and Thompson, F.A., "Pressure Losses Due to Bends in Pneumatic Conveying," *J. of Pipelines*, 7, p. 15, 1987.

31. Michaelides, E. E., and Lasek, A. "Fluid-Solids Flow with Thermal and Hydrodynamic Non-Equilibrium," *Int. J. Heat and Mass Transfer*, 30, p. 2263, 1987.
32. Michaelides, E. E., "On the Drag Coefficient and the Correct Integration of the Equation of Motion of Particles in Gases", *J. Fluids Engin.* 110, p. 339, 1988.
33. Schwartz, L.W. and Michaelides, E. E., "Gravity Flow of a Viscous Liquid down a Slope with Injection," *Physics of Fluids*, vol. 31, p. 2739, 1988.
34. Michaelides, E. E. and Roy, I., "An Evaluation of Several Correlations used for the Prediction of Pressure Drop in Particulate Flows", *J. of Powder and Bulk Solids Techn.*, 12, pp. 15-20, 1988.
35. Arefmanesh, A. and Michaelides, E. E., "Pressure Changes at a Sudden Expansion in Gas-Solid Flows," *Particulate Science and Technology*, 6, pp. 333-341, 1988.
36. Michaelides, E. E., and Hearn, J.R., "Particle Flow Simulation and Efficiency of Electrostatic Precipitators," *Int. J. of Energy Systems*, 9, p. 162, 1989.
37. Michaelides, E. E., "The Role of Vapor in Volcanic Activity" *Int. J. of Volcanology and Geothermal Research*, vol. 37, p. 251, 1989.
38. Kumar, S, Nikitopoulos, D. E. and Michaelides, E. E., "The Effect of Bubbles on the Turbulence of a Bubbly Jet," *Experiments in Fluids*, vol. 7, p. 487, 1989.
39. Michaelides, E. E., "Entropy, Order and Disorder" *Int. J. of Mech. Eng. Education*, vol. 17, p. 157, 1989.
40. Chang, Y., Beris, A. N. and Michaelides, E. E., "A Numerical Study of Heat and Momentum Transfer for Tube Bundles in Cross-Flow," *Int. J. for Numerical Methods in Fluids*, 7, p. 543, 1989.
41. Chang, Y., Beris, A. N. and Michaelides, E. E., "A Numerical Study of Heat and Momentum Transfer for Flexible Tube Bundles in Cross Flow," *Int. J. of Heat and Mass Transfer*, 32, p. 2027, 1989.
42. Arefmanesh, A., Advani S.G. and Michaelides, E. E., "A Numerical Study of Bubble Growth during Low Pressure Structural Foam Molding Process, *Polymer and Engineering Science*, 30, pp. 1330, 1990.
43. Michaelides, E. E., and Lasek, A., "Particulate Flow with Sublimation or Evaporation and with Thermal and Hydrodynamic Non-Equilibrium," *Int. J. of Heat and Mass Transfer*, 34, p. 601, 1991.
44. Scrivens, B. G., Thompson, F.M. and Michaelides, E. E., "Study of a Port Design for Silo Blenders," *J. of Engineering for Industry*, 113, p. 343, 1991.
45. Michaelides, E. E., Liang, L., and Lasek, A., "The Effect of Turbulence on the Phase Change of Droplets and Particles under Non-equilibrium Conditions" *Int. J. of Heat and Mass Transfer*, 34, pp. 601-609, 1992.
46. Arefmanesh, A., Advani S.G. and Michaelides, E. E., "An Accurate Numerical Solution for Mass Diffusion Induced Bubble Growth in Viscous Liquids Containing Limited Dissolved Gas", *Int. J. of Heat and Mass Transfer*, 35, p. 1711, 1992.
47. Michaelides, E. E., "A Novel Way of computing the Basset Term in Unsteady Multiphase Flow Computations", *Phys. of Fluids*, A4, p. 1579, 1992.
48. Cassidy, D. N, Scrivens, B.G, and Michaelides, E. E., "An Experimental Study on the Blending of Granular Materials", *Powder Technology*, 72, 1992.

49. Yuan, Y. and Michaelides, E. E., "Turbulence Modulation in Particulate Flows - A Theoretical Approach", *Int. J. Of Multiphase Flows*, 18, p. 779, 1992.
50. Li. L. and Michaelides, E. E., "The Magnitude of Basset Forces in unsteady Multiphase Flow Computations," *J. Fluids Engineering*, 114, p. 352, 1992.
51. Ryder, J. K. and Michaelides, E. E., "The Influence of Seasonal and Daily Temperature Fluctuations on the Work Produced by Geothermal Power Plants," *Int. J. of Energy Systems*, 12, pp. 68-73, 1992.
52. Yuan, Z. and Michaelides, E. E., "Binary-Flashing Geothermal Power Plants," *J. of Energy Resources Techn.*, vol. 115, pp. 232-237, 1993.
53. Michaelides, E. E., "Measurement of the Latent Heat of Vaporization of a Liquid," in *Experiments in Heat Transfer and Thermodynamics*, ed. R.A. Granger, Cambridge Univ. Press, 1994.
54. Vojir D. J. and Michaelides, E. E., "Effect of the History Term on the Motion of Rigid Spheres in a Viscous Fluid," *Int. J. Multiphase Flows*, vol. 20, pp. 547-556, 1994.
55. Michaelides, E. E., and Feng, Z.G., "Heat Transfer from a Sphere in a Non-Uniform Flow and Temperature Field," *Int. J. Heat and Mass Transfer*, vol. 37, p. 2069, 1994.
56. Nikitopoulos, D.E. and Michaelides, E. E., "A Phenomenological Model for dispersed Bubbly Flow in Pipes," *A.I.Ch.E. Journal*, vol. 41, p. 12, 1995.
57. Michaelides, E. E., and Feng, Z.G. "The Equation of Motion of a Small Viscous Sphere in an Unsteady Flow with Interface Slip," *Int. J. Multiphase Flows*, vol. 21, p. 315, 1995.
58. Feng, Z.G and Michaelides, E. E., "The Symbolic Operator Representation applied to the Derivation of Solutions of Unsteady Heat Diffusion Problems," *Intern. Communications in Heat and Mass Transfer*, vol. 22, p. 859, 1995.
59. Michaelides, E. E. and Feng, Z.G., "Unsteady Heat Transfer from a Sphere at Small Peclet Numbers," *J. of Fluids Engin.*, vol. 118, p. 96, 1996.
60. Xu, Q. and Michaelides, E. E., "A Numerical study of the Flow over Ellipsoidal Objects inside a cylindrical Tube," *Int. J. of Numerical Methods in Fluids*, vol. 22, p. 1075, 1996.
61. Feng, Z.G. Michaelides, E. E., and Scibilia, M.-F. "The Energy Equation of a Sphere in an Unsteady and Non-Uniform Temperature Field," *Revue Generale de Thermique*, vol. 35, p. 5, 1996.
62. Seffal, R. and Michaelides, E. E., "Similarity Solutions for a Turbulent Round Jet," *J. Fluids Engineering*, vol. 118, p. 618, 1996.
63. Michaelides, E. E. and Feng, Z.-G., "Analogies between the Transient Momentum and Energy Equations of Particles," *Progr. in Energy and Combustion Science*, vol. 22, p. 147, 1996.
64. Feng, Z.G. and Michaelides, E. E., "The Use of Modified Green's Functions in Unsteady Heat Transfer," *Int. J. Heat Mass Transfer*, vol., 40, p. 2997, 1997.
65. Feng, Z.G. and Michaelides, E. E., "Unsteady Heat and Mass Transfer from a Spheroid," *A.I.Ch.E. Journal*, vol. 43, p.609, 1997.
66. Bilicki, Z. and Michaelides, E. E., "Thermodynamic Non-equilibrium in Liquid-Vapor Flows," *J. of Non-Equilibrium Thermodynamics*, vol. 22, p. 99, 1997.
67. Din X.Z. and Michaelides, E. E., "Calculation Of Long-Range Interactions In Molecular Dynamics And Monte Carlo Simulations," *J. Physical Chemistry A*, vol. 101, p. 4322,1997.
68. Michaelides, E. E., "Review-The transient Equation of Motion for Particles, Bubbles and Droplets," *J. Fluids Engin.*, vol. 119, p. 233, 1997.

69. Din X.Z. and Michaelides, E. E., "Kinetic Theory and Molecular Dynamics Simulations of Microscopic Flows," *Physics of Fluids*, vol. 9, p. 3015, 1997.
70. Kwidzinski, R., Bilicki, Z. and Michaelides, E. E., "Effect of Mechanical Non-Equilibrium on Dissipation in condensing Bubbly Flow," *Archives of Thermodynamics*, vol. 17, p. 25, 1997.
71. Din X.Z. and Michaelides, E. E., "Transport Processes of Water and Protons through Micro-Pores," *A.I.Ch.E. Journal*, vol. 44, p. 35, 1998.
72. Feng, Z.G. and Michaelides, E. E., "Motion of a Permeable Sphere at Finite but Small Reynolds Numbers," *Phys. of Fluids*, vol. 10, p.1375, 1998.
73. Feng, Z.-G. and Michaelides, E. E. "Transient Heat Transfer from a Particle with Arbitrary Shape and Motion," *J. Heat Transfer*, vol. 120, p. 674, 1998.
74. Bilicki, Z., Kardas, D. and Michaelides, E. E., "Relaxation Models for Wave Phenomena in Liquid-Vapor Bubble flow in Channels," *J. Fluids Engineering*, vol. 120, p. 369, 1999.
75. Feng, Z.G. and Michaelides, E. E., "Unsteady Mass Transport from a Sphere immersed in a porous Medium at finite Peclet Numbers," *Int. J. of Heat and Mass Transf.*, vol. 42, p. 536, 1999.
76. Munoz, J. R and Michaelides, E. E. "The Impact of the Model of the Environment in Exergy Analyses," *J. of Energy Resources Technology*, pp. 268-276, 1999.
77. Feng, Z.-G. and Michaelides, E. E., "A Numerical study on the Transient Heat Transfer from a Sphere at high Reynolds and Peclet Numbers," *Int. J. of Heat and Mass Transf.*, vol. 43, p. 219, 2000.
78. Feng, Z.-G. and Michaelides, E. E., "Mass and heat transfer from fluid spheres at low Reynolds numbers," *Powder Technology*, vol. 112, pp. 63-69, 2000.
79. Feng, Z.-G. and Michaelides, E. E., "Drag coefficients of viscous spheres at intermediate and high Reynolds numbers," *J. Fluids Eng.*, vol. 123, pp. 841-849, 2001.
80. Feng, Z-G. and Michaelides, E. E., "Heat and mass transfer coefficients of viscous spheres," *Int. J. Heat and Mass Transf.* vol. 44, pp. 4445-4454, 2001.
81. Tsega, Y., Michaelides, E. E. and Eschenazi, E. V., "Particle dynamics and mixing in the frequency driven 'Kelvin cat eyes' flow," *Chaos*, vol. 11, pp. 351-358, 2001.
82. Feng, Z.-G. and Michaelides, E. E., "Inter-particle forces and lift on a particle attached to a solid boundary in suspension flow," *Physics of Fluids*, vol. 14, pp. 49-60, 2002.
83. Feng, Z.-G. and Michaelides, E. E., "Hydrodynamic Force on Spheres in Cylindrical and Prismatic Enclosures," *Int. J. Multiphase Flow*, vol. 28, pp. 479-496, 2002.
84. Feng, Z.-G. and Michaelides, E. E., "Fluid dynamics of a sphere in an arbitrary electric field," *Powder Technology.*, vol. 125, pp. 192-199, 2002.
85. Michaelides, E. E., "Analytical Expressions," in *Transport Processes in Bubbles, Drops and Particles*, eds. DeKee and Chhabra, Taylor Francis, New York, 2002.
86. Gay, M. and Michaelides, E. E., "Effect of the history term on the transient energy equation of a sphere," *Int. J. Heat Mass Transf.*, vol. 46, pp. 1575 - 1586, 2003.
87. Michaelides, E. E., "Freeman Scholar Paper - Hydrodynamic force and heat/mass transfer from particles, bubbles and drops," *J. Fluids Eng.*, vol. 125, pp. 209-238, 2003.
88. Michaelides, E. E., "Models for multiphase flows," *von Karman Institute Lecture series*, editor J.-M. Buchlin, Brussels, Belgium, 2003.

89. Michaelides, E. E., "Introduction and basic equations for multiphase flow," *von Karman Institute Lecture series*, editor J.-M. Buchlin, Brussels, Belgium, 2003.
90. Michaelides, E. E., "Heat transfer and hydrodynamic force in dispersed multiphase flows," *von Karman Institute Lecture series*, editor J.-M. Buchlin, Brussels, Belgium, 2003.
91. Feng, Z.-G. and Michaelides, E. E., "Equilibrium position for a particle in a horizontal shear flow," *Int. J. Multiphase Flow*, vol. 29, pp. 943-957, 2003.
92. Feng, Z.G. and Michaelides, E. E., "Fluid-particle interactions and resuspension in simple shear flow," *ASCE J. Hydraulic Eng.*, vol. 129, pp. 985-994, 2003.
93. Xu, Z.-J., and Michaelides, E. E., "The effect of particle interactions on the sedimentation process of non-cohesive particles," *Int. J. Multiphase Flow*, vol. 29, pp. 959-982, 2003.
94. Tran-Cong S., Gay, M. and Michaelides, E. E., "Drag coefficients of irregularly shaped particles," *Powder Technology*, vol. 139, pp. 21-32, 2004.
95. Feng, Z.G. and Michaelides, E. E., "The Immersed Boundary - Lattice Boltzmann Method for solving fluid-particles interaction problems," *J. Computational Physics*, vol. 195, pp.602-628, 2004.
96. Kartushinski, A. and Michaelides, E. E., "Inter-particle collisions. Analytical approach for closure of driving equations of dispersed phase in gas-solid particle flows." *Int. J. Multiphase Flow*, vol. 30, pp. 159-180, 2004.
97. Michaelides, E. E. "Geothermal Energy," in *The World Book Encyclopedia*, World Book online, article id: 751375, 2004.
98. Kartushinski, A., Michaelides, E. E. and Rodi, A., "Numerical simulation of gas-solid particle flows in vertical pipes; effect of the inter-particle collisions," *Proceedings of the Russian Academy of Sciences, Fluid Dynamics Research*, vol. 5, pp. 748-755, 2004.
99. Feng, Z.-G. and Michaelides, E. E., "Comment on 'the hydrodynamics of an oscillating porous sphere'," *Phys. of Fluids*, vol. 16, pp. 4758-4759, 2004.
100. Feng, Z.G. and Michaelides, E. E., "Proteus-A direct forcing method in the simulation of particulate flows," *J. Computational Physics*, vol. 202, pp. 20-51, 2005.
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C. Selected Presentations and Publications in Conference Proceedings

Dr. Michaelides has made more than 300 presentations in National and International Conferences and Symposia. This is a partial list.

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49. (Keynote Lecture) Michaelides, E. E., "On the Equations of Motion and Energy of a Particle in a Viscous Fluid," in *Gas-Particle Flows*, ed. D.A. Stock et al, ASME-FED 228, pp. 55-61, 1995.
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53. Michaelides, E. E., "Analogies in the Momentum and Energy Equations of Particles," in *ASME FED-97 meeting*, Vancouver, British Columbia, 1997.
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59. Sherif, S. A., Stock, D. N., Brozka, Meroney, Peterson, J. J., Kumar S., Davies, and Michaelides, E. E., "Measurement and Modeling of Environmental Flows, an Introduction" Proc. of the ASME, Fluids Engineering Division, pp. 69-81, November 1988.
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61. Michaelides, E. E. "The transient Equations for the motion and Heat transfer from Viscous and Conducting Spheres," 2nd IMuST workshop, Santa Barbara, March 1999.
62. Michaelides, E. E., "On the transport Coefficients of a Viscous Sphere in Unsteady Flows," Intern. Symposium on Two-Phase Flow Modeling and Experimentation," Pisa, Italy, May 1999.
63. (Keynote lecture) Michaelides, E. E. "Analogies between the transient Equations of motion and energy/mass Transfer from Spheres," Intern. Conference on Recent Advances in Multiphase Flows, Gdansk, Poland, June 1999.
64. Michaelides, E. E. "Industry-University Collaborative Research-The point of view of a University administrator," IMECE-1999, Nashville, November 1999.
65. Xu, Z., Michaelides, E. E. and Nikitopoulos, D.E. "The influence of Large Scale Structures of an Axisymmetric Jet in the Evaporation of Droplets," APS-DFD annual meeting, New Orleans, November 1999.
66. Michaelides, E. E. "Heat and momentum transport coefficients of a sphere in unsteady processes" AIChE Meeting, Dallas, TX, November 1999.
67. Feng, Z.-G. and Michaelides, E. E. "Viscous droplets in gaseous streams," Symposium on the 100th anniversary of the NY Polytechnic Institute, New York, NY, November 1999.
68. J. R. Martin, Jr., L. J. Steinberg, and E. E. Michaelides "Determination of Bed Shear Stress by Digital Particle Image Velocimetry in Turbulent Open Channel Flow," Joint Conference in Water Resources Engineering and Water Resources Planning & Management, Minneapolis, MN August 2000.
69. Z.-G. Feng, L. J. Steinberg, E. E. Michaelides, "Transport of dissolved contaminants within a stream bed with bedforms" Joint Conference in Water Resources Engineering and Water Resources Planning & Management, Minneapolis, MN August 2000.
70. (Keynote Lecture) Feng, Z.-G. and Michaelides, E. E., "Drag coefficients of viscous drops," Proc. Of the ASME-FED-2000, pp. 709-719, November 2000.
71. Tranc-Cong, S., Feng, Z.-G. and Michaelides, E. E. "A novel method for sediment transport based on the equations of turbulence," APS-DFD annual meeting, Washington DC, November 2000.

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73. Feng, Z-G. and Michaelides, E. E., "Fluid dynamics of a sphere in an arbitrary electric field," 4th International Conference on Multiphase Flow, New Orleans, LA, May 2001.
74. Tsega, Y., Michaelides, E. E. and Eschenazi, E., "Particle dynamics and mixing in the frequency driven 'Kelvin cat eyes' flow," 4th International Conference on Multiphase Flow, New Orleans, LA, May 2001.
75. Nolen, J. D. L., Gaver, D. P. and Michaelides, E. E., "A continuum model of platelet aggregation in blood," 4th International Conference on Multiphase Flow, New Orleans, LA, May 2001.
76. Feng, Z.-G. and Michaelides, E. E. "Fundamental studies on the resuspension of particles," APS-DFD annual meeting, San Diego CA November 2001.
77. Kartushinski, A. and Michaelides, E. E. "Inter-particle collisions-Two-fluid model for closure," 10-th Workshop on Two-Phase Flow Predictions, Erlangen, Germany, April 2002.
78. Michaelides E. E., Zhi-Gang Feng and Tran-Cong, S., "Sediment transport models with coupled momentum and solids mass transport, 5th Int. Conf. On Hydro-science and Engineering, Warsaw, Poland, July 2002.
79. Michaelides E. E. and Feng Z.-G., "History terms in the heat and mass transfer equations of particles," Proc. Of the 12th Intern. Heat Transfer Conf., Grenoble, France, August 2002.
80. (Keynote Lecture) Xu Z.-J. and Michaelides E. E., "Lattice Boltzmann simulation of the sedimentation process with non-cohesive particles," Particle Fluids Interactions-VI, Barga, Italy, August 2002.
81. Feng Z.-G. and Michaelides E. E., "Fluidization and resuspension of particles in simple shear flow," Particle Fluids Interactions-VI, Barga, Italy, August 2002.
82. (Plenary Lecture-The Freeman Scholar Lecture) Michaelides, E. E., "Hydrodynamic force and heat/mass transfer from particles, bubbles and drops," ASME, Int. Mechanical Engineering Conference and Exhibition, New Orleans, LA, November, 2002.
83. Michaelides, E. E. and Xu, Z.-J. "Particle interactions during sedimentation," APS-DFD Annual meeting, Dallas TX, November 2002.
84. Kartushinski, A. Rudi, U. and Michaelides, E. E. "Gas-Solid particle flow in a horizontal channel-flow decomposition and particle collisions," EUROMECH-447, Tallin, Estonia, June 2003.
85. (Keynote Lecture) Michaelides, E. E., "The development of the equation of motion and energy equation for particles," ASME-JSME Fluids Engineering Meeting, Honolulu, HI, July 2003.
86. Kartushinski, A. and Michaelides, E. E., "Inter-particle collisions. Analytical approach for closure of driving equations of dispersed phase in gas-solid particle flows." ASME-JSME Fluids Engineering Meeting, Honolulu, HI, July 2003.
87. (Plenary lecture) Michaelides, E. E. "Transient equations of motion and heat transfer for bubbles, drops and particles," 5th International conference on Multiphase Flow, Yokohama, Japan, 2004.
88. Feng, Z.-G., and Michaelides, E. E., *Proteus*, a novel computational technique for solving fluid-particle interaction problems, 5th International Conference on Multiphase Flow, ICMF'04, Yokohama, Japan, 2004.

89. Kartushinski, A. Rudi, U. and Michaelides, E. E., "Gas-Solid Particle Flow in Horizontal Channels at High Mass Loadings," 5th International Conference on Multiphase Flow, ICMF'04, Yokohama, Japan, 2004.
90. (Invited lecture) Feng, Z.-G., and Michaelides, E. E., *Proteus*-a new computational scheme for deformable particles and particle interaction problems, IUTAM Symposium, Argonne, IL, 2004.
91. Kartushinsky, A. and Michaelides, E.E., "RANS Modeling in Gas-Solid Particle Flow in Vertical Channels," ASME-FED annual meeting, Houston, 2005.
92. Kartushinsky, A. Michaelides, E.E., and Pihlak, U., "Gas-solid particle mixture in vertical duct by RANS approach," 10th jubilee Polish seminar on mixing and international workshop, Poznań, Poland, 2005.
93. Feng, Z.-G., and Michaelides, E. E., "*Proteus*: – An efficient computational scheme for the simulation of dense particulate flows," 5th World Congress on Particle Technology, Orlando, 2006.
94. Mao, S.-L., Patton, E. and Michaelides, E. E. "Large-Eddy simulation of the net ecosystem-atmosphere exchange of CO₂ in a canopy," American Geophysical Union meeting, San Diego, 2006.
95. Kartushinsky, A., Michaelides, E. E. and Zaichik, L. The RANS, PDF & TBL simulations of turbulent gas-solid particle flow in vertical pipe (2006) ASME Joint U.S. - European Fluids Engineering Meeting (FEDSM2006), Miami 2006, Paper FEDSM2006-98036, pp. 1-13.
96. Michaelides, E. E., and Mirshams, R., "An Innovative Mechanical and Energy Engineering Curriculum," ASEE Annual Conference, Hawaii, 2007.
97. Michaelides, E. E., and Mirshams, R., "Mechanical and Energy Engineering Department at UNT – An innovation to Engineering Education," ASEE Gulf-Southwest section annual meeting, Padre Island, 2007.
98. (Plenary lecture) Feng Z. G. and Michaelides, E. E., "Inclusion of Heat/Mass Transfer Computations in DNS Studies for Particle Laden Flows," IUTAM, Symposium, Istanbul, Turkey, June, 2007.
99. (Invited lecture) Michaelides, E. E., "Analogies in the transient equation of motion and energy equation for particles, bubbles and drops," Colloquium Jean Bataille, Lyons France, June 2007.
100. Feng, Z.-G. and Michaelides, E. E., "A Direct Numerical Simulation Method for the Study of Heat/Mass and Momentum Interactions in Particulate Flows," 6th Int. Conf. on Multiphase Flow, Leipzig, Germany, July 2007.
101. Kartushinski, A., Michaelides, E. E., and Zaichick, L., Comparison of the Simulations of Turbulent Particulate Flow in Pipes Using the TBL, RANS and PDF Methods," 6th Int. Conf. on Multiphase Flow, Leipzig, Germany, July 2007.
102. (Invited lecture) Hussainov, M., Kartushuinski, A. Rudi, U., Shceglov, I., and Michaelides, E. E., Deposition of Fine Solid Particles in Laminar, Flat-Plate boundary Layers, Joint ASME-JSME Fluids Engineering Meeting, San Diego CA, July 2007.
103. Michaelides, E. E., "The Chernobyl accident and the transport of radionuclides released," ASME meeting, San Antonio, November, 2007.
104. Michaelides, E. E., "The accident in the Chernobyl power plant," SACCESS meeting, San Antonio, March 2008.

105. Michaelides, E. E. "Renewable energy sources and hydrogen as a solution to the energy challenge of the future," *Joint meeting of Canary Islands and San Antonio*, February 2008.
106. Michaelides, E. E. "Energy storage – The Hydrogen Economy" *North American Energy Summit*, San Antonio, May 2008.
107. Michaelides, E. E. and Davis, A.P. "Geothermal power extraction from abandoned oil wells in Texas," TREIA annual meeting, Austin TX, Nov. 2008.
108. Michaelides, E. E. and Davis, A.P., "Geothermal Power From Dry Wells" Clean Technology Conference and Exposition, Houston, TX, May 2009.
109. (Keynote lecture) Michaelides and Feng, Z.-G. "Application of the Immersed Boundary Method and Direct Numerical Simulation for the Heat Transfer from Particles," 12th international Symposium on Gas-Particle Flows," Veil CO, Aug. 2009.
110. Michaelides, E. E. "The future of geothermal energy – power plants and resources." Symposium on Geothermal Energy, San Antonio, TX, Sept. 2009.
111. (Invited lecture) Michaelides, E. E. "The next generation of geothermal power plants," TREIA annual Conference, Austin TX, Nov. 2009.
112. Michaelides, E. E. "The DNS-IB method for particulate flow and heat transfer simulation," DOE contractors annual meeting, June 2009, Morgantown, West Virginia.
113. (Invited lecture) Michaelides, E. E., "New Directions for Geothermal Energy," UT-System Workshop on Alternative Energy, Dallas, May 2010.
114. Roig, A. and Michaelides, E.E., "A re-interpretation of the Odar and Hamilton data on the history terms of the equation of motion," ICMF-2010, May 2010, Tampa, FL.
115. Davis, A., Michaelides, E. E., and Feng, Z.-G., "Particle Velocity near Vertical Boundaries – A Source of Uncertainty in Two-Fluid Models," ICMF-2010, May 2010, Tampa, FL.
116. Kartushinsky, A and Michaelides, E.E., "RANS Modeling of a Particulate Turbulent Downward Jet," ICMF-2010, May 2010, Tampa, FL.
117. (Keynote lecture) Michaelides, E. E. and Feng, Z.-G., "Direct Numerical Simulations of Particulate Flows that Include Momentum, Heat and Mass Exchanges" ICMF-2010, May 2010, Tampa, FL.
118. Feng, Z.-G. and Michaelides, E. E., 2010, "Simulation Of The Particle-Wall Collisions In A Viscous Fluid Using A Resolved Discrete Particle Method," Proceedings of the ASME 3rd Joint US-European Fluids Engineering Summer Meeting, FEDSM-ICNMM 2010, August 1-5, 2010, Montreal, Canada.
119. Michaelides, E. E., Geothermal Energy from Abandoned Oil and Gas Wells," International Workshop on Alternative Energy Sources, College Station, TX, January 2011.
120. Kartushinsky, A.I. , E.E. Michaelides, Y.A. Rudi, S.V. Tisler, I.N. Shcheglov, and A. Shablinskya, Two-Phase Boundary Layers, Euromech Colloquium on Dynamics of Non-spherical Particles in Fluid Turbulence, Udine, Italy, March 2011.
121. Feng, Z-G, Michaelides, E. E., and Mao, Shaolin, 2011, "A multilevel simulation approach to derive the slip boundary condition of the solid phase in two-fluid models," 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore, Maryland.
122. Feng, Z-G. Musong, S.G., and Michaelides, E. E., "Effect of Model Parameters of Soft-Sphere Collision Scheme to the Particle-Particle Collision in a Viscous Fluid," NETL 2012 Multiphase Flow Conference, Morgantown, WV, USA, May 2012.

123. Tisler; S., Rudi, Y. Michaelides, E.E. and Kartushinsky, A. Turbulent Particulate Pipe Flow at Constant Reynolds Numbers,” 23rd International Congress of Theoretical and Applied Mechanics, ICTAM-2012, Beijing, China.
124. Michaelides, E. E. and Feng, Z-G., “A DNS method for particle motion to establish boundary conditions in coal gasifiers,” ECOS-2012, Perugia, Italy, June 2012.
125. Michaelides, E.E. “Cooling of electronic components with nanofluids – particle motion, enhanced heat transfer and uncertainties” San Antonio Simulation and Visualization Symposium, (SVS) November 2012.
126. (Keynote Lecture) Michaelides, E.E., “Particle, bubble and drop dynamics and heat transfer,” 8th International Conference on Multiphase Flow, ICMF 2013, May 2013, Jeju, Korea.
127. Michaelides, E.E., Lingo, S.K., Esparza H.E., Dubinski C., Millwater, H.R., Heat transfer from particles in nanofluids – an uncertainty analysis,” 8th International Conference on Multiphase Flow, ICMF 2013, May 2013, Jeju, Korea.
128. (Plenary Lecture) Michaelides, E. E., “The Immersed Boundary Method applied to the Motion and Heat Transfer of Particles in Fluids,” Int. Symposium on Turbulent Particle-Laden Flow and Coal Combustion, June 2013, Wuhan, China.
129. (Invited lecture) Michaelides, E.E. and Feng Z-G., “Heat Transfer in Particulate Flows,” Int. Symposium on Turbulent Particle-Laden Flow and Coal Combustion, June 2013, Wuhan, China.
130. (Plenary Lecture) Michaelides, E. E., “Current Practice and Future Directions of Geothermal Energy,” *IEEE MetroCon* 2013, October 2013, Arlington TX.
131. (Invited Lecture) Michaelides, E.E. “Direct Numerical Simulations (DNS) and heat transfer particulate processes” Chemnitz University, Germany, June 2014.
132. (Invited Lecture) Michaelides, E.E. “Direct Numerical Simulations (DNS) with particles bubbles and drops” Technical University of Tallinn, Estonia, June 2014.
133. Michaelides, E.E., Power Production from Geothermal Energy– Future Directions and Cycles,” ECOS-2014, Turku, Finland.
134. (Plenary Lecture) Michaelides, E.E., Feng, Z-G., and Musong, S., “Particulate DNS with Heat and Mass Transfer” 2nd Int. Conference on Numerical Methods in Multiphase Flow, Darmstadt, Germany, July 2014.
135. (Invited Lecture) Michaelides, E.E. “Nanofluidics – Properties and Myths” Aristotle University of Thessalonica, Greece, July 2014.
136. (Plenary Lecture – the lecture of the 2014 ASME Fluids Engineering Award) Michaelides, E.E., “Heat and Mass Transfer with Nanofluids - Fundamentals and Applications,” ASME-FED Summer Annual Meeting, Chicago, August 2014.
137. Michaelides, E.E., Feng, Z-G., and Musong, S. “A Three Dimensional Immersed Boundary Method for Free Convection from Single Spheres and Aggregates,” ASME-FED Summer Annual Meeting, Chicago, August 2014.
138. (Invited Lecture) Michaelides, E.E. “Do not Waste the Good Experimentalist!” in the Symposium on EFD/CFD Choice – A dilemma for Industry, ASME Intern. Mechanical Engineering Conference and Exhibition, Houston, TX, November 2015.
139. Michaelides, E.E., Mass transfer with nanofluids – the role of microconvection, 9th Int. Conf. on Multiphase Flow, Florence, Italy, May 2016.

140. Feng Z.G., Gatewood J., Duan Y., Michaelides E.E, Wall effects on the dynamics of particle motion in a laminar flow, 9th Int. Conf. on Multiphase Flow, Florence, Italy, May 2016.
141. Michaelides, E.E., A Critical Assessment of Nanofluid Mass Transfer, ASME HT-FE-ICNMM Conference 2016, Washington DC, July 2016.
142. Michaelides, E.E., Duan,Y., Feng, Z.G., Mao, S. Modifications to the Kinetic Theory as Applied to Dense and Granular Particulate Flows, ICNMMF-2017, Tokyo, June 2017.
143. Leonard, M.D., and Michaelides, E.E. Energy Storage Requirements of a Grid Independent Building with Significant Air-Conditioning Need, ECOS-2017, San Diego, July 2017.
144. (Keynote Lecture) Michaelides, E.E., Particulate/Multiphase Flows – What Has Been Done, What Is Needed, ASTFE annual meeting, Fort Lauderdale, March 2018.
145. (Plenary Lecture) Michaelides, E.E., Transition to Renewable Energy – The Need for Energy Storage, ECOS annual meeting, Guimaraes, Portugal, June 2018.
146. Michaelides, E.E., Duan ,Y., Feng, Z.G., Modified Kinetic Theory for the Flow of Dense Particulate Mixtures and Granular Materials, DOE annual workshop on Multiphase Flow, Houston, TX, August 2018.
147. (Plenary Lecture) Michaelides, E.E., Energy Storage Needs for a Transition to Renewables, 8th Intern. Conf. on Clean Energy, Montreal, Canada, August 2019.
148. (Keynote Lecture) Michaelides, E. E., Substitution of fossil fuels with renewables for the production of electric power – difficulties and resolutions, 4th Intern. Conference on Renewable Energy, Houston, TX, February 2020.
149. (Keynote Lecture, online) Michaelides, E.E., Technical Problems and Resolutions for the Substitution of Fossil Fuels with Renewables, 5th International Conference on Energy Engineering and Environmental Protection (EEEE2020), Xianmen, China, November 2020 (online).
150. (Plenary Lecture) Michaelides, E.E., “Myths and Reality for Electric Vehicles,” 1st Inter. Conference on Thermal Management in Electric Vehicles,” Chennai, India, January 2021 (online).
151. (Plenary Lecture) Michaelides, E.E., “Substitution of Fossil Fuels with Renewables – a Sustainability Conundrum?” 6th *Thermal and Fluids Engineering Conference 2021* (online).
152. (Plenary Lecture) Michaelides, E.E., “Thermodynamics and Environmental Effects of Electric Cars - Myths and Reality,” 9th Intern. Conf. on Clean Energy, Ottawa, Canada, August 2021 (online).
153. (Invited Lecture) Michaelides E. E., “Substitution of Fossil Fuels with Renewables – Myths and Reality,” 1st TCU Energy Institute Annual Conference, Fort Worth, April 2022.
154. (Plenary Lecture) Michaelides, E.E., “The Road to Renewable Energy and Sustainability Goals,” *3rd Renewable and Sustainable Energy Webinar*, June 2022.
155. Michaelides, E.E. and Michaelides, D.N., Electricity Generation by Renewables – Infrastructure and Effects on Sustainability Goals, ECOS, 35th annual meeting, Copenhagen, Denmark, July 2022.
156. Michaelides, E.E., Carbon Capture and Storage – An Exergy and Power Analysis, ECOS, 35th annual meeting, Copenhagen, Denmark, July 2022.
157. (Plenary Lecture) Michaelides, E.E. “Sustainability and Electric Vehicles - Myths and Reality,” 10th Intern. Conf. on Clean Energy, Vancouver, Canada, October 2022 (online).

158. (Plenary Lecture) Michaelides, E.E., "The role of Natural Gas in the Transition of Electricity Generation to Renewables," Annual Meeting of North Texas Midstream Association, Tyllar TX, November 2022.
159. (Plenary Lecture) Michaelides, E. E., "Electricity from Renewable Energy Sources and Global Sustainability Goals," 9th International Conference on Energy Engineering and Environmental Engineering (ICEEEE2022), Sanya, China, December 2022 (online).

D. Conference Books and Proceedings Edited

1. "Fundamental Aspects of Gas-Liquid Flows", ASME December 1985.
2. "Fundamentals of Gas-Liquid Flows" (with M. P. Sharma), ASME, November 1988.
3. "Turbulence Modulation in Dispersed Multiphase Flows" (with D. E. Stock) ASME, 1989.
4. "Turbulence Modification in Two-Phase Flows" (with T. Fukano and A. Serizawa) ASME, 1991.
5. "Measurement and Modeling of Environmental Flows" (with Sherif, Davis, Stock and Khalighi, Celik and Kumar) ASME, November 1992.
6. "Gas-Solid Flows 1993" (with Stock, Reeks, Tsuji, Gautam and Jurewicz) ASME, June 1993.
7. "Liquid-Solid Flows-1994" (with Roco, Joseph and Khalighi) ASME, June 1994.
8. "Gas-Particle Flows," (with Stock, Reeks, Tsuji and Gautam) ASME-FED 228, August 1995.
9. "Heat Mass and Momentum Transfer in Environmental Flows" (with Sherif, Stock, Davis, Meroney, Peterson and Celik), ASME HTD-321, 1995.
10. "Proceedings of the Annual Meeting of the Society of Engineering Science," (with D. Hui) New Orleans, 1995.
11. "Gas-Particle Flows-1997" (with Stock, Reeks, and Tsuji) ASME-FED 145, June 1997.
12. "Liquid-Solid Flows-1997" (with Roco, Joseph and Khalighi) ASME, FED 148, June 1997.
13. "Gas-Particle Flows-1999" (with Stock and Tsuji) Published in CD_ROM ASME-FED, June 1999.
14. "Dispersed flows in combustion, incineration and propulsion systems," (with Nikitopoulos, Acharya and O'Hern) Proceedings of the ASME-FED, November 2000.
15. "Proceedings of the ICMF-2001" a collection of 539 papers from the 4th Int. Conference on Multiphase Flow, New Orleans, 2001 (in CD-ROM).
16. "Gas-Particle Flows-1999" (with Stock, Reeks and Tsuji) Published in CD_ROM ASME-FED, June 2001.
17. "Gas-Particle Flows-1999" (with Stock, Reeks and Tsuji) Published in CD_ROM ASME-FED, June 2003.
18. "Proceedings of the ASME – Fluids Engineering Division Summer Meeting (editor), CD_ROM ASME-FED, June 2005.
19. "Proceedings of the ASME-GSW Annual Conference" March 2016, published in USB drive.

RESEARCH CONTRACTS AND GRANTS (P.I., unless listed otherwise funds rounded to the nearest thousand)

1. University of Delaware Research Foundation, "New models for Critical Two-Phase Flow", 1-81 to 6-82, \$8,000.
2. DOE, "Studies on alternative Cycles for Geothermal Power Plants," 5-81 to 5-84, \$96,500.

3. University of Delaware Research Foundation "Studies on Particulate Flows", 1-82 to 6-83, \$9,000.
4. DuPont "Research Studies on Pipe Fittings for Pneumatic Conveying" 9-81 to 3-88, (a series of five smaller grants with a total of \$160,000).
5. DuPont "Experimental Studies on Teflon Heat Exchangers" 1-84 to 6-87, \$170,000.
6. UNI-DEL Foundation "Research Equipment for Fluid Dynamics" (co-P.I. with Professor F.A. Kulacki as P.I. in 1984-85, then P.I. in 1985-88) 1-84 to -88 \$340,000.
7. University of Delaware Research Foundation "Particulate Transport in Electric Fields" 1-85 to 6-86 (Co-PI with Professor J. H. Davidson) \$11,500.
8. DuPont "Analytical and Numerical Studies on Teflon Heat Exchangers" 7-85 to 6-88, \$69,000.
9. State of Delaware/DOE "Applications of Teflon Heat Exchangers" 1-86 to 12-87 \$104,000.
10. DuPont "Mixing of Particulates in Silo-Blenders-Effect of Valves and Gates", 7-88 to 3-90, \$40,000.
11. Delaware Office for International Development, "Study in France, Travel Grant" 1988-1989, \$2,500.
12. NASA, "Particulate Flows related to Coastal Erosion Processes," 1991-1994, \$69,000.
13. NASA, "Establishment of Louisiana Space Consortium-LaSPACE", (co-P.I. in a team of eight Louisiana Scientists, P.I. Dr. Wefel), 1991-1995, total funding \$408,000 per year for four years.
14. Shell Foundation "Support for the Mechanical Engineering Department at Tulane," \$48,000 (16k per year for three years) 1990-1993.
15. NSF "Hydrodynamics of Particulate Flows through Membranes and Interphases" (Co- P.I. in a team of researchers from Tulane, UNO and LSU with P.I. Dr. Papadopoulos) 1992-1997, EEM's expenditures total \$134,000.
16. LEQSF "Hydrodynamics of Particulate Flows through Membranes and Interphases" (Co- P.I. in a team of researchers from Tulane, UNO and LSU with P.I. Dr. Papadopoulos) 1992-1997, EEM's expenditures total \$178,000.
17. LASPACE "Turbulence Modulation by Embedded Particles", 1993-1994, \$5,000.
18. TRW "Support for Studies in Energy and the Environment", 1993-1998, (a series of three smaller grants with a total of \$165,000).
19. NASA "Particulate Flows in Propulsion Systems" (Co-P.I. in a group from LSU, Xavier and Southern Universities with P.I. Dr. Acharya of LSU), 1994-2000, EEM's expenditures total \$122,000.
20. LEQSF "Particulate Flows in Propulsion Systems" (Co-P.I. in a group from LSU, Xavier and Southern Universities with P.I. Dr. Acharya of LSU), 1994-2000, EEM's expenditures total \$107,000.
21. DOD-ONR "Graduate Fellowships to Support Minority Students – the 3-2 year Xavier-Tulane Program," a series of three grants 1995-2001, total funding \$420,000 (co-PI, with P.I. Dr. Eschenazi).
22. LASPACE "Spurious Solutions in Two-Phase Codes," 1995-1996, \$5,200.
23. NSF (Infrastructure Program) "Renovations of Engineering Facilities" (co-PI in a team of five Tulane School of Engineering faculty) total funding, \$667,000.

24. DOE (Environmental Management) "Collaborative Research with IREP and CREM in Belarus on the Transport and Fate of Radionuclides following the Chernobyl Accident" (a series of three grants) 1994-1997, \$232,000.
25. DOE (through the Center for Bioenvironmental Research) "Transport and Fate of Radionuclides and Pollutants in Aquatic Environments," (a series of two grants, with co-P.I.'s Drs. Luna, Ramer and Steinberg) 1996-1998, \$365,000.
26. Louisiana Education Quality Support Fund "Graduate Fellowships to Support future Leaders in Engineering," 1996-2000, \$272,000.
27. Louisiana Education Quality Support Fund "Graduate Fellowships to Support future Leaders in Engineering," 1997-2001, \$408,000.
28. TRW "Research Evaluation of Nuclear Waste Storage Facilities," 1996-1998, total funding \$200,000 EEM's expenditures total \$40,000.
29. Louisiana Education Quality Support Fund "Graduate Fellowships to Support future Leaders in Engineering," 1998-2002, \$340,000.
30. DOD "Experimental and Analytical Studies on the Transport of Cohesive Sediment," 1998-2001, total funding \$468,000.
31. Louisiana Education Quality Support Fund "Graduate Fellowships to Support future Leaders in Engineering," 1999-2003, \$408,000.
32. DOD-DTRA (through the Center for Bioenvironmental Research) "Extension of Studies on the Transport of Pollutants and Sediments," 1999-2000, \$61,000.
33. Louisiana Board of Regents "Graduate Fellowships to Support the new Generation of Leaders in Engineering," 2000-2004, \$340,000.
34. DOD-ONR "Sedimentation and Resuspension Studies for the Mississippi River and the Louisiana Environment," 1999-2001 (co-P.I.'s Drs. Eschenazi and Steinberg), \$399, 000.
35. DOD-ONR "A five-year B.S./M.S. program between Xavier and Tulane Universities of Louisiana," 1999-2002 (co-P.I. Dr. Eschenazi), \$124, 000.
36. DOD-ONR "Support for the 4th International Conference on Multiphase Flow," 2001-2002, \$10,000.
37. Louisiana Board of Regents "Graduate Fellowships to Support the new Generation of Leaders in Engineering," 2001-2005, \$350,000.
38. NSF "Support for the 4th International Conference on Multiphase Flow," 2001-2002, \$35,000.
39. Louisiana Board of Regents "Graduate Fellowships to Support the new Leaders in Engineering," 2002-2006, \$280,000.
40. DOE "Fundamental studies on the sediment transport in rivers," 2002-2003, 96,000.
41. USGS "Modeling of the sedimentation processes and Sediment Transport," 2002-2003, \$38,500.
42. DOE "Support for the Tulane-Xavier BS/MSE 5-year program," 2002-2003, \$72,000.
43. Louisiana Board of Regents "Graduate Fellowships to Support the new Leaders in Engineering," 2003-2007, \$216,000.
44. Entergy Inc. "Preliminary work to establish the Tulane Energy Institute," 2002-2003, \$70,000 (co-P.I. with Dr. James McFarland as P.I.).
45. DOE-NIGEC, "Funding for the Southcentral Regional Center for FY 03-04," 2003-2004, \$1,109,000.

46. DOE-NIGEC, "Improvement of the accuracy of carbon flux measurements," 2003-2004, \$92,000.
47. DOE-NIGEC, "Funding for the Southcentral Regional Center for FY 04-05," 2004-2005, \$1,254,000.
48. DOE-BER, "The use of Computational Fluid Dynamics for the improvement of the accuracy of carbon flux measurements," 2004-2006, \$458,000.
49. Entergy Inc. "The Tulane-Entergy, Energy Institute," endowment of \$5,000,000, 2004-2008 (co-P.I. with Dr. McFarland as P.I.).
50. DOE-NIGEC, "Funding for the Southcentral Regional Center of NIGEC for FY 05-06," 2005-2006, \$1,453,000.
51. DOE-NIGEC, "Pilot project- the governing equations for Eddy-Covariance Method (ECM)," 2004-2006, \$92,000.
52. DOE-BER "The use of Computational Fluid Dynamics for the improvement of the accuracy of carbon flux measurements," 2006-2007, \$107,000.
53. Xinwen Mining Group, "Development of A Low-Pressure Pneumatic Coal Conveying and Separation System" 2008-2010 \$565,000 (co-P.I., with Dr. F. F. Chen as P.I.).
54. DOE "Use of an Accurate DNS Particulate Flow Method to Supply and Validate Boundary Conditions for the MFIX Code" 2009-2011, \$200,000.
55. NSF "Integrating High Performance Computing in Research and Education for Simulation, Visualization and Real-Time Prediction" 2009-2014, \$5,000,000.
56. NSF (through UTSA) "Cooling of electronic components with nanofluids" 2011-2014, 179,000.

GRADUATE STUDENTS SUPERVISED (with thesis or dissertation topic)

1. K. L. Zissis, M.S., 1982, "Velocity of Sound in Two-Phase Mixtures."
2. S. R. Parikh, M.S., 1983, "Critical Two-Phase Flow."
3. M. A. Degliobizzi, M.S., 1983, "Experimental Studies on the Feeding of Solid Particles in a Pneumatic Conveying System."
4. L. K. Farmer, M.S., 1983, "A Model for Slurry Transport Based on the Equations of Turbulence."
5. F. Shafaie, Ph.D., 1984, "Modeling of Geothermal Well Flow."
6. J. Martin, M.S., 1984, "Evaluation of Material Entrance Region Design in Positive Pressure Pneumatic Conveying Systems."
7. C. Lai, M.S., 1985, "Pressure Drop through Return Bends in Pneumatic Conveying Systems."
8. W. K. Harris, M.S., 1986, "Investigation of Heat Transfer Coefficients in Teflon Heat Exchangers."
9. M. A. Westman, M.S. 1986, "Effect of 90o Bends in Pneumatic Conveying."
10. H. Q. Gong, M.S. 1987, "Simulation of Turbulent Bubbly Jets."
11. M. D. Marcozzi, M.S. 1987, "Computation of a Supersonic Axisymmetric Inlet Flow."
12. S. Kumar, M.S., 1988 "Experimental Investigation of Turbulence in Bubbly Jets."
13. A. Arefmanesh, M.S. 1987, "The Flow of Air-Solid Mixtures through Expansions."
14. H. B. Meyer, Ph.D. 1987 "Numerical and Experimental Investigation of a Hypersonic Shaped Charge Jet" (co-advisor with Dr. Danberg).
15. Y. Chang, Ph.D. 1988, "Heat Transfer through Vibrating Flexible Tubes."

16. C. Lai, Ph.D, 1988, "Heat Transfer in Porous Media" (co-advisor with Dr. Kulacki).
17. B. G. Scrivens, M.S. 1988, "Modeling of Air-Solid Mixtures in Hoppers."
18. A. Etzel, M.S. 1989 "Turbulence Measurements over a Plate with embedded Particles."
19. J. Cassidy, M.S. 1990, "Gravity Flow of Granular Materials."
20. Z. Plazaola, M.S. 1990, "Vapor-Liquid Non-Equilibrium in Flow through Convergent Passages."
21. A. Arefmanesh, Ph.D. 1991, "Manufacturing of Structural Foams" (co-advisor with Dr. Advani).
22. J.-P. Ganty, Thesis Dipl. Ingénieur, 1992, Ecole Supérieure de Hydraulique, Grenoble, France, "Effect of Basset Forces on Particle Motion."
23. N. Nayyar, M.S. 1993 "Particulate Jet Flows."
24. B.G. Scrivens, Ph.D. 1992, "Flow Patterns Gravity in Granular Material Flows."
25. Q. Xu, M.S.E., 1993 "Deformation of Droplets in Capillaries."
26. X.-D. Din, M.S.E., 1993 "Molecular Dynamics modeling of Flows in Porous Media."
27. Z.-G. Feng, M.S.E., 1993 "Modeling of Flows in Porous Media."
28. S. F. Wiegand, M.S.E. 1995 "The Drag Coefficient of axisymmetric Dendrites."
29. Q. Xu, Ph.D. 1995 "Flow of Ellipsoids in Cylindrical Tubes."
30. O. Pimenov, M.S.E., 1996 "Fate and Transport of Radionuclides, in Forest Fires."
31. X. D. Din, Ph.D. 1996 "Non-continuous modeling of Flows in Porous Media."
32. Z.-G. Feng, Ph.D. 1996 "Unsteady Heat Transfer from Particles."
33. N. Henn, Thesis Dipl. Ingénieur, 1996, Université Claude Bernard, Lyon I, France, "Effect of the History Terms on the Dispersion of Particles."
34. S. M. Fitzpatrick, M.S.E. 1997 "Particulate Flows related to Coastal Erosion Processes."
35. O. Melkozerova, M.S.E. 1997, "Transport and Fate of Radionuclides in Sediments following the Chernobyl Accident."
36. Y. Tsega, M.S.E. 1998, "Non-linear aspects and chaos in the motion of particles in fluids."
37. R. Seffal, Ph.D., 1998, "The Effect of Large-Scale Structures on the Motion of Particles in an Axisymmetric Round Jet."
38. G. Atzamos, M.S.E. 1998, "Experimental and Analytical Studies on the Resuspension of Sediments."
39. P. Koukios, M.S.E., 1999, "Sedimentation Problems in Nuclear Waste Storage Facilities."
40. R. Farish M.S.E. 2000 "The Effects of large-scale Structures on bubble Condensation and Phase Transition."
41. J. R. Martin M.S.E. 1999, "Measurements of shear stress with a PIV."
42. S. R. Niyrendra, MSE 1999, "Studies on the Resuspension of Cohesive Sediments."
43. J. D. Nolen, Ph.D. 2001 "The Effect of Flow Turbulence on the Coagulation of Platelets in Blood" (co-advisor, Dr. Gaver).
44. M. Gay, MSE, 2002, "Effect of the history terms on the transient energy equation of particles."
45. Z.-J. Xu, Ph.D, 2003, "Numerical simulations of particulate sedimentation processes"
46. J. R. Martin, Ph.D., 2004 "Gravity currents through bends-the saltwater intrusion."
47. L. Craig, MSE, 2005 "Lift forces in particles exerted by their proximity to a wall."

48. R. Farish, Ph.D. 2005 "The effect of surface slip on the drag of fine particles and bubbles."
49. Steven Duck, M.S. 2006 "An analytical approach for the determination of unsteady drag for nano- and micro-particles."
50. Adam Baran, part-time student, Ph. D. 2008, "Thermodynamics of the densification of liquid rocket propellants."
51. Muriele Dugay, 2007, Thesis Dipl. Ingénieur, Université Claude Bernard, Lyon I, France "The influence of the History terms on the heat transfer from micro- and nano-particles."
52. Adelina Popruga-Davis, MS 2009, "Geothermal power from abandoned oil wells."
53. Bradley Denton, MS 2011 "Testing of particulate flow through filters."
54. Mey Cabrejos-Davy, MS, 2010, "The effect of the history terms on the heat transfer from fine particles at finite Peclet numbers."
55. Shamsul Al-Tomal, MS 2011 "Entropy production in Geothermal Power Plants and Optimization of the Plants."
56. Erem Ugras, MS, 2011 "Exergy of Solar Radiation and its Potential in the south Texas Area."
57. John Zigtema, MS 2011 "Interaction of a geothermal well operation with the surrounding geological strata"
58. Stephanie Koch-Lingo MS 2011 "Heat transfer in microtubes with micro- and nano-particles."
59. Bakhtosh Edrisi, MS 2012 "Binary-Flashing geothermal power plants."
60. Jason Brubacker, MS 2013 "Geothermal energy from abandoned oil and gas."
61. Maria Andersson, MS. 2012, "Power from pairs of abandoned oil and gas wells."
62. Hector Esparza, MS. 2012 "Quantification of uncertainty in heat transfer with nanofluids."
63. Adam Roig, MS 2013 "History terms in the double-diffusion processes involving droplets."

COURSES TAUGHT

A. Undergraduate

1. Thermodynamics I
2. Thermodynamics II
3. Thermal Sciences-I (including laboratory)
4. Fluid Mechanics I
5. Heat Transfer
6. Energy Conversion
7. Two-Phase Flow
8. Mathematical Optimization and its Engineering Uses
9. Engineering Science Laboratory
10. The Chernobyl Catastrophe and its Aftermath
11. Engineering Economics
12. Design of Thermal Power Plants
13. Engineering Ethics.
14. Alternative Energy Sources.
15. Sustainable Energy

B. Graduate

1. Advanced Thermodynamics
2. Two-Phase Flow
3. Experimental Fluid Dynamics
4. Turbulence
5. Statistical Mechanics and Thermodynamics
6. Thermal Power Plants
7. Energy and Ecology
8. Fluid Mechanics
9. Computational Fluid Dynamics (CFD)
10. Alternative Energy Sources.

