

Curriculum Vitae
October 2018

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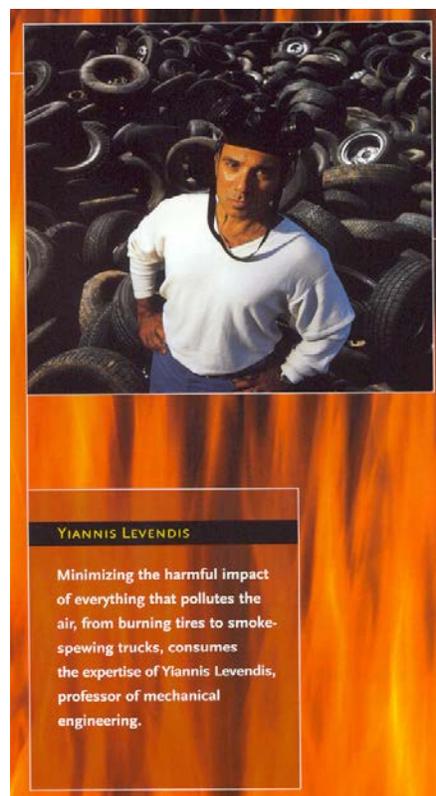
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EDUCATION:

- **Ph.D.**, Environmental Engineering Science, Sep. 1987
California Institute of Technology (Caltech)
Thesis Subject: "A Fundamental Study on Char Oxidation
Using Model Materials"
Thesis Advisor: Professor Richard C. Flagan

- **M.S.** Mechanical Engineering, Dec. 1982
University of Michigan
Thesis Subject: "Reduction of Diesel Particulate Emissions
Using Oxygen-Enriched Air."
Thesis Advisors: Professors John Hilliard and Jay Bolt

- **B.S.** Mechanical Engineering, Cum Laude, Dec. 1981
University of Michigan
Thesis Subject: "Design and Evaluation of Solar Stills"
Thesis Advisor: Professor John Clark



WORK EXPERIENCE:

- **College of Engineering Distinguished Professor**, 2006 - present Northeastern University
- **Affiliated Professor**, 2012-2015 University of Ulster, Northern Ireland
- **Visiting Professor**, 2004 ΠΟΛΥΤΕΧΝΕΙΟ, the National Technical University of Athens
- **Professor**, 1998 – 2006 Northeastern University
- **Visiting Professor**, 1998 – 1999 Massachusetts Institute of Technology (MIT)
- **Associate Professor**, 1994 – 1998 Northeastern University
- **Assistant Professor**, 1988 – 1994 Northeastern University

- **Post-Doctoral Research Scientist**, 1987 – 1988 California Institute of Technology (Caltech)
Research Topics: Combustion of coal: (a) studies concerning the effects of catalysis on the

reactivity of carbonaceous chars and (b) studies concerning the vaporization of coal-ash.

- **Graduate Research Assistant**, 1983 – 1987 California Institute of Technology (Caltech)
Research Topic: Combustion of coal: Reactivity, temperature and heat release of burning pulverized coal. Development of a nearly ideal synthetic char materials (artificial coal) for controlled laboratory studies of coal properties and oxidation kinetics.
- **Graduate Research Assistant**, 1982 – 1983 University of Michigan
Research topic: Investigated the effect of oxygen supercharging on the performance and exhaust emissions of various types of Diesel engines.
- **Teaching Assistant**, 1981 – 1982 University of Michigan
Subject: Conducted internal and external combustion engines laboratories.
- **Other:** Tutor for freshman and sophomore science courses (Tau, Beta, Pi) and grader for an undergraduate manufacturing process course. Tutor for high school students through Caltech's secondary school project; taught electrical circuits - electronics.

TECHNICAL INTERESTS:

Technical interests include clean energy related problems, combustion of liquid, gaseous and solid fuels, internal and external combustion engines, turbomachinery, incineration of hazardous wastes, atmospheric pollution - acid rain, polynuclear aromatic hydrocarbons, soot, SO₂ and NO_x chemistry solar energy, pyrolysis and combustion generated materials and manufacturing processes.

COURSES TAUGHT:

Undergraduate: Thermodynamics I, II and III, Internal Combustion Engines, Gas Turbines, Fluid Mechanics, Refrigeration and Air Conditioning, Capstone Senior Design Projects, Technical Laboratories, etc. Also, developed and taught a course on Pre-engineering Design Experience for K-12 Science Teachers.

Graduate: Developed and taught Courses on Combustion and Air Pollution Fundamentals and Gas Turbine Combustion.

MAJOR RESEARCH PROJECTS:

Current research is dealing with topics related to Clean Energy, Combustion, Air Pollution and Acid Rain Prevention, Incineration of Municipal Wastes, and Engine Performance and Emissions.

In particular the following projects have been funded:

- (i). Studies on Incineration - Examination of the Combustion Characteristics of Solid Organic Municipal Wastes with Emphasis to Plastics. Project funded by a Research Initiation (RI) Award from the U.S. National Science Foundation, 1989-1991, Y.A. Levendis, P.I.
The NSF RI Award was the predecessor of the NSF Career Award
- (ii). Studies on the Effects of Calcium Magnesium Acetate on the Combustion of Coal-Water Slurries - SO₂ emissions. Project funded by the U.S. Department of Energy and Stone & Webster Corp., 1989-1993, single investigator projects Y.A. Levendis, P.I.
- (iii). Studies on Calcium Magnesium Acetate Sorbent Injection in Furnaces to Control SO₂ and NO_x Emissions. Project funded by the U.S. Department of Energy, 1992-1994, Single investigator project, Y.A. Levendis, P.I.
- (iii). Incineration of Selected Municipal Waste Plastics, Industrial Refuse Plastics and Used

- Automobile Tyres. Project funded by the U.S. EPA, 1993-1997. Single Investigator project
Y.A. Levendis, P.I.
- (v). Studies on the Reduction of Diesel Exhaust Particulate Emissions using Ceramic Monolith Filters. Project funded by Taft Environmental, CeraMem Corp. and the Massachusetts Transit Authority, 1990-2000, Y.A. Levendis, P.I.
 - (vi). Studies of Diesel Particulate Filtration Using Fibrous Membrane Modules. Project funded by Pallflex Corp., 1994-1995, Y.A. Levendis, P.I.
 - (vii). The Effect of Diesel Exhaust Temperature on the Refeneration Efficiency of Silicon Carbide Monoliths. Project funded by Ividen Corp., 1997-1998, Y.A. Levendis, P.I.
 - (viii). Simultaneous Control of SO₂, NO_x, HCl, PAH and Particulate Emissions of Combustion by In-Furnace Sorbent Injection Upstream of a Ceramic Filter. Project funded by NSF, 1997-2001. Single investigator project, Y.A. Levendis, P.I.
 - (ix). On the Emissions of Polynuclear Aromatic Hydrocarbons, Particulate Matter and Other Pollutants from Burning Organic Wastes, Targeting Applications in Municipal/Medical Incinerators. Project funded by NSF, 2000-2004, Y.A. Levendis, P.I.
 - (x). Reduction of Sulfur Dioxide Emissions from the Combustion of Coal treated with Tall-Oil Pitch and Carboxylic Salts of Calcium and Magnesium. Project funded by Progress Materials Inc., 2002-2003, Single investigator project, Y.A. Levendis, P.I.
 - (xi). Reduction of SO₂ and NO_x Emissions from the Combustion of Coal treated with Tall-Oil Pitch and 3-Hydroxy-Propionate Salts of Calcium. Project funded by Progress Materials Inc., 2005, Single investigator project, Y.A. Levendis, P.I.
 - (xii). Boston Science Partnership conducted by a multi-university team (NU, UMass, Boston Public Schools, etc.), 5-year project funded by NSF, 2005-2010. Y.A. Levendis, Senior Personnel.
 - (xiii). Emergency Fire Extinction by Direct Application of Liquid Nitrogen. Project funded by the Institute of Hazardous Materials Management, 2007-2008, Y.A. Levendis, P.I.
 - (xiv). NU STEP-UP. Funded by NSF, 2007-2014. Y.A. Levendis, Co-PI.
 - (xv). Flame Synthesis of Carbon Nanotubes. STTR project funded by NSF 2008-2009, Y.A. Levendis, University PI.
 - (xvi). Temperature measurements and Submicron Ash Formation in Oxy-Combustion of Coal. Funded by NSF, 2008-2013. Single investigator project, Y.A. Levendis, PI.
 - (xvii). A Versatile Self-Sustaining Device for Power Generation by Sequential Liquifaction, Gasification and “Clean Combustion” of Waste Plastics. Funded by the Massachusetts Clean Energy Center, 2011-2012. Single investigator project, Y.A. Levendis, PI.
 - (xviii). Co-firing Illinois Bituminous Coals with Highly-Fragmenting Lignite Coals for SO₂/HCl Control. Funded by the State of Illinois through the Illinois Clean Coal Institute (ICCI), 2014-2015.
 - (xx). Pyrolysis of Polyethylene Terephthalate (PET) wastes to MW-CNTs. Funded by Canon Virginia Inc., 2017.
 - (xxi). Pyrolysis of Polyethylene (PE) Wastes to MW-CNTs. Funded by Canon Virginia Inc., 2018.
 - (xxii). Containment of Greenhouse Gases through use of Refrigerants that are based on Petroleum-derived Products and Recycled CO₂. Funded by The American Chemical Society – Petroleum Research Fund, 2018-2020.
 - (xxiii). On the Torrefied Biomass Grind Sizing for Firing or co-Firing with Coal in Existing Boilers, Funded by NSF, 2018-2021.

PROFESSIONAL HONORS:

- Elected Fellow of the Combustion Institute, 2018
- Elected to the Steering committee of the Greek Energy Forum, 2016
- Percy Nicholls Award, Joint Award by the American Society of Mechanical Engineers (ASME) and the Society of Manufacturing Engineers (SME), 2015

- George Westinghouse Gold Medal, American Society of Mechanical Engineers (ASME), 2013



- Honorable Mention, co-advisor of best Engineering Thesis, Brazilian Ministry of Education, 2012
- AEA Environmental Award, Brazilian Association of Automotive Engineering, 2012
- Outstanding Oral Presentation Award, SAE, 2010
- Outstanding Teaching Award, ASEE New England Section, 2007
- John J. McCambridge Award, Institute of Hazardous Materials Management, 2007
- Elected Fellow of the Society of Automotive Engineers SAE, 2007
- Elected Fellow of the American Society of Mechanical Engineers ASME, 2006
- Elected Distinguished Professor College of Engineering, Northeastern University, 2006
- SAE Outstanding Faculty Advisor Award, SAE, 2005
- Outstanding Teaching Award, College of Engineering, Northeastern University, 2005
- Outstanding Research Award, College of Engineering, Northeastern University, 2001
- Elected member of ΦΚΦ, Northeastern University, 2000
- Excellence in Teaching Award, University-wide, Northeastern University, 1995
- Outstanding Mechanical Engineering Professor (students' choice) 2010, 2002, 1998, 1995, 1993
- SAE Faculty Advisor Recognition Award, SAE, 1997
- SAE Outstanding Faculty Advisor Award, SAE, 1994
- Ralph E. Teetor Educational Award SAE, 1993
- Charipar Fellow Cummins Engine Company, 1982 and 1983
- Dean's honor list of University of Michigan, Ann Arbor 6 consecutive semesters, 1978-80
- Five yearly excellence awards Greek-Italian High School, Athens 1970-76

PROFESSIONAL AFFILIATIONS:

Member of the honorary engineering societies: ΤΒΠ, ΠΤΣ, ΦΚΦ. Member of the professional societies: SAE (Society of Automotive Engineers), SME (Society Manufacturing Engineering), ASME (American Society of Mechanical Engineers), ASEE (American Society of Engineering Education), AIAA (American Institute of Aeronautics and Astronautics), ACS (American Chemical Society), Air and Waste Management Association, the American Association for the Advancement of Science (AAAS) and of the Combustion Institute.

PROFESSIONAL SERVICE:

Member of the organizing committee of the International Conference of Coal Utilization and Fuel Systems.

Senator at the Northeastern Faculty Senate.

Member of the University Financial Affairs and Financial Priorities Committees.

Member of the University Appeals Resolution Committee.

Reviewer for NSF, DOE, EPA, SAE, ASME, the Combustion Institute

Reviewer for the Journals of Environmental Engineering, Solar Energy, ASME Journal of Heat Transfer, AIChE Journal, Energy Resources Technology, Dynamic Systems, Measurement and Control, Combustion & Flame, Combustion Science and Technology, Review of Scientific Instruments, Journal of the Air & Waste Management Association, Hazardous Wastes and Hazardous Materials, Atmospheric Environment, Energy & Fuels, Environmental Science and Technology, Fuel, Biomass and Biotechnology, etc.

Academic advisor for ten completed Ph.D, thirty-five completed Master's theses and twenty-five completed undergraduate research projects at NU.

Co-advisor for five completed Ph.D theses at MIT and one at the Polytechnion of Athens.

Co-advisor for two completed Masters theses at Tufts University.

Currently, academic advisor for 3 PhD students and 3 MS students.

Founder and faculty advisor of the NU - SAE student branch from 1994-2010.

LANGUAGES: Greek, English (Oxford's "Proficiency in English"), Italian (Diploma di Esperto in Lingua e Letteratura Italiana), working knowledge of Spanish, and limited knowledge of Latin.

GENERAL INTERESTS: include: architecture and poleodomy, impact of pollution on modern cities, literature, arts, poetry, classical music, world affairs, human and animal rights (member of Amnesty International, Greenpeace, MSPCA, Sierra Club), amateur car racing (AROC, FCA, SCCA).

PATENTS:

1. "Rotating Diesel Particulate Trap." **U.S. Patent No. 5,013,340**, 1991. Co-inventor M. Taslim.
2. "Pulsed, Reverse-Flow Regenerated Diesel Trap Capturing Soot, Ash and PAH's." **U.S. Patent No. 5,253,476**, 1993. Co-inventor: N. Khalil.
3. "Production of Polymer Particles in Powder Form Using an Atomization Technique." **U.S. Patent No. 5,269,980**, 1993. Co-inventors: T. Panagiotou and R.C. Flagan.
4. "Method of Simultaneously Removing SO₂ and NO_x Pollutants from Exhaust of a Combustion System." **U.S. Patent No. 5,312,605**, 1994. Co-inventor: D. Wise.
5. "Use of Aromatic Salts for Simultaneously Removing SO₂ and NO_x Pollutants from Exhaust of a Combustion System." **U.S. Patent No. 5,352,423**, 1994. Co-inventor: D. Wise.
6. "A Flow-Through Incinerator Coupled to an Aerodynamically-Cleaned Diesel Particulate Trap for Diesel Engine Exhaust Gas." **U.S. Patent No. 5,390,492**, 1995.

7. "Control of NO_x Emissions from Diesel Engines Using Filtered EGR." **U.S. Patent No. 5,426,936**, 1995. Co-inventor: R. Abrams.
8. "Simultaneous Control of SO₂, NO_x, HCl and Particulates by In-Furnace High Temperature Sorbent Injection and Particulate Removal." **U.S. Patent No. 5,785,936**, 1998.
9. "Process for Producing Polymer Coatings with Various Porosities and Surface Areas." **U.S. Patent No. 6,143,370**, 2000. Co-inventor: T. Panagiotou.
10. "Carbon Nanostructures from Pyrolysis of Organic Materials." **U.S. Patent No: 9,051,185 B2 A1**, 2015. Co-inventors: C. Zhuo, H. Richter.
11. "Method and Device for Fuel and Power Generation by Clean Combustion of Organic Waste Materials." **U.S. Patent No. 9,664,382**, 2017. Co-inventors: Christopher Flanagan, Anna Craver, Brittney Rose Lynn, Mason Riley, Katherine Dixon, Wilbraham, MA; Chuanwei Zhuo.
12. "Carbon Nanostructures from Pyrolysis of Organic Materials." **U.S. Patent No: 9,738,524**, 2017. Co-inventors: C. Zhuo, H. Richter.
13. "Catalyst and Method for Synthesis of Carbon Nanomaterials." Co-inventor C. Zhuo, U.S. Patent Pending (US 14,447,196), filed July 30, 2014.

EDITED BOOKS:

"Calcium Magnesium Acetate. An Emerging Bulk Chemical for Environmental Applications." Co-editor with D.L. Wise and M. Metghalchi. Elsevier, Amsterdam, 1991.

BOOK CHAPTERS:

"A Waste-Derived Chemical for Acid Rain Control." in Environmental Biotechnology: Principles and Applications. Donald L. Wise, Judith Steciak and Yiannis A. Levendis. Moo-Young M., Anderson, W.A. and Chakrabarty, A.M. Editors, pp. 237-248. Kluwer Academic Publishers, Dordrecht/Boston/London, 1995.

"Control of Submicron Air Toxin Particles after Coal Combustion Utilizing Calcium Magnesium Acetate" Jianxi Zhao, Donald L. Wise, Edgar B. Guttoff, Joseph D. Gresser and Yiannis A. Levendis. Contributed chapter in the book Environmental Biotechnology and Cleaner Bioprocesses, Sanchez, G. and Hernandez, E., Editors, Taylor & Francis, London, 2000.

"Diesel Engines" by Theodore C. Zannis, Roussos G. Papagiannakis and Yiannis A. Levendis. Contributed chapter in the book "Oxygen-Enhanced Combustion." Second Edition, Charles E. Baukal, Editor, CRC Press, Taylor and Francis Group, Chapter 30, pages 681-710, 2013. Print ISBN: 978-1-4398-6228-5.

"Critical Review of the Effects of Diesel Fuel Composition and Properties on Engine Performance and Pollutant Emissions" by Theodore C. Zannis, Elias A. Yfantis, Dimitrios T. Hountalas,

Roussos G. Papagiannakis and Yiannis A. Levendis. Contributed chapter in the book “Diesel Fuels: Characteristics, Performances and Environmental Impacts.” Cristobal Silva and Agustin Rivera, Editors, Nova Publishers, Chapter 1, pages 1-60, 2013. Print ISBN: 978-1-62618-867-9 (eBook).

ENCYCLOPEDIA CHAPTERS: “Emission Purification Technologies,” Invited Chapter in the volume of *Environmental and Ecological Chemistry* (A. Sabljic, Editor) of the **UNESCO** On-line Encyclopedia of **Life Support Systems (UNESCO-EOLSS)**, 2004, updated in 2007.

ARCHIVAL PEER-REVIEWED JOURNAL PUBLICATIONS:

- J1.** “Effect of Oxygen Enrichment on the Performance and Emissions of I.D.I. Diesel Engines” J. Ghojel, J. C. Hilliard and Y. A. Levendis. *SAE publication 830245*, p.1-14, 1983.
- J2.** “Combustion of Uniformly Sized Glassy Carbon Particles” Yiannis A Levendis and Richard C. Flagan, *Combustion Science and Technology* **53**, 2-3, p.117-136, 1987.
- J3.** “Physical Properties and Oxidation Rates of Chars from three Bituminous Chars.” Ranajit Sahu, Yiannis A. Levendis, Richard C. Flagan and George R. Gavalas. *Fuel* **67**, p.275-283, 1988.
- J4.** “Glassy Carbons from Poly(furfuryl alcohol) Copolymers: Structural Studies by High-Resolution Solid-State NMR Techniques.” Helmut Eckert, Yiannis A. Levendis and Richard C. Flagan. *Journal of Physical Chemistry* **92**, p.5011-5019, 1988.
- J5.** “Synthesis, Formation and Characterization of Micron-Sized Glassy Carbon Spheres of Controlled Pore Structure.” Yiannis A. Levendis and Richard. C. Flagan. *Carbon* **27**, 2, p. 265-283, 1989.
- J6.** “Oxidation Kinetics of Monodisperse Spherical Carbonaceous Particles of Variable Properties” Yiannis A. Levendis, Richard C. Flagan and George R. Gavalas. *Combustion and Flame* **76**, p. 221-241, 1989.
- J7.** “Post-Ignition Phenomena in the Combustion of Single Coal Char Particles” Yiannis A. Levendis, Ranajit Sahu, Richard C. Flagan and George R. Gavalas. *Fuel* **68**, p.849-855, 1989.
- J8.** “Catalysis of the Combustion of Synthetic Char Particles by Various Forms of Calcium Additives” Yiannis A. Levendis, Sookwu Nam, Michael Loewenberg, Richard C. Flagan and George R. Gavalas. *Journal of Energy & Fuels* **3**, p.28-37, 1989.
- J9.** “Characterization of the Environment in a Laminar Flow Furnace with Applications to the Combustion of Coal and Coal-Water Slurries”, John G. Cumper, Yiannis A. Levendis and Mohamad Metghalchi. *ASME publication HTD-Vol* **148**, p.89-96, 1990.
- J10.** “Development of a Self-Cleaning Particle Trap for Diesel Engine Particulate Control” Yiannis

- A. Levendis, Thomai Panagiotou and Mo E. Taslim. *SAE publication 900601*, Vol. SAE SP-816, p.195-201, 1990.
- J11.** “Evaluation of a Self-Cleaning Particulate Control System for Diesel Engines” Yiannis A. Levendis, Kevin McNerney and Thomai Panagiotou. *SAE publication 910333*, Vol. SAE SP-240, p.183-193, 1991.
- J12.** “Combustion Behavior and Kinetics of Synthetic and Coal-derived Chars: Comparison of Theory and Experiment” Michael Loewenberg and Yiannis A. Levendis. *Combustion and Flame* **84**, p. 47-65, 1991.
- J13.** “Combustion Characteristics of Carbonaceous Residues from Heavy Oil Fired Boilers” Paul S. Northrop, George R. Gavalas and Yiannis A. Levendis, *Energy and Fuels* **5**, p. 587-594, 1991.
- J14.** “Generation of Spherical and Monodisperse Particles of Poly(styrene) and Poly(methyl methacrylate) by Atomization of Monomers or Dissolved Polymer Precursors” Thomai Panagiotou and Yiannis A. Levendis. *Journal of Applied Polymer Science* **43**, p.1549-1558, 1991.
- J15.** “Development of a Diesel Particulate Control System with Wall-Flow Filters and Reverse Cleaning Regeneration.” Najib Khalil and Yiannis A. Levendis, *SAE publication 920567*, Vol. SAE SP-896, p.217-231, 1992. Also selected for the **1992 SAE Transactions**.
- J16.** “Optimization of a Self-Cleaning Particulate Control System - Evaluation of the Retention of PACs and HC Emissions.” Iraklis Pavlatos and Yiannis A. Levendis, *SAE publication 920568*, Vol. SAE SP-896, p.233-247, 1992.
- J17.** “Preparation of Monodisperse Carbonaceous Particles with Micro-, Meso-, and Macro-porous Structures” Khaled M. Daer and Yiannis A. Levendis. *Journal of Applied Polymer Science* **45**, p.2061-2073, 1992.
- J18.** “Development of Multi-Color Pyrometers to Monitor the Transient Response of Burning Carbonaceous Particles.” Yiannis A. Levendis, Kelvin Rafael Estrada, and Hoyt C. Hottel. *Review of Scientific Instruments* **63** (7), p.3608-3622, 1992.
- J19.** “The Effectiveness of Calcium Magnesium Acetate (CMA) as a SO_x Sorbent in Coal Combustion” Yiannis A. Levendis, Wenqi Zhu, Donald L. Wise and Girard A. Simons. *AIChE Journal*, **63** (7), p.761-773, 1993.
- J20.** “Observations on the Combustion Behavior of Coal Water Fuels and Coal Water Fuels Impregnated with Calcium Magnesium Acetate” Ajay Atal and Yiannis A. Levendis. *Combustion and Flame*, **39** (5), p.61-89, 1993.
- J21.** “Design of a Diesel Particulate Trap-Incinerator with Simultaneous Filtration and Compressed-Air Regeneration (CAR).” Sung Ho Kim and Yiannis A. Levendis, *SAE*

publication 930367, Vol. SAE SP-943, p.183-194, 1993. Also selected for the **1993 SAE Transactions**.

- J22.** “On-Road Testing of a Reverse Air-Flow Cleaning, Soot-Oxidizing Diesel Particulate Trap System.” Sandeep Mehta Yiannis A. Levendis and Najib Khalil, *SAE publication 930368*, Vol. SAE SP-943, p.195-211, 1992. Also selected for the **1993 SAE Transactions**.
- J23.** “An Exploratory Study on the Combustion and PAH Emissions of Selected Municipal Waste Plastics” Lloyd Wheatley, Yiannis A. Levendis and Paul Vouros. *Environmental Science and Technology*, **27** (13) p.2885-2895, 1993.
- J24.** “Control of Diesel Soot and NO_x Emissions with a Particulate Trap and EGR.” Yiannis A. Levendis, Iraklis Pavlatos and Richard Abrams. *SAE publication 940460*, Vol. SAE SP-1020, p.225-233, 1994.
- J25.** “An Aerodynamically Regenerated Diesel Particulate Trap with a Flow-through Soot Incinerator Section” Sandeep Mehta, Frederick Oey, Christianto Sumbung, Chester Li, and Yiannis A. Levendis. *SAE publication 940461*, Vol. SAE SP-1020, p.235-248, 1994.
- J26.** “Combustion of CWF Agglomerates from Pulverized or Micronized Bituminous Coal, Carbon Black and Diesel Soot.” Ajay Atal and Yiannis A. Levendis. *Combustion and Flame*, **98** (4), p.326-349, 1994.
- J27.** “A Study on the Combustion Characteristics of PVC, Poly(styrene), Poly(ethylene) and Poly(propylene) Particles under High Heating Rates.” Thomai Panagiotou and Yiannis A. Levendis. *Combustion and Flame*, **99** (1), p.53-74, 1994.
- J28.** “The Effectiveness of Calcium (Magnesium) Acetate and Calcium Benzoate as NO_x Reduction Agents in Coal Combustion.” Judith Steciak, Yiannis A. Levendis and Donald L. Wise. *Combustion Science and Technology*, **102** (1-6), p.193-211, 1994.
- J29.** “Combustion Behavior of Poly(styrene) Particles of Various Degrees of Crosslinking and Styrene Monomer Droplets” Thomai Panagiotou, Yiannis A. Levendis and Michael A. Delichatsios. *Combustion Science and Technology*, **103** (1-6), p.63-84, 1994.
- J30.** “Combustion and SO₂-NO_x Emissions of Bituminous Coal Particles Treated with CMA” Ajay Atal, Judi Steciak and Yiannis A. Levendis. *Fuel*, **74** (4), p.495-506, 1995.
- J31.** “Diesel Vehicle Application of an Aerodynamically Regenerated Trap and EGR System.” Frederick Oey, Sandeep Mehta and Yiannis A. Levendis. *SAE publication 950370*, Vol. SAE SP-1073, p.103-116, 1995.
- J32.** “An Aerodynamically Regenerated Diesel Particulate Trap Coupled to an Electric Soot Incinerator with Dual Wall-Flow Filters.” Jorge Caceres and Yiannis A. Levendis. *SAE publication 950371*, Vol. SAE SP-1073, p.117-126, 1995.

- J33.** “Reducing Diesel Particulate and NO_x Emissions via Filtration and Particle-Free Exhaust Gas Recirculation.” Najib Khalil, Yiannis A. Levendis and Richard Abrams. *SAE publication 950736*, Vol. SAE SP-1073, p.165-174, 175-186, 1995.
- J34.** “A Thermally Regenerated Diesel Particulate Trap Using High-Temperature Glass-Fiber Filters.” Sandeep Mehta, Yiannis A. Levendis and Joseph Adiletta. *SAE publication 950737*, Vol. SAE SP-1073, p.175-186, 1995.
- J35.** “The Effectiveness of Calcium Magnesium Acetate as a Dual SO₂-NO_x Emission Control Agent.” Judith Steciak, Yiannis A. Levendis and Donald L. Wise, *AIChE Journal*, **41**, 3, p.712-722, 1995.
- J36.** “Dual SO₂-NO_x Concentration Reduction by Calcium Salts of Carboxylic Acids.” Judith Steciak, Yiannis A. Levendis, Donald L. Wise and Gerard Simons. *Journal of Environmental Engineering*, **121**, 8, p.595-604, 1995.
- J37.** “Comparison of the Combustion Behavior of Pulverized Waste Tires and Coal.” Ajay Atal and Yiannis A. Levendis. *Fuel*, **74** (11), p.1570-1581, 1995.
- J38.** “NO_x and SO₂ Emissions from Pulverized Coal and Waste Tire: The Role of Devolatilization and Char Combustion Phases.” Ajay Atal, Judi Steciak and Yiannis A. Levendis. *IMECE Proceedings of the ASME Heat Transfer Division*, HTD-Vol. **317-2**, p.1-9, 1995.
- J39.** “An Optimization Study on the Control of NO_x and Particulate Emissions from Diesel Engines.” Chris Larsen, Frederic Oey and Yiannis A. Levendis. *SAE publication 960473*, Vol. SAE SP-1140, p.175-191, 1996.
- J40.** “Measurements of Particle Flame Temperatures Using Three-Color Optical Pyrometry” Thomai Panagiotou, Yiannis A. Levendis and Michael A. Delichatsios. *Combustion and Flame*, **104**, (3), p.272-277, 1996.
- J41.** “Control of Air Toxin Particulate and Vapor Emissions after Coal Combustion Utilizing Calcium Magnesium Acetate.” Judith I. Shuckerow, Judith A. Steciak, Donald L. Wise, Yiannis A. Levendis, Girard A. Simons, Joseph D. Gresser, Edgar B. Gutoff and C. David Livengood. *Resources, Conservation and Recycling*, **16**, p.15-69, 1996.
- J42.** “Observations on the Combustion of Pulverized PVC and Poly(ethylene)” Thomai Panagiotou and Yiannis A. Levendis. *Combustion Science and Technology*, **112**, p.117-140, 1996.
- J43.** “Comparative Study on the Combustion and Emissions of Waste Tire Crumb and Pulverized Coal” Yiannis A. Levendis, Ajay Atal, Joel Carlson, Yuriy Dunayevskiy and Paul Vouros. *Environmental Science and Technology*, **30**, 9, p.2742-2754, 1996.
- J44.** “Aromatic Hydrocarbon Emissions from Burning Poly(styrene), Poly(ethylene) and PVC Particles at High Temperatures” Thomai Panagiotou, Yiannis A. Levendis, Joel Carlson, Yuriy M. Dunayevskiy and Paul Vouros. *Combustion Science and Technology*, **116-117**

(1-6), p.91-128, 1996.

- J45.** “The Effect of Bulk Equivalence Ratio on the PAH Emissions from the Combustion of PVC, Poly(styrene) and Poly(ethylene).” Thomai Panagiotou, Yiannis A. Levendis, Joel Carlson and Paul Vouros. *Proceedings of the Combustion Institute*, **26**, p. 2421-2430, 1996.
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- J47.** “An Integrated Diesel Engine Particulate ART-EGR Retrofit System with Engine Sensory Inputs.” Chris Larsen and Yiannis A. Levendis. *SAE publication 970477*, Vol. SAE SP-1140, p. 183-201, 1997.
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- C105.** “Introduction of the Engineering Design Process to Middle- and High-School Science Teachers through the Re-Design of a Toy” Yiannis A. Levendis and Christos Zahopoulos. Presented at the *NSTA National Conference*, Boston, March 27-30, 2008.
- C106.** “Combustion of two Lignite Coals in O₂-N₂ & O₂-CO₂.” Yiannis A. Levendis and Kulbhushan Joshi. *Proceedings of the 33rd Coal Utilization & Fuel Systems International Conference*, CD-ROM, Clearwater, Florida, June 2-6, 2008.
- C107.** “Chemical Speciation of Premixed Ethylbenzene Flames at the Soot Onset Limit at various (ϕ , T) pairs.” Ali Ergut, Richard J. Therrien, Yiannis A. Levendis, Henning Richter, Jack B. Howard and Joel Carlson, Presented at the *32nd International Symposium on Combustion*, Montreal, Canada, August 3-8, 2008.
- C108.** “Cryogenic Extinction of Liquid Pool Fires.” Yiannis A. Levendis and Michael Delichatsios, Presented at the *32nd International Symposium on Combustion*, Montreal, Canada, August 3-8, 2008.
- C109.** “Emissions Generated during the Co-Combustion of Coal and Biomass Fuel Blends.” Marcia Bragato, Kulbhushan Joshi, Joel Carlson, Jorge A. S. Tenorio and Yiannis A. Levendis, Presented at the *32nd International Symposium on Combustion*, Montreal, Canada, August 3-8, 2008.
- C110.** “Emergency Fire Extinction by Direct Application of Liquid Nitrogen.” Yiannis A. Levendis, Invited presentation at the *ACHMM 2008 National Conference and Exposition*, Minneapolis, Minnesota, Canada, September 7-10, 2008.
- C111.** “Emissions from Direct or Indirect Combustion of Tire-Derived Fuel.” Yiannis A. Levendis, *Proceedings of the 2008 ASME International Mechanical Engineering Congress and Exposition (IMECE2008)*, Boston, Massachusetts, October 31-November 6, 2008.
- C112.** “Cryogenic Extinction of Liquid Pool Fires” Yiannis Levendis, Ali Ergut and Michael Delichatsios. Invited paper presented at the *2009 AIChE Spring National Meeting and 5th Global Congress on Process Safety*, Tampa, Fl., April 26-30, 2009.
- C113.** “Comparative emission yields from Combustion of beds of various solid fuels.” Yiannis A. Levendis. *Proceedings of the 34th Coal Utilization & Fuel Systems International Conference*, CD-ROM, Clearwater, Florida, June 1-6, 2009.
- C114.** “Intake-Air Oxygen-Enrichment of Diesel Engines as a Power Enhancement Method and Implications on Pollutant Emissions” Theodoros C. Zannis, Dimitrios T. Houndalas, Elias

Yphantis, Roussos Papagiannakis and Yiannis A. Levendis. [Proceedings of the Internal Combustion Engine Division Fall Technical Conference \(ICE FTC 09\)](#), Lucerne, Switzerland, Sept. 27-30, 2009.

- C115.** “Influence of Reactant Fuel Class on the Flame Synthesis of Carbon Nanostructures.” Brendan Hall, Chuanwei Zhuo, Henning Richter and Yiannis A. Levendis, Presented at the [Eastern Section Meeting of the Combustion Institute](#), College Park, Maryland, October 18-21, 2009.
- C116.** “Analysis of Light Hydrocarbon Gases in the Pyrolysis and Combustion Processes of Waste Tires” Joner O. Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. Presented at the [2010 TMS Annual Meeting and Exhibition](#). Seattle, WA, February 14-18, 2010.
- C117.** “Ignition of Single Coal Particles in O₂/N₂/CO₂ Atmospheres.” Chris Stivers and Yiannis A. Levendis. [Proceedings of the 35th Coal Utilization & Fuel Systems International Conference](#), CD-ROM, Clearwater, Florida, June 7-10, 2010.
- C118.** “Analysis of Light Hydrocarbon Gases in the Pyrolysis Process of Sugarcane Bagasse.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the 65th International ABM Congress](#); Jul 26-30, 2010; Rio de Janeiro, Brazil.
- C119.** “Assessment and Control of Gaseous Emissions Generated during the Pyrolysis Process of wastes from Bio-Ethanol Industry.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the 5th International Bioenergy Congress](#); Aug. 10-13, 2010; Curitiba, Brazil.
- C120.** “Feasibility Study of the Use of Sugarcane Bagasse as Raw Material to Produce Nanomaterials” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the 5th International Bioenergy Congress](#); 2010 Aug. 10-13, 2010; Curitiba, Brazil.
- C121.** “Analysis of Gaseous Emissions Generated in the Pyrolysis Process of DDGS.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the XXVIII National Congress of Maize and Sorghum](#); Aug. 30-Sep. 02, 2010; Goiania, Brazil.
- C122.** “Recovery of Waste Tires in the Synthesis of Carbon Nanotubes.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the XVIII International Symposium on Automotive Engineering](#); Sep 22-23, 2010; Sao Paulo, Brazil.
- C123.** “Microstructural analysis of carbon nanotubes produced from pyrolysis-combustion of styrene-butadiene-rubber (SBR)” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the 19th CBECiMat - Brazilian Congress of Materials Science and Engineering](#). Campos do Jordão - SP, Brazil, November 21-25

2010, p.188-196.

- C124.** “A Novel Technology for Green(er) Manufacturing of CNTs via Recycling of Waste Plastics” Chuanwei Zhuo, Brendan Hall, Henning Richter and Yiannis A. Levendis, [Proceedings of the 2010 MRS Fall Meeting](#), Boston, November 29 – December 2, 2010.
- C125.** “Converting Plastic Waste into Sustainable Clean Power.” Chuanwei Zhuo, Jeff Young, Shane McElroy, David Laskowski, Jason Lee, Paul Conroy, Brendan Hall and Yiannis A. Levendis, Presented at the [NSF CMMI Contractors Conference](#), themed Engineering for Sustainability and Prosperity, Atlanta, Georgia, January 3-7, 2011.
- C126.** “NO_x and SO₂ Emissions of Coal/Biomass Blend from Combustion in CO₂/O₂ and N₂/CO₂ Environments” Paula Manoel Crnkovic, Fayza Kazanc, Reza Khatami and Yiannis A. Levendis. [Proceedings of the 14th Annual Energy, Utility & Environment Conference – EUEC 2011](#); Phoenix Arizona, Jan.31-Feb 2, 2011.
- C127.** “Microstructural Characterization of Nanomaterials Produced from co-products of the Ethanol Production (DDGS).” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the 2011 TMS Annual Meeting & Exhibition](#). San Diego, CA, February 27 – March 3, 2011.
- C128.** “Microstructural Analysis of Nanomaterials Synthesized from Unserviceable Tires.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the 2011 TMS Annual Meeting & Exhibition](#). San Diego, CA, Febr. 27–March 3, 2011.
- C129.** “Analysis and Control of Light Hydrocarbon Gases in the Pyrolysis and Combustion Process of Several Solid Wastes” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A. S. Tenorio. [Proceedings of the 2011 TMS Annual Meeting & Exhibition](#). San Diego, CA, February 27 – March 3, 2011.
- C130.** “Cryogenic Suppression of Fires.” Yiannis A. Levendis and Michael A. Delichatsios. [Proceedings of the Suppression Detection and Signaling Conference SUPDET 2011, of the Fire Protection Research Foundation](#), pages 130-138, Orlando, Florida, March 22-25, 2011.
- C131.** “Cryogenic Suppression of Liquid Pool Fires and Wooden Crib Fires.” Yiannis A. Levendis and Michael A. Delichatsios. Featured article in the [Fire and Safety Magazine \(FS-Word.com\)](#), pages 4-8, Spring 2011 edition.
- C132.** “In-Furnace Behavior and Emissions from Conventional Combustion and Oxy-Combustion of Coal.” Yiannis A. Levendis, Reza Khatami and Feyza Kazanc. [Proceedings of the 36th Coal Utilization & Fuel Systems International Conference](#), CD-ROM, Clearwater, Florida, June 5-9, 2011.
- C133.** “Power Generation by Sequential Liquefaction, Gasification and *Clean* Combustion of Waste Plastics” Yiannis A. Levendis. Invited Presentation at the [TechConnect World](#)

Summit, Conference and Expo, Boston, Massachusetts, June 14-15, 2011.

- C134.** “Microstructural Characterization of Nanomaterials Synthesized from Pyrolysis Gases of Sugarcane Bagasse.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A.S. Tenorio. Brazilian Association of Metallurgy, Materials and Mining. [Proceedings of the 66th ABM Congress](#), Sao Paulo, Brazil, p.1592-1598, ISSN 1516-392X, 18-22 July 2011.
- C135.** “Characterization of Light Hydrocarbon Emissions from the Combustion Process of PET Bottles.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A.S. Tenorio. Brazilian Association of Metallurgy, Materials and Mining. [Proceedings of the 66th ABM Congress](#), Sao Paulo, Brazil, p. 1584-1591, ISSN 1516-392X, 18-22 July 2011.
- C136.** “Feasibility Study of the Use of PET bottles as Raw Material to Produce Nanomaterials.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis and Jorge A.S. Tenorio. Brazilian Association of Metallurgy, Materials and Mining. [Proceedings of the 66th ABM Congress](#), Sao Paulo, Brazil, p. 2253-2259, ISSN 1516-392X, 18-22 July 2011.
- C137.** “Raman Spectroscopy of Nanomaterials Obtained from Solid Wastes.” Joner Oliveira Alves, Chuanwei Zhuo, Yiannis A. Levendis, Jorge A.S. Tenorio, L.H.F. Lima and P. Corio, Brazilian Association of Metallurgy, Materials and Mining. [Proceedings of the 66th ABM Congress](#), Sao Paulo, Brazil, p. 1897-1903, ISSN 1516-392X, 18-22 July 2011.
- C138.** “Gaseous and Particulate Emissions from Conventional Combustion and Oxy-Combustion of a Lignite Coal.” Feyza Kazanc and Yiannis Levendis. Proceedings of the 2011 Fall Technical Meeting of the [Eastern States Section of the Combustion Institute](#), University of Connecticut, Storrs, CT, October 9-12, 2011.
- C139.** “Differences in Single Coal Particle Ignition Mechanisms in N₂ and CO₂-rich Environments” Reza Khatami and Yiannis Levendis. Proceedings of the 2011 Fall Technical Meeting of the [Eastern States Section of the Combustion Institute](#), University of Connecticut, Storrs, CT, October 9-12, 2011.
- C140.** “Synthesis of Carbon Nanomaterials via Up-Cycling Several Solid Wastes.” Chuanwei Zhuo, Joner Oliveira Alves, Jorge A.S. Tenorio and Yiannis A. Levendis. [Presented at the Materials Science & Technology 2011 Conference & Exhibition](#), Columbus, Ohio, October 16-20, 2011.
- C141.** “Pool Fire Extinction by Remotely-Controlled Application of Liquid Nitrogen.” Yiannis A. Levendis and Michael A. Delichatsios. [Invited talk at the 2011 FIRESEAT Conference](#) at the National Museum of Scotland, Edinburgh, UK, November 9, 2011.
- C142.** “Waste-to-Energy Conversion by Stepwise Liquefaction, Gasification and “Clean Combustion” of Waste Plastics.” Saleb Talebi Anaraki, Andrew Davis, Chuanwei Zhuo and Yiannis A. Levendis. Proceedings of the [20th Annual North American Waste-to-Energy Conference](#), Portland, Maine, April 23-25, 2012.

- C143.** “Ignition, Combustion and Emissions from Sugarcane Bagasse Burning under Conventional and Oxy-Fuel Conditions.” Yiannis A. Leventis, Reza Khatami and Feyza Kazanc. Proceedings of the [37th Coal Utilization & Fuel Systems International Conference](#), CD-ROM, Clearwater, Florida, June 4-7, 2012.
- C144.** “Up-cycling of Solid Polymer Wastes and Biomass Residues to Carbon Nanomaterials” Chuanwei Zhuo, Joner Alves, Jorge Tenorio, Henning Richter and Yiannis A. Leventis. [Proceedings of the 2012 MRS Fall Meeting](#), Boston, November 25 – 30, 2012.
- C145.** “Flame Synthesis of Carbon Nanomaterials Using Polyethylene, Ethylene, Ethyl-Benzene and Ethyl-Alcohol as Fuels” Chuanwei Zhuo, Brendan Hall, Henning Richter and Yiannis A. Leventis. [Proceedings of the 2012 MRS Fall Meeting](#), Boston, November 25–30, 2012.
- C146.** “Physical and Chemical Characteristics of Particulate Matter (PM1) Emitted from Combustion of a Bituminous Coal in Air and Oxy-Fuel Environments.” Feyza Kazanc and Yiannis Leventis. Proceedings of the [8th US National Meeting of the Combustion Institute](#), Salt Lake City –UT, USA, 19-22 May 2013.
- C147.** “Comparative Radiative Transfer from Burning Single Particles of Coal and Biomass in Conventional and in Oxy-Combustion Conditions.” Yiannis A. Leventis, and Reza Khatami. Proceedings of the [38th Coal Utilization & Fuel Systems International Conference](#), CD-ROM, Clearwater, Florida, June 3-6, 2013.
- C148.** “Soot Volume Fractions in Volatile Matter Envelope Flames of Bituminous Coal Particles in Air and Oxy-Fuel Combustion” Reza Khatami and Yiannis A. Leventis. Proceedings of the [ASME 2013 Power Conference](#), Boston, Massachusetts, July 29 - August 1, 2013.
- C149.** “Environmentally-Benign Conversion of Biomass Residues to Electricity” Andrew Davis, Rasam Soheilian, Chuanwei Zhuo and Yiannis A. Leventis. Proceedings of the [ASME 2013 Power Conference](#), Boston, Massachusetts, July 29 - August 1, 2013.
- C150.** “Rank-Dependent Combustion Behavior of Pulverized Coals.” Yiannis A. Leventis, and Reza Khatami. Proceedings of the [39th Coal Utilization & Fuel Systems International Conference](#) CD-ROM, Clearwater, Florida, June 1-4, 2014.
- C151.** “Fine Ash Particle Emissions from Combustion of Coals and Biomass Process Residues” Feyza Kazanc, Amanda Ruscio and Yiannis A. Leventis, Presented at the [36th International Symposium on Combustion](#), San Francisco, USA, August 4-8, 2014.
- C152.** “Effects of CO₂ on Carbon Nanotube Formation from Thermal Decomposition of Ethylene” Chuanwei Zhuo, Fariba Seyedzadeh Khanshan, Richard West, Henning Richter and Yiannis A. Leventis. [Proceedings of the 2014 MRS Fall Meeting](#), Boston, December 1-5, 2014.
- C153.** “Coal and Biomass Combustion Study under Air and Oxy-Fuel Atmospheres.” Juan Riaza,

- Reza Khatami and Yiannis A. Levendis, Presented at the 5th International Workshop on Co-firing Biomass with Coal by the IEA Clean Coal Centre, CD-ROM, Drax, UK, September 16-17, 2015.
- C154.** “Use of Recycled Plastic Wastes Instead of Premium Gaseous Hydrocarbons as Feedstocks for Sustainable Synthesis of Carbon Nanotubes.” Chuanwei Zhuo and Yiannis A. Levendis [Proceedings of the 144th TMS 2015 Annual Meeting & Exhibition](#). Orlando, FL, March 15-19, 2015.
- C155.** “Emissions from Co-firing Coals.” Yiannis A. Levendis, Aidin Panahi, Emad Rokni and Xiaohan Ren. [Proceedings of the 40th Coal Utilization & Fuel Systems International Conference CD-ROM](#), Clearwater, Florida, May 31-June 4, 2015.
- C156.** “Oxygen Concentration in Oxy-fuel Combustion.” Yiannis A. Levendis and Reza Khatami. [Proceedings of the 41st Coal Utilization & Fuel Systems International Conference CD-ROM](#), Clearwater, Florida, June 5-9, 2016.
- C157.** “Combustion Behavior of Herbaceous and Woody Biomass.” Aidin Panahi, Yiannis A. Levendis, Nikita Vorobiev, Martin Schiemann and Viktor Scherer. [Proceedings of the 41st Coal Utilization & Fuel Systems International Conference CD-ROM](#), Clearwater, Florida, June 5-9, 2016.
- C158.** “Cryogen Capsules to Suppress WildFires.” Craig W. Martland, David P. Marchessault, Andrew McGarey, Diego Rivas, Kevin W. Stanley and Yiannis A. Levendis. Featured article in [Fire and Safety Magazine \(FS-Word.com\)](#), pages 30-33, Fall 2016 edition.
- C159.** “In-Furnace Sulfur Capture by Co-Firing Coal with Alkali-based Sorbents.” Emad Rokni, Hsun-Hsien Chi, Emad Rokni and Yiannis A. Levendis. [Proceedings of the 40th IMECE International Mechanical Engineering Congress & Exposition CD-ROM](#), Phoenix, Arizona, November 14-18, 2016.
- C160.** “Conversion of Waste Plastics into Nano-Carbons and Fuels” Zixiang Wei, Connell Dsouza, Chuanwei Zhuo and Yiannis A. Levendis. [Presented at the 2016 MRS Fall Meeting](#), Boston, November 28 – December 2, 2016.
- C161.** “Design of Liquid Nitrogen Capsules for Forest Fire Suppression” Craig W. Martland, David P. Marchessault, Andrew McGarey, Diego Rivas, Kevin W. Stanley and Yiannis A. Levendis, *Embark*, 1, 12-21, 2016.
http://issuu.com/northeastern/docs/embark_volume_1/43?e=4455913/40861924
- C162.** “Torrefied Biomass Size for Combustion in Existing Boilers.” Aidin Panahi, Mahmut Tarakcioglu and Yiannis A. Levendis, [Proceedings of the 10th US National Meeting of the Combustion Institute](#), April 23-26, Maryland, USA, 2017.
- C163.** “Coal and Biomass Combustion and Gasification Emad Rokni, Aidin Panahi and Yiannis Levendis. [Proceedings of the 10th US National Meeting of the Combustion Institute](#), April

23-26, Maryland, USA, 2017.

- C164.** “Fuel Nitrogen to NO_x Conversion in O₂/CO₂ Atmospheres.” Aidin Panahi, Andrew Baugher, Belinda Slakman, Richard West and Yiannis A. Levendis, [Proceedings of the 10th US National Meeting of the Combustion Institute](#), April 23-26, Maryland, USA, 2017.
- C165.** “Nitrogen Oxide Evolution in Oxy-Coal Combustion.” Aidin Panahi, Andrew Baugher, Belinda Slakman, Richard West and Yiannis A. Levendis, Presented at the [2018 Eastern Sections of the Combustion Institute Spring Technical Meeting](#), March 4-7, Penn State, State College, Pennsylvania, USA, 2018.
- C166.** “Laminar burning Speed of Propane/CO₂ – Air Mixtures” Sai C Yelishala, Ziyu Wang, Hamed Metghalchi, Yiannis A Levendis [Proceedings of the 3rd Thermal and Fluids Engineering Conference \(TFEC\)](#) March 4–7, 2018 Fort Lauderdale, FL, USA.
- C167.** “Assessment of Blends of Hydrocarbons and CO₂ as Alternative Natural Refrigerants” Sai C Yelishala, Xiao Ma, Ziyu Wang, Hamed Metghalchi, Yiannis A Levendis [Proceedings of the 3rd Thermal and Fluids Engineering Conference \(TFEC\)](#) March 4–7, 2018 Fort Lauderdale, FL, USA.
- C168.** “The Impact of Biomass Ash as an Additive on the Nitrogen Partitioning and NO_x Emissions from Coal Combustion”. Richard I. Birley, Jenny M. Jones, L.I Darvell, Allan Williams, D. Waldron, Yiannis A. Levendis, Presented at the [2018 Combustion Institute British Section Spring Meeting](#), April 5, Manchester, UK, 2018.
- C169.** “A Comprehensive Study on Optimizing Conversion of Waste Plastics Using Diverse Catalysts, Carrier Gases, Flow-Rates and Pre-Treatment Methods into Nano-Carbons and Fuels” Aidin Panahi, Xiao Sun, Guangchao Song and Yiannis A. Levendis. Presented at the [2018 MRS Fall Meeting](#), Boston, November 25–30, 2018.

Highlights of other activities include invited talks at the Chemical and Mechanical Engineering departments of MIT (1989 and 1998), Tufts University (1990) and University of Connecticut (1992), as well as serving as co-organizer, chairman and speaker at the International Symposium on CMA held at Northeastern University, April 11-14 1991. Invited speaker at a workshop on “How Elastic is Technology to Regulatory Pressure?” held at Tufts University on May 13, 1994. Presentations were given at three University Coal Research Contractors' Review Conferences at DOE-PETC in Pittsburgh. Presentations were also made at Northeastern University's Science Days (6), at the High School Science Teachers program (3), at the NU Presidential Inauguration week, January 1997 (1), at the NU Centennial Poster Session, May 1998 (2), at the first Materials Showcase, September 1998 (2). A multitude of presentations were made at the NU Research & Scholarship EXPO Showcases 2001-2013. In 2010 and in 2011 our presentations won in the Undergraduate Research category whereas in 2013 one of our presentations was runner up. Served as member of the Scientific Committee of the 4th International Symposium on Feedstock Recycling of Plastics and Other Polymer Materials, September 2007, Jeju, Korea.

- Invited presentation on “The Effect of Temperature of Premixed Flames on their Critical Equivalence Ratio for Soot Formation” at the University of Ulster, Northern Ireland, in May of 2008.
- Invited presentation on a “Self-Sustaining Pyrolyzer/Combustor for Waste Plastics” at the 2010 MIT Energy Conference.
- Invited presentation on “Laboratory Studies on the Ignition and Burning Behavior of Coal under Conventional and Oxy-Combustion Conditions” at the Department of Chemical Engineering of MIT, September 27, 2011.
- Two invited presentations at Showcases of the Massachusetts Clean Energy Center, 2011, 2012.
- Multiple invited presentations at the MIT Energy Showcases of 2010, 2011, 2012, 2013.
- Invited presentation, entitled: “A First Course in Engineering Design Based on an Energy-Centered Thematic Approach,” at the inaugural STEP to Success Conference held at MassBay College, Massachusetts April 12 2013.
- Delivered an invited public lecture to the NU School of Architecture on Understanding Design: <https://www.youtube.com/watch?v=ji6dNJyW20g&list=PLWV41YoXRdK-cAtawa0EfXEqU15NAyWbC>

K-12 Education Outreach

A NSF-BSP 2-week summer course on Pre-engineering Design experience (NU Graduate School of Education course GSE3601) was developed and has been conducted for 6 years. Over the 2005-2010 period approx. 100 high- and middle-school STEM teachers took this course, most of them as receive credit towards a graduate Masters degree in STEM Education and paid tuition to NU. The NSF-funded Boston Science Partnership (BSP) is a partnership between UMass Boston, Northeastern University and Boston Public Schools, as core partners, and the Education Development Center, Harvard Medical School, The College Board and Lesley University as supporting partners. A few highlights are presented below to illustrate the success of the BSP:

- i. **Broad reaching BSP Impact** – BSP included teachers from more than 80% of the 28 middle schools and 30 high schools in the district.
- ii. **Increased Student Achievement is Attributable to BSP Participation** - High-participation schools demonstrate a 43% increase in the percent of students passing the state MCAS compared to nonparticipating schools.
- iii. **Contextualized Content Courses (CCC)** - Eleven unique CCC courses have been offered multiple times. For example, 240 teachers in Year 4 exhibited increases in their content knowledge by between 26 and 97% on pre/post content tests. Students of these teachers realized increases of 8 to 13% over students of the same teachers the previous year on the district’s end-of-year science exams. **One of these eleven courses was a novel course, entitled, “From Science to Engineering: Pre-Engineering design experience” developed and taught by Professor Yiannis Levendis.**
- iv. **Vertical Teaming (VT)** - In Year 5, 52 participants from middle and high school, university and community college examined relationships between and among concepts in grades 6-13 through an improved College Board model and created articulation maps that demonstrate the learning of concepts from middle school through AP exams and freshman college science courses.
- v. **Collaborative Coaching and Learning in Science (CCLS)** - In Year 5 alone, 182 teachers in 30 middle and high schools in BPS engaged in 10-12 week learning cycles composed of identification of a course of study on inquiry topics, peer observations, and follow-up reflection. Facilitation was provided by classroom teachers, with coaching by 2 staff equivalents supported by the BSP.
- vi. **Faculty Seminars (SUP)** - 40 STEM faculty members at UMass Boston, Northeastern University, and Roxbury Community College (RCC) have participated in PD to improve their college teaching.
- vii. **AP Science Support (SUP)** - In Year 5, 308 students (up from 73 in 2006) from 11 schools participated in our AP Science Support Program, 337 students from 14 schools took AP science exams, and 234 passed. 46 AP teachers participated in BSP-supported Urban-Focused AP Institutes.
- viii. **Highly Qualified Teachers** - In the past three years, the number of science courses taught by teachers with the appropriate science license increased by 47%. The number of science courses taught by teachers with no license or a non-relevant license decreased by 22%. The number of licensed physics teachers has increased from 7 to 28 in the last 6 years, and 25% of all the teachers of science added a STEM license to their credentials.
- ix. **Sustainability** - All 11 CCC courses have been approved at the Universities; two science education Centers (The Center of Science and Mathematics In Context (COSMIC) at UMass Boston and the Center for STEM Education at Northeastern) have been established; BPS has established staff positions that support CCLS; an M.Ed. in middle school science has been

established at Northeastern; and \$1.35M in additional related science education grants have been received by the three core partners to continue aspects of the BSP.

- x. **Dissemination** - Over 20 presentations based on BSP work and research have been presented at national conferences, 2 peer-reviewed journal papers have been submitted, 1 is in preparation, and 1 book is in press. One of them is: “A Vertically-Aligned Contextualized Pre-Engineering Design Course for Middle- and High-School Science Teachers”, by Yiannis A. Levendis, Christos Zahopoulos, Cheryl Hall and Jonathan McLaughlin. Proceedings of the ASEE New England Section Meeting, CD-ROM, University of Rhode Island, Kingston, April 20-21, 2007.
- xi. **Cultural Change** - The BSP has made tremendous progress at shifting the culture of University and District participants. University professors have gained respect for K-12 teachers for their skills and pedagogical content knowledge, teachers have benefited working with content knowledgeable University faculty, and teachers look forward to working together across grade bands and across disciplines. PD is much more efficient and effective when all participants "play well in the sand box". The involvement of University faculty is critical to maintaining the accuracy of the scientific content, vertically aligning knowledge with university-level expectations, and maintaining the excitement that the new discoveries of science bring to all participants.



As of October 2018