



CURRICULUM VITAE OF BERNARD R. CUZZILLO, Ph.D., P.E.
PRESIDENT, MECHANICAL ENGINEER, AND FIRE SCIENTIST

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AREAS OF CONSULTATION:

Fire and Thermal Sciences: Fire causation in vehicles, appliances, and machines Thermal and emissions testing Wood ignition and "pyrophoric carbon" Combustion systems CO exposure reconstruction	Automotive Engineering: Component & system performance: Brakes, engines and emissions, interlocks, electronic and computerized systems, human error. Repair analysis	Mechanical Engineering: Heat transfer analysis Laboratory & field testing Microprocessor-based systems Advanced demonstrative evidence Failure analysis Design analysis
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EDUCATION

- 1997 U.C. Berkeley, Mechanical Engineering, Ph.D.
Dissertation topic: Accidental ignition of wood due to self-heating, or "pyrophoric carbon." Major field: Combustion. ME minors: Control systems and heat transfer. Outside minor: Mathematics.
- 1982 U.C. Berkeley, Mechanical Engineering, M.S.
Master's project topic: Laser absorption spectroscopy in a laboratory engine simulator. Course work emphasis on thermosciences.
- 1980 U.C. Berkeley, Mechanical Engineering, B.S.
Course work emphasis in thermosciences.

AWARDS AND HONORS

- 2000, 2007 Co-Chairman of the seminars, Society of Forensic Engineers and Scientists.
- 1998-Present Invited lecturer in Mechanical Engineering 290F, a graduate class entitled Case Studies in Fire Safety Engineering Science, University of California at Berkeley.
- 1999 Jack Bono Engineering Communications Award, awarded by the Society of Fire Protection Engineers, Educational and Scientific Foundation, for contributions to The SFPE Journal of Fire Protection Engineering.

PROFESSIONAL EXPERIENCE

- 2006-Present Founder, Berkeley Research Company (BRC)
- 1991-2006 Co-Founder, Berkeley Engineering And Research, Inc. (BEAR)
A California Corporation offering services encompassing mechanical engineering, fire science, and related disciplines.
- 1988-Present Mechanical Engineering Consultant
Consulting and expert witness testimony in Mechanical Engineering and Fire Science. 40+ trial appearances; 70+ depositions.

- 1987 - 1989 Graduate Student Instructor, U.C. Berkeley
Principal teaching assistant in two graduate classes and a two-week intensive course for professors: ME 230 Real-Time Applications of Mini- and Micro-Computers, and ME 235 Switching Control and Computer Interfacing, and Software for Microprocessor-Based Systems. Responsibilities included laboratory setup and management, report grading, individual instruction, troubleshooting student projects, and substitute lecturing.
- 1980 - 1987 Research Engineer, Chevron Research Company, Richmond, CA
 Technical Engineering: Experimental design and systems design engineering of laboratory engine test facilities. Technical specialties included experimental design, instrumentation and electronics, C-language real-time computer programming, computer operations with experimental data from acquisition and verification to statistical analysis, mechanical design, and process design.
 Project Management: Responsibilities included proposal creation and preparation, planning and coordination, budgeting, formulation of experimental methodology, specification writing, report writing, and oral presentations of technical findings.
 Communication: Extensive technical writing and oral presentations. Company representation at technical society meetings. Editor of a weekly management update highlighting recent technical developments.
 Supervision: Sole supervisor of research technicians and technical advisor to mechanical and electrical engineers, computer programmers, machinists, and mechanics. Responsible for performance appraisals.
- 1981 - 1982 Research Assistant, Lawrence Berkeley Laboratory, U.C. Berkeley
Designed and built a laser absorption system and a transient fuel delivery system for temporal/spatial mapping of hydrocarbons in a laboratory engine.
- 1977 - 1981 Automotive Mechanic/Driver Supervisor, U.C. Central Garage, Berkeley, CA
Created a student mechanic program. Performed all mechanical services on a variety of cars, trucks and buses. Designed and built diesel injector testing equipment. Responsible for functioning of campus shuttle bus service, including driver training and supervision.
- Summer '79 Student Engineer, Hughes Aircraft Company, Los Angeles, CA
Designed hardware and electrical circuits for radar test equipment for the F-18 fighter.

PROFESSIONAL AFFILIATIONS AND LICENSE

Registered Mechanical Engineer, State of California, #M26633 American Soc. of Mech. Engineers
 National Ass'n of Professional Accident Reconstruction Specialists Society of Automotive Engineers
 National Fire Protection Association Society of Forensic Engineers and Scientists

REPRESENTATIVE PROJECTS

- Design and development of a functioning spark- and injection-timing exhibit for courtroom demonstration.
- Invention and development of a method for ultra-low-disturbance hydraulic brake pressure measurement.
- Development of a brake pedal force v. displacement measurement system.
- Laboratory recreations of brake defects, with switch in-out capability.
- Invention and development of a portable, precision Center-of-Mass measurement system.
- Development of CO-Carboxyhemoglobin reconstruction software.
- Development of a NO→NO₂ model for ice rinks.
- Intrinsic thermocouple thermometry of natural gas burners.

SELECTED LABORATORY CAPABILITIES

- Microscopy laboratory including SEM, FE-SEM for uncoated nonconductive specimens, EDS, Stereo optical, Compound optical, PL, BF, DF, DIC, Epi and Trans-illumination.
- Superb photomicrographic capabilities.
- Machine shop with CNC milling machine for specimen preparation.
- High-resolution, ultra-high speed still image capture with instant triggering.
- High-accuracy surface temperature studies. Thermostat calibration testing.
- Electrical event testing.
- Automotive inspection and service facility, including hoist. In-depth hydraulic brake testing.
- Propane and natural gas leak and combustion testing.
- Fault insertion on a wide range of devices.
- Vehicular road testing with instrumentation.
- General instrumented experiments. Computer data acquisition, analysis, and graphical presentation. Video documentation of experiments with on-screen data display.
- Ignition characterization of self-heating materials.
- Mobile 5-gas measurement of exhaust and flue gas components.

PUBLICATIONS AND PRESENTATIONS

Cuzzillo, Bernard R., Low-Temperature Wood Ignition, presented Feb. 2, 2005 at winter meeting of the California Conference of Arson Investigators.

Cuzzillo, B.R. and Pagni, P.J., Portions of the self-heating to ignition (popularly known as “spontaneous combustion”) section of NFPA 921, Guide for Fire and Explosion Investigations, 2004 edition.

Packham, S.C., Cuzzillo, B.R. and Purser, D.A., Calculating blood carboxyhemoglobin levels associated with the respiratory elimination of carbon monoxide, forthcoming.

Cuzzillo, B. R., Pagni, P.J., Williamson, R.B, and Schroeder, R.A., “The Verdict Is In: Pyrophoric Carbon Is Out,” Fire and Arson Investigator, October 2002.

Hysert, D.W., White, J.W. Jr., Cuzzillo, B.R. and Garden, S.W., “Fire loss prevention, self-heating, and spontaneous combustion of hops,” Journal of the American Society of Brewing Chemists, accepted for publication.

Wolthers, F.C., Pagni, P.J., Frost, T.R. and Cuzzillo, B.R., “Size Constraints on Self Ignition of Charcoal Briquets,” Fire Safety Science—Proceedings of the 7th International Sympo-

sium, 2002.

Cuzzillo, Bernard R., "NOx Poisoning in Ice Rinks: Measurement, Modeling, and Mitigation," presented at the February 2001 seminar of The Society of Forensic Engineers and Scientists, Monterey, CA.

Cuzzillo, Bernard R., "Measurement of Mechanical Performance of Paper and Plastic Cup-Cap Systems," presented at the September 2000 seminar of The Society of Forensic Engineers and Scientists, Banff, Alberta, Canada.

Cuzzillo, B.R. and Pagni, P.J., "The Myth of Pyrophoric Carbon," Fire Safety Science—Proceedings of the 6th International Symposium, pp 301-312, 1999.

Cuzzillo, Bernard R. and Pagni, Patrick J., "Low-Temperature Wood Ignition," Fire Findings, Vol. 7, No. 2, pp 7-10, 1999.

Cuzzillo, Bernard R., "Pyrophoric Carbon: A 125-Year Old Enigma Finally Solved," presented at the October 1998 seminar of The Society of Forensic Engineers and Scientists, Fallen Leaf Lake.

Cuzzillo, B.R. and Pagni, P.J., "Breakage of Double-Pane Window Glass in Fires," Journal of Fire Protection Engineering, Vol. 9, No. 1, pp 1-11, 1998. This paper won the Jack Bono Engineering Communications Award, awarded by the Society of Fire Protection Engineers Educational and Scientific Foundation.

Cuzzillo, Bernard R. "A Live Demonstration of Spark- and Fuel-Injection Timing in a Case of Alleged Patent Infringement," presented at the American Academy of Forensic Sciences Annual Meeting, February, 1998.

Cuzzillo, Bernard Robert. Pyrophoria. Ph.D. Dissertation, Department of Mechanical Engineering, University of California at Berkeley, 1997.

Cuzzillo, Bernard R. and Gale, William E., "Another Propane-Grill Fire: An Atypical Case Study," presented at the August 1996 seminar of The Society of Forensic Engineers and Scientists, Semi-Ah-Mooh, WA.

Cuzzillo, Bernard R., "New Forensic Brake System Diagnostic Tools," presented at the American Academy of Forensic Sciences Annual Meeting, Presentation Number C22, Proceedings p. 68, Nashville, 1996.

Cuzzillo, Bernard R., "The Use of the CFK Equation with Time-Varying Parameters for [CO] Profile Testing Based on Postmortem Carboxyhemoglobin," presented at the American Academy of Forensic Sciences Annual Meeting, Presentation Number C28, Proceedings p. 71, Nashville, 1996.

Cuzzillo, Bernard R., "Vehicle Test Methods in the Laboratory," presented at the July 1995 seminar of The Society of Forensic Engineers and Scientists, Willows.

FEES AND TERMS

\$350 per hour plus expenses for consulting, including travel and waiting. 2%/month late payment fee after 30 days. Laboratory fees are additional as are assistant and associate fees. Minimum fee per case is \$500. Minimum time unit: ¼ hour. Name or resume may not be used without specific approval and payment of retainer. Fees may be required in advance. A retainer deposit is required, typically \$1000 to \$10,000, to be applied to final invoice. Travel and accommodations shall be first class.

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