

John Garman, Ph.D.
Forensic Expert

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EDUCATION & PROFESSIONAL CREDENTIALS

Ph.D.: Mechanical and Aerospace Engineering
Emphasis on Laser Diagnostics in Combustion Systems
Ph.D. Thesis: Temperature Measurements in Low Pressure Flames using Laser Diagnostic Techniques
Graduated June 1996
University of California, Irvine

Master of Science: Mechanical and Aerospace Engineering
Emphasis on Fluid Mechanics and Combustion
Master's Thesis: Nox Measurements Using Laser Diagnostic Techniques
Graduated December 1992
University of California, Irvine

Bachelor of Science: Mechanical Engineering
Undergraduate Thesis: Design and Measurements of an Optically Accessible Forced Induction Engine
Graduated December 1991
Pennsylvania State University

FAA Private Pilot Certificate Holder
FAA Part 107 Remote Pilot Certificate Holder

Event Data Recorder (EDR) Tool Technician, Institute of Police Technology and Management (IPTM)

MEMBERSHIPS

- Society of Automotive Engineers (SAE), 6162289462
- National Association of Professional Accident Reconstruction Specialists (NAPARS), 95058414
- Southwestern Association of Technical Accident Investigators (SATAI), 95058242
- California Association of Accident Reconstruction Specialists (CA2RS), 95058379
- Association for the Advancement of Automotive Medicine (AAAM), 1515267

WORK EXPERIENCE

Forensic Expert, *Aperture LLC,* Irvine, CA, (10/2025 - present)

- Analyses and specialties include and are not limited to severity assessment, rapid response, speed analysis, liability, collision avoidance, vehicle system dynamics, and Crash Data Retrieval (CDR)
- Conduct field inspections of accident locations and vehicles, utilizing UAS (Unmanned Aircraft System), FARO and Artec laser scanners, photographs, measurements, and EDR data retrieval to assist in analysis.

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Program Manager, *OKSI*, Torrance, CA, (7/2022 -12/2023)

- Value Stream Management addressing cost challenges of low volume, high value defense arena products. Program management of imaging, multispectral, and hyperspectral systems for ground and aerial applications. Directed highly diverse and incredibly skilled team of engineers and scientists to develop elegant solutions to real world problem for industry and government agencies. Directed design of high-end EO/IR systems, requirements, sensor and hardware selection, sensor alignment, sensor calibration, thermal systems, aerodynamics, and other elements of EO/IR systems solutions. Developed and implemented concepts for a range of product issues and engineering solutions. Contributed to programs of interest including NASA's SAMI (SCIFLI Airborne Multispectral Imager) and USSOCOM 81mm Mortar Precision Guidance Kit.

Expert Witness, Associate, *Peter Thom and Associates*, Orinda, CA (8/93 - 9/22)

- Automobile and heavy transportation accident and failure reconstruction and documentation. Specialization in transportation fires, truck and bus cases, engine, suspension, and drivetrain failures. Duties included vehicle inspections, location inspections, engine teardowns, CDR/EDR imaging, and analysis.

Director of 'Tier 4 Systems', Emissions Systems for High Horsepower Stationary Generators, *Cummins Pacific, LLC*, Irvine, CA (9/2013 - 8/2015)

- Leader of 11 person 'Tier 4' Aftertreatment Program team comprising Engineering, Manufacturing, Purchasing, Marketing, Sales, Quality, and Customer Service. Hands on emission system development for large displacement diesel and natural gas generators ranging from 30 to 92 liters. Responsibilities include engineering and design, manufacturing, addressing revenue, gross margins, overhead and profitability; development of document control strategies and design standards; new product development and validation; implementation of ISO 9001; warranties and accruals; development of marketing materials.

Director, Engineering Design in Industry Program, *Mechanical and Aerospace Department, University of California, Irvine*, Irvine, CA (4/2007 - 9/2013)

- Primary responsibilities include student advising and experimental design, management, and implementation of a very large variety of combusting and non-combustion projects. These projects include but are not limited to the build of a small engine dyno for evaluation of 1-10 KW class DCCI engines, the design and construction of a GE Discover funded coal drop tube furnace, an Air Force SFO sponsored high speed turbine burner simulation, design and build of NSF funded wind tunnel for droplet evaporation studies, design of a system for flow visualization of non-Newtonian shear flows, and application of laser based combustion and flow visualization to these and other systems. Additional activities include proposal writing, creation and mentoring of independent research activities, and sponsor company recruiter and forty-four time instructor for the Engineering Design in Industry class, ME188.

  Author and recipient of $100,000 Grand Challenges Explorations grant from the Bill & Melinda Gates Foundation for development of a stored energy solar stove that enables carbon emissions-free cooking.

Senior Scientist, *Opto-Knowledge Systems, Inc.*, Torrance, CA, (3/2002 -12/2007)

- Responsible for SBIR, commercial, and defense related proposal writing, contract management and administration, as well as all technical work on a variety of efforts including but not limited to Coherent Anti-Stokes Raman Spectroscopy on liquid fueled rocket combustors, design, development, and demonstration of imaging spectrometer systems in the LW, MW, and VIS, design and implementation of variable aperture cold stop mechanisms for tactical IR cameras, arc jet diagnostics for health monitoring, piezo actuation of gimbals set. Extensive experience with cryogenics, vacuum systems, imaging and non-imaging optics, lasers, camera electronics, and all things mechanical. Winner of the Army SBIR quality award 2006. Developer and inventor

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(patent issued) for variable aperture cold stop mechanism currently being implemented in the next gen FLIR systems for US Army.

Senior Research Scientist, *Orqis Medical,* Lake Forest, CA, (7/1999 – 7/2001)

- Responsible for development and operation of cardiovascular research laboratory for product research and development, duties included all aspects of project management, centrifugal blood pump testing and evaluation, flow diagnostics including planar laser induced fluorescence and particle imaging velocimetry, fluid dynamic evaluations on systems under development, developed MMI and console for perfusion system.

Senior Scientist, *Lumenyte International Corporation*, Lake Forest, CA, (7/1998 – 7/1999)

- Responsible for new product development, engineering of special lighting systems utilizing fiber optics, development and implementation of advanced manufacturing equipment and general research and development, developed photometrics system for characterization of side emitting fiber optics.

Research Scientist, *Rice Systems, Inc,* Irvine, CA (11/1996 – 7/1998)

- Responsibilities included SBIR proposal writing and contract fulfillment, lead scientist and project manager for NASA SBIR contract to develop interferometer based diagnostic for improving crystal growth, investigated and evaluated remote sensing techniques including polarization difference imaging, technical lead on ARMY SBIR Phase II contract to develop waveguide gyroscope, development of various micro electro-optical sensors including a proposed laser doppler velocimetry system based on a single silicon wafer.

Research Assistant, *University of California, Irvine,* Irvine, CA, (1/1992 - 7/1995)

- Developed laser-based thermometry system, designed and constructed laser laboratory facility, made improvements to computer-controlled fuel injected V-8 engine and dynometer used for evaluation of alternative fuels, instructed electronics and circuit class laboratory, designed and built inexpensive modeless dye laser, designed university darkroom.

Visiting Scientist, *Sandia National Laboratories*, Livermore, CA, (6/1994 - 11/1994)

- Designed and implemented experimental study comparing CARS (Coherent Anti-Stokes Raman Spectroscopy), DFWM (Degenerate Four Wave Mixing), and LIF (Laser Induced Fluorescence) for remote temperature sensing and measurement in low pressure combustion systems.

Mechanical Engineer, *ISC Defense Systems*, Columbia, PA, (6/1989 - 8/1989)

- Responsibilities included mechanical design and drawings of power supply for Navy P3 aircraft technical trainers.

CONTINUING EDUCATION

- Institute of Police Technology and Management (IPTM), Hyundai-Kia & Tesla EDR Tools Technician Training: Use of the Hyundai-Kia (GIT) EDR Tool and Tesla EDR Tool to collect data, preserve and save the collected data, 21 November 2025

- Aperture Advanced Heavy Vehicle Inspections Training, 1-3 April 2026

- Society of Automotive Engineers (SAE) Professional Development Program, Applying Automotive EDR Data to Traffic Crash Reconstruction, 14 April 2026

- National Association of Professional Accident Reconstruction Specialists (NAPARS) Bicycle and e-Bike Crash Analysis, 15 May 2026

- National Association of Professional Accident Reconstruction Specialists (NAPARS) Tires and

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Wheels in Crashes, 12 June 2026

- California Association of Accident Reconstruction Specialists (CA2RS) Heavy Vehicle Electronic Data and Preservation 18 August 2026

- California Association of Accident Reconstruction Specialists (CA2RS) Video Forensics in Crash Reconstruction 5-7 October 2026

PUBLICATIONS

- Martin, F., Martinez, O., Mazo, D., Garman, J., Dunn-Rankin, D., "Evaporation of a droplet larger than the Kolmogorov length scale immersed in a relative mean flow", International Journal of Multiphase Flow, Volume 88, Pages 63-68, Jan 2017

- Castronuovo, L., Dunn-Rankin, D., Garman, J., Photoignited Nanocombustion in Air, Journal of Aeronautics, Astronautics and Aviation, Vol.47, No.3 pp.299 – 308, September 14, 2015

- Kim, K.M,, Jiang, F,, Garman, J., Dunn-Rankin, D., The Effects of Carbon-in-Ash on Mercury Capture from Flue Gas, Environmental Management and Sustainable Practice, November 2015

- Trolinger, J., Buckner, B., Tomov, I., Van der Veer, W, Dunn-Rankin, D, Garman, J., "Probing Dense Sprays with Gated, Picosecond, Digital Particle Field Holography", International Journal of Spray and Combustion Dynamics, Volume 3, Number 3&4, Pages 351–366, 2011

- Menesha, J., Kim K. M., Mirsepassi, A., Garman, J., and Dunn-Rankin, D., "Experimental Investigation of ABS Formation in a Model Single Air Preheater Channel", poster presentation, 32nd International Symposium on Combustion, Montreal, CA, August 3-8, 2008

- Therkelsen, P., Garman, J., and Dunn-Rankin, D., "Platform Development for the Study of Small Scale HCCI Engines" poster presentation, 32nd International Symposium on Combustion, Montreal, CA, August 3-8, 2008

- Arezoo M. Ardekani, Roger H. Rangel, John Garman, Derek Dunn-Rankin and Daniel D. Joseph, "Particle-wall interaction in a viscoelastic fluid", The XVth International Congress on Rheology in Monterey, CA, August 7, 2008

- Kriesel, J., Garman, J., Gat, N., Danczyk, S., "Compact and Rugged Coherent Anti-Stokes Raman Spectroscopy (CARS) System for Measurements of Temperature in Rocket Test Stands and Other Harsh Operating Environments" 55th JANNAF Propulsion Meeting / 42nd Combustion Subcommittee / 30th Airbreathing Propulsion Subcommittee / 30th Exhaust Plume Technology Subcommittee / 24th Propulsion Systems Hazards Subcommittee / 12th SPIRITS User Group Joint Meeting. Boston, Massachusetts, May 2008

- Adam Jepsen, Chris Miller, Peter Therkelsen, John Garman, Derek Dunn-Rankin, and Jim Hynes., "Development and Characterization of a Small IC Engine Dynamometer", WSS/CI Spring 2008 Meeting, University of Southern California, Los Angeles, California, 16-18 March 2008

- Gat, N., Garman, J., Dunn-Rankin, D., and Papac, M. "Rocket Engine Boundary Layer Temperature Measurements Using Coherent Anti-Stokes Raman Spectroscopy (CARS)." Air Force Research Laboratory Report AFRL-PR-ED-TR-2006-0006, May 2006

- Gat, N., Scriven, G., Garman, J., Li, M.D., Zhang, J. "Development of Four-Dimensional

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Imaging Spectrometer (4D-IS). " Proc. SPIE Vol. 6302, Imaging Spectrometry XI; Sylvia S. Shen, Paul E. Lewis; Eds.

- Garman, J., Gat, N., Vizgaitis, J., "Dual F/Number Tactical Dewar Development." 2006 Meeting of the Military Sensing Symposia (MSS) on Passive Sensors, Orlando, FL, 13-17 February 2006

- Garman, J., and Gat, N. "Variable Aperture Cold Stop for Dual F/# IR Optical Systems." 2004 Meeting of the Military Sensing Symposia (MSS) on Passive Sensors, Raytheon Missile Systems, Tucson, AZ, 22-26 March, 2004.;

- Garman, J., Gat, N. "Sensor for Spatial-Spectral-Temporal Missile Signature Characterization & MPR." Reports: XA-SMDC and XD-MDA, October 21, 2002.

- Garman, J.D. and Dunn-Rankin, D. (1997) “Spatial Averaging Effects in CARS Thermometry of a Non-Premixed Flame,” Combustion and Flame, 115, 481—486.

- Garman, J.D. and Dunn-Rankin, D. (1997) “Spatial Averaging Effects in CARS Thermometry of a Non-Premixed Flame,” Institute of Physics Topical Meeting: Optics and Optical Diagnostics in Combustion, London, England, February 26.

- Garman, J.D. and Dunn-Rankin, D. (1996) “Spatial Averaging in CARS Measurements,” Poster Session of the 26th International Combustion Symposium, Naples, Italy, July 28—August 2.

- Garman, J.D., Dunn-Rankin, D., Farrow, R., Rakestraw, D., and Volponi, J. (1996) “A Comparison of Temperature Measurements in Low Pressure Flames Using Coherent Anti-Stokes Raman Spectroscopy (CARS), Laser-Induced Fluorescence (LIF), and Degenerate Four-Wave Mixing (DFWM),”Western States Section/The Combustion Institute Spring Meeting, Arizona State University, Tempe, AZ, March 11—12.

- Garman, J.D., Dunn-Rankin, D., Farrow, R., and Rakestraw, D. (1995) “A Comparison of Temperature Measurements in Low Pressure Flames using Coherent Anti-Stokes Raman Spectroscopy (CARS), Laser-Induced Fluorescence (LIF), and Degenerate Four-Wave Mixing (DFWM),” Gordon Conference on Chemistry and Physics of Laser Diagnostics in Combustion, Plymouth, NH, July 9—14.

- Garman, J.D., Dunn-Rankin, D., Farrow, R.L, and Rakestraw, D.J. (1993) “Laser Induced Fluorescence and Degenerate Four-Wave Mixing of NO in a 100,000 Btu/hr Atmospheric Pressure Natural Gas Burner,” Poster session, Gordon Research Conference on the Physics and Chemistry of Laser Diagnostics in Combustion, Plymouth, NH, July 12—16.

- Garman, J.D. and Dunn-Rankin, D. (1993) “Dependence of NO2 degenerate four-wave mixing signals on buffer gas pressure,” Proceedings of the SPIE International Symposium on Lasers, Sensors, and Applications, Los Angeles, January 16—23.

- Garman, J.D., McDonell, B.W., Bobrow, J.E., and Dunn-Rankin, D. (1993) “Adaptive Control of an IC Engine,” Western States Section/The Combustion Institute paper WSS/CI 93-096, SRI International, October 18—19.

- Zhu, J.Y., Garman, J.D., Dunn-Rankin, D. (1992) “CARS Thermometry in Spray Flames and High Temperature Gradients,” Western States Section/The Combustion Institute Paper WSS/CI 92-02,Oregon State University, March 23—24.

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- Martin, F., Martinez, O., Mazo, D., Garman, J., Dunn-Rankin, D., “Evaporation of a droplet larger than the Kolmogorov length scale immersed in a relative mean flow”, International Journal of Multiphase Flow, Volume 88, Pages 63-68, Jan 2017

- Castronuovo, L., Dunn-Rankin, D., Garman, J., Photoignited Nanocombustion in Air, Journal of Aeronautics, Astronautics and Aviation, Vol.47, No.3 pp.299 – 308, September 14, 2015

- Kim, K.M,, Jiang, F,, Garman, J., Dunn-Rankin, D., The Effects of Carbon-in-Ash on Mercury Capture from Flue Gas, Environmental Management and Sustainable Practice, November 2015

- Trolinger, J., Buckner, B., Tomov, I., Van der Veer, W, Dunn-Rankin, D, Garman, J., “Probing Dense Sprays with Gated, Picosecond, Digital Particle Field Holography”, International Journal of Spray and Combustion Dynamics, Volume 3, Number 3&4, Pages 351–366, 2011

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- Gat, N., Scriven, G., Garman, J., Li, M.D., Zhang, J. "Development of Four-Dimensional Imaging Spectrometer (4D-IS). " Proc. SPIE Vol. 6302, Imaging Spectrometry XI; Sylvia S. Shen, Paul E. Lewis; Eds.

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MPR." Reports: XA-SMDC and XD-MDA, October 21, 2002.

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- Garman, J.D., Dunn-Rankin, D., Farrow, R., and Rakestraw, D. (1995) “A Comparison of Temperature Measurements in Low Pressure Flames using Coherent Anti-Stokes Raman Spectroscopy (CARS), Laser-Induced Fluorescence (LIF), and Degenerate Four-Wave Mixing (DFWM),” Gordon Conference on Chemistry and Physics of Laser Diagnostics in Combustion, Plymouth, NH, July 9—14.
- Garman, J.D., Dunn-Rankin, D., Farrow, R.L, and Rakestraw, D.J. (1993) “Laser Induced Fluorescence and Degenerate Four-Wave Mixing of NO in a 100,000 Btu/hr Atmospheric Pressure Natural Gas Burner,” Poster session, Gordon Research Conference on the Physics and Chemistry of Laser Diagnostics in Combustion, Plymouth, NH, July 12—16.
- Garman, J.D. and Dunn-Rankin, D. (1993) “Dependence of NO2 degenerate four-wave mixing signals on buffer gas pressure,” Proceedings of the SPIE International Symposium on Lasers, Sensors, and Applications, Los Angeles, January 16—23.
- Garman, J.D., McDonell, B.W., Bobrow, J.E., and Dunn-Rankin, D. (1993) “Adaptive Control of an IC Engine,” Western States Section/The Combustion Institute paper WSS/CI 93-096, SRI International, October 18—19.
- Zhu, J.Y., Garman, J.D., Dunn-Rankin, D. (1992) “CARS Thermometry in Spray Flames and High Temperature Gradients,” Western States Section/The Combustion Institute Paper WSS/CI 92-02,Oregon State University, March 23—24.

PATENTS

- Variable Aperture for Infrared Cameras, US 8071947, Issued Jan 1, 2011
- External Aperture and Relay for Infrared Camera, US 7816650, Issued Jan 1, 2010
- Cryogenically cooled adjustable apertures for infra-red cameras, US 7427758, Issued Jan 1, 2008
- Method and Apparatus for Using Temperature Controlled Variable Diaphragms or Swapable Fixed Apertures with Infrared Cameras, US 7157706, Issued Jan 1, 2007

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- Flexible Optical Fiber Ribbon Cable, Fiber Optic Reformattor, and Method for Making Same Cable and Reformattor, US 20050111801, Issued Nov 25, 2003

- Inspection Wand, US 20030194189, Issued Jan 1, 2003

RELATED INTERESTS

- 48 years motorcycle and snowmobile riding experience
- 40 years of Class ‘M’ motorcycle licensure
- 30 years of FAA private pilot licensure
- Automotive enthusiast, engine builder, chassis tuner, auto restorations (1959 International Metro Truck, 1960 VW Beetle, 1966 VW Panel Van, 1967 VW 13 Window Van, 1979 MG MGB,)
- 38 years competitive auto and motorcycle drag racing, several NHRA Series track championships, recent Trophy Class Winner VW Irwindale Bug-In event 2024

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