

Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

LUKA SERDAR, JR. Vehicle and Mechanical Systems Expert

Forensic engineering: Over 25 years experience in vehicle design, mechanical systems, crash investigation and failure analysis. Competitive auto racer and performance and safety driving instructor. Areas of work:

- **Crash Reconstruction and Analysis:** single vehicle, car, truck, bicycle, motorcycle, two vehicle crossover, intersection, rear end, multi vehicle.
- **Vehicle Systems:** electronic engine control, ABS, brake-by-wire, stability management, air bags, tire systems.
- **Vehicle Safety Systems:** chassis structural integrity, occupant protection, seat construction, windshield integration and performance.
- **Fault Code Retrieval and Diagnosis:** OEM and generic scan tool operation, member SAE committee developing fault code recommended practices and industry-wide uniformity.
- **Vehicle Maintenance and Repair:** US, European and Asian autos.
- **Vehicle Dynamics:** skid control, threshold braking and vehicle control systems (ABS, stability).
- **Driver Actions:** driver performance, evasive and recovery actions.
- **Racing School Instructor:** teach novices and competitors safe handling and performance in classroom and on-track sessions aimed at maximizing safety.
- **Motorsport Safety:** event organization, participant safety, spectator safety, technical vehicle inspections, competition vehicle safety systems, participant training and experience, emergency response team deployment, track side safety barriers and participant protective barriers, track run-off areas and spectator protective barriers.
- **Teen Driver Training:** advanced driving skills development, car control, emergency braking, accident avoidance, emergency lane change, braking and turning simultaneously, skid control, electronic and mechanical active driver aids.
- **Law Enforcement/Military/Government Driver Training:** advanced driving skill development, skid control and recovery, pursuit driving techniques, law enforcement agency high performance driving instructor training – Massachusetts State Police, New Hampshire State Police, Worcester, MA Police Department. Professional instructor, teaching members of various government agencies and independent contractors in counter-terrorism-related driving techniques.

Vehicle engineering: domestic and foreign vehicles. Diagnosis, repair and modification of components including:

- Engine: fuel management, emissions, mechanical and hybrid powertrain control.
- Transmission: automatic, manual.
- Steering: recirculating ball, rack pinion, rear wheel active and passive.
- Suspension: independent, multi link, McPherson strut, rigid axle, beam axle and torsion.
- Brakes: disc, drum, rear wheel anti-lock, full ABS.
- Instrument panel electronics.
- Climate control, heating, air conditioning and ventilation.

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PROFESSIONAL EXPERIENCE

2004 to present **Robson Forensic, Inc.**
Associate

Provide technical investigations, analysis, reports, and testimony towards the resolution of commercial and personal injury litigation involving vehicle crashes and vehicle engineering failure analysis.

2010 to present **Moorefield Training Center LLC**, West Virginia
Vehicle Dynamics Instructor

Demonstrate and teach counter terrorism driving techniques to government and military personnel. Daylight and night high speed pursuit, skid control, run off-road recovery, ramming road blocks, P.I.T. maneuver, forward and reverse J turns, unimproved roads and off-road obstacles.

2009 to Present **The O’Gara Group**, Virginia
Vehicle Dynamics Instructor

Demonstrate and teach counter terrorism driving techniques to government, law enforcement and military personnel. High speed pursuit, skid control, run off-road recovery, ramming road blocks, P.I.T. maneuver, and reverse J turns.

2007 to present **Street Survival, BMWCCA Foundation**
Lead Vehicle Dynamics Lecturer and Driving Coach

Advanced driving skills development, vehicle safety systems, electronic driver aids, crashworthiness.

1991 to 2009 **BMW CCA, Inc.**
Car Crash Investigator

1992-2009

Investigate and report on over 80 crashes occurring at high performance driver education events and vehicle skid control schools.

Director of High Performance Driver’s Education

1991-2009

Lecturer – vehicle dynamics, road course club racer, driving instructor. Vehicle performance capability demonstrations, skid control, emergency braking, emergency lane change, accident avoidance driver education. Engineering lecturer in chassis, drivetrain, and the tire ultimate performance envelope.

2004 **Mazda North America, Inc.**
Consumer Events

Vehicle dynamics teaching and vehicle performance capability demonstrations at “Mazda Speed” events targeted at prospective buyers.

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1999 to **The Information Foundry at Robert Bentley, Inc.**

2004 *Lead Automotive Engineer*

Servicing US, European and Asian auto manufacturers. Technical training for dealership technicians, diagnostic tool development and testing; fault tree failure analysis of automotive systems and components. Active and passive safety systems, Hybrid Electric Vehicle Technology; deployment of technical information to sales and technical service at dealerships and corporate headquarters.

1993 to **SatCon Technology Corporation**

1999 *Engineering Program Manager – Automotive Programs*

1996-1999

Prototype development, commercial application and subsequent production line manufacturing of sensors, actuators and motor drives. Development also included failure testing and root cause failure analysis. Failure modes included material, design, manufacture and operation. Developed new technology programs in collaboration with commercial and government customers. Examples were related to novel “steer-by-wire” SAE show demonstrator, prototype and second generation systems. Other major programs also included electric motor development.

Engineering Team Leader

1993-1996

Daimler Chrysler PATRIOT hybrid electric vehicle program. Finite element stress and modal analyses on a variety of components including a flywheel energy storage unit, turbine-alternator and traction motor. Solid and finite element pre and post modeling. Detailed system/vehicle dynamic response simulation and rotordynamic analyses. Many of these analyses were verified with testing. Principal responsibilities included test supervision, planning, instrumentation and data evaluation.

1984 to **Kaman Sciences Corporation**

1993 *Research Engineer*

Lead mechanical engineer (three years) for qualification of hardware for a space shuttle optical experiment. Interface with NASA and other experimentors on the flight, supervision of analysis methodology, finite element development, vibration testing, progress reporting, cost and schedule. Participated in finite element modeling and the dynamic response of U.S. Army field communication shelters based on truck beds as well as HUMMVs, and the correlation of model behavior with full-scale experimental test results.

1980 to **URS/John A. Blume**

1984 *Consulting Engineer*

Associate Engineer in the Nuclear and Energy Division. Assignments included nonlinear dynamic analysis of structure and the seismic qualification of mechanical equipment by dynamic analysis and supervision of shake table testing. Responsibilities included both analysis and on-site inspections and safety assessment.

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1978 to **M.I.T.**
1980 *Graduate Research Assistant* 1979-1980
Development and the application of risk analysis methodology to cost benefit and safety issues regarding existing and planned dams.

Undergraduate Research Assistant 1978-1979
Correlation and sensitivity studies of a nonlinear finite element code used to predict the response and nonlinear cracking of reinforced concrete walls subjected to dynamic cyclic loading.

EDUCATION

M.S., Mechanical Dynamics, Massachusetts Institute of Technology, 1980
B.S., Civil Engineering, Massachusetts Institute of Technology, 1979

Continuing Education

New York State Traffic Accident Reconstruction Society, Inc. – Critical Curve Speed & Contaminated Road Surfaces Course, 2006
Society of Automotive Engineers – Vehicle Accident Reconstruction Methods Seminar 2005

PROFESSIONAL MEMBERSHIPS and AFFILIATIONS

Massachusetts State Police, New Hampshire State Police, Worcester, MA Police Department – Law Enforcement Agency Driving Instructor, 2008 to present
Advanced driving skill development, skid control and recovery, pursuit driving techniques, law enforcement agency high performance driving instructor training.

Street Survival – Instructor and Vehicle Dynamics Lecturer, 2006-present
Advanced driving skill development for teen drivers: seating position, car control, skid control and recovery, emergency braking, accident avoidance, emergency lane change, braking and turning simultaneously, electronic and

Society of Automotive Engineers (SAE)
Vice Chair, Science and Technology, New England Section, Society of Automotive Engineers

BMW Car Club of America – Director of driving events since 1992

American Society of Civil Engineers (ASCE)

Boston Society of Civil Engineers (BSCES)

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PUBLICATIONS

“ANSYS and Mechanical Dynamics Provide Winning Solutions Designing Energy-Storing Flywheels for Electric Vehicles,” ANSYS Company User profiles, April 1997.

Serdar, L., R. Yeghiyan, and E. Patnaik, “Nonlinear Dynamic Analysis of Communication Shelters,” U.S. Army Symposium on Solid Mechanics, Massachusetts, November 1991.

“Siting of a Dam: Probability of Failure,” M.S. Thesis, M.I.T., June 1980.

Serdar, L., F. Elsabee, W. Djordjevic, and R. Graves, “Seismic Evaluation Study of Mechanical and Electrical Equipment at an Existing Nuclear Handling Facility,” Proceedings of the 7th SMIRT Conference, Chicago, August 1983.

Serdar, L., F. Elsabee, and D. Williams, “Seismic Investigation of Electrical Raceway Components,” ASME Conference, Texas, October 1984.

PRESENTATIONS

“Vehicle Engineering and Driver Performance in Accident Reconstruction,” New England Section of SAE at MIT, December 6, 2007.

PATENTS

“Gimbal Support System with Unidirectional Roll Stiffness,” Chrysler Corp., February 23, 1999, U.S. Patent 5,873,560

“Segmented Rim Construction for a Rotor,” Chrysler Corp., September 22, 1998, U.S. Patent 5,811,900

“Subcritical Spoke for Hub to Rotor Attachment,” Chrysler Corp., July 21, 1998, U.S. Patent 5,783,883

“Sliding Spoke Rotor to Hub Attachment,” Chrysler Corp., December 9, 1997, U.S. Patent 5,696,414

“Pocket Attachment to Rim – Energy Storage Apparatus for Hybrid Vehicle,” Chrysler Corp., June 10, 1997, U.S. Patent No. 5,637,939

“Method of Forming a Rim Construction for a Rotor-Hybrid Vehicle Energy Storage,” Chrysler Corp., October 6, 1998, U.S. Patent No. 5,815,907

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“Spoke Shape for Hub to Rotor Attachment – Energy Storage Apparatus for Hybrid Vehicle,” Chrysler Corp., October 5, 1999, U.S. Patent No. 5,962,941

“Flywheel Power Supply Having Axial Magnetic Bearing for Frictionless Rotation,” SatCon, July 17, 2001, U.S. Patent No. 6,262,505

EXPERT NOT RETAINED