

Charles Funk, Ph.D., P.E., CFEI, CVFI
Managing Engineer

Professional Profile

Dr. Charles Funk is a Managing Engineer at Exponent. Dr. Funk specializes in vehicle engineering, thermal analyses, and mechanical engineering analyses. He has conducted numerous accident reconstructions and accident damage analyses involving pedestrians, motorized wheelchairs, motorcycles, vehicles, commercial vehicles, and on-road and off-road objects. He has conducted computer simulations of vehicle-to-vehicle and vehicle-to-object collisions, and conducted photogrammetry analyses. Dr. Funk has research experience with narrow object impacts, event data recorders, vehicle braking and acceleration, bumper mismatch collisions, accident simulation validation, and vehicle body crush. Dr. Funk is also a certified Bosch Crash Data Retrieval (CDR) Technician and Analyst.

Dr. Funk also has a background in thermal sciences including fire cause and origin investigations, combustion, fluid flow, and thermodynamics. He has conducted fire and explosion cause and origin investigations on vehicles, residences, and commercial properties. He has analyzed and evaluated electric and gas appliances and products as well as vehicle systems during his investigations. Dr. Funk has conducted experiments on turbulence, combustion, and emissions in gas turbines and internal combustion engines via the use of laser diagnostic techniques. Dr. Funk has also worked at Demag Delaval Turbomachinery, where he performed thermodynamic and fluid analyses on centrifugal and axial compressors for petrochemical applications.

Prior to joining Exponent, Dr. Funk received his doctorate from the University of Michigan, where he performed both an experimental and computational comparison of turbulent flows in an internal combustion engine. In this work, he performed some of the first high-resolution turbulence measurements in an internal combustion engine to assist in developing and validating advanced turbulence models. He has worked at Synthes Corporation, where he assisted in the design of a radiolucent aiming guide to assist surgeons with repairing broken femoral bones. Dr. Funk is proficient in German and French and has an intermediate knowledge of Spanish.

Academic Credentials and Professional Honors

Ph.D., Mechanical Engineering, University of Michigan Ann Arbor, 2005
M.S., Mechanical Engineering, University of Michigan Ann Arbor, 2001
B.S., Mechanical Engineering, Drexel University (*magna cum laude*), 1999

Licenses and Certifications

Licensed Professional Engineer, Illinois, #06063893
Licensed Professional Engineer, Indiana, #PE11100479
Licensed Professional Engineer, Kentucky, #28117
Licensed Professional Engineer, Michigan, #6201056673
Licensed Professional Engineer, New York, # 090029
Licensed Professional Engineer, Ohio, #PE.75939
Licensed Professional Engineer, South Carolina, #29329
Licensed Professional Engineer, Wisconsin, #41859-006
Certified Fire and Explosions Investigator (C.F.E.I.)
Certified Vehicle Fire Investigator (C.V.F.I.)
Certified Bosch Crash Data Retrieval (CDR) Technician and Analyst

Languages

German, French

Continued Education

Northwestern Accident Reconstruction
Vehicle Accident Reconstruction Methods, Society of Automotive Engineers
Bosch CDR Technician and Analyst
Fundamentals of Heavy Truck Dynamics, Society of Automotive Engineers
Motorcycle Accident Investigation and Reconstruction, Michigan State University
School Bus Accident Reconstruction, Michigan State University
National Fire, Arson & Explosion Investigation Training
Fire Analysis Litigation Seminar
Vehicle Fire, Arson, and Explosions Investigation
International Association of Arson Investigators CFI Training

- Arc Mapping Basics
- A Ventilation-Focused Approach to the Impact of Building Structures and Systems on Fire
- Evidence Examination: What Happens at the lab?
- Fundamentals of Residential Building Construction
- An Analysis of the Station Nightclub Fire

Publications

Funk C, Sick V, Reuss DL, Dahm WJA. Turbulence properties of high and low swirl in-cylinder flows. SAE Technical Paper Series, 2002-01-2841, 2002.

Funk C. Detailed analysis of experimental in-cylinder flow fields with applications to a k-epsilon model. Master's Thesis, University of Michigan, December 2001.

Doctoral Dissertation

Funk C. An in-depth comparison of experimental and computational turbulence parameters for in-cylinder engine flows. The University of Michigan, Ann Arbor, MI, April 2005.

Presentations and Published Abstracts

Funk C. Vehicle engineering and accident reconstruction. University of Michigan Department of Engineering, March 2011.

Funk C. Accident reconstruction. Society of Automotive Engineers – Detroit, June 2010.

Funk C. Vehicle engineering. University of Michigan, Department of Engineering, February 2010.

Funk C. Vehicle engineering. Society of Automotive Engineers, University of Michigan, October 2008.

Funk C. Implications of swirl on turbulence properties in an IC Engine. Physical Chemistry Group at the University of Heidelberg, Germany, November 2002.

Funk C. Turbulence properties of high and low-swirl flows. Fall 2002 SAE Fuels and Lubricants Conference, San Diego, CA, October 2002.

Funk C. Implications of swirl on kinetic energy in SI engines. 3rd Annual Graduate Student Symposium, University of Michigan, Ann Arbor, MI, September 2002.

Funk C. Comparison of experimental in-cylinder flow fields to a k-epsilon model. Combustion and Fuels Group of Drexel University, Philadelphia, PA, November 2001.

Funk C. Detailed analysis of experimental in-cylinder flow fields with applications to a k-epsilon model. General Motors Research and Development Center, Warren, MI, October 2001.

Peer Reviewer

- Society of Automotive Engineers
- American Society for Mechanical Engineers

Professional Affiliations

- Society of Automotive Engineers
- National Association of Professional Accident Reconstruction Specialists
- Michigan Association of Traffic Accident Investigators
- International Association of Arson Investigators
- National Association of Fire Investigators
- National Fire Protection Agency