Russell Gish PhD PE

Senior Engineer

contact

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expertise

Collision Reconstruction

areas of specialization

Structural crashworthiness design principles

Crash simulation using Finite Element Analysis

Component fracture due to impact

Feasibility of safer alternative designs

Dr. Russell Gish is a senior engineer in the Collision Reconstruction group in Los Angeles. Russell uses engineering principles to analyze evidence and answer a wide range of questions about the circumstances of a particular car accident. He can also assess the crashworthiness of vehicles involved in a crash.

Before joining MEA, Russell worked as a safety engineer at General Motors for 15 years. Using computer modeling and laboratory crash testing, he developed vehicle designs that met federal crashworthiness requirements. "When analyzing vehicle damage, my industry experience helps me," Russell says, "because I know how vehicles are designed and put together."

Russell has Bachelor's, Master's, and Doctoral degrees in Mechanical Engineering. His PhD work, done at the University of California, Berkley, established the mathematical foundation for a new method of analyzing crash forces and the resulting car damage. At MEA, Russell has continued to develop techniques for damage analysis and has published peer-reviewed research on how to use a computer method called finite element analysis in the field of collision reconstruction.

Upon graduating with his Doctorate, Russell received a note from a friend congratulating him on his achievement. The card also contained a message, reminding Russell that with the gift of education comes an obligation to give back by educating others. By contributing to research, publishing peer-reviewed studies, helping clients understand evidence, and clearly presenting engineering analyses in court, Russell aims to meet this obligation.

education

Doctor of Philosophy, Mechanical Engineering, Solid Mechanics, University of California, Berkeley, 2007

Masters of Science, Mechanical Engineering, George Washington University, 2000

Bachelor of Science, Mechanical Engineering, University of Missouri, Rolla, 1996

professional status

Registered Professional Engineer, State of California, September 2016. License number M37809.

professional associations

California Association of Accident Reconstruction Specialists (CA2Rs), since 2018

Southwestern Association of Technical Accident Investigators (SATAI), since 2014

Society of Automotive Engineers (SAE), since 2017

professional experience

MEA Forensic Engineers & Scientists
Senior Engineer, 2014 to Present

Conducts technical investigations involving motor vehicle accident reconstruction. Case analysis includes severity assessment, collision sequence, occupant kinematics, vehicle speed, vehicle dynamics, and accident avoidance potential.

General Motors
Chassis Simulation Lead Engineer, 2012 to 2014

As Project Lead, designed and fabricated drop-silo test fixtures to study fracture characteristics of powertrain mounts, steering gears, and engine cradle mounts. Built and validated finite element models of powertrain mounts and engine cradle mounts capable of predicting fracture in front of crash loadcases. Responsible for identifying chassis performance strategies for meeting IIHS small overlap test performance targets, for Transverse Front-Wheel-drive, Body-on-Frame and Rear-Wheel-drive architectures. Trained and managed international team to develop a subsystem test to study fracture of the control arm, knuckle, and wheel resulting from the IIHS small overlap crash test.

General Motors
Crash Simulation Lead Engineer, 2007 to 2012

Responsible for ensuring crash performance targets are met in early structural development of advanced vehicle programs; sedan, cross-over, coupe & convertible and plug-in hybrid electric vehicles. Developed door impact beam strategy reducing mass and improving side-crash performance (FMVSS214 & IIHS side) used in coupe and convertible architectures. Developed the B-pillar strategy for side-crash performance used in sedans. Developed the front crash strategy (bumper, motor rail, and engine cradle design meeting US-NCAP, FMVSS208, and IIHS offset requirements) used in a cross-over vehicle. Designed protective structures for large, extended-range hybrid batteries located in the rear compartment of sedan and cross-over architectures. Simulated the rear crash test (FMVSS301) to confirm performance. Leader of simulation team, responsible for the vehicle model used by the team: defined model build requirements and acted as model quality champion. Utilized explicit Finite Element software, LS-dyna, to simulate both federal and consumer metric crash loadcases. Performed structural optimization, Design for Six Sigma greenbelt. Instructed newly hired crash analysts in modeling best practices.

University of California, Berkeley
Graduate Student Instructor, Fall 2005

ME280A: Graduate-level finite element methods. Responsible for practical portion of course using commercial finite element software, ABAQUS. Prepared and delivered weekly lectures supplementing Professor's lectures. Prepared homework solutions used by the course grader.

General Motors, Warren, MI
Associate Engineer, July 2000 to July 2002

Performed side-impact simulations to support the BIW, door, and seat development of the 2002 Cadillac CTS. Implemented the group's first curtain airbag into the side-impact vehicle model. Researched improvements to the FMVSS214 moving barrier model. Built and maintained group's website for ISO2000 compliance.

Opel Automotive, Ruselshiem, Germany
International Assignment, June to December 1999

Supported the Safety department's transition in finite element software, from RADIOSS to LS-Dyna. Correlated a vehicle crash model to FMVSS208 test data. Assessed the simulation capability of IIHS offset deformable barrier models and of the side-impact dummy model.

General Motors, Flint, MI
Engineer, May 1996 to July 1998

2000 Deville frontal crashworthiness FMVSS and IIHS compliance. Engine compartment hood and Front bumper subsystem simulation method development.

awards

Team GM Recognition – for successfully developing chassis subsystem tests for safety, 2013

Employee Recognition Award, United Negro College Fund fundraising, 2012

Department Fellowship Award, UC Berkeley, 2000

GM Master's Degree Fellowship Award, George Washington University, Washington, D.C., 1998-2000

GM President's Award – contribution to 2000 Deville IIHS offset test countermeasures, 1998

Curator's Award, UM Rolla, 1995

publications

Finite element analysis to analyze the properties of pole impacts

lectures & presentations

April 9, 2019 – Using Adjusted Force-Displacement Data to Predict the EBS of Car into Barrier Impacts, SAE World Congress, Detroit, MI.

April 10, 2018 – Finite Element Analysis to Analyze the Properties of Pole Impacts, SAE World Congress, Detroit, MI.

April 1, 2017 – Structural Crashworthiness and Finite Element Crash Simulation, SATAI Spring Conference, Henderson, NV.

training and professional development

March 22–25, 2021 – iNPUT-ACE Video Evidence Symposium 2021, Online.

April 9-11, 2019 – Society of Automotive Engineers World Congress, Detroit, MI.

April 10-12, 2018 – Society of Automotive Engineers World Congress, Detroit, MI.

January 23-26, 2018 – PC-Crash live training: Essentials and Advanced, Irvine, CA.

July 25, 2017 – Rail Safety Training Course, Los Angeles County Metropolitan Transportation Authority, Los Angeles, CA.

April 4-6, 2017 – Society of Automotive Engineers World Congress, Detroit, MI.

March 3-5, 2016 – Southwestern Association of Technical Accident Investigators Conference, Las Vegas, NV.

December 2015 – CDR Operators and Applications Course, Mississauga, ON.

March 12-14, 2015 – Southwestern Association of Technical Accident Investigators Conference, Las Vegas, NV.

September 25-27, 2014 – Southwestern Association of Technical Accident Investigators Conference, Glendale, AZ.

September 23-25, 2014 – Tire Mechanics, Inspection and Forensic Tire Examination, Glendale, AZ.

October 29, 2013 – Suspension Overview for Architecture, GM Training, Warren, MI.

September 25, 2013 – DFMEA Design Failure Mode and Effects Analysis 4, GM Training, Warren, MI.

August 14, 2013 – Fundamentals of Vehicle Dynamics, GM Training, Warren, MI.

April 23, 2013 – ABAQUS Standard/Explicit/Viewer Introduction, GM Training, Warren, MI.

December 17, 2012 – DFSS Project Role – Leader, First, GM Training, Warren, MI.

December 17, 2012 – DFSS Green Belt Certification, GM Training, Warren, MI.

November 30, 2012 – GM DFSS Project Leader Training – Part 2, GM Training, Warren, MI.

August 17, 2012 – Product Liability, Law and Litigation, GM Training, Warren, MI.

October 28, 2011 – GM DFSS Project Leader Training – Part 1, GM Training, Warren, MI.

April 5, 2011 – OASYS PRIMER Advanced, GM Training, Warren, MI.

April 17, 2009 – DEP Morpher – Shape Optimization MDO, GM Training, Warren, MI.

February 16, 2009 – DEP/MeshWorks MORPHER Introduction, GM Training, Warren, MI.

September 3, 2008 – Mass Optimization for Multidisciplinary Loadcases, GM Training, Warren, MI.

Mary 28, 2008 – Oasys PRIMER Introduction, GM Training, Warren, MI.

May 5, 2008 – RMA2006 – Rapid Modeling and Analysis, GM Training, Webinar.

February 29, 2008 – SFE CONCEPT – Basic, GM Training, Warren, MI.

August 7, 2007 – HYPERMESH 8.0 Update for LS-DYNA Users, GM Training, Warren, MI.

December 19, 2001 – LS-DYNA (Advanced), GM Training, Warren, MI

April 3, 2001 – ISO/QS-9000 Internal Audit, GM Training, Webinar.

April 3, 2001 – ISO/QS-9000 Overview, GM Training, Webinar.

February 23, 2001 – MATLAB 1 Fundamentals, GM Training, Webinar.

November 9, 2000 – ISO/QS-9000 Internal Audit, GM Training, Webinar.

August 29, 2000 – Vehicle Development Process 24 (VDP24), GM Training, Warren, MI.

June 23, 1998 – LS-DYNA (Advanced), GM Training, Warren, MI.

November 26, 1996 – AUTO TALK – An Automobile Familiarization, GM Training, Warren, MI.