

Executive Summary

- Over 25 years of experience in new product and process development, data science, statistics, and reliability; with roles in Design and Release, Product Quality, Probabilistic Risk Assessments, Decision Analysis, Product Reliability, Applied Statistics, and Six Sigma
- Consultant and expert witness in matters of product development and product liability
- Doctorate in Mechanical Engineering, with focus in Reliability Engineering and Decision-based Risk Analysis
 - Supported with a Master of Science in Statistics
- Professional Engineer in State of Michigan (#6201069773)
- Accredited Professional Statistician[®] (PStat[®]) through the American Statistical Association (ASA)
- International Quality Federation (IQF) Six Sigma Master Black Belt in Operation Six Sigma and Design for Six Sigma (DFSS)
 - IQF Fellow
- Successfully managed own consulting practice in Reliability Engineering
- Strong analytical background with regards to industrial statistics and product reliability
- Extensive experience with the design and analysis of statistical studies
- Over 15 years of experience in using R¹ for the design and analysis of statistical studies, data analysis, statistical inference, reliability life test planning and analysis, and warranty analysis

Work Experience

Praxis Reliability Consulting, LLC – Monroe, Michigan

June 2012– Present

Managing Director, Owner

- Six Sigma Lead with Midmark Corporation
 - Working as contractor through own consultancy
 - Lead deployment of Six Sigma and Reliability Management programs
 - ◆ Certification of Six Sigma Green Belts, Black Belts, and Master Black Belts
- Long-term Consultant with Northrup Grumman
 - Reliability analysis of spacecraft systems
- Long-term Consultant with Engineering Systems, Inc.
 - Support projects with data analysis for purposes of engineering and scientific investigations related to matters of litigation
 - Analyze data and provide technical opinions in support of litigation cases
- Provide technical consulting in statistical and reliability methods
 - Integration of structured reliability management process within existing product development programs
 - Provide leadership in the application of key reliability tools and methods on product development efforts
- Provide support in developing design validation plans for components, assemblies, and complex, repairable systems
 - Design of Accelerated Life Testing (ALT) for components and assemblies
 - Development of Reliability Growth (RG) test plans for repairable systems

¹ R is a programming language used extensively in the fields of statistical analysis and data science.

- Facilitate statistical analyses on reliability data
- Reliability target setting and allocation
- Perform reliability modeling and simulations
- Application of robust design methodologies for production optimization
- Design of Experiments (DOE) for process optimization
- Application of multivariate statistics to define usage space and usage profiles

ESi – Ann Arbor, Michigan

May 2017 – June 2021

Sr. Consultant

- Statistician
 - Support projects with data analysis for purposes of engineering and scientific investigations related to matters of litigation
 - Analyze data and provide technical opinions in support of litigation cases
 - Consult on client-based research in the way of design of statistically based experiments, statistical analyses, statistical modeling, and forecasting
 - Expert witness in litigation matters involving data analysis and statistically based inferences
 - Reliability Engineer
 - Support product liability cases with regards to product robustness and reliability
 - Support managements decisions, including product campaigns and recall decisions, with statistical analysis of warranty data
 - Expert witness for product liability cases; including product recalls and campaigns

University of Toledo – Toledo, Ohio

May 2018 – Present

Adjunct Professor

- Probability and Statistics for Engineers I (MIME4000)
- Probability and Statistics for Engineers II (MIME4980)
- Design for Six Sigma (MIME4980/5980)
- Design of Experiments (GNEN6980)
- Reliability (MIME4690/5690)

International TechneGroup, Inc. – Milford, Ohio

Feb 2010 – Feb 2013

Senior Reliability Engineering Consultant

- Support OEMs in the implementation of Reliability Management Processes
- Warranty analysis for automotive, heavy truck, construction, and agricultural vehicles
- Development of component and assembly reliability verification plans
- Provide support for Reliability Growth planning and tracking

AVL Powertrain Engineering, Inc. – Plymouth, Michigan

Jan 2006 – Feb 2010

Technical Specialist in Statistical and Reliability Methods

- Application of fundamental principles in Reliability Demonstration and Reliability Growth of powertrain systems
- Facilitation of Design Failure Mode and Effects Analysis (D-FMEA) on Powertrain Systems, Assemblies, and Components
- Design of Accelerated Life Testing (ALT) for powertrain systems and components
- Facilitation of AVL's Load Matrix methodology
- Statistical definition of Customer Usage Profiles (CUP)

Visteon Corporation – Dearborn, Michigan

May 1997 – Dec 2005

Six Sigma Corporate Master Black Belt

Six Sigma Black Belt / Quality and Reliability Engineer – Powertrain Division

Product Design Engineer – Chassis Division

American Axle & Manufacturing - Rochester Hills, Michigan

Oct 1996 - May 1997

Test Engineer - Corporate Technical Center

Education

University of Toledo - Toledo, Ohio

Aug 2015 – May 2018

Doctor of Philosophy in Mechanical Engineering

- Focus on Reliability, Markov Chain Monte Carlo Simulation, Bayesian Statistics, and Decision Analysis
- Dissertation: *“Assessing the value of information for comparing multiple, dependent design alternatives”*

University of Toledo - Toledo, Ohio

Aug 2015 – May 2020

Master of Science in Statistics

- Mathematical Statistics, Statistical Inference
- Generalized Linear Models, Multivariate Statistics, Design of Experiments

University of Michigan-Dearborn – Dearborn, Michigan

June 2001 – Dec 2006

Master of Science in Industrial and Systems Engineering

- Concentration in Manufacturing & Quality Systems, Reliability

University of Toledo - Toledo, Ohio

Sept 1995 - Aug 1997

Master of Science in Mechanical Engineering

- Concentration in Fluid Mechanics and Heat Transfer
- Thesis: *“Effect of bifurcation angle on flow development in a symmetric model”*

University of Toledo - Toledo, Ohio

Sept 1990 - Aug 1995

Bachelor of Science in Mechanical Engineering

Licenses and Accreditation

Professional Engineer – State of Michigan License #6201069773 (exp. January 3, 2025)

Accredited Professional Statistician® (PStat®) through ASA (exp. July 31, 2026)

– <http://www.amstat.org/ASA/Your-Career/Accredited-Members.aspx>

Certificates

Fundamentals of Engineering Certificate – December 1995

IQF Certified DMAIC Master Black Belt – February 2004

IQF Certified DFSS Master Black Belt – March 2009

IQF Certified Lean Six Sigma Master Black Belt – March 2011

Certificate of Completion “Using R” – August 2015

- Certificate was provided through the *Program in Analytics and Statistical Studies* at The Institute for Statistical Education (TISE)¹

Publications

- “Early Life Reliability Growth Testing with Non-Constant Failure Intensity”, Haselgruber, Nikloaus, Capser, Shawn P., Vignati, Giorgio I., International Conference on Industry 4.0 and Smart Manufacturing, Procedia Computer Science, Volume 180, 2021, Pages 608-617, <https://doi.org/10.1016/j.procs.2021.01.283>.
- “Compliance Testing for Locomotive LED Headlights and Auxiliary Lights, Phase II”, Meza-Arroyo, Manuel, Shibata, Peggy A., Sprague, James K., Capser, Shawn, U.S. Department of Transportation, Federal Railroad Administration, Publication/ Report Number: DOT/FRA/ORD20/42. 2020.
- “Sensitivity Analysis of Various Vehicle Dynamic Simulation Software Packages Using Design of Experiments (DOE)”, R. Matthew Brach, Shawn Capser, Emmanuel Jay Manuel, Joshua Rogers, Robert Bailey, Paper 2020-01-0639, SAE International, Warrendale, PA, 2020. "The Kinematic Analysis of Occupant Excursions and Accelerations during Staged Low Speed Far-Side Lateral Vehicle-to-Vehicle Impacts," Shibata, P., Roberts, J., Sprague, J., Light, A., and Capser, S., SAE Technical Paper 2019-01-1030, 2019, <https://doi.org/10.4271/2019-01-1030>. "Sensitivity Analysis of Simulated Postimpact Vehicle Motion Using Design of Experiments (DOE)," Brach, R. and Capser, S., SAE Technical Paper 2018-01-0526, 2018, <https://doi.org/10.4271/2018-01-0526>.
- “Assessing the Value of Information for Multiple, Correlated Design Alternatives,” Capser, Shawn and Efstratios, Nikolaidis, SAE 17IDM-0020 (2017).
- “Making Conservative Estimates of Demonstrable Reliability When Model Parameters Are Unknown,” Capser, Shawn, Applied Reliability Symposium, San Diego, 2009.
- “THE-71G, 2007 AIAG Truck and Heavy Equipment Reliability Methods Guide, Reliability Program Implementation Plan and Report,” Version 1, Joe Anderson, John Bair, Doug Berg, Mark Braun, Shawn Capser, et al. Issued 12/2006.
- "The Influence of the Steering Gear Design into the Steering Wheel Nibble," Capser, Shawn and Massera, Sergio, SAE Technical Paper 2003-01-3643, doi:10.4271/2003-01-3643, November 18, 2003.

¹ TISE is certified through the State Council of Higher Education for Virginia (SCHEV).