

**ALLISE WACHS, PH.D.**

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**QUALIFICATIONS**

Possesses extensive experience applying mathematical and statistical methods to optimize product designs, product reliability, manufacturing processes, quality, and product liability risk. Research also includes the development of mathematical models to reveal optimal decision sequences over any planning horizon. Skills include the application and training of designed experimentation, reliability analysis, statistical process control, measurement system assessment, general statistical methods and modeling, and stochastic optimization.

Currently the president of Integral Concepts, Inc., and formerly a managing scientist for Exponent *Failure Analysis Associates* in risk assessment and product litigation. Has helped numerous manufacturing companies quickly resolve complex manufacturing problems and product design issues, and has been an adjunct professor in the College of Engineering at the University of Michigan. Has worked as a researcher for Intelligent Transportation Systems developing stochastic models to minimize travel times with route guidance systems and provided a Reliability Engineering certification program at the Univ. of Michigan.

**PROFESSIONAL EXPERIENCE**

**INTEGRAL CONCEPTS, INC.** West Bloomfield, Michigan 2002 – Present  
*Specialists in optimization of product designs and manufacturing operations*

**President (2002 – Present)**

- Help our clients significantly reduce product development time & launch flawlessly
- Assess and improve the Reliability of *products and manufacturing processes*
- Develop mathematical models to accurately predict product and process performance
- Assist manufacturers in *preventing* and *solving* complex product design problems *quickly*
- Educate our clientele in methods to optimize product reliability & quality
- Estimate product liability risks and helped to minimize risk
- Testify on the root causes of serious product and process failures

**Accomplishments**

- Saved our clients millions of dollars by reducing product variation and waste
- Saved our clients millions of dollars by improving productivity, quality, & reliability
- Saved our clients months/years of development time via optimization methods
- Minimized our clients' product liability risk by improving product designs and by providing supportive data analyses—and predictive models

**EXPONENT FAILURE ANALYSIS ASSOCIATES**, Menlo Park, California 2000 – 2002  
*Failure analysis and risk assessment experts*

**Managing Scientist (2000 – 2002)**

- Estimated the risk of product failures & forecasts for large manufacturers and utilities
- Predicted traffic fatalities in the U.S. for several potential government regulation initiatives
- Estimated safety risks for a variety of automotive parts, consumer products, and medical devices
- Prepared research and analysis for expert testimony in corporate litigation cases

**Accomplishments**

- Quickly and successfully helped to re-design flawed and recalled products

**MANAGEMENT RESOURCES INTERNATIONAL**, Saline, Michigan 1993 – 2000  
*Quality and productivity specialists*

**Statistical Consultant (1993 – 2000)**

- Educated our clientele in statistical methods to optimize product quality and reliability
- Helped many manufacturers solve complex product design and manufacturing problems

**THE UNIVERSITY OF MICHIGAN**, Ann Arbor, Michigan  
*Academic Institution*

**Adjunct Faculty (2006) College of Engineering**

- Developed and delivered a Reliability Certification Program.

**Adjunct Professor (1999) College of Engineering**

- Taught statistical & quality methods to juniors, seniors, and graduate students in the College of Engineering and received consistently excellent reviews in the course evaluations

**Research Assistant (1993 – 1995) College of Engineering**

- Worked on the Intelligent Transportation Systems project developing anticipatory mathematical models to minimize travel times for users of route guidance systems
- Provided statistical support to a division of Ford Motor Company

**Teaching Assistant (1992 – 1993) College of Literature, Science & Arts**

- Taught a statistics class in the Department of Statistics with outstanding student reviews

**WESLEY•JESEN (SCHERING-PLOUGH)**, Chicago, Puerto Rico 1989-1992  
*Pharmaceuticals and Medical Devices*

**Industrial Statistician and Consultant (1989 – 1992)**

- Applied statistical methods for product and process optimization

**ANDERSEN CONSULTING (ACCENTURE)**, New York, Chicago 1987 - 1989  
*Software Development for inventory control and accounting applications*

## **EDUCATION**

**UNIVERSITY OF MICHIGAN**, Ann Arbor, Michigan  
*Ph.D. Applied Mathematics*, 1998  
*M.S. Industrial Engineering*, 1993  
*M.A. Statistics*, 1987  
*B.S. Mathematics*, 1986, *Dual B.S. Degree in Statistics* 1986

**UNIVERSITY OF CHICAGO**, Chicago, Illinois  
*Statistics Ph.D. program*, 1989 – 1991

## **PUBLICATIONS**

*“The Statistics of a Medicare Audit.”* Compliance Today, accepted for publication (with Mantese and Nowakowski)—to appear later in 2012.

*“Average Optimality in Nonhomogeneous Infinite Horizon Markov Decision Processes.”* Mathematics of Operations Research, (with Smith & Schochetman), Vol. 36, No. 1, February 2011, pp. 147-164.

*“Predicting Process Performance to Reduce Warranty Costs.”* Manufacturing Engineering, September, 2010 issue.

*“Automakers Need a Crash Course in Quality.”* CBS News Opinions (cbsnews.com), November, 2008.

*“Effects of methylmalonyl-CoA mutase gene knockouts on erythromycin production in carbohydrate-based and oil-based fermentations of Saccharopolyspora erythraea.”* Journal of Industrial Microbiology & Biotechnology, Vol. 33, Number 7, p. 600-609. *Assisted authors with all statistical support.*

*“A Design of Experiments Primer.”* Fabricating & Metalworking. Interview by Tim Heston, March, 2006.

*"Limitations of Popular Capability Indices."* Manufacturing Engineering, November, 2005.

*"Just the Right Size."* Fabricating & Metalworking. Interview by Phil Waters, August 26, 2005.

*"Do You Use SPC Correctly? Misapplication of Statistical Process Control can Damage Your Operations."* Manufacturing Engineering, March, 2005 Vol. 134 No. 3.

*Made in the USA: Eliminating Inefficiencies—Not Jobs & Profits!* A book. Submitted, 2005.

*"Accounting for Risk Exposure in Failure Rate Analysis."* Michigan Defense Quarterly, 2005.

*"Design of Experiments II."* Textbook for a 32 hour course published and copyrighted by Integral Concepts, Inc., 2003.

*"Analysis of the Relationship Between Passenger Vehicle Weight and the Risk of Traffic Fatality and Injury,"* prepared for General Motors Corporation for CAFÉ legislation (with R. Ray, K. Ramachandran, and A. Donelson), 2002.

*"Analysis of Beryllium Lymphocyte Proliferation Test using Statistical Process Control."* Technical Report Exponent Health Group (with Daniel Cher), 2002.

*"Design of Experiments I: A First Course."* Text for a 32 hour course published and copyrighted by Integral Concepts, Inc., 2002.

*"Statistical Process Control I: A First Course."* Text for a 32 hour course published and copyrighted by Integral Concepts, Inc., 2002.

*"Statistical Process Control II."* Text for a 32 hour course published and copyrighted by Integral Concepts, Inc., 2002.

*"Statistical Analysis for Process Improvement."* Text for a 32 hour course published and copyrighted (with Steven Wachs) by Integral Concepts, Inc., 2002.

*"Measurement System Assessment."* Text for a 16 hour course published and copyrighted by Integral Concepts, Inc., 2002.

*"Reliability Analysis."* Seminar book for a 16 hour course published and copyrighted by MRI, April 2000.

*"Stochastic Infinite Horizon Optimization with Average Cost Criterion,"* Ph.D. Thesis, University of Michigan, Ann Arbor, MI, 1998.

*"Quantifying the Number of Probes for Testing Route Guidance Systems,"* Transportation Research Board, (with S. Underwood), 1994.

*"The Expected Value of Perfect Information: Applications to Route Guidance and Traffic Control,"* IVHS Technical Report 93-06, June 1993 (with R.L. Smith).

Blog: *Manufacturing & Engineering Optimization.* [www.integralconcepts.blogspot.com](http://www.integralconcepts.blogspot.com)

*"Recapturing our Manufacturing Dominance."* Blog, 2008.

*"American Industry: Beyond the Quick Fix."* Blog, 2008, etc.

## SPEAKING ENGAGEMENTS

*“Statistical Methods to Assess Effectiveness of Corporate Education Programs,”* International Society for Performance Improvement, Southfield, MI, April 14, 2012.

*“DOE for Reliability & Optimization of Multiple Performance Characteristics,”* International Applied Reliability Symposium, Reno, NV, June 16, 2010.

*“Designed Experimentation for Reliability Prediction & Performance Optimization,”* International Applied Reliability Symposium, San Diego, CA, June 10, 2009.

*“Multi-Response Optimization,”* Society for Industrial & Applied Mathematics (SIAM), Dearborn, MI, October, 2008.

*“The Impact of Reliability & Quality on U.S. Competitiveness,”* Quality Expo, Novi MI, June, 2006.

*“World Class Manufacturing: Competing in the Global Economy,”* Center for Automotive Research Management Briefing Seminar, August, 2005.

*“Industrial Applications of Reliability, Designed Experimentation and Statistical Process Control,”* Institute for Industrial Engineers, May, 2005.

*“Reliability Engineering Certification Program,”* The University of Michigan, February, 2005.

*“Common Misapplications of Designed Experimentation and Statistical Process Control,”* The American Society for Quality: Orlando, FL, 2005.

*“The Truth about Quality,”* National Manufacturing Week, Chicago, IL, 2005.

*“Common Misapplications of Statistical Methods,”* The American Society for Quality: BOSCON 2004, Boston, MA, 2004.

*“The Benefits of Industrial Statistics to Manufacturers,”* Annual MQVP Meeting, Troy, MI, 2004.

*“The Truth about Quality,”* Detroit Quality Expo and Conference, Novi, MI, 2004.

*“Common Misapplications of Statistical Process Control,”* Manufacturing Technology Summit: Society for Manufacturing Engineers, Dearborn, MI, 2004.

*“Design for Six Sigma,”* Society for Automotive Engineers Conference, Detroit, MI, 2002.

*“Stochastic Infinite Horizon Optimization with Average Cost Criterion,”* INFORMS Conference (Institute for Operations Research & the Management Sciences), Applied Probability Society, Cincinnati, OH, 1998.

*\*Regular speaking engagements through The University of Michigan, Eastern Michigan University, and Integral Concepts, Inc. on the subjects of applied probability, reliability, optimization, and statistical methods, 1993 – present.*