

# Daniel Zwillinger, PhD

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## OVERVIEW

Forty years' experience in solving technical and business problems in engineering and the physical sciences. Experienced in large and small companies, government labs, consulting, and academia.

### TECHNICAL STRENGTHS

- ✓ Experienced in identifying and resolving the key issue of a technical problem.
- ✓ Extensive experience in algorithm design, data analysis, modeling & simulation, software requirements.
- ✓ Computer skills/expertise: Matlab, Mathematica, Perl, Python, R, SQL, UNIX.

### BUSINESS STRENGTHS

- ✓ Six Sigma (6 $\sigma$ ) black belt; both Raytheon and ASQ certified.
- ✓ Project and personnel management experience with fiscal responsibility.

### COMMUNICATION STRENGTHS

- ✓ Excellent technical communication skills. Wrote several technical books.
- ✓ College professor for four years at RPI (Rensselaer Polytechnic Institute)

## EDUCATION

PhD	<a href="#">California Institute of Technology</a>	Applied Mathematics	1983
BS	<a href="#">Massachusetts Institute of Technology</a>	Mathematics	1978

## INDUSTRIAL EXPERIENCE

**BAE Systems – Chief Scientist** (2018 – current) Burlington, MA  
Apply game theory capabilities to military problems. Led architecture creation for a decentralized data fuser.  
Principal Investigator (PI) and Project Manager (PM) on multiple research programs.

**Autoliv – Validation Manager** (2015–2018) Lowell, MA  
Autoliv was the world's largest manufacturer of automobile radars. My team designed and created data collection systems, performed environmental testing, and determined radar performance with fleet of 19 vehicles & 6 drivers. Improved effectiveness, efficiency, capability, and capacity by process improvements. Was resident statistician. Created models for LIDAR object classification, radar calibration & synchronization. Experienced with ISO 17387.

**Raytheon – Senior Principal Systems Engineer & Six Sigma Black Belt** (2001–2015) Sudbury, MA  
**Systems Engineering** • SW Requirements lead for C-Band Radar Project Line • Test lead for IRAD radar calibration project • Led systems engineering, usability, and deployment for Time Card system • SW requirements lead for Pre- and Post-Mission Software for Cobra Judy Replacement (CJR) • Test lead for Multiple Hypothesis Tracking.  
**Six Sigma** • \$42M benefit (audited) from my improvements • Twice won “President’s Best Six Sigma Project of the Year” • Improved VV&A (Verification, Validation & Accreditation) process for Zumwalt destroyer (DDG-1000).  
• Improved Patriot Missiles Rolling Wave process • Subject Matter Expert (SME) in Design for Six Sigma (DFSS), Critical Chain Program Management (CCPM), and Voice of the Customer (VoC)  
**Other** • Lead for “Trust in Autonomous Systems” project • Four time winner of “Raytheon Innovation Challenge.”  
• Managed (and frequent teacher) of Six Sigma white/yellow belt training for 5 years

Held consulting, staff, and scientist positions at

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|---|---|
| o <a href="#">Exxon Research and Engineering</a> 1981–1983  | Summer positions  |
| o <a href="#">The MITRE Corporation</a> 1987–1990           | o <a href="#">Sandia Laboratories</a> 1979                    |
| o <a href="#">Bolt Beranek &amp; Newman (BBN)</a> 1992–1994 | o <a href="#">Jet Propulsion Laboratory (JPL)</a> 1980 & 1981 |
| o <a href="#">IronBridge Networks</a> 1999–2001             | o <a href="#">Institute for Defense Analysis (IDA)</a> 1987   |

Application areas have included: queueing theory for terabit routers, cryptographic analysis for the NSA, design of thin film optical interference filters, communication theory for NASA's deep space net, acoustics/sonar for geo-prospecting and submarines, and cost estimation for geothermal wells.

## ENTREPRENEURIAL EXPERIENCE

1. Founded an applied engineering consulting firm, [Aztec Corporation](#) (1990-1999). Handled business development, project and personnel management, proposal writing, and client negotiations.
  - Created Matlab's statistics toolbox ([The MathWorks](#)).
  - Principal investigator on [Air Force](#) SBIR contracts to develop automated-test equipment (ATE) system. Phase I: Explored novel physical effects to allow visualization of circuit board electromagnetic fields. Phase II: Prototyped a visualization system using electro-optic sensors.
  - Managed [Department of Transportation](#) SBIR contract: developed CAD tools for luggage simulations.
  - Rewrote the mathematical reference manual for the computer language [Macsyma](#).
  - Created electronic question testbanks to accompany textbooks for [McGraw-Hill](#).
  - Converted technical books to web format (HTML, Javascript) for [Academic Press](#).
  - Performed probabilistic modeling of random emitters for [PinPoint Corporation](#).
2. Co-founder of [China Spirits Corporation](#) (2014–2017); manufacturer of Chinese liquors.
3. Created and sold patent #9,412,280 (*Cooperative System and Method for Precise Autonomous Delivery*) to Uber. The related design patents D796418 & D797648 address "Where does a drone deliver its payload?" On team for patent #11,057,740 (*Custodianship Model for Decentralized Track Fusion*).

## ACADEMIC EXPERIENCE

Assistant Professor of Mathematics & Computer Science at [Rensselaer Polytechnic Institute](#) (1983–1987).

Taught graduate and undergraduate courses in information theory, probability, statistics, linear algebra, discrete mathematics, differential equations, complex variables, and advanced calculus. Published papers on wave theory, information theory, materials engineering, and algorithmic design.

- Judge for annual undergraduate [Mathematical Contest in Modeling](#) (administered to more than 800 schools internationally). Created several of the competition problems. (1992–2012)
- Appointed a visiting SIAM ([Society of Industrial and Applied Mathematics](#)) lecturer (1992–1999)
- Appointed to Technology/Engineering Advisory Council for the [Massachusetts Board of Ed](#) (2000–2003)

## PUBLISHED BOOKS

- Editor-in-chief of 30<sup>th</sup>–33<sup>rd</sup> editions of [Standard Mathematical Tables and Formulae](#) (CRC, 1995-2018), an extremely successful reference book (first edition in 1928) with two million copies sold (all editions). Assembled team of 2 associate editors, 13 advisory board editors, and 25 contributors. CD-ROM version with embedded Maple engine 1997. Chinese version 1998.
- Authored two reference books - each was "Book of the Month" for the Library of Science book club:
  - [Handbook of Differential Equations](#) (Academic Press, 1<sup>st</sup>–4<sup>th</sup> editions, 1989–2021; CD-ROM 1997)
  - [Handbook of Integration](#) (Jones and Bartlett, 1992).
- Co-authored [Standard Probability and Statistics Tables](#) (CRC, 2000)
- Editor-in-chief of [Tables of Integrals, Series, and Products](#) (Academic Press, 6<sup>th</sup>–8<sup>th</sup> editions 2000–2014)

## PUBLISHING – OTHER

- Advisory editor for [Handbook of Chemistry and Physics](#) (CRC, 85<sup>th</sup>–97<sup>th</sup> editions, 2004–2016).
- Editor-in-chief of CRC's "[Advances in Applied Mathematics](#)" book series (CRC, 2013-present) <https://www.crcpress.com/Advances-in-Applied-Mathematics/book-series/CRCADVAPPMTH> -- 33 books in series
- Recent publications
  - "Voting Power of Teams Working Together," <http://arxiv.org/abs/1312.3394>
  - "Kuhn Poker with Cheating and Its Detection," <https://arxiv.org/abs/2011.04450>
  - "As Easy as 1, 3, 9?," *Six Sigma Forum Magazine*, Aug 2013
  - "Six Sigma Tools in Six Minutes," <https://www.sixsigmainsixminutes.com/>
  - "The 'Trust V': Building and Measuring Trust in Autonomous Systems," Chapter 4 in *Robust Intelligence and Trust in Autonomous Systems*, April 2016

## OTHER

- Active DoD Top Secret clearance. Previously held NSA clearance.
- Home page at [www.mathtable.com/zwillinger/](http://www.mathtable.com/zwillinger/)
- Hobby: creating a Differential Equations search engine
- Private pilot. Enjoy travelling and have vacationed in 40+ countries.

