

## Professional Biography of James C. Spall

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### Synopsis

James C. Spall is a member of the Principal Professional Staff at the Johns Hopkins University, Applied Physics Laboratory, and is a Research Professor in the Johns Hopkins Department of Applied Mathematics and Statistics. He is involved further in educational and leadership activities through serving as a Program Chair, instructor, and adviser in the Applied and Computational Mathematics Program within the Johns Hopkins University Engineering and Applied Science Programs for Professionals. Dr. Spall's technical and educational activities are focused on stochastic systems, statistical analysis, and computational algorithms.

### Experience

**1983–Present.** The Johns Hopkins University, Applied Physics Laboratory (JHU/APL), Principal Professional Staff (1991–present), Senior Professional Staff (1983–1991). Dr. Spall has worked in diverse areas within the fields of statistics and control systems, and has worked in applications areas such as defense systems and transportation systems. He has published over 100 refereed papers on topics such as parameter estimation, adaptive control, small-sample data analysis, performance evaluation and testing, time series, optimization, and neural networks, and has edited and coauthored one book on dynamic models and has written (sole author) another book on stochastic optimization (see separate publications list). He also holds two U.S. patents for inventions in control systems (both licensed to the private sector). Dr. Spall has extensive experience leading and managing research and development projects. These projects include several funded by the U.S. Navy on advanced techniques for estimation in a large-scale defense system. The work in these projects involved the development of new statistical theory and the subsequent implementation in software and processing of actual system data. He has also been the principal investigator of many JHU/APL-funded Independent Research and Development projects. These projects represent basic research in the fields of statistics and control.

**1996–Present.** The educational activities described here are carried out on a part-time basis in addition to the main employment activities described above: Chair of the Applied and Computational Mathematics (ACM) Program within the Engineering and Applied Science Programs for Professionals, JHU Whiting School of Engineering (responsible for overseeing a program with approximately 25 part-time faculty and 200 graduate students: [www.ep.jhu.edu](http://www.ep.jhu.edu)) (1999–present). Instructor (1997–present) and adviser (1999–present) in the ACM Program. Instructor in the JHU/APL Strategic Education Program (1996–present). Instructor for short course in the Applied Technology Institute, Inc. ([www.aticourses.com](http://www.aticourses.com)) (2004–present). Research (Full) Professor with the JHU Department of Applied Mathematics and Statistics (2004–present). Ph.D. and M.S. student adviser or co-adviser for several students (listed below).

Teach graduate courses in the areas of stochastic algorithms, optimization, Monte Carlo simulation, and neural networks.

**1979–1982.** Temporary professional positions with the U.S. Department of Transportation (NHTSA) and the General Motors Research Laboratory.

## **Education**

Ph.D., Systems Engineering, University of Virginia, 1983.

S.M., Technology and Policy Program (specialization and thesis in transportation systems), Massachusetts Institute of Technology, 1981.

B.S., Systems Engineering, Oakland University, 1979 (top graduate in School of Engineering).

## **Selected Honors**

Dunning Professorship for collaboration between the Johns Hopkins School of Engineering and JHU/APL, 2004–2012.

Innovation award for the Strategic Systems Business Area at JHU/APL for exceptional innovation in reliability estimation, November 2011.

Excellence in Teaching Award, Johns Hopkins University Engineering and Applied Science Programs for Professionals, 2006 (one of 3 awards for approximately 400 faculty).

Fellow of Institute of Electrical and Electronics Engineers (IEEE) (elected 2003).

Awards for best research paper at JHU/APL, 1988 and 2000.

Janney Fellowships for independent projects at JHU/APL, 1987 and 1999.

Several best presentation awards at the American Control Conference and American Statistical Association Annual Meeting (Joint Statistical Meetings).

R.W. Hart Prize as principal investigator of the outstanding 1990 Independent Research and Development project at JHU/APL (selected from 40 projects).

Best paper award at 1995 Military Operations Research Symposium (chosen from among 25 papers in the test and evaluation area).

Plenary speaker at Mid-Atlantic Probability and Statistics Day (1992, 1997, and 2007) and at National Institute of Standards and Technology (NIST) Performance Metrics Symposium (2004); many other invited talks at conferences sponsored by IEEE, American Statistical Association, and other organizations.

Fellow of engineering honor society Tau Beta Pi (1979) (18 selected from approximately 200 national candidates).

Highest award to graduating senior by the Oakland University School of Engineering (1979).

## **Selected Professional Service Activities**

One of four inaugural Senior Editors for the *IEEE Transactions on Automatic Control* (2009–present; responsible for final publication decision on over 200 papers/year).

Topic Editor in stochastic optimization for *Encyclopedia of Operations Research and Management Science* (Wiley) (print version published 2011; online version updated on ongoing basis).

Program Chair for the 2007 IEEE Conference on Decision and Control (oversaw peer review process and scheduling for approximately 1700 submitted papers).

Area Editor for 2005 Joint IEEE Conference on Decision and Control/European Control Conference.

Vice Program Chair at 2001 and 2004 IEEE Conference on Decision and Control and 2002 American Control Conference.

Member of Program Committees for 1999 American Control Conference; 1999, 2006, and 2008 IEEE Conference on Decision and Control; 2003–2007 IEEE International Symposium on Intelligent Control; 2005 Mediterranean Control Conference; 2010 International Symposium on Mathematical Theory of Networks and Systems; 2011–2012 International Conference on Simulation and Modeling Methodologies, Technologies and Applications (SIMULATECH).

Member of IEEE Control Systems Society Technical Committee on Identification and Adaptive Control.

Associate Editor at Large for the *IEEE Transactions on Automatic Control* (2003–2009).

Associate Editor for the *IEEE Transactions on Automatic Control* (1996–1999).

Contributing Editor for the *Current Index to Statistics*, responsible for control engineering and related areas (1992–present).

Member of JHU School of Engineering Graduate Committee (2003–2006).

Member of Search Committee for JHU Associate Dean (to serve as Head of JHU Engineering and Applied Science Programs for Professionals) (2001)

Editorial board for *Johns Hopkins APL Technical Digest* (1996–present).

General Chair of the 4<sup>th</sup> APL Research and Development Symposium, November 1997.

President of the Maryland Chapter of the American Statistical Association, 1998–2000.

Member of JHU/APL Committee on Sabbatical Fellows and Professors (1998–2000).

Organized and chaired invited sessions at the IEEE Conference on Decision and Control, American Control Conference, American Statistical Association Annual Meeting, International Statistical Institute Biennial Meeting, etc.

Taught short courses (tutorials or workshops) at the American Control Conference, IEEE Conference on Decision and Control, American Statistical Association Annual Meeting, Summer Computer Simulation Conference, and several other conferences.

General Chair of the Mid-Atlantic Probability and Statistics Day, October 1988.

Reviewer of papers for many journals and conferences and reviewer of proposals for NSF, DOE, (U. S. Department of Energy), and NSERC (Canada) (1983–present).

Mentor for high school and undergraduate students with interest in mathematics.

Member of IEEE (Fellow), American Statistical Association, Sigma Xi, and Tau Beta Pi (Fellow).

## Publications

See separate list at [www.ams.jhu.edu/~spall/Personal/index.htm](http://www.ams.jhu.edu/~spall/Personal/index.htm). Included in the list are the books, *Introduction to Stochastic Search and Optimization: Estimation, Simulation, and Control*, Wiley (2003) ([www.jhuapl.edu/ISSO](http://www.jhuapl.edu/ISSO)), “Solutions Manual for *Introduction to Stochastic Search and Optimization: Estimation, Simulation, and Control*” (2012), and *Bayesian Analysis of Time Series and Dynamic Models*, Dekker (now CRC Press) (1988).

## **Doctoral and Master's Students**

As part of his involvement in research and educational activities, Dr. Spall works on a part-time basis to supervise the research work of graduate students, among them:

Qi Wang (current doctoral student) (JHU–Applied Mathematics and Statistics). Research topic: discrete stochastic optimization.

Xumeng Cao (current doctoral student) (JHU–Applied Mathematics and Statistics). Research topic: observed vs. expected Fisher information for inference purposes.

David W. Hutchison (JHU–Applied Mathematics and Statistics, Ph.D. 2009). Thesis topic: small-sample analysis of stochastic approximation algorithms.

Sonjoy Das (JHU–Applied Mathematics and Statistics, M.S. 2007). Thesis topic: efficient Monte Carlo calculation of Fisher information matrix.

Payman Sadegh (Technical University of Denmark, Ph.D. 1997). Thesis topic: statistical methods for optimal sensor placement.

Nathan Kleinman (JHU–Mathematical Sciences, Ph.D. 1996). Thesis topic: Monte Carlo simulation-based optimization (co-advisor with Prof. Daniel Naiman).