

Curriculum Vitae: Michael L. Deaton

Integrated Science and Technology, MSC 4102
James Madison University, Harrisonburg, VA 22807
540-568-2725 (JMU); 540-849-8445 (CELL), 540-568-2955 (FAX)
deatonml@jmu.edu;

EDUCATION

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|---|------|
| Ph.D., Statistics, Virginia Polytechnic Institute and State University Dissertation: <i>The Causal Analysis of Multiple Time Series: A Frequency Domain Approach Using Group Delay</i> | 1980 |
| M.S., Mathematics, Memphis State University | 1976 |
| B.S., Mathematics, David Lipscomb University | 1974 |

PROFESSIONAL EXPERIENCE

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|---|--------------|
| James Madison University, Harrisonburg, Virginia | 1994-present |
| Professor, College of Integrated Science and Technology | 1998-present |
| Associate Professor and Academic Group Coordinator | 1994-1998 |
| Affiliate Professor - University of Malta, Institute of Earth Systems | 2010-present |
| E. I. DuPont de Nemours Company, Inc. | |
| Technical Group Manager, Textile Nylon R&D, Seaford, DE | 1991-1994 |
| Manager, Laboratory Operations, Waynesboro, VA | 1980-1991 |
| Manager, Orlon® Quality Assurance, Waynesboro, VA | 1988-1990 |
| Senior Statistical Consultant, Applied Statistics Group, Wilmington, DE | 1985-1988 |
| Statistical Consultant, Applied Statistics Group, Wilmington, DE | 1984-1985 |
| Assistant Professor, Dept of Statistics, Kansas State University, Manhattan, KS | 1981-1984 |
| Consulting Experience | |
| DuPont Quality Management and Technology Center, Wilmington, DE General statistical consulting with DuPont Operating Departments Lead course developer Strategy of Experimentation with JMU® Data Analysis for Decision Making Disciplined Process Improvement Corporate Six-Sigma Green Belt and Black Belt Training/Certification Strategic planning | 1994-2005 |
| DuPont Textiles and Interiors Co-Developer – Six Sigma Green Belt training for Global R&D General statistical consulting with Global R&D | 2001-2005 |
| R.R. Donnelly Print Solutions Lead Course Developer – Corporate Six Sigma Black Belt Training Curriculum | 2004 |
| National Library of Medicine/National Institutes of Health Chemical Hazards Emergency Medical Management (CHEMM) | 2010-2011 |

PROFESSIONAL AFFILIATIONS

- American Statistical Association
- System Dynamics Society
- Fellow: Center for the Interdisciplinary Study of Terrorism and Peace, James Madison University

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- Affiliate Professor: Institute for Earth Systems, University of Malta

AWARDS AND RECOGNITION

- **Provost Award for Excellence in Graduate Advising** – James Madison University, 2013
- **Research Fellow** – Institute for Infrastructure and Information Assurance, James Madison University for Excellence in Support of Undergraduate Education and Research
- **Madison Teaching Award** – James Madison University, 2008
- **Co-Recipient of James Madison Innovation Award for 2013** for ERAMAT: A Culturally Anchored Eco-Game (with Jacob Mayiani Loorimirim and Dr. Jennifer Coffman)
- **Co-Recipient of the Rising Star Award** for the workshop entitled *ERAMAT: Systems Thinking for Survival in East Africa at the North American Simulation and Gaming Association*, Baltimore, MD, October 7-12, 2014 (with Jacob Mayiani Loorimirim, Alexander Hickling, and Jennifer Coffman)
- **Finalist: Outstanding Faculty Award**, VA State Council of Higher Education (2015)

GRADUATE THESIS ADVISING

- James Simon (2013). *"A System Dynamics Approach to Education on How to Manage the Endangered Species of the Edwards Aquifer."*
- Raguram Sellakannu (2013). *"System Dynamics Modeling of Residential Electricity Consumption Growth in Virginia."*
- Jacob Mayiani Loorimirim (2013). *"ERAMAT! A Board Game Simulator for Promoting Systems Thinking for Sustainable Pastoralism Among the Maasai of Southern Kenya."*
- Ivan Gowe (2013). *"System Dynamics Modeling Study of the Possibility of Endemic Measles in the State of Virginia."*
- Brookes E. Taylor (2012). *"A Business Case for Electric Power Distributors Using Simulation: Investigating the Combined use of the Strategies of Feed-in-Tariffs, Distributed Generation, Time-of-use Rates, and Efficiency"*.
- J. Schembri (2010). *"A System Dynamics Approach Toward Assessing Posidonea Oceanica Habitat"*
- Abigail N. Graefe (2010). *"Assessing the Potential Benefits of Learning about Environmental Issues Through a Systems Thinking Pedagogy"*
- Bader Q. Fazea (2010). *"The Center for STEM Education and Outreach at James Madison University: A Case Study for Using System Dynamics and the Balanced Scorecard to Perform Strategic Planning"*
- V. Akins (2010). *"System Dynamics of Chronic Diseases in the Presence of Social Determinants"*
- S. Songkiatisak (2009). *"A Simulation Model for Triclosan Concentrations in the North and Middle Rivers, Virginia"* (co-advised with Dr. Tom Benzing)
- Martin (2008). *"Making the Grade: A System Dynamics Analysis of No Child Left Behind and its Impact on Student Performance"*
- P. Salyers (2007). *"Water Shortages and Water Management in Wise County, Virginia: A System Dynamics Analysis"*
- S. Bantz (2007). *"Growing Pains: Exploring the Future of the U.S. Biodiesel Industry"*
- Daniel S. Shaffer (2007). *"Identifying Gaps in Rural Broadband Services"*
- M. Bourne (2004). *"The Dynamics of Identify Theft: A Comparison of Symptomatic and Systemic Solutions"*

PUBLICATIONS AND BOOK REVIEWS

Deaton, M.L. and R. V. Foutz (1980). "Group Delay and the Time-Lag Relationship Between Stochastic Processes." *Journal of Time Series Analysis* 1(2). pp. 111-118.

Deaton, M.L. and R.V. Foutz (1981). "Path analysis for complex-valued random variables with an application to spectral analysis of time series." *J. Statist. Comp. Simul.* 12, pp. 61-65

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- Reynolds, M.R. and M. L. Deaton (1981). "Comparison of Some Tests of Validation of Stochastic Simulation Models." *Communications in Statistics: B*, **11(6)**, pp. 769-799.
- Good, I. J., and M. L. Deaton (1981). "Recent Advances in Bump-Hunting." *Computer Science and Statistics: Proceedings of the 13th Symposium on the Interface* (William F. Eddy, ed); Springer, 92-104 (with discussion).
- Thompson, K.W., M. L. Deaton, R. V. Foutz, John Cairns, Jr., and A. C. Hendricks (1982). "Application of the Box-Tiao Intervention Analysis to Fish Ventilatory Response Data." *Canadian Journal of Fisheries and Aquatic Sciences*, **39(3)**, pp. 518-521.
- Deaton, M. L. M. R. Reynolds, and R. H. Myers (1983). "Estimation and Hypothesis Testing in Regression in the Presence of Nonhomogeneous Error Variance." *Communications in Statistics – Simulation and Computation*, **12**, pp. 45-66.
- Deaton, M. L., J. J. Higgins, and J. E. Smith (1983). "A Statistical Model for Describing the Response of Diabetic Patients to Insulin Therapy." *Journal of Undergraduate Mathematics and Its Applications*.
- Deaton, M. L., J. J. Higgins, and Je. E. Smith (1984). "A Model for the Synthesis of Chemical Compounds in Red Blood Cells with an Application to Diabetes." *Biometrics*, **40**, pp. 77-84.
- Deaton, M.L. (1987) Book review of *Response Surfaces: Design and Analysis*, by A. I. Khuri and J. A. Cornell (Marcell-Dekker). *Journal of the American Statistical Association*, vol. **84**.
- Deaton, M. L. (1988). "Validation of Simulation Models." *Encyclopedia of Statistical Sciences, Vol. 8*, (S. Kotz and N. L. Johnson, Editors), Wiley and Sons, NY, pp. 481-484.
- Deaton, M.L. (1989) Book review of *Measurement Error Models* by W. A. Fuller (Wiley). *Technometrics*, **31(1)**, p. 112.
- Good, I. J., G. I. Holtzman, M. L. Deaton, and L. H. Bernstein (1989). "Diagnosis of Acute Myocardial Infarction from Two Measurements of Creatin Kinase Isoenzyme MB with Use of Nonparametric Probability Estimation." *Clinical Chemistry*, **35**: 444-447.
- Boyer, J. E. and M. L. Deaton (1989). "Estimation of Stage Transition: An application to Entomological Studies." *Annals of the Entomological Society of America*, **82:2**, 135-148.
- Good, I. J., G. I. Holtzman, M. L. Deaton, and L. H. Bernstein (1989). "Diagnosis of Heart Attack from Two Enzyme Measurements by Means of Bivariate Probability Density Estimation: Statistical Details." *J. Statistical Computation and Simulation*, **32 (1-2)**, pp. 68-76.
- Deaton, M.L. (1991). "The Dynamic Quality Improvement Model." *Product Quality Management* (D.W. Marquardt, editor. Internal text published by the DuPont Company.
- Winebrake, J. J. and M. L. Deaton (1997). "A Determination of Deterioration Factors for Three Types of Alternative Fuels: Natural Gas, Ethanol, and Methanol." *Proceedings of the 90th Annual Conference of the Air and Waste Management Association, Toronto, Canada, June 8-13, 1997*.
- Winebrake, J.J. and M. L. Deaton (1997). "A Determination of Deterioration Factors for Three Types of Alternative Fuels: Natural Gas, Ethanol, and Methanol." *Proceedings of the 90th Annual Conference of the Air and Waste Management Association*, Toronto, Canada.
- Winebrake, J. J. and M. L. Deaton (1997). "A Comparative Analysis of Emissions Deterioration for in-use Alternative Fuel Vehicles." *Journal of the Air and Waste Management Association*, **47**. pp. 1291-1296.
- Deaton, M.L. and J.J. Winebrake (1998). "Determining Emissions Characteristics for In-Use Alternative Fuel Vehicles." *Proceedings of the 91st Annual Conference of the Air and Waste Management Association*, San Deigo, CA, June 1998.

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- Winebrake, J. J. and M. L. Deaton (1999). "Hazardous Air Pollution from Mobile Sources: A Comparison of Alternative Fuel and Reformulated Gasoline Vehicles." *Journal of the Air and Waste Management Association*, **49**. pp. 576-581.
- Deaton, M. L., and J. J. Winebrake (2000). "Comparing Lifetime Emissions of Natural Gas and Conventional Fuel Vehicles: An Application of the Generalized ANCOVA Model." *Journal of the Air and Waste Management Association*, **50**. pp. 162-168.
- Winebrake, J. J., M. L. Deaton, T. C. Coburn, K. J. Kelly (2000). "Statistical Analysis of Emissions and Deterioration Rates for In-Use High-Mileage CNG and Gasoline Vehicles." *SAE Technical Paper Series, paper #2000-01-1959*
- Deaton, M. L. and J. J. Winebrake (2000). "The Use of Mixed Effects ANCOVA to Characterize Vehicle Emissions Profiles." *Journal of Transportation and Statistics*, **3(2)**, pp. 49-64, (invited paper).
- Deaton, M. L. and J. J. Winebrake (2000). *Dynamic Modeling of Environmental Systems*. Springer-Verlag.
- Kirk, M.A., M.L. Deaton, and S.P. Frysinger (2003). "Preliminary Report: A Decision Support System for Hazardous Materials Accidents and Terrorism Response." *Critical Infrastructure Protection Project: Workshop I Working Papers* (A. Woodcock and K. Thomas, editors). George Mason University Press.
- Bourne, M.L.G, M. L. Deaton, T.P. Fox, S.P. Frysinger, A.G. Gonzalo, S.D. Kalyani, M.A. Kirk, A.M. VanHorn, and C. G. Williams (2004). "Hazardous Materials Decision Support System: An Integrated Approach for Prevention, Preparation, and Response to Chemical Accidents and Bioterrorism." *Critical Infrastructure Protection Project: Workshop II Working Papers* (A. Woodcock and K. Thomas, editors). George Mason University Press.
- Brodrick, C.J., E. A. Laca, A. F. Burke, M. Farshchi, L. Li, and M. Deaton (2004). "Effect of Vehicle Operation, Weight, and Accessory Use on Emissions from a Modern Heavy-Duty Diesel Truck." *Transportation Research Record (1880)*, pp. 119-125.
- Deaton (2005). "The Experimental Experience: Discovery and Scientific Inquiry in a General Science Lab." *Cutting Ed*, **3(1)**, pp. 16-21
- Bourne, M.L. and M. L. Deaton (2005). "The Dynamics of Identity Theft: A Comparison of Symptomatic and Systemic Solutions." *2005 Annual Proceedings of the System Dynamics Society*, Boston, MA.
- Bantz, S. G, and M. L. Deaton (2006). "Understanding U.S. Biodiesel Industry Growth using System Dynamics Modeling." *Proceedings of the 2006 Systems and Information Engineering Design Symposium*, Michael DeVore, ed.
- Gonzalo, A. G., A. M. VanHorn, S. P. Frysinger, M. L. Deaton, and M. A. Kirk (2007). "The FALCON System: Preparing Communities for Weapons of Opportunity." *Journal of Environmental Software and Modeling* (22), 431-435.
- Kirk, M. A., and M. L. Deaton (2007). "Bringing Order Out of Chaos: Effective Strategies for Medical Response to Mass Chemical Exposure." *Emergency Med Clin N Am*, **25(2)**, 527-548.
- Saunders, M. J., G. R. Hipp, D. L. Wenos, and M.L. Deaton (2007). "Trekking poles increase physiological responses to hiking without increased perceived exertion." *J. of Strength and Conditioning Research* (in press)
- Knight, D. B, R. E. Davis, S. C. Sheridan, D. M. Hondula, L. J. Sitka, M. L. Deaton, T. R. Lee, S. D. Gawtry, P. J. Stenger, F. Mazzei, B. P. Kenny (2008). "Increasing Frequencies of Warm and Humid Air Masses Over the Conterminous United States from 1948 to 2005." *Geophysical Research Letters*, **35**, L10702, doi:10.1029/2008GL033697

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- Hondula, D. M., L. J. Sitka, R. E. Davis, D. B. Knight, S. Gawtry, T. Lee, J. Stenger, M. L. Deaton (2010). "A Back-Trajectory and Air Mass Climatology for the Shenandoah Valley, Virginia, USA." *International Journal of Climatology*, **30**, 569-581, doi:10.1002/joc.1896
- McKown, R.L., K. Seifert, N. C. Gandia, J. K. Wilburn, K. S. Bower, R. K. Sia, D. S. Ryan, M. L. Deaton, S. W. Laurie, (2011). "Tear Lacritin Levels by Age, Gender, and Time of Day in Healthy Adults." . " *Investigative Ophthalmology & Visual Science*, **September 2012**, *53(10)*, pp. 6610-6616. DOI:10.1167/iops.11-8729
- Hondula, David M., Davis, Robert E., Knight, David B., Sitka, Luke J., Enfield, Kyle, Gawtry, Stephen B., Stenger, Phillip J., Deaton, Michael L., Normile, Caroline P., Lee, Temple R. (2012). "A Respiratory Alert Model for the Shenandoah Valley, Virginia, USA." *International Journal of Biometeorology*, DOI 10.1007/s00484-012-0537-7.
- Deaton, M. L., and N. Hendrickson (2012). *Playing the Wild Cards: A Structured Method for Intelligence Analysis to Identify and Exploit Possible Surprises*. Technical report, DAGGRE Project, George Mason University
- Flannery, F., M. L. Deaton, and T. R. Walton (2013). "Radical Apocalypticism and Iranian Nuclear Proliferation: A Systems Oriented Analysis." *International Journal of Intelligence and Counterintelligence*, **26(4)**, Winter 2013-14. DOI: 10.1080/08850607.2013.807186
- Coffman, J., M.L. Deaton, J. Mayiani, and A. Hickling (2013). "ERAMAT! – A Board Game Simulator Modeling Pastoralism Among Maasai in Southern Kenya." *Anthropology News*. American Anthropological Association.
- Mayiani, J., M.L. Deaton, J. Coffman, and A. Hickling (2013). "ERAMAT! A Culturally-Anchored Board Game Simulator for Maasai Pastoralists in Southern Kenya." *Proceedings of the 2013 International System Dynamics Society Conference*, Boston, MA.

SELECTED PRESENTATIONS

- Christoph, O.B., M.J. Reilly, and M.L. Deaton (1995). *An Innovated Curriculum: Integrated Science and Technology*. Accepted for presentation at the October, 1995 meeting of the Production and Operations Management Society.
- Deaton, M. L. (1995). *Statistics for Real People: Teaching Statistical Thinking in an Integrated Science and Technology Curriculum*. Fall Technical Conference, St. Louis, Missouri, October, 1995. This conference is jointly sponsored by the American Statistical Association, the Biometric Society, and the Society for Quality Control.
- Deaton, M.L., C.A. Klevickis, and R.A. Kolvoord (1996). *Integrated Science Math, and Technology at the College Level: Overall Principles and Specific Examples*. NCSSSMST Conference on Issues and Connections, DePauw University.
- Kirk, Mark, and M. L. Deaton (2003). *A Decision Support System for Hazardous Materials Accidents and Terrorist Response*. Presented at the 2003 Institute for Defense of Homeland Security, Washington, D.C., July, 2003 (with proceedings)
- Deaton, M.L., M.A. Kirk, M.L.G. Bourne, T.P. Fox, S.D. Kalyani, and C.G. Williams (2004). *FALCON: A Decision Support System for Hazardous Materials Accidents and Terrorism Response*. Invited paper at the 2004 Virginia HAZMAT Conference, Virginia Beach, 2004.
- Deaton, M.L. *Systems Thinking for K-12 Science and Math*. (2000-2004). Workshop presented as part of the NSF funded project entitled Visualization in Science and Mathematics (R. A. Kolvoord, P.I.).

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- Deaton, M.L., M. A. Kirk, S. P. Frysinger, C. Werner (2005). *Decision Support Systems for Local EMS: The Poison Next Door – Preparedness, Planning, and Response to Hazardous Chemical Accidents and Terrorism*. Invited paper at the DHS conference entitled Working Together: Research and Development Partnerships in Homeland Security, Boston, MA.
- Saunders, Hipp, Wenos, and Deaton (2005). *Trekking Poles Increase Physiological Responses to Hiking Without Increased Perceived Exertion*. Poster presented at the national meeting of the *American Council of Sports Medicine*.
- Bantz, Steven G, M. L. Deaton (2006). *Understanding US Biodiesel Market Growth Using System Dynamics Modeling*. Presented at the 2006 IEEE Systems and Information Engineering Design Symposium, Charlottesville, VA.
- Easley Elizabeth, D. L. Wenos, M. L. Deaton, T. Wagner, & M. Saunders (2007). *Effect of Exercise Assignment on Compliance and Physiological Changes in Sedentary Adults*. Poster presented at the 54th annual meeting of the *American Council of Sports Medicine*, New Orleans, LA. May 30 – June 2, 2007.
- Deaton, M. L. (2007). *Introduction to System Dynamics: Tools for Managing Policy Resistance and Unintended Consequences*. Keynote address at the *Environmental Summit Conference*, sponsored by the University of Pittsburgh School of Public Health, Pittsburgh, PA, April, 2007.
- Davis, R.E., D. M. Hondula, L. Sitka, P. J. Stenger, T. Lee, M. L. Deaton (2007). *Atmospheric Impacts on Severe Respiratory Distress*. Presented at the annual meeting of the American Association of Geographers (AAG), Boston, MA, April, 2007.
- Easley, E. A. D. L. Wenos, M. L. Deaton, T. L. Wagner, M. J. Saunders (2008). *Effects of 16 Weeks of Nordic Walking and Pedometer Use on Metabolic Alterations and Adherence*. Presented at the 55th annual meeting of the American Council of Sports Medicine.
- Crockett, C. E., D. L. Wenos, M. K. Todd, FACSM, M. L. Deaton, T. L. Wagner, C. A. Mueller (2008). *Effects of Exercise on C-Reactive Protein in Sedentary Smokers and Non-smokers*. Presented at the 55th annual meeting of the American Council of Sports Medicine.
- Davis, R. E., D. M. Hondula, L. Sitka, D. Knight, S. Gawtry, P. J. Stenger, T. Lee, C. Normile, and M. Deaton (2008). *Atmospheric Impacts on Severe Respiratory Distress*. Presented at the Association of American Geographers national meeting, Boston, MA, April, 2008.
- Polacek, G. A., and M. L. Deaton (2010). *A Dynamic Hypothesis for Evaluating Diabetes Health Policies in the Presence of Social Determinants of Disease Progression*. Presented at the 138th American Public Health Association Annual Meeting, November 6-10, 2010, Denver, CO.
- Hendrickson, N. and M. L. Deaton (2011). *Playing the Wild Cards: Using Counterfactual Reasoning and System Dynamics to Identify and Exploit Possible Surprises Before They Happen*. Presented at the Five Eyes Analytic Training Workshop, Bolling AFB, Washington DC, November 2, 2011.
- Brent, R. N., M.L. Deaton, J. D. Tang, and M. K. Handley. *Incorporating Habits of Mind into Science and Technology Curricula*. 3rd Annual Conference on Higher Education Pedagogy, VA Tech, February, 2012.
- Brent, R. N., M. L. Deaton, J. D. Tang, M. K. Handley, K. Altaii, and P. B. Goodall. *Tackling the Problem of Problem-Based Learning*. 4th Annual Conference on Higher Education Pedagogy, VA, Tech, February, 2013.
- Deaton, M. L. and N. Hendrickson (2012). *Forecasting, Futures Analysis, and the Challenge of Wild Cards: How to Identify Possible Surprises Before They Happen*, Presented at the DAGGRE Decision and Judgment Analysis Training Workshop, March 18, 2012.

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- Deaton, M.L. and N. Hendrickson (2012). *How to Play the Wild Cards: A Guided Exercise and Example in Identifying and Exploiting Possible Surprises Before They Happen*. Presented at the Five Eyes Analytic Training Workshop, University of Mississippi, March 8, 2012.
- Walton, T. R., F. Flannery, and M. L. Deaton (2012). *The Problem of the Iranian Nuclear Program: Working Together as an Interdisciplinary Team*. Presented at the 2012 Conference of the International Association for Intelligence Education, Washington, DC, May, 2012.
- Deaton, M.L., J. E. Coffman, J. M. Loorimirim, and A. K. Hickling (2012). *Systems Thinking for Sustainable Pastoralism among Maasai in Southern Kenya: A Pilot Study Using a Board Game Simulator*. Presented at the Africana Studies Conference, James Madison University, October, 2012.
- Loorimirim, J.M., Deaton, M.L., Coffman, J.E., and Hickling, A. K. (2013). *ERAMAT! A Culturally-Anchored Board Game Simulator for Maasai Pastoralists in Southern Kenya*. Presented at the 2013 international conference of the System Dynamics Society, Boston, MA.
- Deaton, M.L., Loorimirim, J.M., Hickling, A.K., and Coffman, J.E. (2014). *ERAMAT: Systems Thinking for Survival in East Africa*. Three-hour workshop, presented at the annual meeting of the North American Simulation and Gaming Association, Baltimore, MD, October 7-12, 2014. Winner of the Rising Star Award.
- Deaton, M.L. (2016). *Holistic Problem Solving: A System-Based Approach to Understanding the World*. Plenary talk at the Food Systems Community of Practice, Columbia Medical School, Columbia University, July 26-27, 2016.

COURSE SUBJECT AREAS

- Introduction to systems thinking and system dynamics
- System dynamics: Building and evaluating models for policy analysis
- Group Modeling Methods
- Introduction to applied statistical thinking
- Introduction to spatial thinking and problem solving
- Six-Sigma black belt and green belt certification
- Design of experiments for products and processes
- Regression and empirical modeling methods
- Time series analysis
- Discrete Event Simulation and Modeling
- Spatial Analysis and Geographic Information systems
- Short courses developed for Industry
 - Data Analysis for Decision Making (3-day short course)
 - Strategy of Experimentation (3-day short course; experimental design for industrial optimization)
 - Six Sigma Black Belt Curriculum (5-week curriculum for E. I. DuPont's Six Sigma Quality Improvement program)
 - Mastering the Red Rings (3-day short course; improving measurement methods in a laboratory context; for DuPont's worldwide corporate research labs)

REFERENCES

Available upon request