RÉSUMÉ

Thomas W. Lucas
Professor
Operations Research Department
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Education

Ph.D., Statistics, 1991, University of California at Riverside

M.S., Statistics, 1985, Michigan State University

B.S., Operations Research and Industrial Engineering, 1981, Cornell University

Professional Experience

March 1998-Present: Professor, Operations Research Department, Naval Postgraduate School, Monterey, California.
-- Promoted to Full Professor in 2011
-- Tenured in 2005

June 2006-Present: Co-founder and Co-director of the Simulation Experiments and Efficient Design (SEED) Center for Data Farming (http://harvest.nps.edu), Naval Postgraduate School, Monterey, California.

July 1992-March 1998: Statistician & Project Leader, Economics & Statistics Group, RAND, Santa Monica, California.

June 1981-July 1992: Systems Engineer, Combat Systems Department, Surface Ship Systems Division, Hughes Aircraft Company, Fullerton, California.

Other Professional Experience

Summer 2013, Spring 2011, Fall 2009, Fall 2007, Fall 2003, and Fall 2002: Visiting Senior Fellow, Department of Industrial and Systems Engineering, National University of Singapore, Singapore.

Fall 2011: Visiting Professor, Fakultät für Informatik, The Universität der Bundeswehr München, Munich, Germany.

Spring 1996 and Fall 1994: Adjunct Assistant Professor, Marshall School of Business, University of Southern California, Los Angeles, California.

Spring 1992: Lecturer in Statistics, University of California at Riverside, Riverside, California.

September 1983-June 1985: Lecturer in Mathematics and Statistics, Michigan State University, East Lansing, Michigan.

Research Interests

Statistical Methodology: Model robustness, especially with respect to distributional assumptions and functional forms of prior beliefs. Design of experiments, with an emphasis on high-dimensional computational models.

Military Modeling and Analysis: Exploring historical warfare data; how uncertainty is incorporated in defense and national security models; and designing experiments to efficiently explore large simulations.

Command and Control: Tracking, data fusion, and weapon assignment; and efficient use (and the value) of information in warfare.

Numerical Methods: Efficient computation for both complex probability models and large simulations.

Research Grants, Principal Investigator

At the Naval Postgraduate School, Dr. Lucas has been a Principal Investigator (PI) on grants totaling over $15 million. In addition, research projects totaling several million more dollars have been conducted under the rubric of his SEED Center for Data Farming (https://harvest.nps.edu). Research sponsors include:

- U.S. Navy Office of Naval Research
- U.S. Navy N81 Assessments Division
- U.S. Navy N98 Air Warfare Division
- U.S. Navy Naval Air Weapons Station China Lake
- U.S. Navy Naval Surface Warfare Center
- U.S. Navy N1 Personnel
- U.S. Army Research Laboratory
- U.S. Army Training and Doctrine Command Analysis Center
- U.S. Army G-8 Warfighting Analysis Division
- U.S. Army Center for Army Analysis
- U.S. Army G-1 Manpower
- U.S. Forces Afghanistan
- Joint Chiefs of Staff J8
- Health and Human Services
- Defense Threat Reduction Agency
- Joint Improvised Explosive Device Defeat Organization
- Joint Non-Lethal Weapons Directorate
- U.S. Marine Corps Combat Development Command
- U.S. Marine Corps Warfighting Laboratory
- U.S. Marine Corps Installations and Logistics
- U.S. Marine Corps Logistics Command
- U.S. Marine Corps Warfighting Laboratory
- U.S. Marine Corps Systems Command
- U.S. Marine Corps Expeditionary Energy Office

Professional Honors

John K. Walker Jr. Award for the best technical article published in PHALANX during the previous calendar year, Military Operations Research Society, 2021.

Menneken Award for Excellence in Scientific Research Significant and Sustained Contributions at the Naval Postgraduate School, 2019.

RADM John J. Schieffelin Award for Excellence in Teaching at NPS, Finalist, 2019.

Certificate of Appreciation, Training and Doctrine Command Analysis Center in Monterey, 2019.

Prize for the Teaching of the OR/MS Practice, Institute for Operations Research and the Management Sciences (INFORMS), 2015.

Best Teacher Award, Master of Defence Technology and Systems program, National University of Singapore, Singapore, 2013.

Koopman Prize, for the outstanding publication in military operations research during the previous calendar year, Institute for Operations Research and the Management Sciences (INFORMS), 2013.

UPS George D. Smith Award to an *academic department* or program for effective and innovative preparation of students to be good practitioners of operations research, Institute for Operations Research and the Management Sciences (INFORMS), 2013.

Master of Defence Technology and Systems Pioneer Teachers Award in recognition of contributions in curriculum development and teaching in the founding of the Master of Defence Technology and Systems Programme, National University of Singapore, Singapore, 2013.

Best Teacher Award, Master of Defence Technology and Systems, National University of Singapore, Singapore, 2011.

Richard W. Hamming Faculty Award for Excellence in Teaching at the Naval Postgraduate School, 2009.

Best Teacher Award, Master of Defence Technology and Systems, National University of Singapore, Singapore, 2009.

Best Student Paper Award Finalist for “Efficient Experimental Design Tools for Exploring Command and Control Organizational Structures" by R. P. T. Oh (student), S. M. Sanchez, H. Wan, and T. W. Lucas, at the 13th International Command and Control Research & Technology Symposium, June 2008.

Certificate of Appreciation, Training and Doctrine Command Analysis Center in Monterey, 2007.

Best Teacher Award, Master of Defence Technology and Systems, National University of Singapore, Singapore, 2007.

Certificate of Appreciation, Training and Doctrine Command Analysis Center in Monterey, 2006.

Best Teacher Award, Master of Defence Technology and Systems, National University of Singapore, Singapore, 2004.

John K. Walker Jr. Award for the best technical article published in *PHALANX* during the previous calendar year, Military Operations Research Society, 2003.

Working Group 23, Battlefield Performance, Casualty Sustainment & Medical Planning, Richard H. Barchi nomination as the working group's best presentation at the 70th MORS Symposium for "Predicting Battle Outcomes with Classification Trees," by Lucas, T., S. Buttrey, and M. Coban, 2002.

RADM John J. Schieffelin Award for Excellence in Teaching at NPS, Finalist, 2001.

Outstanding Instructional Performance, Naval Postgraduate School, 1999.

United States Patent (number 5,153,366): "Method for Allocating and Assigning Defensive Weapons Against Attacking Weapons," 6 October 1992.

University of California Gamma Sigma Delta Honor Society, 1991.

Morris J. Garber Award for Outstanding Graduate Student in Statistics, Statistics Department, University of California at Riverside, 1990.

Hughes Aircraft Doctoral Fellowship, 1987-1991.

Hughes Aircraft Masters Fellowship, 1983-1985.

Outstanding Teaching Recognition. The OR Department recognizes faculty who receive over an average 4.5 (on a scale from 1 to 5) in a class's Student Opinion Forms (SOFs) for both "Overall, I would rate this instructor" and "Overall, I would rate this course." In 2018 the key question was changed to "Overall, the instructor was effective in teaching this course." Professor Lucas has exceeded this criterion in at least one section in the following classes.

Naval Postgraduate School (FY): OA 3102 Statistics, Winter 2021; OA 3102 Statistics, Summer 2020; OA/MV 4655 Combat Modeling, Fall 2020; OA 3102 Statistics, Winter 2019; OA/MV 4655 Combat Modeling, Fall 2019; OA 3102 Statistics, Winter 2018; OA 3102 Statistics, Winter 2017; OA 3102 Statistics, Winter 2016; OA/MV 4655 Combat Modeling, Fall 2015; OA 3102 Statistics, Summer 2014; OA/MV 4655 Combat Modeling, Fall 2014; OA 3102 Statistics, Winter 2013; OA/MV 4655 Combat Modeling, Fall 2012; OA/MV 4655 Combat Modeling, Summer 2009; OA/MV 4655 Combat Modeling, Summer 2008; OA/MV 4655 Combat Modeling, Summer 2008; OA/MV 4655 Combat Modeling, Summer 2007; OA 4910 Special Topics: The Bootstrap, Spring 2006; OA/MV 4655 Combat Modeling, Summer 2006; OA 3102 Statistics, Summer 2002; OA 4655 Combat Modeling, Winter 2001; OA 3102 Statistics, Summer 2000; OA 4910 Special Topics: Bayesian Statistics and The Bootstrap, Fall 1999; OA 3102 Statistics, Summer 1998.

National University of Singapore: DTS5707 Modeling and Simulation, Summer 2013; DTS5707 Modeling and Simulation, Spring 2011; DTS5707 Modeling and Simulation, Summer 2009.

Journal Articles, Book Chapters, and Refereed RAND Publications

[73] Lovejoy, C.V., M.L. McDonald, T.W. Lucas, and S.M. Sanchez, "Investigating an Active Shooter Defeat System with Simulation and Data Farming," *to appear in* Proceedings of the 2021 Winter Simulation Conference, Institute of Electrical and Electronic Engineers: Piscataway, NJ.

[72] Thompson, C., T.W. Lucas, and M.L. McDonald, "Estimating the Effects of Combat Load Weight on Mission Outcomes," *PHALANX*, 53(1), 2020, 52-57. *Winner of the Military Operations Research Society's 2021 John K. Walker Jr. Award for the best technical article published in PHALANX the previous year.*

[71] Kelser, G., T.W. Lucas, and P.J. Sanchez, "A Data Farming Analysis of a Simulation of Armstrong's Stochastic Salvo Model," *Proceedings of the 2019 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2019, 2443-2454.

[70] Morgan, B.L, H.C. Schramm, J.R. Smith, T.W. Lucas, M.L. McDonald, P.J. Sanchez, S.M. Sanchez, and S.C. Upton, "Improving U.S. Navy Campaign Analyses with Big Data," *Interfaces*, 48(2), 2018, 130-146.

[69] Opcin, A.E., A.H. Buss, T.W. Lucas, and P.J. Sanchez, "Modeling Anti-Air Warfare with Discrete Event Simulation and Analyzing Naval Convoy Operations," *Proceedings of the 2017 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2017, 4048-4057.

[68] MacCalman, A.D., H. Vieira, and T.W. Lucas, "Second Order Nearly Orthogonal Latin Hypercubes for Exploring Complex Stochastic Simulations," *Journal of Simulation*, 11(2), 2017, 137-150.

[67] Hogarth, A.R., T.W. Lucas, and C.S. McLemore. "Improving Navy Recruiting with Data Farming," *Proceedings of the 2016 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2016, 3576-3577.

[66] Lucas, T.W., "Learning by Solving Real Problems," *ORMS Today*, 43(4), 2016, 24-27.

[65] Lucas, T.W., W.D. Kelton, P.J. Sanchez, S.M. Sanchez, and B.L. Anderson, "Changing the Paradigm: Simulation, Often the Method of First Resort," *Naval Research Logistics*, 62(4), 2015, 293-303.

[64] McDonald, M.L., S.C. Upton, C.N. Seymour, T.W. Lucas, S.M. Sanchez, P.J. Sanchez, H.C. Schramm, and J.R. Smith. "Enhancing the Analytic Utility of the Synthetic Theater Operations Research Model (STORM)," *Proceedings of the 2014 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2014, 4136-4137.

[63] Slootmaker, L.A., E. Regnier, J.A. Hansen, and T.W. Lucas, "User Focus and Simulation Improve Predictions of Piracy Risk," *Interfaces*, 43(3), 2013, 256-267.

[62] Hernandez, A.S., T.W. Lucas, and M. Carlyle, "Constructing Nearly Orthogonal Latin Hypercubes for Any Nonsaturated Run-Variable Combination," *ACM Transactions on Modeling and Computer Simulation,* 22(4), 2012, 20:1-20:17.

[61] Powers, M.J., S.M. Sanchez, and T.W. Lucas, "The Exponential Expansion of Simulation in Research," *Proceedings of the 2012 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2012, Article 138.

[60] Hernandez, A.S., T.W. Lucas, and P.J. Sanchez, "Selecting Random Latin Hypercube Dimensions and Designs through Estimation of Maximum Absolute Pairwise Correlation," *Proceedings of the 2012 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2012, Article 25.

[59] Sanchez, S.M., T.W. Lucas, P.J. Sanchez, C.J. Nannini, and H. Wong, "Designs for Large-Scale Simulation Experiments with Applications to Defense and Homeland Security," *Design and Analysis of Experiments*, *volume III*, by Hinkelmann (ed.), Wiley, 2012, 413-441. *Winner of the Institute for Operations Research and the Management Sciences 2013 Koopman Prize for the outstanding publication in military operations research of the previous year.*

[58] Oh, R.P.T., S.M. Sanchez, T.W. Lucas, H. Wan, and M.E. Nissen, "Efficient Experimental Design Tools for Exploring Large Simulation Models," *Computational & Mathematical Organization Theory*, 15:3*,* 2009, 237-257.

[57] Sanchez, S.M., H. Wan, and T.W. Lucas, "A Two-Phase Screening Procedure for Simulation Experiments," *ACM Transactions on Modeling and Computer Simulation*, 19(2), 2009, 7:1-7:24.

[56] Lucas, T.W., S.M. Sanchez, F. Martinez, J.W. Roginski, L.R. Sickinger, "Defense and Homeland Security Applications of Multi-agent Simulations," invited paper, *Proceedings of the 2007 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2007, 138-149.

[55] Cioppa, T.M., and T.W. Lucas, "Efficient Nearly Orthogonal and Space-filling Latin Hypercubes," *Technometrics*, 49(1), 2007, 45-55.

[54] Sanchez, S.M., H. Wan, and T.W. Lucas, "A Two-Phase Screening Procedure for Simulation Experiments," *Proceedings of the 2005 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2005, 223-230.

[53] Kleijnen, J.P.C., S.M. Sanchez, T.W. Lucas, and T.M. Cioppa, "A User's Guide to the Brave New World of Designing Simulation Experiments," *INFORMS Journal on Computing*, 17(3), 2005, 263-289.

[52] Lucas, T.W., and J.A. Dinges, "The Effect of Battle Circumstances on Fitting Lanchester Equations to the Battle of Kursk," *Military Operations Research*, 9(2), 2004, 17-30.

[51] Lucas, T.W., and T. Turkes, "Fitting Lanchester Equations to the Battles of Kursk and Ardennes," *Naval Research Logistics*, 51(1), 2004, 95-116.

[50] Cioppa, T.M., T.W. Lucas, and S.M. Sanchez, "Military Applications of Agent-based Simulations," *Proceedings of the 2004 Winter Simulation Conference*, Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2004, 171-180.

[49] Brown, L., T. Cioppa, and T. Lucas, "Agent-Based Simulations Supporting Military Analysis," *PHALANX*, 37(3), 2004, 29-32.

[48] Lucas, T.W., "Damage Functions and Estimates of Fratricide and Collateral Damage," *Naval Research Logistics*, 50(4), 2003, 306-321.

[47] Lucas, T.W., and J. McGunnigle, "When is Model Complexity Too Much? Illustrating the Benefits of Simple Models with Hughes' Salvo Equations," *Naval Research Logistics*, 50(3), 2003, 197-217.

[46] Lucas, T.W., S.M. Sanchez, T.M. Cioppa, and A.I. Ipekci, "Generating Hypotheses on Fighting the Global War on Terrorism," *Maneuver Warfare Science 2003*, United States Marine Corp Project Albert, Quantico, VA, 2003, 107-124.

[45] Wan, S.C., C.S. Choo, E.C. Ng, C.K. Ang, T.W. Lucas, and A. Fry, "Modeling Communications in Sensor Networks Using Agent-Based Distillations," *Maneuver Warfare Science 2003*, United States Marine Corp Project Albert, Quantico, VA, 2003, 23-38.

[44] Sanchez, S.M., and T.W. Lucas, "Agent-based Simulations: Simple Models, Complex Analyses," invited paper, *Proceedings of the 2002 Winter Simulation Conference,* Institute of Electrical and Electronic Engineers: Piscataway, NJ, 2002, 116-126.

[43] Lucas, T.W., S.M. Sanchez, L. Brown, and W. Vinyard, "Better Designs for High-Dimensional Explorations of Distillations," *Maneuver Warfare Science 2002*, United States Marine Corp Project Albert, Quantico, VA, 2002, 17-45.

[42] Vinyard, W., and T. Lucas, "Exploring Combat Models for Non-monotonicities and Remedies," *PHALANX*, 35(1), 2002, 19, 36-38. *Winner of the Military Operations Research Society's 2003 John K. Walker Jr. Award for the best technical article published in PHALANX the previous year.*

[41] McGunnigle, J., W. Hughes, and T.W. Lucas, "Human Experiments on the Values of Information and Force Advantage," *PHALANX*, 33(4), 2000, 10-11, 26-27.

[40] Lucas, T.W., "The Stochastic Versus Deterministic Argument for Combat Simulations: Tales of When the Average Won't Do!" *Military Operations Research: Special Issue on Warfare Analysis and Complexity—the New Sciences*, 5(3), 2000, 9-28.

[39] Lucas, T., B. Bennett, J. Friel, and R. Kerchner, "ADS for Analysis: Much Agreement, Important Differences," *PHALANX*, 31(4), 1998, 8-10.

[38] Galway, L., and T.W. Lucas, "Comments on Pressure Matching for Hydrocarbon Reservoirs," in *Case Studies in Bayesian Statistics*, Volume III, Gatsonis, Hodges, Kass, and Singpurwalla (Eds.), Springer-Verlag, New York, 1997, 87-91.

[37] Lucas, T.W., B. Bennett, J. Friel, and R. Kerchner, "Advanced Distributed Simulation (ADS) for Analysis: The Reality and the Hype," *PHALANX*, 30(3), 1997, 10-12.

[36] Allen, P., and T.W. Lucas, "Non-monotonicity: Clarifications and a New Direction," *PHALANX*, 30(3), 1997, 32-34.

[35] Lucas, T.W., S. Bankes, and P. Vye, *Improving the Analytic Contribution of Advanced Warfighting Experiments (AWEs)*, DB-207-A, RAND, Santa Monica, CA, 1997.

[34] Lucas, T.W., J. Friel, R. Kerchner, and D. Jones, *A Guide for Analysis Using Advanced Distributed Simulation (ADS)*, MR-879-AF, RAND, Santa Monica, CA, 1997.

[33] Lucas, T.W., "How One Randomizes Matters: A Study of Randomness and Non-monotonicity in Combat Models," *PHALANX*, 30(1), 1997, 7-10.

[32] Farley, D., G. Carter, J. Kallich, T. Lucas, and K. Spritzer, "Modified Capitation and Treatment Incentives for End Stage Renal Disease," *Health Care Financing Review*, 17(3), 1996,129-142.

[31] Dewar, J., S. Bankes, J. Hodges, T. Lucas, D. Saunders-Newton, and P. Vye, *Credible Uses of the Distributed Interactive Simulation (DIS) System*, MR-607-A, RAND, Santa Monica, CA, 1996.

[30] Kerchner, R., J. Friel, T. Lucas, and D. Jones, *Understanding the Air Force's Capability to Use Advanced Distributed Simulation for Analysis*, MR-744-AF, RAND, Santa Monica, CA, 1996.

[29] Lucas, T.W., "Priors and Likelihoods that are Arbitrarily Sensitive to Outlying Observations," *Biometrika*, 81(2), 1994, 385-389.

[28] Farley, D., G. Carter, J. Kallich, T. Lucas, and K. Spritzer, *Designing a Capitation Payment Plan for Medicare End Stage Renal Disease Services*, MR-391-HCFA, RAND, Santa Monica, CA, 1994.

[27] Lucas, T.W., "When is Conflict Normal?" *Journal of the American Statistical Association*, 88(424), 1993, 1433-1437.

Other Non-Refereed Publications

[26] Kline, J., J. Tanalega, J. Appleget, and T.W. Lucas, "Developing New Tactics and Technologies in Naval Warfare: The MDUSV Example," online at Center for International Maritime Security, http://cimsec.org/developing-new-tactics-and-technologies-in-naval-warfare-the-mdusv-example/39436, 24 January 2019.

[25] Kelton, D., G.E. Horne, E. Lesnowicz, and T.W. Lucas, "Observations and Suggestions from the ABS VV&A Framework Study Workshop," appearing in *The Agent-based (ABS) Verification, Validation, and Accreditation (VV&A) Study Phase II*, Northrop Grumman Mission Systems, Reston, VA, 15 September 2008.

[24] Mahon, C.M., W.P. Hughes, and T.W. Lucas, *Is a Ship a Fool to Fight a Fort? A Littoral Combat Model for Land-Sea Engagements*, unpublished technical report, Naval Postgraduate School, Monterey, CA, 2008.

[23] Oh, R., S.M. Sanchez, T.W. Lucas, and H. Wong, "Efficient Experimental Design Tools for Exploring Command and Control Organizational Structures," *Proceedings of the 13th International Command and Control Research Technology Symposium*, June 2008. *Finalist for "Best Student Paper" award.*

[22] Lucas, T.W., and S.M. Sanchez, "The Brave New World of Designing Simulation Experiments for Defense and Homeland Security Applications," *2006 Joint Statistical Meetings Proceedings*, 2006, 1212-1218.

[21] Lucas, T.W., and S.M. Sanchez, "Design of Experiments for Analyzing Systems of Systems," *The 13th US-ROK Defense Analysis Seminar*, April 2006.

[20] Lucas, T.W., and S.M. Sanchez, "Smart Experimental Designs Provide Military Decision-Makers With New Insights From Agent-Based Simulations," *Naval Postgraduate School RESEARCH*, 13(2), Naval Postgraduate School, Monterey, CA, 2003, 20-21, 57-59, 63.

[19] Lucas, T.W., and S.M. Sanchez, "NPS Hosts the Marine Corps Warfighting Laboratory's Sixth Project Albert International Workshop," *Naval Postgraduate School RESEARCH*, 13(2), Naval Postgraduate School, Monterey, CA, 2003, 45-46.

[18] Cioppa, T.M., and T.W. Lucas, "A Clinical Paper on Efficient Strategies in High-Dimensional Complex Models," *Proceeding of the U.S. Army Conference on Applied Statistics*, Published by George Mason University for the U.S. Army Research Laboratory, 2001.

[17] Lucas, T.W., On the Choice of Order Statistic for Radar OS CFAR Thresholding in Nonhomogeneous Clutter with Multiple and Extended Targets, unpublished technical report, 1998.

[16] Lucas, T.W., *Credible Uses of Combat Simulation: A Framework for Validating and Using Models*, P-7990, RAND, 1997.

[15] Lucas, T.W., *A Study of Non-Monotonicity and Randomness in Combat Models*, P-7997, RAND, Santa Monica, CA, 1997.

[14] Lucas, T., L. Moore, and P. Vye, *Designing Experiments for the Modern Heavy Division Design*, DRR-1533-A, RAND, Santa Monica CA, 1996.

[13] Lucas, T., J. Friel, R. Kerchner, and D. Jones, *A Guide for Analysis Using Advanced Distributed Simulation (ADS)*, DRR-1501-AF, RAND, Santa Monica CA, 1996.

[12] Joe, L., J. Grossman, T. Lucas, and L. Moore, *Achieving OPTEC's Vision*, DRR-1542-A, RAND, Santa Monica CA, 1996.

[11] Lucas, T., S. Bankes, and P. Vye, *Credible Analysis in Advanced Warfighting Experiments*, DRR-1289-A-1, RAND, Santa Monica CA, 1996.

[10] Kerchner, R., J. Friel, and T. Lucas, *Improving the USAF's Capability to Effectively Apply Advanced Distributed Simulation for Analysis*, DRR-1111-AF, RAND, Santa Monica CA, 1995.

[9] Lucas, T.W., *An Air Force Review of the Extended Air Defense Testbed*, PM-201-AF, RAND, Santa Monica CA, 1994.

[8] Farley, D., J. Kallich, G. Carter, T. Lucas, and K. Spritzer, *Designing a Capitation Payment Plan for Medicare ESRD Services*, DRU-518-HCFA, RAND, Santa Monica CA, 1993.

[7] Ellis, J., G. Born, and T. Lucas, *Defense Suppression for Regional Conflicts Phase 1 Report*, DRR-510-AF, SECRET, RAND, Santa Monica CA, 1993.

[6] Bennett, B., G. Born, and T. Lucas, *High-Level Design and Systems/Segment Specification for a Mission-Level Model*, DRU-152-AF, RAND, Santa Monica CA, 1993.

[5] Born, G., B. Bennett, and T. Lucas, *A Comparative Model Assessment of SUPPRESSER and EADSIM*, PM-117-AF, RAND, Santa Monica CA, 1993.

[4] Lucas, T.W., *Advanced Methods in Simulation Analysis*, V-029, RAND, Santa Monica CA, 1993.

[3] Lucas, T.W., *Method for Allocating and Assigning Defensive Weapons Against Attacking Weapons*, Patent Disclosure (#PD-85508), Hughes Aircraft Company, Los Angeles, CA, 1992.

[2] Lucas, T.W., *Robust Bayesian Inference When the Data Conflicts with the Prior*, Ph. D. Dissertation, University of California at Riverside, University Microfilms International, Ann Arbor, Michigan, 1991.

[1] Lucas, T.W., K.M. Schwab, and S. Feldman, "The Impact of Data Fusion on Mission Effectiveness," *Technical Proceedings of the 1990 Joint Service Data Fusion Symposium*, Published by the Naval Air Development Center, 1990.

Presentations

[121] Lucas, T.W., G. Kelser, and P.J. Sanchez, "A Data Farming Analysis of a Simulation of Armstrong's Stochastic Salvo Model," 2019 Winter Simulation Conference, Oxon Hill, MD, December 2019.

[120] Lucas, T.W., and S.M. Sanchez, "Supporting Military Decision Makers with Efficient Computational Experimentation: An Overview of the SEED Center for Data Farming," Briefing to ADM Bill Moran and VADM Bill Lescher, Monterey, CA, June 2019.

[119] Lucas, T.W., and S.M. Sanchez, "Supporting Military Decision Makers with Efficient Computational Experimentation: An Overview of the SEED Center for Data Farming," Briefing to RADM James Bynum, Monterey, CA, February 2019.

[118] Sanchez, S.M., P.J. Sanchez, and T.W. Lucas, "An Introduction to Modern Design and Analysis of High-Dimensional Computer Experiments aka Data Farming 101," Tutorial to Naval Air Warfare Center Weapons Division, China Lake, CA, September 2018.

[117] Sanchez, P.J., S.M. Sanchez, T.W. Lucas, A. Hernandez, M.L. McDonald, and S.C. Upton, "An Introduction to Modern Design and Analysis of High-Dimensional Computer Experiments," Tutorial at Military Operations Research Society (MORS) Symposium, Monterey, CA, June 2018.

[116] Lucas, T.W., "Getting the Most From Your Model Through Efficient Design of Experiments," MORS M&S Community of Practice Seminar, Distributed Teleconference, December 2017.

[115] Sanchez, P.J., A.E. Opcin, A.H. Buss, and T.W. Lucas, "Modeling Anti-Air Warfare with Discrete Event Simulation and Analyzing Naval Convoy Operations," 2017 Winter Simulation Conference, Las Vegas, NV, December 2017.

[114] Lucas, T.W., "An Introduction to Combat Modeling and Hughes' Salvo Equations," Technologies for Information Operations (TIO) Short Course, Monterey, CA, November 2017.

[113] Hogarth, A.R., T.W. Lucas, and C.S. McLemore, "Improving Navy Recruiting with Data Farming," 2016 Winter Simulation Conference, Arlington, VA, December 2016.

[112] Sanchez, P.J., T.W. Lucas, and S.M. Sanchez, "Recent Breakthroughs in Large Scale Simulation Experiments," 54th U.S. Army Operations Research Symposium, Aberdeen Proving Ground, MD, November 2016.

[111] Lucas, T.W., M.L. McDonald, B.L. Morgan, P.J. Sanchez, S.M. Sanchez, H.C. Schramm, J.R. Smith, and S.C. Upton, "Improving U.S. Navy Campaign Analyses with Big Data," Invited Talk at the 33rd Quality & Productivity Research Conference, Tempe, AZ, June 2016.

[110] Sanchez, S.M., P.J. Sanchez, and T.W. Lucas, "The Fundamentals of Data Farming," five-day course given to Australia's Defence Science and Technology Group, Melbourne, Australia, May 2016.

[109] Lucas, T.W., S.M. Sanchez, M.L. McDonald, and S.C. Upton, "Navy MPTE Data Farming Workshop," Office of the Chief of Naval Personnel, N-14, Arlington, VA, March 2016.

[108] McDonald, M.L., S.C. Upton, C.N. Seymour, T.W. Lucas, S.M. Sanchez, P.J. Sanchez, H.C. Schramm, and J.R. Smith, "Enhancing the Analytic Utility of the Synthetic Theater Operations Research Model (STORM)," 2014 Winter Simulation Conference, Savannah, GA, December 2014.

[107] Lucas, T.W., and S.M. Sanchez, "Supporting Military Decision Makers with Efficient Computational Experimentation: An Overview of the SEED Center for Data Farming," Marine Corps ORSAPalooza, Quantico, VA, December 2014.

[106] Lucas, T.W., and S.M. Sanchez, "Supporting Military Decision Makers with Efficient Computational Experimentation," Center for Army Analysis, Fort Belvoir, VA, December 2014.

[105] Lucas, T.W., and Sanchez, S.M., "Improving Navy MPTE Studies with Model-Driven Big Data," Office of the Chief of Naval Personnel, N-14, Arlington, VA, December 2014.

[104] McDonald, M.L., Upton, S.C., Lucas, T.W., Sanchez, S.M., and Sanchez, P.J., "Developing Synthetic Theater Operations Research Model (STORM) Analytic Utility," Office of the Chief of Naval Operations, Assessments, N-81, The Pentagon, VA, December 2014.

[103] Lucas, T.W., "The Growing Power and Usage of Simulation," Operations Research Departmental Seminar, Naval Postgraduate School, Monterey, CA, April 2013.

[102] Lucas, T.W., Sanchez, P.J., and Sanchez, S.M., "Breakthroughs in Designing Simulation Experiments," Video Teleconference to Office of the Chief of Naval Operations, Assessments, N-81, Pentagon, VA, February 2013.

[101] Lucas, T.W., and Sanchez, S.M., "Breakthroughs in Designing Simulation Experiments," Seminar at the Army Research Laboratory's (ARL's) Survivability/Lethality Analysis Directorate (SLAD), Las Cruces, NM, November 2012.

[100] Sanchez, S.M., Lucas, T.W., Sanchez, P.J., and Hernandez, A.S., "Recent Breakthroughs in Large Scale Simulation Experiments," Army Conference on Applied Statistics, Monterey, CA, October 24-26, 2012.

[99] Lucas, T.W., "Faculty Success at NPS — Teaching," Compass New faculty Orientation seminar, Monterey, CA, September 2012.

[98] Lucas, T.W., "The SEED Center and Data Farming," INFORMS Military Application Society Conference 2012, Monterey, CA, March 2012.

[97] Sanchez, P.J., Sanchez, S.M., and Lucas, T.W., "The ABCs of Simulation Experiments," International Data Farming Workshop 24, Monterey, CA, March 2012.

[96] Lucas, T.W., "Breakthroughs in Simulation Studies: Making our Models Work for Us," seminar at The University of Applied Sciences Technikum Wien, Vienna, Austria, December 2011.

[95] Lucas, T.W., "Breakthroughs in Simulation Studies: New Designs and Applications," seminar at The Universität der Bundeswehr München, Munich, Germany, November 2011.

[94] Lucas, T.W., "What is Growing in the SEED Center for Data Farming: New Methods and Applications," DSO National Laboratories, Singapore, April 2011.

[93] Lucas, T.W., "Improving Analysis with the Integrated Training Center (ITC) Model for Time-to-Train Estimates," Marine Fighter Attack Training Squadron 501, Eglin Air Force Base, Florida, November 2010.

[92] Lucas, T.W., and Sanchez, S.M., "Breakthroughs in Simulation Studies: Making our Models Work for Us," Presentation to the National Academies' Board of Mathematical Sciences and their Applications, Washington, D.C., October 2010.

[91] Sanchez, S. M., Sanchez, P.J., Lucas, T. W., Vieira Jr., H., and Nannini, C. J., "Designing Large-scale Simulation Experiments," 16th Army Conference on Applied Statistics, Cary, NC, October 2010.

[90] Lucas, T.W., and Sanchez, S.M., "The Power of Efficient Experimental Design," International Data Farming Workshop 21, Lisbon, Portugal, September 2010.

[89] Sanchez, S.M., and Lucas, T.W., "V&V for Combat Models: How Experimental Design Can Help," Meeting of the Committee on Mathematical Foundation of Verification, Validation, and Uncertainty Quantification, Board on Mathematical Sciences and their Applications, National Academy of Sciences, Washington, D.C., August 2010.

[88] Lucas, T.W., and Sanchez, S.M., "Better than a Petaflop: The Power of Efficient Experimental Design," International Data Farming Workshop 20, Monterey, CA, March 2010.

[87] Lucas, T.W., and Sanchez, S.M., "SEED Center for Data Farming: Top-level Overview and Recent News," International Data Farming Workshop 20, Monterey, CA, March 2010.

[86] Lucas, T.W., and Sanchez, S.M., "Supporting Military Decision Makers with Efficient Computational Experimentation: An Overview of the SEED Center for Data Farming," Naval Operations Research Workshop, Pontificia Universidad Catolica de Valparaiso, Vina Del Mar, Chile, December 2009.

[85] Sanchez, S.M., Sanchez, P.J., and Lucas, T.W., "The Power of Efficient Experimental Design," International Data Farming Workshop 19, Auckland, New Zealand, November 2009.

[84] Lucas, T.W., "Supporting Military Decision Makers with Efficient Computational Experimentation," DSO National Laboratories, Singapore, October 2009.

[83] Sanchez, S.M., Marlin, B., Lucas, T.W., and Larson, A., "Developing and Assessing Irregular Warfare Models to Support IED Interdiction and Mitigation," INFORMS Annual Meeting, San Diego, CA, October 2009.

[82] Lucas, T.W., and Zappa, D.R., "Integrating New Intelligence, Surveillance, and Reconnaissance Systems into a Marine Rifle Company," JIEDDO Chartered Analytic Program Review, Crystal City, VA, June 2009.

[81] Lucas, T.W., and Marlin, B.J., "Ascertaining Validity in the Abstract Realm of PMESII Simulation Models: An Analysis of the Peace Support Operations Model (PSOM)," Human Social Culture Behavior (HSCB) Conference, National Defense University, Washington, D.C., June 2009.

[80] Lucas, T.W., and Sanchez, S.M., "Modeling and Simulation for Analysis and Computational Experimentation," Special Course in Advanced Simulation for Senior Leaders in Army Career Field 57, Naval Postgraduate School, Monterey, CA, May 2009.

[79] Lucas, T.W., and Sanchez, S.M., "Better than a Petaflop: The Power of Efficient Experimental Design," International Data Farming Workshop 18, Monterey, CA, March 2009.

[78] Lucas, T.W., and Sanchez, S.M., "SEED Center for Data Farming: Top-level Overview and Recent News," International Data Farming Workshop 18, Monterey, CA, March 2009.

[77] Lucas, T.W., and Sanchez, S.M., "Agent-based Models in the Department of Defense: Motivation, History, and Applications," National Institute of Statistical Sciences (NISS) Agent-based Modeling Workshop, National Institute of Statistical Sciences, Research Triangle Park, NC, November 2008.

[76] Lucas, T.W., "SEED Center Support for JIEDDO," Naval Postgraduate School Foundation, Monterey, CA, October 2008.

[75] Lucas, T.W., and Sanchez, S.M., "Efficient Design of Experiments at the Naval Postgraduate School," Universität der Bundeswehr, Munich, Germany, September 2008.

[74] Lucas, T.W., and Sanchez, S.M., "Better than a Petaflop: The Power of Efficient Experimental Design," International Data Farming Workshop 17, Garmisch-Partenkirchen, Germany, September 2008.

[73] Sanchez, S.M., and T.W. Lucas, "Better than a Petaflop: The Power of Efficient Experimental Design," invited talk, Computational Science & Engineering (CSE) Technical Forum, Kirtland AFB, Albuquerque, NM, July 2008.

[72] Sanchez, S.M., and T.W. Lucas, "Getting the Most from High Performance Computing by Efficient Design of Experiments," Half-day Tutorial, DoD High Performance Computing Modernization Program User's Group Conference, Seattle, WA, July 2008.

[71] Sanchez, S.M., and T.W. Lucas, "Design of Experiments," International Data Farming Workshop 16, Monterey, CA, April 2008.

[70] Lucas, T.W., and Sanchez, S.M., "Using Simulation Experiments and Efficient Design to Enhance the Operational Effectiveness of the Ground-Based Operational Surveillance System (G-BOSS)," JIEDDO Seminar, Crystal City, Virginia, June 2008.

[69] Lucas, T.W., "The Bootstrap: Or, What to do When My Statistics Book Fails Me!" National Assessment Group, Kirtland Air Force Base, Albuquerque, New Mexico, January 2008.

[68] Lucas, T.W., "Design and Analysis of Simulation Experiments for Studying Systems of Systems," DSO National Laboratories, Singapore, October 2007.

[67] Lucas, T.W., "Experimental Designs and Analysis for Simulation Studies of Systems of Systems," National University of Singapore, Singapore, October 2007.

[66] Kent, W., Lucas, T., Pearman, G., Middleton, V., and Alt, J., "Modeling Chemical Environments and Effects on Mobile Forces Using an Agent-based Simulation," 75th Military Operations Research Symposium, Annapolis, Maryland, June 2007.

[65] Mahon, C., Hughes, W., and Lucas, T., "The Littoral Combat Model: Analyzing Combat Interactions Between Sea-based and Land-based Forces," 75th Military Operations Research Symposium, Annapolis, Maryland, June 2007.

[64] Lucas, T.W., and Sanchez, S.M., "The Brave New World of Designing Simulation Experiments for Defense and Homeland Security Applications," Joint Statistical Meetings, Seattle, Washington, August 2006.

[63] Lucas, T.W., and Sanchez, S.M., "The New SEED Center for Data Farming," Project Albert 12th International Workshop, Boppard, Germany, June 2006.

[62] Lucas, T.W., and Sanchez, S.M., "Design of Experiments for Analyzing Systems of Systems," The 13th US-ROK Defense Analysis Seminar, Seoul, Korea, April 2006.

[61] Lucas, T.W., Sanchez, S.M., and Martinez, F., "Using Simulation to Study the Protection of Critical Maritime Assets," International Maritime Protection Symposium, Honolulu, Hawaii, December 2005.

[60] Sanchez, S.M., Wan, H., and Lucas, T.W., "A Two-phase Screening Procedure for Simulation Experiments," 2005 Winter Simulation Conference, Orlando, Florida, December 2005.

[59] Sanchez, S.M., Lucas, T.W., and Sanchez, P.J., "Experimental Designs for Large Scale Simulation Studies," U.S. Army Conference on Applied Statistics, Naval Postgraduate School, Monterey, California, October 2005.

[58] Lucas, T.W., "Game Theory: When Theory Meets Practice," LucasFest, Claremont Graduate School, Claremont, California, June 2005.

[57] Sanchez, S.M., and Lucas, T.W., "Updated Experimental Design and Analysis in the Data Farming Environment," Project Albert 10th International Workshop, Stockholm, Sweden, May 2005.

[56] Lucas, T.W., "On Increasing the Data Farming Harvest," RAND Seminar, RAND, Santa Monica, California, February 2005.

[55] Cioppa, T.M., Lucas, T.W., and Sanchez, S.M., "Advancements in Large Scale Experimental Design," Military Operations Research Society (MORS) Tutorial on "New" Analysis Techniques: Understanding and Applications, Johns Hopkins University/Applied Physics Lab, Laurel, Maryland, January 2005.

[54] Sanchez, S.M., Lucas, T.W., and Cioppa, T.M., "Military Applications of Agent-based simulations," Winter Simulation Conference, Washington, D.C., December 2004.

[53] Sanchez, S.M., and Lucas, T.W., "Experimental Design and Analysis in the Data Farming Environment," Project Albert 9th International Workshop, Wellington, New Zealand, November 2004.

[52] Lucas, T.W., and Sanchez, S.M., "Data Farming: Accidental VV&A," Institute for Operations Research and the Management Sciences Annual Meeting, Denver, Colorado, October 2004.

[51] Cioppa, T.M., and Lucas, T.W., "Agent-Based Simulations Supporting Military Analyses," Institute for Operations Research and the Management Sciences Annual Meeting, Denver, Colorado, October 2004.

[50] Lucas, T.W., Sanchez, S.M., and Widdowson, B., "Data Farming: Accidental VV&A," Military Operations Research Society Symposium, Naval Postgraduate School, Monterey, California, June 2004.

[49] Lucas, T.W., "Military Modeling for Decision-Making," Defence Science and Technology Agency (DSTA) Seminar, Singapore, November 2003.

[48] Lucas, T.W., "Improving the Analytical Contribution of Warfighting Experiments," Defence Science and Technology Agency (DSTA) Seminar, Singapore, November 2003.

[47] Lucas, T.W., "Fitting Lanchester Equations to the Battles of Kursk and Ardennes," 20th International Symposium on Military Operations Research, Oxford, United Kingdom, August 2003.

[46] Lucas, T.W., "High-dimensional Explorations of Agent-based Simulations," Modeling, Virtual Environments, and Simulation (MOVES) Open House, Naval Postgraduate School, Monterey, California, August 2003.

[45] Lucas, T.W., Sanchez, S.M., "Exploring the World of Agent-Based Simulations: Simple Models, Complex Analyses," 2002 Winter Simulation Conference, San Diego, California, December 2002.

[44] Lucas, T.W., "Some Prototype Agent-based Simulation Studies," DSO National Laboratories seminar, Singapore, October 2003.

[43] Lucas, T.W., "Empirical Assessments of Simulation Search Strategies," Joint Temasek Defense Systems Institute and Industrial and Systems Engineering Depart seminar, National University of Singapore, Singapore, October 2002.

[42] Lucas, T.W., Sanchez, S.M., "Getting the Most From Our Models: Efficient High-dimensional Explorations," 5th Project Albert International Workshop, Uberlingen, Germany, July 2002.

[41] Lucas, T.W., "Reducing Non-monotonicities in Combat Models," Military Operations Research Society (MORS) Symposium, Fort Leavenworth, KS, June 2002.

[40] Lucas, T.W., "Exploring the Validation of Lanchester Equations for the Battle of Kursk," Military Operations Research Society (MORS) Symposium, Fort Leavenworth, KS, June 2002.

[39] Lucas, T.W., "Predicting Battle Outcomes with Classification Trees," Military Operations Research Society (MORS) Symposium, Fort Leavenworth, KS, June 2002.

[38] Lucas, T.W., "Advanced Methods in Simulation Analysis," NATO sponsored seminar series to faculty, officers, and students from the Turkish Military Academy, Turkish Army Headquarters, and Middle East Technical University, Ankara, Turkey, April 2002.

[37] Lucas, T.W., and Vinyard, W., "Chaos & Non-Monotonicity in Combat Models: Is It Widespread? Can We Fix It?," NATO sponsored seminar series to faculty, officers, and students from the Turkish Military Academy, Turkish Army Headquarters, and Middle East Technical University, Ankara, Turkey, April 2002.

[36] Lucas, T.W., Yigit, F., and Coban, M., "A Statistical Analysis of Land Battles: What is Associated with Winning?," NATO sponsored seminar series to faculty, officers, and students from the Turkish Military Academy, Turkish Army Headquarters, and Middle East Technical University, Ankara, Turkey, April 2002.

[35] Lucas, T.W., "An Overview of Key Military Simulation Issues," NATO sponsored seminar series to faculty, officers, and students from the Turkish Military Academy, Turkish Army Headquarters, and Middle East Technical University, Ankara, Turkey, April 2002.

[34] Lucas, T.W., Turkes, T., Gozel, R., and Dinges, J., "Fitting Lanchester and Other Models to the Battle of Kursk," NATO sponsored seminar series to faculty, officers, and students from the Turkish Military Academy, Turkish Army Headquarters, and Middle East Technical University, Ankara, Turkey, April 2002.

[33] Lucas, T.W., "The Stochastic Versus Deterministic Argument for Combat Simulations: Tales of When the Average Won't Do," NATO sponsored seminar series to faculty, officers, and students from the Turkish Military Academy, Turkish Army Headquarters, and Middle East Technical University, Ankara, Turkey, April 2002.

[32] Lucas, T.W., "Why Combat Models?," NATO sponsored seminar series to faculty, officers, and students from the Turkish Military Academy, Turkish Army Headquarters, and Middle East Technical University, Ankara, Turkey, April 2002.

[31] Lucas, T.W., "Adaptive Exploration of Project Albert Distillations," INFORMS International, Maui, HI, June 2001.

[30] Lucas, T.W., "Adaptive Exploration of Agent-Based Command and Control Simulations," INFORMS Military Applications Society 4th Annual International Meeting, Quantico, VA, May 2001.

[29] Lucas, T.W., "Adaptive Exploration of Agent-based Command and Control Simulations," Project Albert Review Panel, Maui, HI, March 2001.

[28] Lucas, T.W., "Joint Combat Modeling at NPS," Modeling, Virtual Environments, and Simulations (MOVES) Open House, Monterey, CA, August 2000.

[27] Lucas, T.W., "A Close Look at the Stochastic Versus Deterministic Argument for Combat Models: Tales of When the Average Won't Do!" Military Operations Research Society (MORS) Symposium, Colorado Springs, CO, June 2000.

[26] Lucas, T.W., "Fitting Lanchester and Other Equations to the Battle of Kursk Data," Center for Army Analysis, Fort Belvoir, VA, June 2000.

[25] Lucas, T.W., “Experiments on the Values of Information and Force Advantage,” OPNAV N81, Pentagon, VA, June 2000.

[24] Lucas, T.W., “Why Most Combat Models Should be Stochastic: Tales of When the Average Won't Do,” Military Operations Research Society (MORS) Symposium, West Point, NY, June 1999.

[23] Lucas, T.W., “Advanced Methods in Simulation Analysis,” Pacific Northwest National Laboratory, Richland, WA, May 1999.

[22] Lucas, T.W., “Ideas to Enhance the Analytic Contribution of Joint Experiments,” The Military Operations Research Society’s Workshop on Joint Experimentation, Armed Forces Staff College, Norfolk, VA, March 1999.

[21] Lucas, T.W., “The Warfighting Experiment Analytical Process — Where Do We Go From Here?” The U.S. Army Conference on Applied Statistics (ACAS), Las Cruces, NM, October 1998.

[20] Lucas, T.W., “Improving the Analytical Contribution of Advanced Warfighting Experiments,” Center for Military Analysis, Haifa, Israel, July 1998.

[19] Lucas, T.W., “The Warfighting Experiment Analytical Process — Where Do We Go From Here?” Army Senior Analysts' Review, RAND, Santa Monica, CA, February 1998.

[18] Lucas, T.W., “RAND’s Credible Uses of Simulation (CUSim) and the Use of Modeling and Simulation (M&S) in OT&E,” Director of Operational Test & Evaluation (DOT&E), Pentagon, VA, September 1997.

[17] Lucas, T.W., “Most Combat Models Should be Stochastic! How one Randomizes Matters!” Naval Postgraduate School, Monterey, CA, August 1997.

[16] Lucas, T.W., tutorial on “Advanced Methods in Simulation Analysis,” Military Operations Research Society (MORS) Symposium, Quantico, VA, June 1997.

[15] Lucas, T.W., “A Framework for Validating and Using Models,” invited keynote address to an Environmental Protection Agency (EPA) Workshop on Model Validation, Chapel Hill, NC, October 1996.

[14] Lucas, T.W., and Bennett, B., “Modeling and Simulation: Improving Analysis with ADS,” Air Force Advisory Group, RAND, Santa Monica, CA, March 1996.

[13] Lucas, T.W., “Credible Uses of Distributed Interactive Simulations as Applied to Advanced Warfighting Experiments,” Army Senior Analysts' Review, RAND, Santa Monica, CA, February 1996.

[12] Lucas, T.W., and Vye, P., “Some Thoughts on Statistics and Simulation Based Defense Analysis,” National Research Council (NRC) on Statistics in the Department of Defense (DoD), Naval Postgraduate School, Monterey, CA, October 1995.

[11] Bankes, S., and Lucas, T.W., "Statistical Approaches for the Exploratory Modeling of Large Complex Models," International Symposium on Theory and Applications of Sensitivity Analysis of Model Output in Computer Simulation, Milan, Italy, September 1995.

[10] Lucas, T.W., "Effective Applications of Advanced Distributed Simulation (ADS)," Modeling and Simulation Roundtable, Air Combat Command (ACC), Langley AFB, VA, May 1995.

[9] Lucas, T.W., "Some Thoughts on Statistics and Distributed Interactive Combat Simulations," Institute for Defense Analysis (IDA) Seminar, Alexandria, VA, October 1994.

[8] Lucas, T.W., "Design of Experiment Principles as Applied to Distributed Interactive Simulation (DIS)," Workshop on Standards for the Interoperability of Distributed Simulations, Orlando, FL, September 1994.

[7] Lucas, T.W., "Limiting Forms of the Posterior When the Data Conflicts with the Prior," Cornell University, Department of Operations Research and Industrial Engineering, Ithaca, New York, March 1994.

[6] Lucas, T.W., "When is Conflict Normal?," First Annual International Society of Bayesian Analysts, San Francisco, CA, August 1993.

[5] Lucas, T.W., "Eighteen Months of Statistics in the Real World," University of California at Riverside, Department of Statistics, Riverside, CA, June 1993.

[4] Lucas, T.W., "Limiting Forms of the Posterior When the Data Conflicts with the Prior," University of California at Riverside, Department of Statistics, Riverside, CA, October 1991.

[3] Lucas, T.W., "Conflict is Normal," Southern California Chapter of the American Statistical Association, Newport Beach, CA, January 1991.

[2] Lucas, T.W., "The Impact of Data Fusion on Mission Effectiveness," Tri Services Data Fusion Symposium, Johns Hopkins University Applied Physics Laboratory, Laurel, Maryland, May 1990.

[1] Lucas, T.W., "Force Coordination in a Naval AAW Environment," ORSA/TIMS Conference, Las Vegas, NV, May 1990.

NPS Thesis Supervision

Ph.D. Dissertation Supervisor

[177] Hernandez, Alejandro S., Colonel, U.S. Army, "Breaking Barriers to Design Dimensions in Nearly Orthogonal Latin Hypercubes," Doctor of Philosophy in Operations Research, December 2008.

[176] Cioppa, Thomas M., Lieutenant Colonel, U.S. Army, "Efficient Nearly Orthogonal and Space-filling Experimental Designs for High-dimensional Complex Models," Doctor of Philosophy in Operations Research, September 2002. *Winner of the American Statistical Association's Prize for Best Student Paper Applying Statistics to National Defense*

Ph.D. Dissertation Committee Member

[175] Pugsley, Thomas S., Lieutenant Colonel, U.S. Army, "An Implicit Model Development Process for Bounding External, Seemingly Intangible/Non-Quantifiable Factors," Doctor of Philosophy in Modeling, Virtual Environments and Simulation (MOVES), June 2017.

[174] Cheng, Yuan-Pin, Major, Taiwan Army, "Hybrid High-Fidelity Modeling of Radar Scenarios using A temporal, Discrete-Event, and Time-Step Simulation," Doctor of Philosophy in Modeling, Virtual Environments and Simulation (MOVES), December 2016.

[173] Chen, You-Quan, Lieutenant Commander, Taiwan Navy, "Hybrid Architecture Framework for C4ISR and Discrete Event Simulation (DES) to Support Sensor-Driven Model Synthesis in Real-World Scenarios," Doctor of Philosophy in Modeling, Virtual Environments and Simulation (MOVES), September 2013.

[172] MacCalman, Alexander D., Lieutenant Colonel, U.S. Army, "Flexible Space-Filling Designs for Complex System Simulations," Doctor of Philosophy in Modeling, Virtual Environments and Simulation (MOVES), June 2013.

[171] Jungkunz, Patrick W., Kapitänleutnant, German Navy, "Modeling Human Visual Perception for Target Detection in Military Simulations," Doctor of Philosophy in Modeling, Virtual Environments and Simulation (MOVES), June 2009.

[170] Wells, William D., Major, U.S. Air Force, "Generating Enhanced Natural Environments and Terrain for Interactive Combat Simulations (GENETICS)," Ph.D. in Modeling, Virtual Environments and Simulation (MOVES), September 2005.

Masters Theses (Advisor)

[169] Kadrmas, Caleb M., Captain, U.S. Marine Corps, "Robust Analysis of Critical Factors for Cannon Artillery Lethality and Survivability in Peer Conflict," M.S. in Operations Research, June 2021. *Chief of Naval Operations Award for Excellence in Operations Research, Outstanding thesis recognition*

[168] Harper, Sean A., Captain, U.S. Marine Corps, "Marine Infantry Company Lethality: An Analysis of Force Design 2030 Proposals," M.S. in Operations Research, June 2021.

[167] Fitzmaurice, Samuel B., Captain, U.S. Marine Corps, "Anti-Surface Warfare Battery Survivability and Lethality in Expeditionary Advanced Base Operations," M.S. in Operations Research, June 2021. (Restricted)

[166] Sentinella, Forest, Captain, U.S. Army, "Using Data farming and Optimization to Enable Analysis of Concepts of Employment for Surface Connectors," M.S. in Operations Research, June 2021.

[165] Ling, Tong Hai, DSO National Laboratories, Singapore, "Use of Cooperative Unmanned Systems for Mine Countermeasures," M.S. in Operations Research, September 2020. *MORS Tisdale Finalist, Outstanding thesis recognition*

[164] Meehan, Martin J., Captain, U.S. Marine Corps, "Moving the Corps into the Information Age: Data-Driven Training Standards and Analytics to Support Evaluation," M.S. in Operations Research, June 2020.

[163] Lovejoy, Charles V., Major, U.S. Army, "Joint Active Shooter Protection and Response (JASPR) Scenario Modeling and Analysis in Support of Force Protection," M.S. in Operations Research, June 2020. *MORS Tisdale Finalist, Outstanding thesis recognition*

[162] Howser, John A., Captain, U.S. Marine Corps, "Salvo Analysis of Land-Based Anti-Ship Missiles in the First Island Chain," M.S. in Operations Research, June 2020. (Restricted)

[161] Dywan, Joseph D., Major, U.S. Army, "Analysis of CUAS Tactics, Techniques, Procedures and Capabilities Against Weaponized Opioid Payloads," M.S. in Operations Research, June 2020. (Restricted)

[160] Medici, David A., Lieutenant Commander, U.S. Navy, "A Sensitivity Analysis of IPOWER: A Small Unit Energy and Mission Planning Tool," M.S. in Operations Research, September 2019.

[159] Thompson, Courtney, Captain, U.S. Marine Corps, "Paying for Weight in Blood: An Analysis of Weight and Protective Level of a Combat Load During Tactical Operations," M.S. in Operations Research, June 2019. *MORS Tisdale Winner, Navy League Award for Outstanding Academic Achievement, Outstanding thesis recognition*

[158] Doherty, Kevin J., Major, U.S. Marine Corps, "Data Farming the Marine Corps' Readiness Availability Tool," M.S. in Operations Research, June 2019.

[157] McKavitt, Thomas P., Captain, U.S. Marine Corps, "An Analysis of the Marine Corps Depot-Level Maintenance Budgeting Model," M.S. in Operations Research, June 2019.

[156] Mateo, Gregory W., Captain, U.S. Marine Corps, "Analysis of Capabilities and Tactics to Counter Weaponized Opioid-UAV Threats," M.S. in Operations Research, June 2019. (Restricted)

[155] Kassulke, Jared D., Major, U.S. Army, "An Analysis of an Unmanned Aerial Vehicle Attack on Civilians with a Weaponized Synthetic Opioid Payload," M.S. in Operations Research, June 2019. (Restricted)

[154] Kesler, Gokhan, First Lieutenant, Turkish Air Force, "A Data Farming Analysis of Multiple Salvo Equations," M.S. in Operations Research, March 2019.

[153] Renquist, John J., Lieutenant Commander, U.S. Navy, "An Independent Assessment of the Energy Enhancements to the Synthetic Theater Operations Research Model (STORM)," M.S. in Operations Research, September 2018.

[152] Li, Chuan-Haun, Lieutenant Commander, Taiwanese Navy, "Verification Analyses of Armstrong's Stochastic Salvo Equations Using Data Farming," M.S. in Operations Research, June 2018.

[151] Gulosh, Nathan J., Major, U.S. Marine Corps, "Employment of Intelligence, Surveillance, and Reconnaissance Drone Swarms to Enhance Ground Combat Operations," M.S. in Operations Research, June 2018. *MORS Tisdale Finalist, Outstanding thesis recognition*

[150] King, John F., Major, U.S. Army, "An Implementation of Designed Experiments in COMBATXXI," M.S. in Operations Research, June 2018. (Restricted)

[149] Tanalega, John F., Lieutenant, U.S. Navy, "Analyzing Unmanned Surface Tactics with the Lightweight Interstitials Toolkit for Mission Engineering Using Simulation (LITMUS)," M.S. in Operations Research, March 2018. *MORS Tisdale Winner, Outstanding thesis recognition* (Restricted)

[148] Püschel, Silvio, Lieutenant Colonel, German Army, "Optimization of an Advanced Multi-Junction Solar-Cell Design for Space Environments (AM0) Using Nearly Orthogonal Latin Hypercubes," M.S. in Operations Research, June 2017. *MORS Tisdale Finalist, Outstanding thesis recognition*

[147] Gray, Samuel P., Major, U.S. Marine Corps, "Agent-Based Simulation to Support the Effectiveness, Procurement, and Employment of Non-Lethal Weapon Systems," M.S. in Operations Research, June 2017.

[146] Maldonado, Zachary M., Captain, U.S. Marine Corps, "Determining Tactical Usage of Non-Lethal Weapons for Fixed Site Security of United States Embassies," M.S. in Operations Research, June 2017.

[145] Adeniji, Oludare A., Captain, U.S. Marine Corps, "Forecasting Maintenance Shortcomings of a Planned Equipment Density Listing (EDL) in Support of Expeditionary Missions," M.S. in Operations Research, June 2017.

[144] Hogarth, Allison R., Lieutenant, U.S. Navy, "Improving Navy Recruiting with the New Planned Resources Optimization Model with Experimental Design (PROM-WED)," M.S. in Operations Research, March 2017. *MORS Tisdale Winner, Outstanding thesis recognition*

[143] Souba, Collin P., Lieutenant, U.S. Navy, "Towards a Capability for Model-based Analysis of Naval Integrated Fire Control (Counter Air)," M.S. in Operations Research, March 2017. (Restricted)

[142] Solem, Kevin K., Lieutenant Commander, U.S. Navy, "Quantifying the Potential Benefits of Anti-submarine Warfare (ASW) Continuous Trail Unmanned Vessels (ACTUV) in a Tactical ASW Scenario," M.S. in Operations Research, March 2017. (Restricted)

[141] Williams, Kevin G., Commander, U.S. Navy, "Modeling and Analysis of Coyote UAV Augmentation to the P-8A Poseidon," M.S. in Operations Research, September 2016. *Chief of Naval Operations Award for Excellence in Operations Research, MORS Tisdale Finalist, Outstanding thesis recognition* (Restricted)

[140] Eriksen, Kristen J., Lieutenant, U.S. Navy, "Analyzing Tactics and Techniques within Distributed Lethality using Agent-based Simulation," M.S. in Operations Research, September 2016. *Surface Navy Association Award for Academic Excellence, MORS Tisdale Finalist, Outstanding thesis recognition* (Restricted)

[139] Opcin, Ali E., Lieutenant Junior Grade, Turkish Navy, "Modeling Anti-Air Warfare with Discrete Event Simulation and Analyzing Naval Convoy Operations," M.S. in Operations Research and Modeling, Virtual Environments and Simulation (MOVES), June 2016. *The George L. Phillips Modeling, Virtual Environments and Simulation (MOVES) Award, MORS Tisdale Finalist, Outstanding thesis recognition*

[138] Sikandar, Raja I., Lieutenant Commander, Pakistan Navy, "Analysis of Protection Measures for Naval Vessels Berthed at Harbor Against Terrorist Attacks," M.S. in Operations Research, June 2016.

[137] Ilaslan, Salih, Captain, Turkish Air Force, "Analysis of Error Propagation within Hierarchical Air Combat Models," M.S. in Operations Research, June 2016.

[136] Villatoro, Henry A., Lieutenant, U.S. Navy, "High Energy Laser Employment in Self Defense Tactics on Naval Platforms in a Complex Air Threat Environment," M.S. in Operations Research, March 2016. (Restricted)

[135] DeSousa, William P., Ensign, U.S. Navy, "An Exploratory Analysis of Economic Factors in the Navy Total Force Strength Model (NTFSM)," M.S. in Operations Research, December 2015.

[134] Pav, Russell G., Lieutenant, U.S. Navy, "Experiments in Error Propagation within Hierarchal Combat Models," M.S. in Operations Research, September 2015.

[133] Gondal, Bilal S., Major, Pakistan Army, "Statistical Analysis of Warfare: Identification of Winning Factors with a Focus on Irregular Warfare," M.S. in Operations Research, September 2015.

[132] Unlu, Salim, Lieutenant Junior Grade, Turkish Navy, "Effectiveness of Unmanned Surface Vehicles in Anti-Submarine Warfare with the Goal of Protecting a High Value Unit," M.S. in Operations Research, June 2015.

[131] Sen, Fatih, First Lieutenant, Turkish Air Force, "Analysis of the Use of Unmanned Combat Aerial Vehicles in Conjunction with Manned Aircraft to Counter Active Terrorists in Rough Terrain," M.S. in Operations Research, June 2015.

[130] Rockwell, Steven V., Lieutenant, U.S. Navy, "High Energy Laser Employment in Self Defense Tactics on Naval Platforms in a Complex Air Threat Environment," M.S. in Operations Research, March 2015. *Surface Navy Association Award for Academic Excellence, MORS Tisdale Finalist* (Restricted)

[129] Mclaughlin, Forest B., Lieutenant, U.S. Navy, "Undersea Communications between Submarines and Unmanned Undersea Vehicles in a Command and Control Denied Environment," M.S. in Operations Research, March 2015.

[128] Seymour, Christian N., Lieutenant, U.S. Navy, "Capturing the Full Potential of the Synthetic Theater Operations Research Model (STORM)," M.S. in Operations Research, September 2014. *MORS Tisdale Winner*

[127] Bickel, William G., Lieutenant, U.S. Navy, "Improving the Analysis Capabilities of the Synthetic Theater Operations Research Model (STORM)," M.S. in Operations Research, September 2014.

[126] Robblee, Brett P., Lieutenant, U.S. Navy, "High Energy Laser Employment in Self-defense Tactics on Naval Platforms," M.S. in Operations Research, March 2014. *MORS Tisdale Finalist* (Restricted)

[125] Treml, Tobias, Major, German Army, "A Revolutionary Approach for the Development of Future Ground Combat System Specifications," M.S. in Operations Research, September 2013. *Naval Postgraduate School Outstanding Academic Achievement Award for International Students, MORS Tisdale Finalist*

[124] Ozcan, Begum Y., First Lieutenant, Turkish Air Force, "Effectiveness of Unmanned Aerial Vehicles in Helping Secure a Border Characterized by Rough Terrain and Active Terrorists," M.S. in Operations Research, June 2013. *MORS Tisdale Winner*

[123] Groves, Jeff, Major, U.S. Marine Corps, "An Analysis of ARADS Combat Model Communication Parameters," M.S. in Operations Research, December 2011. (Restricted)

[122] Anderson, Ben L., Lieutenant, U.S. Navy, "Changing the Paradigm: Simulation, A Method of First Resort," M.S. in Operations Research, September 2011.

[121] Davidson, Pornchai, Lieutenant Commander, U.S. Navy, "Robust Analysis of the Joint Strike Fighter Integrated Training Center Pilot Scheduling," M.S. in Operations Research, September 2011.

[120] Edmiston, Russell J., Major, U.S. Army, "An Exploration of the Communications Environment within the System of Systems Survivability Simulation (S4)," M.S. in Operations Research, June 2011.

[119] Lorenzen, Jesse D., Lieutenant, U.S. Navy, "Determining the Important Attributes for Submarine-Launched Unmanned Aerial Vehicles Used in Support of Special Operations Forces," M.S. in Operations Research, June 2011. (Restricted)

[118] Tsilis, Thomas, Lieutenant Commander, Hellenic Navy, "Counter-piracy Escort Operations in the Gulf of Aden," M.S. in Operations Research, June 2011.

[117] Jordan, John D., Major, U.S. Marine Corps, "Improving the Enhanced Company Operations Fire Support Team," M.S. in Operations Research, June 2011.

[116] Macaskill, Jonathan M., Lieutenant, U.S. Navy, "A Model to Enhance Further Testing, Evaluation, and Employment of the Jordan Border Security System," M.S. in Operations Research, March 2011. (Restricted)

[115] Wong, Ka-Yoon, Singapore Defence Science and Technology Agency, "Robust Defense Against Small Boat Attacks," M.S. in Operations Research, December 2010. *Outstanding thesis recognition*

[114] Ting, Chi Yon, Major, Singapore Army, "Life Cycle Cost Estimate of the Transformable Craft," M.S. in Operations Research, December 2010. (Restricted)

[113] Taylor, Jeremy B., Lieutenant, U.S. Navy, "Analysis of the Defensive Capabilities of Mutually-Supporting AEGIS Destroyers Against a HARPY Unmanned Aerial Systems Swarm Attack," M.S. in Operations Research, September 2010. *Surface Navy Association Award for Academic Excellence* (Restricted)

[112] Cizek, Robert A., Lieutenant, U.S. Navy, "Determining the Important Factors in a Submarine-Launched Unmanned Aerial Vehicle," M.S. in Operations Research, September 2010. (Restricted)

[111] Hinkson, Daniel S., Captain, U.S. Marine Corps, "Supporting Marine Corps Enhanced Company Operations: A Quantitative Analysis," M.S. in Operations Research, June 2010.

[110] Hafer, William J., Lieutenant, U.S. Navy, "Analysis of the Vulnerability of an AEGIS Destroyer Against an Unmanned Aerial System (UAS) Saturation Attack in a Multiple Threat Environment," M.S. in Operations Research, March 2010. *Surface Navy Association Award for Academic Excellence* (Restricted)

[109] Marlin, Benjamin J., Major, U.S. Army, "Ascertaining Validity in the Abstract Realm of PMESII Simulation Models: An Analysis of the Peace Support Operations Model (PSOM)," M.S. in Operations Research, June 2009. *MORS Tisdale Finalist*

[108] Zappa, Daniel R., Major, U.S. Marine Corps, "Integrating New Intelligence, Surveillance, and Reconnaissance Systems into a Marine Rifle Company," M.S. in Operations Research, June 2009. (Restricted)

[107] Phillips, Shawn M., Captain, U.S. Marine Corps, "Improving Marine Corps Total Life Cycle Management by Connecting Collected Data and Simulation," M.S. in Operations Research, June 2009.

[106] Almanza, Cielo I., Lieutenant Commander, U.S. Navy, "Modeling Ordnance Movements into the Asian Pacific Theater," M.S. in Operations Research, March 2009. *MORS Tisdale Finalist*

[105] Rayburg, Casey M., Lieutenant, U.S. Navy, "Force Protection Capability Requirements for Military, Auxiliary, and Commercial Vessels Operating in a Confined Area," M.S. in Operations Research, March 2009. (Restricted)

[104] Ong, Cher Howe, Captain, Singapore Army, "Effects of Terrain on a System of Systems," M.S. in Operations Research, December 2008. *MORS Tisdale Winner*

[103] Foo, Kong Pin Gilbert, Captain, Singapore Army, "Exploring First Responder Tactics to a Terrorist Chemical Attack," M.S. in Operations Research, December 2008.

[102] Kaiser, Chad S., Lieutenant, U.S. Navy, "Analysis of the Vulnerability of an Aegis Destroyer to a Kamikaze Unmanned Aerial Systems Saturation Attack," M.S. in Operations Research, September 2008. *MORS Tisdale Winner, Surface Navy Association Award for Academic Excellence* (Restricted)

[101] Garcia, Alberto A., Lieutenant Commander, U.S. Navy, "Improving Life Cycle Management Through Simulation and Efficient Design," M.S. in Operations Research, September 2008.

[100] Milliken, Michael S., Lieutenant Commander, U.S. Navy, "The Impact Analysis of a Mixed Squadron, Containing LCS and Multimission Surface Platforms, on Blue Force Casualties and Mission Effectiveness," M.S. in Modeling, Virtual Environments, and Simulation (MOVES), September 2008.

[99] Midgette, William D., Captain, U.S. Marine Corps, "Enhancing the Operational Effectiveness of the Ground-Based Operational Surveillance System (G-BOSS)," M.S. in Operations Research, June 2008. *MORS Tisdale Finalist*

[98] Geren, Richard L., Major, U.S. Army, "The Effects of Unmanned Ground Vehicle Tactics and Chemical Risk-Based Decisions on Infantry in an Urban, Chemical Environment," M.S. in Operations Research, June 2008. (Restricted)

[97] Young, Ernst B., Major, U.S. Marine Corps, "Total Life Cycle Management—Assessment Tool: An Exploratory Analysis," M.S. in Operations Research, June 2008.

[96] Ferris, Todd P., Major, U.S. Marine Corps, "Modeling Methodologies for Representing Urban Cultural Geographies in Stability Operations," M.S. in Operations Research, June 2008.

[95] Abbott, Benjamin P., Lieutenant, U.S. Navy, "Littoral Combat Ship (LCS) Mission Packages: Determining the Best Mix," M.S. in Operations Research, March 2008. *MORS Tisdale Winner, Surface Navy Association Award for Academic Excellence*

[94] Brown, Richard F., Captain, U.S. Army, "Exploring the Capabilities of the Platoon-sized Future Force Warrior Small Combat Unit," M.S. in Operations Research, December 2007. (Restricted)

[93] Oh, Pei Tze Regine, DSO National Laboratories, Singapore, "Fractional Factorial Controlled Sequential Bifurcation: Efficient Screening Through Divide and Discard," M.S. in Operations Research, December 2007. *MORS Tisdale Finalist, Finalist for "Best Student Paper" award in the 13th International Command and Control Research Technology Symposium*

[92] Mahon, Casey M., Lieutenant, U.S. Navy, "A Littoral Combat Model for Land-Sea Missile Engagements," M.S. in Operations Research, September 2007. *Surface Navy Association Award for Academic Excellence*

[91] Wegner, Christopher M., Major, U.S. Air Force, "System-of-Systems Test Planning in a Complex Joint Environment," M.S. in Operations Research, June 2007. *MORS Tisdale Finalist*

[90] Kent, Walter E., Major, U.S. Army, "The Effects of Situation Awareness on Infantry in an Urban, Chemical Environment," M.S. in Operations Research, June 2007. (Restricted)

[89] Lovelace, Daniel A., Captain, U.S. Marine Corps, "Comparison of Ground-based Fire Support Capabilities of the Marine Expeditionary Unit," M.S. in Operations Research, June 2007. (Restricted)

[88] Freye, Jeffrey T., Lieutenant, U.S. Navy, "Design of Experiment and Analysis for the Joint Dynamic Allocation of Fires and Sensors (JDAFS) Simulation," M.S. in Operations Research, June 2007.

[87] Lalis, Vasileios, Lieutenant, Hellenic Navy, "Exploring Naval Tactics with Unmanned Aerial Vehicles in an Island Complex Using Agent-based Simulation," M.S. in Operations Research, June 2007.

[86] Ang, Keng-Ern Joshua, Captain, Singapore Army, "Extending Orthogonal and Nearly Orthogonal Latin Hypercube Designs for Computer Simulation and Experimentation," M.S. in Operations Research, December 2006.

[85] Pfeiffer, Volker, Captain, German Army, "Communication Aspects in Urban Terrain," M.S. in Operations Research, December 2006. (Restricted)

[84] Michel, Christopher, Major, U.S. Marine Corps, "Evaluating the Marine Corp's Artillery Triad in STOM Operations," M.S. in Operations Research, September 2006. (Restricted)

[83] Vaughn, David P., Captain, U.S. Marine Corps, "Exploration of Force Transition in Stability Operations Using Multi-Agent Simulation," M.S. in Operations Research, September 2006.

[82] Roginski, Jonathan W., Major, U.S. Army, "Emergency First response to a Crisis Event: A Multi-Agent Simulation Approach," M.S. in Operations Research, June 2006.

[81] Alt, Jonathan K., Major, U.S. Army, "Exploring Tactics, Techniques and Procedures for a Future Force Warrior Small Combat Unit," M.S. in Operations Research, June 2006. *TRAC-MRY Director's Kelleher Award for Research Excellence* (Restricted)

[80] Wittwer, Larry N., Major, U.S. Army, "An Exploration of Equipping a Future Force Warrior Small Combat Unit with Non-Lethal Weapons," M.S. in Operations Research, June 2006.

[79] Lehmann, Wolfgang, Major, German Army, "An Upgradeable Agent-Based Model to Explore Non-linearity and Intangibles in Peacekeeping Operations," M.S. in Operations Research, June 2006.

[78] Sulewski, Charles A., Captain, U.S. Army, "An Exploration of Unmanned Aerial Vehicles in the Army's Future Combat Systems Family of Systems," M.S. in Operations Research, December 2005.

[77] Martinez, Felix, Lieutenant, Mexican Navy, "Maritime Protection of Critical Infrastructure Assets in the Campeche Sound," M.S. in Operations Research, December 2005.

[76] Bain, Matthew D., Captain, U.S. Marine Corps, "Supporting a Marine Corps Distributed Operations Platoon: A Quantitative Analysis," M.S. in Operations Research, September 2005. *MORS Tisdale Finalist*

[75] McMindes, Kevin L., Major, U.S. Marine Corps, "Unmanned Aerial Vehicle Survivability: The Impacts of Speed, Detectability, and Enemy Capabilities," M.S. in Operations Research, September 2005. (Restricted Appendix)

[74] Babilot, Michael, Captain, U.S. Marine Corps, "Comparison of a Distributed Operations Force to a Traditional Force in Urban Combat," M.S. in Operations Research, September 2005.

[73] Sanders, Todd M., Captain, U.S. Marine Corps, "Exploring the Effectiveness of the Marine Expeditionary Rifle Squad," M.S. in Operations Research, September 2005.

[72] Kramlich, Gary R., Captain, U.S. Army, "The Effects of Posture, Body Armor, and Other Equipment on Rifleman Lethality," M.S. in Operations Research, June 2005. *MORS Tisdale Winner*

[71] Berner, Andrew B., Lieutenant, U.S. Navy, "The Effective Use of Multiple Unmanned Aerial Vehicles in Surface Search and Control," M.S. in Operations Research, December 2004.

[70] Raffetto, Mark, Captain, U.S. Marine Corps, "Unmanned Aerial Vehicle Contributions to Intelligence, Surveillance, and Reconnaissance Missions for Expeditionary Operations," M.S. in Operations Research, September 2004. *Marine Corps Association Superior Service Award, MORS Tisdale Finalist*

[69] Haug, Kevin G., Lieutenant, U.S. Navy, "Using Hughes' Salvo Model to Examine Ship Characteristics in Surface Warfare," M.S. in Operations Research, September 2004. (Restricted)

[68] Rhoads, Russell A., Major, U.S. Army, and GILMAN, SCOTT D., Captain, U.S. Army, "Wargaming and Simulation as Tools for CONOPS Development," M.S. in Modeling, Virtual Environments, and Simulation (MOVES), September 2004.

[67] Lindquist, Joseph P., Captain, U.S. Army, "An Analysis of Degraded Communications in the Army's Future Force," M.S. in Operations Research, June 2004. *MORS Tisdale Winner*

[66] Hakola, Matthew B., Captain, U.S. Marine Corps, "An Exploratory Analysis of Convoy Protection Using Agent-Based Simulation," M.S. in Operations Research, June 2004.

[65] Aydin, Mehmet, First Lieutenant, Turkish Army, "An Exploratory Analysis of Village Search Operations," M.S. in Operations Research, June 2004.

[64] Nesbitt, Woodrow M., Lieutenant, U.S. Navy, "Defending High Value Homeland Units Against the Low Slow Flyer," M.S. in Operations Research, March 2004. (Restricted)

[63] Efimba, Motale E., Lieutenant, U.S. Navy, "An Exploratory Analysis of Littoral Combat Ships' Ability to Protect Expeditionary Strike Groups," M.S. in Operations Research, September 2003.

[62] Cakan, Ali, First Lieutenant, Turkish Army, "Determining the Importance of Nationality on the Outcome of Battles Using the Classification Trees," M.S. in Operations Research, June 2003.

[61] Ipekci, Arif, First Lieutenant, Turkish Army, "How Agent-Based Models Can Be Utilized To Explore and Exploit Non-linearity and Intangibles Inherent in Guerrilla Warfare," M.S. in Operations Research, June 2002. *MORS Tisdale Winner*

[60] McIntosh, Gary A., Lieutenant Commander, U.S. Navy, "Information Superiority and Game Theory: The Value of Varying Levels of Information," M.S. in Operations Research, March 2002.

[59] Wan, Szu Ching, Major, Singapore Army, "An Exploratory Analysis on the Effects of Human Factors on Combat Outcomes," M.S. in Operations Research, March 2002.

[58] Pee, Eng Yau, Singapore Defence Science and Technology Agency, "An Exploratory Analysis on the Effects of Information Superiority on Battle Outcomes," M.S. in Operations Research, March 2002. *MORS Tisdale Finalist*

[57] Coban, Muzaffer, First Lieutenant, Turkish Army, "Predicting Battle Outcomes With Classification Trees," M.S. in Operations Research, December 2001.

[56] Ho, Kieth J., Captain, Singapore Army, "An Analysis of Distributed Combat Systems," M.S. in Systems Integration, December 2001.

[55] Vinyard, William C., Major, U.S. Marine Corps, "Reducing Non-monotonicities in Combat Models," M.S. in Operations Research, September 2001. *MORS Tisdale Winner*

[54] Dinges, John, Captain, U.S. Army, "Exploring the Validation of Lanchester Equations for the Battle of Kursk," M.S. in Operations Research, June 2001.

[53] Hartmann, Jens, Captain, German Army, "Analysis of Maintenance Records to Support Prediction of Maintenance Requirements in the German Army," M.S. in Operations Research, June 2001.

[52] Johnston, Michael, Lieutenant, U.S. Navy, "An Analysis on the Survivability of Land Attack Missiles (LAM)," M.S. in Operations Research, December 2000.

[51] Yigit, Faruk, First Lieutenant, Turkish Army, "An Exploratory Analysis of Historical Land Battles," M.S. in Operations Research, December 2000.

[50] Gozel, Ramazan, First Lieutenant, Turkish Army, "Fitting Firepower Score Models to the Battle of Kursk Data," M.S. in Modeling, Virtual Environments, and Simulation (MOVES), September 2000.

[49] Dirks, Armin D.W., Captain, German Army, "Campaign Analysis of a NATO Ground Forces Campaign in Kosovo," M.S. in Operations Research, June 2000.

[48] Brown, Lloyd P., Captain, U.S. Marine Corps, "Agent Based Simulation as an Exploratory Tool in the Study of the Human Dimension of Combat," M.S. in Operations Research, March 2000. (Restricted)

[47] Turkes, Turker, First Lieutenant, Turkish Army, "Fitting Lanchester and Other Equations to the Battle of Kursk Data," M.S. in Operations Research, March 2000.

[46] McGunnigle, John E., JR., Lieutenant, U.S. Navy, "An Exploratory Analysis of the Military Value of Information and Force," M.S. in Operations Research, December 1999. *MORS Tisdale Finalist*

[45] Morgan, Brian L., Lieutenant Commander, U.S. Navy, "Exploratory Model Analysis of the Space Based Infrared System (SBIRS) Low Global Scheduler Problem," M.S. in Operations Research, December 1999. *MORS Tisdale Finalist*

[44] Kulac, Ogur, Lieutenant Junior Grade, Turkish Navy, "A Comparative Analysis of Active and Passive Sensors in Anti-Air Warfare Area Defense Using Discrete Event Simulation Components," M.S. in Operations Research, March 1999.

[43] Turan, Bulent, Lieutenant Junior Grade, Turkish Navy, "A Comparative Analysis of Ship Self Air Defense (SSAD) Systems Using a Modkit Simulation," M.S. in Operations Research, March 1999.

Masters Theses (Second Reader)

[42] Lin, Yi-Chung, Major, U.S. Army, "Reducing Aviation Fatalities by Monitoring Pilots Cognitive States Using Psychophysiological Measurements," M.S. in Operations Research, June 2021.

[41] Fabijanowicz, Jason R., Major, U.S. Army, "Design of Experiments for Air Launched Effects Unmanned Aerial Vehicles," M.S. in Operations Research, June 2020. (Restricted)

[40] Liu, Shuchang, Lieutenant Commander, Taiwan Navy, "Micro-class Missile Assault Boat Swarm Tactics Effectiveness in the Taiwan Strait," M.S. in Operations Research, December 2019.

[39] Yao, Kuo-wei, Lieutenant, Taiwan Navy, "Chinese People's Liberation Army Invasion Breakpoint Analysis," M.S. in Operations Research, December 2019.

[38] Brose, Lily M., Ensign, U.S. Navy, "Continuation Study for the Selected Marine Corps Reserve," M.S. in Operations Research, June 2018.

[37] Tilus, Preston T., Lieutenant, U.S. Navy, "Assessing Orchestrated Simulation Through Modeling to Quantify the Benefits of Unmanned-Manned Teaming in a Tactical ASW Scenario," M.S. in Operations Research, March 2018.

[36] Beaumont, William C., Lieutenant, U.S. Navy, "Reachability Analysis of Bulk-Fuel to Intermediate Transportation-nodes (RABIT) in USPACOM Using a Design of Experiments Approach," M.S. in Operations Research, September 2017. *MORS Tisdale Winner, Outstanding thesis Recognition, Winner of the Navy League Award for Outstanding Academic Achievement* (Restricted)

[35] Zaman Khan, Akhtar, Lieutenant Commander, Pakistan Navy, "Convoy Protection Under Multi-Threat Scenario," M.S. in Operations Research, June 2017.

[34] Edwards, Jonathan D., Lieutenant, U.S. Navy, "Naval Convoy Defense," M.S. in Operations Research, March 2017. *MORS Tisdale Finalist* (Restricted)

[33] Meredith, Ian C., Lieutenant, U.S. Navy, "The Effect of Shipboard Manning Levels on Operational Effectiveness—an LCS Case Study," M.S. in Operations Research, September 2016.

[32] Bazalaki, Peter, Lieutenant, U.S. Navy, "An Exploratory Analysis of Projected Navy Officer Inventory Strength Using Data Farming," M.S. in Operations Research, September 2016.

[31] Kaya, Serif, Lieutenant Junior Grade, Turkish Navy, "Evaluating Effectiveness of a Frigate in an Anti-Air Warfare (AAW) Environment," M.S. in Operations Research, June 2016.

[30] White, Daniel P., Commander, U.S. Navy, "The Peace Game: A Data Driven Evaluation of a Software-based Model of the Effects of Modern Conflict on Populations," M.S. in Operations Research, September 2015.

[29] Borozny, Erin E., Lieutenant Commander, U.S. Navy, "Projecting Navy Officer Inventory with Data Farming," M.S. in Operations Research, September 2015.

[28] DeHollan, Aurel N., Lieutenant, U.S. Navy, "Investigating Navy Officer Retention Using Data Farming," M.S. in Operations Research, June September 2015.

[27] Sozen, Volkan, First Lieutenant, Turkish Army, "Optimal Deployment of Unmanned Aerial Vehicles for Border Surveillance," M.S. in Operations Research, June 2014. *MORS Tisdale Finalist*

[26] Cordell, Joseph R., Captain, U.S. Army, "Toward Finding Driving Communications Factors in the System of Systems Survivability Simulation Model," M.S. in Operations Research, March 2014.

[25] Dimitriou, Georgios, Lieutenant Commander, Hellinic Navy, "Integrating Unmanned Aerial Vehicles into Surveillance Systems in Complex Maritime Environments," M.S. in Modeling, Virtual Environments and Simulation (MOVES), September 2013. *Outstanding thesis recognition*

[24] Schwartz, Zachary P., Lieutenant, U.S. Navy, "Using Undersea Assets to Establish a Maritime Exclusion Zone in the South and East China Seas," M.S. in Operations Research, March 2013. (Restricted)

[23] Powers, Matthew J., Lieutenant Commander, U.S. Navy, "The Exponential Expansion of Simulation: How Simulation has Grown as a Research Tool," M.S. in Operations Research, September 2012. *Outstanding thesis recognition*

[22] Salono, Mario L., Captain, U.S. Marine Corps, "Improving the Goodness-of-Fits Associated with the Current and Proposed Combat Active Replacement Factors (CARF) Methodology," M.S. in Operations Research, March 2012.

[21] Cappellini, Ronald D., Lieutenant Commander, U.S. Navy, "Error Propagation through Hierarchical Combat Models," M.S. in Operations Research, September 2011. (Restricted)

[20] Dummar, Joe K., Captain, U.S. Marine Corps, "Improving the Integrated Training Center (ITC) Model to Achieve More Accurate Time to Train Estimates," M.S. in Operations Research, June 2011.

[19] Slootmaker, Leslie A., Lieutenant, U.S. Navy, "Countering Piracy with the Next-Generation Piracy Performance Surface Model," M.S. in Operations Research, March 2011. *MORS Tisdale Winner, Surface Navy Association Award for Academic Excellence*

[18] Blasy, Christian W., Lieutenant, U.S. Navy, "An Analysis of Counterinsurgency Campaigns Using Lanchestrian Based Marketing Differential Equations," M.S. in Operations Research, September 2010.

[17] Erdman, Robert W., Major, U.S. Army, "Using Experimental Design and Data Analysis to Study the Enlisted Specialty Model for the U.S. Army G1," MS in Operations Research, June 2010. *MORS Tisdale Finalist*

[16] Evans, Bernard F., Major, U.S. Army, "Improving Calculations of the Collateral Effects Radius for the Joint Technical Coordinating Group for Munitions Effectiveness," MS in Operations Research, June 2010. (Restricted)

[15] Bodden, Huntley J., Major, U.S. Marine Corps, "A Survivability Assessment of the Transformable Craft in an Operational Environment," MS in Operations Research, June 2010.

[14] Field, Peter A., Lieutenant, U.S. Navy, "A Comparative Analysis of Commercial Off-the-Shelf Naval Simulations and Classic Operations Research Models," MS in Operations Research, September 2009.

[13] Ozdemir, Omur, Lieutenant JG, Turkish Navy, "Evaluation and Comparison of Freedom Class LCS and Other Frigates/Corvettes Against Small Boat, FPB and Submarine Threats in Confined Waters," MS in Operations Research, June 2009.

[12] Christiansen, Bryan J., Lieutenant, U.S. Navy, "Littoral Combat Vessels: Analysis and Comparison of Designs," MS in Operations Research, September 2008.

[11] Wissell, Nicholas E., Lieutenant, U.S. Navy, "Surface Combatant Readiness to Confront a Sea Control Navy," MS in Operations Research, September 2008.

[10] Nelson, Erik J., Lieutenant, U.S. Navy, "Passive and Active Sonar Prosecution of Diesel Submarines by Nuclear Submarines" MS in Operations Research, March 2008.

[9] Tiah, Yao Ming, DSO National Laboratories, Singapore, "An Analysis of Small Navy Tactics Using a Modified Hughes' Salvo Model," MS in Operations Research, March 2007.

[8] Baggesen, Arne, Lieutenant, German Navy, "Design and Operational Aspects of Autonomous Unmanned Combat Aerial Vehicles" MS in Modeling, Virtual Environments, and Simulation (MOVES), September 2005.

[7] Andrews, Charles H., Lieutenant Commander, U.S. Navy, "The Relationship Between Sleep Regimen and Performance in United States Navy Recruits," MS in Operations Research, September 2004.

[6] Streater, Brent D., Captain, U.S. Army, "Modeling How Individual Entities React to Indirect Fire," MS in Operations Research, June 2004.

[5] Smith, Gregory K., Captain, U.S. Army, "A Methodology for Evaluating the Truth Space in Testing for the Single Integrated Air Picture," MS in Operations Research, June 2002.

[4] Posadas, Sergio, Major, U.S. Marine Corps, "Stochastic Simulation of a Commander's Decision Cycle (SSIM CODE)," MS in Operations Research, June 2001.

[3] Dietrich, Nathan S., Captain, U.S. Army, "Performance Metrics for Correlation and Tracking Algorithms," MS in Operations Research, June 2001.

[2] Alaniz, Bradley, Lieutenant, U.S. Navy, "Analysis of the Deterioration Rate of Ship Handling Proficiency of Surface Warfare Officers on Shore Duty," MS in Operations Research, June 2000.

[1] Finken, Paul J., Major, U.S. Army, "Protecting the Force: Application of Statistical Process Control for Force Protection in Bosnia," M.S. in Operations Research, June 2000.

Center Leadership

In 2006, along with Professor Susan Sanchez, Professor Lucas co-founded the Simulation Experiments and Efficient Design (SEED) Center for Data Farming (http://harvest.nps.edu) at the Naval Postgraduate School. Since then, he has served as co-director of the Center. The Center was created to address the high-dimensional aspects that are inherent in many models of real-world phenomena.

The SEED Center enhances our nation's security by providing unique research and support for faculty and students, U.S. armed forces, and our allies. The Center brings a team approach to defense-oriented problem-solving—using academically excellent faculty, operationally-grounded students, and leveraging our strong ties with the international military and civilian simulation communities. The SEED Center's ultimate goal is to help decision makers at all levels to ensure that Sailors, Soldiers, Marines, and Airmen have what they need to safely and efficiently accomplish their missions.

The SEED Center has become an internationally recognized center of expertise in integrating state-of-the-art experimental designs, high performance computing, new modeling environments, and innovative analysis techniques to gain deeper insights from simulation models. Activities include our series of international workshops, mentorship of junior faculty, and success in attracting distinguished visitors to campus. Over 220 students—from all the services and a dozen countries—have completed their dissertation and/or thesis research in the SEED Center.

Selected Consulting

- Contracted by the National University of Singapore's Temasek Defence Systems Institute to give lectures and workshops on design of experiments (DOE) and modeling and simulation (M&S), with an emphasis on national security applications involving systems of systems (2007).

- Contracted by NATO's Research and Technology Organization's Consultant and Exchange Program to give seminars on combat modeling and statistical methods in simulation analysis to faculty, officers, and students from the Turkish Military Academy, Turkish Army Headquarters, and Middle East Technical University (2002).
- Contracted by RAND to provide peer review of prospective Rand Memorandums (2000 and 2001).
- Contracted by the Environmental Protection Agency (EPA) to report to and participate in a model validation workshop for lead exposure models (1996).
- Analyzed survey data for Hewlett-Packard customer service department, the results used to redesign the survey (1992).
- Subcontracted to Professor David Strauss at the University of California at Riverside on statistical analysis of the effects of toxic waste sites on housing values, the results were used in a legal dispute (1991).
- Production, Scheduling, and Inventory Control Systems Development for Japanese software development company (T.S.D. Co. Ltd.), the results were used to improve efficiency in the production of plastics (1989).

Professional Activities

- Served as a referee for the *Journal of the American Statistical Association*, *Operations Research*, *Military Operations Research*, *Naval Research Logistics*, *Interfaces, Risk Analysis, Communications in Statistics: Theory and Methods*, *Mathematical and Computer Modelling*, *Journal of Defense Modeling and Simulation*, *Journal of Computing in Science & Engineering*, *Wiley Encyclopedia of Operations Research and Management Science*, multiple RAND memorandums, review of grant applications for Natural Sciences and Engineering Research Council of Canada**,** review of Chapman Hall book proposal review, chapter reviews for Springer-Verlag and Bayesian Monograph Series.
- On 2016 INFORMS Teaching Prize Committee.
- On Editorial Board for *Journal of Defense Modeling and Simulation,* 2010-1014.
- Session chair for 1995, Institute of Mathematical Statistics Annual Conference: Hierarchical Models I & II.

Professional Memberships (not all current)

American Statistical Association (ASA)

Institute for Operations Research and the Management Sciences (INFORMS)

Military Operations Research Society (MORS)

International Society of Bayesian Analysts (ISBA)

Army Functional Area 49 (FA49) Advisory Committee