

CURRICULUM VITAE – KATHRYN BLACKMOND LASKEY

1. Academic Degrees

PhD Department of Statistics and School of Urban and Public Affairs
Carnegie Mellon University
1985

Dissertation Director: Professor Emeritus Joseph B. Kadane
Dissertation Title: Bayesian Models of Strategic Interaction

MS Department of Mathematics
University of Michigan
1978

Passed PhD qualifiers and elected not to pursue PhD in theoretical mathematics.

BS Department of Mathematics
University of Pittsburgh
1976

Graduated *Summa Cum Laude*

2. Academic Positions

2.1 Positions

George Mason University, Fairfax, VA (1990 – present) – Professor of Systems Engineering and Operations Research. Associate Director of Center of Excellence in Command, Control, Communications, Computing and Intelligence (C⁴I Center). Received tenure in 1994. Teach undergraduate and graduate core courses and elective courses. Perform research in decision theory, computational probabilistic knowledge representation and reasoning, multi-source fusion, Bayesian learning, and decision support.

2.2 University Service Positions and Activities

George Mason University

- Faculty advisor for student section of International Council of Systems Engineering (INCOSE), Fall 2004 – present.
- Faculty counselor, Society of Women Engineers student section, 1993-2001.
- Member, Information Technology subcommittee of SACS Reaccreditation Committee, Academic year 1999-2000
- Mentor, George Mason University Office of Minority Student Affairs faculty/student mentoring program, 1992-2001.

Volgenau School of Engineering

- Associate Director, Center of Excellence in Command, Control, Communications, Computing and Intelligence (C⁴I Center), Fall 2005 – present.
- Member, SEOR chair reappointment committee, 2009.
- Member, Undergraduate Curriculum Committee, 1992-93, 1998-2007.
- Member, Graduate Curriculum Committee, 1995-1997.
- Member, SITE Initiatives Committee, 1994-1995.

Department of Systems Engineering and Operations Research

- Chair, SEOR Department Undergraduate Recruiting Committee, 2007 – present.
- Member, SEOR Department Undergraduate Curriculum Committee, 1998-present.
- Interim Chair, Department of Systems Engineering, Spring/Summer 1998
- Acting chair, Department of Systems Engineering, summer 1993.
- Member of SEOR faculty search committee, 1998-99; 2004-05; 2010-11, 2011-12.

2.3 Courses Taught

SYST 210 (formerly SYST 301): Systems Design. This is one of the core courses in the BSSE curriculum. It introduces students to the system lifecycle, the design activities that occur at each stage in the lifecycle, and model-based systems engineering software to support system lifecycle engineering. Students do a semester-long team project, produce a professional system design document, and give oral presentations. I have taught this class each fall semester since the fall semester of 2001.

SYST 201: Systems Modeling 1 (now SYST 220: Dynamical Systems I). This is the first of two courses in dynamical systems modeling for the BSSE program. I taught this course in Fall semester 1998 and 1999.

SYST 202: Systems Modeling 2 (now SYST 320: Dynamical Systems II): This is the second of two courses in dynamical systems modeling for the BSSE program. I taught this course in Fall semester 1998 and 1999.

SYST 490/495: Senior Design Project. This two-semester sequence is the capstone project for the BSSE program. I taught this course in the 1996-97 academic year. I also taught an individualized section in the 2000-01 academic year for a student with a disability that prevented participation in the intense group interactions of the standard section.

SYST 563: Empirical Methods in Systems Engineering (now Research Methods in Systems Engineering and Information Technology). This course develops understanding of scientific process, use of empirical evidence to support and refute scientific hypotheses, and use of scientific information in decision-making. Students do an empirical research project. I taught this course in Spring 1998.

SYST/STAT 664: Bayesian Inference and Decision Theory. I developed this course as one of the basic methods courses in the Systems Engineering program. The course has subsequently been cross-listed by the Statistics department. The course teaches Bayesian inference and basic concepts in Bayesian decision theory. I developed this course and taught it for the first time in Spring 1993. In subsequent years, Bayesian methods have become increasingly popular and new modeling and inference techniques have become widely used. In response to these developments, I have updated the course to include new material on hierarchical Bayesian modeling and Markov Chain Monte Carlo inference. I taught this course in Spring 1993, Spring 1994, Spring 1995, Spring 1996, Spring 1999, Spring 2001, Spring 2003, Spring 2006, Spring 2007, Spring 2009 and Spring 2011.

OR/STAT 719 / CSI 775 (formerly INFT 819): Computational Models of Probabilistic Inference. As theory and computing technology have matured, there has been an explosion of research interest in the use of probability models in automated reasoning. I developed this course to bring this research into the graduate curriculum at George Mason University. I have updated this course each year to keep up with the rapidly expanding literature in computational probabilistic reasoning. I taught the course in

Fall 1993, Fall 1995, Fall 1997, Spring 2000, Fall 2001, Spring 2002, Fall 2003, Fall 2005, and Spring 2008, Spring 2012.

SYST 542 (formerly SYST 642; UG version taught once as SYST 442): Decision Support Systems Engineering. Decision support plays an increasingly important role in modern organizations. The Systems Engineering department charged me with developing an engineering oriented course on the design and development of decision support systems. I taught this course in Fall 1991, Fall 1992, Fall 1993, Fall 1994, Spring 2001, Spring 2003, Spring 2004, and Fall 2006.

SYST 613 (now SYST 530): Systems Engineering Management. This course was introduced as a core SE course in the spring of 1993, taught by Bernard White. I was asked to teach this course in the spring of 1994 as a team with Drs. Buede and deMonsabert. I was responsible for about 50% of the classes.

OR 750: Topics in Operations Research: Logical Foundations of Knowledge Interchange. I taught this as a summer special topics course for a group of PhD students in Summer 2009.

SYST 798/OR 680: Systems Engineering / Operations Research Project Course. This is the capstone project course for MSSE / MSOR programs. The purpose of the course is to complete a major applied team project resulting in an acceptable technical report and oral briefing. Each project is required to have a sponsor. Sponsors attend the final briefing and provide inputs to the students' grades. I taught this course in Spring 2007, 2008, 2010, 2011 and 2012.

2.5 Students Supervised

PhD Dissertation Supervision (completed)

Name: Rommel Novaes Carvalho
Program: SEOR
Title: Probabilistic Ontology: Representation and Modeling Methodology
Status: Completed Summer 2011

Name: James H. Jones
Program: CSI
Title: Probabilistic Reasoning for Post-Intrusion Assessment of Potentially Compromised Computer Systems
Status: Completed Fall 2008 (co-director with Dr. James Gentle; SCS)

Name: Jee Vang
Program: CSI
Title: Use of Human Cognition of Causality to Orient Arcs in Structural Learning of Bayesian Networks
Status: Completed Fall 2008 (co-director with Dr. Farokh Alemi; SCS)

Name: Pamela Hoyt
Program: IT
Title: Discretization and Learning of Bayesian Networks using Stochastic Search, with Application to Base Realignment and Closure (BRAC)
Status: Completed Spring 2008

Name: Ning Xu
Program: IT
Title: Estimation of Delay Propagation in the National Airspace System
Status: Completed Fall 2007 (co-director with Dr. C.H. Chen)

Name: Paulo Costa
Program: IT
Title: Bayesian Semantics for the Semantic Web
Status: Completed Summer 2005

Name: Ghazi Alghamdi
Program: IT
Title: Dynamic Bayesian Networks Framework to Model Insider User Threats
Status: Completed Summer 2005

Name: David Brown
Program: IT
Title: A Comparison of Equation-Based Modeling with Bayesian Network Modeling for Engineering Applications
Status: Completed Spring 2004

Name: W. Forrest Crain
Program: IT
Title: Multiattribute Weight Determination: Elicitation and Approximation
Status: Completed Spring 2003

Name: Ed Wright
Program: IT
Title: Understanding and Managing Uncertainty in Geospatial Data for Tactical Decision Aids
Status: Completed Summer 2002 (co-director with Dan Carr; SCS)

Name: Suzanne Mahoney
Program: IT
Title: Network Fragments
Status: Completed Spring 1999

Name: James Myers
Program: IT
Title: Learning Bayesian Networks with Incomplete Data
Status: Completed Spring 1999

PhD Dissertation Supervision (ongoing)

Name: Walter Powell
Program: IT
Title: Evaluating the Impact of Geospatial Decision Support Systems on Military Decision-Making
Status: IT Candidate; expected completion Fall 2012

Name: Michael Lehocky
Program: SEOR
Title: TBD
Status: IT Passed comprehensive exam; currently working on proposal

Name: Richard Haberlin
Program: SEOR
Title: TBD
Status: Comprehensive exams to be taken Fall 2012

Name: Cheol Young Park
Program: IT
Title: TBD
Status: Finishing courses Spring 2012

Name: Shou Matsumoto
Program: SEOR
Title: TBD
Status: Started Fall 2011

Service on Doctoral Committees:

Completed: Philip Barry, Mark Brantley, William Bunting, Ray Curts, Larry Daily (psychology), David Lee, Dan Maxwell, Cliff Nelson, Jose Nieves, Walter Perry, Wei Sun, Pu Wang
Ongoing: Khalid Albarrak, James Andary, Stephen Biemer, Thomas Massie, Grayson Morgan

Masters Thesis and Project Supervision

Service on Masters Committees:

Completed: Paulo Costa, Susan Ficklin, Alexander Kit; Mehul Revankar (CpE), A. R. Miller

MS Supervision:

Completed: Stephen Cannon

Note: In recent years, SEOR has discouraged MS theses in favor of MS projects. I have supervised numerous individual MS projects in past years; in recent years, MS students have been strongly encouraged to take the MS project course and do group projects.

3. Industrial and Consulting Positions

3.1 Industrial Positions

Decision Science Consortium, Inc., Reston, Virginia (1985-1991) - Principal Scientist. Managed several projects to develop decision and inference support systems for command, control and intelligence applications. Developed innovative inference architecture combining numerical and assumption-based approaches to uncertainty management. Provided statistical support for a number of projects, including experimental studies of human decision processes, and a major national survey of pesticide contamination in well water.

3.2 Consulting Positions

First DataBank, Inc., San Francisco, CA (summer and fall, 2009) – Provided independent evaluation of mathematical and statistical basis of algorithms for assessing combined risk of multiple medications taken simultaneously. These algorithms form the basis of the PharmaSURVEYOR system, a web-enabled application that assesses risks of adverse effects of combinations of drugs taken by a patient.

Information Extraction and Transport, Inc., Rosslyn, Virginia (1999 – 2006) – Research Fellow and consultant. Consult on applications of computational probabilistic reasoning on a variety of defense and intelligence problems. Assist in development of demonstration systems for military situation awareness, information security, and multi-source fusion. Present lectures on computational probabilistic reasoning.

Lockheed Martin Corporation, Fairfax, VA (summer, 2007) – Consultant on probabilistic aspects of multi-INT semantic information fusion. Provided advice and consultation on semantic technologies and their use in combining multiple sources of intelligence data to solve relevant intelligence problems. Developed probabilistic component of a demonstration supporting the use of these technologies in the intelligence community. Consulted on development of roadmap for future research.

4. Professional Service, Boards, Committees and Public Service

4.1 Journals

Member, editorial board of *Journal of Artificial Intelligence Research*, 2007 – 2010.

Associate editor, *IEEE Transactions on Systems, Man, and Cybernetics*, 1994-1999.

Co-editor, Special issue of *International Journal of Approximate Reasoning*, Bayesian Model Views, 2010.

Co-editor, Special issue of *Journal of Machine Learning Research*, Fusion of Domain Knowledge and Observations, 2003.

Co-editor, Special issue of *Minds and Machines*, Simple Heuristics versus Complex Decision Rules, 2000.

Co-editor, Special Issue of *IEEE Transactions on Systems, Man and Cybernetics*, "Issues in Higher-Order Uncertainty, 1994.

Reviewer for academic journals, including:

Annals of Mathematics in Artificial Intelligence
Artificial Intelligence
Journal of Artificial Intelligence Research
IEEE Transactions on Systems, Man and Cybernetics
International Journal of Approximate Reasoning
Journal of the American Statistical Association
Journal of Intelligent Information Systems
Management Science
Naval Research Logistics Quarterly
Operations Research
Systems Engineering

4.2 Conferences, Workshops, and Committees

Co-Chair, World Wide Web Consortium Experimental Group, March 2006 – March 2007.

Participant, Dagstuhl Seminar: Probabilistic, Logical and Relational Learning - A Further Synthesis, March, 2007.¹

Invited speaker, Dagstuhl Seminar: Plan Recognition, April, 2011.¹

¹ Dagstuhl seminars are week-long seminars in which researchers of international standing are invited to discuss a topic.
<http://www.dagstuhl.de/en/program/dagstuhl-seminars/>

Workshop on Uncertainty Reasoning for the Semantic Web, International Semantic Web Conference. Co-Chair: 2005, 2006; member of program committee, 2007, 2008, 2009, 2010, 2011, 2012.

Member, Advisory Board, *Girls Exploring Engineering* program, Chantilly Academy, Fairfax County Public Schools, 2007-2010.

Member, *Panel to Study Modeling and Simulation Capability for Defense Transformation*, National Academy of Sciences, October 2004 – December, 2006.

Bayesian Modeling Applications Workshop, Conference on Uncertainty in Artificial Intelligence. Co-chair: 2007; Member of Program Committee: 2003, 2004, 2005, 2006, 2008, 2009, 2011.

Workshop on Data-Driven Decision Guidance and Support Systems, IEEE Conference on Data Engineering. Co-chair: 2012; proposed repeat workshop 2012.

AAAI Fall Symposium on Machine Aggregation of Human Forecasts (MAGG 2012), Fall 2012.

Member, *Committee on Applied and Theoretical Statistics*, National Academy of Sciences, 2005 – 2008.

Member, *Board of Mathematical Sciences and their Applications*, National Academy of Sciences, 2002 – 2005.

Member, *Panel on Evaluating the Statistical Validity of Polygraphs*, Committee on the Behavioral and Social Sciences, National Academy of Sciences, January 2001-July, 2002.

General Chair, *Conference on Uncertainty in Artificial Intelligence*, Stanford, CA, 2000.

Program Chair, *Conference on Uncertainty in Artificial Intelligence*, Stockholm, Sweden, 1999.

Co-organizer, *Workshop on Neurostatistics for Cell Assemblies*, Breckenridge, CO, 1997.

Co-organizer, *Workshop on Simple Heuristics versus Complex Decision Machines*, *Neural Information Processing Society Conference*, Breckenridge, CO, 1998.

Member, *Panel on Statistical Methods for Testing and Evaluating Defense Systems*, Committee on National Statistics, National Academy of Sciences, 1994-97.

Instructor, *Summer Institute on Probability in Artificial Intelligence*, Oregon State University, July, 1994 (summer institute sponsored by Air Force Office of Scientific Research).

Member of Program Committee, *Conference on Uncertainty in Artificial Intelligence*, 1994-present (senior program committee 2011, 2012); *Florida Artificial Intelligence Research Symposium*, 1996, 1997; *AAAI*, 2004-present (senior program committee 2006, 2011)

Organizer, *Workshop on Foundations of Probabilistic Reasoning*, George Mason University, July 1993.

Member of organizing committee, *Normative Systems Workshop*, University of Southern California, March 1993.

Discussant, *Workshop on Statistical Issues in Defense Analysis and Testing*, Committee on National Statistics, National Academy of Sciences, September 1992.

Member of Panel to Evaluate Studies in Bilingual Education, Committee on National Statistics, National Academy of Sciences, 1991. Contributing author to Meyer, M. and Fienberg, S.E. (eds), *Assessing Evaluation Studies: The Case of Bilingual Education Studies*, Washington, D.C.: National Academy Press, 1992.

4.3 Short Courses and Tutorials

Conference on Semantic Technology in Defense, Intelligence and Security, Tutorial on Probability and Logic: Bayesian Semantics, November 2011.

Military Operations Research Society, Tutorial on Bayesian Networks, April 2010.

SPARTA Corporation, Rosslyn, Virginia – Short course on computational Bayesian reasoning, Spring, 2002.

Conference on Uncertainty in Artificial Intelligence, Tutorial on Knowledge Engineering for Bayesian Networks, 1996, 1999.

4.4 Professional Society Memberships

- American Statistical Association
 - Secretary/Treasurer of Section, Bayesian Statistical Science (1994-1997)
 - Council of Sections representative, Section on Bayesian Statistical Science (Aug., 1992 - Dec., 1994)
- American Association for Artificial Intelligence
- American Society for Engineering Education
- Institute of Electrical and Electronics Engineers
- Institute for Operations Research and Management Science
- Military Operations Research Society
- International Council of Systems Engineering

- Society of Women Engineers
- International Council on Systems Engineering
 - Currently a candidate for Secretary of the Washington Metropolitan Area Chapter

4.5 Other Professional Service

- External examiner for doctoral dissertation of Charles Fox, *An Entangled Bayesian Gestalt: Mean-field, Monte-Carlo and Quantum Inference in Hierarchical Perception*, PhD dissertation, Department of Engineering Science, University of Oxford, UK, 2008. Nominated for 2009 BCS Best Dissertations Award.
- Opponent for doctoral dissertation examination of Anders Dahlbom, *Petri nets for Situation Recognition*, PhD dissertation, Department of Computer Science, University of Skövde, Sweden, February, 2011.
- Outside reviewer for promotion and tenure cases at University of Kentucky (2005) and Mississippi State University (2011).
- Outside reviewer for candidates for faculty position at University of Skövde, Sweden (2011).
- Member of Level 1 Tenure Review Committee, Department of Computational Social Science, George Mason University (2011).
- Outside evaluator for promotion case of Research Fellow at University of Edinburgh, UK (2011)

5. Honors, Awards and Professional Recognition

Best paper awards:

Twardy, C., Askvig, J., Levitt, T. and Laskey, K. Threat Attribution Classifier. Presented at the 78th Military Operations Research Society Symposium, June 2010, 30 pages.

- Received Best Paper Award, Modeling and Simulation Track
- Nominated for Barchi Best Paper Prize (overall conference best paper)

Costa, P., Laskey, K.B., Chang, KC, PROGNOS: Applying Probabilistic Ontologies to Distributed Predictive Situation Assessment in Naval Operations, *Proceedings of the Twelfth International Conference on Information Fusion*, July 2009, 11 pages.

- Received Best paper award for the Collaborative Technologies for Network-Centric Operations Track

Advisor to student winning best student paper awards:

Wang, P. Laskey, K.B., Domeniconi, C., and Jordan, M.M. Nonparametric Bayesian Co-clustering Ensembles, in Proceedings of the SIAM International Conference on Data Mining, Mesa, Arizona, April 28-30, 2011, pp. 331-342.

- Received Best Student Paper award.

Costa, P (student author), Laskey, K.B., Fung, F., Pool, M., Takikawa, M. and Wright, E. MEBN Logic: A Key Enabler for Network Centric Warfare. *Proceedings of the 10th Annual Command and Control Research and Technology Symposium*, 2005, 17 pages.

- Received Best Student Paper award, Modeling and Simulation Track
- Honorable Mention for Best Student Paper

AlGhamdi, G. (student author), Laskey, K.B., Wright, E., Barbara, D., and Chang, K.C. Modeling Insider Behavior Using Multi-Entity Bayesian Networks. *Proceedings of the 10th Annual Command and Control Research and Technology Symposium*, 2005, 22 pages.

- Received Best Student Paper award, Information Security and Assurance Track
- Honorable Mention for Best Student Paper

Laskey, G. (student author – no relation to K.B. Laskey) and Laskey, K.B., *Combat Identification with Bayesian Networks*, *Proceedings of the 7th International Command and Control Research and Technology Symposium*, Spring 2002, 13 pages.

- Received Best Student Paper award, Modeling and Simulation Track
- Honorable Mention for Best Student Paper

Other Professional Recognition:

Keynote address and mini-course, XIV Defense Operational Applications Symposium (XIV SIGE), Jao Jose dos Campos, Brazil, September 2012.

Invited speaker, Dagstuhl Seminar on Plan Recognition, April, 2011. This Dagstuhl seminar brought together personally invited scientists from all over the world to discuss their newest ideas and research on plan recognition. I was invited to give a presentation on Bayesian methods for plan recognition.

Keynote address, Probabilistic Ontologies for High-Level Fusion in a Net-Centric Environment, Skövde Workshop on Information Fusion Topics (SWIFT), October 2009.

Invited participant, Dagstuhl Seminar on Probabilistic, Logical and Relational Learning, April, 2007. This Dagstuhl seminar brought together personally invited scientists from all over the world to discuss their newest ideas and research on probabilistic, logical and relational learning.

Career Development Fellow, Krasnow Institute, George Mason University. The Krasnow Institute is an endowed institute of advanced study, founded in 1993, at George Mason University. Its mission is to form a focus for interdisciplinary study of the cognitive sciences. I was appointed for a 3-year fellowship beginning 1994-1996.

Awards received as student:

*Student Paper Prize, awarded by Decision Analysis Special Interest Group, Operations Research Society of America, 1986, for the paper, *An Experimental Study of Multiattribute Utility Judgments.**

Student of the Year, awarded by Pittsburgh chapter of American Statistical Association, 1972.

6. Research

6.1 Grant and Contract Awards

The table below summarizes grants and contracts in which I have participated since coming to George Mason University in 1990. I have been PI or co-PI on all but one of these awards. I have given the same top-level number to projects associated with a single line of work for a single sponsor (e.g., 5a, 5b and 5c all refer to counter-IED research performed for JIEDDO funded under different contract vehicles). The projects represent over \$14M of funded research, of which the portion for which I was/am responsible totals \$4.9M.

#	Project Title	Sponsor	Dates	PI(s)
1	Decomposition-Based Information Elicitation and Aggregation	IARPA	2011-2015	Twardy/Laskey
2	Mathematical Fundamentals of Probabilistic Semantics for High-level Fusion	ARO	2011-2013	Costa/Laskey
3	Translation of Mission Directives to Behaviors Including Thresholds in Autonomous Undersea Search Sensor Elements of Distributing Sensing Systems	Navy/DH W	2010-2011	Costa/Laskey
4	Predictive Situation Assessment with Multi-Entity Probabilistic Ontologies	ONR	2008-2011	Laskey/Chang
5a	Counter Improvised Explosive Device (IED) Research	JIEDDO/ONR	2008-2011	Laskey/Loerch
5b	Counter IED Research for Joint IED Defeat Organization	JIEDDO/IT	2008-2011	Laskey/Loerch
5c	Modeling and Analysis of the IED Threat	JIEDDO/TEC	2007-2008	Laskey/Loerch
6	GK-12 SUNRISE: Schools, University 'N' (and) Resources In the Sciences and Engineering-A NSF/GMU GK-12 Fellows Project	NSF	2007-2012	Ganesan & several coPIs
7	Project Quicklook	AERO	2007	Laskey
8	Evaluation of Advanced Automated Geospatial Tools: Joint Geospatial Intelligence Services (Task 2)	TEC	2006-2010	Adelman/Laskey
9	Predicate Logic Based Assembly of Situation-Specific Models for Battlespace C2 Assistance (PLASMA)	ONR/IET	2004-2005	Laskey
10	Modeling the Insider Threat	ARDA/IET	2006-2011	Laskey
11a	Advanced Systems Support	MDA/SPARTA	2003-2005	Laskey/Chang
11b	Advanced Systems Support	MDA/SPARTA	2002-2003	Laskey/Chang
11c	Advanced Algorithms for Missile Defense	MIT/LL	2003-2004	Laskey
12a	Multivariate Models for Manpower, Personnel and Training	ONR/IET	2001-2003	Laskey
12b	Multivariate Models for Manpower, Personnel and Training	ONR/IET	1999-2000	Laskey

13	Agile Modeling for Dynamic Multi-User Information Fusion	DARPA/IE T	1997-1999	Laskey
14	Knowledge Elicitation for Bayesian Models of Information Fusion	TEC/IET	1993-1997	Laskey
15a	Intelligent Tutoring Games for Interest-Based Learning	NSF/RDC	1992	Laskey
15b	Intelligent Tutoring Games for Interest-Based Learning	CIT match	1992	Laskey
15b	Intelligent Tutoring Games for Interest-Based Learning	NSF/RDC	1993-1995	Laskey
15b	Intelligent Tutoring Games for Interest-Based Learning	CIT match	1993-1995	Laskey
16	Application of Plausibility Networks to Evaluate Enemy Intentions on the Battlefield	Thomson-CSF	1992-1993	Laskey
17	Bayesian Decision Theory for Safety Analysis	NIST	1992-1993	Lehner/Laskey
18a	A Software Architecture for Developing Aggregate Intelligence Summaries	DARPA/M R]	1992	Laskey
18b	A Software Architecture for Developing Aggregate Intelligence Summaries	CIT match	1992	Laskey
19	Modular Fusion Testbed	Army	1991-1995	Stewart

Detailed descriptions of these research projects are provided below.

#1

Title: Decomposition-Based Information Elicitation and Aggregation

Sponsor: IARPA

Duration: May, 2011 – May, 2015

Principal Investigators: Charles Twardy (PI); Kathryn Laskey (co-PI)

Summary: This project combines several promising approaches to improve calibration and accuracy in intelligence forecasting by more than 50% over naive, unweighted opinion pools. (1) New structured elicitation techniques will reduce overconfidence by a substantial margin and will improve accuracy by removing language-based misunderstandings. (2) Combinatorial markets will allow analysts to adjust relevant conditional probabilities. (3) Event decomposition will allow experts to focus on causal factors, improving estimates of new variables. (4) Bayesian networks will represent the decomposed model and enable inference in the combinatorial market. (5) Performance assessment will provide a means to identify clusters, factors, and statistical models by which to weight judgments and improve aggregate estimates. The research will apply these protocols across a range of real, operational conditions, and demonstrate the gains in accuracy and calibration.

#2

Title: Mathematical Fundamentals of Probabilistic Semantics for High-level Fusion

Sponsor: Army Research Office

Duration: May 2011 – May 2013

Principal Investigators: Paulo Costa (PI); Kathryn Laskey (co-PI)

Summary: Mason will conduct an in-depth analysis of requirements for and major approaches to knowledge representation and reasoning with uncertainty. The research will focus on (a) establishing features required of any quantitative uncertainty representation for exchanging soft and hard information in a net-centric environment; (b) developing a set of use cases involving information exchange and fusion requiring sophisticated reasoning and inference under uncertainty; (c) defining evaluation criteria supporting an unbiased comparison among different approaches applied to the use cases; and (d) examining in detail how two popular formalisms, Bayesian and Dempster-Shafer belief functions, address the requirements in the context of the use cases. Our examination will address both capabilities of current implementations and research needs. The proposed research aims to establish a commonly agreed understanding of the fundamental aspects of uncertainty representation and reasoning that a theory of hard and soft high-level fusion must encompass. Successful completion involves an unbiased, in-depth analysis of the above-mentioned enabling technologies, and a formalization of the above-mentioned fundamental principles.

#3

Title: Collaborative Anti-Submarine Warfare (ASW) Threat Assessment

Sponsor: Daniel H. Wagner Associates, Inc / Navy (DoD).

Duration: November 2010 – October 2011

Principal Investigators: Paulo Costa (PI); Kathryn Laskey (co-PI)

Summary: This is a Phase I Small Business Innovative Research (SBIR) project. The objective is to develop an ASW Threat Prioritization System (ATPS) capable of (1) prioritizing targets based on threat potential, both via direct and indirect classification evidence, and (2) reducing the time to make threat contact engagement decisions. It will require the joint application of three levels of fusion (I. contact association, II. situational assessment, III. threat assessment) in a single adaptive framework, where an uncertain contact picture at the entity level can be refined by relational inferencing across all fusion levels simultaneously. GMU will support Daniel H. Wagner Associates by applying its expertise in the fields of Multi-Entity Bayesian Networks, Probabilistic Ontologies, and Multi-Sensor Data Fusion, to develop algorithms and methods of fusing information from traditional and non-traditional sources to form a coherent picture of the situation, and to support plausible reasoning for threat assessment.

#4

Title: Predictive Situation Assessment with Multi-Entity Probabilistic Ontologies

Sponsor: Naval Research Laboratory / Office of Naval Research.

Duration: November 2008 – October 2011

Principal Investigators: KC Chang, Kathryn Laskey

Summary: The objective of this project is to design and develop PROGNOS, a naval predictive situation awareness system intended to work within the context of U.S. Navy's FORCENet. PROGNOS employs probabilistic ontologies in a distributed system architecture as a means to provide semantic interoperability within an intrinsically complex and uncertain environment. PROGNOS will respond to queries from decision makers using distributed, loosely coupled information systems to feed a Bayesian reasoning process. This process must be optimized for both interoperability and operational performance. The research aims to provide consistent higher-level fusion through state-of-the-art knowledge representation and reasoning, as well as to enable predictive analysis with principled hypothesis management.

#5a

Title: Counter Improvised Explosive Device (IED) Research

Sponsor: Joint IED Defeat Organization / Office of Naval Research.

Duration: September 2008 – September 2011

Principal Investigators: Kathryn Laskey, Andrew Loerch

Summary: This project supports the Joint IED Defeat Organization (JIEDDO) on modeling, analyzing, predicting, and developing counter-measures to the IED threat. Specific research objectives include: statistical analyses of interactions between coalition forces and IED emplacement; value models of IED threat groups; causal models relating coalition force behavior, threat behavior, and the environment; and social complexity, agent-based modeling of the IED phenomena. This contract funds a continuation of research funded under the 2007-2008 contract described below.

#5b

Title: Counter IED Research for Joint IED Defeat Organization

Sponsor: Joint IED Defeat Organization / ITT.

Duration: September 2008 – September 2011

Principal Investigators: Kathryn Laskey, Andrew Loerch

Summary: This project supports the Joint IED Defeat Organization (JIEDDO) on modeling, analyzing, predicting, and developing counter-measures to the IED threat. Specific research objectives include: statistical analyses of interactions between coalition forces and IED emplacement; value models of IED threat groups; causal models relating coalition force behavior, threat behavior, and the environment; and social complexity, agent-based modeling of the IED phenomena. This contract funds a continuation of research funded under the 2007-2008 contract described below. This contract provides the capability to perform Top-Secret research.

#5c

Title: Modeling and Analysis of the IED Threat

Sponsor: Joint IED Defeat Organization / U.S. Army Topographic Engineering Center.

Duration: September 2007 - 2008

Principal Investigators: Kathryn Laskey, Andrew Loerch, Kenneth Hintz

Summary: This project supports the Joint IED Defeat Organization (JIEDDO) on modeling, analyzing, predicting, and developing counter-measures to the IED threat. Specific research objectives include: statistical analyses of interactions between

coalition forces and IED emplacement; value models of IED threat groups; causal models relating coalition force behavior, threat behavior, and the environment; and social complexity, agent-based modeling of the IED phenomena. This

#6

Title: GK-12 SUNRISE: Schools, University 'N' (and) Resources In the Sciences and Engineering-A NSF/GMU GK-12 Fellows Project

Sponsor: National Science Foundation

Duration: July 2007-June 2012

Principal Investigators (GMU): PI: Rajesh Ganesan, Systems Engineering and Operations Research (SEOR), co-PI: Dr. Kathryn B. Laskey, SEOR; co-PI: Dr. Donna Sterling, Director of CREST, College of Education and Human Development; co-PI: Dr. Robert Sachs, Dept of Mathematics

Summary: SUNRISE is a GK-12 project led by Dr. Rajesh Ganesan of SEOR. The project is aimed at partnering STEM graduate students ("Fellows") with school teachers from three different school divisions. The objective is to build a unique model of collaboration among elementary and middle schools, school division administration, and GMU to foster systemic efforts in implementing Information Technology (IT) rich STEM content-knowledge into G4-6 education by graduate Fellows, with the potential to fundamentally change the delivery of science instruction and long term professional development of science teachers. This would be supported by science topics from contemporary areas such as GPS, nanotechnology, and oceanography which would be brought into classroom via lessons with hands-on experiments. The innovative aspect of the project is the IT theme that matches the employment demography of the Northern Virginia region, which will eventually absorb a large portion of the K-12 students participating in this project. The project draws heavily on the experiences of GMU's faculty, school administration, and teachers to mentor the Fellows in creating a strong Fellow-teacher partnership, through which the Fellows will be able to successfully bring their research and STEM content knowledge into classrooms. I served for the first two years of the project in an advisory role.

#7

Title: Project Quicklook

Sponsor: The Aerospace Corporation

Duration: October 2011-January 2012

Principal Investigator: Kathryn Laskey

Summary: This contract provided funds to the SEOR Department for a group of students in the SEOR capstone project course, who evaluated SysML as a modeling language for systems engineering design. The students did the project in 2007; administratively, contract date is 2011.

#8

Title: Evaluation of Advanced Automated Geospatial Tools: Joint Geospatial Intelligence Services

Sponsor: U.S. Army Topographic Engineering Center.

Duration: November 2006 - present

Principal Investigator (GMU): Michael Hieb; Task 2 PIs: Kathryn Laskey and Len Adelman

Summary: The objective of this project is to conduct empirical research to assess the value added of geospatial tools to military decision-making. The tools are being developed by the U.S. Army's Topographic Engineering Center to support soldiers' understanding and utilization of terrain and weather information. The experiments and formative evaluations use active-duty military personnel and problem scenarios representative of actual planning environments.

#9

Title: Predicate Logic Based Assembly of Situation-Specific Models for Battlespace C2 Assistance (PLASMA)

Sponsor: ONR / Subcontract to IET, Inc.

Duration: July 2004 - January 2005

Principal Investigator (GMU): Kathryn Laskey

Summary: This Small Business Technology Transfer project, funded by the Office of Naval Research, employed a hybrid logical/probabilistic reasoning system to fuse incoming information from disparate sources, construct candidate models of a situation, generate task-relevant hypotheses to explain the evidence, evaluate the hypotheses against relevant information, and prioritize additional information collection needs.

#10

Title: Modeling the Insider Threat

Sponsor: ARDA / Subcontract to IET, Inc.

Duration: August 2003 - July 2005

Principal Investigators (GMU): Kathryn Laskey, Daniel Barbara

Summary: ARDA's Advanced Countermeasures for Insider Threat (ACIT) program is a research program with the objective of detecting and responding to insider threats in information systems. GMU's work was directed at two of the ACIT objectives, trustworthy document control and modeling the insider. GMU provided models and software modules in support of a prototype system that employed a distributed network of dynamically generated document-centric intelligent agents to provide trustworthy document control. The intelligent agents used a probabilistic ontology to represent insider behavior, reason about the intentions of system users, and issue alerts when suspicious behavior raised the likelihood of untrustworthy intentions above a threshold. The system used automated data collection and data mining of the operational environment to continually learn and update the system's assessment of user intentions. Three systems (the insider behavior model, the document relevance sniffer, and the Glass Box user action capture system, interoperated by means of ontologies, only one of which was a probabilistic ontology.

#11a, b

Title: Advanced Systems Support

Sponsor: Missile Defense Agency / Subcontract to SPARTA, Inc.

Duration: February, 2002 – May, 2003 / June 2003 – November 2005

Principal Investigators (GMU): Kathryn Laskey, K.C. Chang

Summary: Project Hercules is a basic research program sponsored by Missile Defense Agency (MDA). The focus is on identifying critical technical issues and providing technical supports and recommendations for real time target

discrimination. One of the research focuses for GMU team is to develop efficient inference techniques for hybrid Dynamic Bayesian networks (DBN) with static and dynamic discrete and continuous random variables.

#11c

Title: Advanced Algorithms for Missile Defense

Sponsor: MIT Lincoln Labs

Duration: August, 2006 / August 2008 – November 2005

Principal Investigator: Kathryn Laskey

Summary: Project Hercules is a basic research program sponsored by Missile Defense Agency (MDA). The focus is on identifying critical technical issues and providing technical supports and recommendations for real time target discrimination. This project supported a George Mason University graduate student for his MSSE work related to algorithms in support of Project Hercules.

#12a,b

Title: Multivariate Models for Manpower, Personnel and Training

Sponsor: Office of Naval Research / Subcontract to IET, Inc.

Duration: June, 1999 – January, 2001 / February, 2002

Principal Investigator (GMU): Kathryn Laskey

Summary: The objective of this project was to demonstrate the feasibility of automatically generating a Navy personnel model from raw data. To achieve this objective, our approach was to develop Bayesian network models for personnel attrition using a combination of literature review to identify appropriate variables and conditional probability distributions, and by using an automatic learning program and a set of raw data on relevant variables.

#13

Title: Agile Modeling for Dynamic Multi-User Information Fusion

Sponsor: DARPA / Subcontract to IET, Inc.

Duration: September, 1997 - December, 1999

Principal Investigator (GMU): Kathryn Laskey

Summary: DARPA's Dynamic Multi-User Information Fusion (DMIF) program developed agile modeling methodology for rapid adaptation to rapidly changing battlefield situations. GMU provided methodological support and algorithm development. Tasks included developing algorithms for distributed belief updating; knowledge representations and data management strategies for distributed representation of knowledge as network fragments; algorithms for constructing problem-specific belief networks from a distributed model fragment database; generic knowledge structures for inferring object existence and type from sensor reports; and a library of network fragments for use in demonstrating agile modeling concepts. GMU provided an example scenario that used a knowledge base of network fragments to construct a situation-specific model to adapt rapidly to a changing situation.

#14

Title: Knowledge Elicitation for Bayesian Models of Information Fusion

Sponsor: U.S. Army Engineering Topographic Center / Subcontract to IET, Inc.

Duration: November, 1993 - August, 1997

Principal Investigator (GMU): Kathryn Laskey

Summary: This project provided technical support to the design of the Intelligence Correlator for the Warbreaker Program, a major initiative of the Advanced Research Projects Agency (ARPA). IET, Inc., the prime contractor, is responsible for design of the Intelligence Correlator. GMU has two major responsibilities, knowledge elicitation and development of software tools to support knowledge elicitation. I am principal investigator and a major technical contributor to this project. I conduct knowledge elicitation sessions with domain analysts, collaborate with IET personnel and a GMU graduate student to build representations of the elicited knowledge, and supervise a GMU graduate student and a programmer on the development of software tools.

#15a-d

Title: Intelligent Tutoring Games for Interest-Based Learning

Sponsor: National Science Foundation (SBIR)
Matching funds from Virginia Center for Innovative Technology

Duration: February, 1992 - September, 1992 (Phase I)
January, 1993 - September, 1995 (Phase II)

Principal Investigator (GMU): Kathryn Laskey

Summary: This project implemented a commercial computer game that teaches secondary students how to apply statistical methods to scientific problem solving. This was a Small Business Innovative Research (SBIR) project for the National Science Foundation. During Phase I we developed an initial game design and implemented a storyboard prototype. I was a major contributor to the initial game design and the pedagogical approach. I developed an initial curriculum for the game. I designed and implemented the storyboard prototype in a storyboard language developed by prime contractor RDC. I wrote major portions of the Phase I proposal, the final report, and the Phase II proposal. In Phase II, Mason's major responsibilities were to provide statistical consultation for curriculum development, perform ongoing evaluation of the system design and prototypes, and assist in curriculum development. I provided statistical consultation and supervised two graduate students who worked on the evaluation and curriculum development tasks.

#16

Title: Application of Plausibility Networks to Evaluate Enemy Intentions on the Battlefield

Sponsor: Thomson-CSF, Inc.

Duration: October, 1992 - July, 1993

Principal Investigator: Kathryn Laskey

Summary: This project had two major objectives: development of a general purpose, workstation based software system for inference using Bayesian networks (plausibility networks), and development of methods for applying Bayesian networks to the problem of identifying enemy intentions on the battlefield. During Phase I, I supervised a graduate student and a programmer, who implemented two algorithms for inference in Bayesian networks. I worked with Dennis Buede and PhD student Suzanne Mahoney on the development of a generic structure for the application of Bayesian networks to the threat

assessment problem. We also developed initial concepts for incremental construction of Bayesian networks as evidence is acquired. These concepts were further refined in the Dr. Mahoney's doctoral dissertation, which directed. Using a scenario constructed by our French collaborators, I developed an application of our framework. Our work on Phase I led to funding by DRET (the French defense research agency) for Phase II of the project. I was PI on Phase II. In Phase II, we conducted seminars on knowledge elicitation and modeling for the French scientists involved in this effort, developed a human-computer interface for the software developed under Phase I, and performed further research on incremental construction of plausibility networks.

#17

Title: Bayesian Decision Theory for Safety Analysis

Sponsor: National Institute of Standards and Technology

Duration: June, 1993 - August, 1993

Principal Investigators: Paul Lehner and Kathryn Laskey

Summary: The objective of this project was to provide consultation to the National Institute of Standards and Technology (NIST) on the application of Bayesian networks to fire safety analysis. The project led to a major contract with NIST on which Paul Lehner was PI. I contributed to the development of the basic technical approach, and provided consultation on the development of the application problem.

#18a,b

Title: A Software Architecture for Developing Aggregate Intelligence Summaries

Sponsor: Defense Advanced Research Projects Agency / Subcontract to MRJ, Inc.
Matching funds from Virginia Center for Innovative Technology

Duration: January, 1992 - June, 1992

Principal Investigator (GMU): Kathryn Laskey

Summary: The objective of this research project was to develop an architecture for a software system to help intelligence analysts sort through, organize, and analyze the implications of a large numbers of intelligence reports. This project was a Phase I SBIR for the Defense Advanced Research Project Agency (DARPA) on which GMU was a major subcontractor. I was the principal investigator for the GMU portion of the effort. My responsibility was to analyze the potential of Bayesian networks as a tool for combining and analyzing intelligence reports, and to develop a small demonstration system that applied automated construction of Bayesian networks to intelligence reports from an example conflict scenario. I wrote major sections of the proposal and final report. DARPA reacted favorably to our Phase I final report; however, due to conflicting priorities at MRJ, Inc., a Phase II proposal was never written.

#19

Title: Modular Fusion Testbed

Sponsor: U.S. Army Communications-Electronics Command

Duration: July, 1991 - June, 1994

Principal Investigator: Clayton Stewart

Summary: This project had two major research objectives: develop an object-oriented software testbed for multisensor fusion algorithms, and develop and evaluate

algorithms for multisensor fusion. During the time I was actively involved with the project, the primary effort focused on the development of the software testbed. We developed a testbed that included modules for scenario development, sensor models, and tracking and identification. I wrote major sections of the proposal, was a major contributor to the modular testbed architecture, contributed to the year-end reports, and was actively involved in supervising the MS students.

6.2 Students and Post-Doctoral Researchers Funded

The following students have been funded on my research projects:

Shou Matsumoto (PhD student SEOR; funded 2011-present)
Cheol Young Park (PhD student IT; funded 2009-12)
Rommel Carvalho (PhD SEOR; completed 2011; funded 2008-11)
Walter Powell (PhD student IT; completion expected Fall 2012; funded 2005-11)
Ryan Johnson (PhD student IT; funded 2007-10 beginning as undergraduate RA)
Ronald F. Woodaman (PhD student SEOR ongoing; funded 2007-present)
Kellen Leister (MS OR and MS STAT; completed 2010; funded 2008-10)
Gregory Opas (PhD student SEOR; funded 2008-10)
Nancy Perry (MS Geography awarded Spring 2010; PhD student Earth Systems & Geoscience; funded 2008-10)
Daniel Stimpson (PhD student SEOR; funded 2008-10)
Suzanne Mahoney (PhD IT, completed 1999; funded 1993-97)
James Myers (PhD IT, completed 1999; funded 1997-99)
Mehul Revankar (MS ECE, completed 2005; funded 2004-05)
Ning Xu (PhD IT completed 2007; funded 2002-04)
Sepideh Mirza (PhD student in IT; funded 2004-05)

I have also supported post-doctoral research fellows and research faculty. The following research faculty have been supported on my research projects:

Tod Levitt (Research Professor; funded 2008-2011)
Charles Twardy (Research Assistant Professor; funded 2008-present)
Paulo Costa (2009-present)
Wei Sun (2009-present)

In addition, my research projects have provided research experience and dissertation topic ideas for several students who, as military officers, could not accept financial support.

These include:

Richard Haberlin (2009-present; retired from US Navy in 2010)
Michael Lehocky (2009-present)
Ghazi Alghamdi (2004-05)
Paulo Costa (2004-05)
Pamela Hoyt (2002-08)

6.3 Publications

My h-index is 23.² This means I have 23 publications with 23 or more citations in Google Scholar.

Journal Papers

1. Laskey, K.B., Wright, E.J. and Costa, P. Envisioning Uncertainty in Geospatial Information. *International Journal of Approximate Reasoning*, 51(2): 209-223, 2010. Impact factor 2.09; Google Scholar citations 4
2. Xu, N. Sherry, L., Laskey, K.B. Multifactor Model for Predicting Delays at U.S. Airports. *Journal of the Transportation Research Board*, vol. 2052, 2008, pp. 62-71. (also presented at *Transportation Research Board, 88th Annual Meeting*, Washington DC, January 11-15, 2008). Impact factor 0.3; Google Scholar citations 8
3. Laskey, K.B., MEBN: A Language for First-Order Bayesian Knowledge Bases, *Artificial Intelligence*, 172(2-3): 140-178, 2008. Impact factor 3.04; Google Scholar citations 82
4. Laskey, K.B. Quantum Physical Symbol Systems. *Journal of Logic, Language and Information*, 15(1): 109-154, 2006. Cites / Doc (2006, 2 year) 0.44;³ Google scholar citations 3
5. Laskey, K.B. and Myers, J.M., Population Markov Chain Monte Carlo, *Machine Learning*, 50(1): 175-196, 2003. Impact factor 1.67; Google Scholar citations 43
6. Laskey, K.B., d'Ambrosio, B., Levitt, T. and Mahoney, S., Limited Rationality in Action: Decision Support for Military Situation Assessment, *Minds and Machines*, 10(1): 53-77, 2000. Impact factor 0.79; Google Scholar citations 15
7. Martignon, L., Deco, G., Laskey, K., Diamond, M., Freiwald, W., and Vaadia, E. Neural Coding: Higher Order Temporal Patterns in the Neurostatistics of Cell Assemblies, *Neural Computation*, 12(11): 2621-2653, 2000. Impact factor 2.18; Google Scholar citations 101
8. Laskey, K.B. and Mahoney, S.M. Network Engineering for Agile Belief Network Models. *IEEE Transactions in Knowledge and Data Engineering*, 26(3): 487-498, 2000. Impact factor 2.3; Google Scholar citations 67.
9. Levitt, T. and Laskey, K.B., Computational Inference for Evidential Reasoning in Support of Judicial Proof, *Cardozo Law Review*, 22: 1691-1731, 2000. Impact factor not available; Google Scholar citations 23

² Computed by Harzing, A.W. (2007) **Publish or Perish**, available from <http://www.harzing.com/pop.htm>

³ This journal is not listed in Web of Science. Cites/Doc is computed using the same formula as impact factor.

10. Laskey, K.B. Model Uncertainty: Theory and Practical Implications, *IEEE Transactions on Systems, Man and Cybernetics*, 12(4): 340-348, 1995. Google Scholar citations 50
11. Laskey, K.B. Sensitivity Analysis for Probability Assessments in Bayesian Networks, *IEEE Transactions on Systems, Man and Cybernetics*, 25(6): 901-909, 1995. Google Scholar citations 122
12. Laskey, K.B. and Lehner, P.E., Meta Reasoning and the Problem of Small Worlds, *IEEE Transactions on Systems, Man and Cybernetics* 24(11): 1643-1652, 1994. Google Scholar citations 14
13. Laskey, K.B. Bounded Rationality and Search over Small World Models, *International Journal of Approximate Reasoning*, 11(4): 361-384, 1994.
14. Adelman, L.A., Cohen, M.S., Bresnick, T.A., Chinnis, J.O., Laskey, K.B. Real-Time Expert System Interfaces, Cognitive Processes, and Task Performance: An Empirical Assessment, *Human Factors* 35(2): 243-261, 1993. Google Scholar citations 26
15. Laskey, K.B. Adapting connectionist learning to Bayes networks. *International Journal of Approximate Reasoning*, 4(4): 261-282, 1990. Google Scholar citations 19
16. Laskey, K.B., and Lehner, P.E. Assumptions, beliefs and probabilities. *Artificial Intelligence*, 41(1): 65-77, 1989. Google Scholar citations 111
17. Laskey, K.B., Cohen, M.S., and Martin, A.W. Representing and eliciting knowledge about uncertain evidence and its implications. *IEEE Transactions on Systems, Man and Cybernetics*, 19(3), 536-545, 1989. Google Scholar citations 23
18. Fischer, G.W., Damodaran, N., Laskey, K.B., and Lincoln, D. Assessing preferences for proxy attributes. *Management Science*, 33(2): 198-214, 1987. Google Scholar citations 41
19. Laskey, K.B. and Fischer, G.W. Estimating utility functions in the presence of response error. *Management Science*, 33(8): 965-980, 1987. Google Scholar citations 34
20. Holland, P.W., Laskey, K.B., and Leinhardt, S. Stochastic Blockmodels: First Steps. *Social Networks* 5: 109-137, 1983. Google Scholar citations 96

Book chapters (12)

21. Costa, Paulo C. G.; Herencia-Zapana, Heber; and Laskey, Kathryn B. Uncertainty Representation and Reasoning for Combat Models. Chapter 28 in *Engineering*

Principles of Combat Modeling and Distributed Simulation, Andreas Tolk (ed.). pp. 715-745, John Wiley & Sons, Inc.: Hoboken, NJ, in press.

22. Matsumoto, S., Carvalho, R., Costa, P., Laskey, K.B., Santos, L.L. and Ladeira, M. There's No More Need to be a Night OWL: on the PR-OWL for a MEBN Tool Before Nightfall. in *Introduction to the Semantic Web: Concepts, Technologies and Applications*, G. Fung, Ed. iConcept Press, 2011, pp. 267-289.
23. Carvalho, R., Laskey, K.B., Costa, P., Ladeira, M., Santos, L., and Matsumoto, S., UnBBayes: Modeling Uncertainty for Plausible Reasoning in the Semantic Web. In: Gang Wu (ed.), *Semantic Web*, IN-TECH Publishing, 2010, 26 pages. ISBN: 978-953-7619-33-6. <http://www.intechopen.com/articles/show/title/unbbayes-modeling-uncertainty-for-plausible-reasoning-in-the-semantic-web>. (2890 downloads of book; 319 downloads of chapter as of 11/9/2011)
24. Laskey, K.B. and Costa, P. C. G. Uncertainty Representation and Reasoning in Complex Systems. In Tolk, A. and Jain, L. (Eds) *Complex Systems in Knowledge-based Environments: Theory, Models and Applications*. Studies in Computational Intelligence, Vol. 168 Springer-Verlag, 2009, pp. 7-39. ISBN: 978-3-540-88074-5. Google Scholar citations 3
25. Costa, P. C. G., Laskey, K.B. and Lukasiewicz, T. Uncertainty Representation and Reasoning in the Semantic Web, in *Semantic Web Engineering in the Knowledge Society*, Idea Information Science, 2009, pp. 315-340. Google Scholar citations 8
26. Costa, Paulo C. G.; Laskey, Kathryn B.; and Laskey, Kenneth J. PR-OWL: A Bayesian Language for the Semantic Web. In *Uncertainty Reasoning for the Semantic Web I*. Costa, Paulo C. G. et al. (eds.) LNAI 5327, pp. 88-107. Springer-Verlag: Berlin/Heidelberg, Germany, 2008. ISBN: 978-3-540-89764-4. Google Scholar citations 59
27. Daniels, D. C., Hudson, L. D., Laskey, K.B., Mahoney, S. M., Ware, B. S., and Wright, E. J., Terrorism Risk Management, in Pourret, O. Marcot, B. and Naïm, P. *Bayesian Networks: A Practical Guide to Applications*. New York, NY, USA: John Wiley & Sons, 2008, pp. 239-262. Google Scholar citations 3
28. Alemi, F., Vang, J. and Laskey, K.B. Root Cause Analysis, in Alemi, F. and Gustafson, D. (eds) *Decision Analysis for Healthcare Managers*, Health Administration Press, 2006, pp. 169-186.
29. Martignon, L. and Laskey, K.B., Bayesian Benchmarks for Fast and Frugal Heuristics, in Gigerenzer, G., Todd, P., and the ABC Group. *Simple Heuristics that Make us Smart*. Oxford University Press, 1999, pp. 169-188. Google scholar citations 60

30. Laskey, K.B. and Campbell, V.N. Evaluation of an intermediate level decision analysis course. In J. Baron and R.V. Brown (Eds.), *Teaching Decision Making to Adolescents*. Lawrence Erlbaum and Associates, 1991, pp. 123-146.
31. Campbell, V.N. and Laskey, K.B. Institutional strategy for teaching decision making in schools. In J. Baron and R.V. Brown (Eds.), *Teaching Decision Making to Adolescents*. Lawrence Erlbaum and Associates, 1991, pp. 297-308.
32. Laskey, K.B. and Lehner, P.E. Belief maintenance: An integrated approach to uncertainty management. In G. Shafer and J. Pearl (Eds.), *Readings in Uncertain Reasoning*. San Mateo, CA: Morgan Kaufmann Publishers, Inc., 1990, pp. 694-698. (This paper was originally published in *Proceedings of the Seventh Annual Conference on Artificial Intelligence*, 1988, pp. 210-214). Google Scholar citations 28

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35. Laskey, K.B., Bayesian Decision Theory, Subjective Probability and Utility. Invited entry, *Encyclopedia of Operations Research and Management Science*, S. Gass and C. Harris (eds), Springer, 1998, revised 2000, pp. 57-59.

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37. Dybowski, R., Laskey, K.B. and Myers, J. Introduction to the Special Issue of Fusion of Domain Knowledge with Data for Decision Support. *Journal of Machine Learning Research* 4, 2004, pp. 293-294. Impact factor 2.8; Google Scholar Citations 18.
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44. Wang, P., Domeniconi, C. and Laskey, K.B. Nonparametric Bayesian Clustering Ensembles, in *Proceedings of the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases*, Barcelona, Spain, September 21-23, 2010, pp. 435-450. Acceptance rate 16%.
45. Wang, P., Domeniconi, C. and Laskey, K.B. Latent Dirichlet Bayesian Co-Clustering, in *Proceedings of the European Conference on Machine Learning and Principles and Practise of Knowledge Discovery in Databases*, Bled, Slovenia, September 7-11, 2009, pp. 522-537. Acceptance rate 25%. Google Scholar citations 11
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50. Barry, P. and Laskey, K.B. An Application of Uncertain Reasoning to Requirements Engineering. *Uncertainty in Artificial Intelligence: Proceedings of the Fifteenth Conference*, San Mateo, CA: Morgan Kaufman, 1999, pp. 41-48. Acceptance rate 51%. Google Scholar citations 8
51. Mahoney, S.M. and Laskey, K.B. Representing and Combining Partially Specified Conditional Probability Tables. *Uncertainty in Artificial Intelligence: Proceedings of the Fifteenth Conference*, San Mateo, CA: Morgan Kaufman, 1999, pp. 391-400. Acceptance rate 51%. Google Scholar citations 11
52. Myers, J. and Laskey, K. B. Learning Bayesian Networks from Incomplete Data with Stochastic Search Algorithms. *Uncertainty in Artificial Intelligence: Proceedings of the Fifteenth Conference*, San Mateo, CA: Morgan Kaufman, 1999, pp. 476-485. Acceptance rate 51%. Google Scholar citations 39
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54. Mahoney, S.M. and Laskey, K.B., Constructing Situation Specific Belief Networks. *Uncertainty in Artificial Intelligence: Proceedings of the Fourteenth Conference*, San Mateo, CA: Morgan Kaufman, 1998, pp. 370-378. Acceptance rate 45%. Google Scholar citations 58
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56. Martignon, L., Laskey, K.B., Deco, G. and Vaadia, E. Learning Exact Patterns of Quasi-synchronization among Spiking Neurons from Data on Multi-Unit Recordings. *Advances in Neural Information Processing Systems* 9, 1997, pp. 76-81.

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58. Laskey, K.B. and Martignon, L. Bayesian Learning of Loglinear Models for Neural Connectivity. *Uncertainty in Artificial Intelligence: Proceedings of the Twelfth Conference*, San Mateo, CA: Morgan Kaufman, 1996, pp. 373-380. Acceptance rate 48%. Google Scholar citations 5
59. Laskey, K.B. Sensitivity Analysis for Probability Assessments in Bayesian Networks. *Uncertainty in Artificial Intelligence: Proceedings of the Ninth Conference*, San Mateo, CA: Morgan Kaufman, 1993, pp. 136-142.
60. Laskey, K.B. The Bounded Bayesian. *Uncertainty in Artificial Intelligence: Proceedings of the Eighth Conference*, San Mateo, CA: Morgan Kaufmann, 1992, pp. 159-165. Google Scholar citations 6
61. Laskey, K.B. Bayesian Meta-Reasoning: Determining Model Adequacy from Within a Small World. *Uncertainty in Artificial Intelligence: Proceedings of the Eighth Conference*, San Mateo, CA: Morgan Kaufmann, 1992, pp. 155-158.
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Software Packages (2)

130. *Quiddity*Suite* is a suite of probabilistic modeling and reasoning tools developed by Information Extraction and Transport, Inc (IET). It was developed over the last decade to meet the demands of large-scale real-world inference problems. It has an expressive object-oriented scripting language and one of the fastest and most highly-optimized inference engines currently available. I was a major contributor to the design of *Quiddity*Suite's* expressive modeling language and logic engine.
131. *UnBBayes-MEBN* is an open-source probabilistic ontology modeling and inference tool being developed in collaboration between George Mason University and the University of Brasilia. *UnBBayes-MEBN* is an implementation of Multi-Entity Bayesian network logic, with a graphical user interface for entering MEBN fragments (MFragments). It stores MFragments in the probabilistic ontology language PR-OWL, developed by my PhD student and GMU research assistant professor Paulo Costa. It is available from <http://unbbayes.sourceforge.net/>.

Selected Other Publications and Presentations (8)

132. Twardy, C., Askvig, J., Levitt, T. and Laskey, K. Threat Attribution Classifier. Presented at the *Military Operations Research Society Symposium*, June 2010. Nominated for Barchi Best Paper Award.
133. Wang, P. Laskey, K. and Domeniconi, C. Nonparametric Bayesian Methods for Relational Clustering, The Learning Workshop, Cliff Lodge, Snowbird, Utah, April 6-9, 2010. (This is an invitation-only, high-profile workshop on machine learning. I was invited to attend. We provided an extended abstract, and I presented a paper on joint work with Carlotta Domeniconi and student Pu Wang.)
134. Wang, P., Domeniconi, C. and Laskey, K.B., Nonparametric Bayesian Co-clustering Ensembles, Workshop on Nonparametric Bayes, held in conjunction with NIPS, Whistler, BC, Canada, December 11-12, 2009.
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