Michael J. Scott, Ph.D.
Assistant Professor and Director
Engineering Design and Decision Laboratory
Department of Mechanical & Industrial Engineering (MC 251)
College of Engineering
University of Illinois at Chicago
842 W. Taylor St.
Chicago, IL 60607
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EDUCATION

California Institute of Technology: Pasadena, California
Ph.D., Mechanical Engineering, June, 1999.
Thesis: Formalizing Negotiation in Engineering Design.
M.S., Mechanical Engineering, June 1994

Harvard University: Cambridge, Massachusetts
A.B. cum laude, Philosophy, June 1986

APPOINTMENTS

University of Illinois at Chicago: Chicago, Illinois
Assistant Professor of Mechanical Engineering, Jan. 2000–present

California Institute of Technology: Pasadena, California
Postdoctoral Scholar in Mechanical Engineering, Nov. 1998–Nov. 1999
Research and Teaching Assistant, 1993–1998
Yoga instructor, 1997–1999

Buckingham Browne & Nichols Middle School: Cambridge, Massachusetts
Math teacher, 1986–1992
Math teacher and department head, 1988–1992

Sistema Nacional de Capacitación: Managua, Nicaragua
Math teacher at national jobs training center, 1990

HONORS AND AWARDS

ARCS Foundation Fellow, Caltech, 1997

John Harvard and Harvard University Fellowships, 1983-86

JOURNAL ARTICLES (APPEARED OR ACCEPTED)

1. Michael J. Scott. Quantifying uncertainty in multicriteria concept selection methods. *Research in Engineering Design*. accepted for publication pending minor changes, Sep. 2005.
2. Zhihuang Dai and Michael J. Scott. Effective product family design using preference aggregation. *ASME Journal of Mechanical Design*. accepted for publication, Oct. 2005.
3. Zhihuang Dai and Michael J. Scott, Product platform design through sensitivity analysis and cluster analysis. *Journal of Intelligent Manufacturing Special Issue on Product Family Design and Development*, 2005. accepted for publication.

4. Zhihuang Dai and Michael J. Scott, Meaningful tradeoffs in product family design considering positive and negative aspects of commonality. *SAE Transactions*, 2005. accepted for publication; also, SAE Special Publication SP-1956, paper no. 2005-01-1351.
5. Zhihuang Dai and Michael J. Scott, Product platform design with consideration of uncertainty. *SAE Transactions*, 2005. accepted for publication; also, SAE Special Publication SP-1956, paper no. 2005-01-1350.
6. Michael J. Scott and Erik K. Antonsson. Compensation and weights for tradeoffs in engineering design: Beyond the weighted sum. *ASME Journal of Mechanical Design*, Nov. 2005. in press.
7. Zhihuang Dai, Michael J. Scott, and Zissimos P. Mourelatos. Improving robust design with preference aggregation methods. *SAE 2004 Transactions Journal of Materials and Manufacturing*, 5:551–563, 2004.
8. Zhihuang Dai, Michael J. Scott, and Zissimos P. Mourelatos. Propagation of epistemic uncertainty for design reuse. *SAE 2004 Transactions Journal of Materials and Manufacturing*, 5:536–550, 2004.
9. Clive L. Dym, William H. Wood, and Michael J. Scott. Rank ordering engineering designs: Pairwise comparison charts and Borda counts. *Research in Engineering Design*, 13 (4):236-242. Springer, 2002.
10. Fehmi Cirak, Michael J. Scott, Erik K. Antonsson, Michael Ortiz, and Peter Schröder. Integrated modeling, finite-element analysis, and engineering design for thin-shell structures using subdivision. *Computer-Aided Design*, 34 (2):137-148. Elsevier, 2001.
11. Michael J. Scott and Erik K. Antonsson. Arrow's Theorem and engineering design decision making. *Research in Engineering Design*, 11(4):218-228. Springer, 1999.
12. Michael J. Scott and Erik K. Antonsson. Aggregation functions for engineering design trade-offs. *Fuzzy Sets and Systems*, 99(3):253–264. Elsevier, 1998.

JOURNAL ARTICLES (UNDER REVIEW OR IN PREPARATION)

1. Michael J. Scott. Quantifying the consistency of rank-ordering concept selection methods. *Research in Engineering Design*. submitted July 2005, under review.
2. Michael J. Scott. Robust product platform design of components with projected requirements. in preparation for submission to *SAE Transactions*.
3. Michael J. Scott, Stephen Melamed, and Albert L. Page. Lessons from an interdisciplinary product development course. in preparation for submission to *Journal of Engineering Education*.

CONFERENCE PROCEEDINGS

1. Zhihuang Dai and Michael J. Scott. "Effective product family design using preference aggregation." In *2004 ASME Design Engineering Technical Conferences*. Salt Lake City, Utah, September 2004. ASME. Paper number DETC2004-57419.

2. Zhihuang Dai and Michael J. Scott. "Product platform design through sensitivity analysis and cluster analysis." In *2004 ASME Design Engineering Technical Conferences*. Salt Lake City, Utah, September 2004. ASME. Paper number DETC2004-57464.
3. Stephen Melamed, Michael J. Scott, and Albert L. Page. Year two of an Interdisciplinary Product Development course at the University of Illinois at Chicago. *Eastman National IDSA Education Conference*. IDSA, October 2004.
4. Irena Zivkovic and Michael J. Scott "On rank reversals in the Borda Count" In *2003 ASME Design Engineering Technical Conferences, 15th International Conference on Design Theory and Methodology*, Chicago, Illinois, September 2003. ASME. Paper number DETC2003/DTM-48674.
5. Zhihuang Dai, Michael J. Scott, and Zissimos P. Mourelatos. "Robust design using preference aggregation methods." In *2003 ASME Design Engineering Technical Conferences, 29th Design Automation Conference*, Chicago, Illinois, September 2003. ASME. Paper number DETC2003/DAC-48715.
6. Zhihuang Dai, Michael J. Scott, and Zissimos P. Mourelatos. "Incorporating epistemic uncertainty in robust design." In *2003 ASME Design Engineering Technical Conferences, 29th Design Automation Conference*, Chicago, Illinois, September 2003. ASME. Paper number DETC2003/DAC-48713.
7. Stephen Melamed, Michael J. Scott, and Albert L. Page. From experience: Launching an Interdisciplinary Product Development course at the University of Illinois at Chicago . In *Eastman National IDSA Education Conference*. IDSA, August 2003.
8. Michael J. Scott. "Quantifying certainty in design decisions: Examining AHP." In *2002 ASME Design Engineering Technical Conferences, 14th International Conference on Design Theory and Methodology*, Montreal, Quebec, Canada, September 2002. ASME. Paper number DETC2002/DTM-34020.
9. Barbara Di Eugenio, Michael Glass, and Michael J. Scott. "The binomial cumulative distribution, or, is my system better than yours?" *Third International Conference on Language Resources and Evaluation*, Las Palmas, Canary Islands, Spain, May 2002.
10. Michael J. Scott and Erik K. Antonsson. "Using Indifference Points in Engineering Decisions." In *2000 ASME Design Engineering Technical Conferences, 12th International Conference on Design Theory and Methodology*, Baltimore, Maryland, September 2000. ASME. Paper number DETC2000/DTM-14559.
11. Michael J. Scott and Erik K. Antonsson. "Preliminary Vehicle Structure Design: An Industrial Application of Imprecision in Engineering Design." In *1998 ASME Design Engineering Technical Conferences, DETC'98, 10th International Conference on Design Theory and Methodology*, Atlanta, Georgia, September 1998. ASME. Paper number DETC98/DTM-5646.
12. Michael J. Scott, Rolf W. Kaiser, Matthew Dilligan, Robert J. Glaser, and Erik K. Antonsson. "Managing Uncertainty in Preliminary Aeroshell Design Analysis." In *Proceedings of the ASME 1997 Design Engineering Technical Conferences, 9th International Conference on Design Theory and Methodology*, Sacramento, California, September 1997. ASME. Paper number DETC97/DTM-3868.

13. Michael J. Scott and Erik K. Antonsson. "Formalisms for Negotiation in Engineering Design." In *Proceeding of the ASME 1996 Design Engineering Technical Conferences, 8th International Conference on Design Theory and Methodology*, Irvine California, August 1996. ASME. Paper number 96-DETC/DTM-1525.
14. Michael J. Scott and Erik K. Antonsson. "Aggregation Functions for Engineering Design Trade-offs." In *9th International Conference on Design Theory and Methodology*, volume 2, pages 389–396. ASME, September 1995.

BOOK CHAPTERS

1. Clive L. Dym, William H. Wood, and Michael J. Scott. "On the Legitimacy of Pairwise Comparisons." Kemper Lewis, Wei Chen, and Linda Schmidt, editors. *Decision Making in Engineering Design*. ASME, 2005. to appear.
2. Michael J. Scott. "Utility Methods in Engineering Design." Efstratios Nikolaidis and Dan Ghiocel, editors, *CRC Handbook on Reliability Design*. CRC Press, 2004.
3. Michael J. Scott, William S. Law, and Erik K. Antonsson. "A Fuzzy Sets Application to Preliminary Passenger Vehicle Structure Design." In Enrique Ruspini, Piero Bonissone, and Witold Pedrycz, editors, *Handbook of Fuzzy Computation*. Oxford University Press, 1997.

   (papers available at `http://design.me.uic.edu/~mjscott`)

PATENTS

1. Benjamin S. Glick, Eugene Losev, Michael J. Scott, and William A. Stokes. Method and Organization System for Recording Information Regarding Nucleic Acid Constructs. Application submitted August 1, 2005. Provisional patent application No. 60/592,685 filed July 30, 2004.

INVITED LECTURES

University of Iowa, Iowa City, Iowa, May, 2003

Universidad Politecnico de Madrid, Madrid, Spain, March, 2003

General Motors R&D Center, Warren, Michigan, November, 2001

University of Illinois at Urbana-Champaign, April, 2001

RWTH Aachen, Aachen, Germany, December, 2000

Northwestern University, May, 1999

Purdue University, April, 1999

Notre Dame University, March, 1999

University of Florida, Gainesville, February, 1999

Computational Design Lab, Carnegie Mellon University, July, 1998

University of Maryland, College Park, May, 1998

Stanford University, April, 1998

University of Michigan, Ann Arbor, March, 1998

University of California, Irvine, March, 1998

IMPACT Laboratory, University of Southern California, November, 1997

PRESENTATIONS

DARPA/NSF OPAAL Workshop & FINAL Program Review, Washington, DC. January 12, 2002. (2 posters)

DARPA/NSF OPAAL Workshop, Seattle, Washington. May 19, 2001. (poster)

DARPA/NSF OPAAL Workshop, San Diego, California. October 17, 2000. (poster)

DARPA/NSF OPAAL Workshop, Iowa City, Iowa. October 27, 1999. (poster)

Boeing Corporation, Seattle, Washington. July 15, 1999.

DARPA/NSF OPAAL site visit, California Institute of Technology, Pasadena, California. May 4, 1999. (poster)

DARPA/NSF OPAL/OPAAL PI Workshop, Santa Monica, California. January 22-23, 1999.

GRANTS AND CONTRACTS – FUNDED

USDOE OSERS/NIDRR: "Rehabilitation Engineering Research Center on Recreational Technologies and Exercise Physiology Benefiting Persons with Disabilities" (PI: Rimmer, DHD; co-I:Scott)	11/05–10/06 $899,756/**$44,988** intellectual credit
NIH STTR: "Universal Exercise Kits for Manual Wheelchair Users" (PI: Rimmer, DHD; co-I:Scott)	7/05–8/07 $180,000/**$18,000** intellectual credit
General Motors: "Research on Incorporating Uncertainty When Using AHP in Customer Surveys and Hierarchical Engineering Decision Making" (Sole PI: Scott)	7/05–7/07 **$165,700** intellectual credit
NSF (subcontract through PSU): "ITR Supplement – Collaborative Research: A Repository of Problems for Product Platform Development" (Sole Subcontract PI: Scott)	5/05–5/06 **$33,194** intellectual credit
Sci-Tech Corporation: "Improving on Air Compressor Design Computational Issues" (Sole PI: Scott)	1/05–7/05 **$15,000** intellectual credit
Sci-Tech Corporation: "Design Improvements to an Air Compressor" (Sole PI: Scott)	5/04–8/04 **$10,000** intellectual credit
NIH: "Role of Walking Stability in Falls Among the Elderly" (PI: Pai, PT; co-I: Scott)	7/03–6/07 $1,522,210/**$228,331*** intellectual credit (* i.c. only, no department expenditures)
General Motors: "Uncertainty Modeling and Preference Aggregation Methods for (Multi-attribute) Robust Design" (Sole PI: Scott)	8/02–8/03 **$65,000** intellectual credit

NSF EEC: "Advanced Computation and Programming in the Mechanical Engineering Curriculum" (PI: Coller; co-I: Scott)	9/02–12/05 $255,662/**$51,132** intellectual credit
NSF/DARPA (subcontract through California Institute of Technology): "Integrated Design, Modeling, and Simulation" (Sole Subcontract PI: Scott)	10/00–9/01 **$59,789** intellectual credit
Total intellectual credit:	**$691,135**

CASH GIFTS

Gift support for Interdisciplinary Product Development course (shared equally COE/CBA/A&A):

1. Whirlpool Corporation, 2002–2003: $50,000
2. Rehco LLC, 2003–2004: $50,000
3. Copco a division of Wilton Industries, 2004-2005: $50,000
4. Pactiv, 2005–2006: $50,000 (pending)

GRANTS – SUBMITTED

"IGERT: Graduate Program in Computerized Transportation," co-PI with Wolfson (PI; CS), et al. National Science Foundation. $3,097,976 (Scott: $30,980), submitted August, 2005.

"Collaborative Research – CANDID: Adaptive Coordination in Distributed Nonlinear Design," PI with Di Eugenio (CS) on UIC portion of join UIUC/UIC proposal. National Science Foundation (DMII). $279,658 (Scott: $208,361), submitted Feb. 1, 2005.

"Assessing Concept Selection Tools for Engineering Design." National Science Foundation (DMII). $345,155, submitted Oct. 1, 2004.

"ITR-ASE-int: Collaborative Research – Collaboration in Engineering Design: an Information-flow, Decision-based Support System," PI with Di Eugenio (CS) on UIC portion of join UIUC/UIC proposal. National Science Foundation (DMII). $608,619 (Scott: $365,171), submitted Feb. 24, 2004.

"Measurement for Preliminary Engineering Design." National Science Foundation (DMII). $344,163, submitted Feb. 1, 2004.

"COLLABORATIVE GOALI: Optimization Procedures for Reliability-based and Robust Design." National Science Foundation (DMII). $180,485, submitted Feb. 1, 2004.

"CAREER: Decision Uncertainty and Interdisciplinary Product Design." National Science Foundation (DMII). $375,000, submitted Jul. 23, 2003.

"IGERT: Graduate Program in Computerized Transportation," co-PI with Wolfson (PI; CS), et al. National Science Foundation. $3,949,203 (Scott: $39,492), submitted May, 2003.

"Quantifying Certainty and Uncertainty in Concept Selection." National Science Foundation (DMII). $305,641, submitted Oct. 1, 2002.

"Bridges for Engineering Education: Co-designing Engineering Products and K-12 Curriculum," co-PI with Moher (PI; CS), Gupta, Nishimura (Ed), and Varelas (Ed). National Science Foundation (BEE). $99,751 (Scott: $19,950), submitted Jun. 4, 2002.

"Bayesian & Geostatistical Methods for Engineering Design." CRB. $15,000, submitted Mar. 15, 2002.

"ITR: Information Technology in the Mechanical Engineering Curriculum," co-PI with Coller (PI), Loth, and Buy (CS). National Science Foundation (ITR). $251,401 (Scott: $50,280), submitted Feb. 6, 2002. (not funded, conflict with NSF/EEC grant above)

"Quantifying Certainty in Concept Selection: An Approach of Relevance to Industry." National Science Foundation (DMII). $311,817, submitted Feb. 1, 2002.

"Internet-Based Information Technology Oriented Engineering Design Learning Modules," PI with Chen. CETL. $16,000, submitted Nov. 1, 2001.

"Developing an Engineering Design Decision Support Tool." CRB. $15,000, submitted Sep. 14, 2001.

"CAREER: Theory and Methods for Decision-centered Design." National Science Foundation (DMII). $375,000, submitted Jul. 23, 2001.

"Developing a Theory of Decision-centered Engineering Design." CRB. $15,000, submitted Mar. 16, 2001.

"ITR/PE: Information Technology in the Mechanical Engineering Curriculum," co-PI with Coller (PI), Loth, and Buy (CS). National Science Foundation (ITR). $405,252 (Scott: $81,050), submitted Jan. 24, 2001.

"Design with Engineering Parameters: A Decision Theoretic Approach." National Science Foundation (DMII). $261,509, submitted Oct. 1, 2000.

"CAREER: A Formal Theory of Information-based, Multi-disciplinary, Decision-centered Design." National Science Foundation (DMII). $375,000, submitted Jul. 26, 2000.

STUDENTS ADVISED

Zhihuang Dai, Ph.D. 2005. Dissertation: *Robust Product Family Design*. Placement: Constar, Research Engineer.

Andrei Aurel Caratus, M.S. 2005. Thesis: *Test Design and Numerical Simulation of Rock Fracture in the Vicinity of an Interface*. Placement: Ph.D. program, UIC CME.

Irena Zivkovic, M.S. 2003. Thesis: *Assessing Uncertainty in Concept Selection Methods*. Placement: Amtec Precision Products.

Veena Sreedharan, M.S. 2003. Thesis: *Generation of Experimental Designs for Constrained Design Spaces*. Placement: Sulzer Pumps.

CLASSROOM TEACHING

Student Evaluations:

IE 446 Quality Control and Reliability, Spring 2000, 3.8/5
ME/IE 396 Senior Design, Fall 2000 (forms lost)
IE 342 Probability and Statistics, Spring 2001, 4.1/5
IE 446 Quality Control and Reliability, Spring 2001, 4.2/5
ME 594 Theoretical Foundations to Engineering Design, Fall 2001, 4.2/5
ME/IE 396 Senior Design, Spring 2002 4.6/5
IE 446 Quality Control and Reliability, Spring 2002, 4.1/5

ME 494 Mathematics, Fall 2002, 4.7/5
ME 494 Interdisciplinary Product Development (IPD), Fall 2002, 4.4/5
ME/IE 396 Senior Design (with IPD section), Spring 2003 4.4/5
ME/IE 396 Senior Design, Fall 2003 4.4/5
ME 494 Interdisciplinary Product Development (IPD), Fall 2003, 4.6/5
ME 396 Senior Design (IPD), Spring 2004, 4.5/5
ME 444 Interdisciplinary Product Development (IPD), Fall 2004, 4.7/5
ME 396 Senior Design, Spring 2005, 4.8/5
ME 445 Interdisciplinary Product Development (IPD), Spring 2005, 4.6/5

COURSE DEVELOPMENT

ME 594 Theoretical Foundations to Engineering Design
Developed Fall 2001. Graduate course on decision-making methods in engineering design.

ME 444/ME 445 Interdisciplinary Product Development (IPD)
Development began 2002, course numbers assigned Fall 2004. Joint year-long team- and project-based class on product development with CBA (Marketing, MBA program) and A&A (Industrial Design). Students from all three Colleges work on teams to identify new product opportunities and develop prototype products for a sponsoring client company. Gift sponsorship ($50,000/year) provided to date by Whirlpool, Rehco LLC, Copco (a division of Wilton Industries), and Pactiv (pending).

INSTITUTIONAL AND PROFESSIONAL SERVICE

UIC Engineers Without Borders (EWB) Faculty Co-advisor, 2005-present.

UIC MIE Undergraduate Committee, 2003-present.

UIC MIE Advisory Committee, member and secretary, 2002-2004.

UIC COE Student Appeals Board, 2002-2005.

UIC MIE Graduate Committee, 2001-2003.

ASME Student Chapter Faculty Co-advisor, 2001-2003.

IIE Student Chapter Faculty Advisor, 2000-2004.

Reviewer for ASME Design Engineering Technical Conferences, *Research in Engineering Design*, *ASME Journal of Mechanical Design*, *Journal of Engineering Manufacture*, *Fuzzy Sets and Systems*, 1995-present.

NSF Panel Reviewer, 2000-present.

Chairman, Local Committee, ASME International Design Engineering Technical Conferences & Computers in Information Conference, 2003.

Session Chair/co-chair, ASME DETC Design Theory and Methodology Conference, 1996, 2002, 2003, 2004.

Review Coordinator, ASME DETC Design Theory and Methodology Conference, 2002, 2004, 2005.

PROFESSIONAL DEVELOPMENT

Participant, Open Workshop on Decision-based Design, Atlanta, Georgia, Baltimore, Maryland, and Pittsburgh, Pennsylvania, 1999-2001.

Invited participant, NSF Workshop on Decisions in Engineering, Irvine California, October 2001.

CONSULTING

Solution People, 2004. Ideation consultant for new product development processes.

Palomar Observatory, 1996. Analysis of the 60 inch telescope secondary mirror.

VARIOUS

Associate Member, ASME

Proficient in Spanish and German

Member of the U.S. Lightweight Rowing Team, 1985 (silver medal at World Championships, 8+) and 1987 (national champions, 7th place at World Championships, 4-).