Paul D. Collopy

(256) 824-6749 paul.collopy@uah.edu

Education

Stanford University School of Engineering
Palo Alto, California

1993 – 1998 PhD, Engineering-Economic Systems
Dissertation: Replanning in Organizations
Advisers: Michael Fehling, James March, John Weyant

1992 – 1993 MS, Engineering-Economic Systems

1973 – 1977 BS, Electrical Engineering

Career History

2013 – present **ISEEM Dept, College of Engineering, Univ of Alabama in Huntsville**
Huntsville, Alabama

Professor and Department Chair. Lead the Industrial and Systems Engineering and Engineering Management Department to achieve recognition and ranking amongst peer departments in the US.

2012 – 2013 **National Science Foundation, Engineering Directorate**
Arlington, Virginia

Program Director, Engineering and Systems Design. Also managed the Systems Science program, the ODISSEI origami design program, and the Design of Engineered Materials program. Served as NSF representative to the Interagency Working Group on Complex Engineered Systems and to the White House (NSTC) subcommittee on Space Technology.

2011 – 2012 **Center for System Studies, University of Alabama in Huntsville**
Huntsville, Alabama

Deputy Director. Managed the day-to-day operations of the center, wrote and developed proposals for the Center and interdisciplinary proposals for the University. Managed NASA's largest external systems engineering research program, a $3.5 million five year project that required the establishment of a consortium of seven universities to support the work. Also placed UA Huntsville on all three of the winning teams in the NASA Engineering Systems Prototype IDIQ contract for routine engineering development work.

2010 – 2011 **Value-Driven Design Institute**
Urbana, Illinois

Founder and Executive Director. VDDI was a non-profit research and education institute to develop new approaches to the design of complex system with grants from the NSF and the Department of Defense. Won five of five proposals submitted to the NSF.

1996 – 2011 **DFM Consulting**
Urbana, Illinois

Co-Founder. Developed value-centric design methods, value models, and cost models to support complex product design and technology management. Developed value models for National Missile Defense, defense of air mobility forces against chemical and biological weapons, disruptive terrorist weapons and technologies, defense against suicide bombers, as well as many types of military and commercial aircraft. Also modeled the return on investment in basic research. Served as technical pillar lead for value-centric design for the DARPA System F6 fractionated satellite program from 2008 to 2011.

1983 – 1996 **GE Aircraft Engines**
Cincinnati, Ohio

1994 - 1996: Manager, Joint Strike Fighter Affordability Program. Responsible for pricing and costs for a $10 billion engine program. Core member of the government / industry Joint Strike Fighter Affordability IPT.

1990 - 1992: Senior Staff Engineer, Strategic Design, Adv Commercial Engines. Led the design of new engines for advanced Boeing, Airbus, and McDonnell Douglas aircraft. Developed a design optimization tool for conceptual design of aircraft engines.

1989 - 1990: Manager, Advanced Tactical Fighter Control Software Engineering. Supervised a staff of 12 engineers to develop engine control software used in the flight test of the YF-22 and YF-23 aircraft.

1988 - 1989: Manager, Advanced Tactical Fighter Electrical Component Design. Supervised a staff of 6 engineers to design and flight qualify engine-mounted electrical hardware and harnesses for the YF-22 and YF-23.

1987 - 1988: Manager, Advanced Tactical Fighter Transient Performance Analysis. Supervised a staff of 8 engineers to design the control strategy for engine start, shutdown, acceleration and deceleration for the YF-22 and YF-23.

1985 - 1987: Manager, F-16 Falcon Development Control Software Engineering. Supervised 10 engineers to develop the engine controls software used on the F-16 production aircraft.

1984 - 1985: Manager, Advanced Commercial Digital Control Design. Supervised 8 engineers to design and develop the engine control logic and software for the experimental Unducted Fan Engine. This was the first aircraft engine control written in a high level language.

1983 - 1984: Engineer, Advanced Digital Control Design. Conducted experiments paving the way for the use of advanced microprocessors and software languages in digital engine controls.

1982 – 1983 **Thiokol Specialty Chemicals Division**
Cincinnati, Ohio

Process Control Engineer, Chemical Manufacturing Plant. Installed a central computer and distributed programmable logic controllers to control a methyl-tin manufacturing facility.

1977 – 1982 **Procter & Gamble**
Cincinnati, Ohio

Technical Engineer, Chemical Process Control. Designed and installed hierarchical distributed control systems in vegetable oil refineries, and pulp and paper manufacturing plants. Designed pipe layouts, specified control valves, and wrote a treatise on turbine flowmeter applications in vegetable oil plants.

Service

Systems Engineering Research Center (OSD funded UARC managed by Stevens Institute)

Member of the Research Council since 2014

American Institute of Aeronautics and Astronautics

Associate Fellow
Former Chair, Current Member, and founder of the Value-Driven Design Committee
Former Chair and Current Member of the Economics Technical Committee
Current Member of the Management Technical Committee
Nominated to the Board of Directors, 2006
Economics Track Chair, ATIO Conference 2002
Economics Track Chair, Space Conference 2005

Conference Support

General Chair, Systems Engineering Research Conference (CSER) 2016
Defense Research and Engineering Conference General Co-Chair (with Michael Lippitz) 2004
AIAA ATIO Conference Planning Committee 2002-2012
Economics Track Chair, AIAA ATIO Conference 2002
Economics Track Chair, AIAA Space Conference 2005
Value-Driven Design Track Chair, Air Transportation Operations Symposium 2010 – 2012
Track 1 Chair, Complex Aerospace Systems Exchange 2012 (inaugural conference)
Complex Systems Track Chair, CESUN 2014
Session Chair at 18 Conferences

Queens University Belfast

Member of the International Advisory Board for the Center of Excellence in Integrated Aircraft Technology 2003 - 2005

Journal of Aerospace Operations

Associate Editor

INCOSE Systems Engineering Journal

Special Issue Editor

Accreditations

Licensed Professional Engineer in Ohio, 1981 to present

Teaching

Courses

Courses taught within the ISEEM department at UAH:

ISE 321 Engineering Economics
ISE 623 Engineering Economic Analysis
ISE 639 Special Topic: Optimization in Aerospace Systems Design (new course)
ISE 734 Decision Analysis

Guest Lectures within courses

Fall, 1996	ENGS 44 Sustainable Design	Dartmouth
Spring, 1999	EE 203 The Entrepreneurial Engineer	Stanford
Fall, 2008	MSC515 - Innovation Strategy and Management (co-taught course)	Northwestern
Spring, 2012	ME 495 Advanced Computational Methods for Engineering Design	Northwestern
Fall, 2015	Aerospace Engineering Seminar	Iowa State

Student Advising

Jose Martin, PhD Industrial Engineering, 2013
Stuart Feldman, PhD Industrial Engineering, 2014
Currently advising six Industrial Engineering PhD students, each concentrating in Systems Engineering:

Angelinda Rush, expected completion December 2016
Jennifer Stevens, expected completion December 2016
Robert Braunger, beginning research
Nam Ngo, beginning research
Andrew Gilbert, early in coursework
Jeff Hunt, early in coursework

Currently advising seventeen MSE students.

Scholarship

640 citations per GoogleScholar (includes some self-cites)

Patents

Collopy, Paul D. and Bennett, George W. Patent 5,170,365: *Propeller Speed and Phase Sensor*.

Bennett, G. W., Walker, N., Day, S. G., and Collopy, P. D. Patent 4,772,180: *Aircraft Thrust Control*.

Peer-Reviewed Journal Papers

Keller S, Collopy PD and Componation PJ (2014) "What Is Wrong with Space System Cost Models? A Survey and Assessment of Cost Estimating Approaches" *Acta Astronautica*, vol. 93, pp. 345-351.

Maddox ID, Collopy PD, and Farrington PA (2013) "Value-Based Assessment of DoD Acquisition Programs," *Procedia Computer Science*, vol. 16, pp. 1161-1169.

Keller S and Collopy P (2013) "Value Modeling for a Space Launch System," *Procedia Computer Science*, vol. 16, pp. 1152-1160.

Felder WN and Collopy PD (2012) “The Elephant in the Mist: What We Don’t Know About the Design, Development, Test and Management of Complex Systems,” *Journal of Aerospace Operations*, Vol 1 No. 4, 317–327, DOI10.3233, IOS Press.

Murphy L and Collopy PD (2012) “A Work-Centered Perspective on Research Needs for Systems Engineering with Models.” *Procedia Computer Science*, vol. 8, pp. 315-320.

Cheung J, Scanlan J, Wong J, Forrester J, Eres H, Collopy P, Hollingsworth P, Wiseall S and Briceno S (2012) “Application of Value-Driven Design to Commercial Aero-Engine Systems,” Pages 749-759 in *Journal of Aircraft*, Vol. 49, No. 3, May, 2012. (**25 citations)**

Collopy PD and Hollingsworth PM (2011) “Value-Driven Design.” Pages 749-759 in *Journal of Aircraft*, Vol. 48, No. 3, May, 2011. **(75 citations)**

Castagne S, Curran R and Collopy PD (2009) “Implementation of Value-Driven Optimisation for the Design of Aircraft Fuselage Panels. Pages 381-388 in the *International Journal of Production Economics*, Vol. 117, No. 2, February, 2009. **(21 citations)**

Bhadra D, Hogan B, and Collopy P (2008) “Choice of Route Networks: A Qualitative Model for Overland and Overwater Routes,” *Journal of Aircraft*, Vol 45 No 1, pp. 56-63, American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD and Otero JF (2006) “Value Driven Design,” *Value World*, Vol. 29 No. 2, pp. 18-25.

Hong WS and Collopy PD (2005) "Technology for Jet Engines: Case Study in Science and Technology Development." Pages 769-777 in Vol. 21, No. 5 of the *Journal of Propulsion and Power*. American Institute of Aeronautics and Astronautics, Reston, VA, Sep-Oct 2005.

Collopy PD (2004) "Military Technology Pull and the Structure of the Commercial Aircraft Industry." *Journal of Aircraft*, Vol. 41, No. 1, 85 – 94.

Reports Published by FFRDCs and Government Units

Deshmukh A, Wortman M, Collopy P, Boehm B, Lane J, Brown W, and Sullivan K. (2010) *Valuing Flexibility* (No. SERC-RT-18). Air Force Inst of Technology, Wright-Patterson AFB OH. Available in DTIC.

Van Atta R, Bittman M, Collopy P, Hartfield B, Harmon B, Kaplan M, Karvonides N, Lippitz M, Mandelbaum J, Marks M, Patterson M, and Sullivan K (2007) *Export Controls and the U.S. Defense Industrial Base*, IDA Document D-3363, Institute for Defense Analyses, Alexandria VA.

Van Atta RH, Lippitz MJ, Bovey R, Wolcott RC, Kindberg L, Vassiliou M, Petonito D, Meyer J,l Collopy P (2004) *Implementing a Strategically-Focused Science and Technology Program for Missile Defense*, IDA-PAPER-P-3919, Missile Defense Agency, Washington DC.

Van Atta R, Baker C, Bovey R, Cannon P and Collopy P (2003) *Science and Technology in Development Environments-Industry and Department of Defense Case Studies*, IDA-P-3853, Institute for Defense Analyses, Alexandria VA.

VanAtta RA, Lippitz MJ, Collopy PD, Hartfield B, and Richmond NJ (1999) *Complex Product Realization 2020: Key Issue Areas*. Institute for Defense Analyses, Alexandria, VA.

Books and Chapters

Collopy PD (2015) “Guidance and Coordination in Large Engineering Systems,” in *Advances in Systems Engineering and Cost Engineering.* American Institute of Aeronautics and Astronautics, Reston, VA. (abstract accepted)

Holt SC, Collopy PD and DeTurris D (2015) “So It’s Complex, Why Do I Care?” Chapter 1 in *Transdisciplinary Perspectives on System Complexity*, Springer. (abstract accepted, full chapter under review)

Collopy PD and Deshmukh A (2014) “Systems Engineering,” in *Systems Engineering for Clean and Renewable Energy Manufacturing.* World Technology Evaluation Council, Lancaster, PA.

Brown OC and Collopy PD (2010) "Fractionated Spacecraft: Exploring Possible Futures of Space Systems," in *Encyclopedia of Aerospace Engineering*, eds. Blockley R and Shyy W.

Collopy PD (1998) *Replanning in Organizations.* Dissertation, Stanford University School of Engineering.

Conference Papers

Schomburg K, Collopy PD, Componation PJ and Krejci C (2015) "Systems Engineering and Project Success at NASA," IIE Systems Engineering Conference (ISERC) 2015, Nashville TN, May 30 – June 2.

Collopy PD (2015) "A Formal Representation of Systems Engineering Activities Post PDR," IIE Systems Engineering Research Conference (ISERC) 2015, Nashville TN, May 30 – June 2.

Roberson JC, Collopy PD (2015) "Comparative Study of the Space Launch System Across Multiple Missions," IIE ISERC Conference, Nashville TN, May 30 – June 2.

Collopy PD (2015) "Systems Engineering Theory: What Needs to Be Done," IEEE Systems Conference, Vancouver, British Columbia, April 13-16.

Collopy PD (2015) "Technical Risk Management," IEEE Aerospace Conference, Big Sky, Montana, March 8-12.

Collopy PD and Mesmer BL (2015) "Report on the Science of Systems Engineering Workshop," AIAA Paper 2015-1865. American Institute of Aeronautics and Astronautics, Reston, VA.

Componation PJ, Collopy PD, Berg S and Hansen J (2014) "The Role of Requirements and V&V in Project Success," *Proceedings of the 2014 Institute of Industrial Engineering Conference*, Montreal, Quebec, June 1-3, 2014.

Triantis KP and Collopy PD (2014) "A Comprehensive Basis for Systems Engineering Theory." IEEE Systems Conference, Ottawa, Ontario, April 1-3.

Componation PJ and Collopy PC (2012) "Systems Engineering Theory: Addressing Complexity and Uncertainty in Space System Architecting," AIAA Paper 2012-5278. American Institute of Aeronautics and Astronautics, Reston, VA.

Lewis KE and Collopy PD (2012) "The Role of Engineering Design in Large-Scale Complex Systems," AIAA Paper 2012-5573. American Institute of Aeronautics and Astronautics, Reston, VA.

Poleacovschi C and Collopy P (2012) "A Structure for Studying the Design of Complex Systems," AC-12-D1.6.6, *Proceedings of the 63rd International Astronautical Congress*, Naples, Italy.

Componation PJ, Collopy PD, Reed GS, Shapiro DG, and Jhala A (2012) "Development of a Research Agenda to Explore Value-Based Software Design," *Proceedings of the ASEM 2012 International Conference*, American Society of Engineering Management, Rolla, MO.

Bloebaum CL, McGowan AMR, Lightfoot MC, Collopy PD, and Hazelrigg GA (2012) "NSF/NASA Workshop on the Design of Large-Scale Complex Engineered Systems – From Research to Product Realization," AIAA Paper 2012-5572. American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD, Bloebaum CL, and Mesmer BL (2012) "The Distinct and Interrelated Roles of Value-Driven Design, Multidisciplinary Design Optimization, and Decision Analysis," AIAA Paper 2012-5575. American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD and Poleacovschi C (2012) "Validating Value-Driven Design." Proceedings of the 3rd Air Transport and Operations Symposium, Delft, Nederland, June 18-20, 2012.

Collopy PD (2012) "A Research Agenda for the Coming Renaissance in Systems Engineering," AIAA Paper 2012-0799. American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD (2011) "Valuing Capacity in Air Transportation," *Proceedings of the 2nd International Air Transport and Operations Symposium*, Delft, The Netherlands, April, 2011.

Deshmukh A and Collopy PD (2010) "Fundamental Research into the Design of Large-Scale Complex Systems," AIAA Paper 2010-8861. American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD and Sundberg E (2010) “Creating Value with Space Based Group Architecture,” AIAA Paper 2010-8799. American Institute of Aeronautics and Astronautics, Reston, VA.

Richardson GG, Penn JP and Collopy PD (2010) “Value-Centric Analysis and Value-Centric Design.” AIAA Paper 2010-6540. American Institute of Aeronautics and Astronautics, Reston, VA.

Deshmukh A, Wortman M, Collopy P, Boehm B, Lane J, Brown W, Levine A, Jacques D, Colombi J, Housel T, Mun J, Madachy R, and Sullivan K (2010) “Valuing Flexibility,” Conference Paper, Accession No. ADA546882, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.

Brown OC, Eremenko P, and Collopy PD (2009) “Value-Centric Design Methodologies for Fractionated Spacecraft: Progress Summary from Phase I of the DARPA System F6 Program.” AIAA Paper 2009-6540. American Institute of Aeronautics and Astronautics, Reston, VA. **(53 citations)**

Collopy PD (2009) “Aerospace System Value Models: A Survey and Observations.” AIAA Paper 2009-6560. American Institute of Aeronautics and Astronautics, Reston, VA. **(40 citations)**

Collopy PD (2008) "Value of the Probability of Success." AIAA Paper 2008-7876. American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD and Horin C (2007) "Evaluation of New Technology for the Federal Aviation Administration." AIAA Paper 2007-7852. American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD (2007) "Adverse Impact of Extensive Attribute Requirements on the Design of Complex Systems." AIAA Paper 2007-7820. American Institute of Aeronautics and Astronautics, Reston VA.

Collopy PD (2006) "Value-Driven Design and the Global Positioning System." AIAA Paper 2006-7213. American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD and Curran R (2005) “The Challenge of Modeling Cost.” Papers CEIAT-2005-0085 (a) and (b). Presented at the 1st International Conference on Innovation and Integration in Aerospace Sciences 4-5 August 2005, Queen’s University Belfast, Northern Ireland, UK.

Shapiro DG and Collopy PD (2004) "Communicating Values to Autonomous Agents." Spring Symposium of the American Association for Artificial Intelligence, Menlo Park, CA.

Collopy PD (2003) "Balancing Risk and Value in System Development." AIAA Paper 2003-6376, American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD (2003) "Assigning Value to Reliability in Satellite Constellations." AIAA Paper 2003-6214, American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD (2002) "Customer Value Analysis of Hub-Spoke Versus Point-to-Point Airline Routes." AIAA Paper 2002-5865, American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD and Horton RR (2002) "Value Modeling for Technology Evaluation." AIAA Paper 2002-3622, American Institute of Aeronautics and Astronautics, Reston, VA.

Collopy PD, and Eames DJH (2001) “Aerospace Manufacturing Cost Prediction from a Measure of Part Definition Information,” SAE Paper 2001-01-3004, SAE Publications, Warrendale, PA. **(20 citations)**

Collopy PD (2001) “Economic-Based Distributed Optimal Design,” AIAA Paper 2001-4675, American Institute of Aeronautics and Astronautics, Reston, VA. **(41 citations)**

Collopy PD (1999) “Joint Strike Fighter: Optimal Design through Contract Incentives.” Pages 335-346 in *1999 Acquisition Research Symposium Proceedings*, Defense Systems Management College.

Collopy PD (1997) “Surplus Value in Propulsion System Design Optimization,” AIAA paper 97-3159. American Institute of Aeronautics and Astronautics, Reston, VA. **(22 citations)**

Collopy PD (1997) “A System for Values, Leadership and Communications in Product Design,” pages 95 - 98 in *International Powered Lift Conference Proceedings*, P-306, SAE Publications, Warrendale, PA.

Krishnamurthy P, Fehling MR, Collopy PD and Courand G (1994) “Toward a Model of Organizational Problem-solving,” pages 139-146 in *Proceedings of the 1994 AAAI Symposium on Computational Organizational Design*, Stanford University, Stanford, CA.

Invited Presentations

Date	Type of Talk	Title	Venue
1996	Special Seminar	Distributed Optimal Design	Joint Strike Fighter Program Office
1996	Special Seminar	Economics and Aircraft Engine Design	Rolls-Royce
1998	Special Seminar	Value Pricing for JSF Production	Joint Strike Fighter Program Office
1998	Workshop Special Presentation	Using Value Models for Price-Based Acquisition	Kickoff Meeting of the DoD Price-Based Acquisition Working Group
1999	Special Seminar	Distributed Optimal Design	Institute for Defense Analyses
2000	Special Seminar	New Frontiers in Turbine Engine Detailed Design	GE Aircraft Engines
2001	Special Seminar	Value and Cost Modeling	Edwards AFB, Propulsion Directorate, Rocket Engine Division
2001	Symposium Talk	Distributed Optimal Design and Optimal Contracting	AIAA Economics Technical Committee Meeting, OAI
2001	Special Seminar	A Value Model for Long-Range Strike Interdiction	Lockheed Martin Aeronautics, Ft. Worth TX
2001	Special Seminar	Value and Medium Range Strike Interdiction	Northrop Grumman
2003	Conference Inv Talk	Risk and Opportunity	AIAA Delta Forum
2003	Symposium Talk	Hazards of Weight-Based Cost Estimates	AIAA Economics Technical Committee Meeting, Univ of Illinois
2003	Symposium Talk	Military Technology Pull and the Structure of the Commercial Aircraft Industry	AIAA Economics Technical Committee Meeting, Hanscomb AFB
2004	Conference Inv Talk	The Role of Aerospace in the US Economy	AIAA Delta Forum
2004	Symposium Talk	Aerospace Manufacturing Cost Prediction	AIAA Economics Technical Committee Meeting, JPL
2004	Conference Inv Talk	Economic Considerations for Manned versus Unmanned Planetary Exploration	AIAA Space 2004 Conference
2004	Workshop Talk	Contracts with Flexibility for Optimization	Model-Based Contracting Workshop at NASA Ames
2004	Conference Inv Talk	Stakeholder Value and the Evolution of Commercial Aircraft	Transportation Research Forum, Chicago IL
2004	Conference Inv Talk	Economics of Supersonic Passenger Aircraft	Aerospace Sciences Meeting, Reno NV
2003	Conference Inv Talk	Designing the Best	AIAA Delta Forum
2005	Symposium Talk	Value-Driven Design	AIAA Management Technical Committee
2005	Regular Seminar	Value-Driven Design	Hanscomb AFB
2006	Special Seminar	Complex Product Design: Today and Tomorrow	National Science Foundation
2006	Special Seminar	Value-Driven Design: An Initiative to Move Systems Design from Requirements to Optimization	Lockheed Martin Corporate Headquarters
2007	Special Seminar	Value-Driven Design	University of Illinois, Dept of General Engineering
2007	Symposium Talk	Weight and Cost Growth: Problems in Aerospace Systems Development	AIAA Value-Driven Design Committee Meeting
2007	Regular Seminar	Value-Driven Design	Sandia National Lab Systems Engineering Forum

2008	Special Seminar	Engineering Design: Today and Tomorrow	National Science Foundation
2008	Regular Seminar	Value-Driven Design	NASA Distinguished Lecture Series in Systems Analysis
2008	Regular Seminar	Value-Driven Design	Rolls-Royce Systems Engineering Forum (worldwide webex)
2010	Keynote Address	Delivering Value to Operators with Improved Design Processes	Air Transport Operations Symposium, TU Delft
2010	Conference Inv Talk	Introduction to Value-Driven Design	Air Transport Operations Symposium, TU Delft
2010	Luncheon Keynote	Value in Complex Design	Defense Research & Engineering Workshop on Complex Systems
2011	Workshop Talk	Extreme Manufacturing	Castrol 2020 Workshop, Luton Hoo, England
2011	Regular Seminar	Value-Driven Design	Rolls-Royce Corporate Headquarters, Derby, England
2011	Special Seminar	Designing Large-Scale Complex Systems	Office of Naval Research
2012	Regular Seminar	Complex Engineered Systems and the End of Requirements	NASA Lecture Series in Complex Systems, Langley Research Center
2012	Conf erence Special Session	Introduction to Value-Driven Design	Complex World Symposium, TU Delft
2012	Symposium Talk	Value-Driven Design	AIAA Systems Engineering Technical Committee
2013	Special Seminar	A Bright Future for Engineering Design	University of Michigan, Dept of Mechanical Engineering
2013	Special Seminar	A Watershed Moment for Systems Engineering	Purdue, School of Industrial Engineering
2013	Plenary Lunch Talk	The NSF Systems Science Program	CSER Conference, Atlanta
2013	Special Seminar	Research in Engineering and Systems Design	U Colorado Boulder, Departments of Aerospace and Mechanical Engineering
2013	OR Seminar	Engineering Design and Systems Science	Penn State University
2013	OR/Systems Sem.	Frontiers in Systems Engineering Research	George Mason University
2013	Conference Plenary	Design and Engineering Design in a Complex World	Design Research Conference, Chicago
2014	Distinguished Speaker Series	Complex Systems and the End of Requirements	U Oklahoma ISE Department
2014	Graduate Seminar Speaker	Complex Systems and the End of Requirements	Iowa St IMSE and AE Departments
2014	Conference Plenary	Bridging the Gap between Complexity Science and Systems Engineering	CESUN Conference, Hoboken NJ
2015	Workshop Invited Presentation	How Cost Estimates Interact with Actual Cost	MDA Cost Workshop, Huntsville AL
2015	Workshop Special Session	Theory of Systems Engineering	INCOSE International Workshop, Torrance CA
2015	Conference Special Session	Theory of Systems Engineering (invited)	IEEE Systems Conference, Vancouver BC
2015	Conference Special Session	Theory of Systems Engineering (invited)	CSER Conference, Hoboken NJ
2015	Workshop Distinguished Presentation	Foundational Disciplines to Prepare Students for Excellence in Model-Based Systems Engineering (invited)	Joint ACCESS center and LCCC center workshop on Systems Engineering Education, Lund University, Sweden

2015	Conference Special Session	Theory of Systems Engineering (invited)	ISERC Conference, Nashville TN

Research

Sponsored Research Projects as PI, Co-PI or equivalent (Total $9.2 million)

Date	Title	PI	Funding Organization	Gross Amount
1984	INTERFACE (Advanced Digital Control Study)	Harold Brown	AFRL	$ 100,000
1997	Military Engine Value Model	Paul Collopy	GE	$ 50,000
1997	Diesel Engine Value Model	Paul Collopy	Cummins	$ 15,000
1997	SBIR: Compressor Clearance Monitoring.	T Yoshinaka	AFRL	$ 100,000
1997	Value Modeling for Commercial Helicopter Design	Paul Collopy	Rolls-Royce	$ 35,000
1997	Information-based Cost Prediction	Paul Collopy	Rolls-Royce	$ 62,940
1998	Application of Distributed Optimization to a Gas Turbine Engine	Paul Collopy	Rolls-Royce	$ 45,000
2000	Advances in Integrated Product and Process Development	Richard Van Atta	OSD/SE	$ 50,000
2000	RB255 Value Analysis	Paul Collopy	Rolls-Royce	$ 21,300
2000	Strike UAV Value Analysis	Paul Collopy	Rolls-Royce	$ 23,300
2001	Long Range Interdiction Value Model	Paul Collopy	AFRL - GE	$ 35,000
2001	Next Generation Turbine Value Model	Frank Macri	DOE (NETL)	$ 50,000
2002	Financial Health of US Rail and Intermodal Carriers	Richard Holcomb	DOE (NREL)	$ 50,000
2002	Technologies for Defense against Human-Carried Explosives	Richard Holcomb	DDR&E	$ 125,000
2003	Turbine Engine Science and Technology Case Study	William Hong	MDA	$ 100,000
2003	High Value Technologies for Electronic Attack	Richard Holcomb	DDR&E	$ 350,000
2004	Implementing a Strategically Focused Science and Technology Plan for Missile Defense	Richard Van Atta	Missile Defense Agency	$ 750,000
2004	Techs for Wide Area Maritime Surveillance and Interdiction	Richard Holcomb	DDR&E	$ 250,000
2004	Disruptive Technologies for Terrorists	Richard Holcomb	DDR&E	$ 250,000
2005	Chemical and Biological Threat Analysis for Air Mobility	Richard Holcomb	USAF AMC	$ 250,000
2006	Economics Effects of Export Control on the Defense Industrial Base	Richard Van Atta	Office of the Secretary of Defense	$ 792,000

2006	Technology Portfolio Optimization	John-Paul Clarke	FAA	$ 318,000
2007	Evaluation of Economic Modeling within the Aviation Portfolio Management Tool	Paul Collopy	FAA	$ 20,000
2007	Next Generation Air Transportation System Analyses	Richard Van Atta	National Science Foundation	$ 450,000
2008	Assessment of the Return on Investment in Defense Basic Science	Brent Fisher	DDR&E	$ 600,000
2010	RT-20: Valuing Flexibility	Abhijit Deshmukh	OSD/SE	$ 250,000
2010	EAGER: Exploratory Research on Detailed Design of Large Scale Complex Systems	Paul Collopy	NSF	$ 75,000
2011	Extreme Manufacturing Workshop	Richard Van Atta	NIST	$ 100,000
2011	Assessment of Optimization as a Structural Framework for Design	Paul Collopy	NSF	$ 400,000
2011	MSFC Aerospace and Systems Engineering Program	Michael Griffin, Paul Collopy, Phillip Farrington	NASA	$ 3,000,000
2012	Space Market Study	Paul Collopy	Moog	$ 31,656
2013	Engineering Solutions and Prototyping	Paul Collopy	NASA	---
2014	Strategic Planning and Science and Technology (S&T) Portfolio Development	Robin Dillon	OSD/SE	$ 302,673
2014	Control Versus Prediction in Systems Engineering	Paul Collopy	NSF	$ 119,462

Sponsored Workshops (Total $1.0 million)

Date	Title	PI	Funding Organization	Gross Amount
1999	Product Realization 2020	Richard Van Atta	DARPA	$ 100,000
2005	Hypersonics Technology Executive Independent Review Team	William Hong	DDR&E	$ 60,000
2005	Value-Driven Design Workshop	Paul Collopy	Lockheed	$ 10,000
2005	Value-Driven Design Workshop	Paul Collopy	United Technologies	$ 10,000
2006	Value-Driven Design Workshop	Paul Collopy	Orbital Sciences	$ 10,000
2010	Fractionated Spacecraft Wargame	Michael Perry	DARPA	$ 500,000
2010	Engineered Systems Design	Abhijit Deshmukh	NSF	$ 100,000
2010	Design of Large Scale Engineered Complex Systems	Paul Collopy	NSF	$ 50,000
2011	Workshops on Systems and Modeling Advances	Paul Collopy	NSF	$ 31,000
2012	NSF-NASA Workshop of Engineering Complex Systems	Christina Bloebaum	NSF/NASA	$ 50,000

2014	NSF Workshop of the Theory of Systems Engineering	Paul Collopy	NSF/SERC/ INCOSE	$ 80,000

2015	NSF Workshop of Systems Engineering Education	William Scherer	NSF	$ 50,000