Erik D. Goodman

Professor Emeritus, Electrical and Computer Engineering
Director, then Executive Director, BEACON Center for the Study of Evolution in Action (an NSF Science and Technology Center) (http://beacon-center.org)
Professor, Electrical and Computer Engineering
Professor, Mechanical Engineering
Professor, Computer Science and Engineering
Co-Director, Genetic Algorithms Research and Applications Group (MSU GARAGe)

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Co-Founder, Red Cedar Technology, Inc. (now a wholly-owned subsidiary of Siemens)
(and Vice President for Technology, 1999-2010)
4572 S. Hagadorn Road, Suite 3-A
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EDUCATION

Ph.D., Computer and Communication Sciences, University of Michigan, 1972; Dissertation Title: *Adaptive Behavior of Simulated Bacterial Cells Subjected to Nutritional Shifts*
M.S., Systems Science, Michigan State University, 1968
B.S., High Honors, Mathematics, Michigan State University, 1966

HONORS AND PROFESSIONAL ACTIVITIES

Michigan Distinguished Professor of the Year, awarded February, 2009 (by Presidents Council, State Universities of Michigan)

International Recognition
Outstanding Contributions Award, ACM SIGEVO, 2023
Senior Fellow, International Society for Genetic & Evolutionary Computation, elected 6/2004
Member, Academy of Engineering Sciences of Ukraine, elected Oct., 2000
Guest Professor, Wuhan University of Technology, Wuhan, PRC, appointed 10/2009
Honorary Maasai Elder, Losirwa Village, Monduli Distr. Arusha Region, Tanzania, May, 2008
Advisory Professor, Shanghai Business School, Shanghai, PRC, appointed 5/2007
Advisory Professor, Shanghai Maritime University, Shanghai, PRC, appointed 5/2007
Advisory Professor, Shanghai University, Shanghai, PRC, appointed 11/2007
Advisory Professor, Tongji University, Shanghai, PRC, appointed 12/2002
Advisory Professor, East China Normal University, Shanghai, PRC, appointed 1/2002
Honorary Doctorate, Dneprodzerzhinsk State Technical University, 12/1996

Academician, International Academy of Informatics (Moscow), 5/1993

University Recognition

Distinguished Faculty Award, Michigan State University, awarded February, 2011

MSU Curricular Service-Learning and Civic Engagement Award, May, 2009
Alumni Club of Mid-Michigan Quality in Undergraduate Teaching Award, awarded in February, 2007 (Michigan State University's highest award for teaching)
Outstanding Faculty/Staff Award, MSU Resource Center for Persons with Disabilities, 03/2005
Withrow Exceptional Service Award, College of Engineering, Michigan State U., 04/2004

Additional Honorary Societies Elected into Membership:
Phi Kappa Phi
Sigma Xi
Omicron Delta Kappa
Pi Mu Epsilon
Phi Eta Sigma

Scholarships and Fellowships Awarded
MSU Alumni Distinguished Scholar
NSF Trainee
NASA Trainee
IBM Fellowship

Professional Activities:
Member, College of Reviewers for the NSF's Big Idea: Growing Convergence Research (GCR), 2019 –
Charter Member, Advisory Council, Academy for Critical Incident Analysis, John Jay College, City University of New York, February, 2008-2016
Founding Chair, ACM Special Interest Group for Genetic & Evolutionary Computation, January, 2005 – July, 2007
Member, Executive Committee, ACM SIG for Genetic and Evolutionary Computation (SIGEVO), 2005-2009; re-elected for July, 2009 – July, 2015
Chair of the Executive Board, International Society for Genetic and Evolutionary Computation, July, 2001 – December, 2004
General Co-Chair, ACM/SIGEVO 2009 World Summit on Genetic and Evolutionary Computation, Shanghai, China, June 12-14, 2009
General Chair, Genetic and Evolutionary Computation Conference ("GECCO-2001"), San Francisco, July 7-11, 2001
Editorial Board, *Evolutionary Computation,* elected for 2002-2008, 2009-2015
Editorial Advisory Board, *Genetic Programming and Evolvable Machines*, 2008-
Editorial Board, *Journal of Applied Soft Computing, 2002-2013*
Editorial Board, *International Journal of Applied Intelligence,* 2006-2008
Editorial Board, *Journal of Critical Incident Analysis*, 2010-
Advisory Board, Springer Natural Computing Book Series, 2018-
Vice Chair, Genetic and Evolutionary Computation Conference – 2000 ("GECCO-2000"), Las Vegas, July, 2000

Member of Core Faculty, Center for Russian and East European Studies, MSU, 1999 –
Member, Scientific Advisory Board, Kellogg Biological Station Long Term Ecological Research (LTER) site, 2008-
General Chair, Seventh International Conference on Genetic Algorithms, East Lansing, 1997
General Chair, First International Conference on Evolutionary Computation and its Applications, Presidium, Russian Academy of Sciences, Moscow, June, 1996
General Co-Chair, 1987 International Computer Graphics Conference, co-sponsored by SAE and Engineering Society of Detroit
Executive Council, International Society for Genetic Algorithms, 1997 – 2003
Executive Board, International Society for Genetic and Evolutionary Computation, 2000 - 2003
Guest Editor, Special Issue on Evolutionary Computation, *Obozrenie Prikladnoy i Promyshlennoy Matematiki*, (*Review of Applied and Industrial Mathematics*), 1997 (in Russian)
American Institute of Aeronautics and Astronautics CAD/CAM Technical Committee (Outstanding Contributions Award, 1990), Chair of Research & New Directions Subcommittee, 1987-88, Chair of Conferences & Workshops Subcommittee, 1988-89
Member, National Visiting Board for NSF grant from Advanced Technology Education program
International Program Committee, Internat. Aerospace Congress (Moscow), 1997, 2000
Reviewer for following journals: *Evolutionary Computation, IEEE Transactions on Systems, Man, and Cybernetics, IEEE Transactions on Education, IEEE Transactions on Evolutionary Computation, ASME Journal of Manufacturing Science and Engineering, Numerical Heat Transfer, Complex Systems, Applied Intelligence, Information Sciences, Artificial Intelligence in Engineering Design and Manufacturing, Journal of Robotic Systems*
Member of Organizing Committee, CAD 93, CAD 94, CAD 95 (Yalta), ENIAC 50 Conference (Moscow, 1996)
Local News Editor, Southeast Michigan IEEE Chapter, *IEEE Wavelengths,* 1977-80
Reviewer, ASME Design Automation Conference, 1996
Reviewer for Electro-Information Technology Conference, IEEE, 2006.
Reviewer, Division of Environmental Biology, National Science Foundation
Reviewer, MSU All-University Research Initiation Grants, MSU Outreach Grants
Chair/organizer of various conference sessions for Society of Manufacturing Engineers (SME), American Institute of Aeronautics and Astronautics (AIAA), Society of Automotive Engineers (SAE)

Memberships (not all continuous or current):
Academician, International Academy of Information Networking (Moscow)
Member (elected), Academy of Engineering Sciences of Ukraine
International Society for Genetic Algorithms
International Society for Genetic and Evolutionary Computation (Executive Board, 2000-2004; Chair of Executive Board, 2001-2004)
American Institute of Aeronautics and Astronautics
Society for Environmental Toxicology and Chemistry (Charter Member)
Association for Computing Machinery (in 1980s, member of Special Interest Group for Graphics, SIGGRAPH; in 2005, was the founding chair of a new SIG, SIGEVO, the Special Interest Group for Genetic and Evolutionary Computation, 2005-2007; elected member of Executive Committee, 2005-2021)

Institute of Electrical and Electronics Engineers
IEEE Computer Society
Society of Manufacturing Engineers (Senior Member)
Computer and Automated Systems Association, SME
Society of Automotive Engineers
Engineering Society of Detroit
Society for Computer Simulation
American Association for the Advancement of Science
Torch Club of Greater Lansing (Board of Directors, 2008-2012; President, 2010-11)

Listings:
Who's Who in the World
Who's Who in America
Who's Who in Science and Engineering
Who's Who in the Midwest
Who's Who in American Education
Who's Who in Finance and Business
American Men and Women of Science

EMPLOYMENT HISTORY
(Note: All appointments below began and ended in August of the year shown unless
　　　　otherwise noted)
2022 – present Professor Emeritus, Electrical and Computer Engineering, MSU
2018 – 2022 Executive Director and Co-PI, BEACON Center for the Study of Evolution
　　　　　　in Action
2010 - 2018 Director and Principal Investigator, BEACON Center for the Study of Evolution
　　　　　　in Action (a National Science Foundation Science and Technology Center)
2006 – 2010 Design Coordinator, Department of Electrical and Computer Engineering,
　　　　　　Michigan State University
1999 - 2010 Vice President, Technology, and Co-Founder, Red Cedar Technology, Inc.
　　　　　　(formerly Applied Computational Design Associates, Inc.)
1999 – 2013 Member, Board of Directors, Red Cedar Technology, Inc. (co. was sold in 2013)
1993 (January) – 2003 (January) Director, Manufacturing and Materials Research Consortium,
　　　　　　　Michigan State University
　　　Responsible for formation and direction of an industrial consortium administered through
　　　the Case Center for Computer-Aided Engineering and Manufacturing. Membership
　　　included major automobile manufacturers and supplier companies, one governmental
　　　agency.
1993 (September) – 1994 (March) Guest Professor, Beijing University of Aeronautics and
　　　　　　Astronautics
　　　During my sabbatical leave at Bei Hang, I conducted research and taught a non-credit
　　　course on evolutionary computation for graduate students from Bei Hang, Tsinghua, Bei
　　　Da, and the Academy of Sciences
1993 - 1998 Director, Russian/American Joint Education/Research Consortium for Intelligent
　　　　　　　CAD and Genetic Algorithms (ICAD/GA Consortium)

Responsible for formation of new consortium including four Russian universities, which engaged in collaborative research in theory of genetic algorithms and application of genetic algorithms to problems in intelligent design and manufacturing.

1993 – 2022 Co-Director, Genetic Algorithms Research and Applications Group (GARAGe)
Responsible, with co-director Bill Punch, for research activities in genetic algorithms conducted by a group of regular faculty, visiting faculty, post-doctoral research associates, graduate research assistants, and other graduate and undergraduate students. Personally developed a Genetic Algorithms toolkit (GALOPPS) for joint use in Russia, China, and U.S—supported users who downloaded it for about 6 years. Funded GA research in Russia (Russian GARAGe) through the International Science Foundation.

1993 - 2009 Director, Chinese/American Consortium for Genetic Algorithm Research
Responsible for formation of research collaborations with three universities in China and the Chinese Academy of Sciences. Developed and provided first releases of new Genetic Algorithms toolkit (GALOPPS) to faculty and students in China during sabbatical leave; introduced key concepts in seminar course. Added additional Chinese universities to list of collaborators through lecture visits, introduction of software, conducting of joint research, and hosting of visiting scholars (pre-doctoral and visiting professors). Informal activity, not a legally organized entity. Responsible for planning of an ACM SIGEVO-sponsored conference on evolutionary computation in Shanghai, May, 2009.

1994 - 2001   Professor, Materials Science and Mechanics, MSU (dept. eliminated, 2001)

1992 - Present Professor, Mechanical Engineering, MSU

1984 - Present Professor, Electrical Engineering, MSU (later renamed Electrical and Computer Engineering

1983 - 2002   Director, A. H. Case Center for Computer-Aided Engineering and Manufacturing, College of Engineering, MSU
Responsible for administration and development of a leading center for instruction and research in CAD/CAM and computer-aided engineering. Duties include staff recruitment and supervision, planning for expansion; industrial liaison activities to promote sponsorship of research of engineering faculty; seeking donations of cash and equipment to enable center operation and growth; direction of research involving computer graphics and geometric modeling applied to industrial CAD and CAM problems, frequent visits to industry for technical exchange, including no-cost limited-term consulting regarding CAD/CAM acquisition by companies; representing center in several technical groups and professional meetings; operation of an international technology incubator function to provide access to foreign technology for U.S. companies; establishment of international exchange agreements to promote research; liaison with numerous international visitors. (In 1995, the center's Division of Computing Services was made an independent unit, the Division of Engineering Computing Services, with a specialist director reporting to the College of Engineering. The Case Center continued as the research and industrial outreach unit. The center ceased operation in 2002.)

1983 - 1986 Director, Engineering Computer Facility, College of Engineering, MSU
Responsible for planning development of a significant network of computer resources within the college. Duties include administering current facilities and consulting operation; promoting development of courseware by faculty; seeking of industrial and vendor support for improved facilities; representing college on several committees

overseeing university computer resources; participating in design and technical specification of broadband and baseband cable data networks. Facility was merged with Case Center, 1986.

1978-1984   Associate Professor, Electrical Engineering and Systems Science, MSU
1972-1978   Assistant Professor, Electrical Engineering and Systems Science, MSU

FUNDED RESEARCH

<u>As Principal Investigator (or Project Director):</u>
Initiated/directed or co-directed the following funded research projects (total funding about $51 million from sources including National Science Foundation, General Motors, Chrysler, Ford, General Dynamics, National Research Council, SDRC):

RECENT GRANTS:

BEACON: an NSF Center for the Study of Evolution in Action (an NSF Science and Technology Center). Principal Investigator on proposal, 2008-2010; center director, 2010-2019; Exec. Dir., 2019--. Funded at $47.5 million, August, 2010 – July, 2020. Partnering with MSU are NC A&T State University, University of Texas (Austin), University of Idaho and University of Washington. (http://beacon-center.org)

"INNOVIZATION: Discovery of Innovative Knowledge through Optimization and Machine Learning." SPARC: Scheme for Promotion of Academic Research Collaboration, Government of India, $144,000, funded 8/2019 – 7/2021. Dhish Saxena (PI), Gondi Ananthasuresh (co-PI), Kalyanmoy Deb (Internat. PI), Erik Goodman (Internat. co-PI).

 "UHD-SoS: Enabling Design of Ultra High Definition Structure of Structures," Subcontract to Siemens GMBH proposal to DARPA, MSU portion $600,000, 8/31/2016. January, 2017, December, 2019 (co-PI with Ron Averill (PI), Kalyan Deb (co-PI), Alex Diaz (co-PI).

"Addressing the Agricultural Labour Burden in an Era of Feminization and Aging of Rural Communities in East Africa: A Human-Centered Design Approach to Solve Old Problems," Co-PI with Prof. Jennifer Olson (PI), Prof. Susan Wyche (co-PI), Enda Tech (Arusha, Tanzania) and several Kenyan partners on a grant from MSU's Alliance for African Partnerships program, $50,000 2017-2018.

"Multi-Objective Optimization Model," MRIVCC (Dow Chemical Co.), co-PI with Kalyanmoy Deb (PI), $67,000. 8/16/2016-12/31/2017.

"Supply Chain Automation," MRIVCC (Dow Chemical Co.), co-PI with Kalyanmoy Deb, $67,000. 8/16/2016-12/31/2017.

"Multi-Level Supply Chain Optimization," MRIVCC (Dow Chemical Co.), co-PI with Kalyanmoy Deb (PI), $67,000. 8/16/2015-8/15/2016.

 "Improving Governance of Next-Generation ICT Infrastructure," National Science Foundation CDI-Type I, co-PI with Johannes Bauer and Kurt DeMaagd, $698,030. 9/15/2009 – 9/14/2012.

"Automated Design of Advanced Mechatronic Systems (ADAMS)," with Zhun Fan (Tech. Univ. of Denmark (DTU), PI), Ole Sigmund (DTU, PI), Torben Sorenson (DTU, co-PI), Ronald Rosenberg (MSU, co-PI), Ronald Averill (MSU, co-PI). Funded by Danish Research Council for Technology and Production Sciences, March 1, 2007 - Feb. 28, 2010; 1,600,000 kroner

(US$279,179). (A Ph.D. student spent one year at MSU as a visiting scholar under direction of E. Goodman under support of this grant.)

OTHER GRANTS (1991-2009)

Award Amount	Award Begin Date	Award End	PI 1 Name	PI 1 Credit	Grantor	Title
$ 48,947	1/1/2008	12/31/2008	Demaagd; Kurt	50	LENOVO CO	INTERNET KIOSKS IN RURAL AFRICA
$ 3,500	1/1/2008	8/31/2008	Goodman; Erik	100	CLARKSON AEROSPACE CORPORATION	DESIGN DAY SUPPORT - SENSORS TECHNICAL THRUST RESEARCH
$ 105,650	8/1/2002	7/31/2004	Goodman; Erik	67	NATL SCIENCE FOUNDATION	AUTOMATED DESIGN OF MECHATRONIC SYSTEMS USING BOND GRAPHS AND GENETIC PROGRAMMING
$ 102,938	8/1/2001	7/31/2002	Goodman; Erik	67	NATL SCIENCE FOUNDATION	AUTOMATED DESIGN OF MECHATRONIC SYSTEMS USING BOND GRAPHS AND GENETIC PROGRAMMING
$ 100,000	1/1/2001	12/31/2001	Goodman; Erik	100	GENERAL MOTORS FOUNDATION	GENERAL RESEARCH MANUFACTURING MATERIALS CONSORTIUM SUPPORT
$ 90,021	9/1/2000	8/31/2001	Steinfield; Charles	23	NATL SCIENCE FOUNDATION	GLOBALLY DISTRIBUTED ENGINEERING DESIGN TEAMS: CULTURAL; SOCIAL; AND TECHNOLOGICAL FACTORS INFLUENCING GROUP PROCESS & P
$ 10,000	8/3/2000	6/30/2002	Steinfield; Charles	23	NATL SCIENCE FOUNDATION	GLOBALLY DISTRIBUTED ENGINEERING DESIGN TEAMS: CULTURAL; SOCIAL; AND TECHNOLOGICAL FACTORS INFLUENCING GROUP PROCESS & P
$ 100,110	8/15/2000	7/31/2001	Goodman; Erik	67	NATL SCIENCE FOUNDATION	AUTOMATED DESIGN OF MECHATRONIC SYSTEMS USING BOND GRAPHS AND GENETIC PROGRAMMING
$ 100,000	8/16/1999	8/15/2005	Goodman; Erik	100	GENERAL MOTORS CORPORATION	MSU MANUFACTURING RESEARCH CONSORTIUM
$ 125,000	9/1/1999	8/31/2000	Steinfield; Charles	23	NATL SCIENCE FOUNDATION	GLOBALLY DISTRIBUTED ENGINEERING DESIGN TEAMS: CULTURAL; SOCIAL; AND TECHNOLOGICAL FACTORS INFLUENCING GROUP PROCESS & P
$ 124,907	9/1/1998	8/31/1999	Steinfield; Charles	23	NATL SCIENCE FOUNDATION	GLOBALLY DISTRIBUTED ENGINEERING DESIGN TEAMS: CULTURAL; SOCIAL; AND TECHNOLOGICAL FACTORS INFLUENCING GROUP PROCESS & P

$ 100,000	8/16/1998	8/15/1999	Goodman; Erik	100	GENERAL MOTORS CORPORATION	MANUFACTURING RESEARCH CONSORTIUM
$ 500,000	8/16/1998	8/15/2003	Goodman; Erik	100	FORD MOTOR COMPANY	MANUFACTURING RESEARCH CONSORTIUM
$ 59,875	3/1/1998	12/31/1999	Averill; Ronald	50	GENERAL MOTORS CORPORATION	COUPLED OPTIMIZATION OF CRASHWORTHINESS AND VIBRATION FREQUENCIES IN AUTOMOTIVE STRUCTURES USING GENETIC ALGORITHMS
$ 97,150	10/15/1997	10/14/1998	Goodman; Erik	0	FORD MOTOR COMPANY	A DRY PROCESS FOR ADHESION OPTIMIZATION IN FABRICATION AND ROLL LAMINATION OF FLEXIBLE CIRCUITS USING A COMBINATION OF U
$ 200,000	8/16/1996	8/15/1998	Goodman; Erik	100	GENERAL MOTORS CORPORATION	MSU MANUFACTURING RESEARCH CONSORTIUM
$ 90,184	10/24/1996	10/23/1997	Steinfield; Charles	50	ELECTRONIC DATA SYSTEMS (EDS)	SUPPORTING GLOBALLY DISTRIBUTED ENGINEERING DESIGN TEAMS WITH COMM TECHNIQUES
$ 3,750	9/5/1996	9/4/1997	Goodman; Erik	100	ADVANCED COMPOSITE SYSTEMS INC.	GENERAL RESEARCH
$ 125,000	8/16/1996	8/15/2001	Goodman; Erik	100	SIMPLEX PRODUCTS	MSU MANUFACTURING RESEARCH CONSORTIUM
$ 45,838	4/29/1996	12/31/1996	Steinfield; Charles	50	ELECTRONIC DATA SYSTEMS (EDS)	Team Gems: The Effect of Collaborative Technology on Engineering Design Teams
$ 15,642	4/29/1996	12/31/1996	Steinfield; Charles	50	ELECTRONIC DATA SYSTEMS (EDS)	Team Gems: The Effect of Collaborative Technology on Engineering Design Teams
$ 100,000	8/16/1994	8/15/1995	Goodman; Erik	100	GENERAL MOTORS CORPORATION	MSU MANUFACTURING RESEARCH CONSORTIUM
$ 100,000	5/30/1995	5/29/1996	Goodman; Erik	100	DEFENSE REUTILIZATION &MARKETING SERVICE	MSU Manufacturing Research Consortium Membership
$ 400,000	1/1/1996	12/31/2000	TUMMALA;R	45	NATL SCIENCE FOUNDATION	Environmentally Conscious Mfg: Integrating Environmental Issues Into Product Design Planning; and Manufacturing
$ 100,000	8/16/1995	8/15/1996	Goodman; Erik	100	GENERAL MOTORS CORPORATION	MSU Manufacturing Research Consortium
$ 450,000	8/16/1993	8/15/1998	Goodman; Erik	100	FORD MOTOR COMPANY	MICHIGAN STATE UNIVERSITY MANUFACTURING RESEARCH CONSORTIUM

$ 11,100	2/15/1993	11/14/1993	Goodman; Erik	100	NATL RESEARCH COUNCIL I	COLLABORATIVE RESEARCH ON NC TOOLPATH GENERATION
$ 27,687	9/16/1991	12/15/1991	Goodman; Erik	100	CIMLINC	PORTABILITY OF SOFTWARE FOR VERIFICATION OF NC TOOLPATHS
$ 10,000	1/9/1991	12/31/1991	Goodman; Erik	100	ELECTRONIC DATA SYSTEMS (EDS)	EDS/MSU JOINT PROGRAM IN COMPUTER-AIDED ENGINEERING

Earlier Grants as PI/Co-PI (tabular data no longer available)

 "Enhancements to Algorithms for Robotic Spray Verification," General Dynamics Corporation, $16,508, 4/1/89-9/30/89.

"Off-Line Verification of Robotic Spray Application Programs," General Dynamics, $169,454; 7/1/87-6/30/88.

"Algorithms for Display of Trimmed Surfaces," Structural Dynamics Research Corporation, $55,000, 7/1/87-9/30/88.

"Expert System for Control of Lost Foam Pattern Molding," General Motors, Central Foundry Division, $22,205, 7/28/86 - 7/31/87.

"Techniques for Conversion of Chrysler In-House Surfaces to Allow Communication of Design Data," Chrysler Corporation, $41,209, 1/1/86-9/30/86.

"CAD/CAM for Creating Experimental Parts," Chrysler Corp., $75,138, 9/1/85-11/30/86.

"Research and Development in Surface Reflectance Algorithms," General Dynamics Corporation, $50,000, 4/1/85-3/30/86.

"Research in CAD Applications and Athletic Biomechanics," Wolverine World Wide Corporation, Brooks Division, $351,000 (Case Center portion), 1984 - 1992.

"Research and Development Study Project in Color Graphics Application," General Dynamics Corporation, $50,000, 10/1/83-9/30/84.

"CAD/CAM Graphics," General Dynamics Corporation, $25,000, 9/1/82-8/31/83.

"Enhancement of MSU Colorscope for Trimming, Z-Clipping, and Multiple Hue Shading of Bicubic Patches," General Dynamics Corporation, $25,000, 10/1/82-9/30/83.

"Pseudocoloring of CAD Surfaces According to Curvature Measures," Ford Motor Company, $15,465, 1983.

"Integration of Interactive Graphics into Engineering and Science Instruction," National Science Foundation, $247,067, 5/15/79-10/31/82.

"Research and Development of Study Project in Color Graphics Applications," General Dynamics Corporation, $50,000, 9/16/80-8/31/82.

"Ecosystem Responses to Alternative Pesticides in the Terrestrial Environment: A Systems Approach" Environmental Protection Agency, $675,000, 7/75-9/81.

"A Theoretical and Experimental Approach to Prediction and Control of Eutrophication of a

Lake Ecosystem," National Science Foundation, $248,584, a portion of NSF GI-20 RANN Grant, 4/15/74-4/14/76.

As Director of Consortial Activities:

Director of MSU Manufacturing Research Consortium, 1993 – 2003; administered over $200,000/year budget to provide seed funding for new research areas of interest to the industrial members. Actively recruited additional members through research presentations at industrial and government sites. Significant spinoff funding resulted ($1.2 million in academic year 1998-99, for example). (Many of the grants to the consortium are listed in the table above.)

Co-Director, Genetic Algorithms Research and Applications Group (GARAGe) (with Wm. F. Punch). Research group includes co-directors, 4 affiliated MSU faculty, 3 visiting faculty members, 2 visiting scholars, and 8-10 graduate students. Conducts funded projects and research initiation on GA application and theory.

Co-Director, Russian GARAGe
Initiated as a funded subset of the Russian/American Joint Education/Research Consortium for Intelligent CAD/CAM/CAE and Genetic Algorithms, also founded by Goodman and Punch in collaboration with V. L. Uskov of Moscow State Technical University (Bauman). Four collaborative projects with Russian investigators received low-level funding for research initiation, from U.S. industry, administered through the International Science Foundation.

As a Co-investigator:

"Addressing the Agricultural Labour Burden in an Era of Feminization and Aging of Rural Communities in East Africa: A Human-Centered Design Approach to Solve Old Problems," MSU Alliance for African Partnerships, funded at $50,000 for 2017-2018.

"Rapid Product Development in International Production," (with J. Lloyd, co-PI; P. Kwon, co-PI; M. Chung, Senior Faculty; F. Pourboghrat, Senior Faculty; and E. Goodman, Senior Faculty), National Science Foundation, subcontract to University of Texas Pan American, MSU portion: $289,000, 1/1/00 – 12/31/02.

"New Web-Based CAD Framework for Design of Complex Technical Systems," foreign collaborator, Proj. #1636, Internat. Science and Technology Center of Ukraine, July, 2000 – June, 2003, A. P. Petrenko, principal investigator, National Technical University of Ukraine (Kiev Polytechnic Institute), $180,000 (most funds to be spent in Ukraine).

"Geometry of Helical Gear and Tool Surfaces for Plunge Shaving of Involute Gears," with S. Radzevitch, V. Palaguta, New Venture Gear, $18,472, July 15 – Sept. 30, 1998, and Phase II, $23,000, Jan. 1, 1999 – August 31, 1999.

"Introduction to ALLTED All-Technology Design System," Roberts Sinto Corp., $10,000, July-August, 1994 (with V. Tchkalov).

"Optimization of Cutting Conditions for Hobbing," Chrysler, $24,000, June - August, 1994 (with N. Smirnov, S. Radzevitch).

"Optimization of Cutting Condition", Chrysler, $7,000, July - August, 1993 (with N. Smirnov, S. Radzevitch).

"New Hob Designs for Improved Tool Life", General Motors Corporation, $10,000, 5/31/92-8/20/92 (with N. Smirnov).

"Interactive Computer Graphics Applied to Agriculture," W.K. Kellogg Foundation, $478,200, 1984-1988.

"Evaluating Acoustic Warning Signals in Automobile Interiors," Ford Motor Company, $58,000, 2/82-1/83.

"Shading of Rational B-Spline Surfaces," General Dynamics Corporation, $25,000, 9/1/82-8/31/83.

"Modal Testing of Clock PC Boards," Ford Motor Company, $4,597, 9/81-12/81.

"Design and Direct Implementation of Dynamic Stream Flow and Toxicant Transport Model for Use in On-Line Control Algorithm," Monticello Stream Project, Environmental Protection Agency, $850,000, 10/1/78-9/1/81.

ADDITIONAL RESEARCH (UNSPONSORED)

a) Development of heuristics for optimal bin packing, minimum makespan scheduling (patent applied for, with B. Zulawinski, W. Punch, G. Ragatz, E. Torng, not issued).
b) Invention of a new hybrid representation for genetic algorithm optimization of problems involving both permutation of tasks and determination of optimal values of (possibly inter-dependent) variables.
c) Development of new, apparently superior algorithms for ranking of permutations and combinations (mapping bidirectionally between an index value and the field ordering or subset selected to which the index corresponds), 1999. Not published, and later discovered by others.
d) Development of "Genetic ALgorithm Optimized for Portability and Parallelism" System ("GALOPPS"), a tool for coarse-grain parallel genetic algorithm research.
e) Development of mathematical bounds on verification error for NC verification software
f) Machine learning via genetic algorithms, applied to artificial systems exhibiting temporal and two-dimensional spatial complexity.
g) Enhancement of two-and three-dimensional imaging capabilities for MR scanning data.
h) VLSI implementation of graphics algorithms for display of geometric models.
i) During Ph.D. thesis research, development of a genetic algorithm using an integers-mapped-exponentially-to-reals representation, one-point crossover, and a Gaussian mutation operator, applied to solving for rate constants governing a model of bacterial growth. One run of program used nearly one year of CPU time on an IBM 1800 computer.

TEACHING EXPERIENCE

Taught ECE 390, Ethics and Professionalism, 2007-2009.

Co-developed an online graduate course in Evolutionary Computation, with Wolfgang Banzhaf and Kalyanmoy Deb. Most lectures were recorded in Fall, 2020, and the course was offered for the first time in Spring, 2021.

Taught ECE 480, Senior Capstone Design, fall and spring semesters, 2002 – 2010. Four-credit course, required of all EE and CPE majors, requires individual lab projects by students, a major team-based design project, several written and oral presentations, about 35 lectures on engineering topics (including ethics, presented before 2007 by another faculty member). Course

development includes finding industry sponsors for nearly all teams, more oral and written presentations, project management training, entrepreneurship, six sigma and lifecycle design lectures, awarding of prizes to best teams, and more public and media exposure of teams and projects in ECE Design Day. In fall, 2007, reduced to 4 credits with moving of the material on ethics and professionalism to a new junior-level course, ECE 390. In 2007-8, helped to join with other departments to create Engineering Design Day.

Co-taught CSE 848/ECE 802 – Evolutionary Computation, with William F. Punch, fall semester, 2000, 2002, 2004, 2006, 2008; co-taught with Amir Gandomi, 2016.

Taught CSE 410, Operating Systems Principles, 4 credits, ~35 students/class, in Dept. of Computer Science and Engineering, spring semesters, 2000-2002.

Team taught EGR 475, Global Engineering Design Teams, a cross-disciplinary course teaming MSU students with engineering students at universities in other countries, working on team projects, and including training of participants on many aspects of computer-supported collaborative work and trans-cultural cooperation, annually, 1999 – 2002.

Taught ECE 381, Communications, Ethics, and Professionalism, typically 25 students, 1 credit, in Dept. of Electrical and Computer Engineering, multiple semesters in 1997-1999.

Taught a 20-hour graduate seminar on Genetic Algorithms, at Beijing University of Aeronautics and Astronautics, Beijing, China, September - December, 1993, for students from BUAA, Tsinghua University, and Academia Sinica (Chinese Academy of Sciences). Served as foundation for a research consortium of investigators at three Chinese universities with MSU's Genetic Algorithms Research and Applications Group.

Developed three-course sequence in biological modeling for engineers and biologists (seniors and graduate students), taught two of the three courses from 1972 - 1982, to over 150 undergraduate students, 250 graduate students, and about 20 faculty members (visitors) in SYS 442, Systems Concepts for Biologists; supervised development of over 100 mathematical models of biological/ecological systems by teams each involving undergraduate engineering students, undergraduate and/or graduate biology students and a faculty member from biology (including faculty from the departments of Zoology, Entomology, Botany and Plant Pathology, Physiology, Crop and Soil Sciences, Horticulture, Resource Development, Forestry, Fisheries and Wildlife, and Agricultural Economics), in a project-oriented course entitled Ecosystem Analysis, Design, and Management, SYS 843. In addition to faculty members visiting the courses from MSU, faculty members from other universities also arranged sabbaticals here to participate in this course sequence.

Developed senior-level capstone computer engineering course, Computer Interfacing, with six associated laboratory projects, and taught this course three years, until appointed Director of Case Center.

Taught EE courses entitled Electric Circuits I, Electric Circuits II, Discrete-Time Systems, Continuous-Time Systems, and Analysis of Control Systems, at various times 1973 - 1989. My teaching of the Discrete-Time Systems class was selected for detailed study of teaching techniques by a Ph.D. student in the College of Education, forming basis for the student's doctoral dissertation.

Taught an 8-hour short course on Local- and Wide-Area Computer Networking at the National University of Science and Technology, Rawalpindi, Pakistan, May, 1992.

Guest lectured in numerous classes, including EGR 160, IDC 201, ZOL 404, ME 464, *et al.*

Taught intensive 2- and 3-week courses on computing and simulation for telephone engineers, sponsored by U. S. Independent Telephone Association, annually, 1968-72.

Taught intensive short course for 22 EPA scientists, Duluth Research Laboratories, 1977.

Taught intensive short course on mathematical modeling for scientists of U.S. Soil Conservation Service, Lincoln, NE, 1974.

Developed software that used computer graphics to aid in teaching mathematical modeling concepts to biologists. Software was subsequently adopted by faculty at five other universities.

Invited Panelist, "The Lecture: Some Insights into What Makes a Good One," sponsored by Learning and Evaluation Services, MSU, February 19, 1980.

Invited Panelist, "Humor in the Classroom," sponsored by Learning and Evaluation Services, MSU, May 9, 1980.

GRADUATE STUDENT DIRECTION
Ph. D. Theses Directed (with Department Granting Degree, Year):
Thomas M. Koplyay (co-directed), Systems Science, 1974
John A. Van Sickle, Systems Science, 1975
Mark N. Pickelmann, Mechanical Engineering, 1985
Cameron S. Kayvan, (co-directed), Electrical Engineering, 1985
James H. Oliver, Mechanical Engineering, 1986
Adrian V. Sannier, Systems Science, 1988
Jane L. Hawkins, Mechanical Engineering, 1989
Ki-Yin Chang, Mechanical Engineering, 1991
Shyh-Chang Lin, Electrical and Computer Engineering, 1997
Ming Bao, Electrical and Computer Engineering, 1997
Zhun Fan, Electrical and Computer Engineering, 2004
Bulent Buyukbozkirli, Mathematics, 2004
Jianjun Hu, Computer Science and Engineering, 2004
Hiram Firpi, Electrical and Computer Engineering, 2005
John Oliva, Mechanical Engineering, 2010
Prakarn Unachak, Computer Science and Engineering, 2010
Jinyao Yan (co-directed), Electrical and Computer Engineering, 2018
Matthew Ryerkerk (co-directed), Mechanical Engineering, 2018
José Llera Ortiz, Electrical and Computer Engineering, 2020

Biology Ph.D. Students Guided in Mathematical Modeling Work,
   But Not As Advisor:
Glenn C. Kroh, Ph.D., Botany & Plant Pathology, 1975
Vaughn E. Wagner, Ph. D., Entomology, 1975
James D. Nichols, Ph.D., Fisheries & Wildlife, 1976
James E. Breck, Ph.D., Zoology, 1978
Rosemary Loria, Ph. D., Botany and Plant Pathology, 1980
James E. Galloway, Ph.D., Physiology, 1980

Jorge P. C. de Lima, Ph.D., Forestry, 1981
Jeffrey J. Jenkins, Ph.D., Entomology, 1981
Martha J. Flanders, Ph.D., Zoology, 1984

Other Ph. D. Committee Service:
David Sloan Wilson, Zoology, 1974
Brian Lalone, Physiology, 1975
Philip H. Crowley, Zoology, 1975
Alan S. Tipton, Entomology, 1976
William H. Caskey, Microbiology, 1978
Larry B. Crowder, Zoology, 1978
John W. H. Dacey, Zoology, 1979
Stephen A. Kuschel, Computer Science, 1979
James F. Gilliam, Zoology, 1982
M. John Dwyer, Zoology, 1982
Martin J. Vanderploeg, Mechanical Engineering, 1982
Yu-Ying Leung, Electrical Engineering, 1985
Charles E. Spiekermann, Mechanical Engineering, 1986
Chong-Wei Xu, Computer Science, 1986
Dennis G. Watson, Agricultural Engineering, 1987
Taieb Znati, Computer Science, 1988
Gongzhu Hu, Computer Science, 1988
Michael A. Driscoll, Electrical Engineering, 1988
Andrew J. Hull, Mechanical Engineering, 1990
Patrick Flynn, Computer Science, 1990
Joseph M. Miller, Computer Science, 1990
Chiu Chin-Chuan, Electrical Engineering, 1991
Carl Erickson, Computer Science, 1991
Bruce Koenig, Electrical Engineering, 1992
Timothy Newman, Computer Science, 1993
Gayle Ermer, Mechanical Engineering, 1995
Charles Birdsong, Mechanical Engineering, 1999
Michael Raymer, Computer Science & Engineering, 2000
David J. Eby, Materials Science and Mechanics, 2000
Jay Northern, Electrical and Computer Engineering, 2003
Heping Chen, Electrical and Computer Engineering, 2003
Wei Huang, Electrical and Computer Engineering, 2005
David Cherba, Computer Science and Engineering, 2005
Chen, Hui, Civil and Environmental Engineering
Clune, Jeffrey, Computer Science and Engineering
Goings, Sherri, Computer Science and Engineering
Goradia, Amit, Electrical and Computer Engineering
Shi, Quan, Electrical and Computer Engineering
Namilkonda, Sandeep, Electrical and Computer Engineering
Wu, Tao, Electrical and Computer Engineering
Quwaider, Muhannad, Electrical and Computer Engineering
Velez, Dalimar, Electrical and Computer Engineering
Ziad, Youssfi, Electrical and Computer Engineering
Chapco, Jeff, Electrical and Computer Engineering
Ghanim, Mohammed, Civil and Environmental Engineering
Rupp, Matthew, Computer Science and Engineering

Ramirez, Andres, Computer Science and Engineering
Zhang, Chi, Computer Science and Engineering
Burks, Armand, Computer Science and Engineering
Seada, Haitham, Electrical and Computer Engineering
Nussbaum, Ronald, Computer Science and Engineering
Mirmomeni, Massoud, Computer Science and Engineering
Moore, Jared, Computer Science and Engineering
Rivera, Jesus, Computer Science and Engineering
Pakanati, Anu, Computer Science and Engineering
Ahrari, Ali, Electrical and Computer Engineering
Byers, Chad, Computer Science and Engineering
Anaya, Yaser, Computer Science and Engineering
Fleet, Blair, Electrical and Computer Engineering
Gaur, Abhinav, Electrical and Computer Engineering
Clark, Anthony, Computer Science and Engineering
Fredericks, Erik, Computer Science and Engineering
Goldman, Brian, Computer Science and Engineering
Alavi, Amir, Civil and Environmental Engineering
Couvertier, Daniel, Electrical and Computer Engineering
Lu, Zhichao, Computer Science and Engineering
Liu, Ming, Mechanical Engineering
Roy, Proteek, Electrical and Computer Engineering
Ghosh, Abhiroop, Electrical and Computer Engineering
Wang, Wei, Computer Science and Engineering
Nariyoshi, Pedro, Electrical and Computer Engineering
Talukder, Khaled, Electrical and Computer Engineering
Blank, Julian, Computer Science and Engineering
Gaur, Abhinav, Electrical and Computer Engineering
Dhebar, Yashesh, Electrical and Computer Engineering

Postdoctoral Research Associates Directed and Faculty Sabbaticals and Leaves Hosted:
Philip H. Crowley, Post-Doctoral Research Associate, 1975-76
Jeffrey J. Jenkins, Post-Doctoral Research Associate, 1981-82
Nikolay N. Smirnov, Dean of the Faculty, Volgograd Polytechnical Institute, Volgograd, USSR,
        sabbatical leave 1990-91.
Pei Min, Professor and Vice President, College of Automation, Beijing Union University, Beijing,
        PRC, 1991-92.
Nikolay N. Smirnov, Vice President, Volgograd Civil Engineering Institute/Academy, Russia,
        April - September, 1992; June-August, 1993; June-August, 1994; June - August, 1995;
        June - July, 1996; July, 1997.
Ding Ying, Instructor, Beijing Union University, Beijing, PRC, February 1, 1993 - January 31,
        1994
Stepan Pavlovich Radzevitch, Professor, Dneprodzerzhinsk Industrial Institute, Dnepro-
        dzerzhinsk, Ukraine, (under support of National Research Council), March 15, 1993 -
        November 30, 1993; July - August, 1994; June-July, 1995; June - September, 1996; then

as Professor, Kiev State Technical University (Kiev Polytechnic Institute), July - August, 1997; September, 1998.

Valery Tchkalov, Prof., Kiev Polytech. Inst., Kiev, Ukraine, July - Aug., 1994; Aug - Sept., 1995.

Volker Schnecke, Post-Doctoral Research Associate (co-hosted with L. Kuhn, W. Punch), 1997 - 1999 .

Victor Palaguta, Post-Doctoral Research Associate, June - August, 1997; September, 1998.

Kisung Seo, Post-Doctoral Research Associate, Jan., 1999 – August, 2003

Zhenhua Li, Visiting Research Scholar, Assoc. Prof., China University of Geosciences, Wuhan, April, 2006 – April, 2007.

Lihong Xu, Visiting Research Scholar, Professor, Control Theory and Control Engineering, and Dean, School of Modern Agriculture Science and Engineering, Tongji University, Shanghai, PRC, May, 2006 – May, 2011 (back and forth, but > 50% at MSU)

Ping Wu, Visiting Research Scholar, Associate Professor, Computer Center, East China Normal University, Shanghai, China, visiting MSU October, 2008-September, 2009.

Meng Yao, Visiting Research Scholar, Professor, Electrical Engineering, East China Normal University, Shanghai, PRC, at intervals, February, 2009 – January, 2013.

Zhun Fan, Visiting Research Scholar, Associate Professor, Tongji University, Shanghai, PRC, August, 2011-February, 2012.

Kisung Seo, Visiting Research Scholar, Associate Professor, Seokyeong University, Seoul, Korea, April, 2011 – February, 2012.

Chengju Liu, Visiting Research Scholar, Postdoctoral Researcher, Tongji University, Shanghai, China, August, 2011 – July, 2012.

Hailin Liu, Visiting Research Scholar, Professor, Guangdong University of Technology, June 1 – Nov. 30, 2016.

Yuanping Su, Visiting Research Scholar, Lecturer, Jiangxi University, August 1, 2018 – July 31, 2020.

Chunhong Lu, Visiting Scholar, Lecturer, Nantong University, Jan. 1, 2019 – Dec. 31, 2019.

Visiting Scholars (Pre-Doctoral) Hosted:

G. Pisarenko, Sept-Dec, 1994

V. Tcheprasov, Feb-October, 1995

Yi-Zheng Feng, July, 1995 - November, 1996

Gang Xu, Sept, 1997 – 1998

Huafeng Pei, May - August, 1998

Baoli Yang, Jan., 1999 – June, 2000

Qingsong Hu, Visiting Scholar, Ph.D. student at Tongji University; visiting MSU September, 2007 – August, 2008

Jean-Francois Dupuis, Visiting Scholar, Ph.D. student at Technical University of Denmark, visiting MSU September, 2007 – August, 2008

Bingkun Zhu, Ph.D. student, Tongji University, Shanghai, China, visiting MSU November, 2008-October, 2009.

Dawei Li, Ph.D. student, Tongji University, Shanghai, China, visiting MSU October, 2009 – October, 2010

Chenwen Zhu, Ph.D. student, Tongji University, Shanghai, China, visiting MSU August, 2011 – July, 2012.

Weiming Ji, Ph.D. student, East China Normal University, Shanghai, China, visiting MSU July, 2013 – June, 2014.

Haiqiang Nie, Ph.D. student, Tongji University, Shanghai, China, visiting MSU August, 2013-July, 2015.

Leilei Cao, Ph.D. student, Tongji University, Shanghai, China, visiting MSU August, 2015-December, 2016.

Daniel Lanza Garcia, Ph.D. student, Extremadura University (Spain) and employee of CERN, visiting MSU July 7-Sept. 7, 2016.

Jonas Schwaab, Ph.D. student, ETH Zurich, Switzerland, visiting MSU 2016-2017 (co-supervised with K. Deb)

Chunteng Bao, Ph.D. student, Tongji University, Shanghai, China, visiting MSU January, 2017-December, 2018

Chaoda Peng, Ph.D. student, Guangzhou University of Technology, Guangzhou, China, visiting MSU December, 2017-November, 2019

Shuwei Zhu, Ph.D. student, Tongji University, Shanghai, China, visiting MSU December, 2018-January, 2021.

Sukrit Mittal, Ph.D. student, IIT Roorkee, co-hosted with K. Deb,

M.S. Theses Directed:
David A. McClaughry, ME, (co-directed), 1985
Chia-Yiu Maa, EE, (co-directed), 1987
David R. Chesney, ME, 1987
Daniel A. Wysocki, ME, 1987
Chiu Chin-Chuan, EE, (co-directed), 1989
Hari K. Kosaraju, ME, 1993
Kelvin Sumlin, CS, 1993
Brian Zulawinski, CSE, (co-directed), 1995
Ananda Debnath, ME, 1997
Eric Myers, ME, 2000
Huafeng Pei, ECE, 2001
Anand Uday, ME, 2001
Zhijian Huang, ECE, 2002
Zhiwen Zou, CSE, 2002

M.S. Projects (non-thesis) Directed:
Khurshid Qureshi, ME, 1993
Vladislav Tcheprasov, CSE, 1997
Lakshman Thiruvenkatachari, ECE, 2000
Ahmad Shahid, ECE, 2002
Gowon Patterson, CSE, 2013
Rodney Pickett, CSE, 2014
Nathan Ward, CSE, 2015 (joint with J. Jackson)

Diplomarbeit Projects Directed (students from Rheinische-Westphalische Technische Hochschule, Aachen, Germany):
Jan C. Otten, (co-directed), 1987
Martin Correns, 1989

Other M.S. Thesis Committee Service:
J. Brian Hestbeck, 1976
Ralph F. Stonebraker, 1977

Robert A. Coviak, 1981
Man-Kuan Vai, 1985
Steven Leung, 1985

Undergraduate Students Mentored (as Research Assistants or Professorial Assistants):
Robert Leland (won Rhodes Scholarship)
Paul Haas
Benjamin Pfaff
Antony Paul
Matthew Skalny
Janelle Shane (won Goldwater Scholarship and NSF Graduate Fellowship)
Keith Barber
Albert Anthony
Matthew Durak
Grayson Wright
Nicholas Durak
Tyler Will

ADMINISTRATIVE ACTIVITIES

Donations Obtained for University (totaling over $20 million)
As Director of BEACON, obtained donation of $2 million to endow the John R. Koza Endowed
Chair in Genetic Programming, and $10.7 million in additional funding as bequests, including
two endowed chairs, endowed fellowships, and several other endowed prizes and
infrastructure support endowments.
As co-founder of MSU's ICT4D Tanzania service-learning Study Abroad program and instructor
of ECE Department's Senior Capstone Design course, received bequest of $200,000 in
support of that ICT4D in Tanzania.
As Director of Case Center, obtained industrial donations totaling over $3.2 million in cash and
$4.8 million in equipment, targeted at fostering research in CAD/CAM/CAE and at improving
computing facilities and services for the College of Engineering (averaged over $700,000/year
in donations received, 1983-1993). Funds raised included Case Center Endowment, with $1
million in donations, which has now grown to several million, with net yield of $100+K/year
in earnings disbursed to support programs in the College of Engineering.
Requested and obtained two grants from GE Foundation to support faculty development in the
college -- total award, $180,000. Project funded instructional/curriculum development by 15
faculty members.

Promotion of International Collaborative Projects
Initiated service/learning project to sponsor teams of MSU engineering seniors in ECE to work
on technology for village schools in their capstone design course (under my direction), then to
take that technology to Mto wa Mbu, Tanzania, and install it in primary and secondary
schools, providing them power, computing, and Internet access. This has become an MSU
Education Abroad program, now open to any major. Made trips with students in May, 2008,
December, 2008, May, 2009, December, 2009, and annually in May-June, 2010-2019, then
pause for two COVID years, then again 2022--. Project led to founding (with DeMaagd,

Olson of Dept. of Media and Information) of new undergraduate minor in Information and Communications Technology for Development.

Co-investigator with Prof. Jennifer Olson (PI), Prof. Susan Wyche, Enda Technology (Arusha, Tanzania) and several Kenyan partners on a grant from MSU's Alliance for African Partnerships program entitled: "Addressing the Agricultural Labour Burden in an Era of Feminization and Aging of Rural Communities in East Africa: A Human-Centered Design Approach to Solve Old Problems," 2017-2017.

Initiated joint research program with East China Normal University and Nanjing University on improved methods for detecting cardiac irregularities using microwave devices and genetic algorithms, funded (in China) by National Natural Science Foundation of China; 2000 - 2005.

"Foreign Collaborator" on grant from International Science and Technology Center of Ukraine (ISTCU) to National Technical University of Ukraine (KPI), 2000 - 2003.

Academician (elected member), International Academy of Informatics, Moscow, Russia.

Foreign Member (elected), Academy of Engineering Sciences of Ukraine, 2000 -- .

Co-founded the Genetic Algorithms Research and Applications Group (GARAGe), including the Russian GARAGe, in which three universities participated, with funding arranged through the International Science Foundation, 1993 - 98.

Founded (with V. L. Uskov, W. F. Punch, T. A. Bickart) the Russian/American Joint Education/ Research Consortium for Intelligent CAD/CAM/CAE and Genetic Algorithms ("ICAD/GA"), an organization with four Russian university members, working with MSU's Genetic Algorithm Research and Applications Group, 1993-98.

Initiated collaborative research with Beijing University of Aeronautics and Astronautics, Tsinghua University, and Zhejiang University, during six-month sabbatical leave in China. Collaboration continues, with joint use of my software in several projects at each university. Investigators at Chinese Academy of Sciences have now joined in this joint research effort. Additional GA lectures given at East China Normal University, Shanghai Jiaotong University, Tongji University, Shantou University, SUSTech, and Nanjing University, in frequent visits, 2000-2019.

Initiated the development of an international technology transfer "incubator" in the center, in 1992, for introduction of Russian and Ukrainian technology and software into the U.S. market, with seed money provided by the Vice Provost for Computing and Technology. Incubator provided facilities and support for "Americanizing" technology, helps to identify U.S. companies to co- develop and market technology, negotiated contracts, etc. Future royalties will seed further research in the center and college. Eight foreign visitors were hosted by the ITI.

Initiated Case Center Agreements for Cooperation with Moscow State Technical University (Bauman), Volgograd Polytechnic Institute, Volgograd Civil Engineering Institute, Dneprodzerzhinsk State Technical University, Beijing University of Aeronautics and Astronautics, Tsinghua University, Zhejiang University and Shantou University, 1991-2000.

Advised and assisted Pakistan's National University of Science and Technology regarding purchase of computing and networking facilities for the new multi-campus university, 1991-95.

Other Unit Development

During tenure as director of the Case Center, and before spinoff of new Division of Engineering Computing Services, Case Center expanded from one computer, 4 rooms, and 20 terminals to 28 rooms and a total of over 200 personal and workstation computers. Staffing increased from 8 half-time graduate assistants to 11 full-time professional staff, two

secretaries, 12 half-time graduate assistants, and 200 hours/week of undergraduate student consultant time. Faculty conducting research using center resources exceeded 75. General fund (internal) budget increased from $100,000/year to over $750,000/year. Excluding sponsored research, but including cash donations, center budget exceeded $1 million/year. Division of Engineering Computing Services was spun off as freestanding service (non-research) entity in 1995, under a new director.

Committee Leadership and Service:

Member, ECE Undergraduate Studies Committee, 2020-2022
Member, MSU C4I (Center for Interdisciplinarity) Advisory Committee, 2017-2021
Member, Advisory Committee, MSU Museum, 2017-2020
Chair, Search Committee for the John R. Koza Endowed Chair in Genetic Programming, 2014-2015.
Chair, Search Committee for Koenig Endowed Chair, ECE, 2010-2011.
Search Committee for Director of Interdisciplinary Undergraduate Education, chair, 2008
ECE Promotion and Tenure Committee, 2008-2014
Internal Research Grants Program, MSU – Member of Science and Engineering Review Panel, 2003, 2004, 2005, 2006
ECE Departmental Advisory Committee, 2006-2008
Computer Engineering Working Group, 2002-09
ECE Undergraduate Studies Committee, 2003-05, 2017-2021, chair 2005-09
College of Engineering Undergraduate Studies Committee, 2005-09
Department of ECE Faculty Search Committee, 2002-04
College of Engineering Research Rating Committee (promotion and tenure process), chair, 2000 and 2001
Travel Advisory Task Force (recommending reengineering of MSU travel policies), 1996-7
Travel Request-For-Proposals Task Force, 1997-8
Communication and Computer Systems Advisory Committee, member, 1986-1996; chair, 1988-89 (advises Vice Provost regarding Computing and Technology matters at univ. level)
Service/Outreach Technology Committee, initial organizer and chair, 1990 - 1993; member, 1994-2003
(was asked to initiate this new committee by Vice Provost for Computing and Technology; advises Vice Provost regarding university technology needs for its service and outreach missions; assisted in obtaining a major Kellogg Foundation grant for an outreach activity)
International Studies and Programs Advisory Committee, member, 1993-1997; co-chair, 1996-7
(advises Dean of International Studies and Programs regarding policy decisions, establishment of relationships with foreign institutions, etc. Chair, Communications Subcommittee, 1994-96)
Engineering International Studies Committee, member, 1993-1998
(advises Office of the Dean of Engineering regarding international programs and policies of the College of Engineering)
Advisory Committee, Institute for Global Engineering Education, member, 1998-2001
(advises Director and Dean of Engineering regarding international programs and policies of the College of Engineering)
University Computer Advisory Committee

(predecessor of CCSAC, advised Computer Laboratory regarding computer acquisitions, etc.)

Users' Subcommittee, UCAC, member and chair for several years
(advised Computer Laboratory regarding research and instructional needs of users, prior to formation of separate committees)

Engineering Computer Advisory Committee, chair

Computer Systems Policy and Planning Committee, member
(formulated proposal for all-university computer activity, 1978-79)

Electrical Engineering and Systems Science Department Advisory Committee, member

EESS Graduate Studies Committee, member

Systems Science Curriculum Committee, member

Electrical Engineering Curriculum Committee, member, secretary

Engineering Sciences Committee, member, chair

Department of Botany and Plant Pathology Search Committee

Research Computing Committee, member, chair
(advises university's central Computer Laboratory regarding needs of research community)

Computer Laboratory Search Committee for Associate Director, member

Computer Science Department Chair Search Committee, member, 1994-95

Network Computing Committee, member
(Advises Computer Laboratory regarding networking needs of university)

Computer Communications Committee, member
(Charged with developing a computer network for the university; preceded Network Computing Committee)

Steering Committee, Case Center for Computer-Aided Design, member
(Policy-making group for Case Center; member until became director in 1983)

Reviewer, All-University Research Initiation Grant Program

Reviewer, All-University Outreach Grant Program (reviewed over 60 proposals, 1991-)

Center for European and Russian Studies, Search Committee for Director, member, 1993

CONSULTING (Non-University Professional Positions)

Academy for Critical Incident Analysis, John Jay College, CUNY, Member of Council (governing body), 2008 – 2015.

Vice President, Technology, Red Cedar Technology (formerly, Applied Computational Design Associates, Inc.), 1999 – 2010; Board of Directors, 1999 – 2013.

Consultant to Lear Corporation, 2005

President, NEWTeams Training, Inc. (a not-for-profit entity), 1999 – 2000

Review Panel Member, 21st Century Fund (State of Indiana), 2001-2004

Site Visitor, NSF grant to Univ. of Cincinnati, 2000-2002

Review Panel Member, North Dakota EPSCoR Grant Program (NSF, NASA, EPA), 2001-2006, 2008-2016

Professional Advisory Board Member, Idaho EPSCoR RII Track-1 GEM3 project, 2018-2023.

Senior Scientific Advisor, Utah Russia Institute, 1998-2001.

President, Technology Gateway, Inc., 1992-2000.

Consulted for automotive industry suppliers, Environmental Protection Agency, National Academy of Sciences, American Association for the Advancement of Science, U. S. Soil Conservation Service, U. S. Independent Telephone Association, professional societies, and CAM-I (an industrial consortium).

Technical advisor to Chinese Computer Communications, Inc., 1990-1998.
Reviewer for ASME, AIAA, NSF, IEEE, SME, Science Foundation Ireland.

OTHER CREDENTIALS

President and Director, Mid-Michigan Flight, Inc., 1990-1998.
Private Pilot License, 1977
Commercial Pilot License, Instrument Rating, 1978
Member, Aircraft Owners and Pilots Association, 1977-2000
SCUBA diving certifications: PADI Advanced Open Water certification, 2007; enriched air (Nitrox) certification, 2007; Rescue Diver certification, 2009; Deep Diver, Underwater Navigator, Night Diver specialties, 2009; Equipment Specialist, 2010; Master Scuba Diver, 2010; Cavern Diver, 2014.
Certified Manufacturing Assessment Methodology Field Agent, Industrial Technology Institute (Ann Arbor)
Holder of U.S. Patent #4300135, with C. MacCluer, L. Korn, 1981.
Holder of U.S. Patent #5924105 with W. Punch, M. Wulfekuhler, 1999.
Graduate, Chinese Language Short Course, Fudan University, Shanghai, China, 1988
Studied 3 years of Chinese at MSU, 1987-90; used daily during sabbatical in China, 1993-4
Language Proficiencies:
  Chinese: conversation – formerly moderate, currently limited; reading – formerly, limited; currently, almost nil
  Russian: conversation – formerly moderate; technical reading -- moderate; winner, MSU Russian Poetry Recitation Contests, 1964, 1965
  German: limited
  French: reading – limited
  Swahili: conversation: speaking, moderate; aural comprehension—limited; reading – elementary; took Advanced Swahili class, AFR 348, MSU, 2012-13. Spent 1 month in Tanzania each year 2008-2019, 2022--.

PUBLICATIONS

Festschrift

On August 11, 2018, a Festschrift in honor of Erik Goodman was held at the Kellogg Center, Michigan State University. Prof. Wolfgang Banzhaf was the principal organizer, and editor of the resulting book. Invited guests and many BEACON members gave talks and contributed articles for publication in the Festschrift volume. The book appeared in July, 2020, entitled: Evolution in Action: A Festschrift in Honor of Erik D. Goodman, published by Springer. It comprises over 600 pages, including some biographical information, historical information about the BEACON Center, and many contributed scholarly works.

Books and Monographs

12. Saxena, D. K., Mittal, S., Deb, K., and Goodman, E. D., *Machine Learning Assisted Evolutionary Multi- and Many- Objective Optimization*, Genetic and Evolutionary Computation Series, Springer Singapore, 2024.

11. Deb, K., Goodman, E., Coello, C.A.C., Klamroth, K., Miettinen, K., Mostaghim, S., et al., eds.

Proc. Evolutionary Multi-Criterion Optimization: 10th International Conference, EMO 2019. E. Lansing, MI, March 10-13, 2019.

10. J. Wang, Z, Fan, J. Terpenny, and E. Goodman, guest editors. *IEEE Transactions on Systems, Man and Cybernetics, Part C: Applications and Reviews, Special Issue on Knowledge Extraction and Incorporation in Evolutionary Computation. 35*(2), 2005.

9. L. Spector, E. Goodman, *et al.,* eds., *Proceedings of the Genetic and Evolutionary Computation Conference, 2001,* July 7-11, Morgan Kaufmann Publishers, San Francisco, 1463pp.

8. Late Breaking Papers, GECCO-2001, ed., ISGEC Press, PO Box 19656, Palo Alto, CA, 504pp.

7. Tutorials, GECCO-2001, ed., ISGEC Press, PO Box 19656, Palo Alto, CA, 493pp.

6. Radzevich, S., Palaguta, V., and Goodman, E. *Gear Technology: Handbook* (in Russian), IPTTM Scientific Publishers, Kiev, ISBN 5-7763-2870-9, 299pp., 1999.

5. Radzevitch, S. P., Palaguta, V. A., and Goodman, E. Dolblenie Zubchatykh Kolios (Gear Shaping). DSTU Press, Dneprodzerzhinsk, Ukraine, 1998, 99pp.

4. Kovalenko, A. and Goodman, E., guest editors, Special Issue on Evolutionary Computation, *Obozrenie Prikladnoy i Promyshlennoy Matematiki (Review of Applied and Industrial Mathematics)*, vol.3, no.5, Scientific Publisher TVP, Moscow, Dec., 1996, 173pp.

3. Goodman, E., Uskov, V., and Punch, W. *Proceedings of the First International Conference on Evolutionary Computation and its Applications*, (editors), Institute for High-Performance Computer Systems, Russian Academy of Sciences, Moscow, 1996, 406pp.

2. Rosenberg, R. and Goodman, E. *SYSKIT: Software Toolkit for Linear Systems*, McGraw-Hill, New York, 1986.

1. Anderson, L. Bird, G., French, W., Rice, R., White, G., Zehr, E., and Goodman, E. *Pest Management in Peach and Nectarine Production*, Intersociety Consortium for Plant Protection, St. Paul, MN, 1983.

Chapters in Books

23. Goodman, Erik D. "Academic Biography of Erik D. Goodman." In *Evolution in Action: A Festschrift in Honor of Erik D. Goodman*, pp. 583-602, Springer, July, 2020.

22. Yao, M., Tao, Z. Ji, W, Yao, Y., Fleet, B.D., Goodman, E.D., Deller, J.R. "Pathological Tissue Permittivity Distribution Difference Imaging: Near-field Microwave Tomographic Image for Breast Tumor Visualization." In Q. N. Tran and H. R. Arabnia, eds., *Emerging Trends in Applications and Infrastructures for Computational Biology, Bioinformatics, and Systems Biology*, Morgan Kaufmann, Cambridge, MA, pp. 429-445, 2016.

21. Till, Robert C., Durak, Matthew and Goodman, Erik, "Modeling Critical Incidents to Improve Response." Chapter in Schwester, Richard (ed.), Handbook *of Critical Incident Analysis*, M. E. Sharpe, New York, December, 2011.

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(plus many technical progress reports, final reports, etc. from smaller research projects)

PRESENTATIONS (other than of published work, partial listing):
2011
Goodman, Erik, "BEACON: One Year of Evolution in Action." Annual Distinguished STC Director's Lecture, National Science Foundation Headquarters, Arlington, VA, Nov. 20, 2011.

Goodman, Erik, "Unifying Biology, Computation and Engineering in BEACON Center for the Study of Evolution in Action," Invited Keynote to SPIE Conference on Bioinformatics and Bio-Inspired Computation, in SPIE Defense, Security and Sensing Conference, Orlando, FL, July 20, 2011.

Nine presentations about BEACON overview, research, education and outreach activities for various audiences during 2011.

2010
Various public presentations about BEACON Center for the Study of Evolution in Action to lay groups; newspaper and television interviews, etc.

2006
Goodman, Erik, "Evolutionary Design of Mechatronic and Structural Systems," presented at HPCC Symposium, Michigan State University, Oct. 7, 2006.

Goodman, Erik, "Stupid Computers Evolve Clever Designs," presented to Lansing Torch Club, Kellogg Center, April 19, 2006.

Goodman, Erik, panelist in session "Evolutionary Computation in Industry," at 2006 Genetic and Evolutionary Computation Conference (GECCO-2006), July 12, 2006.

Goodman, Erik, "Self-Configuring Search Methods for Robust and Efficient Optimization,"

presented at International Symposium on Applications of Optimization Techniques to Product and Process Design, at People's Education Society Institute of Technology, Bangalore, India, April 10-11, 2006.

Goodman, Erik, "Collaborative Independent Agents to Speed Discovery," presented at International Symposium on Applications of Optimization Techniques to Product and Process Design, at People's Education Society Institute of Technology, Bangalore, India, April 10-11, 2006.

2005

"A Hybrid, Adaptive Method for Optimization," International Symposium on Product and Process Optimization in Industry, PES Institute of Technology, Bangalore, India, April 10, 2006. "Cooperative Independent Agents for Optimization," International Symposium on Product and Process Optimization in Industry, PES Institute of Technology, Bangalore, India, April 11, 2006.

2003

"Shape Optimization of Vehicle Structures," invited presentation in Evolutionary Computation in Industry: Innovative Applications session, Genetic and Evolutionary Computation Conference (GECCO-2003), Chicago, IL, July 15, 2003.

2001

Workshop on Future Directions in Manufacturing Research, organized meeting and chaired panel discussion, March 19-20, 2001.

"Research Opportunities in MSU's College of Engineering," invited presentation to eight CEO's of small companies in mid-Michigan area, Memorial Healthcare Center, Owosso, MI, June 8, 2001.

2000

"Evolutionary Computation for Data Mining," Nanjing University, Nanjing, China, June 14, 2000.

"Genetic Algorithms – Introduction and Application to Microwave Detection of Heart Anomalies," East China Normal University, Shanghai, China, June 12, 2000.

"Genetic Algorithms and Global Team Collaboration," Shanghai Jiaotong University, Shanghai, China, June 12, 2000.

Presentation to management at Lawrence Livermore National Labs, re NEWTeams project, Aug. 3, 2000

Presentation to Ford management, Dearborn, re NEWTeams support, May, 2000

Presentation to GM management group re current research in genetic algorithms applied to structural optimization, Feb. 11, 2000

1999

(with R. Butler) "Facilitating Employment of Scientists/Engineers in Russia by U. S. Companies: NEWTeams," Internat. Workshop: Technology Transfer & New Opportunities for International Cooperation, Zhukovsky, Russia, Central Aero-Hydrodynamics Research Institute, August 19, 1999.

Previous

Presented over 150 talks and seminars for a variety of professional, university, industrial, and lay audiences. Hosted ten day-long meetings of Industrial Advisory Board of the Case Center for Computer-Aided Engineering and Manufacturing, and about 20 day-long meetings of the MSU Manufacturing Research Consortium.

PERSONAL DATA

Married; wife, Cheryl Goodman; one child, David
Hobbies: tennis, model railroading, formerly musical performance (24 years in a local band), scuba diving

REFERENCES:

Available on request