

ERIK D. GOODMAN

Director, BEACON Center for the Study of Evolution in Action (an NSF Science & Technology Center)
Professor, Electrical and Computer Engineering; Professor, Mechanical Engineering;
Professor, Computer Science & Engineering
Co-Director, Genetic Algorithms Research & Applications Group (GARAGe)

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EDUCATION

1972 Ph.D., Computer and Communication Sciences, University of Michigan, Ann Arbor
1968 M.S., Systems Science, Michigan State University
1966 B.S., High Honors, Mathematics, Michigan State University

EMPLOYMENT HISTORY

1972 – 1984 Asst. Prof., Assoc. Prof., Electrical and Computer Engineering, Michigan State University
1983 – 2002 Director, A. H. Case Center for Computer-Aided Engineering and Manufacturing
1984 – Professor, Electrical & Computer Engineering
1992 – Professor, Mechanical Engineering
2010 – Professor, Computer Science & Engineering
1993 – 2003 Director, MSU Manufacturing Research Consortium
1993 – Co-Director, Genetic Algorithms Research and Applications Group ("GARAGe")
2010 – Director, BEACON Center for the Study of Evolution in Action

HONORS AND REPRESENTATIVE PROFESSIONAL ACTIVITIES

Distinguished Faculty Award, 2011, Michigan State University; MSU Curricular Service-Learning and Civic Engagement Award, 2009; Michigan Distinguished Professor of the Year, 2009 (by Presidents Council, State Universities of Michigan); Honorary Maasai Elder, Losirwa Village, Monduli District, Tanzania, December, 2008; Alumni Club of Mid-Michigan Quality in Undergraduate Teaching Award, 2007 (MSU's highest teaching award); Senior Fellow, International Society for Genetic and Evolutionary Computation, 2004; Withrow Exceptional Service Award, 2004 (College of Engineering, MSU), Advis. Professor, East China Normal Univ. (Shanghai, PRC); Advis. Professor, Tongji Univ. (Shanghai, PRC); Hon. Doctorate, Dneprodzerzhinsk State Technical Univ. (Ukraine); Academician, National Academy of Engineering of Ukraine; Academician, Internat. Academy of Informatization (Moscow); MSU Alumni Distinguished Scholar, NSF Trainee, NASA Trainee, IBM Fellowship; Phi Kappa Phi, Sigma Xi, Omicron Delta Kappa, Pi Mu Epsilon, Phi Eta Sigma.

Exec. Comm., ACM Special Interest Group on Genetic and Evolutionary Computation (SIGEVO), 2005-2015, Founding Chair, 2005-2007; General Co-Chair, International Summit on Genetic and Evolutionary Computation (GEC Summit), Shanghai, June, 2009; Chair, Internat. Society for Genetic and Evolut. Computation, 2001-2004; Gen. Chair, Genetic and Evolut. Computation Conference, 2001; member, Exec. Board, Internat. Soc. for Genetic and Evolut. Computation, 2000 – 2005; Gen. Chair, Seventh Internat. Conf. on Genetic Algorithms (July, 1997); Exec. Ctee., Int'l Soc. for Genetic Algorithms, 1997-2000; Gen. Chair, First Internat. Conf. on Evolutionary Computation and its Applications (Moscow, June, 1996); edit. board member: *Evolutionary Computation*, *Journal of Applied Soft Computing*; editorial advisory board, *Genetic Programming and Evolvable Machines*; senior member, Soc. of Mfg. Engineers; member, Am. Inst. of

Aeronautics and Astronautics -- CAD/CAM Technical Committee (Outstanding Contributions Award, 1990), chaired Research & New Directions Subcttee, 1987-88, chaired Conferences & Workshops Subcommittee, 1988-89; General Chair, 1987 International Computer Graphics Conference, co- sponsored by SAE and Engineering Society of Detroit; member, IEEE Computer Society; Society of Automotive Engineers (SAE); charter member, Society for Env'tal Toxicol. & Chem.; consultant to several companies.

FUNDED RESEARCH

PI and Director of BEACON Center for the Study of Evolution in Action (an NSF Science and Technology Center) funded at \$25 million, 2010-2015, extendable to 2020. Initiated/directed/co-directed other research projects with present value (inflation-adjusted) over \$7 million, excluding funding of consortia administered, from sources including National Science Foundation, U.S. EPA, General Dynamics, General Motors, Chrysler, Ford, CIMLINC, Lenovo, and SDRC) in the areas of evolutionary design, evolutionary scheduling, CAD and graphics, computer-aided manufacturing, simulation, and modeling of biological and environmental systems. Directed consortial research of over \$2 million, plus leveraging and spinoffs.

PUBLICATION SUMMARY:

Two books co-authored; 4 conf. proceedings co-edited; journal special issue guest-edited; 19 book chapters; over 150 papers in journals/reviewed proceedings, 5 s/w packages commercialized or widely distributed.

SELECTED RECENT PUBLICATIONS

- Unachak, P. and Goodman, E., "Solving Multiobjective Flexible Job-shop Scheduling Using an Adaptive Representation." *Proc. Genetic & Evolutionary Computation Conference, 2010*, Portland, OR, ACM, pp. 737-742.
- Seo, K., Hyun, S., and Goodman, E. "Genetic Programming-Based Automatic Gait Generation in Joint Space for a Quadruped Robot." *Advanced Robotics*, v. 24, no. 15, 2010, pp. 2199-2214.
- Li, D., Xu, L., and Goodman, E., "Online Background Learning for Illumination-robust Foreground Detection. *Proc. ICARCV-2010*, Singapore, Nanyang Technical University, December, 2010. (Finalist for Best Paper Award)
- Xu, Lihong, Hu, Qingsong, Hu, Haigen and Goodman, Erik, "Conflicting Multi-Objective Control." Chapter 5 in *New Achievements in Evolutionary Computation*, P. Korosec, ed. INTECH Pub., ISBN 978-953-307-053-7, Feb., 2010.
- Oliva, J. and Goodman, E., "Evolutionary Search and Convertible Agents for the Simultaneous Type and Dimensional Synthesis of Planar Mechanisms," *Proc. 2009 GECCO Conference*, ACM, July, 2009, pp.1577-1584.
- Hu, J., E. Goodman, S. Li and R. Rosenberg, "Automated Synthesis of Mechanical Vibration Absorbers using Genetic Programming," *Artificial Intelligence in Engineering Design and Manufacturing*, vol. 22, no. 3, August, 2008, pp. 207-217.
- Peng, Xiangdong, Erik D. Goodman and Ronald C. Rosenberg, "Robust Engineering Design of Electronic Circuits with Active Components Using Genetic Programming and Bond Graphs." Chapter in Riolo, R., Soule, T. and Worzel, W. (eds.), *Genetic Programming in Theory and Practice, V*, Studies in Computational Intelligence Series. Springer, Berlin, pp. 187-202, 2008.
- Goodman, E., Averill, R., and Sidhu, R. "Multi-Level Decomposition for Tractability in Structural Design Optimization," chapter in Yu, T., Davis, L., Baydar, C., and Roy, R. (eds.), *Evolutionary Computation in Practice*, Springer, Studies in Computational Intelligence Series, v. 88, Berlin, pp. 41-62, 2008.
- Z. Fan; J. Wang; S. Achiche; E. Goodman, R. Rosenberg, "Structured Synthesis of MEMS Using Evolutionary Approaches," *Journal of Applied Soft Computing*, 8, pp. 579-589, January, 2008.
- Hu, J., X. Li & E. Goodman. "Evolutionary Robust Design of Analog Filters using Genetic Programming," in *Evol. Computation in Dynamic and Uncertain Environments*, Kacprzyk, J. (ed.), Springer, pp. 479-496, 2007.
- Xu, L., Hu, Q. and Goodman, E., "A Multi-Objective Compatible Control (MOCC) Algorithm for a Class of Energy-Saving Control Problems." *Proc. IEEE Conf. on Decision and Control*, New Orleans, Dec. 12-14, 2007.
- H. Firpi, E. Goodman, J. Echaz, "On Prediction of Epileptic Seizures by Means of Genetic Programming Artificial Features," *Annals of Biomedical Engineering*, 34(3), 2006, pp. 515-529.
- J. Hu and E. Goodman. "Evolving robust dynamic systems with genetic programming," *Genetic Programming Theory and Practice II*, R. Riolo and W. Worzel (eds.), Kluwer Academic Publishers, Boston, January, 2005, pp. 143-158.
- J. Hu, E. Goodman, K. Seo, Z. Fan, and R. Rosenberg, "The Hierarchical Fair Competition (HFC) Framework for Sustainable Evolutionary Algorithms," *Evolutionary Computation*, 13(2), 2005, pp. 241-277.