Curriculum Vitae

Cezary Z. Janikow

Department of Mathematics and Computer Science
University of Missouri at St. Louis
St. Louis, MO 63121
Tel: (314) 516–6352
janikow@umsl.edu
http://www.cs.umsl.edu/~janikow

MAIN INTEREST

Evolutionary Computation: innovative representations and operators for problem solving, numerical optimization with constraints, machine learning, constrained genetic programming

Artificial Intelligence: symbolic machine learning, fuzzy representation, rule-based systems, decision trees, fuzzy decision trees, applications

Software Engineering: structured and object-oriented analysis and design, C/C++ for Software Engineering

Programming for AI: languages, search methods, heuristics, applications

RELEVANT EDUCATION

[1988—1991] University of North Carolina at Chapel Hill, Department of Computer Science. Ph.D., August 1991. Dissertation: *"Supervised Inductive Learning in Attribute–Based Spaces: a Knowledge–Intensive Genetic Algorithm Approach"*, under Kenneth DeJong (George Mason University and the Naval Research Lab).

[1986—1987] University of North Carolina at Charlotte, Department of Computer Science. MS, August 1987. Thesis: *"Incremental Inductive Learning in a Rule Based System: A Procedural Rough Set Approach"*, under Zbigniew Ras.

[1984—1986] University of North Carolina at Charlotte, Department of Computer Science. BA, August 1986.

RELEVANT EMPLOYMENT/LONG VISITS

[Fall'97—Present] University of Missouri - St. Louis, Department of Mathematics and Computer Science. Associate Professor.

[Winter'92—Present] Continuing Education at the University of Missouri – St. Louis. Teaching various C levels and Software Engineering.

Summer'04] Johnson Space Center, Houston, TX. Working on Adaptable GP.

[Summer'03] Johnson Space Center, Houston, TX. Working on Genetic Programming for robotic control.

[Oct'97–June'99] Seidcon Inc. Research into evolutionary optimization of the Air Mobility Command transportation fleet (with Unisys).

[Fall'91—Winter'97] University of Missouri - St. Louis, Department of Mathematics and Computer Science. Assistant Professor.

[Summer'96] Johnson Space Center, Houston, TX. Working on Genetic Programming for robotic control.

[September'95] Naval Research Lab, Washington, D.C. Researching evolutionary applications to Machine Learning. Invited by John Grefenstette.

[Summer'95] Johnson Space Center, Houston, TX. Working on Genetic Programming for robotic control.

[Summer'92] Naval Coastal Research Center, Panama City, Florida. Working on applying artificial intelligence techniques to signal detection and recognition.

[Summer'91] University of North Carolina at Charlotte, Department of Computer Science. Lecturer.

[Spring'91] University of North Carolina at Chapel Hill, Department of Computer Science. Graduate teaching assistant.

[1990] University of North Carolina at Charlotte, Department of Computer Science. Part–time lecturer.

[Summer'89] Artificial Intelligence Laboratory, George Mason University. Visiting associate. Invited by R. Michalski. Working on inductive learning.

[1988—1989] University of North Carolina at Chapel Hill, Department of Computer Science. Graduate teaching assistant.

[Summer'88] University of North Carolina at Chapel Hill, Department of Computer Science. Research Assistant. Working on Software Engineering: program dependency graphs.

[Fall'87] University of North Carolina at Charlotte, Department of Computer Science. Part–time lecturer.

PUBLICATIONS IN JOURNALS

1. Z. Michalewicz & **C.Z. Janikow**. *"Genetic Algorithms for Numerical Optimization"*, *Statistics and Computing* (1991)

1, pp. 75–91.

2. Z. Michalewicz, **C.Z. Janikow** & J. Krawczyk. *"A Modified Genetic Algorithm for Optimal Control Problems"*, *Computers and Mathematics with Applications: an International Journal*, Vol. 23, No.12, 1992, pp.83–94.
3. **C.Z. Janikow**, H. Cai & X. Luo. *"An Approximate Algorithm for Estimating Treatment Lags from Right Censored Data"*, *Computers and Mathematics with Applications*, Vol. 25, No. 12, 1993, pp. 73-85.
4. **C.Z. Janikow**. *"A Knowledge–Intensive Genetic Algorithm for Supervised Learning"*, *Machine Learning*, 13 (2/3) 1993, pp. 189-228.
5. **C.Z. Janikow** & D. StClair. *"Genetic Algorithms"*, *IEEE Potentials,* Feb/Mar 1995, pp. 31-35.
6. **C.Z. Janikow**. *"A Genetic Algorithm Method for Optimizing Fuzzy Decision Trees"*, *Information Sciences*, 89(3-4), pp. 275-296, March 1996.
7. **C.Z. Janikow**. *"A Methodology for Processing Problem Constraints in Genetic Programming"*. *Computers and Mathematics with Applications*, Vol. 32, No. 8, pp. 97-113, 1996.
8. Z. Michalewicz & **C.Z. Janikow**. *"GENOCOP: A Genetic Algorithm for Numerical Optimization Problems with Constraints"*, *Communications of the ACM*. Vol 39, No. 12, VE (on-line, `http://www.acm.org/cacm/extension/michalew.pdf`), 1996.
9. **C.Z. Janikow**. "*Fuzzy Decision Trees: Issues and Methods*", *IEEE Transactions on Systems, Man, and Cybernetics*, Vol. 28, Issue 1, pp. 1-14, 1998.
10. Franciszek Seredynski, J. Koronacki, and **Cezary Z. Janikow**. *"Distributed Multiprocessor Scheduling with Decomposed Optimization Criterion"*. *Future Generation Computer Systems* 14, Elsevier 17, 2001, pp. 387-396.
11. Uday K. Chakraborty and **Cezary Z. Janikow**. *"An Analysis of Grey versus Binary Encoding in Genetic Search"*. *Information Sciences, 156(3-4)*, 2003, pp. 253-269.

PUBLICATIONS IN PROCEEDINGS/BOOKS

1. Z.W. Ras & **C.Z. Janikow**. *"Learning Concepts in Rough Environment, an Optimization Procedure"*, *Methodologies for Intelligent Systems 2,* Z. Ras & M. Zemankowa (ed.). North–Holland, 1987, pp. 355–361.
2. **C.Z. Janikow** & Z.W. Ras. *"On the Optimization of Rules in Knowledge Based Systems"*, *Proceedings of the 18th International Symposium on Multiple–Valued Logic*, IEEE Computer Society Press 1988, pp. 152–156.
3. L.J. Groves, Z. Michalewicz, P.V. Elia & **C.Z. Janikow**. *"Genetic Algorithms for Drawing Directed Graphs"*, *Methodologies for Intelligent Systems 5*, Z. Ras, M. Zemankowa & M. Emrich (eds.). North–Holland, 1990, pp. 268–276.
4. **C.Z. Janikow** & Z. Michalewicz. *"A Specialized Genetic Algorithm for Numerical Optimization Problems"*, *Proceedings of the Second International Conference on Tools for AI*, IEEE Computer Society Press 1990, pp. 798–804.
5. Z. Michalewicz, J.B. Krawczyk, M. Kazemi & **C.Z. Janikow**. *"Genetic Algorithms and Optimal Control Problems"*, *Proceedings of the 29th IEEE Conference on Decision and Control,* 1990, pp. 1664–1666.
6. **C.Z. Janikow**. *"An Experimental Study Comparing Symbolic and Subsymbolic Inductive Learning Systems"*, *Proceedings of FLAIRS–91: Machine Learning*, 1991, pp. 81–86.
7. **C.Z. Janikow** & Z. Michalewicz. *"An Experimental Comparison of Binary and Floating Point Representations in Genetic Algorithms"*, *Proceedings of the Fourth International Conference on Genetic Algorithms*, Morgan Kaufmann 1991, pp. 31–36.
8. Z. Michalewicz & **C.Z. Janikow**. *"Handling Constraints in Genetic Algorithms"*, *Proceedings of the Fourth International Conference on Genetic Algorithms*, Morgan Kaufmann 1991, pp. 151–157.
9. **C.Z. Janikow**. *"A New System for Inductive Learning in Attribute–Based Spaces"*, *Proceedings of the Sixth International Symposium on Methodologies for Intelligent Information Systems*, Springer Verlag 1991, pp. 378–388.
10. **C.Z. Janikow**. *"Combining Competition and Cooperation in Supervised Inductive Learning"*, *Proceedings of the Ninth International Machine Learning Conference*, Morgan Kaufmann, 1992, pp. 241–248.
11. **C.Z. Janikow** & H. Cai. *"A Genetic Algorithm for a Nonparametric Function Estimation Problem"*, *Proceedings of the Second International Conference on Parallel Problem Solving from Nature*, North–Holland, 1992, pp. 249–258.
12. **C.Z. Janikow**. *"Some Experiments with a Stochastic Production System"*, *Proceedings of the Fifth International Conference on Artificial Intelligence: Methodology, Systems, Applications*, V. Sgurev & B du Bouley (eds.), North Holland, 1992, pp. 105-114.
13. H. Cai, **C.Z. Janikow** & X. Luo. *"Computational Aspects Of Regression On Survival Data With Treatment Lags", Proceedings of the Joint Meeting of the American Statistical Association, Boston, 1992*, pp. 104-107.
14. **C.Z. Janikow**. *"Genetic Algorithms and Applications"*, *Proceedings of the International Conference on Control Systems and Computer Science CSCS9*, 1993, pp. 432–439. **Invited** by conference Chair, Prof. I. Dumitrache.
15. I. Dumitrache, **C.Z. Janikow** & C. Buiu. *"Tuning Fuzzy Logic Controllers Using Genetic Algorithms"*, *Proceedings of the International Conference on Control Systems and Computer Science CSCS9*, 1993, pp. 450–461.
16. **C.Z. Janikow**. *"Fuzzy Processing in Decision Trees"*, *Proceedings of the Sixth International Symposium on Artificial Intelligence*, 1993, pp. 360-367.
17. **C.Z. Janikow**. *"A Genetic Algorithm for Learning Fuzzy Controllers"*, *Proceedings of the 1994 ACM's Symposium on Applied Computing*, ACM Press 1994, pp. 232-236.
18. **C.Z. Janikow**. *"Fuzzy Decision Trees: FIDMV"*, *Proceedings of the Joint Conference on Information Sciences – Fuzzy Theory and Technology*, pp. 232-235. **Invited** by Dr. Les Sztandera.
19. **C.Z. Janikow**. *"A Genetic Algorithm for Optimizing Fuzzy Decision Trees"*, *Proceedings of the International Confer-*

ence on Genetic Algorithms, Morgan Kaufmann 1995, pp 421-428.

20. **C.Z. Janikow**. *"A Genetic Algorithm for Optimizing the Fuzzy Component of Fuzzy Decision Trees", GA for Patter Recognition*, S. Pal & P. Wang (eds.), CRC Press, pp. 253-282.
21. **C.Z. Janikow**. *"A Generic GA for Optimizng Trapezoidal Sets"*, extended summary, *Proceedings of the Joint Conference on Information Sciences – Fuzzy Theory and Technology*, 1995, pp 456-459. **Invited**.
22. **C.Z. Janikow**. *"Learning from Imperfect Examples in Decision Trees"*. *Proceedings of the International Conference on Computers and Their Applications*, 1996, pp. 71-74. **Invited** by Prof. Bouchon-Meunier.
23. **C.Z. Janikow**. *"Genetic Information Learning"*, in *Handbook of Evolutionary Computation*, Oxford University Press, to appear. **Invited**.
24. **C.Z. Janikow**. *"Exemplar Learning in Fuzzy Decision Trees"*. Proceedings of FUZZ-IEEE 1996, pp. 1500-1505. **Invited** by Prof. Bouchon-Meunier.
25. **C.Z. Janikow**. *"Constrained Genetic Programming with lilgp"*. Proceedings of ANNIE-96, pp. 311-316. **Invited** by Dr. Buczak.
26. **C.Z. Janikow**. *"Parallel Problem Solving from Nature"*. Proceedings of PARELEC'98 Intl. Conference, pp. 3-6. **Invited** keynote presentation.
27. **C.Z. Janikow** and Scott DeWeese. *"Processing Constraints in GP with CGP2.1"*. *Proceedings of GP'98 Intl. Conference*, pp. 173-180.
28. **C.Z. Janikow** and Franciszek Seredynski. *"Cellular Programming Approach to Multiprocessor Scheduling"*. Proceedings of JCIS'98, pp. 415-418.
29. Franciszek Seredynski, Jacek Koronacki, and **C.Z. Janikow**. *"Distributed Scheduling with Decomposed Optimization Criterion: Genetic Programming Approach"*. In Jose Rolim et al (eds.), Lecture Notes in Computer Science 1586: Parallel and Distributed Processing. Springer Verlag 1999. pp. 192-200.
30. **C.Z. Janikow** and Maciej Fajfer. *"Fuzzy Partitioning with FID3.1"*. Proceedings of the 18th International Conference of the North American Fuzzy Information Society, IEEE 1999, pp. 467-471.
31. Maciej Fajfer and **C.Z. Janikow**. *"Extracting Fuzzy Representation from Artificial Neural Networks"*. Proceedings of the 18th International Conference of the North American Fuzzy Information Society, IEEE 1999, pp. 600-604. **Invited** by Prof. Mohan.
32. Franciszek Seredynski and **C.Z. Janikow**. *"Learning Nash Equilibria by CoEvolving Distributed Classifier Systems"*. Proceedings of the IEEE World Congree on Evolutionary Computation CEC99, pp. 1619-1626.
33. Franciszek Seredynski and **C.Z. Janikow**. *"Designing Cellular Automata-Based Scheduling Algorithms"*. Proceedings of the Genetic and Evolutionary Computation Conference GECCO99, pp. 587-594.
34. Dipankar Dasgupta, **C.Z. Janikow**, and Uday Chakraborty. *"Representations and operators in genetic algorithms"*. Proc. 4th International Conf. on Pattern Recognition and Digital Techniques, Calcutta, India, 1999.
35. **C.Z. Janikow**. *"Evolutionary Learning with Constrained Genetic Programming"*. Proceedings of International Conference on Learning in Databases, Turawa, Poland, 2000, pp. 182-193.
36. Maciej Fajfer and **C.Z. Janikow**. *"Bottom-up Partitioning in Fuzzy Decision Trees"*. International Conference of the North American Fuzzy Information Society, Atlanta 2000 , pp. 326-330.
37. **C.Z. Janikow** and Maciej Fajfer. *"Fuzzy Decision Forest"*. International Conference of the North American Fuzzy Information Society, Atlanta 2000, pp. 218-221.
38. W. Shannon, D. Banks, **C.Z. Janikow**, and T. Mozolewski. *"Computer-Intensive Methods in Classification"*. Invited paper to the 53rd Session of the ISI conference.
39. Uday K. Chakraborty and **Cezary Z. Janikow**. *"An Analysis of Grey versus Binary Encoding in Genetic Search"*. *Proceedings of Recent Advances in Soft Computiung*, Nottingham, UK, Dec 2002, pp. 338-343.
40. Igor Wojnicki and **Cezary Z. Janikow**. *"Extending Data processing Capabilities of RDBMS"*. Proceedings of the International Conference on Artificial Intelligence IC-AI'03, Las Vegas 2003. pp388-393
41. Jan Kwiatkowski, **Cezary Z. Janikow** and Piotr Hojnor. "PVM Toolkit for Windows". Proceedings of the International Conference on Artificial Intelligence IC-AI'03, Las Vegas 2003. pp. 1605-1610.
42. Uday K. Chakraborty and **Cezary Z. Janikow**. *"Encoding in multivariete marginal distribution algorithm, genetic algorithm, and stochastic hillclimbing"*. Proceedings of GECCO-03, pp. 8-14.
43. **Cezary Z. Janikow**. *"Fuzzy Decision Forest"*. Proceedings of 22nd International Conference of the North American Fuzzy Information Processing Society, Chicago 2003, pp. 480-483.
44. **Cezary Z. Janikow** and Rahul A Deshpande. *"Adaptation of Representation in Genetic Programming"*. Smart Engineering System Design: Neural Networks, Fuzzy Logic, Evolutionary Programming, Complex Systems, and Artificial Life. C.H. Dagli, et.al (eds), pp. 45-50.
45. C**ezary Z. Janikow**. *"Adapting Representation in Genetic Programming"*. *Proceedings of GECCO 2004*, .
46. C**ezary Z. Janikow**. *"ACGP: Adaptable Constrained Genetic Programming"*. *GPTP-2004*.
47. C**ezary Z. Janikow**. *"FID4.1: an Overview"*. *Proceedings of NAFIPS 2004*.

PUBLIC DOMAIN SCIENTIFIC SOFTWARE DEVELOPED

1. `GenET` software system for problem solving with evolutionary computation.
2. `FID` software system for building and inferencing from fuzzy decision trees.
3. `CGP lil-gp`, a modification of another public domain software for genetic programming (lil-gp 1.02) designed to

constrain genetic search.

PRESENTATIONS

1. *"Learning Concepts in Rough Environment, an Optimization Procedure"*. Second International Symposium on Methodologies for Intelligent Information Systems, Charlotte, NC, 1987.
2. *"A Dynamic Probabilistic Recognitions System"*. Fourth International Symposium on Methodologies for Intelligent Information Systems, Charlotte, NC, 1989.
3. *"A Specialized Genetic Algorithm for Numerical Optimization Problems"*. Second International Conference on Tools for AI, Washington, D.C., 1990.
4. *"An Experimental Study Comparing Symbolic and Subsymbolic Inductive Learning Systems"*. Florida Artificial Intelligence Research Symposium on Machine Learning, Cocoa Beach, FL, 1991.
5. *"A New System for Inductive Learning in Attribute–Based Spaces"*. Sixth International Symposium on Methodologies for Intelligent Information Systems, Charlotte, NC, 1991.
6. "*Genetic Algorithms: Theory and Practice"*. St. Louis ACM chapter on Artificial Intelligence SIGART, 1992.
7. *"Combining Competition and Cooperation in Supervised Inductive Learning"*. Ninth International Conference on Machine Learning, Aberdeen, Scotland, July 1992.
8. *"Genetic Algorithms for Numerical and Symbolic Processing"*. Control and Bioengineering Department, Polytechnical Institute of Bucharest, Romania, Sept. 1992. Invited by Prof. Dumitrache.
9. *"Evolutionary Symbolic Learning"*. Department of Informatics, University of Torino, Italy, Sept. 1992. Invited by Prof. A. Giordana.
10. *"A Genetic Algorithm for a Nonparametric Function Estimation Problem"*. Second Parallel Problem Solving from Nature Conference, Brussels, Belgium, Sept. 1992.
11. *"Problem Optimization by Genetic Algorithms"*. Department of System Science and Mathematics, University of Washington, 1993. Invited by Dr. M. Amin.
12. "*Fuzzy Processing in Decision Trees*". Sixth International Symposium on Artificial Intelligence, Monterrey, Mexico, Sept. 1993.
13. "*A Genetic Algorithm for Learning a Fuzzy Controller*". ACM Symposium on Applied Computing, Pheonix, Arizona, March 1994.
14. *"Fuzzy Decision Trees: FIDMV"*. International Joint Conference on Information Sciences – Fuzzy Theory and Technology, Pinehurst, NC, Nov. 1994.
15. *"A Genetic Algorithm for Optimizing Fuzzy Decision Trees"*. International Conference on Genetic Algorithms, Pittsburgh, July 1995.
16. *"Constraints in Genetic Programming"*. Engineering Branch, Division of Robotics and Simulation, Johnson Space Center, Houston, July 1995. Invited by Dennis Lawler.
17. *"Genetic Algorithms, Representation, Operators"*. Department of Computer Science, University of Houston, July 1995. Invited by Prof. Eick.
18. *"Constrained Genetic Programming"*. Department of Computer Science, Sept. 1995. Philladelphia College of Textile. Invited by Dr. Les Sztandera.
19. *"Constrained Genetic Programming"*. Naval Research Lab, Washington, D.C., Sept. 1995. Invited by Dr. John Grefenstette.
20. *"A Generic GA for Fuzzy Set Optimization"*. Third Joint Conference on Information Sciences, Sept. 1995.
21. *"Constrained Genetic Programming"*. Department of Computer Science, University of North Carolina at Chapel Hill, Sept. 1995. Invited by Dr. Jan Prins.
22. *"Constrained Genetic Programming"*. Department of Computer Science, University of North Carolina at Charlotte, Sept. 1995. Invited by Dr. Zbigniew Ras.
23. *"Constrained Genetic Programming"*. Department of System Science and Mathematics, University of Washington, Nov. 1995. Invited by Dr. M. Amin.
24. *"Learning from Imperfect Examples in Decision Trees"*. International Conference on Computers and Applications, San Francisco, March 1996. Invited by Dr. Bouchon-Meunier.
25. *"Constrained Genetic Programming"*. Department of Matc/CS, UMSL, March 1996. Invited by ACM.
26. *"Constraining Search in Genetic Programming"*. Engineering Branch, Division of Robotics and Simulation, Johnson Space Center, Houston, July 1995. Invited by Dennis Lawler.
27. *"Exemplar Learning in Fuzzy Decision Trees"* (presented by student Scott DeWeese). *FUZZ-IEEE'96* International Conference on Fuzzy Systems, New Orleans, September 1996. Submission invited by a session organizer, Prof. Bouchon-Meunier.
28. *"Constrained Genetic Programming with lilgp"*. ANNIE-96 international conference, Nov. 1996.
29. *"Evolutionary Algorithms: Search and Representation"*. University of Missouri, Columbia, Department of Computer Engineering and Computer Science. Feb. 1997. **Invited** by Prof. Chen.
30. *"Parallel Problem Solving from Nature"*. Invited keynote speech to PARELEC'98 Intl. Conference.
31. *"Processing Constraints in GP with CGP2.1"*. Third International Conference on Genetic Programming GP'98.
32. *"Processing Constraints with CGP"*. Tutorial delivered at GP'98.
33. *"Classifications with Fuzzy Decision Trees"*. Delco Electronics, Feb'99.

34. *"Fuzzy Partitioning with FID3.1"*. The 18th International Conference of the North American Fuzzy Information Processing Society, New York 1999.
35. *"Evolutionary Learning with Constrained Genetic Programming"*. International Conference on Learning in Databases, Turawa, Poland, 2000.
36. *"Adapting Representation in Constrained Genetic Programming"*. NASA/JSC, 7/10/2003.
37. *"Fuzzy Decision Forest"*. International Conference of the North American Fuzzy Processign Society, Chicago, 7/2003.
38. *"Adaptation of Representation in GP"*. ANNIE 2003. 11/2003.
39. *"Adapting Representation in Constrained Genetic Programming"*. UI Urbana-Champaign, 12/03.
40. *"ACGP: Adaptable CGP"*. UMR, 4/2004.
41. *"ACGP: Adaptable Constrained Genetic Programming"*. GPTP workshop, 5/2004.
42. *"Adapting Representation in Genetic Programming"*. GECCO 2004.
43. *"FID4.1: an Overview"*. NAFIPS 2004.

AWARDS, FELLOWSHIPS AND ACCOMPLISHMENTS

1. Phi Kappa Phi honor fraternity, honorary admission, 1985.
2. MCNC (Microelectronics Center of North Carolina), graduate fellowship. 1986–1987.
3. Kosciuszko Foundation, graduate scholarship. 1988-1989.
4. Kosciuszko Foundation, graduate scholarship. 1989-1990.
5. ASEE (American Society for Engineering Education) Research Fellow, 1992.
6. NASA (JSC) Summer Research Fellow, 1995.
7. NASA (JSC) Summer Research Fellow, 1996.
8. NASA (JSC) Summer Research Fellow, 2003.
9. NASA (JSC) Summer Research Fellow, 2003.

SERVICE

- Technical meetings
  1. Organizer and Chair of the *International Workshop on Frontiers of Evolutionary Algorithms*, 1997 and 1998 (held in conjunction with the *Joint Conference on Information Sciences*)
- Conference program committees
  1. *International Conference on Genetic Algorithms*
  2. *International Conference on Tools for AI*
  3. *Parallel Program Solving from Nature* international conference
  4. *Genetic Programming*
  5. *Genetic and Evolutionary Computation Int. Conference GECCO*
  6. *World Congres of Evolutionary Computation*
- NSF (Knowledge Models and Cognitive Systems - SBIR, 1995) panelist
- NSF (Knowledge Models and Cognitive Systems, 1996) panelist
- NSF (Knowledge Models and Cognitive Systems - CAA, 1997) panelist
- NSF (Information & Intelligent Systems - CAA, 2003) panelist
- Journal referee: 22 different journals
- Conference referee: 15 different conferences
- Book reviewer
  1. GP III, John Koza (Stanford), Jan'98.
- Proposal referee
  1. UM Research Board
  2. NSF SBIR, Knowledge Models and Cognitive Systems
  3. NSF SBIR, Database and Expert Systems
  4. NSF, Knowledge Models and Cognitive Systems
  5. National Research Council
  6. NSF, International Collaboration
  7. Working as an expert referee for Lycos, Inc (providing proposal reviewing for federal agencies)
  8. NSF, Information and Intelligent Systems

EXTERNAL GRANTS/CONTRACTS

- Funded:
  1. Neuron Data, discount for software purchase (with Dr. Bhatia and Dr. Maher), 1992, $30,000.
  2. ASEE Summer Research Fellowship for research in the Naval Coastal Research Center, Panama City, Florida. 5–7, 1992, $10,000.
  3. NASA Summer Research Fellowship for research on genetic programming at JSC, Houston, TX. 5-7, 1995,

$10,000.

4. NASA Summer Research Fellowship for research on genetic programming at JSC, Houston, TX. 5-7, 1996, $10,000 (plus $3,000 to bring a student).
5. *"Fuzzy Decision Trees"*. NSF. 9/95 – 8/96, $35,544.
6. *"Constraints in Genetic Programming"*. NASA/JSC. 9-12/95, $17,000.
7. Supplement to NSF's grant *"Fuzzy Decision Trees"*. NSF. 1996. $7,329.
8. *"Improving on-line Aircraft Safety Messaging"*. ATCOM (US Army). 4-8/97. ~$50.000.
9. *"Optimization of the Air Mobility Command Transportation Fleet"*. Subcontractor to Seidcon (to Unisys), 8/98-6/99, $45,000.
10. *"Statistical Methods for Recursively Partitioned Trees"* (with Dr. Shannon, WU). NIH, $540,928 ($133,036 for UMSL).
11. *"Methods for Analyzing Multiple Sequences Aligned Protein Data"*, (with Dr. Shannon, WU), 2001, $75,000, Initial investigation for Pharmacia.
12. NASA Summer Research Fellowship for research on genetic programming at JSC, Houston, TX. 5-7, 2003, $12,000 (plus $5,000 for a student RA).
13. Technical training for Amdocs, Inc. Total about $300,000 (ongoing).
14. NASA Summer Research Fellowship to visit JSC, 5/2004-7/2004, $13,500 (plus $5500 for a graduate student).

PERSONAL

1. American citizen.
2. Military clearance 1992, secret 1998.