

## *CURRICULUM VITAE*

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William Gasarch

Full Professor of Computer Science

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### **1 Education**

1. BA in Math and Applied Math, SUNY at Stonybrook, Spring 1980.
2. MS in Applied Math, Harvard University, Spring 1982.
3. Ph.D in Computer Science, Harvard University, Spring 1985. Advisor: Harry Lewis. Title of Thesis: *Recursion-theoretic techniques in complexity theory and combinatorics.*

### **2 Univ. Experience**

1. 1985-1991 Assistant Professor, Comp. Sci. Dept., Univ. of Maryland.
2. 1991- Associate Professor, Comp. Sci. Dept, Univ. of Maryland.
3. 1985- Univ. of Maryland Institute for Adv. Comp. Studies (UMIACS).
4. 1988- Member of Applied Math Program.
5. 1991-1992 Sabbatical. Visited several Universities (list available).
6. 1998- Full Professor, Comp. Sci. Dept., Univ of Maryland.
7. 1998-1999 Sabbatical. Visited several Universities (list available).
8. Fall 2005 Sabbatical. Visited several Universities (list available).

### **3 Non-university Experience**

1. 1984 (summer) Programmer and mathematical modeling, Bell Labs, Holmdel, N.J. Compared two queuing disciplines.
2. 1983 (summer) Programmer, General Systems Group, Nashua, N.H. Wrote programs to test automated performance evaluator.
3. 1982 (summer) Mathematical modeling, General Systems Group, Nashua, N.H. Math modeling work for automated performance evaluation.
4. 2000-present. Have made up GRE questions for Advanced Computer Science, Advanced Mathematics, Quantitative, and GMAT.

## 4 Research

### 4.1 Books

1. Bounded Queries in Recursion Theory (With Georgia Martin). Birkhauser. 1998.
2. Problems in Algorithms (With Ian Parberry). 2002. A Web book.

#### 4.1.1 Chapters in Books and Invited Articles

1. Oracles: Three New Results. *Marcel Dekker Lecture Notes in Pure and Applied Mathematics Vol. 106*, Edited by D.W. Kueker, E.G.K. Lopez-Escobar, and C.H. Smith, 1987, pp. 219-252.
2. Index Sets in Recursive Combinatorics (with G. Martin), *Logical Methods (In honor of Anil Nerodes's Sixtieth Birthday)*. Edited by Crossley, Remmel, Shore, and Sweedler. 1993. Edited by Birkhauser, Boston.
3. The Complexity of Problems, *Advances in Computers Volume 43*. Edited by Marvin Zelkowitz. Published by Academic Press. 1996.
4. A Survey of Inductive Inference with an Emphasis on Learning via Queries (with C. Smith). *Complexity, Logic, and Recursion Theory*. Edited by A. Sorbi. Published by M. Dekker. Volume 187. 1997.
5. A Survey of Recursive Combinatorics. *Handbook of Recursive Mathematics Volume 2*. Edited by Ershov, Goncharov, Marek, Nerode, and Remmel. 1998. Pages 1041–1176. Published by Elsevier
6. Implementing WS1S via Finite Automata. *Automata Implementation*. (with James Glenn) Edited by Raymond, Wood, and Yu. (Lecture Notes in Computer Science 1260.)
7. A techniques-oriented survey of bounded queries. (with Frank Stephan). *Models and Computability (invited papers from Logic Colloquium '97)* (Lecture Note Series 259), Edited by Cooper and Truss. London Mathematical Society 117-156, 1999. Forschungsberichte Mathematische Logik 32 / 1998, Mathematisches Institut, Universitaet Heidelberg, Heidelberg, 1998.
8. Computability, *Handbook of Discrete and Combinatorial Mathematics*. Edited by Kenneth Rosen. Published by CRC Press (Boca Raton, Florida). 2000. pp. 1062-1066.
9. A Survey of Constant Time Parallel Sorting, for *Bulletin of the European Association for Theoretical Computer Science* (with Evan Golub and Clyde Kruskal), Vol 72, pages 84-102, October 2000, Computational Complexity Column.
10. The P=?NP Poll *Special Interest Group in Algorithms and Computing Theory (SIGACT)* Vol 33, 2002.
11. Gems in the field of bounded queries. *Computability and Models* Edited by Cooper and Goncharov. 2003.

12. A Survey on Private Information Retrieval *Bulletin of the European Association for Theoretical Computer Science* Vol 82, February 2004, pages 72–107. Computational Complexity Column.

## 4.2 Articles in Refereed Journals

1. Relativizations Comparing NP and Exponential Time (with S. Homer), *Information and Control*, Vol. 58, July 1983, pp. 88–100.
2. Oracles for Deterministic vs. Alternating Classes, *SIAM Journal of Computing*, Vol. 16, Aug 1987, pp. 613–627.
3. Polynomial Terse Sets (with A. Amir), *Information and Computation*, Vol. 77, No. 1, 1988, pp. 37–56.
4. Nondeterministic Bounded Query Reducibilities (with R. Beigel, and J. Owings), *Annals of Pure and Applied Logic*, Vol. 41, 1989, pp. 107-118.
5. Training Sequences (with D. Angluin and C. Smith), *Theoretical Computer Science*, Vol. 66, 1989, pp. 255-272.
6. On the Complexity of Finding the Chromatic Number of a Recursive Graph I: The Bounded Case (with R. Beigel), *Annals of Pure and Applied Logic*, Vol. 45, 1989, pp. 1-38.
7. On the Complexity of Finding the Chromatic Number of a Recursive Graph II: The Unbounded Case (with R. Beigel), *Annals of Pure and Applied Logic*, Vol. 45, 1989, pp. 227-247.
8. Bounded Query Classes and the Difference Hierarchy (with R. Beigel and L. Hay), *Archive for Math. Logic*, Vol. 29, 1989, pp. 69-84.
9. The Mapmaker’s Dilemma (with R. Beigel), *Discrete Applied Math (Special Issue on Theoretical Computer Science)*, Vol. 34, 1991, pp. 37-48.
10. On Selecting the k Largest with Restricted Quadratic Queries, *Information Processing Letters*, Vol. 38, 1991, pp. 193-195.
11. Learning via Queries to  $[+,i]$  (with M. Pleszkoch and R. Solovay), *Journal of Symbolic Logic*, Vol. 57, 1992, pp. 53-81.
12. Learning Programs with an Easy to Calculate Set of Errors (with Rameshkumar Sitarman, C. Smith, and Mahendran Velauthapillai), *Fundamentica Informaticae*, Vol. 16, No. 3-4, pp. 355–370, 1992.
13. Learning via Queries (with C. Smith), *Journal of the Association of Computing Machinery*, Vol. 39, 1992, pp. 649-675.
14. Selection Problems using m-ary queries (with K. Guimaraes and J. Purtilo), *Computational Complexity*, Vol. 2, 1992, pp. 256-276.
15. Terse, Superterse, and Verbose Sets (with R. Beigel, J. Gill, and J. Owings), *Information and Computation*, Vol. 103, 1993, pp. 68-85, 1993.

16. On Checking Versus Evaluation of Multiple Queries (with Lane Hemachandra and Albrech Hoene), *Information and Computation*, Vol. 105, 1993, pp. 72–93.
17. Extremes in the Degrees of Inferability (with L. Fortnow, S. Jain, E. Kinber, M. Kummer, S. Kurtz, M. Pleszkoch, T. Slaman, F. Stephan, R. Solovay), *Annals of Pure and Applied Logic*, Vol. 66, 1994, pp. 231-276.
18. On Honest Polynomial Reductions and  $P=NP$  (with R. Downey, and M. Moses), *Annals of Pure and Applied Logic*, Vol. 70, 1994, pp. 1-27.
19. Learning via Queries with Teams and Anomalies (with E. Kinber, M. Pleszkoch, C. Smith, and T. Zeugmann), *Fundamenta Informaticae*, Vol. 23, Number 1, May 1995, pp. 67-89.
20. Recursion theoretic models of learning: some results and intuitions, (with C. Smith) *Annals of Mathematics and Artificial Intelligence*, Vol. 15, II, 1995, pp. 155-166.
21. OptP-Completeness as the Normal Behavior of NP-Complete Problems (with M. Krentel and K. Rappoport), *Math Systems Theory*, Vol. 28, 1995, 487-514
22. Frequency Computation and Bounded Queries (with R. Beigel and E. Kinber) *Theoretical Computer Science*, Vol. 163, 1996, 177-192.
23. Bounded Queries and Approximation (with R. Chang and C. Lund), *SIAM Journal of Computing*, Vol. 26, 1997, 188-209
24. Binary search and recursive graph problems (with K. Guimaraes) *Theoretical Computer Science* Vol 181, 1997, 119-139. (Special issue for LATIN 95 conference).
25. Asking Questions Versus Verifiability (with M. Velauthapillai), *Fundamenta Informaticae* Vol. 30, 1-9, 1997
26. Addition in  $\log n + O(1)$  Steps on Average: A Simple Analysis (with R. Beigel, M. Li, L. Zhang), *Theoretical Computer Science*. Vol 191, 1998, 245–248.
27. Relative Sizes of Learnable Sets (with L. Fortnow, R. Freivalds, M. Kummer, S. Kurtz, C. Smith, and F. Stephan), *Theoretical Computer Science* Vol 197(1-2):139-156, 1998.
28. Recursion theory and Reverse Mathematics (with Jeffery Hirst). *Mathematical Logic Quarterly*. Vol. 44, 1998, 465-473.
29. On the Finiteness of the Recursive Chromatic Number (with A. Lee). *Annals of Pure and Applied Logic* Vol. 93, 73-81, 1998.
30. Classification via Information (with M. Pleszkoch, M. Velauthapillai, and F. Stephan), *Annals of Mathematics and Artificial Intelligence*. Vol. 23, 147–168, 1998.
31. On the Number of Automorphisms of a Graph (with R. Beals, R. Chang and J. Toran), *Chicago Journal of Theory*. February 1999.
32. When can one load a set of dice so that the sum is uniformly distributed? (with C. Kruskal) *Mathematics Magazine*. Vol. 72, No. 2, 1999, pp 133-138.

33. The Complexity of  $\text{ODD}_n^A$  (with R. Beigel, M. Kummer, G. Martin, T. McNichol, and F. Stephan) *Journal of Symbolic Logic*, Vol. 65, 1–18, 2000.
34. The Communication Complexity of Enumeration, Elimination, and Selection (with Andris Ambainis, Harry Buhrman, Bala Kalyanasundaram, Leen Torenvliet) *Journal of Computer and Systems Science* (Special issue for COMPLEXITY 2000). Vol 63, pages 148-185, 2001.
35. Automata Techniques for Query Inference Machines (with G. Hird), *Annals of Pure and Applied Logic* Vol. 117, 2002, pp 171-202.
36. Max and min limiters (with James Owings and Georgia Martin), *Archives of Mathematical Logic* Vol. 41, 2002, pp 483-495.
37. Constant Time Parallel Sorting: An Empirical View (with E. Golub and C. Kruskal) *Journal of Computer and Systems Science* Vol 67, 2003, pages 63-91.
38. When Does a Random Robin Hood Win? (with E. Golub and A. Srinivasan) *Theoretical Computer Science* Vol 304, 2003, pages 477–484.
39. Some connections between bounded query classes and non-uniform complexity (with A. Amir and R. Beigel), *Information and Computation* Vol 186, 2003, 104-139.
40. A Nearly Tight Lower Bound for Restricted Private Information Retrieval Protocols (with Richard Beigel and Lance Fortnow), *Computational Complexity*. Vol 15, No 1, 2006, 82–91.
41. Inferring Answers from Questions (with Andrew Lee) *Journal of Computer and Systems Sciences*. To Appear.
42. Large 3-free sets: An Empirical Study. (with James Glenn and Clyde Kruskal), *Journal of Computer and Systems Science* To Appear.

#### 4.2.1 Papers in Preparation

1. Lower bounds on the Deterministic and Quantum Communication Complexity of  $\text{HAM}_n^a$ . (with A. Ambainis, A. Srinivasan, A. Utis)
2. The Multiparty Communication Complexity of Exact- $T$  revisited. (with Richard Beigel and James Glenn).
3. The Complexity of Learning  $\text{SUBSEQ}(A)$ . (with Steven Fenner).
4. The Complexity of Finding  $\text{SUBSEQ}(A)$ . (with Steven Fenner and Brian Postow).

#### 4.2.2 Articles in Refereed Conferences

1. On the inference of sequences of functions, *International Workshop on Analogical and Inductive Inference*, (with C. Smith), Wendisch–Rietz, DDR, October 1986. (Lecture Notes in Computer Science 265, pp. 23-41)
2. Polynomial Terse Sets (with A. Amir), *Second Annual Conference on Structure in Complexity Theory*, Cornell, June 1987.

3. Learning Via Queries (with C. Smith) *Conference on Computational Learning Theory* August 1988.
4. Learning Via Queries (with C. Smith) *29th Annual IEEE Symposium on the Foundations of Computer Science* October 1988.
5. Learning Programs with an Easy to Calculate Set of Errors (with Rameshkumar Sitaraman, C. Smith, and Mahendran Velauthapillai) *Conference on Computational Learning Theory* August 1988.
6. Learning programs with an easy to calculate set of errors. *International Workshop on Analogical and Inductive Inference*, (with R.K. Sitaraman, C. Smith, and M. Velauthapillai), Reinhardtsbrunn Castle, GDR, October 1989. (Lecture Notes in Artificial Intelligence 397, pp. 124-137)
7. On Honest Polynomial Reductions, Relativizations, and  $P=NP$  (with R. Downey, S. Homer, and M. Moses), *Fourth Annual Conference on Structure in Complexity Theory*, Univ. of Oregon, June 1989.
8. Learning via Queries to an Oracle (with M. Pleszkoch), *Second Annual Conference on Computational Learning Theory* August 1989.
9. Some connections between bounded query classes and non-uniform complexity (with A. Amir and R. Beigel), *Fifth Annual Conference on Structure in Complexity Theory*, Barcelona, Spain, June 1990. (Journal Submission)
10. On Checking Versus Evaluation of Multiple Queries (with Lane Hemachandra and Albrecht Hoene), *15th International Symposium on Mathematical Foundations of Computer Science (MFCS '90)*, Banska Bystrica, Czechoslovakia August 1990.
11. Learning via Queries to  $[+,i]$  (with M. Pleszkoch and R. Solovay), *Third Annual Conference on Computational Learning Theory* August 1990.
12. Learning via Queries with Teams and Anomalies (with E. Kinber, M. Pleszkoch, C. Smith, and T. Zeugmann), *Third Annual Conference on Computational Learning Theory* August 1990.
13. A Survey of Bounded Queries in Recursion Theory, *Sixth Annual Conferences on Structure in Complexity Theory*, Chicago, June 1991.
14. On the number of components of a recursive graph (with K. Guimaraes), *First Latin American Symposium on Theoretical Informatics (LATIN 92)* April 1992. Lecture notes in Computer Science volume 583, 177-190.
15. Degrees of Inferability (with P. Cholak, R. Downey, L. Fortnow, E. Kinber, M. Kummer, S. Kurtz, and T. Slaman), *Fifth Annual Conference on Computational Learning Theory* July 1992.
16. Asking Questions Versus Verifiability *International Workshop on Analogical and Inductive Inference*, (with M. Velauthapillai), Dagstuhl Castle, Germany, October 1992. (Lecture notes in Artificial Intelligence 642, pp. 197-213)

17. Bounded Queries and Approximation (with R. Chang), *34th Annual IEEE Symposium on the Foundations of Computer Science* October 1993.
18. Classification Using Information *Algorithmic Learning Theory* (with M. Pleszkoch and Mahendran Velauthapillai), Germany, October 1994. (Lecture notes in Artificial Intelligence 961, pp. 165-176)
19. Measure, Category, and Learning Theory *International Conference on Automata, Languages, and Programming* (ICALP). July 1995. (with Fortnow, Freivalds, Kummer, Kurtz, Smith, and Stephan)
20. Frequency Computation and Bounded Queries (with R. Beigel and E. Kinber), *Tenth Annual Conferences on Structure in Complexity Theory*, June 1995.
21. On the Number of Automorphisms of a Graph, (with R. Chang and J. Toran), *Tenth Annual Conferences on Structure in Complexity Theory*, June 1995.
22. Reductions in Learning Via Queries (with G. Hird) *Eighth Conference on Computational Learning Theory* July 1995. (Journal version, different title: Automata Techniques for Query Inference Machines in *Annals of Pure and Applied Logic* Vol. 117, 2002, pp 171-202.)
23. Unbounded search and recursive graphs (with K. Guimaraes), *Fourth annual Latin American Symposium on Theoretical INformatics (LATIN 95)* Lecture Notes in Computer Science, 911, pp. 323-331, 1995.
24. On the query complexity of sets (with R. Beigel, M. Kummer, G. Martin, T. McNichol, and F. Stephan) *21st International Symposium on Mathematical Foundations of Computer Science (MFCS '96)*, Cracow, Poland August 1996. and Book Chapter
25. Inferring answers from data (with A. Lee) *Tenth Annual Conference on Computational Learning theory* July 1997. (Journal Submission)
26. FIN Teams and games *Algorithmic Learning Theory (ALT)* (A. Ambainis, K. Apsitis, R. Freivalds, W. Gasarch and C. Smith), *Eighth International Workshop on Algorithmic Learning Theory*, Sendi, Japan, October 1997, in *Springer Verlag Lecture Notes in Artificial Intelligence*, Vol. 1316, pp. 2-17. (Journal version)
27. The Communication Complexity of Enumeration, Elimination, and Selection (with Andris Ambainis, Harry Buhrman, Bala Kalyanasundaram, Leen Torenvliet) *Fifteenth Annual Conferences on Structure in Complexity Theory*, July 2000.
28. AHA: An illuminating Perspective. (with Dan Garcia and David Ginat). *Thirty third annual SIGCSE Technical symposium on Computer Science Education*, Feb 2002.
29. The Multiparty Communication Complexity of Exact- $T$  revisited. (with Richard Beigel and James Glenn). *Thirty First International Symposium on Mathematical Foundations of Computer Science (MFCS)* August 2006.
30. The Complexity of Learning SUBSEQ(A). (with Steven Fenner). *Seventeenth International Workshop on Algorithmic Learning Theory (ALT)*, September 2006.

31. Lower bounds on the Deterministic and Quantum Communication Complexity of  $HAM_n^a$ . (with A. Ambainis, A. Srinivasan, A. Utis) *Proceedings of 17th International Symposium on Algorithms and Computation (ISAAC)* December 2006.

### 4.3 Book Reviews

1. Review of the book *An Introduction to The Theory of Computation* by E.M. Gurari, for *Journal of Symbolic Logic*. March 1991.
2. Review of the book *Finite Automata, Formal Logic, and Circuit Complexity* by H. Straubing for *SIGACT NEWS*, Vol 25, No. 3, 1994.
3. Finding the  $i$ th largest of  $n$  for small  $i, n$ , (with W. Kelly and B. Pugh) *SIGACT NEWS*, Vol 27, No. 2, 1996.
4. Complexity Theory Newsflash (with L. Fortnow and S. Fenner), *SIGACT NEWS*, Vol 27, No. 3, 1996.
5. Review of the book *Kolmogorov Complexity: Theory and applications* by Li and Vitanyi for *SIGACT NEWS*, Vol 28, No. 4, 1997.
6. Review of the book *Communication Complexity* by Kushilevits and Nisan for *SIGACT NEWS*, Vol 29, NO. 4, 1998.
7. Review of the book *Algorithms and Theory of Computation Handbook* edited by Atallah for *SIGACT NEWS*, Vol 30, NO. 2, 1999.
8. Review of the book *Handbook of Combinatorics* edited by Graham, Grötechel, and Lovász for *SIGACT NEWS*, Vol 30, NO. 2, 1999.
9. Review of the book *Indiscrete Thoughts* by Rota. for *SIGACT NEWS*, Vol 31, NO. 2, 2000.
10. Review of the book *Descriptive Complexity Theory* by Immerman for *SIGACT NEWS*, Vol 31, NO. 3, 2000.
11. Review of the book *Finite Model Theory* by Ebbinghaus and Flum, for *SIGACT NEWS*, Vol 31, NO. 3, 2000.
12. Review of the book *Descriptive Complexity and Finite Models* Edited by Immerman and Kolatis for *SIGACT NEWS*, Vol 31, NO. 3, 2000.
13. Review of the book *Fair Division: From Cake Cutting to Dispute Resolution* by Brams and Taylor for *SIGACT NEWS*, Vol 31, NO. 4, 2000.
14. Review of the book *Cake Cutting: Be fair if you can* by Robertson and Webb for *SIGACT NEWS*, Vol 31, NO. 4, 2000.
15. Review of the book *Fair Allocation* Edited by Peyton Young *SIGACT NEWS*, Vol 31, NO. 4, 2000.

16. Review of the book *The Win-Win Solution* by Brams and Taylor *SIGACT NEWS*, Vol 31, NO. 4, 2000.
17. Review of the book *The Codebreakers: The story of secret writing* by Kahn *SIGACT NEWS*, Vol 32, NO. 2, 2001.
18. Review of the book *Chaotic Elections* by Saari *SIGACT NEWS*, Vol 32, NO. 3, 2001.
19. Review of the book *Math and Politics* by Taylor *SIGACT NEWS*, Vol 32, NO. 3, 2001.
20. Review of the book *Proofs and Refutations* by Lakatos *SIGACT NEWS*, Vol 32, NO. 4, 2001.
21. Review of the book *Calculated Bets* by Skiena *SIGACT NEWS*, Vol 33, NO. 1. 2002.
22. Problem 1659, December 2002, Mathematics Magazine.
23. Review of the book *Handbook of Graph Theory* Edited by Gross and Yellen *SIGACT NEWS*, Vol 35, NO. 3, 2004.

#### 4.4 Reports and Articles in Unrefereed Journals

(I do not list those that are also in conferences or refereed Journals)

1. A Recursion Theoretic View of Van Der Waerden's Theorem, Computer Science Department TR-10-84, Harvard Univ., 1984.
2. Clock versus Vacation Schedules (with Y. Levy), Bell Labs TR, Aug. 1984.
3. Recursion Theoretic Techniques in Complexity Theory and Combinatorics (Ph.D), Computer Science Department TR-17-85, Harvard Univ., 1985.
4. More on the Random Oracle Hypothesis: What is True Almost Always is Not Necessarily So. Computer Science Department TR-1956, The Univ. of Maryland, 1985.
5. Relativized Space with Immunity Computer Science Department TR-1957, The Univ. of Maryland, 1985.
6. A Hierarchy of Functions with Applications to Recursive Graph Theory, Computer Science Department TR-1651, The Univ. of Maryland, 1985.
7. The Complexity of Optimization Functions, Computer Science Department TR-1652, The Univ. of Maryland, 1985.
8. Learning Concepts from Subconcepts (with C. Smith), Computer Science Department TR-1747, The Univ. of Maryland, 1986.
9. Recursion Theoretic Properties of Minimal Honest Polynomial Degrees. (with Steven Homer), Computer Science Department TR-1803, The Univ. of Maryland, 1987.
10. Applications of Binary Search to Recursive Graph Theory, Computer Science Department TR-1804, The Univ. of Maryland, 1987.

11. Supportive and Parallel-Supportive Sets (with R. Beigel and L. Hay) Computer Science Department TR-1805, The Univ. of Maryland, 1987.
12. Embedding the Three Element Chain Into the Turing Degrees: An Exposition (with David Kamishlian), Computer Science Department TR-2027, The Univ. of Maryland, 1987.
13. The Complexity of Optimization Problems related to Partition (with S. Pearlman) Computer Science Department TR-2028, The Univ. of Maryland, 1988.
14. The Existence of Matchings for Recursive and Highly Recursive Bipartite Graphs (with M. Lockwood) Computer Science Department TR-2029, The Univ. of Maryland, 1988.
15. Complexity Issues in Skeletal Automata (with L. Fass) Computer Science Department TR-2035, The Univ. of Maryland, 1988.
16. Cheatable, P-terse, and P-superterse Sets (with R. Beigel and A. Amir) Computer Science Department TR-2090, The Univ. of Maryland, 1988.
17. Squares in a Square: On-line questions. (with A. Ambianis) *Geocombinatics*, Volume X, No. 1, 2000.

#### 4.4.1 Invitations to Conferences and Workshops

1. Bounded Queries in Recursive Graph Theory and Complexity Theory. Association of Symbolic Logic Spring Meeting, March 1988, Michigan State Univ.
2. Some Open problems in Concrete Complexity, *Workshop on Structural Complexity*, Dagstuhl, Germany, Feb. 1992.
3. Frequency Computation and Bounded Queries, *Workshop on Structural Complexity*, Dagstuhl, Germany, Feb. 1994.
4. The Complexity of Finding the Obstruction Set *Association of Symbolic Logic*, Orlando Florida, Jan 1996.
5. Inductive Inference and Recursion Theory. European Meeting on Complexity, Logic, and Recursion theory. Barcelona, Spain. March 1996.
6. Bounded Queries in Recursion Theory: A Historical Survey. Association of Symbolic Logic. Leeds, England. 1997
7. Gems of Bounded Queries. Computable Model Theory Conference. Germany, 2001.

#### 4.4.2 Unrefereed Conferences

1. Clock versus Vacation Schedules (with Yoni Levy), *Operations Research Society of America* May 1985.

2. Recursive Categoricity of Highly Recursive Rooted Graphs (with D. Mount and D. Kueker) *Nineteenth Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Baton Rouge, February 1988 Also in *Congressus Numerantium*, Vol. 69, pp. 97-102, 1989.
3. Comparisons Between Complexity-Theoretic and Recursion-Theoretic Graph Theory (with R. Beigel and Mike Lockwood) *Third Carbondale Combinatorics Conference* October 1988.
4. The Mapmaker's Dilemma (with R. Beigel) *Capital City Conference on Combinatorics and Theoretical Computer Science*, George Washington Univ. (In Washington DC), May 1989.
5. Recursion Theoretic Models of Learning: Some Results and Intuitions, (with C. Smith) *International Symposium on Artificial Intelligence and Mathematics*, Ft. Lauderdale, Florida, January 1990.
6. Recursive Edge Colorings of Recursive Graphs (with Gary Benson and Terry Grant), *Twenty-First Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Boca Raton, Florida, February 1990
7. A Survey of Recursive Combinatorics, *A Symposium in Honor of Anil Nerode's Sixtieth Birthday*, Cornell, June 1992
8. Reverse mathematics and recursive graph theory, (with Jeff Hirst), *Annual meeting of the Association of Symbolic Logic*, March 1994.
9. Implementing Weak Second Order Theory of Natural Numbers via Finite Automata (with James Glenn), *Workshop on Implementing Automata*, August 1996.
10. Implementing WS1S via Finite Automata: Performance Issues. (with James Glenn), *Workshop on Implementing Automata*, September 1997.
11. On the order of Queries (with Richard Beigel, Richard Chang, Jacob Lurie, and Timothy McNicoll) *AMS meeting*, October 1997.
12. Finding the same number twice. (with Alexander Chan and Clyde Kruskal). *Thirtieth Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Boca Raton, Florida, February 1999
13. The search for an honest man. (with Adam Bargteil). *Thirtieth Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Boca Raton, Florida, February 1999
14. Nonconstructive is BETTER for sorting. (with Evan Golub and Clyde Kruskal). *Thirtieth Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Boca Raton, Florida, February 1999
15. Knights and Knormals (with Adam Bartgeil). *Thirty first Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Boca Raton, Florida, March 2000.

16. Constructive techniques in Ramsey Theory (with Kevin Kane). *Thirty first Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Boca Raton, Florida, March 2000.
17. Interesting Colorings of the Plane (with Clyde Kruskal). *Thirty first Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Boca Raton, Florida, March 2000.
18. Squares in a square: an online problem (with Andris Ambainis). *Thirty first Southeastern International Conference on Combinatorics, Graph Theory, and Computing* Boca Raton, Florida, March 2000.
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#### 4.4.3 Invited Talks

1. Priority arguments in Complexity Theory, March 31, 1982, MIT Logic Seminar.
2. Recursion Theory and Cryptography, December 2, 1983, MIT Computer Science.
3. On Almost all Oracles, March 12, 1984, MIT Computer Science Seminar.
4. Recursive Graph Theory, September 16, 1984, MIT Logic Seminar.
5. Oracles: Three New Results. October 11 1984, Maryland Special Year in Logic and Theoretical Computer Science.
6. Binary Search is Optimal for Recursive Graph Theory, October 1, 1986, Computer Science Research Seminar at Univ. of Maryland at Baltimore Campus.
7. Sparse Sets in NP, October 17, 1986, Computer Science Theory Seminar at John Hopkins Univ..
8. Polynomial Terseness, November 21, 1986, Boston Area Theory Seminar at Boston Univ..
9. Binary Search is Optimal for Recursive Graph Theory, November 24, 1986, Harvard Computer Science Colloquium, Harvard Univ..
10. Terse, Superterse, and Verbose Sets, November 25, 1986, MIT Logic Seminar.
11. Terse and Verbose Sets, April 17, 1987, Carnegie-Mellon Univ. Computer Science Seminar.
12. Recursive Graph Theory and Bounded Queries. October 20, 1987, State Univ. of NY at Stonybrook, Computer Science Seminar.
13. Parity Cannot be computed in Constant Depth: The Algebraic Approach. April 10, 1988, George Washington Univ. Combinatorics and Computing Seminar.
14. Proving Context-free Languages Inherently Ambiguous using Complex Analysis. October 28, 1988, George Washington Univ. Combinatorics and Computing Seminar.

15. If you ask more Questions you can learn more stuff. November 11, 1988, George Washington Univ. Math Colloquium.
16. A Short Course in Recursive Graph Theory. December 2, 9, and 16, 1988. George Washington Univ. Combinatorics and Computing Seminar.
17. Applications of Ramsey Theory to Computer Science. March 24, 1989. George Washington Univ. Combinatorics and Computing Seminar.
18. If you ask more questions, you can learn more stuff. Rutgers Univ., April 20, 1989.
19. Suppose they gave a talk and nobody came? (A nonconstructive approach to algorithms) October 3, 1989 National Science Foundation.
20. If you ask more questions, you can learn more stuff. Dartmouth Univ., October 12, 1989
21. If you ask more questions, you can learn more stuff. Univ. of Delaware, October 25, 1989
22. Circuit Computing: Computing with one hand tied behind your back. George Washington Univ. Combinatorics and Computing Seminar. October 27, 1989.
23. Learning via Queries: Connections to Logic, MIT Logic Seminar, November 3, 1989.
24. If you ask more questions, you can learn more stuff. Harvard Univ., November 9, 1989.
25. Suppose they gave a talk and nobody came? (A nonconstructive approach to algorithms) SRC, November 28, 1989
26. Suppose they gave a talk and nobody came? (A nonconstructive approach to algorithms) George Washington Univ. Combinatorics and Computing Seminar. March 9, 1990
27. Why graph properties are hard. George Washington Univ. Combinatorics and Computing Seminar. Oct 19, 1990
28. Learning via Queries: A Survey. Cornell Univ. November 15, 1990
29. The Complexity of Problems. George Washington Univ.. March 1, 1991.
30. The Complexity of Problems. Univ. of Idaho at Moscow. March 5, 1991.
31. The Complexity of Problems. Boston Univ.. March 27, 1991.
32. Evasive Boolean functions. Yale Univ.. September 25, 1991
33. The Complexity of Problems. Univ. of Georgia at Athens. October 19, 1991.
34. Learning via Queries can learn more stuff. Univ. of Chicago November 18, 1991.
35. Learning via Queries Univ. of Illinois at Urbana. November 22, 1991
36. Learning via Queries, Univ. of Wellington (New Zealand). March 10, 1992.
37. The Univ. of Southern Maine, The Complexity of Problems. April 24, 1992.

38. The Complexity of Problems, Univ. of Maine, April 27, 1992.
39. The Complexity of Problems, Appalachia State Univ., November 20, 1992.
40. The Complexity of Problems, Georgetown Univ., April 27, 1993.
41. Learning via Queries Univ. of Karlsruhe, Germany. Feb. 18, 1994.
42. The Complexity of Problems. West Virginia Univ., Nov 10, 1994
43. The Complexity of Problems. Virginia Tech., Oct 11, 1995.
44. Learning via Queries, University of Kentucky. Oct 10, 1996.
45. Complexity based on the number of queries University of Kentucky. Oct 11, 1996.
46. Complexity based on the number of queries MIT, March 5, 1997
47. Learning via Queries, Harvard University, March 6, 1997.
48. Complexity based on the number of queries. Boston University. March 7, 1997
49. Complexity based on the number of queries. University of Illinois at Urbana May 2, 1997
50. Complexity based on the number of queries. University of Chicago May 5, 1997
51. Complexity based on the number of queries. University of Wisconsin at Madison May 6, 1997
52. Loaded Dice. Haverford University. October 1998.
53. Learning via Queries. University of Turin (Italy). October 1998.
54. Bounded queries in recursion theory (3 lectures). University of Sienna (Italy). October 1998.
55. Leaving via queries. (3 lectures). University of Sienna (Italy). October 1998.
56. Concrete Complexity. (3 lectures). University of Sienna (Italy). November 1998.
57. Parallel Sorting: an empirical view. New Mexico State University. November 1998
58. Bounded queries in recursion theory. University of Texas at El Paso November 1998.
59. When can one load dice to get uniform sums?. University of Dallas. November 1998.
60. Bounded queries in recursion theory. University of North Texas. November 1998.
61. A game over omega. MIT February 1999.
62. Parallel Sorting: an empirical view. Boston University. February 1999.
63. Parallel Sorting: an empirical view. Brown University. February 1999.
64. Bounded Queries in Recursion Theory (3 lectures). Notre Dame. April 1999.
65. Bounded Queries in Recursion Theory University of Chicago. April 1999.

66. Parallel Sorting: an empirical view. University of Illinois at Chicago. April 1999.
67. The Communication Complexity of Enumeration, Elimination, and Selection. University of Austin and Texas. April 2000.
68. Bridging the Gap between Math Games and Fun Games. New Mexico State University. April 2000.
69. Bridging the Gap between Math Games and Fun Games. University of North Texas. April 2000.
70. Bridging the Gap between Math Games and Fun Games. University of Dallas. April 2000.
71. Learning via Queries. University of Texas at El Paso. April 2000.
72. Interesting Math Problems coming out of Computer Science. MAA meeting. Washington DC. November 2000.
73. Reverse and Recursive Combinatorics. Carnegie-Mellon University. April 2001.
74. Reverse and Recursive Combinatorics. Georgetown University. April 2001.

#### 4.5 Contracts and Grants

1. 1988-1990 NSF Research Grant to study *Bounded Queries in Complexity Theory*, jointly with A. Amir. Grant number: CCR-880-3641. Amount: \$134,000.
2. 1990 NSF Research Experience for Undergraduates award jointly with A. Amir. To study decision tree complexity. Add to Grant CCR-880-3641, Amount: \$4000.
3. 1991-1993 NSF Research Grant to study *Inductive Inference and other topics in the Foundations of Computing*. Jointly with C. Smith. Grant Number CCR 9020079. Amount: \$173,400.
4. 1991 NSF Research Experience for Undergraduates award jointly with C. Smith. To study scheduling. Add to Grant CCR-880-3641, Amount: \$4000.
5. 1991 Capitol Area Theory Seminar, (with C. Smith) NSF, \$6000, 1991–1995. CCR 9112976
6. 1993 Inductive Inference of Classes of Recursive Functions. CNR-93.00544.cto1 (Italian Funding agency) (Joint with M. Fulk, P. Odilfreddi, and F. Bergadano)
7. 1994-1997 Learning, Complexity and Testing, (with C. Smith) NSF \$211,260, 1994–97 CCR-9301339
8. 1994 NSF Research Experience for Undergraduates award jointly with C. Smith. (supplement to CCR-93-01339). To study Heap Sort.
9. 1994 Capitol Area Theory Seminar, (with W. Gasarch and S. Khuller) NSF \$7,500, 1994–97 CCR-9401842

10. 1996 NSF Research Experience for Undergraduates award jointly with C. Smith. (supplement to CCR-93-01339). To study Games.
11. 1997 NSF Research Experience for Undergraduates award jointly with C. Smith. (supplement to CCR-93-01339). To study liar-truthteller paradoxes with PROLOG.
12. 1997-1999 The Capabilities and Limitations of Automated Discovery (with C. Smith). NSF \$180,000, 1997–99, CCR-97-32692. Federal Grant CCR0105413
13. A Computational Theory of Discovery (with C. Smith). NSF \$210,000 2001-2003. CCR-01-05413
14. 2003 NSF Research Experience for Undergraduates award jointly with C. Smith. (supplement to CCR-01-05413).
15. 2005 Request by STAND (Science and Technology: Addressing the Need for Diversity) to Intel to Pilot CS SPIRAL (Summer Project in Research and Learning). Faculty Director (with Clyde Kruskal, Larry Davis, Joelle Carter). \$40,000

## 5 Teaching and Advising

### 5.1 Courses Taught

Spring 1984

Math 199 (at Harvard), 6 students

Fall 1986

CMSC 452, Elementary Theory of Computation, 33 students

Spring 1987

CMSC 452, Elementary Theory of Computation, 55 students

Fall 1987

CMSC 650, Theory of Computation, 45 students

Spring 1988

CMSC 750, Advanced Theory of Computation, 13 students

Fall 1988

CMSC 451, Design and Analysis of Computer Algorithms, 35 students

Spring 1989

CMSC 651, Analysis of Algorithms, 13 students

MAPL 699, Seminar on Combinatorics, Comp., and Logic, 11 students

Fall 1989

CMSC 650, Theory of Computing, 26 students

Spring 1990

CMSC 750, Advanced Theory of Computation, 11 students

Fall 1990

CMSC 650, Theory of Computing, 38 students

Spring 1991

CMSC 251, Discrete Mathematics and Algorithms, 40 students  
 Fall 1992  
 CMSC 650, Advanced Theory of Computing, 30 students  
 Spring 1993  
 CMSC 251, Discrete Math and Algorithms, 56 students  
 Fall 1993  
 CMSC 150, Discrete Structures (section 1), 20 students  
 CMSC 150, Discrete Structures (section 2), 80 students  
 CMSC 650, Theory of Computing, 20 students  
 Spring 1994  
 CMSC 750, Advanced Theory of Computing, 14 students  
 Spring 1995  
 CMSC 251, Discrete Math and Algorithms, 105 students  
 Fall 1995  
 CMSC 650, Theory of Computing, 17 students  
 Spring 1996  
 CMSC 858G (752), Concrete Complexity, 13 students  
 Fall 1996  
 CMSC 150, Discrete Structures. 70 students.  
 Spring 1997  
 CMSC 150, Discrete Structures. 95 students.  
 Fall 1997  
 CMSC 150, Discrete Structures. 59 students.  
 Spring 1998  
 CMSC 299, Honors Seminar, 18 students.  
 CMSC 752, Concrete Complexity. 16 students.  
 Fall 1998  
 GEM 496, Team Project. 11 students.  
 Spring 1998  
 GEM 496, Team Project. 11 students.  
 Fall 1999  
 CMSC 150, Discrete Structures. 70 students.  
 CMSC 150, Discrete Structures. 64 students.  
 GEM 496, Team Project. 11 students.  
 Spring 2000  
 GEM 496, Team Project. 10 students.  
 Spring 2001  
 CMSC/MATH 456, Cryptography, 50 students  
 CMSC 451, Algorithms, 40 students  
 Fall 2001  
 CMSC 752, Concrete Complexity, 15 students.  
 CMSC 297, Honors Seminar, 12 students.  
 Fall 2002

HONR 209, Fair Division: From Cake-cutting to dispute resolution, 8 students.

Spring 2003  
 CMSC 451, Algorithms, 40 students

Summer 2003  
 MATH 498G, Learning Math Through Games (Spiral Program), 14 students.  
 MATH 199, Interplay of Math and Games (Young Scholars Program), 8 students.

Fall 2003  
 CMSC 297, Honors seminar, 12 students.  
 CMSC 452, Theory of Computation, 8 students  
 CMSC 838I, How to do research, 30 students

Spring 2004  
 CMSC 858G (650), Complexity Theory, 19 students  
 CMSC 838I, How to do Research, 23 students

Summer 2004  
 MATH 498G, Learning Math Through Games (Spiral Program), 18 students.  
 MATH 199, Interplay of Math and Games (Young Scholars Program), 8 students.

Fall 2004  
 CMSC 297, Honors Seminar, 12 students  
 CMSC 451, Analysis of Algorithms, 32 students  
 CMSC 838I, How to do Research, 42 students

Spring 2005  
 CMSC 250, Discrete Structures, 40 students  
 CMSC 838I, How to do Research, 12 students

Summer 2005  
 Math 498G, Learning Math Through Games (Spiral Program) 12 students.

Spring 2006  
 CMSC 752 Concrete Complexity. 8 students.

Fall 2006  
 CMSC 297, Honors Seminar, 21 students  
 CMSC 451, Analysis of Algorithms, 21 students  
 CMSC 651, Advanced Algorithms, 28 students

Fall 2007  
 CMSC 250h, Discrete Structures (Honors Section), 14 students  
 CMSC 297, Honors Seminar, 15 students  
 CMSC 652, Complexity Theory, 20 students

## 5.2 Advising: Research Direction

### 5.2.1 Doctoral Advisor

1. Mark Pleszkoch. Machine Learning with Queries and Oracles. Spring 1990.
2. Katia Guimaraes. On the quality of queries. Spring 1992.
3. Andrew Lee. On queries in computational learning theory and combinatorial problems. Summer 1998.

4. James Glenn. Implementing *WS1S* via Finite Automata Fall 1998.
5. Evan Golub. Empirical studies in parallel sorting. Spring 1999.
6. Walid Gomma. Finite Model Theory. Summer 2007.
7. Carl Anderson. SAT Solvers. Fall 2007.

### 5.2.2 Doctoral Committee

1. Mahendran Velauthapillai. Inductive Inference. Spring 1986.
2. Jennifer Drapkin. Step Logics. Spring 1988.
3. Phil Steitz. Model Stability Theory. Spring 1990.
4. Mark Pleszkoch. Inductive Inference. Spring 1990.
5. Dominic Duggan. Programming Languages. Spring 1990.
6. Katia Guimaraes. Selection problems. Fall 1990.
7. Pat Sime. Algebraic Number Theory. Spring 1992.
8. James Helmreich. Model Theory. Spring 1992.
9. Gary Benson. Pattern Matching. Spring 1992.
10. Tony Greif. Model Theory. Spring 1993
11. Kevin Rappoport. Parallelism. Summer 1993
12. Georgia Martin. Recursion Theory Fall 1993
13. Gary Flake. Neural Nets. Fall 1993
14. Elisabeth Manduchi. Root Numbers of Fibers. Spring 1994
15. J. Lyn Miller. Algorithms in Ring Theory. Spring 1994
16. Subrata Ghosh. Artificial Intelligence. Spring 1994
17. Cheng-Chieh Lee. Coset Codes. Spring 1995
18. Elena Black. Abstract Algebra. Spring 1995
19. Wayne Kelly. Program Transformations. Spring 1996
20. James Glenn. Empirical Studies in Automata theory. Fall 1996
21. Bill Thomas. Empirical Modelling. Spring 1997
22. Suleyman Sahinalp. Parallelism. Spring 1997

23. Amanda Lubell. Model Theory. Summer 1997
24. Brian Tornaquist. Model Theory. Summer 1997
25. Lee Guan. Parallelism. Summer 1997
26. Kimberly King. Number Theory. Spring 1998
27. Stephanie Cawthorne. Model Theory. Spring 1998
28. Andrew Lee. Inductive Inference. Summer 1998.
29. Phillip Korn. Database. Summer 1998.
30. Randeep Bhatia. Scheduling. Summer 1998.
31. Evan Golub. Empirical studies in parallel sorting. Spring 1999.
32. Parke Godfrey. Logic Programming. Spring 1999.
33. Mark Morgan. Number Theory. Spring 1999.
34. Mu-Ling Chang. Number Theory. Spring 2001.
35. William McGraw. Number Theory. Spring 2001.
36. Mee Kim Knystautas. Logic. Spring 2001
37. Habash Nizar. NLP. Spring 2003.
38. Mike Roberts. Bio-comp. Summer 2003.
39. Ed Eikenberg. Number Theory. Spring 2004
40. Dave Zajic. NLP. Fall 2006
41. Kathryn Truman. Number Theory. Spring 2007
42. John Vogler. Number Theory. Spring 2007
43. Walid Gomma. Finite Model Theory. Summer 2007.
44. Susan Schmoeyers. Number Theory. Summer 2007.
45. Greg Bard, Number Theory and Crypto, Summer 2007
46. Tsz Wo Sze. Cryptography and Number Theory. Fall 2007.
47. Chiu-Yuen Koo. Cryptography. Fall 2007.
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### **5.2.3 Outside Reader for Ph.D**

1. Arun Sharma, Univ. of NY at Buffalo, Inductive Inference 1990
2. Tim McNichol, GWU, Recursion Theory 1995
3. Tizra Hirst, Weizmann Institute, Infinite Recursive Structures 1992

### **5.2.4 Preliminary Defense Committee**

1. Mahendran Velauthapillai. Inductive Inference 1986
2. John Waclawsky. Fault Tolerance 1986
3. Jennifer Drapkin. Step Logics 1986
4. John Bailey. Ada and Reusability 1987
5. Diana Gordon. Machine Learning 1987
6. Joshua Lubell. Diagnostic Expert Systems 1988
7. Dominic Duggan. A Prog. Env. based on Types-as-Specifications 1988
8. Martin Farach. Pattern Matching Algorithms 1990
9. Gary Flake. Neural Nets 1992
10. Kevin Rappoport. Parallelism 1992
11. Kutluhan Erol. Complexity and Semantics of Planning 1993
12. Hui-Hsieh Chou. Cellular Automata 1993
13. Wayne Kelly. Program Transformations 1993
14. David Wonnacott. Program Transformation 1993
15. Elliot Shefrin. Software Prototyping 1994
16. Larry Herman. Software Prototyping 1994
17. Suleyman Sahinalp. Parallelism 1995
18. Randeep Bhatia. Algorithms 1996
19. Mark Changizi, Inductive Inference. Fall 1996
20. Kalvis Apistis, Inductive Inference. Fall 1996
21. Andrew Lee, Inductive Inference. Fall 1996
22. Evan Golub, Empirical Parallelism. Summer 1998
23. Dave Zadajic. NLP. Summer 2003.

### **5.2.5 Outside Reader for Prelim Exam**

Mandayam Suraj, Univ. of Del, Inductive Inference 1993

### **5.2.6 Masters Defense Committee**

Brian Sutton. Primality Testing 1988

Mary Conrad. Number Theory 1990

### **5.2.7 Reading/Research Courses for Graduate Students**

David Kamishlian. Fall 1986

Susan Flynn. Spring 1987

Larry Herman. Fall 1987, Spring 1988, Spring 1990, Summer 1990

Stuart Pearlman. Fall 1987

Rameshkumar Sitarman. Fall 1987, Spring 1988

Sofoklis Efremidis. Spring 1988

Terry Grant. Spring 1989, Fall 1989, Spring 1990

Walid Aref. Spring 1989

Katia Guimaraes. Fall 1989, Spring 1990, Fall 1990, Spring 1991.

Mark Pleszkoch. Fall 1989, Spring 1990

Bill Regli. Spring 1991

Gary Flake. Spring 1991

Steven Smith. Spring 1991

Paul Timmel. Spring 1991

Daniel Eshner. Spring 1991

Yeung Chung Lee. Spring 1993, Fall 1994, Fall 1995, Spring 1996

James Glenn. Fall 1994, Spring 1995, Fall 1995, Fall 1996, Spring 1996

Evan Golub. Fall 1998, Spring 1999.

Andre Rukhin, Fall 2003, Spring 2004

Charles Glover, Fall 2004

Walid Gomma, Fall 2004-present

Arkady Yerukhimovich, Fall 2006-present

Kin Ma, Fall 2006-present

### **5.2.8 Reading/Research Courses for Undergraduate Students**

Kent Kimball. Fall 1989

Dan Wilkerson. Fall 1990

Daniel Levine. Fall 1990, Spring 1991, Fall 1991

David Baggett. Spring 1991

Vimarsh Bakaya. Fall 1994

Jason Ellis. Spring 1995

Chi Tran. Spring 1995, Fall 1995

David Zimmerman. Fall 1995

Ali Saqib. Fall 1995

David Peng. Summer 1996, Fall 1996.  
Anna Winkler. Fall 1996  
Amy Castner. Fall 2001  
Chad Groft. Fall 2001  
Eric Everest. Fall 2001  
Ilya Burdman. Fall 2002 (498A)  
Stuart Fletcher. Fall 2003  
Ed Ridge, Spring 2004  
Jon Chapin, Fall 2004  
Jeff Markey, Spring 2005

### **5.2.9 Masters Thesis**

1. Lazurus Kikas. Geometric algorithms. Fall 1997.
2. Charles Lin. Private Information Retrieval. Summer 2001.
3. Andrey Rukin. Towers of Hanoi. Spring 2004

### **5.2.10 Masters Scholarly Papers**

1. Mike Lockwood. Matching in Recursive Graph Theory. Fall 1987
2. Stuart Pearlman. Functional NP-Complete Problems. Spring 1988
3. Susan Flynn. Message Passing and Mutual Exclusion. Spring 1988
4. David Kamishlian. Structure of the Turing Degrees. Spring 1988
5. Gary Benson. Rec. Edge Colorings- Combinatorics. Spring 1989
6. Terry Grant. Rec. Edge Colorings- Turing Degrees. Spring 1990
7. William Setzer. Truth Table Degrees. Spring 1990
8. Larry Herman. Parallel Algorithms. Summer 1990
9. Paul Timmel. Communication Complexity. Spring 1991
10. Yeung Chung Lee. Rec. Vertex Colorings. Spring 1995
11. Alex Chan. Concrete Complexity. Fall 1997
12. Charles Glover. The Grid Coloring Problem. Fall 2006.

### 5.2.11 Honors Advisor

1. Jon Siegal. Recursive Algebra. (at Harvard) 1984
2. Sharon Kantrowitz. Recursive Graph Theory. (at Harvard) 1985
3. Bruce Gaffney. Van Der Waerden Numbers. (at Harvard) 1984-1985
4. Daniel Levine. Scheduling Algorithms. 1991
5. Jason Ellis. Heapsort. 1995
6. Chi Tran. Heapsort. 1995
7. David Zimmerman. Nim games. Fall 1995
8. Ali Saqib. Nim games. Fall 1995
9. Gil Carmel. Machine learning and Game theory. Spring 1997.
10. Adam Bartgeil. Knights and Knormals. Spring 2000.
11. Kevin Kane. Constructive Proofs in Ramsey Theory. Spring 2000.
12. Eric Everest. RSA cracking Fall 2001
13. Amy Castner. Private Information Retrieval. Spring 2002
14. Chad Groft. Zero Knowledge. Spring 2002
15. Scott Moore. Base representations and Games. Spring 2003
16. Dan Halperin. Graph Games. Summer 2003.
17. Jacob Burnim. Ramsey Games. Summer 2003.
18. Stuart Fletcher. Egg Game. Spring 2004.
19. Michael Fan. Richman Games. Spring 2004
20. Jeff Markey. Bin Packing. Fall 2004.
21. Svetlana Rabinovich. Crypto. Spring 2004.
22. Patrick Armstrong. Minesweeper. Fall 2005.
23. Asaf Peleg. Casino Game. Fall 2005.
24. Wei-Liang W Lai. Evolutionary Computing. Fall 2006.
25. Andy Parrish. Truel Game. Summer 2006-Fall 2007
26. John Dickerson. Grid Colorings. Fall 2006.
27. Katrina LaCurts. Tug of War. Fall 2006, Spring 2007, Fall 2007.

28. Brent Dorman. Secret Sharing with Cards. Spring 2007, Fall 2007
29. Lynn Reggia. Secret Sharing with Cards. Spring 2007, Fall 2007
30. Andy Parrish. Ramsey Theory. Fall 2007.

#### 5.2.12 High School Projects advised

1. Jacob Lurie. Surreal Analysis. Fall 1995- Spring 1996 (Westinghouse award).
2. Keenen Keeling. Empirical Studies in Computer Science. Fall 1996-Spring 1997.
3. Chris Sutton. Empirical Studies in Computer Science. Fall 1996-Spring 1997.
4. Brendan Connel. Taking probability seriously. Spring 1997-Spring 1998
5. James Lee. The Egg-Drop Game. Summer 2002.
6. Jefferson Pecht. Ramsey Theory. Summer 2006.
7. Joshua Yanovski. Complexity of Graph Isomorphism. Summer 2006. (Top 300 Intel Competition)
8. Paolo Casumbal. Partial Order Game. Summer 2006-Spring 2007.
9. Darnell Primus. Ramsey Theory. Fall 2006.
10. Simeon Andre. Cover times of Random Walks. Fall 2006.
11. Louis Wasserman. Montone Circuits. Fall 2007, Spring 2008. (Top 20 Siemens Competition)
12. Aki Ustimika. Ramsey Theory. Fall 2007, Spring 2008.
13. Jordan Wallis. Cryptography. Fall 2007, Spring 2008.

#### 5.2.13 Awards

1. 1993- Certificate of Teaching Excellence (In Recognition of Significant Influence and Contributions to the Education of Outstanding Graduating Senior Sergey Brin.)
2. 1994 Teaching Excellence Award (Honorable Mention), Department of Computer Science
3. 1995 Service award for *Outstanding Contribution to Seniors* (given by the office of the Vice President for Student Affairs and the Senior Council).
4. 1997 Teaching Excellence Award (Honorable Mention), Department of Computer Science
5. 1998 Teaching Excellence Award (Honorable Mention), Department of Computer Science
6. 2000 Teaching Excellence Award, Department of Computer Science 2002
7. Certificate of Teaching Excellence (In Recognition of Significant Influence and Contributions to the Education of Outstanding Graduating Senior Amy Castner.)
8. Certificate of Teaching Excellence (In Recognition of Significant Influence and Contributions to the Education of Outstanding Graduating Senior Katrina LaCurts.)

## 6 Service

### 6.1 Editing Activities for Journals

1. 1992- Managing Editor for *Information and Computation* (I+C).
2. 1994-1995 Guest Editor for *Journal of Computing and System Sciences* (JCSS). Special issue on Computational Learning Theory Conference 1995.
3. 1995- Associate Editor for *Journal of Computing and System Sciences* (JCSS).
4. 1997-present Book Review Editor for *Special Interest Group- Algorithms and Computability Theory News* (SIGACT News).

### 6.2 Referee and Reviewing Activities for Journals

1. 1982- Referee, *Information and Computation*.
2. 1982- Referee, *Journal of Computers and Systems Science*.
3. 1986- Referee, *Mathematical Systems Theory*.
4. 1985-1988 Reviewer, *Operations Research/Management Sciences*.
5. 1988 Referee, *Journal of Mathematical Psychology*.
6. 1987- Referee, *Theoretical Computer Science*
7. 1988- Reviewer, *Math Reviews*
8. 1990 Reviewer, *Journal of Symbolic Logic*
9. 1990- Referee, *Information Processing Letters*
10. 1992 Referee, *Notre Dame Journal of Logic*
11. 1993 Referee, *Annals of Math and AI*
12. 1993- Referee, *Journal of Parallel and Distributed Computing*
13. 1993- Referee, *SIAM Journal of Computing*

### 6.3 Reviewing Grants

1. 1987-1989 Referee, *National Science Foundation Grants*
2. 1999 Panel *National Science Foundation Grants*
3. 2003 Panel *National Academy of Sciences Grants*
4. *NDSEG Program Review Panel* (Reviewing grants for Grad Students funded by Defense.) 2005-2006
5. *SMART Scholarship Review Panel* 2005

## 6.4 Professional Organizations

1989- Member, Association of Computing Machinery

## 6.5 Professional

1. 1991- Member, Program Committee for Structural Complexity Theory Conference.
2. 1992-2001 - Editor of STRUCTURES ABSTRACTS (Later COMPLEXITY ABSTRACTS)
3. 1993- Member, Program Committee for Computational Learning Theory Conference.
4. 1993-1999- Manager of COLT Bibliography
5. 1996- Member, Program Committee for Computational Learning Theory Conference.
6. 1998- Member, Program Committee for Computational Learning Theory Conference.
7. 2006- Member, Program Committee for Algorithmic Learning Theory.

## 6.6 University

1. 1999-?? Member, The Mathematics Competition Committee. (Makes up and supervises *The University of Maryland Mathematics Competition.*)
2. 1989-1994, Member, CMPS Committee on Cognitive Studies
3. 1990-1994, Member, Calculus Reform Committee
4. 1992-1993 College APT committee
5. 1993-2004 Summer Orientation of Freshman
6. 2000 Supervised Governors School Program for High School Students in Computer Science
7. 1994 First Two Years Committee

## 6.7 Departmental

1. 1985- Member, Theory Field Committee
2. 1985- Organizer, Theory of Computing Seminar (Maryland/Washington Local area. Commonly called the CATS seminar)
3. 1986-1987 Participated in Academically Talented Open House for High School Students.
4. 1986- Graduate Admissions Committee (except 1991,1992)
5. 1986 Chairman of Summer Theory Comprehensive Exam
6. 1986- Chairman, Department Honors Committee (except 1991)
7. 1986- New Faculty Orientation Committee (except 1991)

8. 1987- Grad Student Orientation (for Computer Science)
9. 1988- Grad Student Orientation (for Computer Science)
10. 1988- Speaker at High School Day (Spring)
11. 1989-Undergraduate affairs committee
12. 1988- Chairman of Summer Theory Comprehensive Exam
13. 1989- Speaker at High School Day (Spring)
14. 1989- Chairman of Summer Theory Comprehensive Exam (with Dave Mount)
15. 1989 Supervised a high school student for UMIACS Summer High School program
16. 1990- Chairman of Winter Theory Comprehensive Exam  
1990- Grad Student Orientation (for Computer Science)
17. 1990- Chairman of Summer Theory Comprehensive Exam
18. 1990- Committee to form syllabus for CMCS 280, Member
19. 1990 Participated in Academically Talented Open House (recruiting talented high school students)
20. 1992-1996 Honors Research Award Committee
21. 1992- Chairman of Summer Theory Comprehensive Exam
22. 1992-1993 Chairman of Theory Field Committee
23. 1992- Undergraduate Education Committee
24. 1993- Chairman, Teaching Evaluation Committee
25. 1994- Teaching Evaluation Committee for full time lecturers
26. 1994-1996 Distinguished Dissertation committee
27. 1994 Chairman of Summer Theory Comprehensive Exam
28. 1994- New Grad Student Orientation
29. 1994-1995 Faculty Recruiting Committee
30. 1995 Graduate Retention Fellowship Committee
31. 1995 Chairman of Summer Theory Comprehensive
32. 1995-1996 Chairman of Holiday Entertainment Committee
33. 1996 Chairman of Winter Theory Comprehensive

34. 1997 Chen Scholarship Committee
35. 1997 Senior Summer Scholars Selection Committee
36. 1998 Minority Recruitment committee.
37. 2000- New Faculty Orientation
38. 2000-2004 Undergraduate Co-chair.
39. 2000-2006 Participated in Academically Talented Open House (recruiting talented high school students)
40. 2001 Faculty Recruitment Committee.
41. 2001 Speaker at Workshop for Women in Academia.
42. 2003-2005 Theory Field Committee Chair
43. 2003- Minority Recruitment Chair
44. 2006 Judge at Workshop for Women and Minority Grad Students
45. 2006 Teaching Evaluation Committee.

## **6.8 Community**

1. 1988, Speaker at Alice Deal Junior High School
2. 1989, Judge at Montgomery Area Science Fair- Computer Science Projects
3. 1989, Speaker at Alice Deal Junior High School
4. 1990, Judge at Montgomery Area Science Fair- Computer Science Projects
5. 1994, Session Chair at Junior Science and Humanities Symposium
6. 1994-1996 Mentoring High School Student Jacob Lurie, Blair Montgomery High School
7. 1996 Mentoring High School Student Jacob Lurie who wins Westinghouse Science award
8. 1996-1997 Mentoring High School Student Keenen Keeling.
9. 1996-1997 Mentoring High School Student Chris Sutton.
10. 1997-1998 Mentoring High School Student Brendan Connell.
11. 2001-2002 Mentoring High School Student Jonathan Marcus.
12. 2001-2002 Mentoring High School Student Yong-yi Zhu.
13. 2002, Speaker at River Hill High School.