Curriculum Vitæ 6 May 2015

Roger D. Maddux

Professional appointments

2012–	Professor Emeritus, Mathematics, Iowa State University
2002–2012	Professor, Computer Science, Iowa State University
1989–2012	Professor, Mathematics, Iowa State University
1983–1989	Associate Professor, Mathematics, Iowa State University
1979–1983	Assistant Professor, Mathematics, Iowa State University
1977–1979	Instructor, Mathematics, Iowa State University

Program memberships

2001–2012	Graduate Program in Ecology and Evolutionary Biology (EEB)
1999–2008	Graduate Program in Bioinformatics and Computational Biology (BCB)
1999–2012	Laurence H. Baker Center for Bioinformatics and Biological Statistics (LHBCBL)
1998–2012	Interdepartmental Graduate Minor in Complex Adaptive Systems (CAS)
1978–	Graduate Faculty

Education

1978	Ph.D., Mathematics, University of California, Berkeley (Dissertation: *Topics in relation algebras*, pp. iii+241. Advisor: Alfred Tarski)
1969	B.A., Mathematics, Pomona College (Claremont, CA)

Memberships in professional societies

2004–2009	Review Editor for the Bulletin of Symbolic Logic
2003–2006	American Society of Naturalists
1993–	American Institute of Biological Sciences
1989–2008	American Association for the Advancement of Science
1970–	American Mathematical Society
1968–	Association for Symbolic Logic

Research interests

relation algebras (03G15), algebraic logic (03G), theory of computing (68Q), mathematical ecology (92D40), general algebraic systems (08), combinatorics (05).

Teaching (summary)

- Undergraduate courses: Introduction to Mathematical Ideas (M105), Trigonometry and Analytic Geometry (M141, M142), Analytic Geometry and Calculus (M120, M121, M122, M165, M166), Discrete Mathematics for Business and Social Sciences (M150), Calculus for Business and Social Sciences (M151), Calculus with Differential Equations (M176), Elementary Multivariable Calculus (M223, M265, M265M), Elementary Differential Equations (M213, M266), Elementary Differential Equations and Laplace Transforms (M267), Linear Algebra, Multivariable Calculus and Differential Equations (M270), Introduction to Abstract Algebra (M301, M302), Introduction to Applied Mathematics (M321), Mathematical Logic (M421), Geometry (M435, M436).
- Graduate courses: Abstract Algebra (M504, M505), Theory of Automata (M524), Boolean Algebras (M567), Mathematical Logic (M571, M572, M573, M601, M602), General Theory of Algebraic Structures (M588, M589), Ecology and Evolutionary Biology Seminar (EEB698).

Teaching (details)

1977–78	Fall:	M120 (3.20)	M213 (3.90)
	Winter:	M121 (3.80)	M321 (4.65)
	Spring:	M122 (3.10)	M421 (4.40)
1978–79	Fall:	M105 (3.00)	M223 (2.60)
			M590 (R. L. Kramer, Model theory, 3 cr.)
	Winter:	M150 (3.00)	M213 (1.80)
	Spring:	M120	M321 (1.70)
1979–80	Fall:	M120 (1.80)	M571
			M690L (R. L. Kramer, Boolean algebras with operators)
	Winter:	M121 (1.80)	M572
			M690L (R. L. Kramer, Boolean algebras with operators)
	Spring:	S.H.R.I.[1]	M573
1980–81	Fall:	M120 (1.90)	M213 (2.60)
	Winter:	M121 (2.35)	M213 (2.30)
	Spring:	M223 (1.90)	S.H.R.I.[2]
1981–82	Fall:	M265M	M265M
			M151
	Spring:	M265 (2.20)	M524
1982–83	Fall:	M265 (1.80)	M166
			Univ. St. 321K ("Gödel, Escher, Bach")
			M490H (Allen Farquhar, conducting Univ. St. 321K)
			M590 (John Leuchner, Mathematical Logic, 3 cr.)
	Spring:	M265 (1.50)	M265 (1.70)
1983–84	Fall:	M265 (1.50)	M265 (1.80)
	Spring:	M421	M524

[1] Spring 1980, Science and Humanities Research Institute grant (teaching release time, one course).
[2] Spring 1981, Science and Humanities Research Institute grant (teaching release time, one course).

1984–85	Fall:	M166	M166
	Spring:	M267	S.H.R.I.[3]
	Summer:		M490H (Gabriel Cuka, Computability and Unsolvability)
1985–86	Fall:	M166	M166
	Spring:	M267 (1.71:21)	M267 (2.08)
1986–87	Fall:	M265	M571
	Spring:	M265 (1.87)	M572 (1.29)
1987–88	FIL[4]		
1988–89	Fall:	M165 (2.04)	M165 (2.16)
	Spring:	M165	M166 S.H.R.I.[5]
1989–90	Fall:	M176	M165
	Spring:	M270	
	Summer:		M590 (Paul Hertzel, Mathematical Logic, 3 cr.)
1990–91	Fall:	M270 (1.80:10)	M571 (1.40:5)
	Spring:	M265 (1.44:27)	M572 (1.25:4)
1991–92	Fall:	LWOP[6]	
	Spring:	M166 (2.21:19)	M302 (1.88:8)
			M490 (1 cr., Tim Harmon, relational database theory)
1992–93	Fall:	M165 (1.90:23)	M265 (1.72:18)
	Spring:	M166 (2.16:19)	M166 (1.74:19)
1993–94	Fall:	M165 (1.90:21)	M165 (2.18:22)
	Spring:	M266 (2.32:19)	M166 (2.48:27)
1994–95	Fall:	M150 (n.a.)	M571 (n.a.)
	Spring:	M165 (2.58:28)	M572 (1.00:2)
1995–96	FIL[7]		
1996–97	Fall:	M150 (3.39:105)	M435 (2.45:11)
	Spring:	M266 (2.71:24)	M436 (1.50:8)
1997–98	Fall:	M150 (2.80:121)	M301 (1.67:12)
	Spring:	M267 (1.81:27)	M265 (1.67:23)

[3]Spring 1985, Science and Humanities Research Institute grant (teaching release time, one course).
[4]Faculty Improvement Leave, 8-20-87 to 5-20-88.
[5]Spring 1989, Science and Humanities Research Institute grant.
[6]Banach Center, Warsaw, Poland, October 1991
[7]Faculty Improvement Leave, 8-20-95 to 5-20-96.

			M490 (3 cr., Josh Kortbein, M421)
1998–99	Fall:	M504 (1.67:3)	M435 (2.00:7)
	Spring:	M505 (1.00:3)	
1999–00	Fall:	M301 (NA)	M165 (2.59:27)
	Spring:	M302 (3.90:10)	
2000–01	Fall:	M435 (3.88:8)	M571 (4.60:5)
	Spring:	M436 (4.33:6)	M572 (4.75:4)
2001–02	Fall:	M165 (2.98:64)	course buyout, P+G grant
	Spring:	M492 (4.00:7)	M141/2 on WWW
			M490 (Dan Skinner, Math. Logic 3cr)
2002–03	Fall:	M141/2 on WWW	M571 (3.90:10)
	Spring:	M567 (4.00:2)	M572 (4.50:2)
2003–04	Fall:	M435 (4.06:17)	M588
			EEB 698[8] (3.75:16)
	Spring:	M436 (4.38:13)	M589
2004–05	Fall:	M435 (4.60:15)	M571 (3.80:5)
	Spring:	M436 (4.43:7)	M572 (4.67:3)
2005–06	Fall:	—	—
	Spring:	M436 (3.71:17)	M301 (4.21:14)
2006–07	Fall:	M435 (4.50:10)	M601 (4.00:4)
	Spring:	M436 (4.40:10)	M602 (:)
2007–08	Fall:	FPDA (Bloomington, IN)	
	Spring:	FPDA (London, UK)	
2008–09	Fall:	M435 (3.89:9)	M601 (4.67:3)
	Spring:	M436 (:)	M602 (:)
2009–10	Fall:	M435 (4.50:20)	M504 (4.56:16)
	Spring:	M436 (4.46:13)	M505 (4.80:10)
2010–11	Fall:	M435 (4.69:13)	M601 (4.50:10)
	Spring:	M436 (4.27:15)	M602 (5.00:4)
2011–12	Fall:	M435 (4.17:23)	M601 (4.33:3)
	Spring:	M436 (4.40:10)	

[8]Ecology and Evolutionary Biology Seminar, Co-instructor (with B. Danielson EEOB, R. Koford NREM, J. Pleasants EEOB), on *The Unified Neutral Theory of Biodiversity and Biogeography*, by S. H. Hubbell, Princeton Univ. Press, 2001, plus many related papers.

Advising.

1992–2004: advisor for all Honors Math Majors and several others
Fall 2001: 18 undergraduate advisees
Fall 2002: 24 undergraduate advisees
Fall 2003: 20 undergraduate advisees
Fall 2004: 28 undergraduate advisees
Fall 2006: 26 undergraduate advisees
Fall 2009: 22 undergraduate advisees
Fall 2010: 31 undergraduate advisees
Spring 2011: 28 undergraduate advisees
Spring 2012: 26 undergraduate advisees

Mentor for Ryan Martin, Asst. Prof., Math, ISU, 2003–2004.

M.S. Committees:

Rich, Craig	Comp. Sci.	1984	
Hansen, Richard C.	Comp. Sci.	1985	
Reiners, Paul Dougas	Math.	1986	
Youn, Hwa-Jung	Math.	1986	
Garg, Alok	Math.	1986	
Mukkavilli, Lakshmankumar	Comp. Sci.	1986	
Mobasher, Bamshad	Comp. Sci.	1989	
Karlsson, Gudmundur	Comp. Sci.	1986	
Wagner, David	Math.	1986	
Shen, Xiaorong	Math.	1987	
Boonyavatana, Rattikorn	Comp. Sci.	1986	
Homble, Patricia B.	Comp. Sci.	1986	
Cho, Sang	Comp. Sci.	1986	
Wemhoff, Rebecca	Comp. Sci.	1987	
Nair, Raj	Comp. Sci.	1987	
Juhlin, David	Math.	1992	Major Professor
Hertzel, Paul	Math.	1992	
Garth, David	Math.	1995	
Mitchell, David	Math.	1998	
Rajan, Dileep	Math.	2001	
Bachan, Mallika	Comp. Sci.	2002	
Alm, Jeremy	Math.	2004	Major Professor
Abey, Anumodh	Math.	2004	
Crabtree, David	Math.	2004–	
Murphy, Shane	Math.	2006	Major Professor
Zick, Timothy	Math.	2007	Major Professor
Hussain, Faraz	C.S.	2009	

Ph.D. Committees:

Geske, John	Comp. Sci.	1987	
Rubenstein, Roy	Comp. Sci.	1986	
Leuchner, John Henry	Comp. Sci.	1988	
McCullough, Daryl	Physics	1986	
Lass, Dean	Comp. Sci.	1990	
Rich, Craig	Comp. Sci.	1988	
Keremedis, Kyriakos	Math.	1986	
Yang, Song-Zung	Math.		
Even, Susan	Comp. Sci.	1990	
Jha, Pranava Kumar	Comp. Sci.	1990	
Martin, Andrew	Math.	1988	
Sun, Zhiming	Math.	1990	
Bhargava, Gautam	Comp. Sci.	1989	
Hertzel, Paul	Math.	1992	Major Professor (unfinished)
Palasinska, Katarzyna	Math.	1995	
Reich, Pam	Math.	1996	
Frias, Marcelo	Comp. Sci. (PUC-Rio)	1998	Co-Major Professor
Voutsedakis, George	Math.	1998	
Babyonyshev, Sergei	Math.	1999–2004	
Becker, Joy	Math.	2002	
Mutungi, Patrick M	Math.	2002–2004	
Meyer, Kristen	Math.	2002–2006	
Rajko, Stjepan	Comp. Sci.	2003	
Alm, Jeremy	Math.	2004–2006	Major Professor
Chung, Key One	Math.	2004–2005	
Nandakumar, Satyadev	Comp. Sci.	2007–2009	
Ylvisaker, Andrew	Math.	2009–2012	Major Professor
Gu, Xiaoyang	Comp. Sci.	2010	
Stines, Elijah	Math.	2010–2012	
Peters, Travis	Math.	2010–2012	
Erickson, Craig	Math.	2011–2014	
Failing, David	Math.	2011–2013	
Lastrina, Michelle	Math.	2011–2012	
Kramer, Lucas	Math.	2011–2014	

PUBLICATIONS

Dissertation

1. Topics in Relation Algebras, Doctoral dissertation (advisor: Alfred Tarski), University of California, Berkeley, (1978), pp. iii+241.

Book

1. Relation Algebras, Studies in Logic and Foundations of Mathematics, **Vol. 150**, ed. S. Abramsky, S. Artemov, D. M. Gabbay, A. Kechris, A. Pillay, and R. A. Shore, Elsevier (North-Holland), Amsterdam, May 2006, pp. xxvi+732 pp.

Articles

1. *Some sufficient conditions for the representability of relation algebras*, Algebra Universalis **8** (1978), pp. 162–172. MR 57#205 (U. Wybraniec-Skardowska), Zbl 386.03033 (autorreferat).

2. *The equational theory of* CA_3 *is undecidable*, The Journal of Symbolic Logic **45** (1980), pp. 311–316. MR 81e:03060 (D. Monk), Zbl 435.03010 (J. M. Plotkin).

3. *Embedding modular lattices into relation algebras*, Algebra Universalis **12** (1981), pp. 242–246. MR 82d:06007 (G. Hutchinson), Zbl 415.06010 (autorreferat), Zbl 452.06007.

4. *On the dependence of functions on their variables* (with A. Ehrenfeucht, J. Kahn, and J. Mycielski), Journal of Combinatorial Theory, Series A **33** (1982), pp. 106–108, **42** (1986), p. 317. MR 83m:08004 (H. Werner), Zbl 494.04003 (T. Sturm), addendum: MR 87g:08007, Zbl 588.04009.

5. *Some varieties containing relation algebras*, Transactions of the American Mathematical Society **272** (1982), pp. 501–526. MR 84a:03079 (S. Comer), Zbl 515.03039 (J. Jezek).

6. *Equations not preserved by complete extensions* (with Richard L. Kramer), Algebra Universalis **15** (1982), pp. 86–89. MR 83i:03098 (I. Voilculescu), Zbl 522.03054 (H.-P. Gumm).

7. *A sequent calculus for relation algebras*, Annals of Pure and Applied Logic **25** (1983), pp. 73–101. MR 85h:03067 (R. S. Pierce), Zbl 528.03016 (N. Both).

8. *Finite integral relation algebras,* Universal Algebra and Lattice Theory, Proceedings of the Southeastern Conference in Universal Algebra and Lattice Theory, July 11–14, 1984, Lecture Notes in Mathematics **1149**, Springer-Verlag, (1985), pp. 175–197. MR 87d:03180 (Alasdair Urquhart), Zbl 583.03048 (autorreferat), Zbl 563.00005.

9. *Nonfinite axiomatizability results for cylindric and relation algebras*, The Journal of Symbolic Logic **54(3)** (September, 1989), pp. 951–974. MR 90f:03099 (Pavel Zlatoš), Zbl 686.03035 (A. Ursini).

10. *Canonical relativized cylindric set algebras*, Proceedings of the American Mathematical Society **107(2)** (October, 1989), pp. 465–478. MR 90c:03064 (Pavel Zlatoš), Zbl 678.03029 (J. Monk).

11. *Finitary algebraic logic*, Zeitschrift für mathematische Logik und Grundlagen der Mathematik **35** (1989), pp. 321–332. MR 90j:03111 (S. Comer), Zbl 661.03052 (R. D. Maddux), Zbl 679.03029.

12. *A relation algebra which is not a cylindric reduct*, Algebra Universalis **27** (1990), pp. 279–288. MR 91c:03048 (Pavel Zlatoš), Zbl 697.03036 (S. Rudeanu).

13. *Necessary subalgebras of simple nonintegral semiassociative relation algebras*, Algebra Universalis **27** (1990), pp. 544–558. Zbl 723.03038 (S. Rudeanu), MR 97j:03122 (Jānis Cīrulis).

14. *Splitting in relation algebras* (with H. Andréka and I. Németi), Proceedings of the American Mathematical Society **111, No. 4** (April 1991), pp. 1085–1094. Zbl 721.03046 (J. Cīrulis), MR 91g:03126 (S. Comer).

15. *The neat embedding problem and the number of variables required in proofs*, Proceedings of the American Mathematical Society **112** (1991), pp. 195–202. MR 91h:03089 (S. Comer), Zbl 717.03025 (summary).

16. *Pair-dense relation algebras*, Transactions of the American Mathematical Society **328** (1991), pp. 83–131. MR 92c:03070 (Ildikó Sain), Zbl 746.03055 (summary).

17. *Introductory course on relation algebras, finite-dimensional cylindric algebras, and their interconnections*, Algebraic Logic (Proc. Conf. Budapest 1988) ed. by H. Andréka, J. D. Monk, and I. Németi, Colloq. Math. Soc. J. Bolyai, **54** North-Holland, Amsterdam, (1991), pp. 361–392. MR 93c:03082 (S. Comer), Zbl 749.03048.

18. *The origin of relation algebras in the development and axiomatization of the calculus of relations*, Studia Logica **50 (3/4)** (1991), pp. 421–455. MR 93d:03067 (Jānis Cīrulis), Zbl 754.03042 (J. Monk).

19. *Relation algebras of every dimension*, The Journal of Symbolic Logic **57, No. 4**, (December 1992), pp. 1213–1229. MR 94b:03101 (Manuel Abad), Zbl 778.03022 (R. Maddux).

20. *A working relational model: The derivation of the Dijkstra-Scholten predicate transformer semantics from Tarski's axioms for the Peirce-Schröder calculus of relations*, South African Computer Journal **9** (April 1993), pp. 92–130.

21. *Finitary axiomatizations of the true relational equations*, Algebraic Methods in Logic and Computer Science, Banach Center Publications, Vol. 28 Institute of Mathematics, Polish Academy of Sciences, Warszawa, (1993), pp. 201–208. Zbl 789.03050 (R. Maddux).

22. *Finitary algebraic logic, II*, Mathematical Logic Quarterly **39, No. 4** (1993), pp. 566–569. MR 95d:03110 (S. Comer), Zbl 812.03037 (R. Maddux).

23. *Undecidable semiassociative relation algebras*, The Journal of Symbolic Logic **59, No. 2** (1994), pp. 398–418. MR 95k:03106 (R. A. Di Paola), Zbl 815.03041 (A. A. Mullin).

24. *A perspective on the theory of relation algebras*, Algebra Universalis **31, No. 3** (1994), pp. 456–465. Zbl 803.03043 (J. Cīrulis), MR 95c:03143 (S. Comer).

25. *On binary constraint problems* (with Peter B. Ladkin), Journal of the Association for Computing Machinery **41, No. 3** (1994), pp. 435–469. MR 96h:68186, Zbl 813.03045 (C. Meinel).

26. *Representations for small relation algebras* (with H. Andréka), Notre Dame Journal of Formal Logic **35, No. 4** (1994), pp. 550–562. MR 96c:03115 (Ivo Düntsch), Zbl 830.03033 (Summary).

27. *Small representations of the relation algebra* $\mathcal{E}_{n+1}(1,2,3)$ (with Peter Jipsen and Zsolt Tuza), Algebra Universalis **33, No. 1** (1995), pp. 136–139. MR 95k:03105 (Jānis Cīrulis), Zbl 816.03034 (S. Rudeanu).

28. *Relation algebras for reasoning about time and space*, Algebraic Methodology and Software Technology (AMAST'93), Proceedings of the Third International Conference on Algebraic Methodology and Software Technology, University of Twente, The Netherlands, 21–25 June 1993 ed. M. Nivat, C. Rattray, T. Rus and G. Scollo, Springer-Verlag, London, Series: Workshops in Computing, (1995), pp. 27–44.

29. *On the derivation of identities involving projection functions*, Logic Colloquium '92 ed. László Csirmaz, Dov M. Gabbay, Maarten de Rijke, Center for the Study of Language and Information Publications, Stanford, (1995), pp. 145–163. MR 97c:03149 (D. Rosenblatt).

30. *Total tense algebras and symmetric semiassociative relation algebras* (with Peter Jipsen and Richard L. Kramer), Algebra Universalis **34, No. 3** (1995), pp. 404–423. MR 96h:03104 (Manuel Abad), Zbl 836.08004 (L. Esakia).

31. *Relation-algebraic semantics*, Theoretical Computer Science **160, No. 1–2** (1996), pp. 1–85. Zbl 872.68106 (Summary).

32. *Nonrepresentable sequential algebras* (with Peter Jipsen), Logic Journal of the IGPL **5, No. 4**, (1997), pp. 565–574. MR 98j:03092 (Ivo Düntsch), Zbl 882.03061 (S. Rudeanu).

33. *Non-embeddable simple relation algebras* (with Marcelo Frias), Algebra Universalis, **38** (1997), pp. 115–135. MR 99a:03063 (Szabolcs Mikulás), Zbl 903.03039 (I. Chajda).

34. *Relation algebras of formulas*, Logic at Work (Studies in Fuzziness and Soft Computing, Vol. 24), ed. E. Orlowska, Springer-Verlag, (1999), pp. 613–636. MR 2000h:03123 (Manuel Abad), Zbl 923.03073 (S. Rudeanu).

35. *On the distribution and abundance of species* (with Krishna Athreya), Technical Comment, Science **286, No. 5445** (26 November 1999), p. 1647 and p. 1647a (http://www.sciencemag.org/cgi/content/full/286/5445/1647a).

36. *Completeness of a relational calculus for program schemes* (with Marcelo F. Frias), Theoretical Computer Science **254, No. 1–2**, (2001), pp. 543–556. Zbl 974.68110 (68Q55).

37. *Relation algebra reducts of cylindric algebras and an application to proof theory* (with Robin Hirsch and Ian Hodkinson), The Journal of Symbolic Logic **67, No. 1** (2002), pp. 197–213.
38. *Provability with finitely many variables* (with Robin Hirsch and Ian Hodkinson), The Bulletin of Symbolic Logic **8** (September 2002), pp. 348–379.
39. *Self-similarity and the species-area relationship*, The American Naturalist **163, No. 4** (April 2004), pp. 616–626.
40. *Finite, integral, and finite-dimensional relation algebras: a brief history*, Annals of Pure and Applied Logic **127 (1-3)** (June 2004), pp. 117-130.
41. *Nonrepresentable relation algebras generated by functional elements*, Algebra Universalis **52, Issue 2–3** (Jan 2005), pp. 155–165.
42. *Chromatic Graphs, Ramsey Numbers, and the Flexible Atom Conjecture* (with Jeremy F. Alm and Jacob Manske) The Electronic Journal of Combinatorics **15, #R49** (2008), pp. 1–8.
43. *Finite symmetric integral relation algebras with no 3-cycles*, in Relational and Kleene-algebraic methods in computer science, Papers from the 9th International Seminar on Relational Methods in Computer Science (RELMICS 9) and the 4th International Workshop on Applications of Kleene Algebra held in Manchester, UK, August 30–September 2, 2006, Lecture Notes in Computer Science, **4136**, Renate A. Schmidt, ed., Springer-Verlag, Berlin Heidelberg, 2006, pp. 2–29.
44. *Relevance logics and relation algebras*, (with Katalin Bimbó and J. Michael Dunn) The Review of Symbolic Logic **2, No. 01** (March 2009), pp. 102-131.
45. *Relevance logic and the calculus of relations*, The Review of Symbolic Logic **3, No. 01** (March 2010), pp. 41–70.
46. *Weak representations of relation algebras and relational bases*, (with Robin Hirsch and Ian Hodkinson) The Journal of Symbolic Logic **76, No. 03** (September 2011), pp. 870–882.
47. *Arrow's Theorem for incomplete relations*, Journal of Logic and Algebraic Programming **83, No. 2** (2014), pp. 235-248.

Book chapters

1. *"S4"* (with Richard L. Epstein), Chapter VI, Section F of The Semantic Foundations of Logic, Volume 1: Propositional Logics (1990), pp. 165–168, Kluwer Academic Publishers, Dordrecht-Boston-London, MR 91e:03015, Zbl 699.03001. Chapter VI, Section G.5 of The Semantic Foundations of Logic, Propositional Logics, 2nd Edition Oxford University Press, New York - Oxford, (1995), pp. 254–255.
2. *Relation Algebras,* Chapter 2 in Relational Methods in Computer Science, edited by Chris Brink, Wolfram Kahl, and Gunther Schmidt, Springer-Verlag, Vienna-New York, (1997), pp. 22–38. Zbl 885.03047.

Book edited

1. Algebraic Logic and Universal Algebra in Computer Science Conference, Ames, Iowa, USA, June 1988, Proceedings, C. H. Bergman, R. D. Maddux, D. L. Pigozzi (eds.), Lecture Notes in Computer Science, **425**, Springer-Verlag, Berlin, Heidelberg, New York, London, Paris, Tokyo, Hong Kong, (1990), pp. xi+292. MR 91g:03005, Zbl 779.00012.

Conference proceedings (refereed)

1. *Completeness of a relational calculus for program schemes* (with Marcelo Frias), Proceedings, Thirteenth Annual IEEE Symposium on Logic in Computer Science (June 21–24, 1998, Indianapolis,

Indiana). IEEE Computer Society, Los Alamitos, pp. 127–134. (6 referees. Acceptance rate: 43 out of 123 submissions.) MR 99i:68080 (Summary).

Conference proceedings (unrefereed)

1. *Banquet Speech*, Third Conf. on Algebraic Methodology and Software Technology, Enschede, The Netherlands, 21–25 June 1993 (AMAST'93), Bulletin of the European Association for Theoretical Computer Science (EATCS) **51** (October 1993), pp. 300–304.
2. *Relation algebras for reasoning about time, space, and programs*, Participant's Conference Proceedings, Algebraic Methodology and Software Technology, Enschede, The Netherlands (June 21–24, 1993), pp. 175–194.
3. *Completeness of the relational calculus MU_2* (with Marcelo Frias), Relational Methods in Computer Science, Hammamet, Tunis, Dec 1997.

Book reviews

1. *Review of* Leon Henkin, J. Donald Monk, Alfred Tarski, *"Cylindric Algebras, Part I", North-Holland, 1971, and* L. Henkin, J. D. Monk, A. Tarski, H. Andréka, I. Németi, *"Cylindric Set Algebras", Lecture Notes in Mathematics,* **883**, *Springer-Verlag, 1981.* The Journal of Symbolic Logic **50** (1985), pp. 234–237.
2. *Review of* Leon Henkin, J. Donald Monk, Alfred Tarski, Hajnal Andréka, Istvan Németi, *"Cylindric Set Algebras", Lecture Notes in Mathematics, v. 883, Springer-Verlag, 1981.* Studia Logica **XLV** (1986), pp. 223–225.
3. *Review of* Leon Henkin, J. Donald Monk, Alfred Tarski, *"Cylindric Algebras, Part II", North-Holland, 1985.* The Journal of Symbolic Logic **53** (June 1988), pp. 651–653.
4. *Review of* Alfred Tarski. **Collected Papers**. *Volume 1, 1921–1934, xvi+659 pp., Volume 2, 1935–1944, xvi+699 pp., Volume 3, 1945–1957, xvi+682 pp., Volume 4, 1958–1979, xvi+757 pp., plus Acknowledgements, insert, 3 pp. Edited by Steven R. Givant and Ralph N. McKenzie. (Contemporary Mathematicians, Gian-Carlo Rota, Editor). Birkhäuser, Basel, Boston, and Stuttgart, 1986.* Modern Logic **3, No. 2** (February 1993), pp. 174–188.
5. **Zbl 0812.03035**. Givant, Steven R.. *The structure of relation algebras generated by relativizations.* Contemporary Mathematics. 156. Providence, RI: American Mathematical Society (AMS). xv, 134 p. $34.00 (1994).
6. *Review of* **Arrow Logic and Multi-Modal Logic**, *edited by Maarten Marx, László Pólos, and Michael Masuch.* Journal of Symbolic Logic **63** (1998), p. 333-336. Contains reviews of ten papers:
   Yde Venema, *A crash course in arrow logic*, pp. 3-34.
   Maarten Marx, Szabolcs Mikulás, István Németi, Ildikó Sain, *Investigations in arrow logic*, pp. 35–61.
   Hajnal Andréka, Ágnes Kurucz, István Németi, Ildikó Sain, András Simon, *Causes and remedies for undecidability in arrow logics and multi-modal logics*, pp. 63–99.
   Viktor Gyuris, *Associativity does not imply undecidability without the axiom of modal distribution*, pp. 101–107.
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Abstracts

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2. *The equational theory of* CA_3 *is undecidable - preliminary report*, Notices of the American Mathematical Society **23**(1976), pp. A-19–A-20
3. *Some non-representable relation algebras*, Notices of the American Mathematical Society **23**(1976), pp. A-431, A-557.
4. *A sufficient condition for the representability of relation algebras* (with Alfred Tarski), Notices of the American Mathematical Society **23**(1976), p. A-477. Reprinted in Vol. 4, p. 679, of ALFRED TARSKI: COLLECTED PAPERS (4 volumes), Birkhauser-Verlag, 1986.
5. *Another sufficient condition for the representability of relation algebras*, Notices of the American Mathematical Society **23**(1976), p. A-477–A-478.
6. *Relation algebras and neat embeddings of cylindric algebras*, Notices of the American Mathematical Society **24**(1977), p. A-298.
7. *The algebra of Boolean constraint satisfaction*, (with Peter B. Ladkin), presented at the Annual Meeting of the Association for Symbolic Logic, Los Angeles, 1989, The Journal of Symbolic Logic **55(1)** (1990), pp. 378–379.
8. *On the derivation of identities involving projection functions and direct products*, presented at the European Summer Meeting of the Association for Symbolic Logic (Logic Colloquium '92), Veszprém, Hungary, August 9–15, 1992, The Journal of Symbolic Logic **58** (1993), pp. 1103–1104.

Technical reports

1. *The algebra of convex time intervals* (with Peter B. Ladkin), Kestrel Institute Technical Report KES.U.87.2 (March 1987), pp. 1–19.
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1. *Algebras of diagonal relations* by David Geiger, Algebra Universalis **27** (1990), pp. 319–332.

Funded Research Grants

1. Grants from the Science and Humanities Research Institute at ISU (course buyouts): Spring 1980, Spring 1981, Spring 1985, Spring 1989.
2. Foreign Travel Grant for visit to Budapest, Hungary, May 31–June 15, 1985.
3. *Conference on Applications of Universal Algebra and Algebaic Logic to Computer Science*, Office of Naval Research, N00014-88-J-1182, Jan–June 1988, $2392 (with C. Berman (PI) and D. Pigozzi)
4. *Conference on Applications of Universal Algebra and Algebaic Logic to Computer Science*, NSF CCR-8800793, Jan.–June 1988, $4000 (with C.Bergman (PI) and D. Pigozzi)
5. The *Conference on Applications of Universal Algebra and Algebaic Logic to Computer Science* included 8 invited speakers and attracted 76 participants. The proceedings were published by

Springer-Verlag. Our meeting spawned a series of similar conferences, collectively know and AMAST (Algebraic Methodology and Software Technology).

6. "Bioinformatics Tools for Extraction and Modeling of Signal Transduction Networks", Proctor and Gamble Corporation, with Dan Ashlock (PI, Math), Dan Berleant (EE&CPE), Julie Dickerson (EE&CPE) and Eve Wurtele (Bot), $220,000, (9/15/00–12/31/02).
7. Summer Research Support, from the Department of Mathematics, ISU, June 2003.

Research Grant Proposals (unfunded)

1. "Logic Colloquium: Research in Logic, Universal Algebra and Abstract Computability" (co-PI with Richard L. Epstein, Don L. Pigozzi), $74,389, submitted to the National Science Foundation, 1980.
2. "Research in Logic, Universal Algebra, and Abstract Computability", (co-PI with Don L. Pigozzi), $55,235, submitted to the National Science Foundation, 1981.
3. "Problems in Universal Algebra and Relation Algebras" (co-PI with Clifford Bergman), $45,262, submitted to the National Science Foundation, October 1982.
4. "Dimension theory for relation algebras (with an application to logic)", $48,148, submitted to the National Science Foundation, October 1990.
5. "Stochastic and fuzzy temporal constraint networks" (co-PI with Vasant Honavar, Computer Science Dept., ISU), $318,095, submitted to the National Science Foundation, April 1995.
6. "Focused Research Group: A Graph Theoretic Approach to Metabolic Network Modeling", with Dan Ashlock (PI, Math), Dianne Cook (Co-PI, Stat), Julie Dickerson (Co-PI, EE&CPE), $809,683, submitted to the National Science Foundation, 21 Sept 2001.

Refereeing of Papers, Books, and Grant proposals (summary)

- **152 papers refereed** for journals and conference proceedings: 2 in 1981, 2 in 1982, 2 in 1983, 4 in 1984, 2 in 1986, 2 in 1987, 1 in 1988, 7 in 1989, 2 in 1990, 4 in 1991, 15 in 1992, 4 in 1994, 16 in 1995, 3 in 1996, 3 in 1997, 10 in 1998, 4 in 1999, 6 in 2000, 2 in 2001, 7 in 2002, 7 in 2003, 5 in 2004, 5 in 2005, 5 in 2006, 6 in 2007, 6 in 2008, 5 in 2009, 5 in 2010, 4 in 2011, 4 in 2012, 2 in 2013.
- **11 grants refereed**: 2 for NSF in 1981, 1 for NSF in 1982, 1 for NSF in 1984, 1 for NSF in 1991, 1 for NSF in 1992, 1 in 1995 (Canada), 1 for NRC in 1995, 1 in 1999 (Canada), 1 in 2004 (Netherlands), 1 in 2009 (Hungary).
- **External Thesis Examiner**: M. Sc. (University of Cape Town, 1989), Ph. D. (Vrije Universiteit Amsterdam, 2002), Ph.D. (Australian National University, 2009), Ph.D. (Universidad Politécnica of Madrid, 2012).

1. Book for Memoirs of the American Mathematical Society, March 1980.
2. Paper for Algebra Universalis, May 1981.
3. Paper for Journal of Computer and System Sciences, April 1981.
4. Grant proposal for the National Science Foundation, November 1981.
5. Grant proposal for the National Science Foundation, December 1981.
6. Paper for Algebra Universalis, July 1982.
7. Paper for Contributions to Group Theory, August 1982.
8. Grant proposal for the National Science Foundation, December 1982.
9. Paper for Algebra Universalis, May 1983.
10. Paper for Algebra Universalis, August 1983.
11. Paper for Journal of Philosophical Logic, April 1984.
12. Paper for Algebra Universalis, June 1984.
13. Paper for Houston Journal of Mathematics, October 1984.

14. Paper for Universal Algebra and Lattice Theory, Proceedings, Lecture Notes in Mathematics, vol. 1149, September 1984.
15. Grant proposal for the National Science Foundation, November 1984.
16. Paper for Algebra Universalis, July 1986.
17. Paper for Proceedings of the American Mathematical Society, January 1986.
18. Book proposal for Wadsworth Advanced Books and Software, October 1986.
19. Paper for Algebra Universalis, April 1987.
20. Paper for Algebra Universalis, May 1987.
21. Paper for Algebra Universalis, October 1988.
22. Paper for the Proceedings of the Conference on Algebra Logic (Budapest, August 1988), January 1989.
23. Paper for the International Joint Conference on Artificial Intelligence, (IJCAI-1989), January 1989.
24. Paper for the Proceedings of the Conference on Algebra Logic (Budapest, August 1988), 9 May 1989.
25. Paper for the Proceedings of the Conference on Algebra Logic (Budapest, August 1988), 26 May 1989.
26. Extended abstract for the Conference on Algebraic Logic and Universal Algebra in Computer Science (Ames, June 1–4, 1988), 30 May 1989.
27. Paper for Algebra Universalis, 14 August 1989.
28. Book for the Memoirs of the American Mathematical Society, 30 August 1989.
29. Extended abstract for Conference on Algebra Logic and Universal Algebra in Computer Science (Ames, June 1–4, 1988), September 1989.
30. M. Sc. Thesis (External Examiner) for the Department of Mathematics, University of Cape Town, South Africa, 27 October 1989.
31. Paper for the Michigan Mathematical Journal, 7 February 1990.
32. Paper for Algebra Universalis, 31 October 1990.
33. Paper for the Proceedings of the American Mathematical Society, 18 January 1991.
34. Paper for Algebra Universalis, 26 March 1991.
35. Grant proposal for the National Science Foundation, 17 April 1991.
36. Paper for Algebra Universalis, 2 May 1991.
37. Paper for Algebra Universalis, 15 November 1991.
38. Monograph for the American Mathematical Society, "Contemporary Mathematics" series, 26 May 1992.
39. Grant proposal for the US-Hungary Joint Fund for Scientific and Technogical Cooperation, through the National Science Foundation, 30 July 1992.
40. Book for Oxford University Press, 6 January 1993.
41. Nine papers for the AMAST'93 conference, 16 February 1993.
42. Paper for Algebra Universalis, February 24, 1993. Follow-up, 26 July 1994.
43. Paper for Colloquium Mathematicum, 28 July 1993.
44. Paper for AMAST'93, 30 July 1993.
45. Paper for Algebra Universalis, 6 August 1993.
46. Paper for Algebra Universalis, 21 October 1993.
47. Paper for Notre Dame Journal of Formal Logic, 23 November 1993.
48. Paper for The Journal of Symbolic Logic, 7 April 1994.
49. Paper for Theoretical Computer Science B, 7 July 1994.
50. Paper for Semigroup Forum, July 7, 1994, edited 3 October 1994.
51. Paper for Algebra Universalis, 31 October 1994.

52. Grant proposal National Sciences and Engineering Research Council of Canada, 4 January 1995.
53. Paper for Artificial Intelligence, 9 January 1995.
54. Seven papers for the AMAST'95 conference, 19 January 1995.
55. Paper for Journal of Logic and Computation, 9 February 1995.
56. Paper for the Bulletin of the Interest Group in Pure and Applied Logics, 10 February 1995.
57. Paper for The Bulletin of Symbolic Logic, 1 August 1995.
58. Paper for The Bulletin of Symbolic Logic, 1 August 1995.
59. Paper for the Bulletin of the Interest Group in Pure and Applied Logics, 8 June 1995. Second report: 15 January 1996.
60. Monograph for the Memoirs of the American Mathematical Society, 7 November 1995.
61. Paper for the Bulletin of the Interest Group in Pure and Applied Logics, 13 September 1995. Second report: 7 November 1995.
62. Grant proposal for the National Research Council; Collaboration in Basic Science and Engineering (COBASE), 18 September 1995.
63. Paper for the Helena Rasiowa Memorial Volume, 15 December 1995.
64. Paper for Algebra Universalis, 25 May 1995. Second report: 30 August 1995. Third report: 5 November 1995.
65. Paper for Proceedings of the American Mathematical Society, 27 August 1996.
66. Paper for Modern Logic, 28 October 1996.
67. Three papers for the Journal of the Interest Group in Pure and Applied Logics, 22 December 1996.
68. Paper for Algebra Universalis, May 1997.
69. Paper for Algebra Universalis, May 1997.
70. Paper for The Journal of Symbolic Logic, June 1997.
71. Paper for Journal of Infomation, 23 January 1998.
72. Paper for Proceedings of the XI Brazilian Logic Meeting, 12 March 1998.
73. Paper for Artificial Intelligence and Mathematics, June 1998.
74. Seven papers for AMAST'99, August 1998.
75. Paper for Proceedings of RelMiCS'98, January 1999.
76. Paper for Logic Journal of the Interest Group in Pure and Applied Logics (IGPL), 17 March 1999.
77. Paper for Annals of Pure and Applied Logic, 17 March 1999.
78. Paper for the Logic Journal of the Interest Group in Pure and Applied Logics (IGPL), 20 July 1999.
79. Grant proposal for the Fields Institute for Research in Mathematical Sciences, Canada, 2 November 1999.
80. Paper for the Journal of Artificial Intelligence Research, 1 February 2000.
81. Paper for Studia Logica, 5 July 2000.
82. Two papers for special issue of Information Sciences devoted to RelMiCS'5, 1 August 2000.
83. Paper for special issue of Theoretical Computer Science devoted to the AMAST (Algebraic Methodology and Software Technology) workshop on Algebraic Methods in Language Processing (AMiLP 2000), 27 October 2000.
84. Paper for Proceedings of the American Mathematical Society, 6 November 2000.
85. Paper for The Journal of Symbolic Logic, 29 January 2001.
86. Paper for The Bulletin of Symbolic Logic, 7 May 2001 and 5 September 2001.
87. Five Papers for WoLLIC'02, 25 March 2002.
88. Paper for Science, 19 June 2002.

89. P. H. D. Thesis (Thesis Committee Member) for the Department of Mathematics and Computer Science, Faculty of Sciences, Vrije Universiteit Amsterdam, The Netherlands, 12 July 2002.
90. Paper for Journal of Mathematics and Mathematical Sciences, 22 July 2002.
91. Paper for Journal of Logic Language, and Information, 21 January 2003.
92. Paper for Annals of Pure and Applied Logic (Proc WoLLIC'02), 24 January 2003.
93. Paper for Algebra Universalis (McKenzie Issue), 28 January 2003.
94. Paper for Algebra Universalis, 17 March 2003.
95. Paper for a book (COST action 274 TARSKI), 17 June 2003.
96. Paper for Algebra Universalis, 15 September 2003.
97. Paper for International Journal of Mathematics and Mathematical Sciences, 19 September 2003.
98. Grant proposal for the Netherlands Organisation for Scientific Research, 16 March 2004.
99. Paper for The Bulletin of Symbolic Logic, 19 March 2004 and 1 Dec 2004.
100. Paper for The Bulletin of Symbolic Logic, 25 May 2004.
101. Book (761 pp.) for Springer-Verlag, 25 May 2004.
102. Book (355 pp.) for the American Mathematical Society, Memoirs, 29 Jul 2004 and 2 February 2006.
103. Paper for Ecology Letters, 17 August 2004.
104. Paper for Theoretical Computer Science, 11 October 2004.
105. Paper for Logic Journal of the Interest Group in Pure and Applied Logics, 28 October 2004.
106. Book (about 800 pp.) for the American Mathematical Society, Mathematical Surveys and Monographs, 29 October 2004.
107. Paper for The Journal of Symbolic Logic, 11 January 2005.
108. Paper for Oikos, 3 March 2005.
109. Paper for the Logic Journal of the Interest Group in Pure and Applied Logics (IGPL), 25 May 2005.
110. Paper for Relational Methods in Computer Science (post-conference proceedings), 19 September 2005.
111. Paper for The Journal of Symbolic Logic, 28 June 2005.
112. Paper for Ecological Monographs, 6 March 2006.
113. Paper for a book published by Birkhauser, ed. Jean-Yves Beziau, 14 March 2006.
114. Paper for Studia Logica, 10 May 2006.
115. Paper for Journal of Logic and Computation, 10 August 2006.
116. Paper for the Logic Journal of the Interest Group in Pure and Applied Logic, 10 October 2006.
117. Paper for Algebra Universalis, 8 February 2007, revision checked 14 May 2009.
118. Book for Studies in Universal Logic, Birkhäuser, 5 March 2007.
119. Paper for Annals of Pure and Applied Logic, 11 May 2007.
120. Paper for Notre Dame Journal of Formal Logic, 26 June 2007.
121. Paper for Algebra Universalis, 30 July 2007.
122. Book (66 pp.) for Memoirs of the American Mathematical Society, 31 July 2007.
123. Paper for Ecology, 1 October 2007.
124. Paper for Ecology, 6 December 2007, 3 March 2008.
125. Paper for Math Logic Quarterly, 4 February 2008.
126. Paper for Math Logic Quarterly, 14 February 2008.
127. Paper for Logica Universalis, 4 June 2008.
128. Paper for Journal of Logic and Computation, 1 July 2008.
129. Paper for Logic Journal of the Interest Group in Pure and Applied Logics (IGPL), 28 July 2008.
130. Paper for Studia Logica, 2 October 2008.
131. Book proposal for the Janos Bolyai Mathematical Society and Springer-Verlag, 7 November 2008.

132. Book proposal for Cambridge University Press, 16 January 2009.
133. Paper for Journal of Computer and System Sciences, 29 January 2009.
134. Paper for The Journal of Symbolic Logic, 15 May 2009.
135. Paper for The Journal of Logic and Algebraic Programming, 19 May 2009.
136. External Examiner for a Ph.D. thesis in C.S. at the Australian National University, Canberra, 8 June 2009.
137. Paper for the Bulletin of the Section of Logic, University of Lodz, 5 and 31 August 2009.
138. Paper for the European Journal of Pure and Applied Mathematics, 25 September 2009.
139. Grant proposal for Hungarian Scientific Research Fund (OTKA), 27 October 2009.
140. Paper for the Transactions of the American Mathematical Society, 22 February 2010.
141. Paper for Logic Journal of the IGPL, 19 May and 21 June 2010.
142. Paper for the Review of Symbolic Logic, 24 May and 28 June 2010.
143. Paper for the Journal of Symbolic Logic, 24 January 2010.
144. Paper for RelMiCS 12–the Twelfth International Conference on Relational Methods in Computer Science, 25 January 2011.
145. Paper for the Transactions of the American Mathematical Society, 7 March 2011.
146. External Re-Examination of a Ph.D. in C.S., Australian National University, Canberra, 7 March 2011.
147. Paper for Logic and Logical Philosophy, 19 May 2011.
148. Paper for the Journal of Symbolic Logic, 9 June 2011.
149. Paper for the Bulletin of Symbolic Logic, 9 June 2011.
150. Paper for Algebra Universalis, 2 January 2012.
151. Paper for Algebra Universalis, 7 February 2012.
152. Paper for Logica Universalis, 16 May 2012.
153. Paper for Proceedings of the 12th Asian Logic Conference, World Scientific, 7 September and 7 December 2012.
154. Paper for Studia Logica, 17 July 2013.
155. Paper for The Journal of Symbolic Logic, 28 June and 8 August 2013.
156. Paper for The Journal of Symbolic Logic, 15 August 2013.
157. Paper for Günther Schmidt's 75th birthday Festschrift, 16 November 2013.
158. Paper for Ecology Letters, 31 January 2014.
159. Proposal for the Hungarian Scientific Research Fund (OTKA), 29 April 2014.
160. Evaluation of researcher for South Africa's National Research Foundation (NRF), 15 August 2014.
161. Paper for Journal of Logical and Algebraic Methods in Programming, 24 January 2015.
162. Paper for the Bulletin of Symbolic Logic, 24 April 2015.

SERVICE

A. Departmental

1. Organizer, Logic Colloquium: Spring, 1981.
2. Member, Lectures Committee: 1981–1982.
3. Member, Logic Hiring Committee: Spring, 1982.
4. Member, Logic and Set Theory Qualifying Exam Committee: 1979–1980, 1983–1984, 1985–1986, 1986–1987 (Chair), 1987–1988, 1988–1989, 1989–1990 (Chair), 1990–1991 (Chair),
5. Secretary, Ad Hoc Grievance Committee: April, 1986.
6. Faculty advisor, Pi Mu Epsilon, 1986–1987.
7. Individual Review Team for Assistant Professors, 1989–1990.
8. Graduate Committee, 1989–1992.
9. Coördinating and Policy Committee, 1989–1993 (Chair, 1990–1991), (Chair, 1992–1993).

10. Individual Review Team for Associate Professors, 1990–1991.
11. Individual Review Team for Full Professors in Group 3, 1990–1991.
12. Faculty and Alumni Awards Committee, 1990–1991, Spring 1992, 1992–1995.
13. Individual Review Team for Associate Professors, 1993–1994.
14. Individual Review Team for Full Professors in Group 1, 1993–1994.
15. Mathematics Department Executive Officer Search Committee, 1994–1995.
16. Individual Review Team for Assistant Professors, 1996–1997, 1997–1998 (Chair).
17. Committee to Review the Graduate Major in Mathematics, 1996–1998.
18. Individual Review Team for Associate Professors, 1998–1999.
19. Seppäläinen Promotion Committee, 1998–1999.
20. Song Promotion Committee, 1999–2000.
21. Algebra Qualifying Exam Committee, 1999–2001 (Chair in 1999–2000).
22. Bioinformatics Search Committee, 1999–2000.
23. Tenured Faculty Review and Evaluation Committee, 1999–2001 (Chair in 1999–2000).
24. Bergman Promotion Committee, 2000–2001 (Chair in 2001-2002).
25. Math. Dept. representative to the EEB Supervisory Committee, 2001–2002.
26. Initial Hiring Committee, Fall 2002.
27. Advisory Committee, 2002–2003.
28. "Discrete Math" Hiring Committee, Spring 2003.
30. Advisor for Pi Mu Epsilon, Fall 2003 (substitute for S. Willson).
31. Math. Dept. representative to the EEB Supervisory Committee, 2004–2005.
32. Graduate Committee, Spring 2005.
33. Tenured Faculty Review and Evaluation Committee, 2005–2007.
34. A. Burstein Promotion and Tenure Committee, 2005–2006 (Chair).
35. H. Liu Promotion Committee, 2006–2007.
36. Self-Study Information Coordinator for Algebra, Geometry and Logic Group, 2006–2007.
37. R. Martin Promotion and Tenure Committee, Fall 2008 (Chair).
38. Graduate Committee (Admissions Subcommittee), Spring 2009.
39. Tenured Faculty Review and Evaluation Committee, 2008–2009.
40. Awards Committee, 2009–2011.
41. Graduate Committee (Admissions Subcommittee), 2009–2010.
42. Y. T. Poon Promotion Committee, Spring 2010–Fall 2011.
43. Graduate Committee, 2010–2012.
44. Algebra Qualifying Exam Committee, 2009–2011 (Chair in 2010–2011).
45. Maria Axenovich Promotion Committee, 2011.
46. Tenured Faculty Review and Evaluation Committee, Temporary Chair for Tidriri Review, 2012.

B. College

1. Interdepartmental Review Committee for David Budreck (Chair), 1989–1990.
2. Science and Humanities Curriculum Committee, 1989–1990.
3. Liberal Arts and Sciences Curriculum Committee, 1990–1995.
4. Graduate Curriculum and Catalog Committee, 1993–1995.
5. Replacement for B. Cain on Faculty Senate, 1999–2000.
6. Liberal Arts and Sciences Dean's Mathematics Education Committee, 1999–2000.

C. Other professional service

1. Member, Organizing committee for the Conference on Algebraic Logic and Universal Algebra in Computer Science, Iowa State University, Ames, Iowa, June 1–4, 1987.

2. Member, Organizing committee for the Conference on Algebraic Logic, Janos Bolyai Math. Soc., Budapest, Hungary, August 8–14, 1988.
3. Member, Organizing committee for the Conference on Algebraic Logic (in honor of J. D. Monk's Sixtieth birthday), Boulder, Colorado, May 29–31, 1990.
4. Member, Program Committee for the Conference on Algebraic Methodology and Software Technology (AMAST'99), Jan 3–8, 1999.
5. Member, Program Committee of the Argentinian Workshop on Theoretical Computer Science (WAIT'99), Buenos Aires, September 1999.
6. Member, Program Committee of the 9th Workshop on Logic, Language, Information and Computation (WoLLIC'2002) July 30 to August 2, 2002, Rio de Janeiro, Brazil, Scientific Co-Sponsorship: IGPL, FoLLI, ASL, SBC, SBL.

E. Colloquium and conference talks

Symbol Key:

– At ISU.
***** All expenses paid.
† Honorarium.
§ Funding for accomodations

*****1. "Relation algebras and their connections with logic and set theory" on March 24, 1977, Mathematics Department Colloquium, Iowa State University, Ames, Iowa.

–2. "Some finite relation algebras" on October 10, 1978, Mathematics Department Colloquium, Iowa State University, Ames, Iowa.

3. "Representation of lattices of commuting equivalence elements in relation algebras" on March 28, 1980, Special Session on Lattice Theory and General Algebra, 774th Meeting of the A.M.S., University of Colorado, Boulder, Colorado, March 27–29, 1980.

–4. "On proving that the composition of functions is a function" on March 23, 1982, Mathematics Department Colloquium, Iowa State University, Ames, Iowa.

5. "Finite integral relation algebras" on July 12, 1984, International Conference on Universal Algebra and Lattice Theory, The Citadel, Charleston, South Carolina, July 11–14, 1984.

6. "Representation problems for certain highly symmetric relation algebras" on June 3, 1985, Algebraic Logic Seminar, Mathematical Institute, Hungarian Academy of Science, Budapest, Hungary.

7. "Tarski's application of relation algebras to set theory" on June 7, 1985, Set Theory Seminar, Mathematical Institute, Hungarian Academy of Science, Budapest, Hungary.

8. "Relation algebras and set theory" on June 17, 1985, Geometry Seminar, Institute of Mathematics, Warsaw University, Warsaw, Poland.

9. "Short course on relation algebras" on June 4–7, l985, Mathematical Institute, Hungarian Academy of Science, Budapest, Hungary.

10. "Tarski's application of relation algebras to set theory" on June 20, l985, Torun Section of the Polish Mathematical Society, Torun, Poland.

11. "Representation problems for certain highly symmetric relation algebras" on June 26, 1985, Algebra Seminar, Department of Mathematics, Technical University of Warsaw, Warsaw, Poland.

12. "Small varieties of relation algebras" on January 8, 1987, Conference on Universal Algebra and Lattice Theory, Moloka'i-Sheraton, Hawaii, January 5–9, 1987.

–13. "Tarski's formalization of set theory without variables" on April 21, 1987, Mathematics Department Colloquium, Iowa State University, Ames, Iowa.

*14. "Finitary algebraic logic" on July 9, 1987, **Invited Address**, Conference on Algebra Lattices, and Logic, Asilomar Conference Center, Pacific Grove, California, July 6–12, 1987.

15. "Introductory course on relation algebras, finite-dimensional cylindric algebras, and their interconnections" on August 8–9, 1988, at the Conference on Algebraic Logic, Budapest, Hungary, August 8–14, 1988.

–16. "Three results in combinatorics applied to a problem in logic" on February 14, 1989, Mathematics Department Colloquium, Iowa State University, Ames, Iowa.

–17. "Some algebras and algorithms for reasoning about time and space" on April 5, 1989, Applied Mathematics-Engineering Colloquium, Iowa State University, Ames, Iowa.

–18. "Relational algebra: some open problems and some applications in logic and computer science" on November 1, 1989, Graduate Student Colloquium, Department of Mathematics, Iowa State University, Ames, Iowa.

19. "Progress on a problem originating with Monk" on May 29, 1990, Conference for Don Monk, University of Colorado, Boulder, Colorado, May 29–31, 1990.

20. "Finite relation algebras" (a short course of nine one-hour lectures) on June 11, 12, 13, 16, 17, 18, 19, 20, and 20, 1990, Conference on Algebraic Logic, Mills College, Oakland, California, June 11–20, 1990.

21. "Some representation problems for relation algebras" on June 15, 1990, Conference on Algebraic Logic, Mills College, Oakland, California, June 11–20, 1990.

22. "The history of the calculus of relations" on June 16, 1990, Conference on Algebraic Logic, Mills College, Oakland, California, June 11–20, 1990.

*23. "A perspective on the theory of relation algebras" on July 2, 1990, **Plenary Address**, The Jónsson Symposium, Laugarvatn, Iceland, July 2–6, 1990. (Travel expenses paid by NSF grant to conference.)

§24. "Introduction to relation algebras and their connections with cylindric algebras and logic" (3 lectures) on October 8, 10, and 11, 1991, Semester XXVIII, Banach Center, Warsaw, Poland.

§25. "Some finite axiomatizations for the true relational equations" on October 14, 1991, Semester XXVIII, Banach Center, Warsaw, Poland.

§26. "On the number of variables required in proofs" on October 16, 1991, Semester XXVIII, Banach Center, Warsaw, Poland.

§27. "Introduction to relation algebras: some relation-algebraic arithmetic and a survey of representation results" (2 lectures) on October 21 and 23, 1991, Semester XXVIII, Banach Center, Warsaw, Poland.

§28. "Proof-theoretic characterizations of the equational theories of semiassociative relation algebras, relation algebras, and representable relation algebras" on October 23, 1991, Semester XXVIII, Banach Center, Warsaw, Poland.

–29. "The party theorem" on April 23, 1992, Pi Mu Epsilon, Iowa State University, Ames, Iowa.

*30. "Predicate transformer semantics and Boolean algebras with operators" (a short course of ten one-hour lectures) on July 6, 7, 8, 9, 10, 13, 14, 15, 16, and 17, 1992, at the Workshop on Formal Aspects of Computer Science (WOFACS'92), University of Cape Town, South Africa, July 6–17, 1992. (All expenses paid by the South African Foundation for Research Development and the University of Cape Town.)

*31. "On the derivation of identities involving projection functions and direct products" on August 13, 1992, **Invited Address**, Association for Symbolic Logic European Summer Meeting (Logic Colloquium '92), Veszprém, Hungary, August 9–15, 1992.

†32. "Algebraic relational semantics for set theories and computer programs" on February 3, 1993, at the Workshop on Collection Types, Bell Communications Research, 445 South Street, Morristown, New Jersey, February 3–4, 1993. (Expenses covered by NSF grant at University of Pennsylvania.)

–33. "Computing with sets, relations, and programs" on February 28, 1993, Pi Mu Epsilon, Iowa State University, Ames, Iowa.

–34. "What does a computer program mean?" on March 30, 1993, Mathematics Department Colloquium, Iowa State University, Ames, Iowa.

*35. "Relation algebras for reasoning about time, space, and programs" on June 22, 1993, **Invited Address**, Conference on Algebraic Methodology and Software Technology (AMAST'93), University of Twente, Enschede, The Netherlands, June 21–25, 1993. (Expenses covered by NSF grant at University of Iowa.)

†36. Conference Banquet Speech on June 24, 1993, Algebraic Methodology and Software Technology, Haaksbergen, The Netherlands. (Honorarium received.)

*37. "Connections between predicate transformer semantics, relational semantics, and demonic semantics" on January 17, 1994, Schloss Dagstuhl Seminar 9403: Relational Methods in Computer Science, January 17–21, 1994, Wadern, Germany. (All expenses paid.)

*38. "Representation results for relation algebras" on August 9, 1994, Seminar on Relational Methods in Computer Science, II, August 1–17, 1994, Rio Datacentro, Pontificia Universidade Catolica, Rio de Janeiro, Brazil. (All expenses paid.)

39. "Relation-algebraics semantics" on July 14, 1995, PUC-Rio Seminar on Relational Methods in Computer Science, III, 10–14 July 1995, Paraty, Brazil.

40. "Multiplying matrices of relations and some limits on parallel computation" on November 9, 1995, Universal Algebra Seminar, Department of Mathematics, Statistics, and Computer Science, University of Illinois at Chicago Circle.

†41. "On the number of variables required in proofs", Logic Colloquium, Department of Mathematics, Statistics, and Computer Science, University of Illinois at Chicago Circle, November 9, 1995. (Honorarium received.)

†42. "A relation-algebraic generalization of the Hitchcock-Park-de Bakker Theorem on the nontermination of recursive procedures", January 31, 1996, Colloquium, Department of Mathematics and Applied Mathematics, University of Cape Town. (Honorarium received.)

*43. "Sequential algebras" on May 9, 1996, **Invited Address**, WoLLICS'96, Salvador, Brazil. (All expenses paid.)

–44. "Minds, Machines, Gödel, Lucas, Penrose, Gardner, and Dyson" on October 29, 1997, Graduate Student Colloquium (GSC), Department of Mathematics, Iowa State University, Ames, Iowa.

*45. "Completeness of a relational calculus for program schemes" on November 15, 1997, Second NSF-CNPq Workshop on Formal Foundations of Software Systems, Tulane University, New Orleans, Louisiana. (All expenses paid.)

46. "Completeness of a Relational Calculus for Program Schemes" on June 22, 1998, Thirteenth Annual IEEE Symposium on Logic in Computer Science, June 21–24, 1998, Indianapolis, Indiana.

–47. "On the number of variables required in proofs: a 30-year old problem recently solved" on October 6, 1998, Mathematics Department Colloquium, Iowa State University, Ames, Iowa.

–48. "Computing with relations" on October 14, 1998, Graudate Student Colloquium (GSC), Department of Mathematics, Iowa State University, Ames, Iowa.

–49. "Experiments in the composition of music by computer", 14 April, 1999, Complex Adaptive Systems Seminar, Iowa State University, Ames, Iowa.

50. "Relation-algebraic semantics of programming languages", Monday, 9 August 1999, National Academy of Sciences of the Republic of Armenia (NASRA), Yerevan, Armenia.

51. "Constraint satisfaction problems", Tuesday, 11 August 1999, National Academy of Sciences of the Republic of Armenia (NASRA), Yerevan, Armenia.

–52. "A mathematical proof in the journal Science is wrong." on August 31, 1999, Mathematics Department Colloquium, Iowa State University, Ames, Iowa.

–53. "Collaboration with the National Academy of Sciences, Armenia" (with W. Kliemann and D. Pigozzi), on September 14, 1999, Mathematics Department, Iowa State University, Ames, Iowa.

–54. "Some open problems about coloring the edges of a complete graph", on September 13, 2000, Graduate Student Colloquium (GSC), Department of Mathematics, Iowa State University, Ames, Iowa.

55. "Some problems about coloring the edges of a complete graph", on September 18, 2000, Visiting Speaker, Mathematics Department, Maharishi University of Management, Fairfield, Iowa. (Recruiting trip.)

*56. "Constraint satisfaction problems", **Plenary Address**, on February 3, 2001, at AAA61, the 61$^{\text{st}}$ Arbeitstagung Allgemeine Algebra (Workshop on General Algebra), Technische Universität Darmstadt, Germany.

§57. "A brief history of relation algebras", on May 22, 2001, at the Algebraic Logic Meeting, Euclides Building, room P327, Plantage Muidergracht 24, Amsterdam.

§57a. "A brief history of relation algebras", on May 30, 2001, at the Tarski Centenary Memorial Conference, Banach Center, Warsaw, Poland.

§58. "Some open problems about coloring the edges of a complete graph", on December 4, 2001. Visiting Speaker, Mathematics Department, Grinnell College, Grinnell, Iowa. (Recruiting trip.)

–59. "Self-Similarity and the Species-Area Relationship", 4:10 p.m., E-164 Lagomarcino Hall, on Monday, January 28, 2002, Department of Entomology, Spring 2002 Seminar Series.

–60. "Self-similarity and the species-area relationship", 9th Annual ISU Ecology & Evolutionary Biology Symposium, Saturday, March 30, 2002, McFarland Park, Story Co., Iowa.

61. "Nonrepresentable relation algebras generated by their functional elements", Contributed Talk, The 17th Annual Shanks Lecture and Conference in honor of Ralph McKenzie's 60th birthday, Vanderbilt University, Nashville, Tennessee, 21–24 May 2002.

62. "Colorful relationships", 80th Annual Initiation Banquet, Iowa Alpha Chapter, Pi Mu Epsilon, 27 April 2003, Regency Room, Memorial Union, Iowa State University.

63. "Some odd facts about associativity", **Invited Talk**, 2 June 2003, Special Session on Algebraic Logic and Universal Algebra, The 2003 Annual Meeting of the Association of Symbolic Logic (ASL), University of Illinois at Chicago, June 1-4, 2003.

*64. "Finite symmetric integral relation algebras with no 3-cycles", **Plenary Address**, 30 August 2006, Relations and Kleene Algebra in Computer Science (The 9th International Conference on Relational Methods in Computer Science and the 4th International Workshop on Kleene Algebra, RelMiCS/AKA 2006), 29 August–2 September 2006, Manchester, UK, www.cs.man.ac.uk/relmics06/. (All expenses paid.)

–65. "The PNP problem, or, Who Wants to be a Millionaire?", on January 31, 2007, Graduate Student Colloquium (GSC), Department of Mathematics, Iowa State University, Ames, Iowa.

66. "Relevance logic and the calculus of relations", on June 13, 2007, International Conference on Order, Algebra, and Logics in conjunction with the 22nd annual Shanks Lectures Department of Mathematics, Vanderbilt University, June 12-16, 2007, Nashville, Tennessee.

†67. "Relevance logic as a fragment of the calculus of relations" November 28, 2007, Colloquium, Department of Mathematics, Indiana University, Bloomington, Indiana. (Honorarium received.)

68. "Relevance logic as a fragment of the calculus of relations" on January 24, 2008, Seminar, 2:00–5:30 pm, London Logic Forum, Birkbeck College, University of London, London, UK.

69. "Edge-coloring problems", on January 27 and February 3, 2009, 2:10–3:00 pm, Discrete Mathematics Seminar, Iowa State University.

70. "Relational relevance algebras", **Invited Talk**, on Friday, March 27, 2009, 3:30–4:30 pm, The Logic and Combinatorics of Algebraic Structures, AMS Sectional Meeting, The University of Illinois at Urbana, March 27–29, 2009.

71. "Do all the Ramsey algebras exist?", on Friday, March 18, 2011, 2:30–2:50pm, AMS Sectional Meeting, March 18–20, 2011, University of Iowa, Iowa City.

72. "Desargues, Pappus, and cross products", on Sunday, December 4, 2011, 5:00–5:50pm, Math Club Meeting, Department of Mathematics, Iowa State University, 232 Carver Hall.

*†73. "Arrow's Theorem for incomplete relations", on Wednesday, July 11, 2012, 12:30–1:30pm, Facultad de Informática, Universidad Politécnica de Madrid, Madrid, Spain.

§74. "Subcompletions of atomic representable relational algebras", **Invited Talk**, 9:35–10:35 am, Wednesday, September 12, 2012, in the Universiteits Bibliotheek, room C0.07 (Doelenzaal), at the Workshop on Lattices and Relations, 12–14 September 2012, Institute for Logic, Language and Computation, University of Amsterdam, The Netherlands.

73a. "Arrow's Theorem for incomplete relations", on Tuesday, 2:10–3:00pm, October 9, 2012, and Tuesday, 2:10–3:00pm, October 16, 2012, in 401 Carver Hall, Iowa State University, for the Discrete Mathematics Seminar.

D. Miscellaneous activities

1. Visit to Mathematical Insititute, Hungarian Academy of Science, Budapest, Hungary, May 31–June 15, 1985, by invitation from the Janos Bolyai Mathematical Society.

2. Visit to Institute of Mathematics, Warsaw University, Warsaw, Poland, June 15–30, 1985, by invitation from Warsaw University.

3. Received Foreign Travel Grant from Iowa State University, July 19, 1985, for visit to Budapest, Hungary, May 31–June 15, 1985.
4. April, 1986–December, 1987: assisted Steven Givant in proofreading the galley and page proofs for "A Formalization of Set Theory without Variables", by A. Tarski and S. Givant, Coll. Pub. in Math., Amer. Math. Soc., Providence, 1988.
5. October, 1986, and January, 1987. Rewrote "Algebras of binary relations" for David Geiger, and typeset it. Geiger suffers from some sort of mental illness which prevents him from doing sustained mathematical work. He offered to make me a coauthor, but I declined.
6. Iowa State University Faculty Improvement Leave, August 20, 1987–May 20, 1988, for writing papers, writing a book on Relation Algebras, and conducting research with H. Andréka, I. Németi, I. Sain.
7. Letter of evaluation concerning promotion to associate professor with tenure for Steven T. Tschantz, Department of Mathematics, Vanderbilt University, November 28, 1990.
8. Letter of evaluation concerning promotion to professor for Steven R. Givant, Department of Mathematics, Mills College.
9. Visited Jim Lipton, Peter Freyd, Andre Scedrov at the University of Pennsylvania, February 5–6, 1993. (Expenses covered by NSF grant at University of Pennsylvania.)
10. Iowa State University Faculty Improvement Leave, August 20, 1995–May 20, 1996, for continued work on a book about Relation Algebras, and conducting research with P. Jipsen. Visited University of Cape Town, South Africa, from January 19 to February 5, 1996.
11. Visited PUC in Rio de Janeiro, Brazil, 17–21 Feb 1998, to attend the dissertation defense of Marcelo Frias, for whom I was co-adviser with Armando Haeberer of PUC-Rio. (All expenses paid by PUC-Rio).
12. Visited Jim Lipton, Prof. of Computer Science, Department of Mathematics, Wesleyan University, Middletown, Connecticut, one week in May 1998. (All expenses paid by Wesleyan University.)
13. Visited by Robin Hirsch (Department of Computer Science, University College, London) and Ian Hodkinson (Department of Computing, Imperial College, London) from July 11 to July 17, 1998. (Expenses paid by research grants to Hirsch and Hodkinson.)
14. Letter of evaluation (requested by the Provost) concerning promotion to Senior Lecturer at University College–London for Robin D. Hirsch, February 23, 1999.
15. Letter of evaluation (requested by the Rector) concerning promotion to Reader at Imperial College of Science, Technology and Medicine, London, for Ian Martin Hodkinson, April 20, 1999.
16. Letter of evaluation concerning promotion to Professor at Imperial College of Science, Technology and Medicine, London, for Ian Martin Hodkinson, 19 February 2004.
17. Visited Facultad de Informática, Universidad Politécnica de Madrid, Madrid, Spain, July 9–13, 2012, as a member of the examination panel for the lecture and public defense of the Doctoral Thesis presented by candidate Emilio Jess Gallego Arias, entitled "Relational and Allegorical Semantics for Constraint Logic Programming". (All expenses paid by Universidad Politécnica de Madrid).
18. Letter of evaluation (requested by the President and Provost) of Dr Robin Hirsch, candidate for promotion to Professor at University College–London, 8 February 2013.

Other conferences attended (no contributed paper)

1. International Congress of Mathematicians, Vancouver, British Columbia, Canada, 1974.
2. International Congress of Mathematicians, Berkeley, California, USA, 1986.
3. The Twelfth North American Prairie Conference, Univeristy of Northern Iowa, Cedar Falls, Iowa, 1990.
4. The Thirteenth North American Prairie Conference, Windsor, Ontario, Canada, August 6–9, 1992.
5. The Midwest Oak Savanna Conference, Chicago, Illinois, February 20, 1993.
6. The 44th Annual Meeting of the AIBS (American Institute of Biological Sciences), Ames, Iowa, August 1–5, 1993.
7. The Fourteenth North American Prairie Conference; Prairie Biodiversity, Kansas State University. Manhattan, Kansas, July 12–16, 1994.
8. The Sixteenth North American Prairie Conference; Nebraska State University, Kearney, Nebraska, July 26–29, 1998.
9. The Seventeenth North American Prairie Conference; Northern Iowa Area Community College, Mason City, Iowa, July 16–20, 2000.[9]
10. The Eighteenth North American Prairie Conference; Truman State University, Kirksville, Missouri, June 23–27, 2002.
11. The Ninth Iowa Prairie Conference ("The Practical Prairie"); Iowa State University, Scheman Building, July 11–13, 2003.[10]
12. The Nineteenth North American Prairie Conference; University of Wisconsin, Madison, Wisconsin, August 8–12, 2004.
13. The Twentieth North American Prairie Conference; University of Nebraska at Kearney, Kearney, Nebraska, July 23–26, 2006.
14. The Twenty Second North American Prairie Conference; University of Northern Iowa, August 1-5, 2010.

[9]Served as host for one field trip to prairie reconstruction and restoration sites.
[10]Field trip host.