

# LAST UPDATED NOVEMBER 2012

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## KEITH DEVLIN, Ph.D., D.Sc., F.A.A.A.S., F.A.M.S. Curriculum Vitae

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### 1 Overview

#### Present (regular, continuing) positions

- Executive Director (and co-founder), H-STAR Institute, Stanford University (since 2008)
- Senior Researcher, Center for the Study of Language and Information, Stanford University (since 2001)
- Executive Committee member (and co-founder), Media X, Stanford University (since 2001)

#### Previous (regular, continuing) positions

- Consulting Professor of Mathematics, Stanford University, 2001–2009.
- Dean of the School of Science, Saint Mary's College of California, Moraga, California, 1993–2001.
- Visiting Professor, DUXX Graduate School of Business Leadership, Monterrey, Mexico, 1999–2001.
- Consulting Professor (Research), School of Information Sciences, University of Pittsburgh, 1994–2000.
- Carter Professor and Chair of the Department of Mathematics and Computer Science, Colby College, Maine, 1989–93.
- Associate Professor (Visiting), Stanford University, California, 1987–89.
- Reader in Mathematics, University of Lancaster, U.K., 1979–87.
- Lecturer in Mathematics, University of Lancaster, U.K., 1977–79.
- Assistant Professor of Mathematics, Bonn University, Germany 1974–76

## Major fundraising and capital development activities

- \$45 million, private donor (industrial CEO), funding for a new science center at Saint Mary's College, confirmed in 1997, construction started in 1999, building completed in 2001.
- \$1.5 million, Fletcher Jones Foundation, funding for an endowed chair in biology at Saint Mary's College, awarded 1995.
- \$2 million, various foundations, funding for science equipment at Saint Mary's College, 1999-2000.

## Education

B.Sc. Mathematics, Kings College London, 1968.

Ph.D. Mathematics (Logic), University of Bristol, 1971.

## Research specializations

- Logic, computer and information science
- Linguistics, human-machine communication, human-human communication
- Human and human-machine reasoning
- Mathematical cognition
- Mathematical education
- Science outreach.

## Nationality

I am native of the UK, have joint US and British citizenship. I have resided in the United States since 1987.

## Published scholarship

I have written 29 books, one interactive, first-year calculus text on CD-ROM with accompanying workbook, and over 80 research and research-related<sup>1</sup> articles.

The books comprise six research monographs, seven textbooks, and sixteen general audience books on mathematics and related themes.

The volume *Constructibility* (Springer Verlag, 1984), is a 420 page advanced text that is the first (now standard) book on this material, and which took 10 years to prepare and includes a great deal of my own research work.

*Logic and Information* is the first complete coverage of situation theory, and is the result of a four year research effort. This book was voted "Most Outstanding Book in Computer Science and Data Processing of 1991" by the American Association of Publishers.

The book *Mathematics: The Science of Patterns* was written, by invitation, for publication in the prestigious *Scientific American Library* series and was nominated for the Science Book Prize.

*Life by the Numbers* was written to accompany the PBS television series by the same name, produced by WQED-tv in Pittsburgh in 1988. I was a lead advisor for the series. The book was nominated for the Bay Area Book Reviewers Association (BABRA) Best Non-fiction Prize.

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<sup>1</sup>A few of them are in part expository.

The Italian translations of books *The Language of Mathematics* and *The Math Gene* won the 2003 Italian Peano Prize for the best mathematics or science books for a general audience.

The Italian translation of *The Millennium Problems* won the Pythagoras Prize in 2005.

### **Professional societies**

American Association for the Advancement of Science, American Mathematical Society, Association for Computing Machinery, London Mathematical Society, Mathematical Association of America, New York Academy of Sciences, Sigma Xi.

### **Professional activities**

Fellow of the American Association for the Advancement of Science. (Elected)

Chair of the Mathematics Section of the AAAS. (Elected)

Forum Fellow of the World Economic Forum. (Appointed)

Founding Member and Chair of the Board of Advisors, American Institute of Mathematics, Palo Alto, CA.

Series Editor, Springer–Verlag, Undergraduate Texts in Mathematics.

Series Editor, Chapman and Hall, Mathematics Series.

Former Member of Council of the American Mathematical Society. (Elected)

Former Member of the AMS Committee on Publications. (Appointed)

Former Member of the AMS Committee on Science Policy. (Appointed)

Former Member of the National Academy of Sciences Mathematical Sciences Education Board. (Appointed)

Former Council Member of the National Council on Undergraduate Research. (Elected)

Former Member of the United States Joint Policy Board for Mathematics. (Appointed)

Former Editor of *Focus*, the monthly newsletter of the *Mathematical Association of America*. (Appointed)

Former Contributing Editor (computing and mathematics issues), *Notices of the American Mathematical Society*. (Appointed)

Former Member of Electronic Services Advisory Board of the American Mathematical Society (presidential appointment). (Appointed)

Former Member of the Newsletter Editorial Committee of the Mathematical Association of America. (Elected)

Former Member of the Mathematics Advisory Board, Wolfram Research, Inc. (*Mathematica* software). (Appointed)

Former Member of the Library Advisory Committee of the Mathematical Association of America. (Elected)

Former Member of Electronic Services Advisory Board of the Mathematical Association of America. (Appointed)

### **Science outreach activities**

While living in the UK, I gave frequent talks to schools and student societies on mathematical and computing themes. I have continued with those activities since relocating to the USA in 1987. In recent years, I have also given many presentations at public events.

I write a monthly online column, “Devlin’s Angle,” for the Mathematical Association of America and maintain two blogs, profkeithdevlin.org and MOOCtalk.org.

I appear on National Public Radio’s weekly Saturday morning magazine show *Weekend Edition with Scott Simon*, where I am known as “The Math Guy”.

I comment on mathematics and computing issues on other National Public Radio programs in the USA and on BBC Radio in the UK, and appear occasionally on various television programs in the USA and the UK. In particular, I have appeared several times on the NPR programs *Talk of the Nation: Science Friday*, *Sounds Like Science*, *To The Best of Our Knowledge*, and *Technation*.

I co-wrote the highly acclaimed one-hour television documentary *A Mathematical Mystery Tour* (BBC, 1983), shown around the world — in the UK in the prestigious “Horizon” series and in the USA in the “Nova” series.

I was a lead advisor on the six-part television series *Life By the Numbers* (PBS, 1998), appearing in two of the episodes. I was also the author of the official companion book to the series (published by John Wiley).

In 1999, I worked on the series *Science Bites* for BBC-tv.

I worked on the thirteen-part adult education television series *GED Connections* (PBS, 2001), appearing in a number of episodes.

I worked on the television documentary *In Search of the Hidden Dimension* (PBS, 2008), which I also appeared in, broadcast in the USA in the “Nova” series.

Between 1983 and 1991 I wrote a twice-monthly, 700–1,000 word column on mathematics and computing for the British national newspaper *The Guardian* (begun at my instigation).

I write occasional articles for various mathematics, science, and technology magazines, including *Nature*, *New Scientist*, and *Math Horizons*.

I wrote and presented the video documentary *The Millennium Problems* (Clay Mathematics Institute, 2001).

I write occasional articles on mathematical and pedagogic issues for various journals and magazines.

During the period 1996–99, I worked with *Cogito Learning Media, Inc.*, of San Francisco and New York, to develop interactive educational software for college-level mathematics instruction, for distribution on CD-ROM with accompanying workbooks.

### **Honors and Awards**

1991: My book *Logic and Information* won the American Association of Publishers’ award of “Most Outstanding Book in Computer Science and Data Processing of 1991”.

1999: elected a Fellow of the American Association for the Advancement of Science

2001: Joint Policy Board for Mathematics Communications Award, in recognition of extraordinary success in communicating mathematics to the general public.

2003: Recognized by the California State Assembly for my “innovative work and long-time service in the field of mathematics and its relation to logic and linguistics.”

2003: My books *The Math Gene* and *The Language of Mathematics* (in Italian translation) won the Italian Peano Prize.

2005: My book *The Millennium Problems* (in Italian translation) won the Italian Pythagoras Prize. 2007: Carl Sagan Award for Science Popularization.  
2010. Honorary doctorate of science, University of Hull.  
2012: elected a Fellow of the American Mathematical Society.

### **Research grants and sponsorships**

1989–94. \$25,000 from the System Development Foundation for CSLI related research.

1989–1993. \$5,000 per year, faculty development grant from Colby College (part of my endowed chair at Colby).

1991. \$1,000 Colby travel grant, to support attendance at the International Symposium on New Software Architectures, Tokyo, Japan.

1991. \$740 Science Division travel grant (Colby College), to support a research trip to Stanford University.

1992. \$4,562. NSF Maine EPSCoR Faculty Enhancement Support for the project “A Mathematical Framework for the Study of Cognition and Communication, with Applications to Natural Language”.

1993–2001. \$5,000 per year, professional development grant from Saint Mary’s College (part of my position at Saint Mary’s).

1996. \$10,000, Advanced Research Projects Agency (ARPA), “Virtual Enterprise Engineering Environment,” contracted through Knowledge Based Systems, Inc. (KBSI), in College Station, Texas, to provide a situation-theoretic analysis of business and engineering processes.

1997. \$10,000, Steelcase, Inc., to investigate how office configuration influences information flow in a modern office suite.

1998. \$10,000, Steelcase, Inc., to carry out a preliminary study of the use of situation theory as a tool to assist the capitalization of intangible assets.

2001–2002. \$40,000, Mitani, Inc., to develop improved methods for the selection of suppliers.

2002–2006. Contracted consulting research for Veridian Systems (subsequently renamed General Dynamics – Advanced Information Systems).

2009–date. Contracted consulting research for Earl Industries.

### **Conferences organized**

1992. ‘Mathematics and Computers’, American Association for the Advancement of Science, Chicago, Half-day Special Session.

1993. ‘The Mathematics of Everyday Language’, American Association for the Advancement of Science, Boston, Half-day Special Session.

1994. ‘Information-oriented Approaches to Logic, Language and Computation’, International workshop and conference, Saint Mary’s College, 7 day research conference.

1995. ‘Situation theory’, 5 day symposium at the European Summer School in Language, Logic, and Computation, Barcelona, Spain.

1997. ‘Business Applications of Situation Theory’, three-day workshop, CSLI, Stanford University.

1997. Project Kaleidoscope Three-Day Workshop on Teaching Mathematics, at Saint Mary’s College.

1997. ‘Using Action and Technology to Build Community’, one-day workshop at CSLI, Stanford University.

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## 2 Education

**School** Born in Hull, England. Attended local primary school followed by Greatfield High School, Hull. Appointed Head Boy in final year at school. Gained GCE A-level at Grade 1 in Pure Mathematics, Applied Mathematics, Physics, and a Distinction Grade in GCE S-level Pure Mathematics.

**University** Attended King’s College London as an undergraduate. Elected President of the Mathematical Society in final year. Graduated with a BSc Honours degree in Mathematics, Class I.

Attended the University of Bristol as a research student in Mathematical Logic under Dr Frederick Rowbottom. Completed doctoral thesis by June 1971; awarded PhD in Mathematics in January 1972. Thesis *Some Weak Versions of Large Cardinal Axioms* subsequently published in the journal *Annals of Mathematical Logic* (Vol 5 [1973], pp.327–336).

**Honorary degrees** I was awarded an honorary MA degree by Colby College in 1990.

## 3 Academic career

- 1971–2. Milner Scholar (Mathematics) at the University of Aberdeen, Scotland, during which year spent two months at the University of Oslo as a Scientific Visitor.
- Aug–Dec 1972. Scientific Assistant (Mathematics), University of Oslo, Norway.
- Jan–Jul 1973. Temporary Lecturer in Mathematics, University of Manchester, England.
- Aug–Dec 1973. Scientific Assistant (Mathematics), University of Oslo, Norway.
- Jan–Jul 1974. Scientific Assistant (Mathematics), University of Heidelberg, Germany.
- Aug 1974–Jul 1976. Scientific Assistant (Mathematics), University of Bonn, Germany.
- Sep–Dec 1976. Assistant Professor of Mathematics, University of Toronto, Canada.
- Jan 1977–Sep 1987. Lecturer in Mathematics, University of Lancaster, England. Promoted to Reader in Mathematics in August 1979.

- (1986. Offered the Chair in Mathematics at the University of Keele.)
- Oct 1987–Jun 1988. Associate Professor of Mathematics (Visiting), Stanford University, California.
- (1988. Offered the Chair of Artificial Intelligence at the University of Leeds.)
- Oct 1988–Jun 1989. Associate Professor of Mathematics and Philosophy (Visiting), Stanford University, California.
- August 1989–Jun 1993. Carter Professor and Chair of the Department of Mathematics and Computer Science, Colby College, Maine.
- May 1993–date, Consulting Professor (research), Department of Information Science, University of Pittsburgh.
- July 1993–June 2001. Dean of the School of Science, Saint Mary’s College of California, Moraga, California.
- July 1993–date. Senior Researcher, Stanford University: Center for the Study of Language and Information, Stanford, California.
- August 1999–August 2002. Visiting Professor, DUXX Graduate School of Business Leadership, Monterrey, Mexico (annual visits).
- July 2001–August 2008. Executive Director, Stanford University: Center for the Study of Language and Information, Stanford, California.
- July 2001–July 2009. Consulting Professor, Stanford University: Department of Mathematics, Stanford, California.
- July 2002–date. Executive Committee, Stanford University: Media X, Stanford, California.
- September 2006–August 2008. Executive Committee, Stanford University: H-STAR Institute, Stanford, California.
- September 2008–date. Executive Director, Stanford University: H-STAR Institute, Stanford, California.

## 4 Short term visiting positions

The following positions were all of duration six to twelve weeks.

- Spring 1973. Scientific Visitor, The Banach Center, Warsaw, Poland.
- Summer 1978. Visiting Professor of Mathematics, Pennsylvania State University, USA.
- Summer 1979. Visiting Professor of Mathematics, University of Toronto, Canada.

- Summer 1980. Visiting Professor of Mathematics, University of Colorado at Boulder, Boulder, Colorado.
- Spring 1981. Visiting Professor of Mathematics, University of Essen, Germany.
- Aug–Dec 1981. The 1981 Nuffield Lecturer to Canada. (Based in Toronto.)
- Spring 1982. Visiting Professor of Mathematics, University of Gdansk, Poland.
- Spring 1984. Visiting Professor of Mathematics, University of Siena, Italy.

## 5 Special guest lectures

In addition to the usual university research seminars and conference talks, listed in the next section, I have given the following special lectures.

- 1972.** Association of Symbolic Logic European Meeting, Orleans, France.
- 1973.** Paul Erdős 60th Birthday Meeting, Kesthely, Hungary.
- 1980.** London Mathematical Society Meeting held in London.
- 1982.** LMS Popular Lecture Series, London. (Public Lecture.)
- 1983.** Edinburgh Mathematical Society Centenary Lecture.
- 1984.** British Association for the Advancement of Science, Norwich.
- 1986.** Ninth Annual International Mathematical Olympiad Lecture, The Royal Society, London.
- 1988.** SERC Summer School, *Formal Systems for AI*, Glasgow, Scotland.
- 1990.** Conference on Theories of Partial Information, University of Texas at Austin.
- 1990.** Conference on Situation Theory and its Applications, Kinnloch Rannoch, Scotland.
- 1991.** Public lecture organized by the University of Oklahoma.
- 1991.** Featured Address, Annual Award Ceremony for the Twentieth American Mathematical Olympiad, National Academy of Sciences, Washington, D.C.
- 1991.** Short course on the mathematics of language, Bielefeld University, Germany.
- 1991.** International Symposium on New Models for Software Architecture, Kanagawa, Japan.
- 1992.** “Year of the Renaissance” Lecture, Cameron University, Oklahoma.
- 1992.** MAA Seaway Section Meeting, Queens University, Ontario, guest speaker.
- 1992.** Association for Computational Linguistics Annual Conference, University of Delaware (invited short-course on situation semantics).



- 1992.** Joint AMS–MAA Regional Meeting, University of Southern California, Los Angeles, California, guest speaker.
- 1993.** Utica College, New York, Distinguished College Lecturer.
- 1993.** Second IBM CIM Colloquium on Standards and New Technologies for Enterprise Information Management, Thornwood, NY, February 18–19, 1993, invited speaker and panelist.
- 1993.** MAA South-Eastern Section Meeting, University of South Carolina, guest speaker.
- 1993.** MAA Iowa Section Meeting, Luther College, Decorah, Iowa, guest speaker.
- 1993.** Third International Colloquium on Cognitive Science, San Sebastian, Spain, invited speaker.
- 1993.** MAA Maryland–Virginia–D.C. Section Meeting, Silver Spring, MD, guest speaker.
- 1993.** Mathematical Sciences Education Board, Department Chairs Colloquium, Washington, D.C., workshop instructor.
- 1994.** MAA Northern California Section Meeting, San Jose, CA, guest speaker.
- 1994.** London Mathematical Society Public Lecture, University of Hull, England.
- 1994.** London Mathematical Society Public Lecture, University of Exeter, England.
- 1994.** MAA Oklahoma–Arkansas Section Meeting, Searcy, Arkansas, guest speaker.
- 1994.** MAA Kentucky Section, Morehead State University, Morehead, Kentucky, guest speaker.
- 1994.** MAA North Central Section, Winona State University, Winona, Minnesota, guest speaker.
- 1994.** Canadian Mathematics Education Study Group, University of Regina, Canada, Plenary Speaker.
- 1994.** Fall-School in Cognitive Science, Freiburg University, Freiburg, Germany, guest lecturer.
- 1994.** MAA Ohio Section Meeting, University of Findlay, Ohio, guest speaker.
- 1994.** California Mathematics Council for Community Colleges, annual conference, banquet speaker.
- 1995.** ‘Improving the public image of mathematics’, American Mathematical Society Annual Meeting, San Francisco, CA.
- 1995.** Conference on New Technologies and their Influence on Teaching Mathematics at University, Barcelona, Spain, Plenary Speaker.
- 1995.** MAA Wisconsin Section Meeting, Green Bay, Wisconsin, guest speaker.

- 1995.** Sonoma State University, Public lecture.
- 1995.** “The Legacy of George Boole,” International Conference to Celebrate the 150th Anniversary of the Foundation of University College, Cork, Ireland, Plenary Speaker.
- 1995.** European Summer School in Language, Logic, and Computation, Barcelona, Spain, invited speaker.
- 1995.** 1995 Technology Math EXPO, Kansas City, Missouri, Plenary speaker.
- 1996.** National Council of Teachers of Mathematics, Annual Meeting, San Diego, CA, Plenary speaker.
- 1996.** The Mekler Memorial Mathematics Lecture, public lecture, Simon Fraser University, Vancouver, Canada.
- 1997.** “Working Together,” meeting for Northern Californian college and high school mathematics instructors and students, California State University, Chico, public plenary lecture.
- 1997.** Oregon Science Technology, and Society Lecture Series, one-week lecture tour in Oregon, two public lectures and various tv, radio, and press interviews.
- 1997.** Edinburgh International Festival of Science and Technology, Edinburgh, Scotland. Public Evening Lecture.
- 1997.** MAA Texas Section Meeting, Texas Lutheran College, plenary speaker.
- 1997.** MAA Rocky Mountain Section, Denver State College, plenary speaker.
- 1997.** University of California at Berkeley, Commencement Speaker.
- 1997.** WoLLIC '97, Fortaleza, Brazil, plenary speaker.
- 1997.** Br. Alfred Brousseau Public Lecture in Science, Saint Mary’s College of California.
- 1997.** Oregon Math Summit, Oregon State University, plenary speaker.
- 1997.** Ronnenberg Lecture, Denison University, Ohio.
- 1997.** California Mathematics Council for Community Colleges, annual conference, Monterey, guest speaker.
- 1998.** International Conference on Knowledge, Logic, Information, Darmstadt University, Germany, plenary speaker.
- 1998.** MAA Southern California Section Meeting, Redlands University, plenary speaker.
- 1998.** CMC<sup>3</sup>, Southern Division, Annual Meeting, Costa Mesa, California, plenary speaker.
- 1998.** National Council of Supervisors of Mathematics, Annual Meeting, Washington, D.C., banquet speaker.

- 1998.** Edinburgh International Festival of Science and Technology, Edinburgh, Scotland. Public Evening Lecture.
- 1998.** Preparing Teachers for the 21st Century, National Conference, University of Nebraska, banquet speaker.
- 1998.** AAAS-SWARM National Conference, Grand Junction, Colorado, plenary speaker and panelist.
- 1998.** Smithsonian Institute, Public Lecture.
- 1998.** 1998 Presidential Awards for Excellence in Mathematics and Science Teaching, Washington, D.C., plenary speaker.
- 1998.** First Robert Hooper Memorial Lecture, University of Nevada, Reno.
- 1999.** City Lights Lunchtime Lecture, Sacramento City College, Sacramento, CA.
- 1999.** Conciousness and Science Public Lecture Series, sponsored by the Bhaktivedanta Institute at the University of California in San Francisco.
- 1999.** National Council of Teachers of Mathematics, Annual Meeting, San Francisco, CA, plenary speaker.
- 1999.** University of Washington, Seattle, evening public lecture on the mathematics of information and its applications in business.
- 1999.** Invitational workshop for radio science journalists, KQED Studios, San Francisco, October 1999, guest presentation.
- 1999.** Project Kaleidoscope 10th Anniversary Meeting, Baltimore, Maryland, guest presentation.
- 1999.** Wellesley College, Massachusetts, Public lecture.
- 1999.** Hansen Leadership Lecture (public lecture), Doane College, Nebraska.
- 2000.** Millennium 2000 Mathematics Festival, Melbourne, Australia, plenary speaker.
- 2000.** Distinguished Visiting Scholar, Truman State University, Missouri, two stays of one week each, three public lectures and several faculty/student presentations each week.
- 2000.** Wonderfest, Bay Area Science Weekend, University of California at Berkeley, public presentation.
- 2000.** AAAS Annual Meeting, panel presentation and news media presentation, Washington, D.C.
- 2000.** Elon College, North Carolina, public presentation.
- 2000.** Moraga Rotary Club, luncheon speaker.
- 2000.** Concord Rotary Club, luncheon speaker.

- 2000.** Fourth Annual Tri-Valley Science and Engineering Fair, lunchtime speaker.
- 2000.** Edinburgh International Festival of Science and Technology, Edinburgh, Scotland. Public Evening Lecture.
- 2000.** Butte College, CA: Mathematics Awareness Month, public evening lecture in Chico, CA and lecture at Butte College.
- 2000.** Marin Philosophical Society, luncheon speaker.
- 2000.** Third Annual Spencer and Spencer Systems Public Lecture, University of Missouri in St. Louis.
- 2000.** Commencement Address, California State University at Bakersfield.
- 2000.** Plenary address and panel participant, XI Annual Conference on the Epistemology of Science, Buenos Aires, Argentina.
- 2000.** Plenary address, ICCS 2000, 8th International Conference on Conceptual Structures (Logical, Linguistic, and Computational Issues), Darmstadt, Germany.
- 2000.** Public lecture, University of Washington, Seattle.
- 2000.** Public lecture, Parents Weekend, MIT.
- 2000.** Pi Mu Epsilon Initiation Public Lecture, Western Michigan University, Kalamazoo, MI.
- 2000.** Phi Delta Kappa Lecture, Pittsburgh, CA.
- 2001.** California Writers Club, Berkeley, CA, invited talk.
- 2001.** World Economic Forum Annual Meeting, Davos, Switzerland, invited lecture and member of three discussion panels.
- 2001.** First Annual Conrad D. Festa Community Lecture in Science and Mathematics, College of Charleston, Charleston, South Carolina.
- 2001.** Public lecture, Sonoma State University.
- 2001.** Public lecture, Xavier University, New Orleans.
- 2001.** Visiting speaker, student–faculty mathematics colloquium, Tulane University, New Orleans.
- 2001.** Public lecture, Distinguished Lecture Series, Chabot Space and Science Center, Oakland, California.
- 2001.** Plenary address, MAA Southern California Section Meeting, California State University at Fullerton.
- 2001.** Commencement address, Stanford University Mathematical Sciences Graduation Ceremony.

- 2001.** Two invited talks, International Conference on Engineering Design, Kobe University, Japan.
- 2001.** Plenary address and a series of five lectures, European Summer School on Logic, Language, and Information, University of Helsinki, Finland.
- 2001.** Invited lecture, California Mathematics Council, Asilomar, CA.
- 2002.** Panel discussion (chair), Joint Mathematics Meetings, San Diego, CA.
- 2002.** Public lecture, Boise, Idaho, supported by local businesses.
- 2002.** Invited respondent address, Hollandsche Maatschappij der Wetenschappen, Amsterdam, Netherlands.
- 2002.** Scholar-in-Residence Lectures, Honors Program, Collin County Community College system, Dallas, Texas.
- 2002.** Public lecture, Northern Kentucky University,
- 2002.** Public lecture, Iizuka City Science and Technology Center, Iizuka City, Japan.
- 2002.** Public lecture, Wabash College, Indiana.
- 2002.** Annual Roberts (Public) Lecture in the Natural Sciences, Colorado College, Colorado.
- 2002.** Annual Bullitt (Public) Lecture, University of Louisville, Kentucky.
- 2002.** Invited lecture, International Conference on Mathematical Cognition, University of Rome, Italy.
- 2002.** Polymath Public Lecture, Polytechnic University, Turin, Italy.
- 2002.** Panelist, International Conference on Foundations of Mathematics, University of Trento, Italy.
- 2002.** Invited Lecture, University of Bologna, Italy.
- 2002.** Invited Lecture, University of Pisa, Italy.
- 2002.** Invited Lecture, International Conference on Robotics, Tokyo, Japan.
- 2002.** Invited Lecture, Society for the Study of Office Automation, Toyama, Japan.
- 2002.** Awards Banquet Lecture, California Science Teachers Association, Annual Meeting, San Francisco, CA.
- 2002.** Public Lecture, Kansas City Public Library, Opening event for the *Go Figure* exhibition, Kansas City, Missouri.
- 2002.** Public Lecture and Conversation with Bob Osserman, Commonwealth Club, Palo Alto, California.

- 2002.** Invited lecture, California Mathematics Council, Asilomar, CA.
- 2003.** Institutional Investor Endowments and Foundations Forum, San Francisco, After Dinner talk.
- 2003.** Plenary Lecture, Conference on Context-Aware Information Management, Kinki University, Iizuka City, Japan.
- 2003.** Evening Public Lecture, Carnegie-Mellon University, Pittsburgh, PA.
- 2003.** Public Lecture, Sonoma State University, Rohnert Park, CA.
- 2003.** Conference presentation, Context '03, international conference, Stanford University, Stanford, CA.
- 2003.** Plenary Lecture, Barwise Memorial Conference, Stanford University, Stanford, CA.
- 2003.** Plenary Lecture, Social Intelligence in Design 2003, International Conference held at Royal Holloway University London.
- 2003.** Invited address, Conference on Accelerating Change 2003, Stanford University, Stanford, CA.
- 2003.** 2003 Peano Lecture, Turin University, Turin, Italy.
- 2003.** Plenary address, National council of Teachers of Mathematics Canadian Division, Edmonton, Canada.
- 2003.** Keynote speech, Global Business Venture Forum, Osaka Chamber of Commerce, Osaka, Japan.
- 2003.** Invited lecture, California Mathematics Council, Asilomar, CA.
- 2004.** Invited lecture and classroom visits, Cranbrook Kingswood School, Bloomfield Hills, Michigan
- 2004.** Public lecture, YLEM forum, McBean Theater at the Exploratorium, San Francisco, California
- 2004.** Marschalk Colloquium Lecture, UCLA, Los Angeles, California
- 2004.** Invited lecture, City Businesswomen's Event, Iizuka City, Japan.
- 2004.** Invited lectures, Spring Arbor University, Spring Arbor, Michigan
- 2004.** Invited lecture, San Jose State University, San Jose, CA.
- 2004.** Invited lecture, Santa Clara University, Santa Clara, CA.
- 2004.** Invited address, Annual Alumni Meeting, Duxx Graduate School of Business Leadership, Monterrey, Mexico.
- 2004.** Plenary address, British Association for the Advancement of Science, Exeter University, UK.

- 2004.** Plenary address, International Conference for Advances in Modal Logic, Manchester University, UK.
- 2004.** Plenary address, Georgia Council of Teachers of Mathematics, Annual Conference, Rock Eagle, Georgia.
- 2004.** Invited address, Simon Fraser University, Vancouver, Canada.
- 2005.** AMS Panel discussion (chair), AMS–MAA Joint Mathematics Meetings, Atlanta, GA.
- 2005.** MAA Panel discussion (chair), AMS–MAA Joint Mathematics Meetings, Atlanta, GA.
- 2005.** Invited address, First International Workshop on the Philosophy of Information, University of Amsterdam, Netherlands.
- 2005.** After-dinner speaker, 4th International Social Intelligence Design Conference, Stanford University, CA.
- 2005.** Plenary Address, MAA Sectional Meeting, University of Puget Sound, Tacoma, WA.
- 2005.** Public Lecture, University of Puget Sound, Tacoma, WA.
- 2005.** Public Lecture, Simon Fraser University, Vancouver, B.C., Canada.
- 2005.** Public Lecture, Utah Valley State College, Orem UT.
- 2005.** Physics Colloquium talk, San Jose State University, San Jose, CA.
- 2005.** Rotary Club talk, Palo Alto, CA.
- 2005.** Plenary Lecture, Association for Mathematicians at Two-Year Colleges (AMATYC) Annual National Meeting, San Diego, CA.
- 2005.** College Colloquium talk, Laney College, Oakland, CA.
- 2006.** Plenary Lecture, US National Joint Mathematics Meetings, San Antonio, TX.
- 2006.** Panelist, Mathematics Education Study Group, Fields Institute, Toronto, Ontario, Canada.
- 2006.** Session organizer and session speaker, AAAS Annual Meeting, St. Louis, MO.
- 2006.** Invited talk, Sonoma State University, Rohnert Park, CA
- 2006.** Session talk, AMS Regional Meeting, San Francisco State University, CA.
- 2006.** Invited Lecture, Unione Industriale, Turin, Italy.
- 2006.** Plenary Lecture, International Workshop on Information, Munchenweiler Castle, nr. Freiburg, Switzerland.
- 2006.** Invited Lecture, De Anza College, Cupertino, CA.

- 2006.** Plenary Lecture, International Conference on Elementary Mathematics Education (EME06), Viana do Castelo, Portugal.
- 2006.** Plenary Lecture, Workshop on Human Centered Technology, Pori, Finland.
- 2006.** Guest lecture, Summer Science Program, Ojai, CA.
- 2006.** Plenary Lecture, Workshop on the Foundations and Applications of Mathematics, Berlin, Germany.
- 2006.** Guest Lecture, Mission College, Santa Clara, CA.
- 2006.** Ebey Lectures, University of the South, Sewanee, Tennessee.
- 2006.** Guest presentation, North Star Academy, Redwood City, CA.
- 2006.** Guest Lecture, De Anza College, Cupertino, CA.
- 2006.** The Dalrymple Lecture, University of Mississippi.
- 2006.** Luncheon Speaker, The Commonwealth Club of California, San Francisco, CA.
- 2006.** Plenary speaker, Canadian Mathematics and Education Workshop, Acadia University, Nova Scotia, Canada.
- 2006.** Plenary Speaker CMC<sup>3</sup>, Monterey, CA.
- 2007.** Guest lecture, Marin Academy, San Rafael, CA.
- 2007.** Plenary address, Science, Math and Technology Conference, Head-Royce School Oakland, CA.
- 2007.** Plenary address, WNET/Channel 13 Celebration of Teaching and Learning professional development conference, New York City.
- 2007.** Guest lecture, Truman State University, Kirksville, MO, Student Research Conference.
- 2007.** Guest lecture, Blekinge Institute of Technology, Ronneby, Sweden.
- 2007.** Mathematician in Residence, St. Peters College, Adelaide, Australia, three weeks, including some public talks.
- 2007.** Guest lecture, Mission College, Santa Clara, CA.
- 2007.** Guest speaker, The Carmel Authors and Ideas Festival, Carmel, CA.
- 2007.** Colloquium lecture, Santa Clara University, Santa Clara, CA.
- 2007.** Guest lecture, Pi Mu Epsilon Undergraduate Mathematics Conference, Saint Norbert College, De Pere, WI.
- 2007.** Guest speaker, CogLunch series, Cordura Hall, Stanford University, Stanford, CA.



- 2007.** Guest lecture, CMC-North Annual Meeting, Asilomar, CA.
- 2008.** Guest lecture, Santa Clara University, Santa Clara, CA.
- 2008.** Plenary lecture, WNET/Channel 13 Celebration of Teaching and Learning, New York City, NY.
- 2008.** Guest lecture/panelist, Mastercard Advisors Event: The Future of Commerce, Ritz-Carlton Hotel, Orlando, FL.
- 2008.** Guest lecture, Stanford Alumni Association, Austin, TX.
- 2008.** Panelist, Silicon Valley Education Forum, Santa Clara, CA.
- 2008.** Guest lecture, Computability in Europe 2008 conference, Athens, Greece.
- 2008.** Invited address, Stanford University Office of Science Outreach Summer Research Fellowship Program for Teachers, Stanford, CA.
- 2008.** Guest lecture, MAA Distinguished Lecture Series, MAA Carriage House, Washington, D.C.
- 2008.** Instructor, MAA Workshop on Expository Mathematical Writing, MAA Carriage House, Washington, D.C.
- 2008.** Plenary lecture, Stanford Summer Teachers Institute, Stanford, CA.
- 2008.** Invited talk, Google, Mountain View, CA, invited lecture.
- 2008.** Public talk, Town Hall Science Lecture Series, Seattle, WA.
- 2008.** Invited talk, Microsoft Research, Redmond, WA.
- 2008.** The Annual Bernard Lecture, Davidson College, Davidson, N.C.
- 2008.** Invited lecture, American River College, Sacramento, CA.
- 2008.** Two invited talks, Louisiana Association of Teachers of Mathematics, annual conference, Baton Rouge, LA.
- 2008.** Mathematics and music presentation, CMC-North Annual Conference, Asilomar Conference Center, Pacific Grove, CA.
- 2009.** Invited lecture, Kids Tech University @ Virginia Tech, Blacksburg, VA.
- 2009.** Public lecture and mathematics colloquium talk, University of Tennessee, Knoxville, TN.
- 2009.** Plenary address, John Wiley & Sons College Mathematics Education Workshop, Las Vegas, NV.
- 2009.** Invited talk, Princeton University, Science and Technology Lunchtime Seminar Series.

- 2009.** Invited talk, WNET/Channel 13 Celebration of Teaching and Learning, New York City, NY.
- 2009.** Banquet address and invited talk, MAA Ohio Section, Bowling Green University.
- 2009.** Keynote address, State of Louisiana Literacy and Numeracy Conference, Baton Rouge, LA.
- 2009.** Mathematics and music presentation, 418 Project, Santa Cruz, CA.
- 2009.** Invited talk, Stanford Alumni Association, Palos Verdes, CA.
- 2009.** Public lecture, Sunnyvale Public Library, Sunnyvale, CA.
- 2009.** Public talk, MAA Distinguished Lecture Series, MAA Carriage House, Washington, D.C.
- 2009.** Invited public talk, Science Center Hub, Bors, Sweden.
- 2009.** The annual Kieval Lecture Cornell University, Ithaca, NY. .
- 2009.** Keynote address and invited lecture, 21C Transmedia Innovation Symposium, Seoul, Korea.
- 2009.** The annual IBM Public Lecture, Colby College, Waterville, ME.

## **6 Research papers delivered at universities**

**United States.** Carnegie–Mellon U., U. of Pittsburgh, U. of Pennsylvania, U. of California at Berkeley, UCLA, San Francisco State University (twice), San Jose State U. (four times), Penn State U., U. of Colorado at Boulder, Stanford U. (twice), U. of Maine at Orono, U. of Southern Maine (Portland), Cal Poly State U., Smith College, Sonoma State U. (twice), Colby College, Denison U., Truman State University, MO (twice) Saint Mary’s College.

**United Kingdom.** Lancaster U. (three times), Leicester U., Leeds U. (three times), Sheffield U., York U., Glasgow U., Aberdeen U., Edinburgh U. (twice), Stirling U., Queen Mary College London, Oxford U. (twice), Cambridge U., Bristol U., Brunel U. (twice), Birmingham U.

**Germany.** Free U. Berlin, Technical U. Berlin, Bonn U., Heidelberg U., U. of Aachen, U. of Essen, Mathematical Research Institute at Oberwolfach.

**France.** U. of Paris.

**Poland.** Warsaw U., Banach Center (Warsaw), Wroclaw U., Gdansk U.

**Hungary.** Budapest U.

**Yugoslavia.** Belgrade U.

**Norway.** Oslo U.

**Sweden** Lund U. Ronneby U.

**Italy.** Siena U., Pisa U.

**Canada.** Windsor U. (Ontario), Western Ontario U., York U., U. of Toronto, Simon Frazer U., U. of Vancouver.

**Mexico.** DUXX Graduate School of Business Leadership, Monterrey.

## 7 Published Pedagogic Articles

1. *Mathematics Sets About the Infinite*, New Scientist, 15 July, 1982, pp.162–165.
2. *The Numbers Game*, Radio Times, 8–14 December, 1982, pp.26–27.
3. *The New Golden Age of Mathematics*, New Scientist, 18 April 1985, pp.30–33.
4. *Factoring Fermat Numbers*, New Scientist, 25 September, 1986, pp.41–44.
5. *Mathematics Without Theorems*, Computers in Mathematics, Notices of the American Mathematical Society 35 (December 1988), pp.1480–1482.
6. *The Right Stuff*, Computers in Mathematics, Notices of the American Mathematical Society 37 (April 1990), pp.417–425.
7. *Computers and Research at Four-Year Colleges*, Computers in Mathematics, Notices of the American Mathematical Society 37 (November 1990), pp.1257–1259.
8. *How to Find the Right College Position*, Focus, Volume 11, Number 3, June–July 1991, Mathematical Association of America, pp. 120–11. Reprinted in American Mathematical Society: Employment Information in the Mathematical Sciences, Issue 113, November 1991, pp.xv–xvi.
9. *What is a Mathematical Proof?*, Computers and Mathematics, Notices of the American Mathematical Society 39 (November 1992), pp.1065–1066.
10. *Preserving the Scope and Vitality of Mathematics*, Computers and Mathematics, Notices of the American Mathematical Society 39 (December 1992), pp.1186–1188.
11. *The Death of Proof?*, Computers and Mathematics, Notices of the American Mathematical Society 40 (December 1993), p1352.
12. *Logic*, L. Grinstein and S. Lopsey (Editors), Mathematics Education: An Encyclopedia, Garland Publishing, to appear.
13. *A Collegiate Mathematical Experience for Non Science Majors*, Proceedings of the Annual Meeting of the Canadian Mathematics Education Study Group, Regina, Alberta, 1994, to appear.
14. *Test Tube Computing With DNA*. Math Horizons, April 1995, pp.14–21.
15. *What is a Computation?* Math Horizons, September 1995, pp.24–29

16. *Mathematical Proofs in the Computer Age*. Mathematical Spectrum, to appear (13pp. preprint)
17. *Modern Set Theory*. Encyclopedia of Philosophy, Macmillan 1996.
18. *Soft Mathematics and the Mind*. Chronicle of Higher Education, August 8, 1997, pp.B4–5.
19. *Making the Invisible Visible*. MAA Online, November, 1997. Also published in CMC<sup>3</sup> Newsletter. Vol 26, No. 3, Fall 1997, pp. 1, 14–15.
20. *Rather Than Scientific Literacy, Colleges Should Teach Scientific Awareness*, Chronicle of Higher Education, January 23, 1998, p.B6.
21. *Why We Should Reduce Skills Teaching in the Math Class*. Ontario Mathematics Gazette, 36(4), June 1998, pp.5–7.
22. *Rather Than Scientific Literacy, Colleges Should Teach Scientific Awareness*. American Journal of Physics, Vol. 66, No. 7, July 23, 1998, pp559–560 (an expanded version of an article by the same name published in the Chronicle of Higher Education).
23. *Nice Little Number* (reflections on Paul Erdős), New Scientist (Online edition), 1 August, 1998. (2 pages).
24. *Reduce Skills Teaching in the Mathematics Class*, Mathematics Teaching in the Middle School, Vol. 5, No. 2, October 1999, pp.72–73, NCTM.
25. “Forward, with Caution, to (the New) Basics”, *NCTM Dialogues*, October 1999, p.3.
26. “Snake Eyes in the Garden of Eden”, *The Sciences*, July/August 2000, pp.14–17.
27. “Finding your inner mathematician”, *Chronicle of Higher Education*, September 29, 2000, p.B5.
28. “The Four Faces of Mathematics,” Chapter 2 of *NCTM Yearbook 2000: Learning Mathematics for a New Century*, National Council of Teachers of Mathematics, 2000, pp. 16–27.
29. “Finding your inner mathematician,” *Delta-K* Volume 38, Number 2, May 2001, Alberta Teachers’ Association, Canada, pp.9–11 (reprinted from the Chronicle of Higher Education).
30. “The soap opera that rules our lives,” *Mathematics Today* Volume 37, Number 3, June 2001, Institute of Mathematics and its Applications, UK, pp.87–90.
31. “The real reason why software engineers need math,” *Communications of the ACM*, Vol. 44, No. 10 (October 2001), pp.21–22.
32. “Round the twist,” *New Scientist* Volume 172, Issue 2316 (November 10, 2001), pp.40–42.
33. “Media X: THE New Liberal Arts?” *On the Horizon*, Volume 10, Number 2, 2002, pp.15–17.

34. “Euler’s Identity,” *The Changing Shape of Geometry*, edited by Chris Pritchard, Cambridge University Press (2003), pp. 445–447.
35. “Mathematicians and the War on Terror,” *Frontiers ’03: New Writing on Cutting-Edge Science by Leading Scientists*, edited by Tim Radford, Guardian Books (2003), pp.82–87.
36. “Why Universities Require Computer Science Students to Take Math,” *Communications of the ACM*, Vol. 46, No. 9 (September 2003), pp.37–39.
37. “Mathematicians Face Uncertainty,” *Discover* magazine (USA), Volume 25, No. 1, January 2004, p.36.
38. “How to Beat the Odds,” *Focus* magazine (UK), Special Report, Issue 137, April 2004, pp.51–58.
39. “Perelman’s Possible Poincaré Proof,” *Math Horizons* (USA), September 2004, pp.10–11, 27.
40. “Prime-Time News,” *Discover* magazine (USA), Volume 26, No. 1, January 2005, p.42.
41. “Closing-in on the Twin-Primes Conjecture,” *Discover* magazine (USA), Volume 27, No. 1, January 2006, p.25.
42. “Beyond Professor Langdon’s Classroom,” in Dan Burstein (ed), *Secrets of the Code*, cds Books, 2006, pp.254–261.
43. “How much mathematics can be for all,” in L. Giacardi, M. Mosca, O. Robutti, *Conferenze e Seminari, 2005–2006*, Kim Williams Books, Turin, Italy, 2006, pp.191–204.
44. “The Pascal–Fermat Correspondence,” *The Mathematics Teacher* Vol 103, Number 8, NCTM, April 2010, pp.578–582.

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## 8 Pedagogic Presentations

1. Panelist (Workshop for New and Future Chairs), Mathematics Department Chairs Colloquium, Washington, D.C., October, 1993.
2. Panelist (Promoting Faculty Growth in Teaching and Scholarship), Mathematics Department Chairs Colloquium, Washington, D.C., October, 1993.
3. Panelist (Improving the Public Image of Mathematics), American Mathematical Society Annual Meeting, San Francisco, CA, January 1995.
4. Panelist (The Use of Technology in Teaching Mathematics), 1995 Technology Math EXPO, Kansas City, Missouri, October 1995.

5. Panelist (The Mathematics Curriculum for the Next Millennium), 1997 State of Oregon Math Summit, Corvallis, Oregon, October 1997.
6. Colloquium Lecture (Putting Mathematics on Prime Time Television), San Jose State University, September 1997.
7. Colloquium Lecture (Life By the Numbers), Contra Costa Community College, October 1997.
8. Colloquium Lecture (Putting Mathematics on Prime Time Television), Denison University, October 1997.
9. Invited speaker (Putting Mathematics on Prime Time Television), CMC<sup>3</sup> Annual Conference, Monterey, California, December 1997.
10. Colloquium Lecture (Putting Mathematics on Prime Time Television), San Francisco State University, December 1997.
11. Panelist (Writing Mathematics Books for the Popular Science Market), 1998 AMS–MAA Joint Mathematics Meetings, Baltimore, Maryland, January 1998.
12. Panelist, Mathematics and the Media Conference, Mathematical Sciences Research Institute, University of California at Berkeley, October 1998.
13. Presentation on the use of interactive software in calculus instruction. ICTCM '98, New Orleans.
14. Presentation on the use of interactive software to reinforce learning of calculus concepts. ICTCM '99, San Francisco.
15. Presentation on the use of video to motivate mathematics learning for non-science students. ICTCM '99, San Francisco.
16. Presentation on the use of video to increase the public understanding of mathematics, Millennium 2000 Mathematics Festival, Melbourne, Australia, January 2000.
17. Panel discussion for mathematics department chairs, AMS–MAA–SIAM Joint Mathematic Meetings, New Orleans, January 2001.

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## 9 Recent book reviews

1. *Nature*, Vol 379, January 1996, pp.128–129. Five Equations that Changed the World (Michael Guillen), Five Golden Rules (John Casti), Nature's Numbers (Ian Stewart), Pythagoras' Trousers (Margaret Wertheim), Conversations on Mind, Matter, and Mathematics (Jean-Pierre Changeux and Alain Connes).
2. *Nature*, Vol 386, April 1997, p.670. In retrospect: Syntactic Structures (Noam Chomsky).

3. *New Scientist*, 26 April, 1997, p.44. The Large, the Small and the Human Mind (Roger Penrose).
4. *New Scientist*, 14 June, 1997, pp.42–43. Mathematics: From the Birth of Numbers (Jan Gullberg).
5. *MAA Online*, June, 1997. Strength in Numbers (Sherman Stein).
6. *New Scientist*, 23 May, 1998, p.47. The Magical Maze (Ian Stewart).
7. *Washington Post*, 4 June, 1998, p.B5. Virtual Realism (Michael Heim) and Cybergrace: The Search for God in the Digital World (Jennifer Cobb).
8. *New Scientist*, 27 June, 1998, pp.44–45. Time’s Pendulum: The Quest to Capture Time (Jo Ellen Barnett).
9. *MAA Online*, July, 1998. The Man Who Loved Only Numbers (Paul Hoffman).
10. *MAA Online*, September, 1998. My Brain is Open (Bruce Schechter).
11. *New Scientist*, 5 September, 1998, pp.48–49. A Beautiful Mind: The Biography of John Nash (Sylvia Nasar).
12. *New York Times*, March 12, 2000, p.31. The History of Counting (Denise Schmandt-Besserat).
13. *MAA Online*, April, 2000. Uncle Petros and Goldbach’s Conjecture (Apostolos Doxiadis).
14. *Discover*, Vol. 24, No. 1 January 2003, pp.48–49. “The Wolfram Controversy,” discussion of “A New Kind of Science” (Stephen Wolfram).
15. *MAA Online*, April 2003. “Imagining Numbers (particularly the square root of minus fifteen)” (Barry Mazur).
16. *American Scientist*, November–December 2004, pp.575–576. Becoming a Better Reasoner, review of “Logic Made Easy: How to Know When Language Deceives You,” (Deborah Bennett).
17. *Focus*, April 2005, p.76. Review of “The Infinite Book” (John Barrow).
18. *The College Mathematics Journal*, May 2005, pp.255–256. “A Mathematician at the Ballpark” (Ken Ross).

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## 10 Books

### Research monographs

1. *Aspects of Constructibility*. Springer-Verlag, Lecture Notes in Mathematics 354 (1973), 260pp.

2. *The Souslin Problem*, with H. Johnsbråten, Springer-Verlag, Lecture Notes in Mathematics 405 (1974), 132pp.
3. *The Axiom of Constructibility: A Guide for the Mathematician*. Springer-Verlag, Lecture Notes in Mathematics 617 (1977), 98pp.
4. *Constructibility*. Springer-Verlag (1984), 420pp.
5. *Logic and Information*. Cambridge University Press (1991), xiv + 325pp. (American Association of Publishers “Most Outstanding Book in Computer Science and Data Processing for 1991”.)
6. *Language at Work: Analyzing Communication Breakdown in the Workplace to Inform Systems Design*, with Duska Rosenberg, Stanford University: CSLI Publications and Cambridge University Press (1996), 212pp.
7. *Mathematics Education for a New Era: Video Games as a Medium for Learning*, AK Peters/CRC Press (2011), 218pp.

### Textbooks

1. *Fundamentals of Contemporary Set Theory*. Springer-Verlag (1979), 182pp.
2. *Microchip Mathematics: Number Theory for Computer Users*. Shiva (1984), 160pp.
3. *Sets, Functions and Logic*. Chapman and Hall (1981), 90pp.
4. *Sets, Functions and Logic (Second Edition, completely revised and extended)*. Chapman and Hall (1992), 159pp.
5. *The Joy of Sets: Fundamentals of Contemporary Set Theory (Second Edition)* (a completely revised and extended edition of the 1979 book). Springer-Verlag (1993), 198pp.
6. *Sets, Functions and Logic (Third Edition, completely revised)*. Chapman and Hall (2003), 143pp.
7. *The Computer as Crucible: An Introduction to Experimental Mathematics*, with Jonathan Borwein, AK Peters (2008), 200pp.
8. *Introduction to Mathematical Thinking*, Keith Devlin (July 2012), 102pp.

### Interactive texts on CD-ROM, with workbook

1. *Electronic Companion to Calculus*. Cogito Learning Media (1997).

### General market books

1. *Micro Maths*. Macmillan Educational (1984), 100pp.
2. *Mathematics: The New Golden Age*. Penguin (1988), 290pp.



3. *Mathematics: The Science of Patterns—The Search for Order in Life, Mind, and the Universe*, W. H. Freeman ‘Scientific American Library’ (1994), 216pp.
4. *All the Math That’s Fit to Print: Articles from the Manchester Guardian*. Spectrum: Mathematical Association of America (1994), 330pp.
5. *Mathematics: The Science of Patterns—The Search for Order in Life, Mind, and the Universe (Paperback second edition)*, W. H. Freeman ‘Scientific American Library’ (1996), 216pp.
6. *Goodby Descartes: The End of Logic and the Search for a New Cosmology of the Mind*, Wiley (1997), 310pp.
7. *Life by the Numbers*, the companion to the six-part PBS television series of the same name, produced by WQED, Pittsburgh, Wiley (1998), 214pp.
8. *Mathematics: The New Golden Age (Second Edition)*. Penguin, (1998), 302pp.
9. *The Language of Mathematics: Making the Invisible Visible*, W. H. Freeman, (1998), 344pp.
10. *InfoSense: Turning Information Into Knowledge*, W. H. Freeman (1999), 215pp.
11. *The Maths Gene: Why Everybody Has It but Most People Don’t Use It*, UK: Wiedenfeld and Nicholson (2000).
12. *The Math Gene: How Mathematical Thinking Evolved and Why Numbers Are Like Gossip*, USA: Basic Books (2000).
13. *The Millennium Problems: The Seven Greatest Mathematical Puzzles of Our Time*, Basic Books (2002), 237pp.
14. *The Math Instinct: Why You’re a Mathematical Genius (along with Lobsters, Birds, Cats, and Dogs)*, Thunder’s Mouth Press (2005), 279pp.
15. *The Numbers Behind NUMB3RS: Solving Crime with Mathematics*, with Gary Lorden Penguin–Plume (2007), 243pp.
16. *The Unfinished Game: Pascal, Fermat, and the Seventeenth Century Letter that Made the World Modern*, Basic Books (2008), 208pp.
17. *The Man of Numbers: Fibonacci’s Arithmetic Revolution*, Walker Books (2011), 189pp.
18. *Leonardo and Steve: The Young Genius Who Beat Apple to Market by 800 Years*, e-book original, Ted Weinstein (July 2011), 15,000 words.

## 11 Research Publications

An asterisk denotes a paper that is mostly expository.

1. *Note on a theorem of J. Baumgartner*. Fundamenta Mathematicae 76 (1972), pp.255–260.

2. *Some Weak Versions of Large Cardinal Axioms.* Annals of Mathematical Logic 5 (1973), pp.291–325.
3. *More on the Free Subset Problem.* (with J. B. Paris). Annals of Mathematical Logic 5 (1973), pp.27–30.
4. *Some Remarks on Changing Cofinalities.* Journal of Symbolic Logic 39 (1974), pp.27–30.
5. *Measurable Cardinals and a Combinatorial Principle of Jensen.* Journal of Symbolic Logic 38 (1973), pp.551–560.
6. *On Hereditarily Separable Hausdorff Spaces in the Constructible Universe.* Fundamenta Mathematicae 82 (1974), pp.1–10.
7. *Certain Sequences of Ordinals.* (with J. B. Paris). in ‘Infinite and Finite Sets’, Colloquia Mathematica Societatis Janos Bolyai 10, Kesthely (Hungary) 1973, pp.333–360.
8. *Order-types, Trees, and a Problem of Erdős and Hajnal.* Periodica Mathematica Hungarica 5 (1974), pp.153–160.
9. *An Introduction to the Fine Structure of the Constructible Hierarchy.\** in Fenstad, J.-E. and Hinman, P. (eds) ‘Generalised Recursion Theory’, North Holland (1974), pp.123–163.
10. *Note on a Problem of Erdős and Hajnal.* Discrete Mathematics 11 (1975), pp.9–22.
11. *Kurepa’s Hypothesis and the Continuum.* Fundamenta Mathematicae 89 (1975), pp.23–31.
12. *Indescribability Properties and Small Large Cardinals.\** in “Proceedings of the Logic Conference at Kiel, 1974”, Springer-Verlag: Lecture Notes in Mathematics 499 (1975), pp.89–114.
13. *Marginalia to a Theorem of Silver* (with R. B. Jensen). in “Proceedings of the Logic Conference at Kiel, 1974”, Springer-Verlag: Lecture Notes in Mathematics 499 (1975), pp.115–142.
14. *An Alternative to Martin’s Axiom.* in “Set Theory and Hierarchy Theory, Bierutowice, Poland, 1975”, Springer-Verlag: Lecture Notes in Mathematics 537 (1976), pp.65–76.
15. *Martin’s Axiom versus the Continuum Hypothesis.* in “Proceedings of the Logic Colloquium in Wroclaw, Poland, 1977”, Polish Academy of Science (1977).
16. *Constructibility.\** in Barwise, J. (editor) “Handbook of Mathematical Logic”, North Holland (1977), pp.453–489.
17. *Hierarchies of Constructible Sets.* Annals of Mathematical Logic 11 (1977), pp.195–202.
18.  $\aleph_1$ -trees. Annals of Mathematical Logic 13 (1978), pp.267–330.

19. *On Generalising Martin's Axiom.* Bull. de l'Acad. Polon. des Sci. 26 (1978), pp.211–212.
20. *A Weak Version of  $\diamond$  Which Follows From  $2^{\aleph_0} < 2^{\aleph_1}$ .* (with S. Shelah). Israel Journal of Mathematics 29 (1978), pp.239–247.
21. *The Consistency with CH of Some Consequences of Martin's Axiom Plus  $2^{\aleph_0} > \aleph_1$ .* (with U. Avraham and S. Shelah). Israel Journal of Mathematics 31 (1978), pp.19–33.
22. *A Note on the Combinatorial Principle  $\diamond(E)$ .* Proceedings of the American Mathematical Society 72 (1978), pp.163–166.
23. *Iterated Souslin Forcing, the Principles  $\diamond(E)$ , and a Generalisation of the Axiom SAD.* Israel Journal of Mathematics 31 (1978), pp.368–382.
24. *Variations on  $\diamond$ .* Journal of Symbolic Logic 44 (1979), pp.51–56.
25. *A Note on the Normal Moore Space Conjecture.* (with S. Shelah). Canadian Journal of Mathematics 31 (1979), pp.241–251.
26. *Remark on a Theorem of D. H. Fremlin Concerning  $K$ -analytic Hausdorff Spaces.* Proceedings of the Edinburgh Mathematical Society 22 (1979), pp.3–8.
27. *Souslin Properties and Tree Topologies.* (with S. Shelah). Proceedings of the London Mathematical Society 39 (1979), pp.237–252.
28. *Concerning the Consistency of the Souslin Hypothesis with the Continuum Hypothesis.* Annals of Mathematical Logic 19 (1980), pp.115–125.
29. *Morass-like Constructions of  $\aleph_2$ -trees in  $L$ .* in Jensen, R. B. and Prestel, K. (eds) “Set Theory and Model Theory”, Springer-Verlag: Lecture Notes in Mathematics 872 (1981), pp.1–36.
30. *Infinite Trees and the Axiom of Constructibility.* Bulletin of the London Mathematical Society 13 (1981), pp.193–206.
31. *The Combinatorial Principle  $\diamond^*$ .* Journal of Symbolic Logic 47 (1982), pp.888–899.
32. *A New Construction of a Kurepa tree with no Aronszajn Subtrees.* Fundamenta Mathematicae 118 (1983), pp.123–127.
33. *Reduced Powers of  $\aleph_2$ -trees.* Fundamenta Mathematicae 118 (1983), pp.129–134.
34. *The Yorkshireman's Guide to Proper Forcing.\** in Mathias, A (ed) “Surveys in Set Theory”, London Mathematical Society Lecture Notes 87 (1983), pp.60–115.
35. *The Number of Directed Sets.* (with J Steprans and S Watson). Convegno di Topologia 4 (1984), pp.31–41.
36. *Language and Network Theory.\** Network User 1 (1985), British Telecom (London), pp.35–37.
37. *Situation Semantics.\** Network User 2 (1986), British Telecom (London), pp.10–13.

38. *The Mertens Conjecture*.<sup>\*</sup> Bulletin of the Irish Mathematical Society 17 (1986), pp.29-35.
39. *Logic and Information*: between 1986 and 1987 I wrote a number of short notes that were circulated in preprint form, and which were subsequently incorporated into the research monograph of this title (see section on ‘Books’).
40. *Infons and Types in an Information-based Logic*, in Cooper, R. Mukai, K. Perry, J. (editors) *Situation Theory and its Applications, Volume 1*, CSLI Lecture Notes 22 (1990), pp.79–95 (refereed)
41. *The Role of Infons in a Mathematical Theory of Information*, in *Theories of Partial Information*, Proceedings of the Conference at the University of Texas at Austin, January 1990, Technical Reports of the Center for Cognitive Science, University of Texas at Austin (24pp.).
42. *Infons as Mathematical Objects*, Minds and Machines 2 (1992), pp.185–201. (A revised version of the above.)
43. *Situations as Mathematical Abstractions*, in Barwise, J., Gawron, M, Plotkin, G., Tutiya, S. (editors) *Situation Theory and its Applications, Volume 2*, CSLI Lecture Notes 26 (1991), pp.25–39 (refereed).
44. *Oracles in Situation Semantics*, in Barwise, J., Gawron, M, Plotkin, G., Tutiya, S. (editors) *Situation Theory and its Applications, Volume 2*, CSLI Lecture Notes 26 (1991), pp.41–49 (refereed).
45. *The Logic of Information*,<sup>\*</sup> presented at the ACH/ALLC Annual Joint Meeting held at Arizona State University, March 1990 (15pp, March 1990).
46. *Situation Theory and Searle’s Taxonomy of Speech-acts*, privately circulated technical report (36pp, August 1990).
47. *Negation and Quantification in Situation Semantics*, privately circulated technical report (34pp, September 1990).
48. *Situation theory*,<sup>\*</sup> Encyclopedia of Artificial Intelligence, Wiley (1992), pp.1541–1547.
49. *Seeing is Believing: The Mathematical Modeling of Subjective Phenomena*, privately circulated technical report (11pp, September 1991).
50. *Mathematical Functions and Definite Descriptions*, in private circulation prior to submission for publication. (23pp. preprint, 1992).
51. *Situation Spaces*, privately circulated technical report (11pp, 1991).
52. *Situation Theory and Cooperative Action* (with D. Rosenberg), in Aczel, P. Israel, D, Katagiri, Y. and Peters, S. (editors) *Situation Theory and its Applications, Volume 3*, CSLI Lecture Notes 37 (1993), pp.213–264.

53. *Situation Theory and the Design of Interactive Information Systems*, Stanford University: CSLI Report 92–171, also in Rosenberg, D and Hutchison, C. (editors) *Design Issues for CSCW*, Springer-Verlag (1994), pp.61–87 (refereed).
54. *Situation Theory and Social Structure*, in Masuch, M. and Pólos, L. (editors) *Knowledge Representation and Reasoning Under Uncertainty*, Springer-Verlag, Lecture Notes in Artificial Intelligence 808, pp.197–237.
55. *Situation Theory: A Mathematical Approach to Information*, presented at the Second IBM CIM Colloquium on Standards and New Technologies for Enterprise Information Management, Thornwood, NY, February 18–19, 1993 (22pp. preprint).
56. *Networked Information Flow via Stylized Documents* (with D. Rosenberg), Stanford University: CSLI Report 94–187 (1994) (38pp.).
57. *Layered Formalism and Zooming in the Analysis of Stylized Documents*, (with D. Rosenberg), Stanford University: CSLI Report 94–189 (1994) (26pp.).
58. *Logic: The Mathematics of Reasoning*,\* in *New Directions in Mathematics*, Cambridge University Press, to appear.
59. *Interpretive Grammar and Stylized Documents*, (with D. Rosenberg), Stanford University: CSLI Report 95–196 (1995) (20pp.).
60. *Goodbye, Descartes*, Mathematics Magazine, Vol. 65, No. 5, December 1996, pp. 344–349.
61. *The Logical Structure of Computer-Aided Mathematical Reasoning*, The American Mathematical Monthly 104, August–September 1997, pp.632–646.
62. *Preferential Reference and Formalized Situated Meaning*, preprint.
63. *A Situation-Theoretic Analysis of Processes*, Private report to Knowledge Based Systems Inc. (DARPA project report), July 1996.
64. *Understanding and Explaining Human Activities in the Workplace*, (with D. Rosenberg), preprint.
65. *Using Situation Theory to Compare the Effectiveness of Different Office Configurations*, Private report to Steelcase, Inc. 1998.
66. *Reasoning in a Human Mode* (with Duska Rosenberg), AAAI 98, Stanford University, March 1998 (refereed).
67. *Why we need a science of information*, in Alison Scammell (ed), *i in the Sky: Visions of the information future*, UK: Aslib/IMI, 1999, Chapter 14.
68. *The role of conceptual structure in human evolution*, in Bernhard Ganter and Guy W. Mineau (eds), *Conceptual Structures: Logical, Linguistic, and Computational Issues: 8th International Conference on Conceptual Structures, ICCS 2000, Darmstadt, Germany, August 2000, Proceedings*, Lecture Notes in Artificial Intelligence 1867, Springer-Verlag 2000, pp.1–12.

69. *A framework for understanding partnership decision making*, joint with Norbert Radics (Mitani Sangyo Co. Ltd., Japan) and Duska Rosenberg (Royal Holloway University of London, UK), Private report to Mitani Sangyo Co. Ltd., October 2002.
70. *Kurt Gödel — Separating Truth from Proof in Mathematics*,\* SCIENCE, Vol 298 (December 6, 2002), pp.1899–1900.
71. *A framework for analyzing intelligence analysis*, White paper written under contract for Veridian, Inc., March 2003. (Not for distribution.)
72. *The evolution of mathematical ability in humans*, report presented to the American Mathematical Society May 2003 Meeting, San Francisco State University, May 2003.
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