

# CURRICULUM VITAE ET TRAVAUX SCIENTIFIQUES

Benoît Mandelbrot

Ancien Élève de l'École Polytechnique, Docteur ès Sciences  
Fellow, American Academy of Arts and Sciences  
Member, U.S. National Academy of Sciences  
Sterling Professor of Mathematical Sciences, Yale University  
IBM Fellow in Physical Sciences, Emeritus, IBM Yorktown

19 Février 2004

Né le 20 Novembre 1924 à Varsovie, Pologne.

Ingénieur diplômé: *Ecole Polytechnique*, Paris; Promotion 1944.

Master of Science, then Professional Engineer in Aeronautics:  
*California Institute of Technology*, Pasadena CA, 1948 and 1949.

Docteur d'Etat ès Sciences Mathématiques: *Faculté des Sciences de Paris*, 1952.

- 1949-1957 Attaché, Chargé, puis Maître de Recherches:  
*Centre National de la Recherche Scientifique*, Paris, France.
- 1957-1958 Maître de Conférences de Mathématiques Appliquées: *Université*, Lille, France.  
Maître de Conférences d'Analyse Mathématique: *Ecole Polytechnique*, Paris.
- 1958-1993 Research Staff Member, 1958-74; IBM Fellow, 1974-93;  
IBM Fellow Emeritus since 1993: *IBM Thomas J. Watson Research Center*,  
Yorktown Heights NY.
- 1987-1999 Abraham Robinson Adjunct Professor of Mathematical Sciences;  
1999- Sterling Professor of Mathematical Sciences:  
Mathematics Department: *Yale University*, New Haven, CT.
- 1988- Fellow, *Saybrook College*, New Haven, CT

### CHARGES À TEMPS PLEIN, EN CONGÉ DE LONGUE DURÉE

- 1950-1953 Ingénieur, Groupe de Télévision en Couleur: *LEP, S.A.* (Groupe Philips), Paris, France.
- 1953-1954 Member of the School of Mathematics: *Institute for Advanced Study*, Princeton NJ.
- 1955-1957 Chargé de Cours de Mathématiques & Membre du Séminaire Jean Piaget: *Université*,  
Genève.
- 1962-1963 Visiting Professor of Economics & Research Fellow in Psychology:  
*Harvard University*, Cambridge MA.
- 1963-1964 Visiting Professor of Applied Mathematics & Staff Member of the Joint Committee  
on Biomedical Computer Science: *Harvard University*, Cambridge MA.
- 1979-1980 Visiting Professor, later Professor of the Practice of Mathematics  
Mathematics Department: *Harvard University*, Cambridge MA
- 1999 G.C. Steward Visiting Fellow: *Gonville & Caius College*,  
and Member: *Newton Institute for Mathematical Sciences*, Cambridge, UK.

### CHARGES À TEMPS PARTIEL, OU EN CONGÉ DE COURTE DURÉE

- 1953-1971 Research Associate, later Lecturer in Electrical Engineering, most recently  
Institute Lecturer: *Massachusetts Institute of Technology*, Cambridge MA.
- 1969-1977 Senior Staff Member: *National Bureau of Economic Research*, New York NY.
- 1970 Visiting Professor of Engineering & Applied Science: *Yale University*, New Haven CT.
- 1972 Visiting Professor of Physiology: *Albert Einstein College of Medicine*, Bronx NY.
- 1974 Visiting Professor of Physiology: *SUNY Downstate Medical Center*, Brooklyn NY.
- 1980 Visiteur: *Institut des Hautes Études Scientifiques (IHES)*, Bures-sur-Yvette, France.
- 1984, 2001 Visitor: *Mittag-Leffler Institute*, Djursholm, Sweden.
- 1984 Walker-Ames Distinguished Professor: *University of Washington*, Seattle WA.
- 1987, 2000 Regents' Lecturer: *University of California*, Santa Cruz CA; Riverside CA.
- 1987-1994 Charter Member: *Geometry Center*, Minneapolis MN.
- 1992 Charles M. and Martha Hitchcock Professor: *University of California*, Berkeley CA.
- 1995 Professeur de l'Académie des Sciences: *École Polytechnique*, Palaiseau, France.
- 1998 R. & B. Sackler Visiting Professor: *University*, Oslo, Norway.

**PRIX ET MÉDAILLES (AVEC EXTRAITS DES "MOTIFS")**

- 1974 IBM Fellowship:  
*IBM Corporation, Armonk NY.*
- "There are few contemporary scholars who have made such penetrating contributions to as many fields of physical and social science...In his work, both in depth and range, he is the world leader. His success, where others have faltered, has been due to a combination of command of mathematical tools, extraordinary breadth, and even rarer intellectual courage."
- 1983-84 Research Division Outstanding Innovation Award in 1983; Corporate Award in 1984:  
*IBM Corporation, Armonk NY.*
- 1985 Barnard Medal for Meritorious Service to Science, "Magna est Veritas:"  
*USA National Academy of Sciences and Columbia University, Washington DC and New York NY.*
- "In the great tradition of natural philosophers past you looked at the world around you on a broader canvas."
- 1986 Franklin Medal for Signal and Eminent Service in Science:  
*The Franklin Institute, Philadelphia PA.*
- "For outstanding contributions to mathematics and the creation of the field of fractal geometry, and important and illuminating applications of this new concept to many fields of science."
- 1988 Charles Proteus Steinmetz Medal:  
*IEEE Chapter, General Electric Company, and Union College, Schenectady NY.*
- "Fractals have given new insights into every field of science, mathematics, engineering, economics, psychology, art, and literature."
- 1988 Alumni Distinguished Service Award for Outstanding Achievement:  
*California Institute of Technology, Pasadena CA.*
- "[gave] insight into such complex phenomena as turbulence of liquids..."
- 1988 Senior Award (Humboldt Preis):  
*Alexander von Humboldt-Stiftung, Bonn, Deutschland.*
- 1988 "Science for Art" Prize:  
*Fondation Moët-Hennessy-Louis Vuitton, Paris, France.*
- 1989 Harvey Prize for Science and Technology:  
*Technion-Israel Institute of Technology, Haifa, Israel.*
- 1991 Nevada Prize:  
*University of Nevada System and Desert Research Institute.*
- "Startled scientists, mathematicians and artists alike in 1975 [by] unveiling a dramatic new approach for describing what had previously seemed indescribable."
- 1993 Wolf Foundation Prize for Physics:  
*Wolf Foundation to Promote Science and Art for the Benefit of Mankind, Herzliyah, Israel.*
- "By recognizing the widespread occurrence of fractals and developing mathematical tools for describing them, he has changed our view of nature."
- 1994 Honda Prize:  
*Soichiro Honda Foundation of Japan, Tokyo, Japan.*
- "Identified substantial bridges over the chasms that now separate mathematics, science and technology from one another and from the interests of the common man and the child..."

- 1996 Médaille de Vermeil de la Ville de Paris:  
*Hôtel de Ville*, Paris, France.
- "On vous considère, à juste titre, comme le pionnier d'une nouvelle vision de notre monde... Votre démarche... constitue un effort pour rendre compte de phénomènes dont la théorie ne savait que faire."
- 1999 John Scott Award:  
*John Scott Fund*, Philadelphia PA.
- for "Ingenious Men and Women Who Contribute in Some Outstanding Way to the Comfort, Welfare, or Happiness of Mankind."
- 1999 Lewis Fry Richardson Medal:  
*European Geophysical Society*.
- for his "pioneering contributions to the development and applications of scale-invariance and fractal geometry to non-linear geophysics."
- 2002 Sven Berggren Priset:  
*Kungliga Fysiografiska Sällskapet*, Lund, Sverige.  
(*Academy for the Natural Sciences, Medicine and Technology*)
- 2002 Medaglia della Presidenza della Repubblica Italiana:  
*Centro Pio Manzu*, Rimini, Italia.
- 2002 William Procter Prize for Scientific Achievement:  
*Sigma Xi, The Scientific Research Society of America*.
- 2003 Japan Prize for Science and Technology:  
*Science and Technology Foundation of Japan*, Tokyo, Japan.

## ACADÉMIES

- 1982 - Fellow: *American Academy of Arts and Sciences*, Cambridge MA.
- 1987, 2001 Foreign Associate, then Member: *USA National Academy of Sciences*, Washington DC.
- "His creative thinking was essential for physicists working in diverse fields to capture the essence of previously intractable problems and to unveil order and simplicity in systems with a seemingly high degree of disorder, irregularity, and complexity."
- 1987 - Membre: *Académie Européenne des Arts, Sciences et Lettres*, Paris, France.
- 1989-1993 Member: *IBM Academy of Technology*, Armonk N.Y.
- 1998 - Foreign Member: *Norwegian Academy of Science and Letters*, Oslo, Norge.

## DÉCORATIONS

- 1989 Chevalier: *L'Ordre National de la Légion d'Honneur*, Paris, France.

**DOCTORATS HONORIS CAUSA ET DISCOURS DE "COMMENCEMENT"**

- 1986 Doctor of Science & Engineering Commencement Speaker: *Syracuse University*, Syracuse NY.  
 • "Your interests transcend conventional disciplinary bounds and your work in its breadth and depth speeds the way toward unraveling secrets of the universe."  
 Commencement Speaker: *St. John's College*, Annapolis MD.  
 Doctor of Science: *Laurentian University/Université Laurentienne*, Sudbury ON, Canada.
- 1987 Doctor of Science: *Boston University*, Boston MA.  
 • "What you have named 'fractal geometry' describes ... as well the ... commodities market ... and a myriad of phenomena [that point] to a symmetry of pattern within each of the meldings, branchings, and shatterings of nature. [You are honored] for your prolonged and energetic refusal to confine yourself within accepted rigidities [and] for the scientific, mathematical, and aesthetic insights by which you have brought us closer to the character of the universe."
- 1988 Doctor of Science: *State University of New York*, Albany NY.  
 Doktor: *Universität Bremen*, Bremen, Deutschland.  
 • "For setting standards, as a wanderer-by-choice between the disciplines and between theory and applications."  
 Doctor of Humane Letters: *Pace University*, New York NY.  
 • "For bringing an unsuspected new form of beauty to mathematics, for giving new dimension to our lives"
- 1989 Doctor of Science & Commencement Speaker: *University of Guelph*, Guelph ON, Canada.  
 • "Has reshaped our vision of geometry. Is one of that small number of scientists whose ideas not only have a major impact upon science but also on the popular domain."
- 1992 Doctor of Science & Commencement Speaker: *University of Dallas*, Irving TX.
- 1993 Doctor of Science & Founders Day Speaker: *Union College*, Schenectady NY.  
 Engineering Commencement Speaker: *Université de Franche-Comté*, Besançon, France.  
 Doctor: *Universidad de Buenos Aires*, Buenos Aires, Argentina.
- 1995 Doctor Philosophiae: *Tel Aviv University*, Ramat Aviv, Israel.  
 • "For pioneering work... which broke new ground in the analysis of complex physical systems."
- 1998 Doctor of Science: *Open University* (U.K.), London Commencement.  
 • "[He investigated Julia sets] and thereby discovered a related set of extraordinary complexity and beauty which is named after him. The Mandelbrot set has now been studied in great depth, leading to profound mathematical insights. At the same time, the creation of pictures of these exquisite sets has become an art form in its own right... Our course M337 Complex Analysis has a unit entirely devoted to the Mandelbrot set, and many students report that this is the high point of their studies."  
 Doctor of Science: *Oikonomiko Panepistemio, University of Business & Commerce*, Athens, Greece.
- 1999 Doctor of Science: *University of St Andrews*, St Andrews, Scotland, U.K.  
 • "...created an entirely new geometry with as much system and generality as that of Euclid and a new physical science. Not overawed by tradition or authority...saw that the overwhelming smoothness paradigm with which mathematical physics had attempted to describe Nature was radically flawed and incomplete...Chancellor, as your predecessor...Lord Balfour in 1911 honoured Georg Cantor, I take the greatest pleasure in inviting you to honor a great mathematician of a great mathematical age."
- 1999 Master of Arts *privatim*: *Yale University*, New Haven CT.
- 2002 Doctor of Science: *Emory University*, Atlanta GA.  
 • "Your path-breaking study of fractals not only has established a prominent field worth of study in its own right but also influenced a broad range of other fields, from architecture to ecology, economics, linguistics, neuroscience, and cinematic techniques."

## SOCIÉTÉS SCIENTIFIQUES

Membre (honoraire): *Société Physique de France.*

Fellow: •*American Physical Society.*  
 "For the development of fractal geometry, ... and ... its first applications in physics."  
 •*American Association for the Advancement of Science.*  
 •*American Geophysical Union.*  
 "For [improving] understanding of order and scale in geophysical processes."  
 •*Institute of Mathematical Statistics* (inactive).  
 •*American Statistical Association* (inactive).  
 "For many ingenious contributions to stochastic models in several fields."  
 •*Institute of Electrical and Electronics Engineers* (inactive).  
 "For contributions to information theory and its applications, and to understanding of  $1/f$  random noise processes."  
 •*Econometric Society* (inactive).

Membre (elu): *International Statistical Institute* (inactif).

Membre: *Société Mathématique de France* (inactif).  
*American Mathematical Society.*  
*Materials Research Society* (inactive).

## COMMISSIONS

1964-82 Editorial Board of the journal *Information and Control.*  
 1969-72 Committee on the Applications of Mathematics: *USA National Academy of Sciences.*  
 1974-78 Editorial Board of the *Journal of Financial Economics.*  
 1982-88 Editorial Board of the journal *Pure and Applied Geophysics.*  
 1984- Editorial Board of the journal *Advances in Applied Mathematics.*  
 1989-92 Editorial Board of the *Journal of Visual Communication and Image Representation.*  
 1990-91 Advisory Board of the journal *Experimental Mathematics.*  
 1990-92 Advisory Panel of the journal *Mathematics Review.*  
 1990-95 Advisory Board of the journal *Physica A.*  
 1992- Honorary Editor, *Fractals: An Interdisciplinary Journal on the Complex Geometry of Nature.*  
 1993-96 Commission on Mathematical Physics (C18), *International Union on Pure and Applied Physics.*  
 1993- President, *Mandelbrot Foundation for Fractals.*  
 1995- Scientific Council, Me Vis, Bremen, Germany.  
 2001- Advisory Board of the journal *Quantitative Finance.*  
 2004- Advisory Board of the journal *Annals of Finance.*

## BOURSES

1953-54 *Scholar of the Rockefeller Foundation.*  
 1968 *Fellow of the John Simon Guggenheim Memorial Foundation* (resigned).  
 Grants from NSF and ONR.

## LIVRES "FRACTALES" ET LEURS TRADUCTIONS

- A** *Les objets fractals: forme, hasard et dimension.* Paris: Flammarion, 1975, 192 pp.
- A2** *Les objets fractals: forme, hasard et dimension: 2e édition.* Paris: Flammarion, 1984, 204 pp.
- A3** *WWW. Les objets fractals: forme, hasard et dimension: 3e édition, suivie d'un Survol du langage fractal.* Paris: Flammarion, 1989, 268 pp.
- A4** *Les objets fractals: forme, hasard et dimension: 4e édition ("poche").* Paris: Flammarion (Collection *Champs*), 1995, 209 pp.
- Objektu fraktalak: forma, zoria eta dimentsioa.*  
Basque par Inaki Azkune Mendia. Usurbil: Elhuyar, 1992, 333 pp.
- Fraktalnite obekti: forma, sluchainost i razmernost.* Bulgare par Petr Filipov Lazarov, Andrei Juliev Bakhner & Ilia Vasiliev Petrov. Sofia: St. Kliment Ohridski Press, 1996, 275 pp.
- Chinois* par Wen Zhiying. Beijing: World Publishing Corporation, 1999.
- Fraktály: tvar, náhoda a dimenze*  
Tchéque par Jiri Fiala, Prague: Mladá Fronta, 2003, 210 pp.
- Gli oggetti frattali: forma, caso e dimensione.* Italien par Roberto Pignoni; préface par Luca Peliti & Angelo Vulpiani. Torino: Giulio Einaudi, 1987, xx+207 pp.
- Objectos fractais: forma, acaso e dimensão; seguido de panorama da linguagem fractal.*  
Portugais par Carlos Fiolhais & José Luis Malaquias Lima.  
Lisboa, Portugal: Gradiva, 1991, 300 pp. & Rio de Janeiro, Brazil: Contraponto, 2003.
- Obiecte fractale.* Roumain par Florin Monteanu. Bucaresti: Nemira, 1998.
- Los objetos fractales: forma, azar y dimensión.*  
Espagnol par Josep Maria Llosa. Barcelona: Tusquets, 1987, 213 pp.
- B** *Fractals: Form, Chance and Dimension.*  
San Francisco, CA: W. H. Freeman and Company, 1977, xviii+265 pp.
- C** *WWW. The Fractal Geometry of Nature.*  
New York, NY: W. H. Freeman and Company, 1982, xii + 461 + xvi pp.
- Da Zi Ran De Feng Xing Gi He Xue.* Chinois par Yongmian Huang & Shouji Chen.  
Shanghai: Far East Publishers.1998, xvi + 16 + 574 pp.
- Die fraktale Geometrie der Natur.* Allemand par Reinhilt & Ulrich Zähle.  
Basel: Birkhäuser & Berlin: Akademie-Verlag, 1987, 491 + xvi pp.
- Fraktal Kikagaku.* Japonais dirigé par Heisuke Hironaka.  
Tokyo: Nikkei Science, 1984, 464 + xvi pp.
- Russe.* Izhevsk: Scientific Publishing Center. 2002.
- La geometria fractal de la naturaleza*  
Espagnol par Josep Maria Losa. Barcelona: Tusquets, 1997, 662 pp.

**LIVRES "SELECTA"**

- SE**     ***Fractals and Scaling in Finance: Discontinuity, Concentration, Risk.***  
New York: Springer, 1997, x+551 pp.
- SFE**    ***Fractales, hasard et finance (1959 - 1997).***  
Paris: Flammarion (Collection *Champs*), 1997, 246 pp.
- SN**     ***Multifractals and 1/f Noise: Wild Self-affinity in Physics.***  
New York: Springer.1999, viii + 442 pp.
- SH**     ***Gaussian Self-Affinity and Fractals: Globality, the Earth, 1/f, and R/S.***  
New York: Springer. 2002, ix + 654 pp.
- SC**     ***Fractals and Chaos: The Mandelbrot Set and Beyond.***  
New York: Springer. 2004, xii + 308 pp.
- SP**     ***Fractal and Multifractal Finance: Crashes and Long Dependence.***  
Open-ended web-book. 2004.
- SR**     ***Random Multifractals.***  
Open-ended web-book, 2004.
- SF**     ***Essais et portraits: essais sur les fractales et portraits d'hommes de science.***  
Open-ended web-book. 2004.



**ACTES DE CONGRÈS**

- a** ***Proceedings of the Gaithersburg Symposium on Fractals in the Physical Sciences.***  
*Journal of Statistical Physics* (Special Issue): **36**, Nos. 5/6.  
Edited by Michael F. Shlesinger, BBM & Robert J. Rubin.  
New York: Plenum, 1984, 400 pp.
- b** ***Fractal Aspects of Materials: Metal and Catalyst Surfaces, Powders and Aggregates.***  
*Extended Abstracts of a MRS Symposium held in Boston.*  
Edited by BBM & Dann E. Passoja. Pittsburgh PA: Materials Research Society, 1984, 47 pp.
- c** ***Fractal Aspects of Materials.***  
*Extended Abstracts of a MRS Symposium held in Boston.*  
Edited by Robert Laibowitz, BBM, & Dann E. Passoja.  
Pittsburgh PA: Materials Research Society, 1985, 127 pp.
- d** ***Fractals: Basic Concepts, Computation and Rendering.*** Edited by BBM.  
*Notes for a SIGGRAPH 85 Course.* San Francisco, CA; July 23, 1985.  
Association for Computing Machinery; Special Interest Group on Computer Graphics.
- d2** ***Fractals: Basic Concepts, Computations and Rendering.*** Variant of **d**, with additions and deletions.  
Notes for a Professional Development Seminar given in Boston, MA on March 3, 1986.  
Boston Chapters of Siggraph and ACM.
- e** ***Fractal Aspects of Materials II.*** *Extended Abstracts of a MRS Symposium held in Boston.*  
Edited by Dale W. Schaefer, Robert B. Laibowitz, BBM, & Samuel H. Liu.  
Pittsburgh PA: Materials Research Society, 1986, 148 pp.
- f** ***Ensembles fractals.*** Ecole d'hiver CEA - EDF - INRIA.  
Roquencourt (France) Jan. 1987, 340 pp.
- g** ***Fractal Aspects of Materials: Disordered Systems.*** *Extended Abstracts of a MRS Symposium held in Boston.*  
Edited by Alan J. Hurd, David A. Weitz, & BBM.  
Pittsburgh PA: Materials Research Society, 1987, 208 pp.
- h** ***Fractal Aspects of Materials: Disordered Systems.*** *Extended Abstracts of a MRS Symposium held in Boston.*  
Edited by David A. Weitz, Leonard M. Sander, & BBM.  
Pittsburgh PA: Materials Research Society, 1988, 356 pp.
- i** ***Fractals in Geophysics.*** Edited by Christopher H. Scholz & BBM.  
*Pure and Applied Geophysics* (Special Issue): **131**, Nos. 1/2.  
Boston MA & Basel, Switzerland: Birkhäuser, 1989.
- j** ***Fractals, Graphics, and Mathematics Education.*** Edited by Michael L. Frame & BBM.  
Washington DC: Mathematical Association of America  
& Cambridge UK: The University Press, 2002, xiii + 206pp.

**AUTRES LIVRES**

***Logique, langage et théorie de l'information*** (Léo Apostel, M, & Albert Morf).  
Paris: Presses Universitaires de France, 1957 vi+207 pp.

***La geometria fractal de la naturaleza.***

Milano: Imago (Montedison Progetto Cultura), 1987, 91 pp. Roma: Edizioni Theoria, 1989.

***Nel mondo dei frattali.*** Roma: Di Renzo Editore, 2001, 60 pp.

***The (Mis)behavior of Prices: A Fractal View of Risk, Ruin, and Return***  
(M & Richard L. Hudson). New York: Basic Books, Expected in 2004.

**PUBLICATIONS SCIENTIFIQUES AUTRES QUE LIVRES****AUTRES TRAVAUX****1951**

- 1 **WWW AS & K FE4**. M 1951. Adaptation d'un message sur la ligne de transmission, I & II. *Comptes Rendus* (Paris): **232**, 1638-1640 & 2003-2005.

**1952**

- 2 M 1952. Sur la notion générale d'information et la durée intrinsèque d'une stratégie. *Comptes Rendus* (Paris): **234**, 1346- 1348.
- 3 M 1952. Les démons de Maxwell. *Comptes Rendus* (Paris): **234**, 1842-1844.

**1953**

- 4 M 1953t. Contribution à la théorie mathématique des jeux de communication (Ph.D. Thesis). *Publications de l'Institut de Statistique de l'Université de Paris*: **2**, 1-124.
- 5 M 1953i. An informational theory of the statistical structure of language. *Communication Theory, the Second London Symposium*. Edited by Willis Jackson. London: Butterworth; New York: Academic, 486-504.

**1954**

- 6 M 1954w. Structure formelle des textes et communication (deux études). *Word*: **10**, 1-27.  
 • Corrections: *Word*: **11**, 1955, 424.  
 • English translation by Anthony G. Oettinger: *The formal structure of texts and communication (two studies)*: Cambridge, MA, Harvard Computation Laboratory, 1955.  
 • Czech translation: Komunikace a formální struktura textu. *Teorie informace a jazykoveda (=Information theory and linguistics)*, an anthology edited by Lubomir Dolozel. Prague: Press of the Czechoslovak Academy of Sciences, 1964, 130-150.  
 • Excerpt: *Le Langage*, anthologie dirigée par Robert Pagès. Paris: Hachette, 1959, 55-57.  
 • Summary: Information sans interprétation dans la description des langues réelles. *Synthèse*: **11**, 1959, 160-161.
- 7 M 1954. Simple games of strategy occurring in communication through natural languages. *Transactions of the IRE Professional Group on Information Theory*: **3**, 124-137.  
 • Traduction: *Jeux de stratégie se présentant dans la communication au moyen des langues naturelles*. Centre National des Télécommunications, Traduction **1049**, 1955.  
 • Abstract: Statistical macro-linguistics. *Supplemento di Nuovo Cimento*: **13**, 1959, 518-520.

**1955**

- 8 M 1955b. On recurrent noise limiting coding. *Information Networks, the Brooklyn Polytechnic Institute Symposium*. Edited by Ernst Weber. New York: Interscience, 205-221.  
 • Russian translation: O rekurrentnom kodirovanii, ogranichivayuschem vliyanie pomekh. *Teoriia informatsii (=Information Theory)*. Edited by W. Siforof. Moscow: 1957, 138-157.
- 9 M 1955. *Diagnostic en l'absence de bruit*. Institut de Statistique de Université de Paris. 1-73 (booklet).
- 10 M 1955t. Théorie de la précorrection des erreurs de transmission. *Annales des Télécommunications*: **10**, 122-134.

**1956**

- 11 **WWW.** M 1956c. La distribution de Willis-Yule, relative au nombre d'espèces dans les genres taxonomiques. *Comptes Rendus* (Paris): **242**, 2223-2225.
- 12 M 1956w. On the language of taxonomy: an outline of a thermo-statistical theory of systems of categories, with Willis (natural) structure. *Information Theory, the Third London Symposium*. Edited by Colin Cherry. London: Butterworth; New York: Academic, 135-145.
- 13 M 1956t. Exhaustivité de l'énergie d'un système, pour l'estimation de sa température. *Comptes Rendus* (Paris): **243**, 1835-1837.
- 14 M 1956m. A purely phenomenological theory of statistical thermodynamics: canonical ensembles. *IRE Transactions on Information Theory*: **112**, 190-203.

**1957**

- 15 M 1957b. Note on a law of J. Berry and on insistence stress. *Information and Control*: **1**, 76-81.  
• Russian translation: Zakon Berri i predelenie "udareniya". *Teoriia informatsii (=Information Theory)*. Edited by W. Siforof. Moscow: 1957, 248-254.
- 16 M 1957p. Théorie *mathématique de la loi d'Estoup-Zipf*. Institut de Statistique de l'Université de Paris, 1-80 (booklet).
- 17 M 1957t. *Application of thermodynamical methods in communication theory and in econometrics*. Institut Mathématique de l'Université de Lille.

**1958**

- 18 M 1958p. Les lois statistiques macroscopiques du comportement (rôle de la loi de Gauss et des lois de Paul Lévy). *Psychologie Française*: **3**, 237-249.

**1959**

- 19 M 1959s. A note on a class of skew distribution functions: Analysis and critique of a paper by H. A. Simon. *Information and Control*: **2**, 90-99.
- 20 **WWW AS FEP.** M 1959p. Variables et processus stochastiques de Pareto-Lévy et la répartition des revenus, I & II. *Comptes Rendus* (Paris): **249**, 613-615 & 2153-2155.
- 21 **WWW AS** M 1959g. Ensembles grand canoniques de Gibbs; justification de leur unicité basée sur la divisibilité infinie de leur énergie aléatoire. *Comptes Rendus* (Paris): **249**, 1464-1466.

**1960**

- 22 M 1960. Processus stochastiques à loi stable positive, permanents, markoviens et stationnaires (non additifs). *Comptes Rendus* (Paris): **250**, 451-453.
- 23 **E10.** M 1960i. The Pareto-Lévy law and the distribution of income. *International Economic Review*: **1**, 79-106.  
• Preliminary report: *Au sujet de la distribution de Pareto, relative à la distribution des revenus*. Faculté des Sciences de l'Université de Genève, 1956.

- Abbreviated reprint: *Mathematics and Social Science I: Proceedings of UNESCO Seminars* (Menthon-Saint-Bernard, 1960 and Gösing, 1962), compiled by Saul Sternberg and others. The Hague: Mouton & Co., 1965, 217-239.
- Privately circulated supplement: *Additional note on the distribution of income*.
- Reprint: *Vilfredo Pareto: Critical Assessments*, Edited by John C. Wood & Michael McLure London: Routledge, 1999, **IV**, 155-182.
- Reprint: *Income Distribution*, Edited by Michael Sattinger. *The International Library of Critical Writings in Economics*; Series Editor: Mark Blaug, Edward Elgar, 2000 Cheltenham, UK.

**1961**

- 24 M 1961b. On the theory of word frequencies and on related markovian models of discourse. *Structure of Language and its Mathematical Aspects* (New York, 1960). Edited by Roman Jakobson (Symposia in Applied Mathematics **XII**). Providence, R.I.: American Mathematical Society, 190-219.
- Abbreviated reprint: *Mathematics and Social Science*, (Menthon-Saint Bernard, 1960 & Gösing, 1962) 1965, 241-256.
  - Summary: Discussion of a paper by Prof. N. F. Ramsey. *Symposium on Critical Review of Thermodynamics* (Pittsburgh PA), Edited by Edward B. Stuart, Benjamin Gal-Or & Alan J. Brainard. Baltimore, MD, Mono Book Corp. 1970, 230-232.
- 25 M 1961s. Final note on a class of skew distribution functions (with a post-script). *Information and Control*: **4** 198-216 & 300-304.
- 26 **E11**. M 1961e. Stable Paretian random functions and the multiplicative variation of income. *Econometrica*: **29**, 517-543.
- Reprint: *Vilfredo Pareto: Critical Assessments*, Edited by John C. Wood & Michael McLure. London: Routledge, 1999, **IV**, 183-209.

**1962**

- 27 **E12**. M 1962q. Paretian distributions and income maximization. *Quarterly Journal of Economics*; **76**, 57-85.
- Reprint: *Vilfredo Pareto: Critical Assessments*, Edited by John C. Wood & Michael McLure. London: Routledge, 1999, **IV**, 210-240.
- 28 **WWW AS FE9**. M 1962c. Sur certains prix spéculatifs: faits empiriques et modèle basé sur les processus stables additifs de Paul Lévy. *Comptes Rendus* (Paris): **254**, 3968-3970.
- 29 M 1962t. The role of sufficiency and estimation in thermodynamics. *The Annals of Mathematical Statistics*: **33**, 1021-1038.
- Reprint: *Thermodynamics, a Unifying Science*. Edited by George N. Hatsopoulos & Joseph H. Keenan. Cambridge, MA: MIT Department of Mechanical Engineering, 1964.

**1963**

- 30 Jay M. BERGER & M 1963. **N6**. A new model for the clustering of errors on telephone circuits, *IBM Journal of Research And Development*: **7**, 224-236.
- 31 **E10**. M 1963i. The stable Paretian income distribution, when the apparent exponent is near two. *International Economic Review*: **4**, 111-115.
- Reprint: *Vilfredo Pareto: Critical Assessments*, Edited by John C. Wood & Michael McLure. London: Routledge, 1999, **IV**, 236-240.
- 32 **WWW K & P. E3**. M 1963e. New methods in statistical economics. *The Journal of Political Economy*: **71**, 421-440.

- Reprint: *Bulletin of the International Statistical Institute, 34th Session, Ottawa: 40*, (book 2), 1964, 699-720.
- Reprint: *Vilfredo Pareto: Critical Assessments*, Edited by John C. Wood & Michael McLure. London: Routledge, 1999, **IV**, 241-263.
- Reprint: *Forecasting Financial Markets*. Edited by Terence C. Mills. *The International Library of Critical Writings in Economics*. Series Editor: Mark Blaug. Cheltenham, UK: Edward Elgar, 2002.

- 33 **WWW K & P. E14.** M 1963b. The variation of certain speculative prices. *The Journal of Business of the University of Chicago: 36*, 394-419.
- Photographic reprint followed by discussions by Eugene F. Fama and Paul H. Cootner: *The Random Character of Stock Market Prices*. Edited by Paul H. Cootner. Cambridge, MA: MIT Press, 1964, 297-337.
  - **E14.** Separately published abstract: *Econometrica: 31*, 1963, 757-758.
  - **E14.** Addendum: Linear regression with non-normal error terms: a comment. *Review of Economics and Statistics: 53*, 1971, 205.
  - Addendum: Correction of an error in "The variation of certain speculative prices". *Journal of Business of the University of Chicago: 45*, 1972, 542-543.
  - Citation Classic. *Current Contents: 14*, 1982, 20.
  - Photographic reprint: *Futures Markets*. Three volumes edited by A. G. Malliaris. Cheltenham UK: Edward Elgar, 1996. **2**, 173-198.
  - Reprint: *Classic Futures: Lessons from the Past for the Electronic Age*. Edited by Lester Telser. London: Risk Books. 2000, 649-683.

## 1964

- 34 M 1964t. On the derivation of statistical thermodynamics from purely phenomenological principles. *Journal of Mathematical Physics: 5*, 164-171.
- Reprint: *Thermodynamics, a Unifying Science*. Edited by George N. Hatsopoulos & Joseph H. Keenan. Cambridge, MA: MIT Department of Mechanical Engineering, 1964.
  - Summary: Discussion of a paper by Prof. R. E. Collins. *Symposium on Critical Review of Thermodynamics* (Pittsburgh PA). Edited by Edward B. Stuart, Benjamin Gal-Or & Alan J. Brainard. Baltimore, MD: Mono Book Corp., 1970, 32-34.
- 35 George L. GERSTEIN & M 1964. Random walk models for the spike activity of a single neuron. *The Biophysical Journal: 4*, 41-68.
- 36 **E8.** M 1964o. Random walks, fire damage amount, and other Paretian risk phenomena. *Operations Research: 12*, 582-585.

## 1965

- 37 **N7.** M 1965c. Self-similar error clusters in communications systems and the concept of conditional stationarity. *IEEE Transactions on Communications Technology: COM-13*, 71-90.
- 38 **WWW AS FEP. H9.** M 1965h. Une classe de processus stochastiques homothétiques à soi. Application à la loi climatologique de H. E. Hurst. *Comptes Rendus (Paris): 260*, 3274-3277.
- 39 M 1965s. Leo Szilard and unique decipherability. *IEEE Transactions on Information Theory: IT-11*, 455-456.
- 40 **WWW AS N11.** M 1965. Ensembles de multiplicité aléatoires (Jean-Pierre Kahane & M). *Comptes Rendus (Paris): 262*, 3931-3933.
- 41 M 1965m. Very long-tailed probability distributions and the empirical distribution of city sizes. *Mathematical Explorations in Behavioral Science* (Cambria Pines CA, 1964). Edited by Fred Massarik & Philburn Ratoosh. Homewood, Ill.: R. D. Irwin, 322-332.

- Expanded version: *Mathematics and Social Sciences* (Menthon-Saint-Bernard, 1960 and Gsing, 1962). The Hague: Mouton 1965, 257-278.

- 42 M 1965z. Information theory and psycholinguistics. *Scientific Psychology: Principles and Approaches*. Edited by Benjamin B. Wolman & Ernst Nagel. New York: Basic Books, 550-562.
- Reprint with new appendices: Information theory and psycholinguistics: a theory of word frequencies. *Readings in Mathematical Social Science*. Edited by Paul Lazarfeld and Neil Henry. Chicago: Science Research Associates, 1966 (hard cover); Cambridge, MA, MIT Press, 1968 (paperback), 350-368.
  - Reprint: Information theory and psycholinguistics. *Language, selected readings*. Edited by R. C. Oldfield & J. C. Marshall. London: Penguin Books, 1968, 263-275.
  - Russian translation: Teoria informatsii i psikholingvistika: Teoria častov slov. *Matematiskie metody v sotsial'nykh naukakh*. Moskva 1973.
  - **WWW. F. FE4**. French translation: Aléas du discours.

## 1966

- 43 **WWW. P. E19**. M 1966b. Forecasts of future prices, unbiased markets and "martingale" models. *The Journal of Business of the University of Chicago*: **39**, 242-255.
- Reprint: *Forecasting Financial Markets*. Edited by Terence C. Mills. *The International Library of Critical Writings in Economics*. Series Editor: Mark Blaug. Cheltenham, UK: Edward Elgar, 2002.
- 44 M 1966r. Nouveaux modèles de la variation des prix (cycles lents et changements instantanés). *Cahiers du Séminaire d'Econométrie*: **9**, 53-66.
- Abstract: Stochastic models of the variation of prices. *Working Conference on Stochastic Processes* (Santa Barbara CA, 1967). Edited by Mark Kac & Gordon McDonald.

## 1967

- 45 **N10**. M 1967b. Sporadic random functions and conditional spectral analysis; self-similar examples and limits. *Proceedings of the Fifth (1965) Berkeley Symposium on Mathematical Statistics and Probability*. Edited by Lucien LeCam & Jerzy Neyman. Berkeley, California: University of California Press, **3**, 155-179.
- 46 **N9**. M 1967i. Some noises with  $1/f$  spectrum, a bridge between direct current and white noise. *IEEE Transactions on Information Theory*: **IT-13**, 289-298.
- Abstract: Electro-magnetic turbulence in communication systems. *Proceedings of the International Conference on Microwaves, Circuit Theory and Information Theory* (Tokyo, 1964). Edited by K. Morita. 1964, **3**, 43-53.
  - Abstract: Time varying channels,  $1/f$  noises and the infrared catastrophe. Or: Why does the low frequency energy sometimes seem infinite. *Convention Record of the First IEEE Communications Convention*, 1965.
  - Abstract: Sporadic processes and their application to noise theory. *Working Conference on Stochastic Processes* (Santa Barbara CA), 1967. Edited by Mark Kac & Gordon McDonald.
- 47 **WWW K**. M 1967s. How long is the coast of Britain? Statistical self-similarity and fractional dimension. *Science*: **156**, 636-638.
- 48 **WWW P. E15**. M 1967j. The variation of some other speculative prices. *The Journal of Business of the University of Chicago*: **40**, 393-413.
- Reprint: *Classic Futures: Lessons from the Past for the Electronic Age*. Edited by Lester Telser. London: Risk Books. 2000, 685-708.

- 49 **N12.** M 1967k. Sporadic turbulence. *Proceedings of the International Symposium on Boundary Layers and Turbulence including Geophysical Applications*. Supplement to *The Physics of Fluids*: **10**, S302-3.  
 • Announcement: Uniformly self-similar sporadic turbulence. *Notes on the Summer Study Program in Geophysical Fluid Mechanics* (Woods Hole Oceanographical Institute), 1965, 118-121.
- 50 **WWW. E21.** M & Howard M. TAYLOR 1967. On the distribution of stock price differences. *Operations Research*: **15**, 1057-1062.  
 • Variant: Some aspects of the random-walk model of stock market prices: Comment. *International Economic Review*: **9**, 1968, 258-259.

**1968**

- 51 **H10.** M & James R. WALLIS 1968. Noah, Joseph and operational hydrology. *Water Resources Research*: **4**, 909-918.  
 • Illustrated variant: Self-similar synthetic hydrology (James R. Wallis & M). *Symposium on the Use of Analog and Digital Computers in Hydrology* (Tucson AZ, 1968). Publication 81 of the *International Association of Scientific Hydrology*: **2**, 1968, 738-755.  
 • Elaboration in reply to a question: Reply to Professor Quimpo (M & James R. Wallis). *Discussion of the 1968 Tucson Symposium, Bulletin of the International Association of Scientific Hydrology*: **14**, 1969, 58-60.  
 • Abstract: Self-similar synthetic hydrology (M & James R. Wallis). *Summaries of Contributed Papers, European Meetings of IMS, TIMS, ES and IASPS*, Amsterdam: The Mathematical Center, 1968.  
 • Elaboration in reply to a published comment: Reply to Mr. Alexander (M & James R. Wallis). *Water Resources Research*: **5**, 1969, 917-920.  
 • Elaboration in reply to a published comment: Comment on "Stochastic models in hydrology" by A.E. Scheidegger. *Water Resources Research*: **6**, 1970, 1791.  
 • Elaboration in reply to an oral comment: Notes on the definition and the stationarity of fractional Gaussian noise. *Journal of Hydrology*: **30**, 1976, 407-409.
- 52 **WWW K. H11.** M & John W. VAN NESS 1968. Fractional Brownian motions, fractional noises and applications. *SIAM Review*: **10**, 422-437.
- 53 • Critique of a would-be improvement: On an eigenfunction expansion and on fractional Brownian motions. *Lettere al Nuovo Cimento*: **33**, 1982, 549-550.

**1969**

- 54 **WWW M. N13.** M 1969b. On intermittent free turbulence. *Turbulence of Fluids and Plasmas*. Polytechnic Institute of Brooklyn, April 1968. Edited by Ernst Weber. New York: Interscience.  
 • The geometry of turbulence. *Conference on Prospects for Theoretical Turbulence Research*, N. C. A. R., Boulder, Colo., June 14-20, 1974, 9-12.
- 55 M 1969e. Long-run linearity, locally Gaussian processes, H-spectra and infinite variances. *International Economic Review*: **10**, 82-111.  
 • Abstract: Intermittency and periodicity, and the problem of long cycles. *Econometrica*: **34**, 1966 (Supplement) 152-153.
- 56 **H12,13,14.** M & James R. WALLIS 1969. Computer experiments with fractional Gaussian noises. *Water Resources Research*: **5**, 228-267.
- 57 **H27.** M & James R. WALLIS 1969. Some long-run properties of geophysical records. *Water Resources Research*: **5**, 321-340.



- Edited reprint: *Fractal Geometry and its Use in the Earth Sciences*. Edited by Christopher C. Barton & Paul R. LaPointe. New York: Plenum, 1994, pp. 41-64.

58 **WWW K. H25.** M & James R. WALLIS 1969. Robustness of the rescaled range  $R/S$  in the measurement of noncyclic long-run statistical dependence. *Water Resources Research*: **5**, 967-988.

## 1970

59 **H28.** M & Keith MCCAMY 1970. On the secular pole motion and the Chandler wobble. *The Geophysical Journal*, **21**: 217-232.

- Abstract: On the secular pole motion and the Chandler wobble (M & Keith McCamy). *Eos, Transactions of the American Geophysical Union*: **57**, 1970, 266.

60 **WWW P.** M 1970e. Statistical dependence in prices and interest rates. *Papers of the Second World Congress of the Econometric Society*, Cambridge, England.

- Summary: Analysis of long-run dependence in time series: the  $R/S$  technique. *Fiftieth Annual Report of the National Bureau of Economic Research*, 1970, 107-108.
- Abstract progress report: Long-run interdependence in price records and other economic time series. *Econometrica*: **38**, 1970, 122-123.
- Reprint of Part I: Statistical dependence in prices and interest rates. *Fifty-first Annual Report of the National Bureau of Economic Research*, 1971, 141-142.
- Revised Part II: Analysis of non-periodic long-run dependence using the robust statistic  $R/S$ . *Proceedings of the 1971 Princeton Conference on Information Sciences and Systems*, 155-159.
- Analysis of long-run dependence in economics: the  $R/S$  technique. *Econometrica*: **39**, 1971 (July Supplement), 68-69.

## 1971

61 **H15.** M 1971f. A fast fractional Gaussian noise generator. *Water Resources Research*: **7**, 543-553.

62 **E20.** M 1971e. When can price be arbitrated efficiently? A limit to the validity of the random-walk and martingale models. *Review of Economics and Statistics*: **53**, 225-236.

## 1972

63 M 1972z. Renewal sets and random cutouts. *Zeitschrift für Wahrscheinlichkeitstheorie*: **2**, 145-157.

64 M 1972d. On Dvoretzky coverings for the circle. *Zeitschrift für Wahrscheinlichkeitstheorie*: **22**, 158-160.

65 **WWW K & M. N14.** M 1972i. Possible refinement of the lognormal hypothesis concerning the distribution of energy dissipation in intermittent turbulence. *Statistical Models and Turbulence* (La Jolla, California). Edited by Murray Rosenblatt & Charles Van Atta (Lecture Notes in Physics **12**). New York: Springer, 333-351.

66 M 1972c. Statistical methodology for non-periodic cycles: from the covariance to  $R/S$  analysis. *Annals of Economic and Social Measurement*: **1**, 257-288.

- Advance summary: Comment on "Application of linear random models to four annual streamflow series" by Carlson, MacCormick, & Watts. *Water Resources Research*: **7**, 1971, 1360-1362.

- 67 **H16.** M 1972w. Broken line process derived as an approximation to fractional noise. *Water Resources Research*: **8**, 1354-1356.

**1973**

- 68 **H29.** Frederick J. DAMERAU & M 1973. Tests of the degree of word clustering in samples of written English. *Linguistics*: **102**, 58-75.
- 69 **WWW. P.** M 1973c. Comments on "A subordinated stochastic process model with finite variance for speculative prices." by Peter K. Clark. *Econometrica*: **41**, 157-160.
- 70 M 1973f. Formes nouvelles du hasard dans les sciences. *Économie Appliquée*: **26**, 307-319.  
• Expanded version: Du hasard bénin au hasard sauvage. *Le hasard (Dossier Pour la Science)* Paris: Belin, 1996, 12-17.

**1974**

- 71 **WWW K. N15.** M 1974f. Intermittent turbulence in self-similar cascades; divergence of high moments and dimension of the carrier. *Journal of Fluid Mechanics*: **62**, 331-358.  
• Excerpt: *The Wolf Prizes for Physics*. Edited by T.W.B. Kibble. Singapore, World Scientific, 2003.
- 72 **WWW AS & M. N16.** M 1974c. Multiplications aléatoires itérées et distributions invariantes par moyenne pondérée aléatoire, I & II. *Comptes Rendus (Paris)*: **278A**, 289-292 & 355-358.
- 73 **N8.** M 1974d. A population birth and mutation process, I: Explicit distributions for the number of mutants in an old culture of bacteria. *Journal of Applied Probability*: **11**, 437-444.  
• Complement: A population birth and mutation process, II: Explanations, figures and numerical illustrations. Privately distributed memorandum.

**1975**

- 74 **H26.** M 1975z. Limit theorems on the self-normalized range for weakly and strongly dependent processes. *Zeitschrift für Wahrscheinlichkeitstheorie*: **31**, 271-285.
- 75 **WWW. AS. H17.** M 1975b. Fonctions aléatoires pluri-temporelles: approximation poissonienne du cas brownien et généralisations. *Comptes Rendus (Paris)*: **280A**, 1075-1078.
- 76 **WWW K. H18.** M 1975f. On the geometry of homogeneous turbulence, with stress on the fractal dimension of the isosurfaces of scalars. *Journal of Fluid Mechanics*: **72**, 401-416.
- 77 **WWW K. H19.** M 1975w. Stochastic models for the Earth's relief, the shape and the fractal dimension of the coastlines, and the number-area rule for islands. *Proceedings of the National Academy of Sciences (USA)*: **72**, 3825-3828.
- 78 **WWW AS** M 1975u. Sur un modèle décomposable d'Univers hiérarchisé: déduction des corrélations galactiques sur la sphère céleste. *Comptes Rendus (Paris)*: **280A**, 1551-1554.
- 79 **FE 2.2.** M 1975m. Hasards et tourbillons (quatre contes à clef). *Annales des Mines*: 61-66.

**1976**

- 80 **WWW AS N19**. M 1976c. Géométrie fractale de la turbulence. Dimension de Hausdorff, dispersion et nature des singularités du mouvement des fluides. *Comptes Rendus* (Paris): **282A**, 119-120.
- 81 **WWW M N18**. M 1976o. Intermittent turbulence and fractal dimension: kurtosis and the spectral exponent  $5/3+B$ . *Turbulence and Navier Stokes Equations (Orsay, 1975)*. Edited by Roger Temam (Lecture Notes in Mathematics **565**). New York: Springer, 121-145.  
 • Brief variant: Comment on coherent structures: *Proceedings of the IUTAM Symposium on Turbulence and Chaotic Phenomena in Fluids*. Edited by Tomomasa Tatsumi, Amsterdam: North-Holland, 1984, 207-208.

**1977**

- 82 **WWW M**. 1977b. Fractals and turbulence: attractors and dispersion. *Seminar on Turbulence, Berkeley 1976*. Organized by Alexandre Chorin, Jerald Marsden & Stephen Smale. Edited by P. Bernard & T. Ratiu (Lecture Notes in Mathematics **615**). New York: Springer, 83-93.  
 • Russian translation: *Strannye Atraktory (=Strange Attractors)*. Collection of reprints edited by Yakov G. Sinai & L. P. Silnikova. Moscow: Mir Publishers, 1981, 47-57.  
 • Elaboration of some points: Fractals, attractors, and the fractal dimension. *Bifurcation Theory and Applications in Scientific Disciplines* (New York, 1977). Edited by Okan Gurel & Otto Rossler. *Annals of the New York Academy of Sciences*: **316**, 1979, 463-464.

**1978**

- 83 M 1978b. The fractal geometry of trees and other natural phenomena. *Geometrical Probability and Biological Structures: Buffon's 100th Anniversary Conference (Paris, 1977)*. Edited by Roger Miles & Jean Serra (Lecture Notes in Biomathematics **23**). New York: Springer, 235-249.
- 84 **WWW M M** 1978h. Geometric facets of statistical physics: scaling and fractals. *Statistical Physics 13, International IUPAP Conference (Haifa, 1977)*. Edited by D. Cabib, C.G. Kuper & I. Riess. *Annals of the Israel Physical Society*. Bristol: Adam Hilger. **2** (1), 225-233.
- 85 M 1978r. Les objets fractals. *La Recherche*: **9**, 85, 1-13.  
 • Excerpt: Les facettes fractales de l'anatomie. *La morphogenèse, de la biologie aux mathématiques*. Edited by Yves Bouligand. Paris: Doin-Maloine, 1980, 83-89.  
 • Frontispiece with caption: *Impact of Science on Technology* (UNESCO): **29**, July 1979.
- 86 **WWW AS**. M 1978c. Colliers aléatoires et une alternative aux promenades au hasard sans boucle: les cordonnets discrets et fractals. *Comptes Rendus* (Paris): **286**, 933-936.

**1979**

- 87 **WWW AS**. M 1979u. Corrélations et texture dans un nouveau modèle d'Univers hiérarchisé, basé sur les ensembles trémas. *Comptes Rendus* (Paris): **288**, 81-83.
- 88 M & Murad S. TAQQU 1979. Robust *R/S* analysis of long-run serial correlation. *Bulletin of the International Statistical Institute: 42nd Session, Manila*, **46** (book 2), 79-104.

**1980**

- 89 Yuval GEFEN, M, & Amnon AHARONY 1980. Critical phenomena on fractals. *Physical Review Letters*: **45**, 855-858.

- Abstract: Ising models on fractal lattice (Yuval Gefen, M, & Amnon Aharony). *Proceedings of the XIVth International Conference on Thermodynamics and Statistical Mechanics (Statphys 14)*, August 1980, Edmonton, Alberta, Canada.
- Variant: Critical phenomena and fractals with dimensionality near 1 (Yuval Gefen, M, & Amnon Aharony). *Physics in One Dimension*. Edited by J. Bernasconi & T. Schneider, New York: Springer, 1980.

- 90 **WWW K. C3.** M 1980n. Fractal aspects of the iteration of  $z \rightarrow \lambda z (1-z)$  for complex  $\lambda$  and  $z$ . *Non-Linear Dynamics* (New York, 1979). Edited by Robert H. G. Helleman. *Annals of the New York Academy of Sciences*: **357**, 249-259.
- Abstract: Non-linear random dynamics and fractal attractors. *Proceedings of the XIVth International Conference on Thermodynamics and Statistical Mechanics (Statphys 14)*, August 1980, Edmonton, Alberta, Canada.
  - Letter to the Editor. *Scientific American*: July 1982, 8.
  - Excerpt: A fractal attractor, and why it may matter. *Physics as Natural Philosophy: A Festschrift for Laszlo Tisza*. Edited by Herman Feshbach & Abner Shimony, Cambridge, MA: MIT Press, 1982, front jacket and pp. 3-6.
  - Excerpt: *The Wolf Prizes for Physics*. Edited by T.W.B. Kibble. Singapore: World Scientific, 2003.

### 1981

- 91 M 1981s. Scalebound or scaling shapes: A useful distinction in the visual arts and in the natural sciences. *Leonardo*: **14**, 1981, 45-47.
- 92 Yuval GEFEN, Amnon AHARONY, M, & Scott KIRKPATRICK 1981. Solvable fractal family, and its possible relation to the backbone at percolation, *Physical Review Letters*: **47**, 1771-1774.
- Early version: Percolation, critical phenomena and fractals (Yuval Gefen, Amnon Aharony, M, & Scott Kirkpatrick). *Disordered Systems and Localization* (Roma, 1981, Lecture Notes in Physics **149**). Edited by C. Castellani, C. DiCastro & L. Peliti. New York: Springer, 1981, 56-58.

### 1982

- 93 M 1982f. Comments on computer rendering of fractal stochastic models. *Communications of the Association for Computing Machinery*: **25**, cover and pp. 581-584.
- Reprint: **Book d**.

### 1983

- 94 **C18.** M 1983i. Fractal curves osculated by sigma-discs, and construction of self-inverse limit sets. *Mathematical Intelligencer*: **5** (2), Front and back covers and pp. 9-17.
- Excerpt: Self-inverse fractals and Kleinian groups. *Mathematics Calendar* for 1981, New York: Springer, 1980.
- 95 Yuval GEFEN, Yigal MEIR, M, & Amnon AHARONY 1983. Geometric implementation of hypercubic lattices with noninteger dimensionality, using low lacunarity fractal lattices. *Physical Review Letters*: **50**, 145-148.
- Reprint: *The Wolf Prizes for Physics*. Edited by T.W.B. Kibble. Singapore: World Scientific, 2003.
- 96 James A. GIVEN & M 1983. Diffusion on fractal lattices and the fractal Einstein relation. *Journal of Physics*: **A16**, L565-569.
- Elaboration: Comment on transport processes on fractal structures (James A. Given and M.) *Journal of Physics*: **A17**, 1984, 1937-1939.
- 97 **C5.** M 1983p. On the quadratic mapping  $z \rightarrow z^2 - \mu$  for complex  $\mu$  and  $z$ :

the fractal structure of its  $M$ -set, and scaling. *Physica*: **D7**, 1983, 224-239.

- Reprint in *Order in Chaos*. Edited by David Campbell & Harvey Rose, Amsterdam: North-Holland, 1983.

- 98 Jean VOLDMAN, M, Lee W. HOEVEL, Joshua KNIGHT, & Philip ROSENFELD 1983. Fractal nature of software-cache interaction. *IBM Journal of Research and Development*: **27**, 164-170.
- Reprint in *CMG Transactions*: **88**, 55-60. Westmont, IL: Computer Measurement Group.
- 99 Yuval GEFEN, Amnon AHARONY, & M 1983. Phase transitions on fractals: I. Quasi-linear lattices. *Journal of Physics*: **A16**, 1267-1278.

## 1984

- 100 Yuval GEFEN, Amnon AHARONY, M, & Yonathan SHAPIR 1984. Phase transitions on fractals: II. Sierpinski gaskets. *Journal of Physics*: **A17**, 435-444.
- 101 Yuval GEFEN, Amnon AHARONY, & M 1984. Phase transitions on fractals: III. Infinitely ramified lattices. *Journal of Physics*: **A17**, 1277-1289.
- 102 M, Dann E. PASSOJA, & Alvin J. PAULLAY 1984. The fractal character of the fracture surfaces of metals. *Nature*: **308**, 721-722.
- Abbreviated text: **Book b**, 7-9.
- 103 **WWW M M** 1984e. Fractals in physics: squig clusters, diffusions, fractal measures and the unicity of fractal dimension. *Statistical Physics 15, International IUPAP Conference* (Edinburgh, 1983). Edited by David Wallace & Alistair Bruce. *Journal of Statistical Physics*: **34**, 895-930.
- Excerpt: Each fractal set has a unique fractal dimension. *Proceedings of the IUTAM Symposium on Turbulence and Chaotic Phenomena in Fluid* (Kyoto, 1983). Edited by Tomomasa Tatsumi, Amsterdam: North-Holland, 1984, 203-206.
  - Illustration: On the aggregative fractals called squigs, which include recursive models of polymers and of percolation clusters. *Kinetics of Aggregation and Gelation* (Athens, Georgia, April 1984). Edited by Fereydoon Family & David P. Landau. Amsterdam: North-Holland, 1984, 5-7.
- 104 M & James A. GIVEN 1984. Physical properties of a new fractal model of percolation clusters. *Physical Review Letters*: **52**, 1853-1856.
- 105 M 1984f. Squig sheets and some other squig fractal constructions, followed by Comment on the equivalence between fracton/spectral dimensionality and the dimensionality of recurrence. *Journal of Statistical Physics*: **36**, 519-545 (= **Book a.**)
- 106 **C13 M** 1984k. On the dynamics of iterated maps VIII: The map  $z \rightarrow \mu(z + 1/z)$  from linear to planar chaos, and the measurement of chaos. Edited by Yoshiki Kuramoto, New York: Springer, 32-41. *Chaos and Statistical Methods* (Kyoto Summer Institute, 1983).
- 107 M 1984w. On fractal geometry and a few of the mathematical questions it has raised. *Proceedings of the International Congress of Mathematicians* (Warsaw 1983). Edited by Zbigniew Ciesielski, Warsaw: PWN and Amsterdam: North-Holland, 1661-1675.
- Extensively revised second edition: Unanswered questions raised by fractal geometry. *Physics and Geometry* (Barcelona, 1996). Edited by Sebastià Xambó & David Jou. Barcelona: Institut d'Estudis Catalans, 1999, 161-176.
  - **WWW**. Extensively revised third edition: Some mathematical questions arising in fractal geometry. *Development of Mathematics 1950-2000*. Edited by Jean-Paul Pier. Basel: Birkhäuser, 2000, 795-811.
  - Extensively revised fourth edition: Topics on fractals in mathematics and physics. *Challenges for the 21<sup>st</sup> Century; Fundamental Science. Mathematics and Theoretical Physics*

(Singapore, 2000). Edited by Louis H.Chen, J. Packer Jesudason, C.H. Lai, C.H. Oh, K.K. Phua, & Eng-Chye Tan. Singapore: World Scientific, 2001, 461-478.

- Extensively revised fifth edition. Topics in mathematics, physics, and finance originating in fractal geometry. *Fractal 2004: Complexity and Fractals in Nature*. Edited by Miroslav Novak. Singapore: World Scientific, 2004.

## 1985

- 108 **C11.** M 1985n. Continuous interpolation of the complex discrete map:  $z \rightarrow \lambda z (1 - z)$  and related topics (On the dynamics of iterated maps, IX). *Nobel Foundation Symposium 59 on the Physics of Chaos*. Edited by Nils R. Nilsson, *Physica Scripta*: **T9**, 59-63.
- 109 M, Yuval GEFEN, Amnon AHARONY, & Jacques PEYRIÈRE 1985. Fractals, their transfer matrices and their eigen-dimensional sequences. *Journal of Physics*: **A18**, 335-354.  
  - Variant: Partial dimensional sequences and percolation (M, Yuval Gefen, Amnon Aharony & Aharon Kapitulnik). *Journal of Statistical Physics*: **36**, 1984, 827-830.
- 110 M 1985. Fractal properties of rain, and a fractal model (Shaun Lovejoy & M). *Tellus*: **A 37**, 209-232. • Reprints: **Books d** and **d2**.
- 111 **C6,7,8,9,10.** M 1985g. On the dynamics of iterated maps. Paper III: The individual molecules of the M-set self-similarity properties, the  $N^{-2}$  rule, and the  $N-2$  conjecture. Paper IV: The notion of "normalized radical" R, and the fractal dimension of the boundary of R. Paper V: Conjecture that the boundary of the M-set has a fractal dimension equal to 2. Paper VI: Conjecture that certain Julia sets include smooth components. Paper VII: Domain-filling ("Peano") sequences of fractal Julia sets, and an intuitive rationale for the Siegel discs. *Chaos, Fractals and Dynamics*. Edited by Pal Fischer & William Smith. New York: Marcel Dekker, 213-253.
- 112 M 1985. Topics on the midpoint displacement technique and its application to model reliefs and coastlines. • Reprint: **Book b**.
- 113 **H21.** M 1985l. Self-affine fractals and fractal dimension. *Physica Scripta*: **32**, 257-260.  
  - Reprint: *Dynamics of Fractal Surfaces*. Edited by Fereydoon Family & Tamas Vicsek. Singapore: World Scientific, 1991, 11-20.
  - Shortened reprint: **Book c**, 61-63.

## 1986

- 114 **WWW K. H22, 23, 24.** M 1986t. Self-affine fractal sets, I: The basic fractal dimensions, II: Length and area measurements, III: Hausdorff dimension anomalies and their implications. *Fractals in Physics* (Trieste, 1985). Edited by Luciano Pietronero & Erio Tosatti, Amsterdam: North-Holland, 3-28.  
  - Reprint of Part I: *Dynamics of Fractal Surfaces*. Edited by Fereydoon Family & Tamas Vicsek. Singapore: World Scientific, 1991, 21-36.
- 115 **WWW M** 1986. Fractal measures (their infinite moment sequences and dimensions) and multiplicative chaos: early works and open problems. *Dimensions and Entropies in Dynamical Systems* (Pecos River NM, 1985). Edited by Gottfried Mayer-Kress, New York: Springer, 19-27.  
  - Letter to the Editor: Multifractals and fractals. *Physics Today*: September 1986, 11-12.
  - Multifractal measures: **Book g**, 84-91.

## 1987

- 116 **WWW.** M 1987r. Towards a second stage of indeterminism in science (preceded by historical reflections). *Interdisciplinary Science Reviews*: **12**, 117-127.

- Abstract: The epistemology of chance in certain newer sciences. *International Congress on Logic, Methodology and the Philosophy of Science* (Jerusalem 1964). Abstracts edited by Yehoshua Bar-Hillel, Amsterdam: North-Holland, 1966, 57.

**1988**

- 117 **C20.** Martin C. GUTZWILLER & M 1988. Invariant multifractal measures in chaotic Hamiltonian systems, and related structures. *Physical Review Letters*: **60**, 673-676.
- 118 **H20.** M 1988p. Fractal landscapes without creases and with rivers. *The Science of Fractal Images*. Edited by Heinz-Otto Peitgen & Dietmar Saupe, New York: Springer, 243-260.
- 119 M 1988c. An introduction to multifractal distribution functions. *Fluctuations and Pattern Formation* (Cargèse, 1988). Edited by H. Eugene Stanley and Nicole Ostrowsky, Dordrecht-Boston: Kluwer, 345-360.
- Shorter version: The principles of multifractal measures. *The Fractal Approach to Heterogeneous Chemistry*. Edited by David Avnir, New York: Wiley, 1989, 45-51.
  - Revised version: Multifractal measures for the geophysicist: **Book h**.

**1989**

- 120 M 1989t. The fractal range of the distribution of galaxies: crossover to homogeneity and multifractals. *Large-scale Structure and Motions in the Universe* (Trieste, 1988). Edited by Fabio Mardirossian, M. Mezzetti & Dennis Sciama, Dordrecht-Boston: Kluwer, 259-279.
- Short version: Fractal large scale structures and crossover to homogeneity. *The Structure of the Universe* (Balatonfüred, Hungary, 1987). Edited by Jean Audouze, Marie-Christine Pelletan, & Alex Szalay. Dordrecht-Boston: Kluwer, 1988, 482-484.
  - Very short version: Galaxy distribution and fractals. *Observational Cosmology: from Galaxies to Galaxy Systems* (Sesto, 1995). Edited by Fabio Mardirossian. *Astrophysical Letters and Communications*: **36**, 1996, 1-5.
- 121 M 1989p. Temperature fluctuations: a well-defined and unavoidable notion. *Physics Today*, 71-73.
- 122 M & Tamas VICSEK 1989. Directed recursive models for fractal growth. *Journal of Physics*: **A22**, L377-L383.
- 123 **WWW M.** M 1989g. Multifractal measures, especially for the geophysicist: *Pure and Applied Geophysics*: **131**, 5-42. Also **Book i**.
- Brief excerpt: *Annual Reviews of Materials Sciences*: **19**, 1989, 514-516.
- 124 **WWW M.** M 1989e. A class of multifractal measures with negative (latent) values for the "dimension"  $f(a)$ . *Fractals' Physical Origin and Properties* (Erice, 1988). Edited by Luciano Pietronero, New York: Plenum, 3-29.
- Short version: Negative fractal dimensions and multifractals. *Statistical Physics 17, International IUPAP Conference* (Rio de Janeiro, 1989). Edited by Constantino Tsallis, *Physica*: **A163**, 1990, 306-315.
  - Updated short version: Two meanings of multifractality, and the notion of negative fractal dimension. *Chaos/Xaoc: Soviet-American Perspectives on Nonlinear Science* (Woods Hole, 1989). Edited by David K. Campbell. New York: American Institute of Physics, 1990, 79-90.

**1990**

- 125 **WWW M.** M 1990t. Limit lognormal multifractal measures. *Frontiers of Physics: Landau Memorial Conference* (Tel Aviv, 1988). Edited by E. A. Gotsman et al. New York: Pergamon, 309-340.
- 126 **WWW M.** M 1990d. New "anomalous" multiplicative multifractals: left-sided  $f(a)$  and the modeling of DLA. *Condensed Matter Physics, in Honor of Cyril Domb* (Bar Ilan, 1990). *Physica: A168*, 95-111.
- 127 **WWW M.** M, Carl J. G. EVERTSZ, & Yoshinari HAYAKAWA 1990. Exactly self-similar "left-sided" multifractal measures. *Physical Review: A42*, 1990, 4528-4536.  
 • Reprint combining 126 and 127: M & Carl J. G. Everts. Exactly self-similar multifractals with left-sided  $f(a)$ . *Fractals and Disordered Systems*. Edited by Armin Bunde & Shlomo Havlin. New York: Springer, 323-346.
- 128 M & Carl J. G. EVERTSZ 1990. The potential distribution around growing fractal clusters, *Nature: 378* (6296), front cover & pp. 143-145.
- 1991**
- 129 Carl J. G. EVERTSZ, Peter W. JONES, & M 1991. Behavior of the harmonic measure at the bottom of fjords. *Journal of Physics: A24*, 1880-1901.
- 130 Carl J. G. EVERTSZ & M 1991n. Steady-state noises in diffusion limited fractal growth. *Europhysics Letters: 15*, 245-250.
- 131 **WWW M.** M 1991k. Random multifractals: negative dimensions and the resulting limitations of the thermodynamic formalism. *Proceedings of the Royal Society* (London): **A434**, 79-88. Also in *Turbulence and Stochastic Processes: Kolmogorov's ideas 50 years on*. Edited by Julian C. R. Hunt, O. M. Phillips, & D. Williams, London: The Royal Society.
- 132 Carl J. G. EVERTSZ, M, & François NORMANT 1991f. Fractal aggregates, and the current lines of their electrostatic potential. *In Honor of Michael E. Fisher* (Washington, 1991). Edited by Eytan Domany & David Jasnow. *Physica: A177*, 589-592.
- 133 **WWW M & C22.** M & Carl J. G. EVERTSZ 1991. Multifractality of the harmonic measure on fractal aggregates, and extended self-similarity. *In Honor of Michael E. Fisher* (Washington, 1991). Edited by Eytan Domany & David Jasnow, *Physica: A177*, 386-393.  
 • Reprint: *Fractales y caos* (Valencia, 1992). Edited by P. Martinez.
- 1992**
- 134 Carl J. G. EVERTSZ, M, & François NORMANT 1992t. Harmonic measure around linearly self-similar trees. *Journal of Physics: A25*, 1781-1797.  
 • Reprint: *Fractales y caos* (Valencia, 1992). Edited by P. Martinez.
- 135 Carl J. G. EVERTSZ & M 1992b. Self-similarity of the harmonic measure on DLA. *Complex Systems: fractals, etc.* (Trieste, 1991). Edited by Giorgio Parisi, Luciano Pietronero, & Miguel Virasoro. *Physica: A185*, 77-86.
- 136 Carl J. G. EVERTSZ, M, & Lionel WOOG 1992. Variability of the form and of the harmonic measure for small off-off-lattice diffusion-limited aggregates. *Physical Review: A45*, 5798-5804 & 8985-8986.
- 137 **WWW M.** Carl J. G. EVERTSZ & M 1992a. Multifractal measures. *Chaos and Fractals: New Frontiers in Science*, by Heinz-Otto Peitgen, Hartmut Jürgens & Dietmar Saupe. New York: Springer, 849-881.  
 • Reprint: *Fractales y caos* (Valencia, 1992). Edited by P. Martinez.



- Stand-alone reprint: *Complexity vs. Simplicity* (CCAST, Beijing, 1996). Edited by Hai-Cang Ren, Newark, NJ: Gordon and Breach, 1997.

138 **WWW M. M** 1992h. Plane DLA is not self-similar; is it a fractal that becomes increasingly compact as it grows? *Fractals and Disordered Systems* (Hamburg, 1992). Edited by Armin Bunde. *Physica*: **A191**, 95-107.

### 1993

139 **WWW M. C21. M** 1993s. The Minkowski measure and multifractal anomalies in invariant measures of parabolic dynamic systems. *Chaos in Australia* (Sydney, 1990). Edited by Gavin Brown & Alex Opie. Singapore: World Publishing, 83-94.

- Slightly edited reprint: *Fractals and Disordered Systems*. Second edition. Edited by Armin Bunde & Shlomo Havlin. New York: Springer, 1995, 345-353.

140 Dietrich STAUFFER, Amnon AHARONY, & M 1993. Self-similarity of fractals: a random-walk test. *Physica*: **A196**, 1-5.

141 M 1993n. A fractal's lacunarity, and how it can be tuned and measured. *Fractals in Biology and Medicine* (Ascona, 1993). Edited by Theo F. Nonnenmacher, Gabriele A. Losa & Ewald R. Weibel. Basel and Boston: Birkhäuser, 8-21.

### 1994

142 Iddo YEKUTIELI, M, & Henry KAUFMAN 1994. Self-similarity of the branching structure in very large DLA clusters and other branching fractals. *Journal of Physics*: **A27**, 275-284.

143 Iddo YEKUTIELI & M 1994. Horton-Strahler ordering of random binary trees. *Journal of Physics*: **A27**, 285-293.

144 M, Drogana POPOVIC & al 1994. Spectra of reproducible conductance fluctuations in the resonant tunneling regime. *Bulletin of the American Physical Society*. Abstracts of the March Meeting: **39**, 792.

145 M & Dietrich STAUFFER 1994. Antipodal correlations and texture (fractal lacunarity) in critical percolation clusters. *Journal of Physics*: **A27**, L237-L242.

### 1995

146 Chi-Hang LAM, Henry KAUFMAN & M 1994. Orientation of particle attachment and local isotropy in diffusion-limited aggregates (DLA). *Journal of Physics*: **A28**, 1995, L213-L217.

- Abstract: *Bulletin of the American Physical Society*. Abstracts of the March Meeting: **39**, 138.

147 M, Henry KAUFMAN, Alessandro VESPIGNANI, Iddo YEKUTIELI & Chi-Hang LAM 1995. Deviations from self-similarity in plane DLA and the infinite drift scenario. *Europhysics Letters*: **29**, 599-604.

148 M 1995. Measures of fractal lacunarity: Minkowski content and alternatives. *Fractal Geometry and Stochastics* (Finsterbergen, 1994). Edited by Christopher Bandt, Siegfried Graf, & Martina Zähle.

Basel & Boston: Birkhäuser, 1995, 12-38.

- Listener-prepared notes of a lecture based on the preceding two items: Fractal lacunarity and other tools for the characterization of complex shapes.

*Journal of Research Institute for Science and Technology of Chubu University*: **7**, 1995, 141-156.

- 149 M 1995h. Introduction to fractal sums of pulses. *Lévy Flights and Related Phenomena in Physics* (Nice, 1994). Edited by Michael F. Shlesinger, George Zaslavsky, & Uriel Frisch. (Lecture Notes in Physics: **450**.) New York: Springer, 110-123.
- **WWW**. Updated version. Fractal sums of pulses and a practical challenge to the distinction between local and global dependence. *Long Range Dependent Stochastic Processes: Theory and Applications* (Bengaluru, India, 2002). Edited by Govindan Rangarajan & Ming Ding. (Lecture Notes in Physics: **621**.) New York: Springer, 2003, 118-135.
- 150 M 1995b. Statistics of natural resources and the law of Pareto. *Fractals in Petroleum Geology and Earth Processes*. Edited by Christopher C. Barton & Paul La Pointe. New York: Plenum, 1-12.
- 151 **WWW M**. M 1995k. Negative dimensions and Hölder, multifractals and their Hölder spectra, and the role of lateral preasymptotics in science. *J. P. Kahane meeting* (Paris, 1993). Edited by Aline Bonami & Jacques Peyrière. *The Journal of Fourier Analysis and Applications*: special issue, 409-432.
- 152 M. Alessandro VESPIGNANI & Henry KAUFMAN 1995b. The geometry of DLA: different aspects of the departure from self-similarity. *Fractal Aspects of Materials* (Boston, 1994). Edited by Fereydoon Family, Paul Meakin, Bernard Sapoval, & Richard Wool. Pittsburgh, PA: Materials Research Society, 73-79.
- The Laplace equation and diffusion-limited aggregates. *Abstracts of the American Mathematical Society*. Annual Meeting, San Diego, CA, January 1997.
- 153 Renata CIOCZEK-GEORGES, M, Gennady SAMORODNITSKY, & Murad S. TAQQU 1995. Stable fractal sums of pulses: the cylindrical case. *Bernoulli*: **1**, 201-216.
- 154 Renata CIOCZEK-GEORGES & M 1995. A class of micropulses and antipersistent fractional Brownian motion. *Stochastic Processes and their Applications*: **60**, 1-18.
- 155 **WWW M**. M & Rudolf H. RIEDI 1995. Multifractal formalism for infinite multinomial measures. *Advances in Applied Mathematics*: **16**, 132-150.
- Outline: *Fractals and Disordered Systems*. Second edition. Edited by Armin Bunde & Shlomo Havlin. New York: Springer, 1995, 344-345.
- 156 M, Alessandro VESPIGNANI & Henry KAUFMAN 1995a. Cross-cut analysis of large radial DLA: departures from self-similarity and lacunarity effects. *Europhysics Letters*: **32**, 1995, 199-204.
- 1996**
- 157 Henry KAUFMAN, Alessandro VESPIGNANI, M, & Lionel WOOG 1995. Parallel diffusion-limited aggregation. *Physical Review*: **E 52**, 5602-5609.
- 158 Juha-Pekka HOVI, Amnon AHARONY, Dietrich STAUFFER, & M 1996. Gap independence and lacunarity in percolation clusters. *Physical Review Letters*: **77**, 877-890.
- 159 **WWW M**. Stéphane JAFFARD & M 1995. Local regularity of nonsmooth wavelet expansions and application to the Polyà function. *Advances in Mathematics*: **120**, 265-282.
- 160 Renata CIOCZEK-GEORGES & M 1996. Alternative micropulses and fractional Brownian motion. *Stochastic Processes and their Applications*: **64**, 143-152.
- 1997**
- 161 **WWW M**. M & Rudolf H. RIEDI 1997. Inverse measures, the inversion formula, and discontinuous multifractals. *Advances in Applied Mathematics*: **18**, 50-58.

- 162 **WWW M.** Rudolf H. RIEDI & M 1997. Inversion formula for continuous multifractals. *Advances in Applied Mathematics*: **9**, 332-354.
- 163 Raphael BLUMENFELD & M 1997. Lévy dusts, Mittag-Leffler statistics, mass fractal lacunarity and perceived dimension. *Physical Review*: **E 56**, 112-118.
- 164 **WWW M.** M & Stéphane JAFFARD 1997. Peano-Pólya motions, when time is intrinsic (uniform) or binomial (multifractal). *The Mathematical Intelligencer*: **19(4)** 21-26.
- 165 **WWW M. & P.** M, Laurent CALVET, & Adlai FISHER 1997. The multifractal model of asset returns. *Cowles Foundation Discussion Papers*: **1164**.
- 166 **WWW M. & P.** Laurent CALVET, Adlai FISHER, & M 1997. Large deviations and the distribution of price changes. *Cowles Foundation Discussion Papers*. **1165**.
- 167 **WWW M. & P.** Adlai FISHER, Laurent CALVET, & M 1997. Multifractality of the Deutschmark/US Dollar exchange rates. *Cowles Foundation Discussion Papers*: **1166**.

**1998**

- 168 **WWW M.** Rudolf H. RIEDI & M 1998. Exceptions to the multifractal formalism for discontinuous measures. *Mathematical Proceedings of the Cambridge Philosophical Society*: **123**, 133-157.
- 169 M 1998e. Fractality, lacunarity and the near-isotropic distribution of galaxies. *Current Topics in Astrofundamental Physics* (Erice, 1997) Edited by Norma G. Sanchez & Antonio Zichichi. Dordrecht: Kluwer, 585-603.
- Enlarged version: Fractal lacunarity and scenarios for the near-isotropic distribution of galaxies. *Fundamental Problems in...Cosmology* (Paris, 1998). Edited by Hector de Vega, & Norma G. Sanchez Paris: Observatoire de Paris, 1999, 213-238.
  - Also in *Current Topics in Astrofundamental Physics: The Cosmic Microwave Background* (Erice). Edited by Norma G. Sanchez. Dordrecht: Kluwer, 2001, 365-390.

**1999**

- 170 **WWW P.** M 1999p. Renormalization and fixed points in finance, since 1962. *Statistical Physics 20, International IUPAP Conference* (Paris, 1998). Edited by D. Iagolnitzer. *Physica*: **A263**, 1999, 477-487.
- 171 **WWW M. & R.** Marc-Olivier COPPENS & M 1999. Easy and natural generation of multifractals: multiplying harmonics of periodic functions. *Fractals in Engineering* (Delft, 1999). Edited by Jacques Lévy-Véhel, Evelyne Lutton, & Claude Tricot. New York: Springer, 113-122.
- 172 **WWW.** M & Michael FRAME 1999. The canopy and shortest path in a self-contacting tree. *The Mathematical Intelligencer*: **21 (2)**, 1999, 18-27.

**2001**

- 173 **WWW M & P.** M 2001a. Scaling in financial prices, I: Tails and dependence. *Quantitative Finance*: **1**, 113-123.
- Reprint: *Beyond Efficiency and Equilibrium*. Edited by Dooyne Farmer & John Geanakoplos, Oxford UK: The University Press, 2004.
- 174 **WWW M & P.** M 2001b. Scaling in financial prices, II: Multifractals and the star equation. *Quantitative Finance*: **1**, 124-130.
- Reprint: *Beyond Efficiency and Equilibrium*. Edited by Dooyne Farmer & John Geanakoplos, Oxford UK: The University Press, 2004.

- 175 **WWW K, M & P.** M 2001c. Scaling in financial prices, III: Cartoon Brownian motions in multifractal time. *Quantitative Finance*: **1**, 427-440.
- 176 **WWW K, M & P.** M 2001d. Scaling in financial prices, IV: Multifractal concentration. *Quantitative Finance*: **1**, 641-649.
- 177 **WWW M & P.** M 2001e. Stochastic volatility, power-laws and long memory. *Quantitative Finance*: **1**, 558-559.

## 2002

- 178 **WWW.** M, Boaz KOL & Amnon AHARONY 2002. Angular gaps in radial diffusion-limited aggregation: fractal dimensions and nontransient deviations from linear self-similarity. *Physical Review Letters*: **88**, 055501-1-4.
- 179 **WWW M.** Julien BARRAL & M 2002. Multifractal products of cylindrical pulses. *Probability Theory and Related Fields*: **124**, 409-430.

## 2003

- 180 **WWW M.** M 2003f. Multifractal power-law distributions, other "anomalies," and critical dimensions, explained by a simple example. *Journal of Statistical Physics*: **110**, 739-777.
- 181 **WWW P.** M 2003r. Heavy tails in finance for independent or multifractal price increments. *Handbook on Heavy Tailed Distributions in Finance*. Edited by Svetlozar T. Rachev (*Handbooks in Finance*: **30**, Senior Editor: William T. Ziemba): **1**, 1-34.
- 182 J. ASIKAINEN, Amnon AHARONY, M, Erik RAUSCH, & Juha-Pekka HOVI 2003. Fractal geometry of critical Potts clusters. *European Physical Journal*: **B34 (4)**, 479-487.
- 183 **WWW K & M.** Julien BARRAL, Marc-Olivier COPPENS, & M 2003. Multiperiodic multifractal martingale measures. *Journal des mathématiques pures et appliquées*: **82**, 1555-1589.

## 2004

- 184 **WWW M.** Julien BARRAL & M 2004a. Introduction to multifractal products of independent random functions: *Fractals*. Edited by Michel L. Lapidus. Providence RI: American Mathematical Society, 2004.
- 185 **WWW M.** Julien BARRAL & M 2004b. Non-degeneracy, moments, dimensions, and multifractal analysis for random multifractation measures. *Fractals*. Edited by Michel L. Lapidus. Providence RI: American Mathematical Society, 2004.
- 186 M 2004. Fractal sums of pulses: self-affine global mesodiffusion and lateral limit theorems.
- 187 Renata CIOCZEK-GEORGES & M 2004. Stable fractal sums of pulses: the general case.

**RÉIMPRESSIONS ET TRADUCTIONS PARTIELLES DES LIVRES**

RELATIF/A *LOGIQUE, LANGAGE ET THÉORIE DE L'INFORMATION* (1957)

- *Macroscopic statistical linguistics*. English Translation of Part I of the 1957 book, by J. Cheek, Jr. Cambridge, MA: Harvard Computation Laboratory, 1957

RELATED TO *LES OBJETS FRACTALS*, TROISIÈME ÉDITION (1989)

Survol du langage fractal: **Book B3**, 185-240.

- **WWW**. Excerpt from "Survol" in English: Fractal geometry: What is it and what does it do? *Proceedings of the Royal Society of London: A423*, May 8 1989, 3-16.
- Exact reproduction of the excerpt. *Fractals in the Natural Sciences*, Edited by M. Fleischmann D. J. Tildesley & R. C. Ball, Princeton: The University Press, 1990, 3-9.
- Exact reproduction of the excerpt. *Fractals: Selected Reprints*, Edited by Alan J. Hurd, College Park MD: American Association of Physics Teachers, 1989, 8-14.
- Shorter excerpt: An overview of the language of fractals. *The Fractal Approach to Heterogeneous Chemistry*. Edited by David Avnir, New York: Wiley, 1989, 3-9.
- **WWW**. Updated versions, in the form of several essays.

RELATED TO *THE FRACTAL GEOMETRY OF NATURE* (1982)

- Reprint Chapter 13, with additions. *Percolation Structures and Processes*. Eds Guy Deutscher, Richard Zaller, & Joan Adler. *Annals of the Israel Physical Society: 5*, 1983, 59 – 80. Distributed by Adam Hilger, Bristol UK.
- Large excerpts in paraphrase, *Les Fractals (les chroniques de Rose Polymath)* a "comic book" by Ian C. Stewart. Paris: Belin. 1983. *The World Treasury of Physics, Astronomy and Mathematics*. Edited by Timothy Ferris. Boston: Little, Brown, 1991, 447-455.
- Russian translation of these excerpts: *Chemistry and Life* (A journal of the Russian Academy of Sciences).
- Revised Chapters 1, 2, 3, 4, and 11. *The Wolf Prizes for Physics*. Singapore:World Scientific.
- **WWW** Uncompressed draft of a section. *Two heirs to the Great Chain of Being*. circa 1982.
- **WWW** Uncompressed draft of a section. *A crisis of intuition as viewed by Felix Klein and Hans Hahn and its resolution by fractal geometry*. circa 1982.
- Excerpts read by BBM. Audio-cassette on *Complexity and Chaos*. Nashville TN: Knowledge Products. 1993.
- Large excerpts in paraphrase. *In Praise of Fractals*, a poem by Emily Grosholz. *Hudson* (a magazine of literature and the arts): **LVI (1)**, 2003, 117 – 118.
- Minimally edited reproductions of Chapters 18 and 19. *Fractals and Chaos: The Mandelbrot Set and Beyond*. New York: Springer, 2004.

RELATED TO *FRACTALS AND SCALING IN FINANCE* (1997)

- **WWW P**. Three fractal models in finance: discontinuity, concentration, risk. *Economic Notes* (Siena): **26**, 1997, 139-178.

**TEXTES DE VULGARISATION CONCERNANT LES TRAVAUX DE L'AUTEUR**

Phenomenological principles and statistical thermodynamics. Bibliographical and historical footnote. *Thermodynamics: A Unifying Science*. Edited by George N. Hatsopoulos and Joseph H. Keenan. Cambridge, MA: MIT Department of Mechanical Engineering, 1964.

•Partial reprint: *Principles of General Thermodynamics*, Edited by George N. Hatsopoulos and Joseph H. Keenan, New York: J. Wiley, 1965, XXXIX-XL.

**WWW P. C.** Macro-statistical models and aggregative laws of behavior, a general discussion. *Mathematics and Social Science I: Proceedings of the UNESCO Seminars* (Menthon-Saint-Bernard, 1960 and Gösing, 1962).

Compiled by Saul Sternberg and others. The Hague: Mouton & Co., 1965, 213-215.

**WWW P.** Is there persistence in stock price movements? *Seminar on the Analysis of Security Prices*, held November 12-13, 1966 at the Graduate School of Business of the University of Chicago.

•Reprint: *Staff/Board Conference of the National Bureau of Economic Research, Inc.* held September 17-20, 1969 at Montauk, Long Island, New York.

Operational hydrology using self-similar processes (with James R. Wallis). *Proceedings of the Fifth International Operations Research Conference, Venice 1969*. Edited by John Lawrence. London: Tavistock, and New York: Barnes & Noble, 1970, 265-282.

**FE3.1** Le syndrome de la variance infinie et ses rapports avec la discontinuité des prix, *Economie Appliquée*: **26**, 1973, 321-348.

**FE3.2** Le problème de la réalité des cycles lents et le syndrome de Joseph. *Economie Appliquée*: **26**, 1973, 349-365.

Physical objects with fractional dimension: seacoasts, galaxy clusters, turbulence and soap. *The Institute of Mathematics and its Applications (Great Britain) Bulletin*: **13**, Nos. 7/8, July/August 1977, 189-196. •Reprint: *Fluid Dynamics* (Les Houches, 1973). Edited by Roger Balian & Jean-Laurent Peube. London: Gordon & Breach, 1977, 557-578.

The fractal geometry of percolation, polymers and almost everything else. *Statistical Mechanics and Statistical Methods in Theory and Application, a Tribute to Elliott W. Montroll*. Edited by Uzi Landman. New York: Plenum, 1977, 331-342.

The fractal geometry of  $1/f$  fluctuations. *Proceedings of the Symposium on  $1/f$  Fluctuations* (Tokyo 1977). Edited by T. Musha. Tokyo: Tokyo Institute of Technology, 1977, 206-212.

Getting snowflakes into shape. *New Scientist*: **78**, 1978, 808-810.

•Letter to the Editor: The Menger Sponge. *Mathematical Intelligencer*: **1**, Summer 1978, 126.

**WWW F.** Des monstres de Cantor et Peano à la géométrie fractale de la nature. *Penser les mathématiques*. (Séminaire Jean Dieudonné, Maurice Loi & René Thom). Textes préparés par F. Guénara & G. Lelièvre. Collection Points-Sciences, Paris: Editions du Seuil, 1982, 226-251.

•**WWW F.** Variant only available on the web: *Des monstres mathématiques* (de Bolzano, Cantor et Peano) au tohu-bohu de la nature.

•Spanish translation: De los monstruos de Cantor y Peano a la geometria fractal de la naturaleza. *Pensar la matematica*, Barcelona: Tusquets, 1984, 111-138.

•Japanese translation: Shizen no fraktal kigakaku ni okeru Cantor to Peano no monster. *Sugaku Gengo Genjitsu* **2** (Sugaku Seminar Books, **11**), Tokyo: Nihon Hyoron Sha, 1984, 111-141.

•Italian translation: *La geometria della natura (Book E)*, 1987, 49-91; 1949, 31-78.

The many faces of scaling: fractals, geometry of nature, and economics. *Self-Organization and Dissipative Structures*. Edited by William C. Schieve & Peter M. Allen. Austin, TX: University of Texas Press, 1982, 91-109.

**WWF F.** Les fractales, les monstres et la beauté. *Le débat: histoire, politique et société*: Mars 1983, 54-72.

- Brief version: L'ordinateur aidant, les fractales domptent les monstres mathématiques et transforment l'intuition géométrique. *La Jaune et la Rouge*, Décembre 1982, 67-78.
- Also: *Diplômés 83 de l'Ecole Polytechnique Fédérale de Lausanne*. Cover and 18-28.
- Also: *Mosaic* (Zurich) 5/83, 18-20 and 6/83, 18-20.

Le géomètre qui refait le monde. *ça m'intéresse*: 29 Juillet 1983, 72-75.

Why is nature fractal and when should noises be scaling (with Richard F. Voss). *Proceedings of the 7th International Conference on Noise in Physical Systems and the 3rd International Conference on 1/f Noise*, Montpellier, 17-20 May, 1983. Edited by M. Savelli, G. Lecoy & J. P. Nougier, Amsterdam: North-Holland, 1984, 31-39.

The fractal vision (Letter to the Editor). *The Sciences*: **24**, 3, May/June 1984.

Order in the geometric chaos of roughness and fragmentation. Introduction to **b**, 1-3 and to **c**, 3-5.

- Shorter reprint: *Fractals in Engineering (Abstracts) / Les fractales et l'ingénieur* (Montréal, 1992). Edited by Claude Tricot & Francois Normant. 1992.

Fraktale Geometrie: der Computer macht eine neue Geometrie möglich.  
*75 Jahre IBM Deutschland*, 1985, 122-127.

Fractals and the rebirth of iteration theory. *The Beauty of Fractals*, by Heinz-Otto Peitgen & Peter H. Richter, New York: Springer, 1986, 151-160.

- Preliminary version, together with a German translation:  
*Catalogue of the "Frontiers of Chaos" Exhibit*, Bremen: Mapart, 1985, 11-19.

Fractals: how to imitate the mountains, the clouds and the trees, and to create weird and wonderful new shapes. *Teaching Non-Linear Phenomena II: Chaos in Education* (Balatonfüred, Hungary, 1987). Edited by George Marx, Veszprem, 1988, 5-14.

- Landscapes on an imaginary planet. *Bioastronomy — The Next Steps*. Edited by George Marx. Dordrecht-Boston: Kluwer, 1988, 67-76.
- Fractal mountains and dragons, with an excursion through fractal music.  
*The State of the Art and the Future Trends of Acoustic Research* (Rome, April 1987). Rome: Institute of Acoustics O.M. Corbino, 1989, 57-82.
- Montañas y dragones fractales: la intuición en la matemática y en las ciencias. *Sobre la imaginación científica* (Barcelona, Mayo 1987). Edición de Jorge Wagensberg, Barcelona: Tusquets 1990, 177-204.
- Eine Computerformel fürs Matterhorn. *Chaos und Kreativität*. Edited by Gottlieb Guntern. Zürich-Berlin- New York: Scalo, 1995, 167-214.

Fractals: a geometry of nature. *The New Scientist*: September 15, 1990, cover & pp. 38-43.

- Reprint: *The New Scientist Guide to Chaos*. Edited by Nina Hall. London: Penguin, 122-135.
- Reprint: *Exploring Chaos: a Guide to the New Science of Disorder*. Edited by Nina Hall. New York: Norton, 1993, 122-135.

Fractal craft (Letter to the Editor). *The New Scientist*: September 14, 1991.

Fractals. *Chaos: The New Science* (Gustavus Adolphus Nobel Conference XXVI).

Edited by John M. Holte. Lanham MD: University Press of America, 1993, 1-27.

- Shortened Japanese translation by S. Miyajima & M. Suzuki.  
*Suuri Kagaku (Mathematical Sciences)*: **386**, August 1995, 74-83.
- Shortened English text, together with the above Japanese translation. *The Honda Prize for 1994*. Tokyo: Honda Foundation Report: **79**, 1995, 31 pp.
- Another shortened variant: Fractals as a Morphology of the Amorphous. Introduction to *Fractal Landscapes from the Real World*, by William Hirst. Manchester, UK: Cornerhouse Publications, 1994.
- Italian translation. Frattali. *Dalla tribù alla conquista dell'universo: Scienza, tecnologia e società*. A cura di Umberto Colombo e Giuseppe Lanzavecchia. Milano: Libri Schweiwiller, 2000, 195-204.

- Reprint: *The Colors of Infinity*, Edited by Nigel Gordon. Bath (UK): Clearpress, 2003.
- Portuguese translation. Fractais. *Frontieras da Ciência*. Coordenadores Rui Fausto, Carlos Fiolhais & João Filipe Queiró. Lisboa : Gradiva & Imprensa da Universidade de Coimbra, 2003, 63-89.

**WWW. F.** Les inattendus des fractales. *Pour la Science*: **234**, Avril 1997, 10-12.

A Multifractal Walk Down Wall Street. *Scientific American*, February 1999, 50-53.

- Responses to "Letters to the Editor." *Scientific American*, June 1999, 6.
- Short advance version: Of dollars, deutschmarks and multifractality. *Convergence* (Supplement to the *Wall Street Journal Europe* of 17 November 1997), 10-11.
- Version abrégée en français: Les fractales et la bourse, *Pour la Science*: 242, Décembre 1997, 16-17.
- Not quite so short advanced version: *ASX Perspective* (Australian Stock Exchange), 1998, 4-7.
- Version élargie en français: Randonnées multifractales à Wall Street. *Les mathématiques sociales: (Dossier Pour la Science)*. Paris: Belin, 1999, 126-130.
- Edited reprint: Multifractal structure of financial prices and its implications. *Scientific bridges for 2000 and Beyond: A virtual colloquium by the Elf Professeurs de l'Académie des Sciences*. Paris: Tec et Doc (Librairie Lavoisier), 1999, 131-148.
- Edited reprint: Fractal financial fluctuations: do they threaten sustainability? *Science for Survival and Sustainable Development*. Città di Vaticano: Pontificia Academia Scientiarvm, MM, 299-319.
- Edited reprint: *Risks in Investment Accumulation Products of Financial Institutions*. Schaumburg IL: The Society of Actuaries, 2001, 19-24.
- Finnish advanced version: *Tietoviikko*.

Fractal geometry and the representation of nature. *New Ideas in Science and Arts*. Strasbourg: Council of Europe. 1997, pp 28-29.

Is nature fractal? (Letter to the Editor) *Science*: **279**, February 6, 1998, 783.

**WWW F.** L'anneau fractal: de l'art à l'art, à travers la géométrie, la finance et les sciences.

*Le Monde* (quotidien): 29 août 2000, 12.

- Short English version: **Book j**.
- Version française illustrée. *Université de tous les savoirs*. Sous la direction d'Yves Michaud. *Qu'est-ce que l'Univers?* Paris: Odile Jacob, **4**, 2001, 164-174.

The fractal universe. *The Origins of Creativity*. Edited by Karl H. Pfenninger & Valerie R. Shubik, Oxford: University Press, 2001, 185-206.

- Arabic translation, in progress.

Mouvement brownien,  $4/3$  et le rôle de l'oeil en mathématiques. (Courrier des lecteurs) *Pour la Science*: 2002.

**WWW C.** Symmetry by dilation/reduction, fractals, and roughness, *Symmetry 2000*, edited by I. Hargittai and T. Laurent, **I**, 2002, 133-141.

The garden of fractal orders. *Il Corno du Heimdal*. Pio Manzu. 2003, pp 142-149.

- Italian translation: Il giardino degli ordini frattali, *ibid*.

Fractals and their role in education. Japanese Translation by Mitsugu Matsushita. *Sugaku Seminar* (Special Issue on Complex Dynamical Systems), **42**, 2003, 8-16.

Fractals. *Japan Prize 2003*. Tokyo: The Science and Technology Foundation of Japan. pp.



**ESTHÉTIQUE**

Les fractales: objets mathématiques, modèles physiques et créations artistiques. *Actes du forum international des formes nouvelles* (Monte Carlo, Février 1983). Textes réunis par André Martin.

- *Actes du premier colloque image* (Biarritz, Mai 1984). Textes réunis par B. Picinbono, Cagnes-sur-Mer: Grets, 1-10.

Flare: A by-product of the study of a two-dimensional dynamical system, *IEEE Transactions on Circuits and Systems*: **36**, 1988, 768-769.

**WWW**. Fractals: an art for the sake of science. *Leonardo*: 1989, Supplemental Issue, 21-24.

- **WWW. F.** Version abrégée en français: Les images fractales: un art pour l'amour de la science et ses applications. *Sciences et Techniques*: Mai 1984, 16-19, 34-35 & 65.
- German translation of the French version: Eine Kunst zur Liebe der Wissenschaft. *Artware: Kunst und Elektronik*. Edited by David Galloway. Düsseldorf: Econ, 1987, 69-78.
- Reprint: *The Visual Mind: Art and Mathematics*. Edited by Michele Emmer. Leonardo Books. Cambridge MA: MIT Press, 1993, 11-14 and color Plate I.
- Portuguese translation: Fractais: uma forma de arte a bem da ciência (Tradução de Claudio da Costa). *Imagem -máquina; a era das tecnologias do virtual*. Textes réunis par André Parente. Rio de Janeiro: Editora 34, 1993, 195-200.

Natura ex Machina (with F.K. Musgrave), *IEEE Computer Graphics and its Applications*: January 1989, Front cover & 4-7.

The art of fractal landscapes (with F. K. Musgrave). *IBM Journal of Research and Development*: **35**, 1991, front and back covers & 535-540.

Was ist Schönheit? *NZZ Folio (Neuer Zürcher Zeitung)*: Mai 1993, 15.

**WWW F.** Les fractales, l'art algorithmique et le test de Turing. *La science et la métamorphose des arts*. Textes réunis par Raymond Daudel. Paris: Presses Universitaires de France, 1994, 39-52.

- Italian translation by Michele Emmer. *L'Unità*: 22 Aprile 1994, 2-5.

**AVANT-PROPOS**

*Hasard et prévision*, par Daniel Zajdenweber. Paris: Economica, 1976.

*Fractals*, by Jens Feder. New York: Plenum, 1988.

People and events behind the science of fractal images. *The Science of Fractal Images*. Edited by Heinz-Otto Peitgen & Dietmar Saupe, New York: Springer, 1988, 1-19.

*Fractal Growth Processes*, by Tamas Vicsek. Singapore: World Publishing, 1989.

*Fractals in geophysics*, by Christopher H. Scholz and BBM. Basel & Boston: Birkhäuser, 1989, 1-4.

\**Norbert Wiener (1894-1964)*, by Pesi R. Masani. Basel & Boston: Birkhäuser, 1990.

*An Eye for Fractals: a Graphic/Photographic Essay*, by Michael McGuire. Reading MA: Addison Wesley, 1991.

The grey and the green. *Fractal Forms*. Edited by Étienne Guyon & H. Eugene Stanley. Amsterdam: North-Holland, 1991.

- Le gris et le vert. *Les formes fractales*. Rédaction Étienne Guyon & H. Eugene Stanley. Paris: Palais de la Découverte, 1991.

*Fractals for the Classroom: Strategic Activities*, by Heinz-Otto Peitgen, Hartmut Jürgens, & Dietmar Saupe, Evan M. Matelski, Terry Perciante, & Lee E. Yunker. New York: Springer, 1991.

Fractals and the rebirth of experimental mathematics. *Fractals for the Classroom*, by Heinz-Otto Peitgen, Hartmut Jürgens, & Dietmar Saupe, Evan M. Matelski, Terry Perciante, & Lee E. Yunker. New York: Springer, 1991.

*Dieu joue-t-il aux dés?*, par Ian Stewart. Paris: Flammarion, 1992, 7-13.

*Physique et structures fractales*, par Jean-François Gouyet. Paris: Masson, 1992.

- *Physics and Fractal Structures*, by Jean-François Gouyet. New York: Springer, 1994.

*Non-Equilibrium States in Molecular Aggregation and Fractals in Chemistry*.  
*Croatica Chemica Acta*: **65**, 1992, v.

*Chaos under Control: The Art and Science of Complexity*, by David Peak & Michael L. Frame.  
New York: W. H. Freeman, 1993.

Foreword to the First Issue. *Fractals: an Interdisciplinary Journal on the Complex Geometry of Nature*, **1**, 1993, v-vi.

*Abraham Robinson: The Creation of Nonstandard Analysis; a Personal and Mathematical Odyssey*, by Joseph W. Dauben. Princeton University Press, 1994, ix-xi.

The Paul Lévy I knew. *Lévy Flights and Related Phenomena in Physics* (Nice, 1994).  
Edited by Michael F. Shlesinger, George Zaslowsky, & Uriel Frisch (Lecture Notes in Physics).  
New York: Springer, 1995, ix-xii.

*Fractal Geometry and its Uses in Petroleum Geology and Earth Sciences*.  
Edited by Christopher C. Barton & P. R. La Pointe. New York: Plenum, 1995, vii-xi.

*Universalités et fractales; jeu d'enfants ou délit d'initié?*, par Bernard Sapoval.  
Paris: Flammarion, 1997.

*Discovery of Cosmic Fractals*, by Yuriy Baryshev & Pekka Teerikorpi. Singapore: World Scientific, 2002.

\**An Introduction to High-Frequency Finance*, by Michel M. Dacorogna, Ramazan Gençay, Ulrich A. Müller, Richard B. Olsen, Olivier V. Pictet. Academic Press, 2001.

*Marchés fractals*, par Jacques Lévy-Véhel & Christian Walter. Paris: Presses Universitaires de France, 2002.

\**Heaven's Fractal Net*, by William J. Jackson. Bloomington IN: Indiana University Press, 2004.

\**The Fractal Murders*, by Mark Cohen. New York: Mysterious Books, 2004.

**CRITIQUE, VULGARISATION, OU HISTOIRE**

L'ingénieur en tant que stratège: théories du comportement. *Revue Générale des Sciences*: Septembre 1955.

- German translation: Der Ingenieur als Stratege: Verhaltenstheorien. *Informations theorie*. Edited by W. Meyer-Eppler. Braunschweig: Vieweg, 1956, 32-39.

Degrés d'équilibre. *Logique et équilibre*, par Leo Apostel, Benoit Mandelbrot & Jean Piaget. Paris: Presses Universitaires de France, 1957, 1-26.

Quelques problèmes de la théorie de l'observation, dans le contexte des théories modernes de l'induction des statisticiens. *La lecture de l'expérience*, par Albert Jonckheere, Benoit Mandelbrot & Jean Piaget, Paris: Presses Universitaires de France, 1958, 29-47.

La théorie de l'information est-elle encore utile? *Le concept d'information dans la science contemporaine*, *Cahiers de Royaumont*, Paris: Gauthier-Villars, 1965, 78-98.

- Italian translation: E ancora utile la teoria dell'informazione? *Il concetto d'informazione nella scienza contemporanea*. Bari (Italia): De Donato Editore, 1971, 81-101.

Paul Lévy, In Memoriam. *La Jaune et la Rouge*: **286**, 1973, 19-20.

The last thirty and the last hundred years in mathematics (Hebrew translation). *Machshavot* (Tel Aviv): **48**, 1979, 40-42.

**WWW. F.** Souvenirs à bâtons rompus de Szolem Mandelbrojt, recueillis en 1970 et présentés par Benoit Mandelbrot avec des notes par René Dugac.

- Publications du Séminaire d'Histoire des Mathématiques de l'Université de Paris*: **6**, 1985, 1-46.
- Chinese translation: *Mathematics* (Wuhan University), 1992.
- Excerpts translated into English in *Jacques Hadamard*, by Tatyana Shaposhnikova & Vladimir Mazya, Providence, RI: American Mathematical Society, 1997.

Propos à bâtons rompus, tenus au Séminaire Hausdorff (Paris, Juin 85).

- Fractals: Dimensions non-entières et applications*. Edité par Guy Cherbit. Paris: Masson, 1987, 4-15.
- English translation: Sundry observations. *Fractals: Non Integer Dimensions and Applications*. Edited by Guy Cherbit. Chichester & New York: John Wiley, 1991, 3-9.

Troppi estremisti (The crisis in mathematics). *Espresso (Roma)*: 10 Agosto 1986, 123.

People and events behind the science of fractal images. *The Science of Fractal Images*. Edited by Heinz-Otto Peitgen & Dietmar Saupe, New York: Springer, 1988, 1-19.

Edited and annotated excerpts, in translation, from Jacques Hadamard's paper, "How I did *not* discover relativity". *Mathematical Intelligencer*: **10**, Spring 1988, 65-67.

Chaos, Bourbaki, and Poincaré. *Mathematical Intelligencer*: **11**, Summer 1989, 10-12.

Some "facts" that evaporate upon examination. *Mathematical Intelligencer*: **11**, Fall 1989, 17-19.

Lewis Fry Richardson and prematurity in science. *The British Society for the History of Mathematics, Newsletter*: **12**, October 1989, 2-4.

**WWW.** Opinions. *Fractals, an Interdisciplinary Journal*: **1**, 1993, 117-123.

- Reprint. *Symmetry: Culture and Science*: **4**, 1993, 319-328.

Fractals, the computer, and mathematics education. *Proceedings of the International Congress of Mathematics Education, ICME-7* (Québec, Canada, 1992), Québec: Presses de l'Université Laval, 1994, pp. 77-98.

- Short presentation: Commencement speech. *University of Dallas*, Irving TX, May 17, 1992.
- Long excerpt: What will remain of 20th century formal science? *Europäisches Forum Alpbach*, 1992. Edited by Heinrich Pfusterschmid-Hardtenstein, Vienna: Ibero Verlag, 1993, 34-43.
- Short excerpt: Les fractales à l'école. *Pour la Science*: **214**, 1995, 7. Also **216**, 1995, 9.
- Arabic translation of the short excerpt. *Majallat A l Oloom*: **11** (12), 1995, 72.
- Edited excerpts: **Book j**.

Comment on "Theoretical Mathematics..." by A. Jaffe and F. Quinn, *Bulletin of the American Mathematical Society*: **30**, 1994, 193-196.

Réflexions sur la formation des ingénieurs. *La formation supérieure des ingénieurs et cadres. Bicentennaires du CNAM et de l'École Polytechnique* (Paris, avril 1994). Paris: Éditions J. M. Place, 1995, 111-117.

New role of pictures in science. *Paradigm Shift in the 21st Century* (Tokyo, 1994). The Honda Foundation, 1995, 103-108.

Harold Edwin Hurst. *Statisticians of the Centuries*. Edited by Christopher C. Heyde and Ernest Seneta. New York: Springer, 2001, 335-338.

## CONTRIBUTIONS AUX ENCYCLOPÉDIES ET DICTIONNAIRES

*Encyclopédie de la Pléiade* (Gallimard). *Logique et Connaissance Scientifique* (Dirigé par J. Piaget). Sur l'épistémologie du hasard dans les sciences sociales: invariance des lois et vérification des hypothèses, 1097-1113.

- Spanish translation. Buenos Aires: Nueva Vision, 1976.

*Encyclopédie de la Pléiade* (Gallimard). *Linguistique* (Dirigé par J. Martinet). Les constantes chiffrées du discours, 1968, 46-56.

- Spanish translation. Buenos Aires: Nueva Vision, 1976.

*Encyclopaedia Britannica 1981 Yearbook of Science and the Future*. Fractals and the Geometry of Nature, 1980, 168-181.

*Encyclopaedia Universalis* (Paris).  
*Universalis*, 1981. Les fractales, 259-263.  
*Symposium 1985*. Les fractales, 319-323.  
*Symposium 1987*. Les fractales.

*Encyclopedia of Statistical Sciences*. Edited by S. Kotz & N. L. Johnson (New York: Wiley, 1982).  
 Topics: Fractals **3**, 185-186. Fractional Brownian motions and Gaussian noises **3**, 186-189.  
 Fractional integro-differentiation **3**, 196-197. Gibbs distribution **3**, 431.  
 Hurst coefficient (rescaled range analysis) **3**, 689-693.

**WWW**. *The Encyclopedia of Physical Science and Technology, in Fifteen Volumes* (San Diego CA: Academic) Fractals First edition (1987):, **5**, 579-593. Third edition (2001): (M & M.L. Frame), **6**, 185-208.

*The New Palgrave: A Dictionary of Economic Theory and Doctrine, in Three Volumes*. (London: The Macmillan Press Ltd., 1987). Bachelier.

**WWW F**. *Dictionnaire Encyclopédique Quillet (Supplément)*. Ensembles factals de Julia, de Fatou et de Mandelbrot, 15-17 + color plates.

**PRINCIPALES INTERVIEWS ÉCRITES**

**WWW.** Profile by Monte Davis. *Omni* (New York): February 1984.

**WWW.** *In his own words: B.B.M.*. Interview by Anthony Barcellos. *Mathematical People*.

Edited by Donald J. Albers and G. L. Alexanderson, Boston: Birkhäuser, 1985, 205-225.

•Excerpt: *The College Mathematics Journal*: **15**, 1984, 115-117.

•Adaptation: *Current Biography*: **48/6**, 1987, 42-46.

**WWW F.** *Comment j'ai découvert les fractales*. Entretien avec Marc Lesort, *La Recherche*: Mars 1986, 420-424. •Traduction: *Cómo descubrí los fractales*. *Mundo Científico* (Madrid): **58**, 576-580.

**WWW.** A maverick's apprenticeship. *The Wolf Prize for Physics*. Edited by T.W.B. Kibble.

Singapore: World Scientific, 2003. • Brazilian translation. **Book B-PB**. • Variant in Italian translation.

**Book F**.

*Profile*: Benoit B. Mandelbrot, father of fractal complexity.

*Quantitative Finance*, **3(5)**, 2003, C88-90.

The father of fractals. *The Economist*, December 6, 2003.

**WWW.** BBM. *Candid Science III: Conversation with Famous Physicists*. Edited by Istvan Hargittai, London: Imperial College Press, 2004.

**AUTRES INTERVIEWS ÉCRITES**

Interview by Itsuo Sakane. *Asahi Shinbun* (Tokyo): June 4, 1981.

Interview by Mayumi Yoshinari. *Omni* (Tokyo): May 1984.

•Also in *Shuukan-Bon*, Tokyo: Asahi-Shuppan.

•Also in *Between Science and Art - Fractal Esthetics is Born*, Tokyo.

Entretien avec Christian de Maussion, *La Lettre de l'Image*: Juin 1984.

•English translation: *Computer Graphics Newsletter France*: Summer 1984.

*In the mind of B.B.M.* Interview by Suzan D. Prince, *Computer Pictures*, June 1984.

**WWW F.** *La Galaxie Mandelbrot*. Entretien avec par Robert Allezaud, *Culture Technique*: **14**, Juin 1985, 260-267.

•Excerpt: *Le monde fractal de B.B.M.*, *Cinéma*: **307-308**, Juillet 1984.

*Mathematics? It is no longer dry*. Interview by Michele Fontana. *Panorama* (Milano):

11 Agosto 1985.

*Aha*. Interview by Emiko Tayanazi. *AI: The Artificial Intelligence Journal* (Tokyo): June 4, 1986, 10-21.

*Dialogue on the future*. Interview by Lorenzo Soria. *Espresso* (Rome): June 8, 1986.

*Exiles in pursuit of beauty*. Personal Communication. *The Scientist*: March 23, 1987, 19.

*He introducido el ojo en las matemáticas*. Interview by Arturo San Agustin.

*El Periódico* (Barcelona): May 13, 1987.

*Szabalyzerőség és vallozatosság*. Interview by László Egyed. *Tudomány* (Budapest): April 1987.

*Ahol a rész is egész*. Interview by Julius Staar. *Természet Világa* (Budapest):

September 1987, 349-356. •Reproduction: Book by Julius Staar, Budapest: Gondolat.

Conversazione di B.B.M. con Giulio Giorello. **Book f**, 1987: 1989, 11-47.

*Naturally creative*. Interview by Mike Dibb. *Modern Painters* (London): Premier Issue, Spring 1988, 52-53.

*Moins d'organisation, moins de centralisation*. Entretien avec Philippe Chambon. *L'Actuel*: Mars 1988.

*BM: des "poubelles de la science" à la reconnaissance internationale.*

Entretien avec Danielle Ouellet. *Québec-Scienc*: Avril 1988, 9-11.

*The thirty-ninth reason. Seventy-five reasons to become a scientist.*

*American Scientist*: **76**, September-October 1988, 457.

Interview by David Pollack, *Math Bulletin 1989 of the Bronx High School of Science*, Bronx NY.

Entretien avec Georges Suffert, *Le Figaro* (Paris): 9 Octobre 1989.

Entretien avec Sylvestre Huet, *Révolution* (Paris): 5 Septembre - 5 Octobre 1989.

Interview with Charles Boag, *The Bulletin* (Australia): February 20, 1990.

Interview by Benjamin Ivry, *Newsweek International*: March 26, 1990.

Interview, *Bild der Wissenschaft*.

*Mandelbrot's complex visions: A new way of looking at Mathematics.* Interview by Douglas Birch.

*The Baltimore Sun*: September 29, 1991.

*La révolution de l'oeil, selon Mandelbrot.* Entretien avec Michel Lépinay.

*Lyon-Libération*: 10 Octobre 1991.

*Mandelbrot: l'image fait le mathématicien.* Propos recueillis par Alain Rebetz.

*L'Hebdo* (Lausanne): 21 Janvier 1993.

*Gute Wissenschaft....* Interview by Peter Welcher. *Computer Zeitung*: 15 April 1993.

*Gebrochene Dimension.* Interview by Hanspeter Gschwind. *Schweizerische Technische Zeitschrift*

(STZ): cover, 1 & 10-16.

Interview by Neville Bamji, *Principia Scientifica* (Official Science Journal of Scarsdale High School): June 1993, 8-10.

*Fractals--- Fruit of a Wandering Mind.* Interview by Winston J. Brill. *R & D Innovator*: **3 (1)**, 1994, 1-3.

*A personal view: Mathematical intuition.* Interview by Jay M. Passachoff. *Calculus* (2nd ed.)

and *Single Variable Calculus* (2nd ed.) by Bernard Holder, James DeFranza, & Jay M. Passachoff.

Pacific Grove CA: Brooks/Cole, 1994, 717-718.

*The geometric dream of BBM.* Interview by Jeffrey Goldsmith. *Wired*: **2**, August 1994, 93.

*Le martien des mathématiques.* Entretien avec Dominique Leglu, *Libération* (Paris): 21 Mai 1996, 31.

*The art of mathematics.* Interview by Lynn McBrien. *Education Today*: March 1997.

**WWW. F.** Les fractales en finance, *La Recherche*, 1997, not published.

Enfance d'un maître. *Benoit Mandelbrot: visions géométriques.* Entretien avec Guillaume Orvas.

*Les Cahiers de Science & Vie* (Paris), 10-15.

BBM. *The Caian* (Gonville & Caius College, Cambridge, UK.), Fall 1999.

*Qu'est-ce qu'une découverte scientifique?* *Courrier du CNRS* (Paris), **87**.

*Dagens Nyhyten*, November 2001, Stockholm, Sverige.

*La matematica dell'occhio.* Intervista di Margherita Bologna. Martedì 19 Novembre 2002

"Father of fractals" discusses "essential" role of maths in life. Interview by Jacqueline Weaver.

*Yale Bulletin and Calendar*: February 28, 2003, 12.

*Il volto frattale della natura.* Intervista di Cristina Valsecchi. *Newton* (Roma), 2003.

*Trent'anni di frattali: una scienza piena di emozioni.* Intervista a cura di Paolo Musso.

*Emmeciquadro* (Milano) **17**, 2003, 6-15.

**ENTRETIENS SUR VIDEO**

Interview by H.O. Peitgen • Institut für der Wissenschaftlichen Film, Göttingen, Germany, 1990.

Interview incorporated in H.O. Peitgen, H. Jurgens, D. Saupe & C. Zühlke • *Fractals: an Animated Discussion* • With E. Lorenz & BBM • Animations — Experiments • New York: Freeman • 1990 • German version: • *Fraktale in Filmen und Gesprächen* • mit E. Lorenz & BBM • Heidelberg: Spektrum der Wissenschaft • 1990.

*Between Order and Disorder* • KE-2521 • Films for the Humanities and Sciences, Inc. • Princeton NJ • 1991.

*The Alphabet of Shapes: Benoit Mandelbrot and Fractal Geometry* • AQF5434 • Films for the Humanities and Sciences, Inc. • Princeton NJ • 1991.

*Fractals: The Colors of Infinity* • narrated by Arthur C. Clarke and others • Gordonfilms UK • AQF4976 • Films for the Humanities and Sciences, Inc. • Princeton NJ • 1991.

*The Originals*, Sleeping Giant Productions, Toronto ON, Canada • 1997 (Broadcast on CITY TV).

Massey Science Archive • London UK.

*Clouds are not Spheres* • *The Fractal Theory of Benoit Mandelbrot* • Gordonfilms UK 10915 - A - NT. Films for the Humanities and Sciences, Inc. • Princeton NJ • 2001.

*Keys to Fractals* • *Nine Brief Visits for Teachers and Students* • Gordonfilms UK • 2004.

**ÉMISSIONS DE RADIO**

Norbert Wiener. *Programme culturel français de Radio Canada*, 29 Novembre 1967.

Linguistique et Cybernétique. *Programme culturel français de Radio Canada*, 14 Février 1968.

*Sciences et Techniques*. Matinées de France-Culture, 21 Mars 1979.

*Sciences et Techniques*. Matinées de France-Culture, 16 Juin 1982.

*Danish* (Jorgen Hornemann), June 1983.

*University of Georgia Broadcasts* (Bill Carver), April 15-21, 1984.

*Sciences et Techniques* (Michel Cazenave), France-Culture, Octobre 1984.

*Vorarlberg* (Austria), July 1986.

*Science on Four program*, SO4, BBC, May 1988.

*Science Journal Program*, Station CJRT-FM, Toronto, Ontario, April 18, 1989.

*Upfront News Magazine*, Station CKSL-FM, London, Ontario, 1989.

*Chaos, Sciences and Art*, David Resnick, Station WBEZ Public Radio, Chicago IL (direct broadcast), Oct 1989.

*Chaos and Art*, Station WBAI, New York NY, October 1989.

*La Science et les Hommes* (Michel Cazenave), France-Culture, 15 Novembre 1989.

ABC (Australian Broadcasting Commission) Radio. Separate interviews by Stations in Adelaide (Carolyn Watts), Canberra (Mathew Abraham), Sydney (John Mason) and 2BL (John Doyle), February 1990.

*Open University Broadcasts* (David Saunders), BBC Radio (UK).

*Cinq demi-heures avec BBM* (Jean-François Vallée), France-Culture, 1, 2, 3, 4, et 5 Octobre 1990.

Radio Hamburg (Germany), August 1, 1992.

Bavarian Radio (Germany), *Das Kulturjournal*, August 1992.

Radio Ticino (Switzerland), February 1993.

*Science Program* (50 minutes) Finnish Radio, August 27 & September 2, 1993.

*Technovation* (Jim Horne), Station WAMC Albany, 1993.

*Anderson Country*, BBC Radio 4, 1994.

*France Inter*, 29 Juin, 1994.

*Radio Vaticana* (Heloïse Boyer), January 24, 1996.

*Carnet de notes* (François Hudry), Radio de la Suisse Romande, 14 Mars 1996.

Hong-Kong Today (Station RTHK), Hong-Kong, May 16 1996.

*Les inattendus des fractales* (Les sciences), France-Culture, 9 Avril 1997.

Info-sciences (Science Info) (Marie-Odile Monchicourt) 4 Décembre 1997.

WFMU, 91.1 FM. East Orange NJ (Dorian Devins). Direct broadcast, April 1998.

## ÉMISSIONS DE TELEVISION

*Emission Vingtième Siècle* (Igor Barrère). Télévision française, Mai 1971.

Spanish television, February 8, 1983.

Les montagnes fractales du Professeur Mandelbrot. *Juste une Image* (Antenne 2), 7 Mars 1983.

BBM is on a visit to Japan. *9PM News*. NHK Japan Broadcasting Company, September 21, 1983.

BBM et les images fractales. *Pixels*. Radio-télévision belge francophone, Mars 1984.

*American Institute of Physics*. How About..... program.

BBC Television, *Tomorrow's World.... Fractal World*, 1985.

WGBH *10 PM News*, Boston MA, December 1985, etc...

*Nombres & Lumières* (I.N.A., Antenne 2), March 24, 1986.

NHK Japan Broadcasting Company, April 25, 1986.

RAI Italian Television, June 21, 1986.

*ABC Nightline*, May 27, 1986.

Hungarian TV, Budapest, June 1987.

Radio Canada, Montréal.

*Uno Sera*, RAI Italian Television.

To the  $N$ -th Dimension and back, *Innovation* (WNET), October 6, 1987.

*Naturally Creative* (Michael Dibb), Channel 4 TV, London, November 29, 1987.

*Six O'clock News with Jim Jensen*, CBS, December 21, 1987.

*Quark*, RAI Italian Television, Channel One, November 1988.

Dutch Television, November 1988.

*Equinox Science Magazine*, Channel 4, London, November 20, 1988.

*Eight O'clock News*, Globo Brazilian Television, August 1, 1989.

*Science & Technology*, *Eleven O'clock News*, Globo Brazilian Television, August 2, 1989.



*Futurs* (Igor & Grichka Bogdanoff), TFI, Paris, 26 Octobre 1989.  
*Soixante secondes* (Philippe Plaisance), Antenne 2, Paris, 31 Octobre 1989.  
*Lateline* (Kerry O'Brien), ABC TV Channel 2, February 1990.  
 Chaos Theory and the Arts. *The Late Show* (Martin Davidson),  
 BBC TV Channel 2 (UK), May 23, 1990, 11:15 pm.  
 Nikkei Show, Channel 12, Tokyo, June 16, 1990.  
 Deutsche TV, *Aspekte* (Henning Lohner), November 1990.  
 BBC *Antenna* (David Malone), November 1990.  
 Nevada TV stations: NBC in Las Vegas, CBS and ABC in Reno, March 1991.  
*The Nature of Things*, Discovery channel, October 13, 1991.  
 Korean TV, Seoul, April 1992.  
 On board program of Lufthansa Airlines, April 1992.  
 Dallas Channel 8 WFAA-TV (ABC), May 16, 1992.  
 French TV: FR-3 (Jean-François Vallée), 26 Octobre 1992.  
 IBM Corporate Network, April 29, 1993.  
*Caputher Gespräch*, Ostdeutscher Rundfunk Brandenburg, August 1993.  
 Evening News Finnish Television, August 23, 1993.  
*Les Fractales*, Inventer Demain, Cinquième chaîne (France), 12, 13, 14, 15 et 16 février, 1996.  
*Archimède*, Arte (France), 26 mars 1996.  
 Écu, éco et quoi? M6 (Paris), 5 décembre 1997.  
*Archimède*, Arte (France), 27 janvier 1998.  
 European Business News (London), 1998.  
*The Colours of Infinity*. New York WNET Channel 13, and many other TV stations, 1998.  
*Clouds are not Spheres*. Many TV stations, 2001.

### CONFÉRENCES SUR INVITATION

- 1952 *Communication Theory (2nd Int'l Conference)*, London, UK.
- 1953 *Statistical Methods in Communication Engineering*, Berkeley CA.
- 1954 *Information Networks*, New York NY.
- 1955 *Information Theory (3rd Int'l Conference)*, London, UK.
- 1956 *Symp. on Information Theory* (Inst. Radio Engineers), Cambridge MA.
- 1958 *Corso sulla Teoria della Informazione*, Varenna sul Lago di Como, Italia.
- 1960 *Structure of Language and its Mathematical Aspects* (Am. Math. Soc.), New York NY.  
*Summer School on Mathematics in the Social Sciences* (UNESCO), Menthon, France.
- 1962 *Econometric Society*, Pittsburgh PA.  
*Summer School on Mathematics in the Social Sciences* (UNESCO), Mariazell, Österreich.

- 1963 *Institute of Mathematical Statistics*, Cambridge MA.
- 1964 *Int'l Congress of Logic, Methodology & the Philosophy of Science*, Jerusalem, Israel.  
*Special Course on Thermodynamics*, M.I.T., Cambridge MA.  
*Summer School on Mathematics in the Social Sciences* (UNESCO), Oslo, Norge.  
*Econometric Society*, Chicago IL.
- 1965 *Fifth Symp. on Mathematical Statistics and Probability*, Berkeley CA.  
*First World Econometric Congress*, Roma, Italia.  
*Summer Study Program in Geophysical Fluid Mechanics*, Woods Hole MA.
- 1966 *Boundary Layers and Turbulence* (IUTAM), Kyoto, Japan.  
 Professeur invité de Mathématiques: *Faculté des Sciences*, Paris, France.
- 1967 *Conference on Stochastic Processes*, Santa Barbara CA.
- 1968 *Turbulence in Fluids and Plasmas*, New York NY.  
*Symp. on the Use of Computers in Hydrology*, Tucson AZ.  
 Arts and Sciences Lecturer: *University of California*, Berkeley CA.
- 1969 *Fifth Int'l Conference on Operational Research*, Venezia, Italia.
- 1970 *Second World Econometric Congress*, Cambridge, UK.  
 Charles Gallaudèt Trumbull Lecturer: *Yale University*, New Haven CT.
- 1971 *Statistical Models and Turbulence*, La Jolla CA.
- 1972-3 Professeur invité de Mathématiques: *Université de Paris-Sud*, Orsay, France
- 1973 Conférencier: *Collège de France*, Paris, France.
- 1974 Abraham Wald Memorial Lecturer: *Columbia University*, New York NY.  
 Samuel Wilks Memorial Lecturer: *Princeton University*, Princeton NJ.
- 1975 *Turbulence and Navier-Stokes Equations*, Orsay, France.  
 Invited Lecturer: *Académie des Sciences*, Paris, France.
- 1977 *Buffon Centenary Conference on Geometrical Probability and Biological Structures*, Paris.  
*Statphys 13 (13th Conference on Statistical Physics)* (IUPAP), Haifa, Israel.
- 1978 *Statistical Mechanics* (Rutgers U.), New Brunswick NJ.  
 Goodspeed-Richards Lecturer: *University of Pennsylvania*, Philadelphia PA.
- 1979 *Nonlinear Dynamics* (New York Academy of Sciences), New York NY.
- 1980-2 National Lecturer: *Sigma Xi, The Scientific Research Society of America*.
- 1980 *Canadian Mathematical Congress*, Montréal PQ.  
*Kleinian Groups* (Am. Math. Soc.), Brunswick ME.  
 Distinguished Lecturer: *University of Texas at Dallas*, Richardson TX.
- 1981 *Society of Industrial and Applied Mathematics*, Los Angeles CA.  
*Australasian Congress of Mathematics*, Sydney NSW, Australia.  
 Frontiers of Science Lecturer: *University of Florida*, Gainesville FL.  
 Mathew Vassar Lecturer: *Vassar College*, Poughkeepsie NY.
- 1982 *Statistical Mechanics* (Rutgers U.), New Brunswick NJ.

*Order in Chaos*, Los Alamos NM.  
*Design Conference*, Aspen CO.  
*Ergodic Theory and Applications* (Am. Math. Soc.), Durham NH.  
*Random Walks and Applications* (N.B.S.), Gaithersburg MD.  
*Summer School on Fractals*, Courchevel, France.  
*Union Session on Fractals in Geophysics* (AGU), San Francisco CA.  
 Lewis Fry Richardson Centenary Lecturer: Paisley, Scotland, UK.  
 Célébration du Centenaire: *Ecole de Physique et Chimie Industrielles*, Paris, France.

1983 *Kleinian Groups* (Am. Math. Soc.), Boulder CO (declined).  
*International Congress of Mathematicians* (IMU), Warsaw, Polska.  
*Turbulence and Chaotic Phenomena in Fluids* (IUTAM), Kyoto, Japan.  
*Microstructure of Metals* (Cyril Stanley Smith's 80th Birthday), Philadelphia PA.  
*Statistical Mechanics* (Rutgers U.), New Brunswick NJ.  
*Session on Fractal Geometry in Nature, Science and Art* (AAAS), Detroit MI.  
*Symposium on Fractals* (IMA), Imperial College, London, UK.  
*Random Processes* (Bernoulli Society), Ithaca NY.  
*Statphys15. Fifteenth Conference on Statistical Physics* (IUPAP), Edinburgh, UK.  
*Chaos and Statistical Methods*, Kyoto, Japan.  
*Conference on Fractals in the Physical Sciences* (NBS), Gaithersburg MD.  
 Distinguished Short-Term Visiting Professor: *University of Guelph*, Guelph ON, Canada.  
 James Hudnall Distinguished Visiting Lecturer: *University of Chicago*, Chicago IL.

1984 *Technology, Entertainment and Design*, Monterey CA.  
*Congrès des Mathématiciens Belges*, Bruxelles, Belgique.  
*Swedish Mathematical Soc. Annual Meeting*, Linköping, Sverige.  
*The Computer and the Arts* (New York Philharmonic Orchestra), New York NY.  
*The Physics of Chaos* (Nobel Foundation), Gräftavallen, Sverige.  
*Geometric Measure Theory* (Am. Math. Soc.), Arcata CA (declined).  
*Computer Graphics* (SIGGRAPH 1984), Minneapolis MN.  
*Turbulence* (ICASE/NASA), Virginia Beach VA.  
*Winter Workshop on Fractals*, Les Houches, France.  
*Session on Fractals in Physics* (Am. Phys. Soc.), Detroit MI.  
*Int'l Conference Kinetics of Aggregation and Gelation*, Athens GA.  
*Theoretische Chemie*, Emmetten/NW, Schweiz.  
*Symposium on Fractal Aspects of Materials* (MRS), Boston MA.  
 25th Anniversary Celebration Speaker: *Flemish Faculty of Sciences*, Bruxelles, Belgique.  
*Vancouver Institute*, Vancouver BC, Canada.  
 Leon Lecturer: *University of Pennsylvania*, Philadelphia PA.

1985 *Influence of Computers on Mathematics*, Strasbourg, France.  
*New England Section, American Physical Society*, Worcester MA.  
*Computer Graphics Exhibit* (N.Y. SIGGRAPH Chapter), New York NY.  
*Gordon Research Conference on Ceramics*, Plymouth NH.  
*Summer Meeting, Am. Math. Soc. & Math. Assoc. Am.*, Laramie WY.  
*Eastern Theoretical Physics Conference*, Philadelphia PA.  
*Foundations of Statistical Inference*, Tel Aviv, Israel.  
*Special Session on Fractal Geometry* (Am. Math. Soc.), Worcester MA.  
*Fractals and the Geometry of Nature* (Math. Ass. Am.), Salisbury MD.  
*Fractals in Physics* (ICTP), Trieste, Italia.  
*Gordon Research Conference on Fractals*, Antrim NH.  
*Course on How to Compute and Render Fractals* (Siggraph '85), San Francisco CA.  
*Symposium on Fractal Aspects of Materials* (MRS), Boston MA.  
 Distinguished Speaker: *Graduate Center*, Hartford CT.  
 Distinguished Visiting Professor of Mathematics: *University*, Bremen, Deutschland.  
 Distinguished Lecturer: *Société Française de Physique*: Marseille, France.

- 1986 *Franco-Israeli Condensed Matter Physics Meeting*, Tel Aviv, Israel.  
*Centennial of the Architectural Institute of Japan*, Tokyo.  
*Annual Meeting of SIAM*, Boston MA.  
*New Topics in Condensed Matter Physics*, Aspenäs, Sverige.  
*Climatic Dynamics*, Los Angeles CA.  
*Des fractales en mathématique et en physique (CIRM)*, Marseille-Luminy, France.  
*Fractals: a Professional Development Seminar*, Boston MA.  
*Géométrie Fractale*, Montréal PQ, Canada.  
*Summer Institute on Fractals*, Oberlech, Vorarlberg, Österreich.  
*Gordon Research Conference on Fractals*, New London NH.  
*Dynamics on Fractals and Hierarchies of Critical Exponents*, Orsay, France.  
*Symposium on Fractal Aspects of Materials (MRS)*, Boston MA.  
*Union Session on Fractals in Geophysics (AGU)*, San Francisco CA.  
*Conférence générale: Ecole Polytechnique*, Palaiseau, France.  
*Frontiere della Scienza e della Tecnologia: Progetto Cultura*, Milano, Italia.  
*Society of the Humanities Lecturer: Cornell University*, Ithaca NY.  
*Falconbridge Lecturer: Laurentian University*, Sudbury ON, Canada.  
*Annual Engineering, Arts and Sciences Lecturer: Syracuse University*, Syracuse NY.  
*Frontiers of Science Lecturer: University of Utah*, Salt Lake City UT.
- 1987 *Analyzing the Inchoate*, Ithaca NY.  
*O. M. Corbino Memorial Meeting*, Roma, Italia.  
*Boston Colloquium for the Philosophy of Science*, Boston MA.  
*Chaos in Education*, Balatonfüred, Hungary.  
*The Scientific Imagination*, Barcelona, Spain.  
*Computer Graphics in the Arts & Sciences*, New York NY.  
*Large-Scale Structure of the Universe (Int. Astro. Union)*, Balatonfüred, Hungary.  
*Centenaire de Paul Lévy*, Palaiseau, France.  
*Dynamic Patterns in Complex Systems*, Fort Lauderdale FL.  
*Inaugural Lectures of the Geometry Supercomputing Group*, Minneapolis MN.  
*Fraktale und ihre Bedeutung in Mathematik und Naturwissenschaften*, Oberwolfach, Deutschland.  
*Ensembles fractals*, Roquencourt, France.  
*Fraktalot*, Budapest, Hungary.  
*The Beauty of Fractals (M.I.T.)*, Cambridge MA.  
*Fractal Geometry Lecture Series (CBMS MSRC)*, Cincinnati OH.  
*The Fractal Cosmos: History, Dynamics and Modeling*, Santa Cruz CA & Santa Clara CA.  
*Symposium on Fractal Aspects of Materials (MRS)*, Boston MA.  
*Invited Lecturer: Eötvös Lorand University*, Budapest, Hungary.  
*Werner Heisenberg Lecturer: Bayerische Akademie der Wissenschaften*, München, Deutschland.  
*Boston Colloquium for the Philosophy of Science*, Boston MA.  
*Invited Lecturer: Accademia Nazionale dei Lincei*, Rome, Italia.  
*Gunnar Källen Memorial Lecturer: University*, Lund, Sverige.  
*Invited Lecturer: University*, Oslo, Norge.  
*Abraham Robinson Lecturer: Yale University*, New Haven CT.
- 1988 *Design Conference*, Los Angeles CA.  
*Non Linear Dynamics*, Santa Cruz CA.  
*Large-Scale Structures and Motions of the Universe (ICTP)*, Trieste, Italia.  
*Mathematics in the Sciences*, National Academy of Sciences, Washington DC.  
*Science and the Arts*, Herstmonceaux, UK.  
*Landau Memorial Conference on Frontiers of Physics*, Tel Aviv, Israel.  
*Non Linear Dynamics*, Düsseldorf, Deutschland.  
*Mathematical Geophysics*, Blanes, Spain.  
*Année des fractales*, Montréal PQ, Canada.  
*Hausdorff Memorial Workshop on Fractals (Max Planck Institut für Mathematik)*, Bonn, Deutschland.

*Fractals in Science and Art*, Delft, Nederland.  
*Random Fluctuations and Pattern Growth*, Cargèse, Corse, France.  
*Computer Graphics* (SIGGRAPH 88), Atlanta GA.  
*Gordon Research Conference on Fractals*, Tilton NH.  
*Fractals in the Natural Sciences* (Royal Society), London, UK.  
*Summer School on Fractals*, Erice, Italia.  
*F.A.U.S.T.*, Toulouse, France.  
*Fractals in Geology* (Geol. Soc. Am.), Denver CO.  
 Invited Lecturer: *Institute of Physics*, Fiftieth Anniversary, Mexico City, Mexico.  
 Invited Lecturer: *Design Conference*, Los Angeles CA.  
 Bea Halley Ross Lecturer: *Ohio State University*, Columbus OH.  
 Max Planck Lecturer: *MPI*, Bonn, Deutschland.  
 Distinguished Lecturer: *University of Connecticut*, Storrs CT.  
 J. Von Neumann Computer Center, Princeton NJ.  
 Six Hundredth Anniversary, *University of Cologne*, Deutschland.

- 1989 *Dynamics Days*, Houston TX.  
*L.F. Richardson Memorial*, Bristol, UK.  
*Arnolfini Art Gallery*, Bristol, UK.  
 "SPACE" Conference, Bergen, Norway.  
*Geometry Supercomputing Group*, Minneapolis MN.  
*Géométrie fractale et analyse*, Montréal, Canada.  
*Chaos*, Woods Hole MA.  
*Stat. Phys. 17. Conference on Statistical Physics (IUPAP)*, Rio de Janeiro, Brazil.  
 Kendall Lecturer, *International Statistical Institute*, Paris, France.  
*International Congress of Stereology*, Freiburg/Breisgau, Deutschland.  
*Probability Theory and Polymer Science*, Gaithersburg MD.  
 USSR Academy of Sciences, Moscow and Leningrad, USSR.  
 Studium Generale Lecturer: *University of Groningen*, Groningen, Nederland.  
*Smithsonian Institution*, Washington DC.
- 1990 *Frontiers in Condensed Matter Physics*, Bar Ilan University, Israel.  
*Chaos in Australia*, University of New South Wales, Sydney, Australia.  
*Fractals and Music* (with C. Wuorinen), Guggenheim Museum, New York NY.  
*Creativity and Discovery in the Arts and Sciences*, Glasgow, UK.  
*Fractals in the Fundamental and Applied Sciences*, Lisbon, Portugal.  
*Statistical Dependence and Fractals*, Minneapolis MN.  
*Gordon Research Conference on Fractals*, Plymouth NH.  
*Nobel Conference on Chaos*, Gustavus Adolphus College, St. Peter MN.  
*Ben Gurion University*, Beer Sheva, Israel.  
*Tel Aviv University*, Tel Aviv, Israel.  
*Australian National University*, Canberra, Australia.  
*University of New South Wales*, Sydney, Australia.  
*Texas A&M University*, College Station TX.  
 Rouse Ball Lecturer in Mathematical Science, *University of Cambridge*, Cambridge, UK.  
 Cherwell-Simon Lecturer in Physics, *University of Oxford*, Oxford, UK.  
*University of Warwick*, Coventry, UK.  
*Université Européenne de Paris*, Paris, France.  
*Method in Philosophy and the Sciences*, New York NY.
- 1991 *Meeting of the Am. Assoc. of Petroleum Geologists*, Dallas TX.  
*Meeting of the Am. Chemical Soc.*, Atlanta GA.  
*Regional meeting of the Am. Math. Soc.*, Tampa FL.  
 Nevada Medal Lecturer, Las Vegas NV and Reno NV.  
 Schrödinger Lecturer, *Imperial College*, London, UK.  
 Special Lecturer, *University of Bath*, Bath, UK.  
 Bernard Gregory Lecturer, *CERN*, Geneva, Suisse.

Bea Halley Ross Lecturer, *Ohio State University*, Columbus OH.  
 Special Lecturer, *Iona College*, New Rochelle NY.

- 1992 *Annual Meeting of the National Council of Teachers of Mathematics*, Nashville TN.  
*Special Meeting of the Korean Mathematical Society*, Seoul, Korea.  
*Fractals in Engineering*, Montréal, Canada.  
*Gordon Research Conference on Fractals*, Plymouth NH.  
*Fractals and Disordered Systems*, Hamburg, Deutschland.  
*Europäisches Forum*, Alpbach, Österreich.  
*International Congress of Mathematics Education*, Québec, Canada.  
 Hitchcock Professor, *University of California*,  
 Berkeley, Los Angeles, Santa Barbara, and San Diego CA.  
*Science Forum on Fractals*, Tokyo, Japan.  
 Special Lecturer, *Ajou University*, Suwon, Korea.  
 Microcourse on fractals, *University*, Oslo, Norge.  
 Conférence Bernard Gregory, *Ecole Polytechnique*, Palaiseau, France.
- 1993 *Iso Institute*, Zermatt, Switzerland.  
*European Economic Forum*, Davos, Switzerland.  
*Fractals in Medicine and Biology*, Ascona, Svizzera.  
*Chaos and Complexity*, Blois, France.  
*Analyse Harmonique*, Conférence Jean-Pierre Kahane, Orsay, France.  
*Science and Art*, Santiago de Compostela, España.  
*Science and Art*, Aspen CO.  
*125th Anniversary*, Finnish Mathematical Society, Helsinki, Finland.  
*Summer School*, University of Jyväskylä, Finland.  
*Fractals in Science*, Budapest, Hungary.  
*36ème Congrès*, Association Mathématique du Québec, Montréal, Canada.  
*Association des Professeurs de Mathématiques de l'Enseignement Public*, Poitiers, France.  
 Canadian Mathematical Society, Ottawa, Canada.  
 Bicentennial, *Williams College*, Williamstown MA.  
 Founders Day, *Union College*, Schenectady NY.  
 Harvard Computer Society, *Harvard University*, Cambridge MA.  
 Sakler Lecture, *Tel Aviv University*, Ramat Aviv, Israel.  
 Saul Kaplun Lecture, *Hebrew University of Jerusalem*, Israel.  
 Abe Gelbart Lecturer, *Bard College*, Annandale NY.
- 1994 *Western Meeting of the National Council of Teachers of Mathematics*, San Francisco CA.  
*Bicentenaire de l'Ecole Polytechnique*, Paris, France.  
*Gordon Research Conference on Fractals*, San Miniato, Italia.  
*Fractal Geometry and Stochastics*, Finsterbergen, Deutschland.  
*Lévy Flights*, Nice, France.  
*Fractals* (BBM's Seventieth Birthday celebration), Chubu, Japan.  
 McGill Lecturer, *Columbia University*, New York NY.  
 Vito Volterra Lecturer, *Accademia Nazionale dei Lincei*, Roma, Italia.  
*Statistics of Fractals and Chaos*, *Pennsylvania State University*, State College PA.  
*Urania*, Berlin, Deutschland.  
*Chinese Academy of Sciences*, Beijing, China.
- 1995 *Petroleum Conference*, Scarborough, UK.  
*Fractal Analysis and Modeling of Materials*, Los Alamos NM.  
*Large-Scale Structure of the Universe*, Sesto/Pusteria, Alto Adige, Italia.  
*Bifurcations and Chaos in Economics*, Umeå, Sverige.  
*Dolf Seilacher Festkolloquium*, Universität Tübingen, Deutschland  
 Universität Stuttgart, Deutschland.  
*Physikalisch-Medizinische Gesellschaft*, Universität Würzburg, Deutschland.  
*Urania*, Berlin, Deutschland.

Thirtieth Anniversary of the Physics Department, *Tel Aviv University*, Ramat Aviv, Israel.  
*Académie des Sciences*, Paris, France.  
*Ecole Polytechnique*, Paris, France.

- 1996 Jubilee, *Center for Mathematics and Information*, Amsterdam, Nederland.  
*Fractales et Musique*, Genève, Suisse.  
*Mathématiques et Musique*, Lyon, France.  
*Complexity and Simplicity*, Beijing, China.  
*Gordon Research Conference on Fractals*, Henniker NH.  
World Congress; *Bernoulli Society*, Vienna, Österreich.  
*New ideas in science and art*, Praha, Czech Republic.  
Geometry and Physics, *C.E.C.*, Barcelona, España.  
Financial derivatives, *Banca Monte di Paschi*, Siena, Italia.  
Resnick Lecturer, *Rensselaer Polytechnic Institute*, Troy NY.  
Special Lecturer, *Hong Kong Polytechnic University*, Hong Kong.  
Lecturer: *Nonlinear Dynamics Society*, Shanghai, China.
- 1997 Annual Meeting, *American Finance Association*, New Orleans LA.  
Annual Meeting, *American Mathematical Society*, San Diego CA.  
Annual Meeting, *American Physical Society*, Kansas City KN.  
*Fractals in Engineering*, Arcachon, France.  
Paintings of Francisek Kupka, *Museum of Art*, Dallas TX.  
Astrofundamental Physics, *Ettore Majorana Center*, Erice, Italia.  
*Prematurity in Science*, University of California, Berkeley CA.  
*Fractals in Teaching*, Yale University, New Haven CT.  
Celsius Lecturer, *University of Uppsala*, Sverige.  
Fields Institute Lecturer, *University of Toronto*, Toronto, Canada.  
*University*, Amsterdam, Nederland.  
*Essec*, Cergy-Pontoise, France.  
*École Nationale Supérieure de l'Aéronautique et de l'Espace*, Toulouse, France.  
Statistical Mechanics, *Rutgers University*, New Brunswick NJ.  
European Molecular Biology Laboratory, Heidelberg, Deutschland.  
Ta-You Wu Lecture in Physics, *University of Michigan*, Ann Arbor MI.  
R. & B. Sackler Lecture, *University Oslo*, Norge.
- 1998 *Order, Chance and Risk*, Les Houches, France.  
*Science at the Turn of the Century* (20 years of Wolf Prizes), Jerusalem, Israel.  
*Gordon Research Conference on Fractals*, El Ciocco, Italia.  
*Frontiers of Science: Recent Developments and New Challenges*, Coimbra, Portugal.  
*Classical, Quantum and String Cosmology*, Observatoire de Paris, Paris, France.  
*Statphys 20, Twentieth Conference on Statistical Physics (IUPAP)*, Paris, France.  
*Hercma Conference*, Athens, Greece.
- 1999 Risks in Investment, *Actuarial Foundation*, NewYork NY.  
*RIMS (Hewlett-Packard)*, Bristol, UK.  
*Classical, Quantum and String Cosmology*, Observatoire de Paris, Paris, France.  
*Forbes CEO Conference*, Atlanta GA.  
Scott Lectures in Physics, *Cavendish Laboratory*, Cambridge, UK.  
G.C. Stewart Lectures, *Gonville & Caius College*, Cambridge, UK.  
Science for Survival, *Pontificia Academia Scientiarum*, Citta di Vaticano.  
National Science Week, *University*, Cambridge, UK.  
Felix Klein's 150<sup>th</sup> birthday, *Universität Göttingen*.  
Probability Conference, *Columbia University*, New York, NY.  
Workshop on New Market Models, *DIMAC, Rutgers University*, Piscataway NJ.  
Heavy-Tailed Distributions in Economics, *American University*, Washington DC.  
Finance conference, *London School of Economics*, London, UK.  
Department of Cognition Neurology, *University College*, London, UK.

Colloque Monétaire International, *Banque de France*, Paris, France.  
 Scaling Phenomena in Communications Networks, *IMA*, Minneapolis, MN.  
 Finance, Banking and Insurance, *Universität*, Karlsruhe, Deutschland.  
*ZKM Center for Art and Media*, Karlsruhe, Deutschland.

- 2000 *Fractals in Medicine and Biology*, Monte Verità, Ascona (Ticino), Svizzera.  
*Fundamental Sciences 2000: Mathematics and Theoretical Physics*. National University, Singapore.  
 Annual Assembly: *European Geophysical Union*, Nice, France.  
 Beyond Efficiency and Equilibrium. *Santa Fe Institute*, Santa Fe NM  
*Université de Tous les savoirs*, Paris, France.  
 Fractals in Education Workshop. *Yale University*, New Haven CT.  
*Symmetry*, Wenner-Gren Foundation, Stockholm, Sverige.  
*New Approaches in Financial Economics*, Santa Fe NM.  
*Fractals*. Roma, Italia.  
*The e/volution of Commerce*, Fontainebleau, France.  
*École Normale Supérieure*, Paris France.
- 2001 Annual Meeting, *American Economic Association*, New Orleans LA.  
 Financial Mathematics-Risk Management and Numerical Methods, *UCLA*, Los Angeles CA.  
*Arts and Sciences*, National Arts Club, New York NY.  
 Fractals from Art to Art. *Great Hall*, Cooper Union, New York NY.  
*Creativity* (by video), Ottawa, Canada.  
*Tercentennial Lecture*, *Yale University*, New Haven CT.  
 Image and Meaning, *M.I.T.* Cambridge, MA.  
 Computational Finance, *Yale University*, New Haven CT.  
 Financial Engineering (IAFE), *CERAM*, Sophia Antipolis, France.  
 Joint Meeting, *American & French Mathematical Societies*, Lyon, France.  
 Applied Probability Conference. *INFORS Applied Probability Society*. New York NY.  
 Applied Mathematics(*SIAM/EMS*), *KZC* (Teleconference), Berlin, Deutschland.  
 Sonja Kovalevsky-dagarna. *Royal Swedish Academy of Sciences and KTH*, Stockholm, Sverige.  
 Fractals: Roughness and Beauty. *KTH*, Stockholm, Sverige.  
 Probability and Conformal Mapping. *Mittag-Leffler Institute*, Djursholm, Sverige.  
 Artists and Scientists on the Creative Process, *Villa Serbelloni*, Bellagio, Italia.  
 Leaders in Innovation. MIT, Cambridge MA, and UK, University of Cambridge UK.  
*Politecnico di Milano*, Milano, Italia.  
 Osher Fellowship, *Exploratorium*, San Francisco CA.  
 E. Lorenz Lecture. Annual Meeting, *American Geophysical Union*, San Francisco CA.
- 2002 Annual Meeting, *American Mathematical Society*, San Diego CA.  
*Long-range Dependent Stochastic Processes* (by video), Bangalore, India.  
*National Science Foundation*, Washington D.C.  
*Emory University*, Atlanta GA.  
 Astrophysics, *Observatoire de Paris*, France  
 Fractales ... *Université*, Orsay, France.  
 Fractals in Space, on Earth, and in Mathematics, *University*, Lund, Sverige.  
 Sven Berggren Lecture, *University*, Lund, Sverige.  
 Lund Art School, Malmö, Sverige.  
 Fractals in Education Workshops, *Yale University*, New Haven CT.  
*Royal Physiographic Society*, Lund, Sverige.  
 Pio Manzu, Rimini, Italia.  
 A group of students from three high schools, Kyoto, Japan.  
*Institute for Science, Engineering and Public Policy*, Portland OR.  
 Kliegel Lecture, *California Institute of Technology*, Pasadena CA.  
 Procter Prize Lecture. *Annual Meeting of Sigma Xi*, Galveston TX.  
 Annual Meeting, *Sigma Xi*, Galveston TX.



- 2003 Fractals in Art and Music, *Courtyard Gallery, W.F.C.*, New York NY  
Fractales et musique. Semaine Ligeti (Teleconfrennce), Lyon, France.  
Multiple presentations, *Japan Prize Week*, Tokyo, Japan.  
Fractals, *FUN University*, Hakodate, Hokkaido, Japan.  
Multiple presentations, *von Neumann Centennial Week*, Budapest, Hungary.

### **PUBLICATIONS À DISTRIBUTION LIMITÉE**

- 1949** California Institute of Technology, Pasadena CA  
*Some Problems of Potential Theory* (A.E. Thesis).
- 1953** Institute for the Unity of Science, Boston MA  
*The Brain as a Speaking Machine* (Handout).

### **NON-SUPERSEDED IBM RESEARCH CENTER, YORKTOWN HEIGHTS NY, REPORTS AND NOTES.**

- RC-421 *Five Place Tables of Certain Stable Distributions* (with F. Zarnfaller). December 31, 1959.
- NC-107 *A Critical Note on Information Theory and Statistical Mechanics*. April 16, 1962.
- NC-265 *On the Description of Word Frequencies by the Log-Normal Function*. May 15, 1963.
- RC-1344 *Self-Similar Turbulence and Non-Wienerian Conditioned Spectra*. December 1, 1964.