Ralph Abraham, Curriculum Vita

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1. PROFESSIONAL DATA

1.1 Basic data

Loc: Math Department, University of California,
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Born: July 4, 1936, Burlington, Vermont, U.S.A.
Citizen: United States of America
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1.2 Education and degrees

1954-1956: University of Michigan, B.S.E. Engineering (age 20)
1956-1958: University of Michigan, M.S. Mathematics (age 22)
1958-1960: University of Michigan, Ph.D. Mathematics (age 23)

1.3 Academic appointments

1960-1962: Research Lecturer in Mathematics, University of California, Berkeley
1962-1963: AFOSR Postgraduate Research Fellow, Columbia University, New York City
1963-1964: Assistant Professor of Mathematics, Columbia University, New York City
1964-1968: Assistant Professor of Mathematics, Princeton University, Princeton, N.J.
1968-1978: Associate Professor of Mathematics, University of California, Santa Cruz
1978-1994: Professor of Mathematics, University of California, Santa Cruz
1994-------: Professor Emeritus, University of California, Santa Cruz

1.4 Visiting positions

1967: Visiting Scientist (6 months), Institut des Hautes Etudes Scientifiques
Bures-sur-Yvette, FRANCE
1969: Senior Visiting Scientist (5 months), Mathematics Research Centre
University of Warwick,Coventry, ENGLAND
1971: Visiting Scientist (5 months), Institut des Hautes Etudes Scientifiques
Bures-sur-Yvette, FRANCE
1971: Visiting Professor (4 months), Mathematisch Instituut
University of Amsterdam, Amsterdam, NETHERLANDS

1972: Visiting Scholar (7 months), Neem Karoli Ashram, Nainital, INDIA
1981: Visiting Lecturer (2 weeks), Dept. of Mathematics and Statistics
University of Guelph, Guelph, Ontario, CANADA
1981: Visiting Lecturer (2 weeks), Troisieme Cycle, Section des Physiques Mathematiques
University of Geneva, Geneva, SWITZERLAND
1981: Visiting Lecturer (2 weeks), Institute of Mathematics
University of Warsaw, Warsaw, POLAND
1981: Visiting Scientist (2 months), Institut des Hautes Etudes Scientifiques
Bures-sur-Yvette, FRANCE
1983: Visiting Lecturer (2 weeks), Mathematics Dept.
University of Barcelona, Barcelona, SPAIN
1984: Roche Foundation Fellowship (March, July), Physiology Dept.
University of Basel, Basel, SWITZERLAND
1984: Visiting Lecturer (April), Mathematics Dept. Kyoto
University, Kyoto, JAPAN
1985: Visiting Scientist (March), Institut des Hautes Etudes Scientifiques
Bures-sur-Yvette, FRANCE
1986: Visiting Scientist (July), Brookhaven National Labs, Upton, L.I., NY
1991: Visiting Lecturer (June), Universities of Siena and Florence, ITALY
1993: Visiting Scholar (October), University of Urbino, ITALY
1993: Visiting Scholar (November), University of Paul Sabbatier, Toulouse, FRANCE
1993: Visiting Scholar (December), Kyoto University, JAPAN
1994: Visiting Scholar, Urbino ITALY, Kyoto JAPAN
1995: Visiting Scholar, Urbino ITALY, Kyoto JAPAN
1996: Visiting Scholar, Urbino ITALY, Kyoto JAPAN
1997: Visiting Scholar, Urbino ITALY, Kyoto JAPAN
1998: March 09-22, Kyoto University, Kyoto, JAPAN
1999: March 23 - June 2, Kyoto University, JAPAN
September 4-11, Lectures, Cortona, ITALY
2000: May 24 - April 2, Lectures, Florence, ITALY
2001: May 11-14, Conference, Prague, CZECH REPUBLIC
June 19-24, Workshop, Florence, ITALY
2002: June 5-10, Lectures, s'Graveland, HOLLAND
September 2 - December 12, California State University, San Jose
2003: August 21 - December 18, California State University, San Jose
2004: May 23 -June 14, Fulbright fellowship to JAPAN

1.5 Research interests

1. Coupled networks of dynamical systems, and their applications in the physical, biological, and social sciences.
2. Digital simulation of the biosphere, political and economic systems, and social evolution.
3. Use of interactive computer graphics for mathematical education and research, and in the arts.
4. History of mathematics, esp. chaos theory.
5. Complex dynamical models for environmental economics.
6. The method of critical curves of iterated maps of the plane.

1.6 Grants

1. NSF DISE, 1980-1982: Visual mathematics education.
2. University of California INCOR, 1989-1992: Mathematical models for international relations.
3. NASA Goddard Space Flight Center, 1991-1992: Remote use of massively parallel supercomputers.
4. Fulbright Senior Specialist Award, 2004 - 2008

1.6.1. NSF Grant

Landscape Dynamics is a joint research project of Daniel Friedman, and Ralph Abraham, professors at the University of California, Santa Cruz. It is based upon work supported by the National Science Foundation under Grant No. 0436509. We are developing a mathematical modeling and computer simulation technology based on evolutionary games with continuous spaces of strategies. Applications to economic systems, such as financial markets, provide our initial focus.

1.6.2. Fulbright Grant

Thanks to a grant from the Fulbright Senior Specialist program, 2004-2008, made a number of short visits to Japan and India.

2. TEACHING AND SERVICE

2.1 Master thesis students

1. Amin Kabani, MA (June, 1978)
2. Katherine Scott, MA (June, 1987)
3. Peter Broadwell, MA (January, 1989)
4. Peter Rosencrantz, MA (April, 1989)
5. Nobushige Tsuchiya, MA (August, 1991)
6. Kirby Bunas, MA (1992)

2.2 Doctoral thesis students

1. Jerrold Marsden, Ph.D. Math (1967, Princeton, unofficial advisor)
2. Richard Cushman,Ph.D. Math (1970, Princeton, advisor)
3. Kent Morrison, Ph.D. Math (1972, UCSC, committee member)
4. Daniel Friedman, Ph.D. Math Economics (1974, UCSC, committee member)
5. Thomas Love, Ph.D. Math Physics (1986, UCSC, advisor)
6. Ronald Eglash, Ph.D. History (1993, committee member)
7. Marcella Greening, Ph.D. Literature (1994, committee member)
8. Ronald Joe Record, Ph.D. Comp Math (1994, advisor)
9. Robert Lansdon, Ph.D. Comp Math (1994, advisor)
10. Matthew Clinton, Ph.D. cand. Psychology (committee member)
11. Scott Hotton, Ph.D. Comp Math (1999, committee member)

2.3 Postdoctoral students

1978/79: Marcus Cohen, Biology, Illinois, USA
1981/82: Terje Aaberge, Physics, Oslo, NORWAY
1982/83: Kyaw Thein, Mathematics, Rangoon, BURMA
1983/84:
1. Shashahani, Mathematics, MALAYSIA
2. Eugene Moriarty, Electrical Engineering, San Jose, CA

1984/85: Otsuke, Mathematics, Tokyo, JAPAN
1985/86 K. Kawakami, Electrical Engineering, Tokushima, JAPAN
1987/88: P. G. Vaidya, Applied Math, Pullann, WA
1990/91:
1. Franco Gori, Economics, Florence, ITALY
2. Peter Achermann, Physiology, Zurich, SWITZERLAND
3. Lucio Geronazzo, Economics, Siena, ITALY

2.4 University service

Division Space Committee, 1986/87, 1987/88
Senate Literacy Committee, 1987/88
Department Vice Chair for Facilities, 1986/87 and 1987/88
Division Applied Mathematics Committee, 1988/89
Department Computational Math Center Committee, 1989/90
Library Committee on New Media, 1989/90

2.5 Professional associations

General Evolution Research Group
American Mathematical Society
Society for Mathematical Biology
Lindisfarne Association

2.6 Nonprofit corporations

International Synergy Institute, Santa Fe, NM
The Visual Math Institute, Santa Cruz, CA
The John Dee Society, Santa Cruz, CA
Ecotopia Society, Santa Cruz, CA
American Musical Heritage Society, Felton, CA

2.7 Journals

World Futures, Gordon and Breach (Associate Editor)
Int. J. Bifurcation and Chaos, World Scientific (Founding Editor)

3. TALKS

3.1 Invited addresses since 1980

1981:
1. May, Conference: Mathematics, Dynamics and Evolution of Consciousness, Maharishi International University, Fairfield, Iowa;
   - Lecture: Dynamic Principles in Science and Consciousness.
2. July 1, Colloquium, Physics Department, University of Neuchatel, SWITZERLAND;
   - Lecture: The momentum map.
3. July 6, Colloquium, Chemistry Department, University of Tubingen, GERMANY;
   - Lecture: Structure of the chaotic bagel attractor.
4. July, Visiting Lecturer, Summer School of Physics, Les Houches, FRANCE;
   - Lecture: The Lorenz Attractor.
5. October 8, Colloquium, Institut Henri Poincare, Paris, FRANCE;

- Lecture: Experimental dynamics with computer graphics.

6. October 9, Seminar, Musee des Sciences, Parc de la Villete, Paris, FRANCE;
   - Lecture: Visual mathematics displays.
7. October 19, Seminar, Mathematics Department, University of Tubingen, GERMANY;
   - Lecture: Chaotic blue sky catastrophes.
8. November 6, Seminar, Lucasfilm Ltd., San Raphael, CA;
   - Lecture demonstration: Riding the Lorenz attractor.

1982:

1. Seminar: The Nature of Reality; Esalen Institute, Big Sur, CA; Lecture: The Nature of Chaos (March 2nd)
2. Conference: Nonlinearities in Brain Function, The Kroc Foundation;
   Lecture: Dynamical Models for Physiology, Santa Inez Valley, CA (March 3 - 5)
3. Mathematics Imagery Conference, Kerr Hall, UCSC, "Cognitive Styles of Mathematicians". (March 10-12)
4. Colloquium: "The Geometry of Behavior", San Jose State University, San Jose, CA. (April 15)
5. AMS meeting, California Polytechnic Inst., San Luis Obispo, CA, "Bifurcation research", (June 2)
6. Seminar, Crump Institute of Medical Engineering, University of California, Los Angeles, CA,
   "Chaos in an endocrine system model" (November 26)

1983:

1. One week course: "Modeling and Simulation with Nonlinear Dynamics"
   UCLA Extension, Los Angeles, CA. (February 28 - March 4)
2. Conference: "Chaos Days", University of Guelph, Guelph, Ontario, Canada,
   "Chaotic Tori and Bagels in the Forced Van der Pol Equations" (March 17-19)
3. Winter Conference on Brain Research, Keystone, CO, "Dynamical Stability of Complex Systems". (April)
4. Seminar, IBM Scientific Center, Los Angeles, CA, "Complex system simulation", (May 10)
5. Lecture: "New Maps of Hyperspace", Butterfly Productions, Santa Cruz, CA. (June)
6. Colloquium: "Oscillations and the Stability of Complex Systems" Crump Institute, UCLA, Los Angeles, CA. (June)
7. Fourth International Conference on Mathematical Modelling, Zurich, SWITZERLAND,
   "Complex Dynamical Systems". (August 15-17)
8. Conference: "Singularities and Dynamical Systems", Heraklion, CRETE, "The Bagel Attractors of Birkhoff,
   Van der Pol, and Shaw". (August 30-September 6)
9. Conference: "Scientists and Artists Reunion, Brain Mind Foundation, Belmont, CA. (Oct. 29 - 30)
10. Cosmos Conference, Institute of Ecotechnics, Les Marroniers, Aix-en- Provence, FRANCE,
    "Order in Chaos". (November 20th)
11. Two week course: "Dynamical Models", Physiology Department, University of Basel,
    SWITZERLAND (November 22 - December 8)
12. Math Department, University of Basel, SWITZERLAND, "Blue Sky Chaos", (December 2)
13. Physics Department, University of Basel, SWITZERLAND, "Complex Dynamical Models" (December 5)
14. Seminar: Physiology Department, University of Zurich, Zurich, SWITZERLAND
    "Coupled Circadian Oscillators", (December 6)

1984:

1. Colloquium, Physiology Department, University of Basel, SWITZERLAND,
   "Chaos in a dopamine neuronal circuit model", (March 16)
2. Mitsubishi Central Research Laboratory, Modular Dynamical Systems, Kyoto, JAPAN (March 26)
3. University of Kyoto, Department of Electric Engineering, JAPAN,
   "Bifurcations of Forced and Biased Van der Pol Equations. (March 28)
4. University of Kyoto, Department of Mathematics, JAPAN "Phase Regulation Engineering. (March 29)
5. University of Nagoya, JAPAN, "Phase Entrainment and Morphogenesis". (March 30)
6. Conference: "The Way of the Warrior", Ojai Foundation, Ojai, CA, "Localization of Consciousness". (May 20)
7. Colloquium, Roche Foundation, Basel, SWITZERLAND, "Physiology simulation machines", (June 22)
8. International College of Neurobiology, Zurich, SWITZERLAND, "Dopamine Neuron Models". (June 24-28)
9. Symposium on Mathematics and Computers in Biomedical Application, National Institute of Health,
   Bethesda, MD, "Endosim: A Progress Report". (August 6 - 10)
10. Workshop on Theories of Complexity, Thinking Machines Corporation, Cambridge, MA,
    "Chaos and Cellular Dynamata". (August 26-31)
11. Seminar: "Computational Mathematics and Visual Music", International Synergy Institute, Hollywood, CA. (Oct. 7)
12. Seminar: Bluesky Catastrophes", Brookhaven National Laboratories, Upton, Long Island, NY. (October 21-25)
13. Biospheres Conference One Institute of Ecotechnics, Sunspace Ranch, Oracle, AZ,
    "Funding Biospheric Research". (December 6-9)
14. Conference: "Maps of Consciousness", Esalen Institute, Big Sur, CA,
    "Explorations of Consciousness". (December 9-14)

1985:

1. American Film Institute, Hollywood, CA, "Vibrations in Mathematics, Music, and Mysticism. (January 6)
2. Seminar: "Cellular Dynamical Systems", Los Alamos National Laboratories, Los Alamos, NM. (Febuary 4-6)
3. Conference: "Mayan Civilivation", Ojai Foundation, Ojai, CA, "Mathematical Archaeology". (April 10-14)
4. Colloquium: "Cellular Automata", California State University, Chico, CA. (April 19)
5. Conference: "Sacred Views of Mind and Nature", Ojai Foundation, Ojai, CA,
   "Vibrations and Consciousness". (May 11, 12, 22, 23)
6. Conference: "New Therapies", Esalen Institute, Big Sur, CA, "Chaos and Psychotherapy". (June 17, 18)

7. Seminar: “Reflections on Neurobiology by a Mathematician”, Northwestern University, Evanston, IL. (June 21)
8. Conference: “Consciousness Research”, Esalen Institute, Big Sur, CA, “Chaos and Consciousness”. (August 21-23)
9. “Biospheres Conference Two”, Institute of Ecotechnics, Sunspace Ranch, Oracle, AZ. (September 6-9)
10. Conference: “Nature in the Light of Vision”, Ojai Foundation, Ojai, CA,
    “Meditation and Vibrations”. (September 16-18)
11. Seminar: “Visual Mathematics”, San Jose State University, San Jose, CA. (October)

1986:
1. Lecture: “Vibrations and Resonance Concepts.” Institute for the Study of Consciousness, Berkeley, CA. (February)
2. Nucleation Workshop, Salk Institute, La Jolla, CA. “Bifurcation Models for Evolutionary Processes.” (March)
3. Conference: Matter and Sound, King Alfred’s College, Winchester, ENGLAND,
    “The Vibration Concept in the Ancient World”. (April)
5. Mathematics, Religion, Science and the Arts. Musical Strategies for the Enhancement of Human Intelligence.”
6. Conference on Resonance and Morphogenesis, Esalen Institute, Big Sur, CA.
    “Mathematical Models for Resonant Fields”. (June)
7. Conference: “General Theory of Evolution.” Fourth Galileo Centennial Exposition, Florence, ITALY.
    “Bifurcations in History.” (October)

1987:
1. Marshak Colloquium, UCLA, Los Angeles, CA. “Nonlinear Systems,
    Complex Dynamics, and the Social Sciences.” (January 16)
2. Mathematics Colloquium, Naval Postgraduate School, Monterey, CA.
    “Chaos Theory and its Implications for the Sciences and Society.” (January 22)
3. Burlington Northern Executive Seminar, Palm Springs, CA. “Chaotics and Society”. (February)
4. Electronic Imaging Conference, Anaheim CA. “Image processing and mathematical simulation.” (February 17)
5. Chaos and the Brain Conference, Pecos Ranch, NM. “Chaos in Cellular Dynamical Systems.” (May 1-4)
6. Colloquium, Music Department, Mills College, Oakland, CA.
    “Visual music and the harmony of the spheres.” (October 28)
7. Mathematics colloquium, California State University, San Jose, CA.
    “Complex dynamical systems and visual music”, (November 12)

1988:
1. Graphics Gathering, Santa Cruz, CA. “Cellular dynamical systems and visual intelligence.” (February 20)
2. Third International Conference on Holonomic Processes and Social Systems, Esalen Institute, Big Sur, CA.
    “Complex Dynamical Systems and Holonomic Models.” (March 28)
3. Conference: Living in the Imagination, Esalen Institute, Big Sur, CA. “Chaos and Creativity.” (March 31)
4. Science Discussion Series, Santa Fe Institute, Santa Fe, NM.
    “Complex Dynamics and International Stability.” (May 2)
5. Mathematical Models for Psychoanalysis and Psychotherapy, Beth Israel Medical Center, New York, NY.
    “Dynamics from Communcations Data.” (June3)
6. Philosophy Colloquium, Reality Club, New York, NY. “Chaos in Creation Myths”, (June 2)
7. Science Integration Conference, Dakin Center, San Francisco, CA. (Aug. 20)
8. Lindesfarne Conference, Esalen Institute, Big Sur, CA. (Oct. 3)
9. Chaos and Creativity Conference, Esalen Institute, Big Sur, CA. “Chaos and Cosmos”, (Dec. 1)
10. Annual Conference, California Mathematics Council, Monterey, CA. “Chaos”, (Dec. 2)

1989:
1. Neural Nets as Dynamical Systems, Scripps Institute, La Jolla, CA. (Feb. 18-19)
2. Physics Colloquium, California Polytechnic State University, San Luis Obisbo, CA. “Chaos.” (March 9)
3. Mathematics Colloquium, California Polytechnic State University, San Luis Obisbo, CA.
    “Chaos and Complexity.” (March 9)
4. Public Address, The Smithsonian Institution, Washington, D.C. “The Mathematics of Evolution”, (March 13)
5. Conference on New Technology, The Naval Academy, Annapolis, MD. “Chaos and Global Problems”, (March 17)
6. Forum, International Center for Integrative Studies, New York, NY. “Models for History”, (March 19)
7. Religious Studies Seminar, University of California, Santa Cruz, CA. “The Orphic Revival”, (April 18)
8. Conference on Holonomic Processes, Esalen Institute, Big Sur, CA. “Social Synergy Models”, (April 25)
9. 900th Anniversary, University of Bologna, ITALY. “Social and International Synergy”, (May 18)
10. University of Florence, ITALY. “Socioeconometric models”, (May 19)
11. University of Copenhagen, Mathematics Colloquium Copenhagen, DENMARK
    “Chaos Theory and the Social Sciences”, (June 6)
12. Int’l. Economic Assoc., Conference on Business Cycles, Copenhagen, DENMARK.
    “Cycles and Chaos in Complex Dynamical Systems”, (June 7)
13. Epistomology Workshop, Esalen Institute, Big Sur, CA. “Dimensions of experience”, (June 22)
14. Seventh International Conference on Mathematical and Computer Modeling”, Chicago, IL.
    “Keynote Address”, (August 2)
15. Workshop, Esalen Institute, Big Sur, CA. “Metamorphosis, a Trialog with Rupert Sheldrake and
    Terence McKenna”, (September 9-10)
16. Coloquium, “Complex Dynamical Systems: Experiments and Applications”, Xerox PARC, Palo Alto, CA. (Sept. 14)
17. Seminar, “The emergence of form in a field of chaos: an experiment with 65,000 computers”
    UCSC, Nonlinear Science Institute, Santa Cruz, CA. (Oct. 8)
18. Chaos and Order, Styrian Arts Festival, Graz, AUSTRIA. “Space-time patterns in visual music”, (October 14-18)

19. Cellular dynamical systems, Colloquium, Math Dept., University of Graz, AUSTRIA (October 18)
20. The new math, Colloquium, Dept. of Statistics and Computer Science, Univ. of Vienna, AUSTRIA (October 19)
21. Public Lecture, The Open Center, New York, NY. "Chaos, Gaia and Eros:
    Mathematics and the Pagan Revival", (October 20)
22. Lindesfarne Fellows Conference, Cathedral of Saint John the Divine, New York, NY.
    "Chaos and Creation: the Mathematics of Genesis", (October 21)
23. International Synergy Conference, Los Angeles, CA. "ERODYNAMICS:
    Complex dynamical models for relationship", (November 5)

1990:
1. Winter School on Nonlinear Physics, Visualization techniques for cellular dynamata, UC Santa Cruz (Jan. 11)
2. Colloquium, "Mapping mathematical images into musicalspace", Music Dept., UCSD (Feb. 22)
3. Public Lecture, "Mathematics and the Orphic revival", CIIS, San Francisco, CA (February 23)
4. ISSS International Conference, "Chaoscopy of psychotherapeutic data", Portland, OR (July 8-12)
5. Carmel Bach Festival "Orphism", Carmel, CA (July 26, August 2)
6. Esalen Institute "Three Ms: Mathematics, Music, Myth", Big Sur, CA (July 27-29)
7. University of California, Smalefest Moderator, "Classical mechanics", Berkeley, CA (August 9)
8. Dynamics and Economics Workshop "Chaos in complex systems",
    University of Stockholm, SWEDEN (October 26)
9. Acoustical Society of America, Annual Conference "Resonance of chaotic vibrations",
    San Diego, CA (November 26)

1991:
1. Graduate Students for Social Responsibility, Chaos and the New World Order, UC Santa Cruz (Jan. 31)
2. Bay Area Chaos SIG, Cellular dynamics and the ozone hole, NASA-Ames, CA (Feb. 7)
3. Public lecture, International Synergy Institute, Chaos and the search for a new world order,
    Santa Fe, NM (March 24)
4. Invitational Workshop: Exercise and the immune response, Esalen Institute, Big Sur, CA (April 3-5)
5. Seminar on Science and Spirituality, Stanford University, Stanford, CA (April 18)
6. Cyberspace Conference, Historical models in virtual reality, UCSC, Santa Cruz, CA (April 20)
7. IEEE CAT Conference, Mathematics of chaos, Asilomar, CA (May 14)
8. Workshop on Mathematical Economics, Cellular dynamics and spatial economics, Siena, ITALY (May 27-30)
9. Hollyhock Invitational Conference, Bringing magic to the mainstream, Chaos and social transformation,
    Hollyhock Farm, Cortes Island, B.C. (August 12-18)
10. Society for Literature and Science, Bifurcations and history, Montreal (Oct. 10-13)
11. Conference on the Green Cathedral, Lindisfarne Fellowship, Cathedral of St. John the Divine,
    New York City (October 17)
12. Distinguished plenary lecture, Mathematical basis for music therapy on a planetary scale,
    International Congress, Society for Music Therapy, San Diego (November 22)

1992:
1. Public workshop, Alexandrian traditions, Esalen Institute, Big Sur, CA (Jan. 24-26)
2. Physics colloquium, Discrete dynamical systems, Monterey, CA (Mar. 6)
3. Public lecture, Math and the environment, Math. Dept., UCSC (Apr. 28)
4. Public workshop, Dynamical systems in economics, University of California, Los Angeles, CA (Apr. 29 - May 3)
5. Wili Unsoeld Lecturer, The revival of pagan mathematics, Evergreen College, Olympia, WA (May 13-15)
6. Invited lecture, The rise of the symplectic approach, Inaugural Conference, Fields Institute,
    Toronto, ONT, CANADA (Jun. 11)
7. Public workshop, Mathematics as a visual art, Earth Trust Institute, Malibu, CA (July 10-11)
8. Panel, Chaos in psychology, American Psychological Association Annual Conference,
    Washington, DC (Aug. 14-15)
9. Public workshop, Dynamical systems in economics, University of Aalborg, Aalborg, DENMARK (Aug. 17-21)
10. Public workshop, Return to the edge of the West, Esalen Institute, Big Sur, CA, (Aug. 28-30)
11. Conceptual Tools for Understanding Nature, Models for biological morphogenesis,
    University of Trieste, ITALY (Sept. 23-26)
12. Performance of mathematics as visual music, Duet for cello and endomorphism,
    (with Ami Radunskaya and Peter Broadwell), 20th Anniversary, Lindisfarne Fellowship,
    Cathedral of St. John the Divine, New York, NY (Oct. 17)
13. Society for Mathematical Biology, Cellular dynamata and biological morphogenesis, Denver, CO (Nov. 15)

1993:
1. Public workshop, Eccentric thinking, Esalen Institute, Big Sur, CA (Jan. 29-31)
2. Conference, Art and the Apocalypse, Esalen Institute, Big Sur, CA (April 11-16)
3. Public lecture, Bicycle Day, University of California, Santa Cruz, CA (April 16)
4. Lecture, Complex dynamical models with endomorphisms, Dynamical Systems Institute,
    University of Bremen, GERMANY (June 21)
5. Public workshop, Trialogues, Hazelwood House, Devon, ENGLAND (June 25- 27)
6. Conference, Science and Art, Lindisfarne Association, Crestone, CO (August 8-15)
7. Colloquium, Chaos and economic behavior, University of Macerata, ITALY, 14 October, 1993.
8. Colloquium, Chaos and economic behavior, University of Ancona, ITALY, 20 October, 1993.
9. Colloquium, Chaos and economic behavior, University of Firenza, ITALY, 22 October,1993.

10. Colloquium, Generic properties of planar endomorphisms, University of Paul-Sabbatier, Toulouse, FRANCE, 27 October, 1993.
11. Chaos workshop, Chaos and complex dynamics, Kansei Electric Power Company, Osaka, JAPAN (December 3)
12. Invited lecture, Chaos in the power grid, Institute of Electrical Engineers, Osaka, JAPAN,(December 7)
13. Colloquium, Economics and the power grid, Electrical Engineering Dept., University of Kyoto, JAPAN (December)
14. Colloquium, Economics and the power grid, Insstitute for Systems Sciences, National University of Singapore, SINGAPORE (December 14)

1994:
1. Invited lecture, North-South dynamics and the environment, Mattei Foundation, Milan, ITALY (Jan. 10)
2. Public workshop, The chaos revolution, Esalen Institute, Big Sur, CA (Feb. 4-6)
3. When to Call Home, Appearance with performance artist Nina Wise, A Traveling Jewish Theater, San Francisco, CA (February 6)
4. Invited lecture, Simulation of prairie ecology, The Land Institute, Salina, Kansas (March 25)
5. The World Wide Web in the classroom, UC Extension Conference, Santa Cruz, CA (August 16)
6. Chaos Philosophy, Carl Cherry Foundation, Monterey, CA (October 1)
7. Chaos, Gaia, Eros, Gaia Bookstore, Berkeley, CA (November 1)

1995:
1. Chaos, Gaia, Eros, Black Oak Bookstore, Berkeley, CA (January 8)
2. Complex dynamical models, Economics Dept., Kyoto University, JAPAN (January 12)
3. Post-Aristotelian mathematics, International Center, Kyoto University, JAPAN (January 17)
4. Chaos, Gaia, Eros, Capitola Book Cafe, Capitola, CA (January 24)
5. Chaos, Gaia, Eros, Gateways Bookstore, Santa Cruz, CA (January 27)
6. Complex dynamical model of the world economy, Univ. of Firenzi, Economics Dept., Florence, ITALY (February 8)
7. Tour of the World-Wide Web (with Will Russell), UC Santa Cruz, Santa Cruz, CA (February 16)
8. Chaos, Gaia, Eros (with William Irwin Thompson), weekend workshop, Esalen Institute, Big Sur, CA (February 17-19)
9. Chaos, Gaia, Eros, Borders Bookstore, San Francisco, CA (February 24)
10. The method of critical curves, Geometry Institute, Minneapolis, MN (March 14)
11. Chaos, Gaia, Eros, Calif. Inst. Integral Studies, San Francisco, CA (March 15)
12. Chaos and consciousness, Santa Cruz Book Fair, Santa Cruz Civic Auditorium, Santa Cruz, CA (March 18)
13. Chaos and the spiritual world, Rudolph Steiner-Schule Wien-Maurer, Vienna, AUSTRIA (March 24-26)
14. Complex dynamical models, Technical University of Vienna, Vienna, AUSTRIA (March 28)
15. Political work and the world-wide web, Sustainibility Consciousness Conference, Esalen Institute, Big Sur, CA (April 11)
16. Chaos and Gaia, Environmental Spirit Conference, UC Berkeley, Berkeley, CA (April 15)
17. Euclid's voyage, weekend workshop, Esalen Institute, Big Sur, CA (May 5-7)
18. Chaos philosophy (with Paul Lee and Will Russell), Carl Cherry Foundation, Carmel, CA (May 12)
19. Chaos and music (with Ami Radunskaya), International Transpersonal Association, Santa Clara, CA (June 9)
20. The Sheldrake principle, the World-Wide Web, Workshop presentations, The Ross School, East Hampton, NY (Aug. 7-11)
21. Telluride Mushroom Festival, Telluride, CO (August 24-27). Three lectures and one panel:
    - Dynamical systems and altered states
    - The mycelial mat and the World-Wide Web
    - Math, the environment, and social transformations
    - Mycelial consciousness (panel)
22. Discrete dynamical systems, Univ. of Grenoble, Grenoble, FRANCE (September 48)
23. Concert of chaotic image and music, Pomona College, Claremont CA "MIMI and the Illuminati", (Oct. 31
24. Int'l. Congress of Architecture, Vienna, AUSTRIA, "Urban chaos" (Nov. 4)

1996:
1. Chaos and the language of Nature, weekend workshop, Esalen Institute, Big Sur, CA (February 2-4)
2. Lecture series, Institute for Science, Portland, OR (February 8-11).
    - Education and the chaos revolution, Cleveland High School
    - The WWW, chaos theory, and computer simulation may save the planet, Portland State University
    - Education and the chaos revolution, Pacific University
    - Education and the chaos revolution, Oregon Episcopal School
    - Euclid's voyage into chaos, Schnitzer Theatre, Portland
    - Euclid's voyage into chaos, University of Oregon, Eugene
3. Chaotic resonance, Univ. of Georgia, Athens, GA (February 29 - March 1)
4. The long line of chaos, Society for Chaos Theory in Psychology, Berkeley, CA (June 15)
5. Complexity of the World Wide Web, Fed. Information Science, Vienna, AUSTRIA (June 20)
6. Chaos and the Millennium, National Collegiate Honors Council, San Francisco, CA (October 31)
7. Chaos theory and space-time patterns, Council of Europe, Prague, CZECH REPUBLIC (November 19-23)

1997:
1. Kyoto University, JAPAN (March)
2. Museum of Modern Art, Dallas TX (May)

3. Between Earth and Sky, Esalen Institute, Big Sur CA (June 6-8)
4. Dublin, IRELAND (August 10-24)
5. University of Sienna, ITALY (September)
6. Oregon Dept. of Education (October)
7. Einstein Conference, Poona INDIA (December)

1998:
1. Kyoto Unversity, JAPAN (March)
2. Trialogue conference, Santa Cruz, CA (June)
3. Homeokinetics Conference, Univ. of Conn., Storrs, CN (July)
4. Workshop, Omega Institute, Rhinebeck, NY (August)
5. School for Complex Systems, Neuchatel, SWITZERLAND (September)
6. General Evolution Research Group, Sardinia, ITALY (November)

1999:
1. Kyoto Univesrity, JAPAN (March)
2. Inst'l Society of System Sciences, Asilomar, CA (June 29)
3. Society for Chaos Theory in Psychology, Berkeley, CA (July 23-25)
4. Workshop, Omega Institute, Rhinebeck, NY (July 30 - August 1)
5. Cortona Days, Cortona, ITALY (September 4-9)
6. Future Visions, San Francisco, CA (October)

2000:
1. California Institute for Integral Studies, San Francisco, CA (February 4)
2. Einstein Days, Santiniketan, INDIA (March 16-18)
3. Colloquium, University of San Francisco, CA (April 4)
4. Cruzio, Santa Cruz, CA, Shortcourse in Chaos (April 17 to may 15)
5. Planetworkers Conference, San Francisco, CA (May 12)
6. Lectures, Ross-Holst Wedding, Florence, ITALY (May 24)
7. Conference, Esalen Institute, Big Sur, CA (July 2-6)
8. Workshop, Esalen Institute, Big Sur, CA (September 8-10)
9. Lecture, California College of Arts and Crafts, Oakland, CA (October 3)
10. Chaos Conference, Asuka, JAPAN (October 8-10)**

2001:
1. Public Lecture, Wainwright House, Rye, NY (January 22)**
2. Ross School, East Hampton, NY (January 26-29,)
3. Einstein Days #2, Conference, Calcutta, INDIA (March 14-20)**
4. General Evolution Research Group, Carmel, CA (March 17-18)
5. Ross School, East Hampton, NY (April 23-27)
6. Conference on Art and Science, Prague, CZECH REPUBLIC(May 11-14)
7. The Dream of Florence Workshop, Florence, ITALY (June 19-24)
8. Kronia World Conference, Laughlin, NV (July 6-10)
9. ISSS Annual Conference, Asilomar, CA (July 8-13)
10. Consulting: Ross School, East Hampton, NY (August 6-31)
11. Public Lecture: Image, Culture, and Chaos Theory, G2 Institute, San Francisco, CA (September 17)
12. Workshop: Chaos and the Perennial Philosophy, Esalen Inst. (September 21-23)
13. Lecture, New College, San Francisco, CA (September 27)
14. Colloquium Lecture: Chaos and the Social Sciences, Fernand Braudel Center, Binghampton University, Binghamton, NY (November 1)

2002:
1. Ross School, East Hampton, NY (February 8-10)
2. Foundation for Mind and Being Research, San Jose, CA (March 22)
3. Tagore Einstein Institute, Berlin, GERMANY (May 25-27)
4. Einstein Forum, Potsdam, GERMANY (May 29)
5. Seeds of Wholeness, s'Graveland, HOLLAND (June 5-10)
6. American Cybernetic Society, Santa Cruz, CA (June 13)
7. Institute for Noetic Sciences, Petaluma, CA (June 14-16)
8. Conference, Inst Noetic Sciences, Petaluma, CA (June 14-16)
9. Ross School, East Hampton, NY (August 7-9)
10. Ross School, East Hampton, NY (August 19-21)
11. Conference, Aspen Institute, Aspen, CO (October 4-6)

2003:
1. Workshop, Esalen Institute, Big Sur, CA (January 10-12)
2. Ross School, East Hampton, NY (January 27-29)
3. UCLA Medical (March 3-4)
4. Ross School (March 15-20)
5. Conference, Haverford College, PA (March 29)
6. Teaching at UCSC (April 1 - June 10)
7. Presentation, Kepler's Music of the Spheres, San Francisco Art Institute

San Francisco, CA (April 17)
8. Conference, Science and Consciousness, Albuquerque, NM (April 25-30)
9. Conference, TonyFest, UC Santa Cruz, CA (May 2-3)
10. Conference, ISSS and GERG, Crete, GREECE (July 7-11)**
11. Ross School (July 15-20)
12. Ross School (August 4-8)
13. Teaching at SJSU (Cal State Univ San Jose) (August 21 - December 18)
14. Cybersphere Conference, Inst of Ecotechnics, Santa Fe, NM (November 7-10)
15 Fulbright Senior Specialist award (five years)(November)

2004:
1. Teaching at Univ Calif Santa Cruz (January 2 - March 15)
2. Conference, Greater Philadelphia Philosophy Consortium, Dialogue on Science and Spirituality: Haverford College, Philadelphia, PA (March 20)
3. Fulbright Fellowship to JAPAN, 5 lectures (May 23 -June 14)
4. Math-econ conference, Siena, ITALY (Haverford College, Philadelphia, PA (March 20)
5. Weekend workshop (with Rudy Rucker), Esalen Institute, Big Sur, CA (October 1-3)
6. Colloquium Lecture, UCSC Digital Arts/New Media Program, Santa Cruz, CA, (October 11)
7. Minilecture, Santa Cruz, CA (October 16)
8. Minilecture, Creative Chaos, University of Creation Spirituality, Techno Cosmic Mass, Oakland, CA (October 24)
9. Lecture, (Joint with Dr. Paul A. Lee) , Santa Cruz, CA (October 28)
10. Fulbright Fellowship to INDIA, (November)
11. Conference: The Informed Universe and its Meaning for Our Life and Future, Museum-Insel Hombroich (near Dusseldorf, GERMANY) (December 4 and 5)

2005:
1. Chaos, Fractals, and the Arts, UC Santa Cruz (January-March)
2. The Graduate Institute, New London, CN (March 18)
3. Global Consciousness Project, IONS (April 1-5)
4. Math Colloquium, Harvey Mudd and Pomona Colleges (April 13)
5. 7th International Conference on Science and Consciousness Santa Fe, NM (April 23 -- 25)
6. Lecture, 2:00 -- 3:00 pm, "Where have all the angels gone?" (April 23)
7. Lecture, 10:30 am -- noon, "Neural Networks and Collective Consciousness" (April 25)
8. Fulbright fellowship to JAPAN (May 31 -- June 22)
9. SigGraph, Los Angeles CA (August 3-4)
10. Society for Chaos Theory in Psychology and the Life Sciences, Denver CO (August 5-6)
11. Tjalling Koopmans Distinguished Lecture, IIASA Laxenburg, AUSTRIA (August 24)
12. Fulbright fellowship to INDIA (December)

2006:
1. Fulbright fellowship to INDIA (January)
2. Djerassi Resident Artists Program (March 14-April 16)
3. Teaching at UCSC (April 4)
4. Assisi Conference, Woodstock, VT (May 19)
5. ISSS Conference, Sonoma, CA (July 9-14)
6. Bay Area Playwright Foundation, San Francisco (July 31)
7. Ross School, East Hampton, NY (August 21-23)
8. George Mason University, Fairfax, VA (August 24-25)
9. Mind, Brain, Education Conference, East Hampton, NY (November 30-December 3)
10. Poetry Science Talks, New York, NY; "Quantum Mechanics and Kashmiri Shaivism" (December 7)

2007:
1. Spain (February 26 -- March 15)
2. UCSC course, Porter 34B "Chaos, Fractals, and the Arts" (April, 03 - June 14)
3. Lindesarne Association, Santa Fe, NM (August 2-5)
4. Trialogue with Rupert Sheldrake and Andy Weil, "The Quantum Vacuum and the Soul" Hollyhock, Cortes Island, BC, CANADA (August 8-15)
5. Ross School, East Hampton, NY (August 21-25)
6. Scholar in Residence, Ross School, East Hampton, NY (October-November)

2008:

1. UC Santa Cruz, Digital Arts and New Media 220: Introduction to Programming for the Arts (January 08 -- March 21)
2. Visioning the future: An interactive forum on uplifting evolutionary ideas, with Visionary Indigenous Elders and Western Scientists and Futurists , The INNstitute, Sedona, AZ (January 26)
3. The transmission of knowledge, a Ross School trip, Athens, GREECE (February 22 -- March 02)
4. Four lectures, Complex System 2008, Indian Statistical Institute, Kolkata, INDIA (March 17 -- April 05)
5. Plenary lecture, MathKnow08, Lectues at Universities of Florece and Milan-Bicocca

Polytechnico di Milano, ITALY (May 22-24)
6. Lindisfarne Association Annual Conference
Santa Fe NM (July 31 -- August 03)
7. Ross School, Faculty Retreat, East Hampton, NY (August 19-24)
8. Dynamics Days Asia Pacific 5, Nara, JAPAN (September 9-12)
9. RIKEN Workshop,Tokyo, JAPAN (September 16)
10. Structural stability and the misuse of mathematics, UCSC, Math Colloquium (September 30)
11. Harvard Graduate School of Education (December 12)

2009:
1. Visiting research position, quantum vacuum and consciousness
Indian Statistical Institute, Kolkata, INDIA (February 1-15)
2. Porter College Course: Chaos, Fractals, and the Arts. UCSC (April-June)
3. Lindisfarne Association Annual Conference, Santa Fe, NM (July 15 -19)
4. Teachers Academy, The Ross School, East Hampton, NY (August 20-29)
5. Intl. Policy Dialogue #1 on ---Nuclear Disarmament: Can Complexity Thinking Accelerate the Process?
Madrona Institute, Santa Fe, NM (October 08-11)
6. Science and Nonduality 2009 Conference, 30 minute presentation,
A Digital Solution to the Mind/Body Problem, San Rafael, CA (October 22-25)
7. Fall Emeriti Lecture, Bolts from the Blue: Startling Episodes from the Coevolution of Mathematics and Art
UC Santa Cruz (November 4)
8. Trialogue Workshop with Jean Houston and Mary Catherine Bateson
Esalen Institute, Big Sur, CA (November 20-22)

2010:
1. Digital Arts and New Media 221: Mathematics and the Arts, UC Santa Cruz (January 5 - March 19)
2. Intl. Policy Dialogue #2 on - Nuclear Disarmament: Can Complexity Thinking Accelerate the Process?
Madrona Institute, Santa Fe, NM (February 3-6)
3. Ross School, East Hampton, NY (April, May)
4. Lindisfarne Association Annual Conference, Santa Fe, NM (July 21 -- 25)
5. Ross School, East Hampton, NY(August 22 -- September 04)
6. Tokyo, JAPAN (November 3-13)
7. Workshop with Bruce Lipton, Esalen Institute, Big Sur, CA (December 03-05)

2011:
1. Porter College 34B: Chaos, Fractals, and the Arts, UC Santa Cruz (March 28 - June 09)
2. Workshop with Bruce Lipton, Esalen Institute, Big Sur, CA (August 12-14)
3. Annual Summer Retreat, Ross School, East Hampton, NY (August 22 - September 2)
4. Lindisfarne Fellows Conference, Abode of the Message, New Lebanon, NY (October 12 - 16)
5. Fall Visit, The Ross Institute, East Hampton, NY (October 21-November 02)
6. Lecture on Kepler, Morrison Planetarium, San Francisco, CA (November 17)
7. Intl. Union of Theor. and Appl. Mechanics (IUTAM),
Symp. on 50 Years of Chaos: Applied and Theoretical, Kyoto, JAPAN (November 28 - December 2)

2012
1. 2nd Int'l Symposium on Complex Dynamical Systems and Applications,
Presidency University, Kolkata, INDIA (January 9-11)

3.11 Interviews since 1982

1. Omni Magazine (June, 1983)
2. CBS Radio (31 August, 1983)
3. Newsweek Magazine (18 July, 1983)
4. Brain/Mind Bulletin (18 June, 1984)
5. Mosaic, Nat. Acad. Sci. (January, 1985)
6. German TV (21 March, 1986) Published in: J. Voigt, Paradigms, Old and New, Aerial, 1991.
7. Santa Cruz Sentinel (27 April, 1986)
8. Business Week (4 August, 1986)
9. Los Angeles Weekly (14 November, 1986)
10. Los Angeles Times (26 November, 1986)
11. Santa Cruz Good Times (26 November, 1986)
12. Radio KAZU, Carmel, CA (8 February, 1987)
13. KPFA National Broadcast (16 August, 1987)
14. ABC Good Morning America (17 June, 1988)
15. Whole Mind Newsletter (July, 1988)
16. High Frontiers (November, 1988).
17. PBS Nova Series (Thomas Levenson, January, 1989)
18. BBC Horizon Series (Jeremy Taylor, February, 1989)
19. KGO-TV News (February, 1989)
20. German TV (Jurgen Voigt, May, 1990)
21. KKUP Radio, Cupertino, CA (Barry Fiore, May, 1990)

22. The Pinecone, Carmel, CA (John Detro, July, 1990)
23. IS Newsletter #9, Spring, 1990 (Brown, McClen, Brodsky)
24. Mondo 2000 (Brown and McClen, March 1991, p. 154)
25. Gentlemen's Quarterly (Walter Kern, July 1991, p. 96)
26. BBC TV (Julian Nott, October, 1991) Numerous TV and radio appearances throughout US and Europe, (1992-present)

4. PUBLICATIONS

4.1 Books

1. Linear and Multilinear Algebra, Benjamin, New York, 1967.
2. Foundations of Mechanics (with J. Marsden), Benjamin, New York, 1967.
   - MR 36#3527 (B. L. Reinhart, 1968)
3. Transversal Mappings and Flows (with J. Robbin), Benjamin, New York, 1967.
   - MR 39#2181 (J. Palis, 1970)
4. Foundations of Mechanic, Second Edition (with J. Marsden), Benjamin, New York, , 1979.
   - MR 81e:58025 (D. L. Rod)
5. Dynamics, the Geometry of Behavior, Vol. 1, (with C. Shaw), Aerial, Santa Cruz, 1982.
   - MR 84m:58001 (P. D. F. Ion)
6. Manifolds, Tensor Analysis, and Applications, (with J. Marsden and T. Ratiu), Addison-Wesley, Reading, 1983.
   - MR 84h:58001 (Donald W. Kahn)
7. Dynamics, The Geometry of Behavior, Vol. 2, (with C. Shaw), Aerial, Santa Cruz, 1983.
8. Dynamics, The Geometry of Behavior, Vol. 3, (with C. Shaw), Aerial, Santa Cruz, 1985.
   - Japanese translation of Vols. 1-3, 1990.
9. On Morphodynamics, SFX 2, Aerial, Santa Cruz, 1985.
10. Manifolds, Tensor Analysis, and Applications, Second Edition, (with J. Marsden and T. Ratiu), Addison-Wesley, Reading, 1988.
    - MR 89f:58001
11. Dynamics, The Geometry of Behavior, Vol. 4, (with C. Shaw), Aerial, Santa Cruz. 1988.
12. Complex Dynamics, SFX 3, Aerial, Santa Cruz, 1991.
13. Trialogues at the Edge of the West (with Terence McKenna and Rupert Sheldrake), Bear & Co, Santa Fe, NM, 1992.
    - German translation, Scherz Verlag, Munich, 1993.
    - Portuguese translation, Sao Paulo, 1994.
    - French translation. Paris, 1994.
    - Dutch translation. Amsterdam, 1994.
    - Spanish and Russian editions in press.
14. A Visual Introduction to Dynamical Systems Theory for Psychology (with Fred Abraham and Chris Shaw), Aerial Press, Santa Cruz, CA. 1991.
15. Dynamics, The Geometry of Behavior, Second edition, (with C. Shaw), Addison-Wesley, Reading MA. 1992.
16. Chaos, Gaia, Eros, Harper and Row, San Francisco, CA. October, 1994.
    - Korean translation, Chinese translation in press.
17. The Web Empowerment Book, (with Frank Jas and Willard Russell), TELOS/ Springer-Verlag, New York, March 1995.
    - Chinese translation, 1995.
18. Evolutionary Mind, (with Terence McKenna and Rupert Sheldrake), Santa Cruz: Trialogue Press, May 1998.
    - German translation.
19. Chaos in Discrete Dynamical Systems, book (with Laura Gardini and Christian Mira), and CD-ROM (with Ronald Record) TELOS/Springer-Verlag, 1997.
20. The Chaos Avant-garde, World Scientific, 2000.
21. Demystifying the Akasha: Consciousness and the Quantum Vacuum, Epigraph, 2010.
    (Joint with Sisir Roy, Indian Statistical Institute, Kolkata)
22. Bolts from the Blue, Epigraph, 2011.
23. Chaos, Gaia, Eros, reprinted. Epigraph, 2011.

4.2 Videos

1. Macroscope 0: Introduction to the Jenny macroscope, 30 min., April, 1974.
2. Macroscope 1: Macroscopy, (with Paul Kramerson), 60 min., July, 1980.
3. CD#1: The emergence of order in a field of chaos, (with John Corliss and John Dorband), 10 min., August, 1989.
4. Communicative chess (with Marsha King), 10 min., July, 1990.
5. A double logistic map (with Ron Record) 4 min., July, 1993. Rev. 2: 16 April 1994.
6. Chaos, Gaia, Eros, RoseX, 1993.
7. Morphogenesis, Mystic Fire, 1995.
8. The Cybersphere as a Complex Dynamical System, Institute of Ecotechnics, Santa Fe, NM, 09 November 2003.
9. Bolts from the Blue, UC Santa Cruz Emeriti Lecture, 05 November 2009.
10. Math and the Arts: Just Plane Symmetry, UC Santa Cruz, Digital Arts / New Media 221, Winter 2010.
    A Study of Repeating Patterns [Course Website]
    1T: Introduction First lecture (1T = Week 1, Tuesday, 38 minutes)
    1U: The Math Mentalities Second lecture (1U = Week 1, Thursday, 9 minutes)
    2T: The Seven Frieze Groups Third lecture (2T = Week 2, Tuesday, 28 minutes)

2U: Frieze Groups Again Fourth lecture (2U = Week 2, Thursday, 17 minutes)
3T: The Seventeen Wallpaper Groups Fifth lecture (3T = Week 3, Tuesday, 31 minutes)

11. NetLogo Tutorials (2007-2012)
#1. Browsing the Model Library, 3 minutes, Browsing Models on the NetLogo website
#2. Downloading NetLogo, 4 minutes, Obtaining the full NetLogo package from the NetLogo website
#3. Creating a Model, 8 minutes, Writing your first model: turtle graphics
#4. Interface Elements, 9 minutes, Using the User Manual
#5. Turtle Programming, 8 minutes, Dissecting a Model.
#6. Patch Programming, 9 minutes, Dissecting a Model.
#7. Sound Extension, 6 minutes, Dissecting a Model.
#8. Turtle Graphics, 13 minutes, Dissecting a Model.
#9. Turtle Graphics, 13 minutes, Creating a Model.
12. HubNet Tutorials (2012)
#1. Participatory Simulations (aka NetLogo #10), 5 minutes
#2. Browsing the Model Library (aka NetLogo #11), 9 minutes
#3. Exploring an Activity (aka NetLogo #12), 9 minutes
#4. Dissecting an Activity (aka NetLogo #13), 14 minutes
13. Soroban Tutorials (2010 - 2011)
#1. Play with Marbles (#1 of 3), Introducing the Five Bead, 19 MB, 3 minutes
#2. Play with Marbles (#2 of 3), Using the Five Bead, 23 MB, 4 minutes
#3. Play with Marbles (#3 of 3), Using the Five Stone, 16 MB, 3.3 minutes
#4. Introducing the Soroban (#1 of 6), Unit beads 1 to 4, 40 MB, 3 minutes
#5. Introducing the Soroban (#2 of 6), Using the Five Bead, 40 MB, 8 minutes
#6. Introducing the Soroban (#3 of 6), Addition with the Ten Bead, 20 MB, 4.5 minutes
#7. Introducing the Soroban (#4 of 6), Smart Moves, 2.3 minutes
#8.Introducing the Soroban (#5 of 6), Subtraction with the Ten Bead, 20 MB, 3.5 minutes
#9. Introducing the Soroban (#6 of 6, final tutorial), Serial Addition, 270 MB, 8.5 minutes
#10. The Base 60 Soroban, New soroban for base 60 arithmetic, 20 MB, 2 minutes

4.3 Articles

Articles: 1960-1970

1. Discontinuities in General Relativity, Thesis, University of Michigan, 1960.
2. The Sound Speeds of a Charged Fluid, Technical Report, University of Michigan Research Institute, 1960.
3. Foundations of General Relativity, University of California, Berkeley, 1961.
4. Piecewise differentiable manifolds and the space-time of general relativity, J. Math. Mech. 11, 553-592, 1962. MR 25#2895 (J. A. Wolf, 1983)
5. Transversality in manifolds of mappings, Bull. Amer. Math. Soc. 69, 470-474, 1963. MR 26#6982 (J. Eells, 1963)
6. Lectures of Smale on Differential Topology, Columbia University, 1963.
7. Bumpy metrics, Proc. Sympos. Pure Math 14, 1-4, 1970. MR 42#6875 (I. Chavel, 1972)
8. Nongenericity of omega-stability (with S. Smale), Proc. Sympos. Pure Math 14, 5-8. 1970. MR 42#6867 (J. W. Robbin, 1972)
9. Hamiltonian mechanics of Lie groups and hydrodynamics (with J. Marsden), Proc. Sympos. Pure Math 16, 237-244, 1970.

Articles: 1970-1980

10. Predictions for the future of differentialequations, Sympos. Differential Equations and Dynamical Systems, Springer, Berlin, 1971.
11. Hamiltonian Catastrophes, Univ. de Claude-Bernard, Lyon, France, 1972.
12. Introduction to Morphology, Univ. de Claude-Bernard, Lyon, France 1972.
13. Hamiltonian bifurcations, Journees sur la theorie des catastrophes et la morphogenese, Publ. I.H.E.S., 5, 1973.
14. Psychotronic vibrations, First Int'l Congress Psychotronics and Parapsychology, Prague, 1973. 14a. Optimal betting for time-dependent games. Preprint, 1974.
15. Vibrations and the realization of form, In: Evolution in the Human World (Jantsch and Waddington, eds.) Addison-Wesley, Reading, 1976, pp. 134-149.
16. Macroscopy of resonance, In: Structural Stability, The Theory of Catastrophes, and Applications, Springer, New York (Lecture Notes in Mathematics, Vol. 525), 1976, pp. 1-9. MR 58#24311 (I. Stewart, 1979); MR 83g: 58004
16a. The macroscopy of resonance, In:Selected Studies: Physics - Astronphysics, Mathematics, History of Science, Th. M. Rassias and G. M. Rassias, eds., North-Holland, Amsterdam, 1982, pp. 3-8.
17. Simulation of cascades by videofeedback, In: Structural Stability, The Theory of Catastrophes, and Applications, Springer, New York (Lecture Notes in Mathematics, Vol. 525), 1976, pp. 10-14. MR 58#24311 (I. Stewart, 1979)
18. Dynasim: exploratory research in bifurcations using interactive computer graphics. Ann. N.Y. Acad. Sciences 316 (1976), 673-684. MR 80k:00007; MR 82a:58042
19. Visual Math: A fantasy for the future of education (with Brian Beach and Peter Broadwell), SIGCUE Bull., Assoc. Comput. Mach., January 1979.

Articles: 1980-1985

20. The function of mathematics in the evolution of the noosphere, In: The Evolutionary Vision (E. Jantsch, ed.), AAAS Selected Symposium Ser., 1981, pp. 153-168.
21. Dynamics, a visual introduction (with C.D. Shaw). In: Self-Organizing Systems (F.E. Yates, ed.), Plenum, 1987, pp. 543-597.
22. Dynamics and self-organization. In: Self-Organizing Systems (F.E. Yates, ed), Plenum, 1987, pp. 599-613.

23. Categories of dynamical models. In: Differential Geometry, Calculus of Variations, and their Applications. (G. Rassias, T. Rassias, eds.), Dekker, New York 1985, pp. 1-18. MR 87a:00008; MR 87e:00003 (C. P. Bruter)
24. Dynamical models for physiology, Amer. J. Physiol. 245, 1983, pp. 467-472.
24a. Dynamical models for physiology, Nonlinearities in Brain Function, Proceedings of a Conference, march 1982, Kroc Foundation, 1982.
25. Dynamical models for thought, J. Social Biol. Structures 8, 1985, pp. 13-26.
26. Chaostrophes, intermittency, and noise. In: Chaos, Fractals, and Dynamics, (P. Fisher, W. Smith, eds.), M. Dekker, New York, 1985, pp. 3-22. MR 86h:58004; MR 87f:58116 (Andrew C. Fowler)
27. Chaos and intermittency in an endocrine system model. In: Chaos, Fractals, and Dynamics, 1985, pp. 33-70. MR 86h:58004; MR 87a:92007 (Raphael Zahler)
28. The Outstructure of the Lorenz attractor, In: Chaos, Fractals and Dynamics, 1985, pp. 23-32. MR 56h:58004; MR 87c:58006 (Pascal Chossat)
29. Complex dynamical systems. In: Mathematical Modelling in Science and Technology (X.J.R. Avula, R.E. Kalman, A.I. Leapis, E.Y. Rodin, Eds.), Pergamon, 1984, pp. 82-86. MR 85g:93006
30. Is there chaos without noise? In: Chaos, Fractals and Dynamics, 1985, pp. 117-122. MR 86h:58004; MR 87g:58083 (Andrew C. Fowler)
31. Chaostrophes of forced Van der Pol systems (with K. Scott), In: Chaos, Fractals, and Dynamics, 1985, pp. 123-134. MR 86h:58004; MR 87f:58115 (Andrew C. Fowler)
32. Phase plots of temporal oscillations (with A. Garfinkel). . in: Ultradian rhythms in life processes : an inquiry into fundamental principles of chronobiology and psychobiology , David Lloyd and Ernest L. Rossi eds. London ; New York : Springer-Verlag, 1992.
33. CORTISIM: a complex dynamical model of the cortisol regulation system (with A. Garfinkel), Simulation 47, 1986, pp. 199-207.
34. ENDOSIM: a progress report, in: Mathematics and Computers in Biomedical Applications, Proc. IMACS Symposium, Bathesda, 1984, (J. Eisenfeld and C. DeLisi, eds.), North-Holland, Amsterdam, 1986, pp. 133-136. MR 86i: 92002
35. In pursuit of Birkhoff's chaotic attractor, In: Dynamical Systems and Singularities (S. Pnevmatikos, ed.) North-Holland, Amsterdam, 1986, pp. 303-312. MR 86g:58044; MR 87h:58119 (Frederick R. Marotto)
36. Bifurcations and chaos in forced Van der Pol systems (with C. Simo), In: Dynamical Systems and Singularities, pp. 313-323. MR 86g:58044; MR 86k:58085 (N. D. Kazarinoff)

Articles, 1986-1987

37. Phase regulation of coupled oscillators and chaos, in: A Chaotic Hierarchy (M. Klein and G. Baier, eds.), World Scientific, Singapore, 1991, pp. 49-78.
38. A chaotic blue sky catastrophe in forced relaxation oscillations, (with H. B. Stewart), Physica 21D, 1986, pp. 394-400. MR 88a:58127 (Ding Jun Luo)
39. Cellular dynamical systems, in: Mathematics and Computers in Biomedical Applications, Proc. IMACS World Congress, Oslo, 1985, (J. Eisenfeld and C. DeLisi, eds.), North-Holland, Amsterdam, 1986, pp. 7-8. MR 88g:92002; MR88j:92001

Articles: 1987-1988

40. Complex dynamics and the social sciences, World Futures 23, 1-10 (1987). 40a. Complex dynamical systems theory: historical origins, contemporary applications, in:
The New Evolutionary Paradigm: Transdisciplinary Studies, Ervin Laszlo (ed.), Gordon and Breach, New York, NY, 1990, pp. 1-10.
41. Mathematics and evolution: a manifesto, IS Journal 1, 1(3) 14-27 (1986). 41a. Mathematics and evolution: a manifesto, World Futures 23(4) 237-262 (1988).
42. Vibrations in Math, Music and Mysticism, IS Journal 1, 1(0) 7-8 (1986).
43. Mathematics and evolution: a proposal, IS Journal 2(2) 27-45 (1987). 43a. Mathematical hermeneutics, Revision 10 (3) 15-20 (1988). 43b. Bollettini del tempo politico, in: Physis: abitare la terra, M. Ceruti and E. Laszlo (eds.), Feltrinelli, Milano, 344-350, (1988). 43c. Political weather reports, World Futures 27:125-130 (1989).
44. Mechanics of resonance, Revision, 10(2): 13-19 (1987).

Articles: 1988-1989

45. Netscope: dynamics from communications data, American J. Psychotherapy, 46(4), April, 1992: pp. 581-591.
46. Chaos in Myth and Science, in: Doing Science: the Reality Club 2, (John Brockman, ed.), Prentice Hall, 193-210 (1990). 46a. Roots of Chaos, Annals of the Earth, 1989.
47. Visual Musical Instruments, High Frontiers, Fall, 1988.
48. Complex Dynamical Models, in: Qualitative Simulation Modeling and Analysis, ed. by Paul Fishwick and Paul Luker, Springer, 1991: 240-266.
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