

LARRY S. LIEBOVITCH, Ph.D.

Director of Special Projects and Professor of Physics and Psychology

Queens College, City University of New York

Email: LLIEBOVITCH@NYC.RR.COM

Personal webpage: <http://people.qc.cuny.edu/faculty/Larry.Liebovitch/Pages/Default.aspx>

Linkedin: <http://www.linkedin.com/pub/larry-liebovitch/5a/725/996>

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1. SUMMARY OF ACADEMIC AND ADMINISTRATIVE EXPERIENCE

Overview: I earned a BS, summa cum laude, in physics from the City College of New York in 1972 and a PhD in astronomy from Harvard University in 1978. My first position after graduation was as a postdoctoral fellow at The Mt. Sinai School of Medicine in New York. In 1979 I became a postdoctoral fellow in the Department of Ophthalmology of the Columbia University College of Physicians and Surgeons and was subsequently promoted there to positions as a Research Associate and an Assistant Professor. In 1993 I moved to Florida Atlantic University, a unit of the State University System of Florida, serving first as an Associate Professor and later as a Professor. I then held administrative positions there as the Interim Director of the Center for Complex Systems and Brain Sciences, the Graduate Programs Director, and the Associate Dean for Graduate Studies and Programs in the Charles E. Schmidt College of Science. In August 2010 I returned to New York City to become the Dean of the Division of Mathematics and Natural Sciences of Queens College of the City University of New York and a Professor in the Departments of Physics and Psychology.

Research: My research has been unusually broad and interdisciplinary. I enjoy learning about and linking together knowledge from different scientific fields. This has included using fractals, chaos, neural networks, and other nonlinear methods to study molecular, cellular, and psychological systems. My research has included studies of the function of ion channel proteins in the cell membrane, the structure of networks of gene regulation, the timing of heart attacks, the spread of electronic and biological infections, the spatial pattern of artifacts found in archeological sites, the analysis of economic data from ancient Babylon, and mathematical models of how people behave in conflicts and in psychotherapy. I also collaborate on peace studies with the Morton Deutsch International Center for Cooperation and Conflict Resolution and the Advanced Consortium on Cooperation, Conflict, and Complexity, at Columbia University, NY. Over my career, my research has been funded by grants from the National Institutes of Health, the American Heart Association, and the Whitaker Foundation. My knowledge of the content and culture of different scientific fields has helped me to better understand faculty issues and to see possible opportunities for collaboration within and across different disciplines.

Teaching: My teaching has also been equally varied. I have taught undergraduate and graduate courses on complexity, fractals and chaos for the life sciences, the psychology of the internet,

research methods in psychology, and statistics. With funding from the National Science Foundation, I also developed an undergraduate mathematics course which uses different teaching and learning styles to reach students who have been previously intimidated by mathematics.

Administration: Some of my accomplishments as Dean of the Division of Mathematics and Natural Sciences (DMNS) at Queens College:

- During my tenure as Dean, student enrollment has increased in this Division, while it has decreased overall at Queens College.
- During my tenure as Dean, externally funded faculty research grants have increased in this Division.
- I increased outreach for visibility and student recruitment by revamping the DMNS website, using social media (including Facebook and smart phone apps), creating a Division brochure, and bringing high school and community college students on campus for student and faculty research presentation events.
- The updated DMNS web site in 5 languages includes descriptions of the areas of excellence in each Department, videos of the Department Chairs talking about their Departments, videos of faculty and students describing their research, lists of faculty publications, a directory of all faculty in the Division, and scholarship and summer internship opportunities for students at Queens College.
- I improved the pre-health professions advising by appointing a new pre-dental advisor, raising new scholarship funds, and supervising a pre-MD mentoring program linking MDs, DDSs, DOs, and other health professionals with our students.
- I helped raise and award new scholarship and summer internship funds and travel matching funds for students to present their research at conferences.
- I served on the Steering Committees of the Queens College Minority Access to Research Careers Program (MARC), the CUNY Louis Stokes Alliance for Minority Participation (NYC-LSAMP), and participated in events organized by the Queens College Science Organization of Minority Students (SOMS) and the Queens College Minority Association of Pre-med Students (MAPS).
- I organized faculty in the summer of 2012 to design new science courses (Life and Physical Science and Scientific World) for the CUNY Pathways general education requirement. I actively participated in the faculty process to make sure that science courses were adequately represented in the College Option for Pathways at Queens College.
- I organized 3 Division-wide events to reduce barriers between departmental “silos”: FAIR (Faculty Achievement in Research); DMNS DMNS (DMNS Division Meeting News & Sandwiches); and FOOD (Festival Of Open Discussions) where faculty from different Departments met each other and learned about each other's research and teaching. One Department Chair told me that it was at one of these events that he first met people he did not know who had worked in the same building with him for over 10 years.
- I worked collaboratively with the Department Chairs and Faculty in the 2010-2011 academic year to develop and implement an innovative interdisciplinary DMNS strategic plan for 4 interdisciplinary clusters. The Department Chairs and Faculty, working in groups, prepared proposals for these new interdisciplinary clusters which identified the new faculty hires needed in specific fields. During the 2012-2013 and 2013-2014 academic years, with the approval of the Queens College Provost and President, ten new faculty were hired based on this plan. Queens College and CUNY also developed building and laboratory

renovations for these clusters. The interdisciplinary Neuroscience Program and the new CUNY Center for Computational Infrastructure for the Sciences here at Queens College are successful examples of this interdisciplinary, synergistic approach.

- I improved communication in the Division by developing a faculty email list and used it to send (brief) memos about grant opportunities for faculty and announcements that faculty could make to students about fellowships, internships, and events.
- I created an Advisory Board for strategic advice and fundraising which is also developing an Alumni Academy of winter session courses taught by prestigious Queens College alumni.
- I met with each Department Chair individually once a month, with all Department Chairs together once a month, and responded to all requests for additional interactions carried out by email, phone, or in person.
- I worked collaboratively with the Department Chairs to establish budget expense estimates for the next fiscal year, Division policies on faculty release time for unsponsored and sponsored research, and standard language to be used in annual evaluations.
- I performed an oversight role in faculty reappointments/tenure/promotions/hiring including 10 new faculty hires, over 25 faculty reappointments each year, and 13 tenure/promotion cases.
- I served as the principal investigator for institutional proposals (unfortunately not funded): 1) Howard Hughes Medical Institute proposal for Undergraduate Science and Science Education Leadership Training Through Collaborative Student Participation; and 2) NSF ADVANCE proposal, Women ProF: Supporting Mid-Career Women Faculty Professional Growth, Advancement and Leadership.
- I performed an oversight role in the distribution of Research Enhancement (from indirect costs from grants), GII (Graduate Investment Initiative), and GRTI (Graduate Research Technology Incentive) funds.
- I served on the Queens College Technology Fee Committee.
- I played a role in college-wide projects including: the redesign of the Queens College website, the creation of the ePAF (electronic personnel action form) system, and the Queens College Strategic Plan.
- I initiated meetings of the science deans of the senior CUNY Colleges to share best practices and innovative ideas. These meetings have been held at the CUNY Graduate Center, Hunter College, John Jay College, and York College.
- I worked with the Coalition for Queens, attended networking technology business events such as those sponsored by NYC Tech Connect, and attended the Queens Tech and Data Driven NYC ("Big Data") Meetups to help Queens College play a growing role in the developing technology industry in our borough.
- During my tenure as Dean I also successfully continued my own research program that resulted in the publication of 4 journal articles, 1 book chapter, and 1 book. I also continued to supervise my last two graduate students at Florida Atlantic University who have now been awarded their PhDs and hired by Harvard University and the Mitre Corporation.

FULL CURRICULUM VITAE

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Director of Special Projects, Professor of Physics and Psychology
Queens College, City University of New York

e-mail: larry.liebovitch@qc.cuny.edu

Personal webpage: <http://people.qc.cuny.edu/faculty/Larry.Liebovitch/Pages/Default.aspx>

Linkedin: <http://www.linkedin.com/pub/larry-liebovitch/5a/725/996>

Queens College, City University of New York, Flushing, NY

2014-present Director of Special Projects

2010-present Professor of Physics and Psychology

2010-present Professor of Physics, Graduate Center, City University of New York

2010-2013 Dean, Division of Mathematics and Natural Sciences overseeing the Departments of Biology; Chemistry and Biochemistry; Computer Science; Earth and Environmental Sciences; Family, Nutrition and Exercise Sciences; Mathematics; Physics; and Psychology.

Columbia University in the City of New York, NY

2010-present Affiliate of the Morton Deutsch International Center for Cooperation and Conflict Resolution.

2010-present Affiliate of the Advanced Consortium on Cooperation, Conflict, and Complexity

Florida Atlantic University, Boca Raton, FL

Center for Complex Systems and Brain Sciences

Center for Molecular Biology and Biotechnology

Department of Psychology

Department of Biomedical Science

2008-2010 Associate Dean for Graduate Studies and Programs, Charles E. Schmidt College of Science

2007-2008 Graduate Programs Director, Charles E. Schmidt College of Science

2004-2007 Interim Director, Center for Complex Systems and Brain Sciences

1998-2010 Professor

1993-1998 Associate Professor, tenured: August 1996

College of Physicians & Surgeons of Columbia University, NY

Department of Ophthalmology

1985-1993 Assistant Professor

1982-1985 Associate Research Scientist

1979-1982 N.I.H. Postdoctoral Fellow

1978-1979 Mt. Sinai School of Medicine, City University of New York

Department of Ophthalmology

N.I.H. Postdoctoral Fellow

1972-1978 Harvard University, Department of Astronomy, Cambridge, MA

Ph.D. Astronomy, 1978

A.M. Astronomy, 1973

Thesis: Two dimensional calculation of gas flow in barred spiral galaxies.

Teaching Fellow - Harvard University

Instructor - Cambridge Center for Adult Education

Research Assistant - M.I.T.

1968-1972 City College, City University of New York

B.S. summa cum laude, Physics, 1972

PROFESSIONAL HONORS AND POSITIONS

Member of the Editorial Board of the *American Journal of Physiology*, Modeling in Physiology Section, 1991-1996

Chair of the Biophysics Section of the New York Academy of Sciences, 1991-1992

Fellow of the American Physical Society through the Division of Biological Physics, 1995

"For advancing the physics of fractals and chaos and using these methods to analyze and understand biological systems."

Zbigniew Czernicki, Larry Liebovitch, and Wlodzimierz Klonowski: Founding Editors of *Nonlinear Biomedical Physics* published by Biomed Central <http://www.nonlinearbiomedphys.com/>

Grants:

Principal Investigator:

NIH EY4624 Measurement of Human Corneal Endothelial Fluid Flows 1983-86

Whitaker Foundation: Fractals in Biomedical Signal Processing 1987-90

American Heart Association: Established Investigatorship 1988-93

NIH EY6234 Ion Current Analysis in the Cornea 1986-89

NIH EY6234 Ion Current Analysis in the Cornea (Renewal) 1989-94

NIH EY6234 Ion Current Analysis in the Cornea (Renewal) 1994-99

NSF DUE-9752226 Interactive Fractal and Chaos Units 1998-99

NSF DUE-9980715 Integrated Electronic Curricula Material in Fractals and Chaos 2000-2003

NIH GM63527-01 subcontract, Nonlinear Dynamics of Intracellular Signaling 2001-5

McGuire Foundation Nonlinear Analysis of Cardiac Patient Data 2001-2.

U.S.Navy-ASEE Summer Faculty Research Program with Ira Schwartz, Naval Research Laboratory, Washington, DC 2002.

U.S.Navy-ONR-ASEE Summer Faculty Research Program with Ira Schwartz, Naval Research Laboratory, Washington, DC 2003.

U.S.Navy-ONR-ASEE Summer Faculty Research Program with Ira Schwartz, Naval Research Laboratory, Washington, DC 2004.

Participant:

James S. McDonnell Foundation: Intractable Conflict as a Dynamical System, P.I. Peter T. Coleman, Columbia University 2006-2009.

Fellowships:

International Center for Transdisciplinary Studies, International University of Bremen, Germany, 2006.

Member of the following professional societies: (*=currently active)

American Association for the Advancement of Science*

American Association for Artificial Intelligence

American Astronomical Society*

American Physical Society*

Association for Psychological Science*

Association for Research in Vision and Ophthalmology

Basic Science Council of the American Heart Association*

Biophysical Society

International Chemometrics Society

International Neural Network Society

International Society for Eye Research

Mathematical Association of America*

New York Academy of Sciences

Sigma Xi*

Society for Chaos Theory in Psychology and Life Sciences*

Society for Personality and Social Psychology*

Reviewer of grant proposals for the following agencies and foundations:

AIBS Bioelectromagnetics Review Group for the Office of Naval Research

Canadian Cystic Fibrosis Foundation

Department of Energy

Department of the Army
Thomas F. and Kate Miller Jeffress Memorial Trust
Fonds zur Förderung der wissenschaftlichen Forschung (Austrian Science Foundation)
Marsden Fund (Royal Society of New Zealand)
Medical Research Council of Canada
National Institutes of Health
ad hoc reviewer
Study Section: VISA special Emphasis
Study Section: VISA-ZRG(1)
National Science Foundation
ad hoc reviewer
Div. Undergraduate Ed., Course Curriculum, and Lab. Improvement Program Panel
Human and Social Dynamics (HSD) Program
Natural Sciences and Engineering Research Council of Canada
Northwest Health Foundation
Research Corporation, Tucson AZ
Whitaker Foundation

Reviewer of articles submitted to the following Journals:

Advances in Complex Systems
American Journal of Physiology
Animal Behavior
Annals of Biomedical Engineering
Biochemica et Biophysica Acta
Bioelectrochemistry and Bioenergetics
Bioinformatics
Biological Cybernetics
Biophysical Chemistry
Biophysical Journal
Bioscience Reports
Biosensors and Bioelectronics
Biosystems
Biotechnology Progress
Bulletin of Mathematical Biology
BMC Systems Biology
Canadian Journal of Physiology and Pharmacology
Cell Biochemistry and Function
Cellular and Molecular Biology Letters
Chaos
The CLAO (Contact Lens Association of Ophthalmologists) Journal
Complex Systems
Croatica Chemica Acta
Current Eye Research
Fractals
Experimental Eye Research
European Biophysics Journal
Europhysics Letters
IEEE Transactions on Biomedical Engineering
Integrative and Comparative Biology
Investigative Ophthalmology and Visual Science
Journal of Biological Physics
Journal of Biomedical Science
Journal of the Electrochemical Society
Journal of General Physiology
Journal of Membrane Biology
Journal of Neurophysiology

Journal of Neuroscience Methods
Journal of Pediatric Gastroenterology and Nutrition
Journal of Physical Chemistry
Journal of the Royal Society - Interface
Journal of Statistical Physics
Journal of Theoretical Biology
Journal of Thermal Analysis
Langmuir
Mathematical Biosciences
Molecular Psychiatry
Neuroscience Letters
Nonlinear Dynamics, Psychology, and Life Sciences
Pediatric Research
Perception
Physica A
Physica D
Physical Review E
Physical Review Letters
Physics Letters
Plant Biology
Proceedings of the National Academy of Sciences (USA)
Proceedings of the Royal Society (London)
Social Cognition
Transactions on Biomedical Engineering

Invited presentations at scientific meetings:

1983
4th International Conference on Physicochemical Hydrodynamics, New York, NY
1987
IEEE Engineering in Medicine and Biology Society, Boston, MA
13th IEEE Annual Northeast Bioengineering Conference, Philadelphia, PA
Workshop on Advanced Methods of Physiological System Modeling, Los Angeles, CA
1988
Gordon Research Conference on Theoretical Biology and Biomathematics, Tilton, NH
Gordon Research Conference on Bioelectrochemistry, Plymouth, NH Workshop on Advanced Methods of Physiological System Modeling, Los Angeles, CA
World Congress on Medical Physics and Biomedical Engineering, San Antonio, TX
1989
American Physical Society - Symposium on Nonlinear Dynamics in Living Systems, St. Louis, MO
New York Academy of Sciences - Mathematical Approaches to Cardiac Arrhythmias, New York, NY
1990
9th International Congress of Eye Research, Helsinki, Finland
NATO Advanced Workshop on Complex Dynamics and Biological Evolution, Hindsø, Denmark
1991
2nd Finnish Nonlinear Days, Jyväskylä, Finland
Federation of the Societies of Experimental Biology of Brazil, Brazilian Congress of Biophysics, Symposium on the Functional and Structural Properties of Macromolecules of Cell Membranes, Caxambu, Brazil
Stony Brook Biomathematics Conference, Stony Brook, NY
Contractors Meeting of the Membrane Electrochemistry Program of the Office of Naval Research, Airlie, VA
Annual Fall Meeting of the Biomedical Engineering Society, Charlottesville, VA
American Heart Association, Research Fellowship Symposium, Anaheim, CA
Society for Neuroscience, Symposium on the Dynamical Behavior of Neural Systems, New Orleans, LA
1992
Radiation Research Society, Plenary Lecture: An Introduction to Chaos and Its Application to Biology, Salt Lake City, UT
NATO Advanced Workshop on Stochastic Resonance in Physics and Biology

San Diego, CA

The Head and Heart of Chaos: NIH Workshop on Nonlinear Dynamics in Biological Systems, NIH Bethesda, MD
IEEE Engineering in Medicine and Biology Society, Tutorial: Introduction to Fractals in Biology, Paris, France
1993

Hofstra University Biomathematics and Bioengineering Conference, Hempstead, NY

19th IEEE Annual Northeast Bioengineering Conference: Minisymposium on Fractals and Chaos, Newark, NJ

17th Annual Cell Kinetics Society Meeting, Richland, WA

Biophysics of Membrane Transport: Symposium in Memory of Peter Lauser, Konstanz, Germany
1994

American Physical Society: Fractals in Biological Physics, Symposium of the Division of Biological Physics,
Pittsburgh, PA

North American Society for the Psychology of Sport and Physical Activity, Preconference Workshop on Complex
Systems, Clearwater, FL

XVII Congress of the International Society for Analytical Cytology, Frontiers in Science Lecture, Lake Placid, NY

IEEE Engineering in Medicine and Biology Society Workshop on Chaotic Questions: From Theory to Bedside
Applications, Baltimore, MD

Dynamical Neuroscience Workshop, Satellite Symposium of the 24th Annual Meeting of the Society for
Neuroscience, Boca Raton, FL

Artificial Neural Networks in Engineering, Tutorial on Chaos and Fractals, St. Louis, MO
1995

Biophysical Society, Workshop in Molecular Biophysics, San Francisco, CA

American Physical Society: Applications of Artificial Neural Networks and Other Artificial Intelligence Procedures
to Chemical Systems, Symposium of the Division of Chemical Physics, San Jose, CA

Association for Research in Vision and Ophthalmology, Special Interest Group Meeting - Fractals in

Ophthalmology: A New Tool for Basic Science and Clinical Diagnosis, Ft. Lauderdale, FL.

Tumor Heterogeneity Workshop, Kananaskis, Alberta, Canada

Workshop on the Role and Control of Random Events in Biological Systems, Sigtuna, Sweden

Flow Cytometry Consensus Meeting of the HIV/AIDS Clinical Trials Network of Canada, Aylmer, Quebec, Canada
1996

44th Annual Meeting of the Radiation Research Society, Symposium on New Concepts in Tumor

Biology/Physiology, Chicago, IL

Polish-British Workshop on Fractals, Nonlinear Dynamics and Chaos, Zakopane, Poland
1997

13th School on Biophysics of Membrane Transport, Ladek Zdroj, Poland

4-lecture Tutorial at the Polish-Anglosaxon-Italian Forum on Nonlinear Biophysics, Ladek Zdroj, Poland
1998

American Physical Society: Long-range Correlated Fluctuations in Biological Systems, Symposium of the Division
of Biological Physics, Los Angeles, CA

Association for Research in Vision and Ophthalmology, Special Interest Group Meeting - Morphology and
Differentiation in the Transparent Lens, Ft. Lauderdale, FL.

1999

Membrane Transport and Renal Physiology Workshop, Institute for Mathematics and its Applications, University of
Minnesota, Minneapolis, MN

Keynote speaker: Mathematics Awareness Day, Rhode Island College, Providence, RI

Facets of Universality in Complex Systems: Climate, Biodynamics and Stock Market, Schloss Rauschholzhausen,
Germany

12th Marian Smoluchowski Symposium on Statistical Physics, Zakopane, Poland

Complexity Research and Biotechnology in Agriculture and Medicine, Bozeman, MT.

University of Minnesota Institute for Mathematics and its Applications Hot Topics Workshop: Scaling Phenomena
in Communications Networks, Minneapolis, MN.

VHA Third Annual Conference on Complexity Science and Health Care, Philadelphia, PA.

Dr. Charles Sing, Genetics Conference, Ann Arbor, MI.

2000

MAA Mathematics Curriculum for Health and Life Sciences Students Conference, Virginia Commonwealth
University, Richmond, VA.

VHA Complexity Leadership and Learning Network Session, Short Hills, NJ.

Society for Chaos Theory in Psychology and Life Sciences: Physiology Workshop: Nonlinear Dynamics in Health and Disease by Susan Mirow and Larry Liebovitch, Philadelphia, PA.

Modeling and Analysis of Genome-Quantitative Phenotype Relationships, Ann Arbor, MI.

Atelier sur les fractales et modelisation en analyse structurelle et dynamique (Workshop on Fractal Modeling in Structural and Dynamical Analysis"), Montreal, Quebec, Canada.

2001

AMATYC (American Mathematics Association of Two Year Colleges), New Visions in Mathematics Education: A Poster Session Featuring Grants Funded by the National Science Foundation, Toronto, Canada.

2002

BioFlorida, Boca Raton, FL.

Workshop on Biotechnology and Complexity in Agriculture and Medicine, Bozeman MT.

2003

Joint Mathematics Meeting, MAA (Mathematical Association of America) Session on Projects Supported by the NSF Division of Undergraduate Education, Baltimore, MD.

Biomathematics Workshop and Summer School, Instituto de Matematica Pure e Aplicada (Institute for Pure and Applied Mathematics), Rio de Janeiro, Brazil.

Uncertainty and Surprise: Questions on Working with the Unexpected and Unknowable, The Plexus Institute and the Red McCombs School of Business, University of Texas, Austin TX.

Workshop: Nonlinear Methods in Psychology, George Mason University, Fairfax, VA.

2003 Allen Cognitive Network Symposium, Tampa, FL.

2004

St. Olaf College's Fifth Annual Science Symposium, "The Strange Attraction of Chaos: Advances in Understanding Complex Systems" St. Olaf College, Northfield, MN.

Society for Chaos Theory in Psychology and Life Science - Tutorial: Introduction to Fractals and Chaos, Milwaukee, WI.

Workshop on Complexity Science and Healthcare Quality: Crafting an International Research Agenda, Harvard Interfaculty Program for Health Systems Improvement and the Plexus Institute, Durham, NH.

2006

BioQUEST Summer Workshop 2006, Beloit, WI.

Society for Chaos Theory in Psychology and Life Science - Tutorial: Introduction to Fractals and Chaos, Baltimore, MD.

2007

Wilhelm and Else Heraeus Summer School, Statistical Physics of Gene Regulation - From Networks to Expression Data and Back, Jacobs University, Bremen, Germany.

Global Futures Form on Genocide Prevention: Complexity Theory and Genocide Prevention, October 18-19, 2007, Washington DC.

2008

Society for Chaos Theory in Psychology and Life Science - Tutorial: Introduction to Fractals and Chaos, Richmond VA.

Sessions organized at scientific meetings:

1991

Workshop on Physical and Mathematical Theories of Ion Channel Gating at the 35th Annual Meeting of the Biophysical Society, San Francisco, CA

Fractals and Mathematical Models at the 17th Annual Northeast Bioengineering Conference, Hartford, CT

1995

Fractals in Molecular Biophysics at the 39th Annual Meeting of the Biophysical Society, San Francisco, CA

Special Interest Group Meeting, Fractals in Ophthalmology: A New Tool for Basic Science and Clinical Diagnosis at the 1995 Annual Meeting of the Association for Research in Vision and Ophthalmology, Ft. Lauderdale, FL

1998

Tutorial: Additional Instructor in Fractal Biology and Chaos in Medicine, March Meeting of the American Physical Society, Los Angeles, CA

2003

Workshop: Introduction to Fractals and Chaos, Society for Chaos Theory in Psychology and Life Sciences, Boston, MA

Scientific meetings organized:

2003

Program Committee, International Nonlinear Sciences Conference: Research and Applications in the Life Sciences, Vienna, Austria.

2005

FAU Center for Complex Systems and Brain Sciences - Plexus Institute Conference: On the Verge: Changing Lives, Organizations and Minds. Complexity Science in a Changing World, Boca Raton and Delray Beach Florida.

2006

Programme Committee, Fractal 2006, Vienna, Austria.

Invited seminars at universities, research institutes, and corporations:

1986

CUNY Mt. Sinai School of Medicine, NY (Dept. of Physiology and Biophysics)

1987

Albert Einstein College of Medicine (Dept. of Physiology and Biophysics)

The City College of New York (Sigma Chi Lecture)

Columbia University (Dept. of Applied Mathematics, Dept. of Ophthalmology, Dept. of Physiology and Biophysics)

Cornell University Medical College (Dept. of Physiology and Biophysics)

New York University (Courant Institute)

Syracuse University (Depts. of Physics and Biophysics)

University of Maryland (Dept. of Physiology)

University of Rhode Island (Dept. of Electrical Engineering)

Weizmann Institute (Dept. of Applied Mathematics)

1988

Columbia University (Dept. of Ophthalmology)

University of Connecticut Health Sciences (Dept. of Pharmacology) University of Washington (Dept. of Bioengineering)

1989

Boston University School of Medicine (Dept. of Physiology)

State University of New York at Stony Brook (Dept. of Applied Mathematics & State University of New York at Stony Brook (Dept. of Applied Mathematics & Statistics)

University of Illinois at Urbana (Dept. of Physics)

Washington University (Jewish Hospital)

1990

Columbia University (Dept. of Ophthalmology)

FDA (Center for Devices and Radiological Health)

Johns Hopkins University School of Medicine (Dept. of Bioengineering)

University of Alberta (Dept. of Physiology)

University of Pennsylvania (Dept. of Physiology)

1991

Cornell University Medical College (Dept. of Pharmacology)

CUNY Mt. Sinai School of Medicine, NY (Dept. of Biomathematical Sciences)

University of Southern California (Dept. of Biomedical Engineering)

University of Oulu Finland (Dept. of Physiology)

Columbia University (Dept. of Developmental Psychobiology)

City College of New York (Dept. of Biology)

The Rockefeller University (Biophysics Laboratory)

Boston University School of Medicine (Dept. of Physiology)

SUNY Health Sciences at Syracuse (Dept. of Physiology)

Syracuse University (Dept. of Physics)

Cornell University (Dept. of Pharmacology, Biophysics Seminar)

Federal University in Rio de Janeiro (Institute of Biophysics)

Brazilian Center for Research in Physics (Dept. of Condensed Matter and Spectroscopy)

Geisinger Medical Center (Weis Center for Research)

Columbia University (Dept. of Ophthalmology)

1992

Emory University (Dept. of Physics)
The City College of New York (Biomechanics Seminar Series)
Princeton University (Dept. of Physics)
University of Utah (Dept. of Applied Mathematics)
University of Washington (Dept. of Bioengineering)
University of California at Santa Cruz (Dept. of Chemistry)
The City College of New York (Levich Institute for Physico-Chemical Hydrodynamics)
University of Chicago (Depts. of Cardiology and Neurology)
National Institutes of Health (National Eye Institute)
Boston University (Dept. of Bioengineering)

1993

Rutgers University, Newark (Frontiers in Biomedical Science)
University of Washington (Dept. of Bioengineering)
Florida Atlantic University (Center for Complex Systems)
CUNY Mt. Sinai School of Medicine, NY (Dept. of Biomathematical Sciences)
University of Helsinki (Institute of Physics)

1994

Florida Atlantic University (Dept. of Biology)
New Jersey Institute of Technology (Dept. of Bioengineering)
Columbia University (Comprehensive Cancer Center)
Yale University (Dept. of Cellular and Molecular Physiology)
Carnegie Mellon University (Dept. of Physics)
Columbia University (Dept. of Medical Informatics)
Coulter Corporation (Miami, FL)
Boca Raton Members of the New York Academy of Sciences

1995

Columbia University (Dept. of Ophthalmology)
Columbia University (Biophysics Seminar Series)
University of Alberta, Edmonton, Alberta, Canada (Dept. of Physiology)
Florida International University (Dept. of Physics)
Florida Atlantic University (Dept. of Physics)

1996

Polish Academy of Sciences, Warsaw (Institute of Theoretical Physics)
Columbia University (Dept. of Ophthalmology)
University of Rochester (Dept. of Physics and Astronomy)

1997

Columbia University (Dept. of Ophthalmology)
Silesian Technical University, Gliwice, Poland (Dept. Physical Chemistry and Polymer Technology)
University of Bremen, Germany (Center for Complex Systems and Visualization).
Florida Atlantic University (Dept. of Electrical Engineering)

1998

Columbia University (Dept. of Ophthalmology)
Borders, Ft. Lauderdale
Technion, Haifa, Israel (Dept. of Physiology and Biophysics)
Technion, Haifa, Israel (Dept. of Physics)
University of Texas Medical Branch, Galveston, TX (Dept. of Ophthalmology)
University of Texas Medical Branch, Galveston, TX (Dept. of Physiology and Biophysics)

1999

Florida Atlantic University (Center for Molecular Biology & Biotechnology)
Rhode Island College (Department of Mathematics)
University of Technology, Darmstadt, Germany (Botanical Institute)

2000

Florida Atlantic University (Dept. of Physics)
Mayo Clinic, Rochester, MN (Dept. of Biochemistry & Molecular Biology)
University of Michigan, MI (Center for the Study of Complex Systems)

Florida Atlantic University (Center for Molecular Biology & Biotechnology)
University of Technology, Darmstadt, Germany (Botanical Institute)
GSI (Gesellschaft für Schwerionenforschung) Darmstadt, Germany (Dept. of Material Sciences)
Dalhousie University, Halifax, Canada (Dept. of Physiology & Biophysics)
University of Miami School of Medicine (Grand Rounds: Daughtry Family Dept. of Surgery & UM/JM Burn Center)
2001
Keck Graduate Institute of Applied Life Sciences
University of Texas Health Science Center Houston (Center for Computational Medicine)
University of Giessen, Germany (Institute for Theoretical Physics III)
University of Bremen, Germany (Center for Complex Systems and Visualization and Center for Medical Diagnostic Systems and Visualization)
Max Planck Institute for Flow Research (Max-Planck-Institut für Strömungsforschung), Göttingen, Germany (Department of Nonlinear Dynamics)
Syracuse University, New York (Dept. of Physics)
Florida Atlantic University (Center for Molecular Biology & Biotechnology)
2002
Naval Research Laboratory, Washington, DC (Plasma Physics Div.)
2003
Florida Atlantic University (Center for Molecular Biology & Biotechnology)
2005
Syracuse University (Department of Physics)
2006
International University Bremen, Germany (International Center for Transdisciplinary Science)
Florida Atlantic University (Division of Research, Lunch and Learn)
2007
Champlain College, St-Lambert, QC, Canada (Pedagogical Day Winter 2007)
Broward Community College (Davie FL, Pembroke Pines FL)
College of Charleston, Charleston, SC (Biology Department)
Medical University of South Carolina, Charleston SC (Hollings Marine Laboratory)
Florida Atlantic University (Department of Psychology)
MeVis Research Center for Medical Imaging Computing, Bremen, Germany
International Center for Cooperation and Conflict Resolution, Teachers College, Columbia University, New York, NY
2008
Helmholtz Zentrum München, Institute for Bioinformatics and Systems Biology, Munich, Germany
2009
Florida Atlantic University, Frontiers in Science Public Lecture Series, Boca Raton, FL
2010
City College, City University of New York, Department of Chemistry.

TEACHING

Harvard University - Teaching Fellow

Natural Sciences 9 - History and Introduction to Astronomy
Astronomy 8 - Astronomy for Nonscience Students
Astronomy 14 - Advanced Astronomy for Nonscience Students

Cambridge Center for Adult Education - Instructor

The Astronomical Universe - astronomy for nonscientists

Columbia University, College of Physicians and Surgeons

Basic Science Course for Residents in Ophthalmology
Lecture: Why are eyes round?
Lecture: Intercellular junctions
Physiology Graduate Course G4001 - Introduction to Membrane Biophysics

Lecture: Kinetics of ion channels
Physiology 101F - Human Physiology for Medical and Dental Students
Laboratory: Resting and action potentials in single muscle fibers
Anatomy 101F - Microscopic Anatomy for Medical and Dental Students
Laboratory: Anatomy of the eye

University of Jyväskylä, Finland

International Summer School CH3 - Nonlinear Chemical and Physical Processes in Biology

University of Alberta, Alberta, Canada

Examiner on Ph.D. committee of A. Pece in the Department of Physiology

Silesian Technical University, Gliwice, Poland

Examiner on Ph.D. committee of Z. Siwy in the Department of Physical Chemistry and Polymer Technology

University of Technology, Darmstadt, Germany

Graduiertenkolleg 340 - Fractal Geometry in Biology

Jacobs University, Bremen Germany

Heraeus International Summer School - Statistical Physics of Gene Regulation

Florida Atlantic University

Courses:

Psychology PSY 3213 - Research Methods in Psychology
Psychology PSY 4906 - Directed Independent Undergraduate Study
Psychology PSY 5721 - Fractals and Chaos in the Life Sciences
Psychology PSY 5930 - Fractals and Chaos in the Life Sciences
Psychology PSY 3502 - Fractals in Psychology
Psychology ISC 6908 - Directed Independent Graduate Study
Psychology ISC 6930 - Methods in Complex Systems
Psychology PSY 6930 - Research in Psychobiophysics
Mathematics MAT1932 - Mathematics & Science of Fractals
Psychology PSY 4930 - Psychology of the Internet
Complex Systems ISC 6937 - Proseminar
Psychology PSY 5930 - Complexity for the Life Sciences
Complex Systems ISC 6930 - Seminars in Neuroscience

Master Students -Primary Advisor

Jay Michaels, awarded 2009.

Master Students - Committe Member

T. Holroyd (Psychology), M.A. awarded.

K. Kogan (Psychology)

J. Fernandes (Biological Sciences), M.A. awarded.

R. Deitsch (Chemistry and Biochemistry)

D. Knickerbocker (Biological Sciences)

Ph.D. Students - Primary Advisor

L. Shehadeh (Complex Systems and Brain Sciences), Ph.D. awarded 2002.

Young-Ah Rho (Complex Systems and Brain Sciences) (Co-Advisor), Ph.D. awarded 2009.

Carey Witkov (Complex Systems and Brain Sciences), Ph.D. awarded 2011.

Jay Michaels (Psychology) (Primary and later Co-Advisor), Ph.D. awarded 2012.

Michael Norman (Complex Systems and Brain Sciences), Ph.D. awarded 2012.

Ph.D. Students - Committee Member

C. Anderson (Psychology), Ph.D. awarded.

T. Dineva (Physics), Ph.D. awarded.
 M. Rockloff (Psychology), Ph.D. awarded.
 Z. Albo (Complex Systems and Brain Sciences), Ph.D. awarded.
 R. Sambrook (Complex Systems and Brain Sciences), Ph.D. awarded.
 R. Gross (Physics). Ph.D. awarded.
 Katharine Kaye McMillan (Psychology), Ph.D. awarded 2005

PUBLICATIONS

Books:

J. Bassingthwaighe, L. Liebovitch and B. West. 1994. *Fractal Physiology*. Volume 2 in the series Methods in Physiology from the American Physiological Society. Oxford University Press, New York.
 L. S. Liebovitch. 1998. *Fractals and Chaos Simplified for the Life Sciences*. Oxford University Press, New York.
 C. T. Brown and L. S. Liebovitch. 2010. *Fractal Analysis, Quantitative Applications in the Social Sciences*, Volume 165, SAGE Publications, Los Angeles, CA.
 R. R. Vallacher, P. T. Coleman, A. Nowak, L. Bui-Wrzosinska, L. S. Liebovitch, K. Kugler, and A. Bartoli. 2013. *Attracted to Conflict: Dynamic Foundations of Destructive Social Relations*. Springer, New York.

Chapters in books:

P. Ganatos, S. Weinbaum, J. Fischbarg, and L. S. Liebovitch. 1981. A hydrodynamic theory for the passage of spherical molecules through an extracellular cleft. In *Adv. Bioengr.*, Ed. Van C. Mow, ASME, N.Y.
 L. S. Liebovitch and S. Weinbaum. 1983 A model of epithelial water transport. In *Fourth Int'l Conf. Physicochemical Hydrodynamics*, Ed. R. Pfeffer, N.Y. Acad. Sci., **404**:54- 56.
 L. S. Liebovitch, J. Fischbarg, and J. P. Koniarek. 1987. Cellular automata model for interacting cell membrane ion channels. In *Perspectives in Biological Dynamics and Theoretical Medicine*, Eds. S. H. Koslow, A. J. Mandell, and M. F. Shlesinger, N.Y. Acad. Sci., **504**:299-300.
 J. P. Koniarek, J. Fischbarg, and L. S. Liebovitch. 1988. The corneal endothelium: its physiological properties as related to survivability of the cornea. In *Cellular and Molecular Aspects of Eye Research*, Eds. G. C. Lavers and J. H. Chen, Sino-American Tech., NY, pp. 120-128.
 J. Fischbarg, L. S. Liebovitch, and J. P. Koniarek. 1988. Inhibition of water flow across rabbit corneal endothelium by blockers of the glucose transporter. In *The Cornea: Trans. World Congr. Cornea III*, Ed. H. D. Cavanagh, Raven Press, NY, pp. 107-109.
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 L. S. Liebovitch. 1994. Single channels: from Markovian to fractal models. In *Cardiac Electrophysiology: From Cell to Bedside, 2nd ed.*, Eds. D. P. Zipes and J. Jalife, W. B. Saunders, Philadelphia, PA, pp. 293-304.
 L. S. Liebovitch, N. A. Arnold, and L. Y. Selector. 1994. Neural networks to compute molecular dynamics. In *Intelligent Engineering Systems Through Artificial Neural Networks Vol. 4*, Eds. C. H. Dagli, B. R. Fernandez, J. Ghosh, and R. T. S. Kumara, ASME Press, NY, pp. 843-848.
 T. H. Haines and L. S. Liebovitch. 1995. A molecular mechanism for the transport of water across phospholipid bilayers. In *Permeability and Stability of Lipid Bilayers*, Eds. E. A. Disalvo and S. A. Simon, CRC Press, Boca Raton FL, pp. 123-136.
 L. S. Liebovitch. 1996. Ion channel kinetics. In *Fractal Geometry in Biological Systems*, Eds. P. Iannaccone and M. Khokha, CRC Press, Boca Raton FL, pp. 31-56.
 L. S. Liebovitch. 1996. Ion channel gating: Markov, fractal, and chaos. In *Neural Engineering*, Eds. Y. Kim and N. Thakor, Springer-Verlag, in press.
 M. A. Wood, P. M. Simpson, L. S. Liebovitch, A. T. Todorov, and K. A. Ellenbogen. 1997. Temporal patterns of ventricular tachyarrhythmias: insights from the implantable defibrillator. In *Sudden Cardiac Death: Past, Present, and Future*, Eds. S. B. Dunbar, K. A. Ellenbogen, and A. E. Epstein, Futura Pub. Co., Mt. Kisco, NY, pp. 103-118.

- L. S. Liebovitch, A. T. Todorov, M. A. Wood, and K. A. Ellenbogen. 1999. When using the mean is meaningless: Examples from probability theory and cardiology. In *Handbook of Research Design in Mathematics and Science Education*, Eds. A. E. Kelly and R. A. Lesh, Lawrence Erlbaum Assoc., Mahwah, NJ, pp. 913-926.
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- L. S. Liebovitch, L. A. Shehadeh, and V. K. Jirsa. 2004. Patterns of genetic interactions: Analysis of mRNA levels from cDNA microarrays. In *Modeling in the Neurosciences: From Biological Systems to Neuromimetic Robotics 2nd Edition*, Eds. G. N. Reeke, R. R. Poznanski, K. A. Lindsay, J. R. Rosenberg, and O. Sporns, CRC Press, New York, pp. 9-24.
- L. S. Liebovitch, L. S. 2005. An introduction to the mathematics and meaning of chaos. In *Uncertainty and Surprise in Complex Systems*, Eds. R. R. McDaniel, Jr., and D. J. Driebe, Springer Verlag, Heidelberg, Germany, pp. 99-105.
- L. S. Liebovitch and Lina A. Shehadeh. 2005. Chapter 5. Introduction to Fractals. In *Tutorials in Contemporary Nonlinear Methods for the Behavioral Sciences Web Book* Eds. M. A. Riley and G. V. Orden, National Science Foundation, Directorate for Social, Behavioral and Economic Sciences, <http://www.nsf.gov/sbe/bcs/pac/nmbs/nmbs.jsp>
- L. S. Liebovitch. 2006. Why the eye is round. In *Biology of the Eye*, Ed. J. Fischbarg. Elsevier, New York, pp. 1-19.
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- L. S. Liebovitch and S. Weinbaum. 1981. A model of epithelial water transport: the corneal endothelium. *Biophys. J.*, **35**:315-338.
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