

**GEOFFREY B. WEST** *(updated 6/11/14)*  
**CURRICULUM VITAE**

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Distinguished Professor and former President  
The Santa Fe Institute (SFI)  
Santa Fe, New Mexico

Associate Fellow  
Oxford Martin School  
Oxford University

Senior Visiting Research Fellow  
Green Templeton College  
Oxford University

Senior Research Investigator  
Visiting Professor  
Dept of Mathematics, Imperial College

Senior Fellow  
Los Alamos National Laboratory

**OVERVIEW**

Geoffrey West received his BA from Cambridge University in 1961 and his PhD in physics from Stanford University in 1966. After spells at Cornell and Harvard Universities, he returned to Stanford in 1970 to join the faculty. Prior to joining the Santa Fe Institute (SFI) in 2003, he was the founding leader of the high energy physics group at Los Alamos National Laboratory, where he remains a Senior Fellow. He was President of SFI from 2005 - 2009.

West is a theoretical physicist whose primary interests have been in fundamental questions in physics and biology, ranging from the elementary particles (quarks, gluons, strings, etc), their interactions and cosmological implications to the origins of universal scaling laws and a unifying quantitative framework for addressing diverse questions in biology. His research areas in biology have included metabolic rate, growth, aging & mortality, sleep, cancer, and ecosystem structure and dynamics.

West's work is motivated by the search for "simplicity underlying complexity" and the unifying principles that can lead to a quantitative, predictive, integrated, mathematisable conceptual framework for understanding complex adaptive systems ranging from cells and ecosystems to cities, social networks and the challenges of sustainability. His recent work has focused on developing an underlying quantitative theory for the structure and dynamics of cities, companies and long-term global sustainability.

He has given many colloquia and public lectures worldwide. Among recent awards are the Mercer Prize from the Ecological Society of America, the Weldon Prize for Mathematical Biology, the Glenn Award for Aging research and the Leo

Szilard Award from the American Physical Society. He is the author of several books and a Fellow of the American Physical Society. He has been featured in many publications worldwide including The New York Times, Nature, Science, The Financial Times, Wired and Scientific American and has participated in television productions including Nova, the National Geographic and the BBC. His work on cities and companies was selected as a breakthrough idea of 2007 by *Harvard Business Review* and, in 2006, he was selected for *Time* magazine's list of "100 Most Influential People in the World".

## EDUCATION

B.A. Cambridge University (Gonville & Caius College), England 1961  
Ph.D. Stanford University, California 1966 (Advisor: Leonard Schiff)

## PERSONAL

Geoffrey B. West  
Santa Fe Institute  
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Born December 15, 1940; Taunton, Somerset, England.  
Married, two children.

## EMPLOYMENT HISTORY

Post-doctoral Research Associate, Cornell University (1966-1968).  
Post-doctoral Fellow, MIT (1969-1970).  
Research Fellow and Lecturer, Harvard University (1968-1970).  
Assistant Professor, Department of Physics, Stanford University (1970-1975).  
Group Leader and founder, Elementary Particle Physics and Field Theory Group, Los Alamos National Laboratory (1975-1988).  
Fellow, Los Alamos National Laboratory (1982-1997); Senior Fellow (1997 – present).  
Visiting Professor, University of Sussex, England (1973).  
Visiting Professor, University of California, Santa Cruz (1979 and 1982).  
Visiting Professor, Stanford Linear Accelerator Center, Stanford University (1979 and 1982).  
Adjunct Professor, University of Sussex, England (1990-1995).  
Program Manager for High Energy Physics, Los Alamos National Laboratory (1995-2001).  
Member and External Faculty, Santa Fe Institute (1993-2005).  
ESPRC Visiting Fellow, Oxford University (1999-2000).  
ESPRC Visiting Fellow, Imperial College, London (2001).  
Research Professor of Biology, University of New Mexico (1999-present).  
Distinguished Professor, Santa Fe Institute (2003-present).  
President, Santa Fe Institute (2005-2009).  
Associate Fellow, James Martin School, Oxford University (2009-present).  
Visiting Professor, Senior Research Investigator, Dept of Mathematics, Imperial College (2012 – present)

## SELECTED HONORS AND AWARDS

Centenary Speaker for the American Physical Society 1999  
Packard Foundation 5-Year Award (1999)  
Fellow of the American Physical Society  
Ulam Lecturer, Santa Fe Institute, 2001  
Mercer Award, Ecological Society of America, 2002  
ΦBK Distinguished Scholar 2003  
Weldon Memorial Prize for Mathematical Biology, 2005  
Glenn Award for Aging research, 2006  
*Time* 100 Most Influential People, *Time*, 2006  
Darwin's Birthday Lecture, Natural History Museum, London (2006)  
*Harvard Business Review* Breakthrough Idea, 2007  
Nobel Laureates Symposium Lecturer, Potsdam (2007)  
Google Distinguished Scientist Lecture (2007)  
Sigma Xi Lecture, University of California, Santa Cruz (2008)  
Brody Memorial Lecture, University of Missouri (2008)  
Royal Irish Academy lecturer, Dublin, Eire (2009)  
Edmonds Distinguished Lecture, Boston University (2009)  
Silicon Valley Big Thinkers Lecture, Yahoo (2010)  
Ted speaker (2011) (Viewed over 1,045,000 times)  
Hofstadter Memorial Lecture, Stanford University, 2012  
Oppenheim lecture, UCLA 2012  
Leo Szilard Award, American Physical Society 2013

## SELECTED INVITED CONFERENCE, WORKSHOP, PLENARY PRESENTATIONS, COLLOQUIA, & SEMINARS

**"Introduction to String Field Theory; a Pedestrian Approach,"** Aspen Winter Conference, Aspen, CO, January 1986.

**"An Analytical Approach to the Solution of QCD,"** LAMPF Workshop on Particle and Nuclear Physics, Los Alamos, NM, February 1986.

**"Towards an Analytic Solution of QCD; the Glueball Mass"** Irvine Conference on Non-Perturbative Methods in Field Theory, Newport Beach, CA, January 1987.

**"A Simple Solution to the Solar Neutrino and Missing Mass Problems,"** 4th Generation Workshop, Santa Monica, California, April 1987; 11th International Workshop on Weak Interactions, Santa Fe, NM, June 1987.

**"Solving QCD Non-Perturbatively,"** QCD Workshop, ITP, Santa Barbara, CA, January 1988.

**"Dark Matter and the Solar Neutrino Problem; the Search for the Missing WIMP,"** Neutrino '88, Boston, Massachusetts, June 1988; University of California, Santa Cruz, (Astronomy Dept.), April 1989; University of California, Davis, March 1989; University of Turin, Italy, April 1989; University of Arizona, September 1989; University of Delaware (and Bartol Institute), November 1989.

**"Nuclear and Particle Physics on the Light Cone - a Pedagogical Introduction,"**

Nuclear and Particle Physics on the Light Cone, LAMPF, Los Alamos, NM, July 1988.

**“Scaling Laws in Deep Inelastic Processes,”** International Summer School on New Aspects of Nuclear Dynamics, Dronten, Holland, August 1988.

**“X and Y-Scaling,”** Workshop on Momentum Distributions, Argonne, IL, October 1988.

**“Light Higgs, Dark Matter and the Solar Neutrino Problem,”** 4th Generation Conference, Santa Monica, CA, January 1989.

**“Can We Make Sense of QCD Perturbation Theory?”** Workshop on Radiative Corrections for LEP, Brighton, England, July 1989; University of Arizona, September 1989; University of Delaware (and Bartol Institute), November 1989; University of New Mexico, November 1989; Stanford University, February 1990; Fermilab, March 1990; Argonne National Laboratory, November 1990; University of Arizona, December 1990; University of North Carolina, January 1990; University of Michigan, March 1990; Institute of Theoretical Physics, Beijing, China, May 1990; University of Washington, April 1991; University of Sussex, England, June 1991; University of Cambridge, England, July 1991; Imperial College, University of London, England, July 1991; Durham University, England, July 1992; Brown University, March 1993.

**“Scaling in Various Physical Systems Ranging from Animals to Quarks”** University of California, Santa Cruz, April 1989; Ohio State University, April 1990; Duke University, January 1990; San Francisco State University, February 1990; CEBAF, Newport News, VA, October 1991; University of Texas, December 1991; NIKHEF, University of Amsterdam, Holland, July 1992.

**“Limits on Light Higgs,”** International Workshop on Rare Decays of Light Mesons, Gif-sur-Yvette, France, March 1990.

**“A Theorist's View of the SSC; its Science, Politics and Sociology”** University of Arizona, December 1990; University of New Mexico, February 1990; Stanford University, May 1991; College of William & Mary, October 1991.

**“Introduction and Overview of Some Topics in Perturbative QCD and Their Relationship to Non-perturbative Effects,”** International Workshop on the Quark-Gluon Structure of Hadrons and Nuclei, Shanghai, China, May 1990.

**“The Large Coefficient Problem in QCD,”** Workshop on Lattice Gauge Theory and QCD, Santa Barbara, CA, July 1990; QCD Workshop, Santa Fe, NM, August 1990.

**“y-Scaling: What Can We Learn About Nuclei from Medium Energy Deep Inelastic Electron Scattering?”** University of Rome, Rome, Italy, May 1989; University of Washington, May 1991; CEBAF, Newport News, VA, October 1991; University of New Hampshire, May 1993; California Institute of Technology, June 1993; University of California, Irvine, June 1993; University of Maryland, October 1995.

**“Why Does Leading Order QCD Perturbation Theory Works so Well Even Though the Series is Divergent and the Coupling Large?”** SSC, Dallas, December 1991; University of Chicago, February 1992; University of California, Berkeley, February 1992; Imperial College, England, March 1992; Cambridge University, England, March 1992; Oxford University, England, June 1992; University of New Mexico, October 1993; Rockefeller University, October 1993; University of Wisconsin, November 1994; University of Connecticut, April 1995; University of Mexico, Mexico, April 1995.

**“The Renormalization Group and Scaling in Particle Physics,”** Winter School on Complex Systems and Scaling, Tucson, AZ, January 1992.

**“Why Does QCD Perturbation Theory Work?”** Moriond QCD Conference, Les Arcs, France, March 1992.

**“Can We Understand QCD Perturbation Theory?”** Coral Gables Conference on Symmetry in the Small and the Large, January 1993.

**“Size, Scale and Fractals in Biological and Physical Systems”** Rencontre de Blois on Chaos and Complexity, Blois, France, June 1993.

**“Fun with Size and Scale; Elephants, Quarks and the Early Universe”** University of New Hampshire, May 1993; University of California, Irvine, June 1993; University of Southern California, November 1993; University of California, Los Angeles, November 1993; University of Illinois, Urbana, February 1994; University of New Mexico, March 1994; Ohio State University, May 1994; California Institute of Technology, May 1994; Yale University, October 1994; University of Wisconsin, November 1994; University of Connecticut, March 1995; MIT, February 1996.

**“Scaling, Fractals and the Renormalisation Group”** Conference on Unity in the Small and the Large, Coral Gables, FL, January 1994.

**“Scaling and Perturbation Theory in Deep Inelastic Processes”** International Workshop on the Parton Structure of Nucleons & Nuclei, Trento, Italy, April 1994.

**“Divergence Problems in QCD Perturbation Theory”** International Conference on QCD, Trento, Italy, July 1994.

**“Towards a Theory of Longevity and Death”** Orbis Scientiae Conference, Miami, FL, January 1995.

**“Glueballs”** Gluonia95, Corsica, France, June 1995.

**“Scaling, Fractals and the Renormalisation Group,”** University of Sussex, England, March 1995; Grinnell College, September 1997; Rutgers University (Mathematics Department), October 1997; Ohio State University, February 1998.

**“Glueballs: the Fundamental Particle of Non-Perturbative QCD”** University of Maryland, October 1995; MIT, February 1995; Cambridge University, November 1995; Coral Gables Conference, January 1996; University of Arizona, March 1996; University of Washington, May 1996; University of New Mexico, October 1996; Yale University, April 1997; SLAC, April 1997.

**“Glueballs and Non-Perturbative QCD”** Workshop on Collisions, Confinement and Chaos, Paris, June 1996.

**“Glueballs, An Overview”** QCD 96, Montpellier, July 1996.

**“The Origin of Universal Scaling Laws in Biology; the Physics of the Cardiovascular and Respiratory Systems”** Brown University, April 1997; Brandeis University, April 1997; International Conference on Complex Systems, Nashua, New Hampshire, September 1997; Rutgers University, October, 1997; California Institute of Technology, February 1998; Ohio State University, February 1998; University of New Mexico, March 1998; NASA, Goddard Space Center, April 1998; University of Washington, May 1998.

**“Scaling in Biology”** Conference on Non-Equilibrium Systems, Lehigh University, October 1997.

**“Electron Scattering and the Search for the Fundamental Constituents of Matter”** International Conference Celebrating 100 years of the Electron, Frascati, Italy, November 1997.

**“The Universal Features of Nuclear Structure Functions”** International Workshop on Electron Scattering from Nuclei, Elba, Italy, 1998.

**“Universal Scaling Laws in Biology”** The New York Times Workshop for Science Writers, July 1998.

**“Scaling Laws in River Networks”** International Conference in Geophysics, Cambridge, England, July 1998.

**“The Origin of Universal Scaling Laws in Biology”** STATPHYS 20, Paris, July, 1998

**“The Origin of Universal Scaling Laws in Biology from Cells to Whales”** International Conference on Biological Physics, Santa Fe, NM, September 1998.

**“y-Scaling: the Universal Features of Nuclear Structure Functions”** California Institute of Technology, June 1998; University of Washington, July 1998.

**“The Origin of Universal Scaling Laws in Biology from Molecules and Cells to Whales”** Princeton University, September 1998; University of Minnesota, October, 1998; Northeastern University, October, 1998; CERN, Geneva, Switzerland, December 1998; Washington University, St. Louis, February, 1999; University of California, Santa Cruz, February 1999; University of Connecticut, April 1999; Argonne National Laboratory, May, 1999; Stanford University, May 1999; University of Michigan, October 1999; University of California, Santa Barbara, October 1999; Oxford University, February 2000; SLAC, Stanford University, April, 2000; Cornell University, May 2000; University of California, Davis, May 2000; Medical School, University of Washington, October 2000; National Science Foundation, November 2000; Cambridge University, February 2001; Imperial College, London, March, 2001; Sussex University, May 2001; Oxford University, June, 2001; University of Maryland, November 2001; Victoria University, Wellington, NZ, July, 2003.

- “Fractals, Self-Similarity and the Renormalisation Group”** International Conference on Complex Systems, Nashua, NH, October 1998.
- “Scaling from Dimensional Analysis to Fractals, Self-Similarity and the Renormalization Group”** Nonlinear Science Festival, Niels Bohr Institute, Copenhagen, Denmark, December 1998.
- “The Origin of Universal Scaling Laws in Biology from Molecules and Cells to Whales”** AAAS Annual Meeting, Anaheim, CA, January 1999; APS Centenary Meeting, Atlanta, GA, March 1999.
- “Fractals and Universal Scaling Laws in Biology”** University of Michigan, February 1999; Oxford University, April, 2000; University of New Mexico, September, 2000; Princeton University, October, 2000; University of Washington, October 2000; University College, London, January, 2001; Middlesex University, London, May 2001.
- “The Origin of Universal Scaling Laws in Biology and Speculations on Aging and Mortality”** Gordon Conference on Aging, Ventura, CA, February 2000.
- “The Origin of Universal Scaling Laws in Biology from Genes and Cells to Whales”** Conference on the Human Genome Project, Santa Fe, NM, March 2000.
- “The Origin of Universal Scaling Laws in Biology from Molecules and Cells to Whales”** International Congress on Mathematical Physics, London, July 2000 and the Annual Meeting of the Argentine Physical Society, Buenos Aires, September 2000.
- “Fractals and Scaling in Biology”** Workshop on Techniques in Complex Systems, Leipzig, May 2001.
- “The Origin of Universal Scaling Laws in Biology from Molecules and Cells to Whales and Ecosystems”** Annual Meeting of the American Physical Society, Indianapolis, IN, March 2002.
- “The Origin of Universal Scaling Laws”** International Conference on Complex Systems, New England Institute of Complex Systems, Nashua, NH, June 2002.
- “Towards a Quantitative Unifying Theory of Biological Structure, Function and Organization”** Templeton Conference on Fine Tuning in Living Systems, Windsor Castle, September 2002.
- “Scaling in Social Organisations”** ISCOM Workshop, Venice, Italy, November 2002.
- “Universal Scaling Laws in Biology from Genomes to Ecosystems; Towards a Quantitative Unifying Theory of Biological Structure and Organization”** University of Illinois, October 2002; University of Connecticut, October, 2003; University of Rhode Island, October 2003; Brown University, March 2003; Princeton University, April, 2004.
- “Towards a Unifying Theory of Biological Structure, Function and Organization”** Symposium on the opening of the Centro de Astrobiologia, Madrid, January 2003.

- “Fractals and Scaling in Biology: Solving the Metabolic Scaling Law”** MedMath 2003; Fractals, Networks and Power Laws: Their Importance for Medicine and its Allied Sciences, Winnipeg, May 2003.
- “Networks: a Matter of Life and Death?”** International Conference on Networks: Structure, Dynamics, and Function, Santa Fe, NM, May 2003.
- “Scaling, Fractals and the Renormalisation in Classical, Nuclear and Particle Physics”** Biannual Meeting of the New Zealand Institute of Physics, Palmerston North, NZ, July 2003.
- “The Physics Underlying Universal Scaling Laws in Biology from Cells to Whales to Molecules and Ecosystems”** Keynote address, Biannual Meeting of the New Zealand Institute of Physics, Palmerston North, NZ, July 2003.
- “The Search for Fundamental Principles in Biology; Scaling Laws from Molecules and Cells to Mammals and Ecosystems”** Keynote address, Canadian Undergraduate Physics Conference, Montreal, November 2003.
- “Scaling in Biology: Growth, Cancer, Mortality and Sleep”** Workshop on Immune System Modeling, ITP, Santa Barbara, CA, November 2003.
- “Universal Scaling, Fractals and the Renormalisation Group from Quarks and Cells to Whales and Ecosystems”** University of Arizona, April 2004.
- “Towards a Quantitative Unifying Theory of Biological Structure, Function and Organization”** Symposium on Future Directions in Neuroscience, Merck Pharmaceuticals, Tillings Park, UK, March 2004.
- “The Complexity, Simplicity, and Unity of Living Systems”** Symposium on Complexity Science and 21st Century, London School of Economics, March 2004; and the Conference on Scaling and dimensionality, Brown University, April 2004.
- “Aging, Mortality and Sleep”** Conference on Soft Matter, Biology and Statistical Physics, Les Houches, France, April 2004.
- “Overview on Interrelationships of Energy and Materials in Ecology”** Gordon Research Conference on the Metabolic Basis of Ecology, Bates College, Maine, July 2004.
- “Towards a Quantitative Unified Theory of Scaling Laws in Biology from Genomes to Ecosystems”** Workshop on Size as a Determinant of Biological Processes, Ascona, Switzerland, September 2004.
- “Towards a Quantitative Unified Theory of Scaling Laws in Biology”** Santa Fe Institute Complex Systems School, Chennai, India, January 2006.
- “The Physics Underlying Universal Scaling Laws in Biology”** Silicon Valley Leaders Symposium, San Jose State, San Jose, CA, March 2006.



- “Towards a Quantitative Unified Theory of Scaling Laws in Biology”** University of California, Davis Spring Colloquium, Davis, CA, April 2006.
- “Dynamics of Complex Systems”** International Society for Systems Science, Sonoma State University, Sonoma, CA, July 2006.
- “Metabolic Basis of Ecology and Evolution”** Gordon Research Conference, Bates, ME, July 2006.
- “Complexity and Biological Systems”** World Knowledge Dialogue, Switzerland, September 2006.
- “The Future of IT in Society and its Impact on People’s Lifestyles”** Science and Technology in Society Forum, Kyoto, Japan, September 2006.
- “Developments in Nanotechnology”** Science and Technology in Society Forum, Kyoto, Japan, September 2006.
- “Universal Scaling Laws in Biology, from Genomes to Ecosystems”** American Association for the Advancement of Science Annual Meeting, San Francisco, CA, February 2007.
- “The Complexity, Simplicity, and Unity of Living Systems: Universal Scaling Laws from Cells to Cities”** Cornell University Colloquium, Ithaca, NY, April 2007.
- “Towards a Quantitative Unified Theory of Scaling Laws in Biology”** Harvard University Colloquium, Cambridge, MA, May 2007.
- “Scaling in Social Networks”** Fidelity Investments, Boston, MA, May 2007.
- “On the Scale and Unity of Life”** Weldon Memorial Lecture, Oxford University, Oxford, UK, June 2007.
- “The Scale and Unity of Life from Cells to Cities: Growth, Innovation and the Pace of Living,”** Google, August 2007.
- “Ontogeny to Mortality: Simplicity and Unity of Complex Living Systems,”** Tulane University, December 2007.
- “A General Theory of Biological Organization from Metabolism, Growth and Vascular Networks to Tumors and Sleep,”** Grand Rounds, Tulane University Medical School, December 2007.
- “The Complexity, Simplicity, and Unity of Life from Cells to Cities,”** Sigma Xi Lecture, University of California, Santa Cruz, CA, February 2008.
- “Universal Scaling Laws in Living Systems from Cells to Cities; Towards a Unifying Theory of Biological and Social Structure and Organization,”** Massachusetts Institute of Technology, Cambridge, MA, April 2008

- "Universal Scaling Laws from Cells to Cities; Towards a Unified Quantitative Theory of Biological and Social Structure and Organization,"** University of Kansas, April 2008
- "Size Matters; the Complexity, Simplicity, and Unity of Living Systems from Cells to Cities,"** Brody Memorial Lecture, University of Missouri, April 2008
- "The Complexity, Simplicity, and Unity of Life from Cells to Cities,"** Science and Research Seminar, University of Nevada, Reno, NV, April 2008
- "The Biology of Business – Learning from Nature to Understand Business,"** Dubai Leaders Forum, Dubai, UAE, November 2008
- "Complexity: Science of the 21<sup>st</sup> Century,"** Royal Irish Academy, Dublin, Ireland, January 2009
- "The Complexity, Simplicity, and Unity of Living Systems from Cells to Cities; A Physicist's Search for Quantitative, Unified Theories of Biological and Social Structure and Organization,"** Edmonds Distinguished Lecture, Boston University, April 2009.
- "Size Matters; the Complexity, Simplicity, and Unity of Living Systems from Cells to Cities,"** California Institute of Technology, April 2009.
- Davos 2010: the World Economic Forum in Davos, Switzerland** *In attendance* January 2010
- "Growth, Innovation, and the Pace of Life from Cells and Ecosystems to Cities and Corporations; Are They Sustainable?"** James Martin 21<sup>st</sup> Complexity and Systemic Risk Series, Century School, Oxford University February 2010
- "Complexity and Transdisciplinarity; Science for the 21st Century"** Pontificia Universidad Católica de Chile, Santiago, Chile, March 2010
- "Growth, Innovation, Economies of Scale and the Pace of Life from Cells & Ecosystems to Cities & Corporations"** URBANICS, Marbella, Chile Workshop on Urban Dynamics. March 2010
- "Cities as Complex Systems Growth, Innovation, Economies of Scale and the Pace of Life"** ADC Forum, Melbourne, Australia, March 2010
- "Damage and Repair; Sleep, Aging and Nucleotide Substitution Rates"** Weizmann Institute, ISRAEL Systems Biology Talk: May 2010
- "The Complexity, Simplicity, and Unity of Living Systems from Cells to Cities; A Physicist's Search for Quantitative, Unified Theories of Biological and Social Structure and Organization"** Colloquium: Physics Department Weizmann Institute, ISRAEL Systems Biology Talk: May 2010
- "Universal Scaling Laws, Network Structures, Sustainability and the Pace of Life from Cells and Ecosystems to Cities and Corporations"** Statistical Modelling and Inference for Networks Workshop, University of Bristol, June 2010

- “Toward a General Metabolic Theory of Biological Organization and Evolutionary Dynamics”** Gordon Research Conference on Metabolic Basis of Ecology and Evolution, Maine, July 2010
- “Is a Quantitative, Predictive, "Universal" Theory of Cities Conceivable? What Can We Learn from Biology and Physics?”**. 3 day Workshop A Comprehensive Program in the Theory and Application of Urban Organization and Dynamics, Bellagio, ITALY July 2010
- “Growth and Sustainability from Cells to Cities and Corporations”** Techonomy, Lake Tahoe, CA, August 2010
- “Growth, Innovation, and the Pace of Life from Cells to Cities and Corporations, Are They Sustainable?”** ADC Forum – Australian Leadership Retreat, Hayman Island, Australia, August 2010
- “Growth, Innovation, and the Pace of Life from Cells to Cities and Corporations, Are They Sustainable?”** Yahoo Labs – Big Thinkers Presentation, Mountain View, CA, September 2010
- “Growth, Innovation, Economies of Scale and the Pace of Life from Cells to Cities and Corporations; Are They Sustainable?”** Business Complexity & the Global Leader Conference, Boston, MA, September 2010
- “Towards a Quantitative Predictive Framework for Cancer”** NSF and NIH Physics of Cancer Metastasis Meeting, Washington DC, November 2010  
Masterclass of Freedom Labs, Amsterdam. November 2010
- “Growth, Innovation, Economies of Scale and the Pace of Life from Cells to Cities; are they Sustainable?”** Catalyst Network The Search for Simplicity in Complexity. Sandia National Labs, Albuquerque, NM, November 2010
- “Ontogeny to Mortality; Towards a Generic Quantitative Theory of Aging”** Systems Biology for Human Aging, Drexel University, Philadelphia, December 2010
- "Universal Scaling Laws from Cells and Ecosystems to Cities and Corporations; Towards a Unified Framework of Biological and Social Organization and Dynamics"** Scaling and Complex Systems Workshop, Imperial College, London, January 2011
- “Sustainability and Cities”** *Digital Life Design*, DLD Conference, Munich, January 2011
- Future Cities Program**, ETH Zurich, January 2011
- The Intelligent Infrastructure Series – The Ideas Economy**, The Economist, New York, NY, February 2011
- “Ontogeny to Mortality; Towards a Generic Quantitative Theory of Aging”** PIBBS, University of New Mexico, February 2011

**"Growth, Innovation, and the Pace of Life from Cells to Cities and Corporations; Are They Sustainable?"** Stanford University Center for International Security and Cooperation, March 2011

**"Growth, Innovation, and the Pace of Life from Cells to Cities and Corporations; Are They Sustainable?"** IBM – Watson Research Center, Yorkville Heights, NY, April 2011

Panel **"Modeling & Measuring Cities"** Panel **"Defining Urban Systems"**  
Urban Systems Symposium, New York, NY, May 2011

**"Ontogeny to Mortality: Towards a General Quantitative Theory of Aging"**  
Aging and Cancer 2011, Heidelberg, Germany, May 2011

**3<sup>rd</sup> Nobel Laureates Symposium**, Stockholm *In attendance* May 2011

**"The Complexity, Simplicity, and Unity of Living Systems from Cells to Cities; Towards a Quantitative, Unifying Theory of Biological and Social Structure and Organization"** Seminar at IHPC, Singapore, June 2011

**"Is a Quantitative, Predictive, Science of Cities Conceivable? What Can We Learn from Biology and Physics?"** R & D Congress, (Plenary Keynote Address)  
Singapore June 2011

**"Sustainability? What Can We Learn from Biology and Physics?"** Guaning Symposium, Singapore, June 2011

**"The Complexity, Simplicity, and Unity of Living Systems from Cells to Cities; Towards a Quantitative, Unifying Framework of Biological and Social Structure, Organization and Dynamics"** *International Conference on Complex Systems ICCS* Boston, June 2011

**"The Surprising Math of Cities and Corporations"** Ted Global, Edinburgh, July 2011

**Sci Foo Conference**, Google, Mountain View, CA, August 2011

**"On Biological and Social Time, Why Does Life get Faster and is it Sustainable?"**  
Setting Time Aright FQxi Conference, Norway, August 2011

**"Damage and Repair; Sleep, Aging, Mortality and Nucleotide Substitution Rates"**  
Research seminar, Istanbul, September 2011

**"Searching for Simplicity and Unity from Cells and Ecosystems to Cities and Companies"** Keynote Address, European Conference on Complex Systems, ECCS11, Vienna, September 2011

**"Towards a Quantitative, Predictive, "Universal" Theory of the Structure, Growth and Sustainability of Cities"** American Institute of Architects, Santa Fe, NM  
September 2011

- "Can There be a Predictive Science of Cities, Companies and Sustainability? What Can We Learn from Biology and Physics?"** Suffolk Business Complexity and Global Leadership Conference, Boston, MA October 2011
- "Growth, Innovation, and the Accelerating Pace of Life from Cells to Cities and Corporations; Are They Sustainable?"** Compass Summit, Palos Verdes, CA, October 2011
- "The Complexity, Simplicity, and Unity of Living Systems from Cells & Ecosystems to Cities & Companies"** AStar Conference, Singapore, November 2011
- "The City Never Sleeps: Mankind's urban migration brings staggering benefits: more productivity, innovation and equality. Density and diversity supercharge creativity. Can cities fuel global economic expansion?"** Techonomy, Tucson, AZ, November 2011
- "The Complexity, Simplicity, and Unity of Living Systems from Cells & Ecosystems to Cities & Companies"** MacMillan Publishing, London, November 2011
- Connections: The Urban Nervous System** North House Salon, London December 2011
- "Scaling in Social System"** workshop Said Business School, Oxford, UK, December 2011
- "Towards a Quantitative, Predictive Theory of Tumor Growth, Metabolic Rate and Vascular Structure"** Arizona State University, January 2012
- "Is a Quantitative, Predictive, Science of Cities Conceivable? What Can We Learn From Physics and Biology?"** IEDC, San Antonio, TX January 2012
- "Why Cities Keep Growing, Companies Always Die, and Life Gets"** Panel Invitation at Dallas Committee on Foreign Relations, Dallas, TX January 2012
- "Complexity and Transdisciplinarity; Science for the 21st Century (?)"** More is Different – Complexity Programme NTU, Singapore, February 2011
- "Growth, Innovation and the Accelerating Treadmill of Life From Cells to Cities: Are They Sustainable?"** Oppenheim lecture, UCLA March 2012
- "Universal Scaling Laws from Cells to Cities; A Physicist's Search for Quantitative, Unified Theories of Biological and Social Structure and Dynamics"** Colloquium Stanford April 2012
- "Nature & Origin of Biological Information"** Physics of Living Matter Workshop series, ASU, May 2012
- "Defining Urbanites: how we became a city species and why it matters"** New Cities Summit, Paris May 2012

**“The Importance of Quantitative Systemic Thinking in Medicine: Lessons from Physics and Complexity Science”** Department of Medicine, Medical Grand Rounds, Stanford, May 2012

**“The Social and Biological Life of Cities”** Urban Studies Class Stanford May 2012

**“Universal Scaling Laws From Cells to Cities A Physicists search for Quantitative, Unified Theories of Biological and Social Structure Dynamics”**  
XVth International Conference on Calorimetry in High Energy Physics,  
Convention Center, Santa Fe, NM June 2012

**“Growth, Innovation and the Accelerating Pace of Life”** The Economist Ideas Economy: Information- Big Data and the evolution of smart systems conference San Francisco June 2012  
*Interview with Kenneth Cukier data editor, The Economist*

**“Towards a Quantitative, Predictive Theory of Tumor Growth, Metabolic Rate and Vascular Structure”** Arizona State University Complex Adaptive Systems Initiative (CASI) and the University of Southern California Physical Sciences Oncology Center (USC-PSOC) June 2012

**"Searching for Simplicity and Unity in the Complexity of Life: Cells to Cities, Companies to Ecosystems, Milliseconds to Millennia"** CSSS lecture – St Johns College Santa Fe, NM, June 2102

**“Cities as Complex Systems”**  
Complexity: Out of the Box Thinking Tomorrow’s Science workshop  
Santa Fe, NM, September 2012

**WWW.WWW conference**  
A conversation with Richard Wurman, Riverside, CA, September 2012

**“Growth, Innovation, and the Accelerating Pace of Life from Cells to Cities”**  
The Feast, New York, NY, October 2012

**Challenge Talk at the Center for Urban Science and Progress**  
CUSP Partners Workshop, NYU, New York, NY, October 2012

**“Implications of a Networked World”**  
Before and After Europe: Macroeconomics, Geopolitics and History.  
Greenmantle Gathering, Munich, October 2012

**“What’s Next in the Theory of Urban Development?”**  
Hosted by Charter Cities with support from the Rockefeller Foundation. NYU Stern School of Business Workshop New York, NY, October 2012

**"Growth, Innovation and the Accelerating Pace of Life From Cells to Cities: Are They Sustainable?"**  
Innovative Chemical and Engineering Solutions for Sustainable Growth  
Singapore, October 2012

**“Is a quantitative, mathematisable, predictive theory of cities and companies conceivable?”**

2012 Modular and Off-Site Construction Summit, Edmonton, Canada,  
November 2012

**"Universal Scaling Laws, Network Structures, Sustainability and the Pace of Life from Cells to Cities"**

Bristol Center for Complexity Sciences International Advisory Board Bristol, UK  
November 2012

**“Universal Scaling Laws from Cells to Cities; A Physicist's Search for "Grand Unified Theories" of Biological and Social Structure and Dynamics”**

70th Birthday Celebration in Honor of Professor Sir Chris Llewellyn  
CERN, Geneva, November 2012

**“Universal Scaling Laws, Network Structures, Sustainability and the Pace of Life from Cells to Cities”**

COMPLEX 2012, Santa Fe, NM, December 2012

**"Growth, Innovation and the Accelerating Pace of Life from Cells to Cities; Are They Sustainable?"**

WME retreat, Carlsbad, CA January 2013

**“The Complexity, Simplicity, and Unity of Living Systems from Cells to Cities; A Physicist's Search for Unifying Theories of Biological and Social Structure and Dynamics”**

University of Illinois Colloquium, Urbana, IL, January 2013

**Davos 2013: the World Economic Forum in Davos, Switzerland**

Chair Global Agenda Council on Complex Systems January 2013

**“A Unifying Metabolic Theory of Growth, Aging, Mortality, Sleep and Nucleotide Substitution Rates”**

Imperial College, London, UK, February 2013

**“Why Cities Keep Growing, Companies Always Die, and Life Gets Faster”**

Technology Frontiers Economist, London, UK, March 2013

**“The Surprising Math of Cities and Corporations”**

National Association of Real Estate Investment – Santa Monica, CA March 2013

**"The Complexity, Simplicity, and Unity of Living Systems from Cells to Cities; A Physicist's Search for Unifying Theories of Biological and Social Structure and Dynamics"**

University of Victoria – Victoria, BC, March 2013

University of British Columbia – Vancouver, BC, March 2013

Simon Fraser University – Vancouver, BC, March 2013

**“The Surprising Math of Cities”**

Fort Worth Downtown Annual Meeting – Fort Worth, TX March 2013

**"Growth, Innovation and the Accelerating Pace of Life from Cells to Cities; Are They Sustainable?"**

Pardee Lecture, University of Boston – Boston, MA, April 2013

**"From Reductionism to Complexity; A Theoretical Physicist's Journey into Biology and the Social Sciences"**

FPS meeting Denver, CO April 2013

**"Universal Scaling Laws from Cells to Cities; A Physicist's Search for Quantitative, Unified Theories of Biological and Social Structure and Dynamics"**

APS SZILARD AWARD – Denver, CO April 2013

**"A Unifying Framework for the Dynamics and Structure of Organisms, Ecosystems, Cities and Companies; from Metabolism, Growth and Mortality to Cancer and Sleep"**

Stanford Complexity Group, Stanford, June 2013

**"A Unifying Framework for the Dynamics and Structure of Organisms, Ecosystems, Cities and Companies; from Metabolism, Growth and Mortality to Cancer and Sleep"**

CSSS Santa Fe Institute – Santa Fe, NM, July 2013

**"The Principles of Complexity: Life, Scale, and Civilization II"**

The Santa Fe Institute, Santa Fe, NM August 2013

**"Discussion on systems and frameworks in nature that should inform our strategies for managing large social and political challenges"**

Aspen Institute – Aspen, CO August 2013

**"Big Data + Science = Understanding. So What?"**

How Far Can "Big Data" Take Us Towards Understanding Cities?

The Santa Fe Institute Santa Fe, NM September 2013

**"Mining for Gold"** Panelist with Nate Silver and Dr. David Kendrick

Pricewaterhouse Coopers 180 Health Forum – Washington DC October 2013

**"Are there theoretical foundations for sustainability science"**

Panel discussion with Simon Levin and Bill Clark

Theory and Knowledge Systems for Sustainability workshop

Santa Fe, NM October 2013

**"Big Data Needs Big Theory; Paradigm 4.0 or Just 3.1?"**

Business Network Symposium Santa Fe, NM November 2013

**"Towards a Science of Cities; The Role of Scaling"**

CUSP (Center for Urban Science + Progress) New York, NY, November 2013

**"Is a Quantitative, Predictive Science of Cities Conceivable? What Can We Learn from Physics and Biology?"**

CUSP Research Seminar New York, NY, November 2013



**“Cities, Companies and Cells; Big Data Needs Big Theory”**

The Revolution Business, Techonomy, Tucson, AZ November 2013

**“From Cells and Cities to Companies and Economies, Examining The Role of Risk in Growth, Innovation and the Accelerating Pace of Socio-Economic Life”**

RiskMinds International 2013, Amsterdam December 2013

**"The Renormalisation Group and Scaling from Quarks to Jaguars"**

The 50<sup>th</sup> Anniversary of Quarks –Celebration of Murray Gell-Mann’s Quark Model of Hadrons, CalTech, Pasadena, CA December 2013

**“Complexity Science and Urban Scaling”**

Singapore Sustainability Symposium, Singapore January 2014

**"The Fate of Cities is the Fate of the Planet"**

Earth League, The World Under a 2 -4 Degree Warming. Workshop at Santa Fe Institute Santa Fe, NM April 2014

**"The Conceptual Framework of Urban Scaling"**

2014 Science Board Symposium: Complexity: Theory and Practice, Santa Fe, NM May 2014

**2014 UrbDP Interdisciplinary PhD Annual Symposium**

The Centrality of Urban in the Anthropocene: Implications for Graduate Research and Education. University of Washington, Seattle WA, May 2014

**“General Principles of Physical Aging”**

Connecting the Biological and Physical Principles of Mammalian Aging workshop. Washington DC May 2014

**“World Cities Summit Plenary: The Next Urban Decade – Critical Challenges and Opportunities”**

World Cities Summit Mayors Forum, Singapore June 2014

**“Generation, Acquisition and Diffusion of Knowledge at the Individual, Organizational and Societal Level”**

Workshop panel participant, Santa Fe Institute, Santa Fe, NM June 2014

**“Is a Quantitative, Predictive Science of Cities Conceivable? What Can We Learn from Biology and Physics?”**

Keynote speaker, “Re-imagining Cities” New Cities Summit, Dallas TX June 2014

**“The Science of Cities: The Good, The Bad, & The Ugly”**

Aspen Ideas Festival, Aspen, CO, June 2014

**“Size matters; Growth, Innovation, and the Pace of Life from Cells to Cities”**

2014 Frontiers of Thought, 2 lectures Porto Alegre, Sao Paulo, Brazil August 2014

**“The Principles of Complexity: Life, Scale, and Civilization III”**

John Templeton Foundation workshop at Santa Fe Institute, Santa Fe, NM  
August 2014

**“Growth, Innovation and the Accelerating Pace of Life From Cells to Cities and Companies”**

Keynote speaker, CLSA Investors’ Forum 2014, Hong Kong September 2014

**“It Takes Energy to Innovate”**

Origins of Novelty in Biological, Social and Technological Systems: Towards a General Theory of Innovation. Workshop at Santa Fe Institute, Santa Fe, NM  
October 2014

**“From Escalade to Explosion, Evolution and Critical Points”**

Interdisciplinarity in Action: A Practical Experience of Interdisciplinary Research”  
WORLD KNOWLEDGE DIALOG 2014 Villars-Sur-Ollon, Switzerland October 2014

**Tallberg Workshop@CERN**

Tallberg Foundation Workshop, Cern, Switzerland October 2014

**“Applications of Urban Science: Understanding the City Using Big Data and Informatics”**

New York University, Center for Urban Science + Progress, New York, NY  
November 2014

**“Cities, Urban Living and Diversity”**

Keynote speaker at BASF’s D&I Ambassador Day – Frankfurt, Germany December  
2014

**“A Physicist's Search for Simplicity and Unity in Living Systems from Cells and Ecosystems to Cities and Companies”**

Physics Colloquium, Georgia Tech, Atlanta March 2015

**SELECTED DISTINGUISHED LECTURER SERIES**

**“The Origin of Universal Scaling Laws in Biology from Molecules and Cells to Whales”** Institute for Advanced Study, Princeton, October 2000; Medical School, Stanford University, October 2000; Scripps Institute, La Jolla, October, 2000; Hewlett-Packard, April 2001; Michigan State University, December, 2001.

**“The Complexity, Simplicity, and Unity of Living Systems”** St. John’s College, February 2004; University of Arizona, April 2004.

**“Size, Scale and Fractals from the Big Bang to Life”** Rhodes College, February, 2004.

**“Santa Fe Institute: An Experiment in Transformational, Transdisciplinary**

**Science,** National Science Foundation Distinguished Lecture Series, Arlington, VA, June 2007

**“On the Scale and Unity of Life from Cells to Cities: Towards a Unified Quantitative Theory of Biological and Social Structure and Organization,”** National Science Foundation Distinguished Lecture Series, Arlington, VA, June 2007

**“Size Matters; Growth, Innovation and the Pace of Life from Cells to Cities,”** Cornell University, October 2007

**“The Complexity, Simplicity, and Unity of Living Systems from Ontogeny to Mortality and from Cells to Whales,”** Tulane University Distinguished Lecture on Aging, December 2007

**"The Complexity, Simplicity, and Unity of Living Systems from Cells to Cities; A Physicist's Search for Quantitative, Unified Theories of Biological and Social Structure and Organization,"** Edmonds Distinguished Lecture, Boston University, April 2009

**"Growth, Innovation and the Accelerating Treadmill of Life From Cells to Cities: Are They Sustainable?"** Oppenheim lecture, UCLA March 2012

**"Growth, Innovation and the Accelerating Pace of Life from Cells to Cities; Are They Sustainable?"**  
Pardee Lecture, University of Boston, April 2013

**"From Reductionism to Complexity; A Theoretical Physicist's Journey into Biology and the Social Sciences"**  
FPS meeting at APS awards, Denver April 2013

**“Universal Scaling Laws from Cells to Cities; A Physicist's Search for Quantitative, Unified Theories of Biological and Social Structure and Dynamics”**  
APS Szilard Lectureship Award. Denver, April 2013

**“A Unifying Framework for the Dynamics and Structure of Organisms, Ecosystems, Cities and Companies; from Metabolism, Growth and Mortality to Cancer and Sleep”**  
Stanford Complexity Group, Stanford, June 2013

**“Growth, Innovation and the Accelerating Pace of Life From Cells and Ecosystems to Cities and Economies; Are They Sustainable?”**  
Karlovitz Lecture, Georgia Tech, Atlanta, March 2015

## **PUBLIC LECTURES**

**“The Strange Case of Dark Matter.”** San Francisco, CA, 14th February, 1990.

**“Fun with Size and Scale; Elephants, Quarks and the Early Universe.”** Santa Fe, New Mexico, 4th December, 1991  
Tucson, AZ, 12th January, 1992.

**“Size and Scale in Biology and Physics.”** Phoenix, AZ, 7th January, 1997.

- “The Origin of Universal Scaling Laws in Biology; the Physics of the Cardiovascular and Respiratory Systems.”** The Squire Lecture, Grinnell College, IA, September, 1997.
- “Electrons and the Search for the Fundamental Constituents of Matter”** (in Celebrating 100 years of the Electron”), Perugia, Italy, November, 1997.
- “Fractals and the Tree of Life; A Unifying Theme for Creatures Great and Small”**  
Rio de Janeiro, Brazil, May, 1999.
- “The Tree of Life”** Copenhagen, July, 1998 (with P. Bak).
- “Scaling the Tree of Life,”** The Ulam Lectures, Santa Fe, NM November, 2001.
- “Size, Scale and Fractals from the Big bang to Life,”** Budapest, July, 2002.
- “The Complexity, Simplicity, and Unity of Living Systems,”** Memphis, February, 2004.
- “The Complexity, Simplicity, and Unity of Living Systems,”** London, 2004.
- “The Origin of Universal Scaling Laws in Biology,”** Arizona State University, January 2007.
- “Why Cities Keep on Growing, Corporations Always Die, and Life Gets Faster”**  
Long Now Seminar, San Francisco, CA, July 2011
- "The Science of Cities and Their Critical Role in Global Sustainability: Growth, Mortality, Innovation, and the Accelerating Pace of Life"** Museum of Art, San Diego, CA, August 2011
- "Size Matters; the Complexity, Simplicity, and Unity of Life from Cells & Ecosystems to Cities & Corporations"** Istanbul, September 2011
- “Searching for Simplicity and Unity in the Complexity of Life: Cells to Cities, Companies to Ecosystems, Milliseconds to Millennia”** Hofstadter Lecture.  
Stanford April 2012
- "Energy and Information in 21st Century Biology." UNIVERSITY OF WISCONSIN**  
John von Neumann Public Lectures in Complexity, Wisconsin Institute of Discovery  
October 2012
- “Cities and Corporations: Growth, Scaling and Sustainability”**  
William Eddy Lecture Fairbanks Museum, Vermont March 2013
- Science on the Screen “Particle Fever”**  
Discussion with director Mark Levinson at the Lensic Theater, Santa Fe February 2014

## BOOKS

**Particle Physics: A Los Alamos Primer** (with N. G. Cooper). Cambridge University Press, 1988.

**The Santa Fe TASI-87** (Ed. with R. Slansky). World Scientific, 1988.

**The State of Physics at the End of the 20th Century** (with F. Cooper, I. Sarcevic, and C. Tan). World Scientific, 1999.

**Scaling in Biology: From Organisms to Ecosystems** (with James H. Brown), Oxford University Press, 2000.

**Complexity Perspectives in Innovation and Social Change**, (editor with David Lane, Sander van der Leeuw, Denise Pumain), Methodos Series Volume 7, Springer, 2009.

## SELECTED CHAPTERS IN EDITED VOLUMES

Review of **“Workshop on Non-Perturbative QCD,”** eds. K. A. Milton and M. A. Samuel. *Found. Phys.* 15 (1985): 247.

**“Scaling in Intermediate Energy Deep Inelastic Electron Scattering from Nuclear Targets.”** In *Studies in High Energy Physics*, p. 417, vol.II “Electron and Pion Interactions with Nuclei at Intermediate Energies.” Harwood Academic Publisher, NY, 1980.

**“The Parton Model and Asymptotic Freedom Revisited,”** Erice Lectures *Probing Hadrons with Leptons*, p. 253. Plenum Press, NY 1980.

**“On the n-p Mass Difference in QCD.”** *Proceedings of Orbis Scientiae, Recent Developments in High Energy Physics*, p. 239. Plenum Press, 1980.

**“The EMC Effect; Asymptotic Freedom with Nuclear Targets.”** In *Intersections between Particle and Nuclear Physics*, ed. R. Mischke, p. 360. AIP, 1985.

**“Towards a Covariant String Field Theory.”** In *Proc. Lewes String Field Theory Workshop*, eds. L. Clavelli and A. Halprin, p. 246. World Scientific, 1986 (with S. Raby and R. Slansky).

**“Magninos: Experimental Consequences and Constraints.”** In *Proc. Telemark IV Conference*, p. 182. World Scientific, 1987 (with S. Raby).

**“Short Times and Short Distances in Nuclear and Particle Physics - A Pedagogical Review.”** In *Nuclear and Particle Physics on the Light-cone*, p. 15. World Scientific, 1989.

**“Deep Inelastic Scaling in Nuclear and Particle Physics.”** In *International Summer School on New Aspects of Nuclear Dynamics*, p. 1. Plenum Press, 1989.

**“X and Y Scaling.”** In *Momentum Distributions*, p. 95. Plenum Press, NY, 1989.

**“The Large Coefficient Problem; Can we Make Sense out of QCD Perturbation Theory?”** In *Radiative Corrections*, p.487. Plenum Press, NY, 1990.

**“Introduction and Overview to Some Topics in Perturbative QCD and Their Relationship to Non-perturbative Effects.”** In *Quark-Gluon Structure of Hadrons and Nuclei*. World Scientific, 1991.

**“The Glueball; the Fundamental Particle of Non-perturbative QCD.”** In *QCD, Collisions, Confinement and Chaos*. World Scientific, 1997.

**“Scaling in Biology: Patterns and Processes, Causes and Consequences.”** In *Scaling in Biology: From Organisms to Ecosystems*, eds. J.H. Brown and G.B. West. Oxford University Press, 1999.

**“Nuclear x and y Scaling.”** In *Workshop on Electron-Nucleus Scattering*, ed. O. Benhar, p.181. Edizioni, Pisa, 1999 (with D. Faralli and C. Cioffi degli Atti).

**“Scaling in Biology: Patterns and Processes, Causes and Consequences.”** In *Scaling in Biology*, eds. J. H. Brown and G. B. West. Oxford University Press, Oxford, 2000 (with J. H. Brown and B. J. Enquist).

**“The Next Step in Macroecology: From General Empirical Patterns to Universal Ecological Laws.”** In *Macroecology: Concepts and Consequences*, eds. T. M. Blackburn and K. J. Gaston. Blackwell Science, 2003.

**“Biological Scaling and Physiological Time: Biomedical Applications.”** In *Complex Systems Science in Biomedicine*, ed. T. Deisboeck. Kluwer Academic Press, NY. (with V. M. Savage).

**“Size, Scale and the Boat Race; Conceptions, Connections and Misconceptions.”** In *Hierarchy in Natural and Social Sciences*, ed. D. Pumain, Springer, 2006, p. 71-80.

**“Resilience: Why Things Bounce Back”** Andrew Zolli and Ann Marie Healy. Free Press, a division of Simon and Schuster July 2012

## SCIENTIFIC PAPERS IN REFEREED JOURNALS

1. “Relativistic Effects in the Form Factors of H<sub>3</sub> and He<sub>3</sub>.” *Phys. Rev. B* 139 (1965): 1246.
2. “Remarks Concerning Inelastic Electron Scattering from <sup>3</sup>He.” *Nucl. Phys. B* 1 (1967): 349 (with B. F. Gibson).
3. “Scattering from Coulomb-like Potentials without Divergences or Cutoffs. I. Formalism: Generalized Lippmann-Schwinger Equations.” *J. Math. Phys.* 8 (1967): 942.
4. “Pion Electromagnetic Form Factor from Coulomb Interference.” *Phys. Rev.* 162 (1967): 1677.
5. “Current Algebras and Pole Dominance Applied to Three-Point Functions.” *Phys. Rev. Lett.* 19 (1967): 812 (with S. G. Brown).
6. “Current Algebras and Pole Dominance: A. Consistent Treatment of the A-rho- $\pi$  System.” *Phys. Rev.* 168 (1968): 1605 (with S. G. Brown).
7. “Coulomb Interference in High Energy Scattering.” *Phys. Rev.* 172 (1968): 1413 (with D. R. Yennie).

8. "The Bjorken Limit and Pole Dominance, I. The A-rho- $\pi$  System and the Algebra of Fields." *Phys. Rev.* 174 (1968): 1777 (with S. G. Brown).
9. "The Bjorken Limit and Pole Dominance, II. Virtual  $\pi$ -rho Scattering." *Phys. Rev.* 174 (1968): 1782 (with S. G. Brown).
10. "Hard Pion Results from the Algebra of Fields." *Phys. Rev.* 180 (1969): 1613 (with S. G. Brown).
11. "Scalar and Tensor Meson Dominance." *Phys. Rev.* 183 (1969): 1496.
12. "Construction of Veneziano-like Formulae from Superconvergence." *Phys. Rev.* 185 (1969): 1927.
13. "Gauge Invariance and the Born Approximation in Pion Electroproduction." *Phys. Rev.* 188 (1969): 2538 (with F. A. Berends).
14. "Production of Single W-Mesons in Electro-Positron Colliding Beams and in Electron or Muon Scattering Experiments." *Phys. Rev. D* 1 (1970): 122 (with F. A. Berends).
15. "Measuring Light Cone Singularities." *Phys. Rev. D* 2 (1970): 2473 (with R. Jackiw and R. Van Royen).
16. "A Phenomenological Model for the Electromagnetic Structure of the Proton." *Phys. Rev. Lett.* 24 (1970): 1206.
17. "Why Do Neutrinos Produce More W's than Muons?" *Phys. Rev. D* 3 (1971): 262 (with F. A. Berends).
18. "Theorem on the Vanishing of Z<sup>2</sup>: Evidence from Electron Scattering that the Proton Really Is a Composite Particle." *Phys. Rev. Lett.* 27 (1971): 762.
19. "Total Neutron Cross Sections May Not Be What They Seem To Be," *Phys. Rev. Lett. B* 38 (1971): 504.
20. "A Conjecture on the Approach to Scaling in Deep-Inelastic Electron Scattering and Some Comments on Electromagnetic Mass Differences." *Phys. Rev. D* 5 (1972).
21. "The Doppler Effect in the Extraction of Total Neutron Cross Sections from Deuterium Data with Particular Emphasis on Asymptotic Hadron and Deep Inelastic Electron Scattering." *Ann. Phys. (NY)* 74 (1972): 464.
22. "The Extraction of Asymptotic Nucleon Cross-Sections from Deuterium Data." *Phys. Rev. D* 7 (1973): 773 (with W. B. Atwood).
23. "Theorems and Bounds Relating to the Two-Photon Decay of the Pion." *Phys. Rev. Lett.* 30 (1973): 1271.
24. "The Electromagnetic Structure of the Proton, Partons and the Rise in the Total Proton-Proton Cross-Section." *Phys. Rev. Lett.* 31 (1973): 798.
25. "Scaling in Deep Inelastic Pion Electroproduction." *Phys. Letters B* 46 (1973): 111.
26. "Possible Evidence for Quark Substructure from Electron-Positron Colliding-Beam

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27. "Experimental Consequences of Quark Substructure." *Phys. Rev. D* 10 (1974): 2130 (with P. Zerwas).
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  31. "Elastic-Inelastic Connection in Electron Scattering and the Choice of Scaling Variable." *Phys. Rev. D* 14 (1976): 732.
  32. "When is the Deuteron Six Quarks: Possible Evidence Against Dimensional Scaling." *Phys. Rev. Lett.* 37 (1976): 1454.
  33. "Coulomb Nuclear Interference with Pions." *Nuc. Phys. A* 292 (1977): 350 (with M. D. Cooper and M. B. Johnson).
  34. "Path Integrals with Periodic Constraints II. The Non-Linear Sigma and Planar Models." *Annals of Physics*.
  35. "Path Integrals with Periodic Constraints I: Quantum Mechanics of a Particle on a Ring." *Annals of Physics*.
  36. "Electroweak Contributions to Quark Masses." *Phys. Rev. Lett.* 45 (1980): 773 (with J. Kiskis).
  37. "Confinement in Quantum Chromodynamics." *Phys. Rev. Lett.* 46 (1981): 1365.
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  39. "Asymptotic Freedom and the Infrared Problem; A Novel Solution to the Renormalization-Group Equations." *Phys. Rev. D* 27 (1983): 1402.
  40. "General Infrared and Ultraviolet Properties of the Gluon Propagator in the Axial Gauge." *Phys. Rev. D* 27 (1983): 1878.
  41. "Comment on the Ultraviolet Behavior of Gauge-Dependent Green's Functions in QCD." *Phys. Rev. D* 30 (1984): 1349.
  42. "Analyticity and the Borel Summability of Asymptotically Free Theories." *Phys. Lett. B* 145 (1984): 103.
  43. "An Almost Model Independent Framework for Analyzing the EMC Effect." *Phys. Rev. D*.
  44. "Scale and Dimension from Animals to Quarks." *Los Alamos Science*, 1984.
  45. "Particle Physics and the Standard Model." *Los Alamos Science*, 1984 with S. Raby and R. Slansky.
  46. "Energy Momentum Sum Rule and the EMC Effect." *Phys. Rev. Lett.* 54 (1985): 2576.



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62. "Theorem on the Lightest Glueball State." *Phys. Rev. Letts.* 67 (1996): 1388.
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92. "Toward a Metabolic Theory of Ecology." *Ecology* 85 (2004): 1771 (with J. F. Gillooly, V. M. Savage, A. P. Allen, and J. H. Brown).
93. "Growth Models; First Principles or Phenomenology?" *Functional Ecology* 18(2) (2004): 188 (with J. H. Brown and B. J. Enquist).
94. "Toward a Metabolic Theory of Ecology - Response to Forum Commentary." *Ecology* 85 (2004): 1818 (with J. F. Gillooly, V. M. Savage, A. P. Allen, and J. H. Brown).
95. "The Rate of DNA Evolution: Effects of Body Size and Temperature on the Molecular Clock," *Proc. Nat. Acad. Sc.* 102 (2005): 140 (with J. F. Gillooly, A. P. Allen, and J. H. Brown).
96. "Effects of Temperature on Metabolic Rate; Response to Clarke and Fraser." *Functional Ecology* (2004) (with J. F. Gillooly, A. P. Allen, V. M. Savage, and J. H. Brown).
97. "One Rate to Rule them All." *New Scientist* 182:2445, 38 (2004), with J. H. Brown).
98. "Life's Universal Scaling Laws." *Physics Today* 57(9) (2004): 36 (with J. H. Brown).
99. Response to forum commentary on "Toward A Metabolic Theory of Ecology." *Ecology* 85 (2004): 1818-1821 (with J. H. Brown, J. F. Gillooly, A. P. Allen, and V. M. Savage).
100. "The Metabolic Basis of Whole Organisms RNA and Phosphorus Content." *Proc. Nat. Acad. Sc.* (2004) (with J. F. Gillooly, A. P. Allen, J. H. Brown, J. J. Elser, C. Martinez del Rio, H. A. Woods).
101. "Towards a Quantitative, Metabolic Theory for Mammalian Sleep." *Proc. Nat. Acad. Sc.* (2004) (with V. M. Savage).
102. "Yes, West, Brown, and Enquist's Model of Allometric Scaling is both Mathematically Correct and Biologically Relevant." *Functional Ecology*. 19 (2005): 735-738 (with J.H. Brown, and B.J. Enquist).
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- Clock." *Proceedings of the National Academy of Sciences of the United States of America*. 102 (2005): 140-145 (with J.F. Gillooly, A.P. Allen, and J.H. Brown).
105. "The Origin of Allometric Scaling Laws in Biology from Genomes to Ecosystems: Towards a Quantitative Unifying Theory of Biological Structure and Organization." *J. Experimental Biology*. 208 (2005): 1575-1592 (with J. H. Brown).
  106. "Response to Clarke and Fraser: effects of temperature on metabolic rate." *Functional Ecology*. 20 (2006): 400-404 (with J.F. Gillooly, A. P. Allen, V. M. Savage, E. L. Charnov, and J. H. Brown).
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  108. "Scaling Laws in Urban Supply Networks," *Physica A* 363 (2006) 96–103 (with Christian Kuhnert, & Dirk Helbing)
  109. "A Grand Unifying Theory of Biology?" *The Scientist* March 2007 (with J. H. Brown and B. Enquist.
  110. "Scaling of number, size, and metabolic rate of cells with body size in mammals" *PNAS* 104 (11): 4718-4723 2007 (with V. M. Savage, A. P. Allen, J. H. Brown, J. F. Gillooly, A. B. Herman, & W. H. Woodruff).
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  112. "A quantitative, theoretical framework for understanding mammalian sleep" *PNAS* 104 (3): 1051-1056 2007 (with V. M. Savage)
  113. "Innovation and Growth: Size Matters" *Harvard Business Review's* List of Breakthrough Ideas for 2007.
  114. "Growth, Innovation, Scaling, and the Pace of Life in Cities." *PNAS* 104 (2007): 7301-7306 (with L. M. A. Bettencourt, J. Lobo, D. Helbing, and C. Kühnert).
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  117. "Why are large cities faster? Universal scaling and self-similarity in urban organization and dynamics" *The European Physical Journal B*, J. B **63**, 285–293 (2008) (with L. M. A. Bettencourt & J. Lobo)
  118. "Energy uptake and allocation during ontogeny;" *Science* 322 (5902), 2008, 736-739 (with C. Hou, W. Y. Zuo, M. E. Moses, W. H. Woodruff, & J. H. Brown).
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  120. "Toward a Systems Biology Framework for Understanding Aging and Health

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  122. "Size, Scale and the Boat Race: Conceptions, Connections and Misconceptions." *Hierarchy in Natural and Social Sciences* 3 (2009): 71-80.
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  128. "Integrated Sustainability and the Underlying Threat of Urbanisation" (2010) in *Global Sustainability; A Nobel Cause*, edited by H. J. Schellnhuber, N. Stern et al. Cambridge University Press, Cambridge.
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  133. "Differences between Tumor and Healthy Vasculature; Consequences for Tumor Growth and Drug Therapies" (2011) *PLoS One* Vol 6 | Issue 9 | e22973 (with Van M Savage, Alexander B Herman and Kevin Leu.
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tumor vasculature and metabolic rate with healthy tissue and for predicting responses to drug therapies” (2013) *Discrete and Continuous Dynamical Systems – Series B (DCDS-B)* Vol. 18, no. 4 (with Van M. Savage, Alexander B. Herman, and Kevin Leu

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138. “The Scaling of Human Interactions with City Size.” <http://arxiv.org/abs/1210.5215>, (with M. Schläpfer, L. M. A. Bettencourt, M. Raschke, R. Claxton, Z. Smoreda, C. Ratti)
139. “*The Allometry and Growth of Markets*” (with M.J. Hamilton, J. Zhang, L.M.A. Bettencourt) Submitted to PNAS
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141. “On Theory in Ecology” *BioScience* April 2014 (with Pablo A. Marquet, Andrew P. Allen, James H. Brown, Jennifer A. Dunne, Brian J. Enquist, James F. Gillooly, Patricia A. Gowaty, Jessica L. Green, John Harte, Steve P. Hubbell, James O’Dwyer, Jordan G. Okie, Annette Ostling, Mark Ritchie, David Storch)
142. “The dynamics of mergers and acquisitions: ancestry as the seminal determinant” Eduardo Viegas, Stuart P. Cockburn, Henrik J. Jensen and Geoffrey B. West *Proc. R. Soc. A* 2014 470, 20140370, published 10 September 2014
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## PRESS REVIEWS AND COMMENTS

### 1) Scientific, Technical Journals:

“**Fractal Geometry Gets the Measure of Life’s Scales.**” *Science* 276 (1997): 34 N. Williams

“**Why Nature Loves Economies of Scale.**” *New Scientist* April 12, (1997): 16 R. Pool

“**Reading Between the Lines - Is Allometric Scaling Useful?**” *Trends in Ecology and Evolution* 12 (1997): 339 S.E. Cates & J. L. Gittleman

“**Die Unvermeidlich Langsamkeit des Seins.**” *Spektrum der Wissenschaft* September 25, (1997: 27 C. Poppe).

“**Common Rules for Plants and Animals.**” *Nature* 395 (1998): 115 J. D. Damuth

“**Of Mice and Mammoths: New Approaches to Understanding the Biological Implications of Body Size.**” *BioScience* 48 (1998): 887 S. Norris

“**Do Energy-Transport Systems Shape Organisms?**” *The Scientist* 12 (1998): 14 S. Bunk

**“Ruling Passions.”** *New Scientist* 162 (1999): 34 R. Lewin

**“Built to Scale.”** *Science News* October 16, 1999 P. Weiss

**“New Clues to Why Size Equals Destiny.”** *Science* 284 (1999): 1607 D. Mackenzie

**“Growth Clocked: Size and Temperature Predict Pace of Life.”** *Nature* (2001) J. Whitfield

**“All Fired Up: The Universal Metabolic Rate.”** *Science* 9(21) (2001).

AAAS **“Science Update”** radio show, 2001, K. Brown.

**“For All Creatures Great and Small: One Model Predicts Metabolic Rate.”** *Scientific American* 9(26) (2001) D. Labrador.

**“Faculty of 1000”.** Review of Gillooly et al. 2001 *Science* paper designated as “must read” article, 2002, J. Eisen.

## 2) Popular Press

**“Team’s Model Demonstrates How Evolution Obeys Mathematical Laws.”** *The Washington Post*, April 7, A-3, 1997 C. Suplee

**“The Geometry of Weeping Willows and Blue Whales.”** *Daily Telegraph* (London), April 30, 1997 R. Highfield

**“All Things Great and Small: Model Shows How Energy Use by Most Life Forms is Related.”** *The Dallas Morning News* April 21, D-8, 1997 S. Goetinck

**“Team Explores Sizable Secret of Nature.”** *Albuquerque Journal*, A-1, April 28, 1997, J. Fleck

**“Of Mice and Elephants: A Matter of Scale.”** *The New York Times, Science Times* D1 January 12, 1999 G. Johnson

**“Nature’s Blueprints.”** *US News & World Report* 60 June 14, 1999 J. Couzin

**“Square Root of an Elephant”** *The Financial Times* (London) 11 June 19, 1999 C. Cookson

Half-hour Interview on CBC’s **“IDEAS”** Program, October, 2002 C. Whittaker

**“Metabolic Rate May Be Missing Factor that Aligns Genetic Evidence with Fossil Record.”** *Dallas Morning News*, 2004 S. G. Ambrose

**“The Science of Synergy.”** *Santa Fean* March 2006.

**“Connecting Maverick Minds, A Conversation with Geoffrey West”** *Harvard Business Review*, March 2006.

**“In Focus,”** Interview, KNME-TV, May 2006.

**“Breakthrough Ideas for 2007: Innovation and Growth, Size Matters,”** Geoffrey B. West, *Harvard Business Review*, February 2007.

**“The Powers That Might Be, A Grand Unifying Theory of Biology?”** Interview with Geoffrey West, *The Scientist*, March 2007.

**“Sleep Found to Repair and Reorganize the Brain: Why Mice Sleep Longer than Humans,”** V. Savage, G. West, *Harvard University Gazette*, March 2007

**“Boomtown,”** *New Scientist*, May 2007

**“The Living City,”** *Seed*, August 2007

**“Size Matters: The Hidden Mathematics of Life,”** Interview by Robert Krulwich, National Public Radio, August 2007

**“Fractals: Hunting the Hidden Dimension,”** NOVA PBS, October 2008

**“Four is the Universal Number of Life,”** *Super Interessante*, Portugal, October 2008

**“Focus on Rethinking Scale”** Alliance Magazine, Vol.15 Number 2 June 2010

**“Cities as Complex Systems”** People and Places: Issues that Connect Us, Vol. 1 Issue 3 October 26, 2010

**Catalyst Networking Group Sandia Lab News**, November 19, 2010

**“Cities As Barometers Of Socioeconomic Change Both Good and Bad”** Radio Free Europe, November 2010

**“The Science of Cities”** The Brian Lehrer Show, December 2010

**“A Physicist Solves the City”** New York Times, December 17, 2010

**“One Man’s Slum is Another Man’s Manhattan”** Forbes Magazine, March 23, 2011

**“The tallest tree in the land: New model predicts maximum tree height across the United States; gives information about forest density, carbon storage”** (Based on the PLoS One paper with Chris Kempes) MIT NEWS, July 18, 2011

**Interview with Steffan Heuer**, Herrenknecht September 2011

**“Physicist Cracks Cities Formula”** Interview, Atlantis, January 2012

**“City by Numbers”** interview, Urbanite, January 2012

**Stanford Report**  
Interview by Steve Tung on the upcoming Hofstadter lecture

**“Cities of Future”** Staci Matlock for Santa Fe New Mexican



**“The Laws of the City”** Interview by Ludwig Siegele for The Economist May 2012  
<http://www.economist.com/node/21557313>

**“The Urban Physicist Geoffrey West”** Profile by Nikki Greenwood for Discover Magazine, October 2012

### **Reflex Magazine**

Interview by Daniel Saraga (expected in print March)  
*Reflex is a bilingual (French and English) Swiss science magazine co-financed by EPFL*

**“Big Data Needs Big Theory”**  
Scientific American, May 2013

**“Big is beautiful -Prepare yourself for even bigger megacities in the future”**  
*Interview with Lena Barner-Rasmussen for Wartsila’s company magazine. Wartsila is a global leader in power solutions for the marine and energy markets, and has taken an active role in creating solutions for future smart power generation. Published in Sep 2013*

**“Life in the City Is Essentially One Giant Math Problem”**  
Smithsonian Magazine, May 2013

**“Bigger Cites Do More with Less”**  
Scientific American, November 2013

**“Megacities: slums or saviours of tomorrow”**  
World Economic Forum Blog, November 2013

**“The Rise of the Megacity”**  
CNN blog, November 2013

**“The Spark of Invention”**  
Time magazine interview with Jeffrey Kluger November 2013

### **VIDEO, RADIO AND TELEVISION**

**Yahoo Labs. Big Thinkers Presentation, Mountain View, CA, September 2010**  
Growth, Innovation, and the Pace of Life from Cells to Cities and Corporations, Are They Sustainable?"  
<http://www.santafe.edu/news/item/west-yahoo-cities-companies/>

**The Brian Lehrer Show, The Science of Cities, December 2010**  
<http://www.wnyc.org/shows/bl/2010/dec/23/science-cities/>

**The Economist, New York, Feb 2011**  
The Intelligent Infrastructure Series – The Ideas Economy  
<http://ideas.economist.com/presentation/urban-physics>

**Urban Systems Symposium, New York, NY, May 2011**  
Panel “Modeling & Measuring Cities”, Panel “Defining Urban Systems”  
[http://www.livestream.com/urbansystemssymposium/video?clipId=pla\\_8614fa62-b2e5-426a-a5b7-6f2d0443757a](http://www.livestream.com/urbansystemssymposium/video?clipId=pla_8614fa62-b2e5-426a-a5b7-6f2d0443757a)

**X-Ray Earth National Geographic , May 2011** (*television*)

**Edge.org, May 2011**

**Why Cities Keep Growing, Corporations and People Always Die and Life Gets Faster: A Conversation with Geoffrey West**

<http://edge.org/conversation/geoffrey-west>

**The Forum – BBC podcast from TED, July 2011**

BBC World Service

<http://www.bbc.co.uk/programmes/p00hsvwt>

**TED GLOBAL, “The Surprising Math of Cities and Corporations”**

**Edinburgh, Scotland, July 2011**

[http://www.ted.com/talks/lang/eng/geoffrey\\_west\\_the\\_surprising\\_math\\_of\\_cities\\_and\\_corporations.html](http://www.ted.com/talks/lang/eng/geoffrey_west_the_surprising_math_of_cities_and_corporations.html)

**Long Now Seminar, “Why Cities Keep on Growing, Corporations Always Die, and Life Gets Faster” San Francisco, July 2011**

[http://fora.tv/2011/07/25/Why\\_Cities\\_Grow\\_Corporations\\_Die\\_and\\_Life\\_Gets\\_Faster](http://fora.tv/2011/07/25/Why_Cities_Grow_Corporations_Die_and_Life_Gets_Faster)

**Setting Time Aright conference. “Emergence of “Universal” Time in Living Systems from Cells to Cities” Jesse Dylan video August 2011**

<http://vimeo.com/31748227>

**The Code, Episode: Prediction BBC UK August 2011** (*television*)

**Radiolab. It's Alive? October 2011**

Interview with Geoffrey West and Luis Bettencourt

<http://www.radiolab.org/2010/oct/08/its-alive/>

**Conversation Crossroads with Garrison Leykam, October 2011**

<http://conversationcrossroad.com/?p=3518>

**Cambridge nights October 2011**

<http://cambridgenights.media.mit.edu/>

**SFI Website February 2012**

**Cities Scaling and Sustainability**

<http://www.santafe.edu/research/cities-scaling-and-sustainability/>

**“Thinking Cities” film by Ericsson multimedia, February 2012**

Interview by Einar Bodstrom

<http://www.youtube.com/watch?v=DC1oFkBVuLU>

**‘More is Different’ Singapore, February 2012**

<http://itunes.apple.com/itunes-u/conference-more-is-different/id523060215>

**Documentary film on “Future Cities” March 2012**

VPRO Television (Netherlands)

**TED Radio Hour “What Does Nature Teach Us About Cities?”**

**Radio Interview for NPR by Alison Stewart March 2012**

<http://www.npr.org/2012/06/15/154806578/what-does-nature-teach-us-about-cities>

**KPFK (Los Angeles) Radio interview by Brandon Barney March 2012**

**Defining Urbanites: how we became a city species and why it matters**

**New Cities Summit, Paris, May 2012**

<http://www.youtube.com/watch?v=62nzu5oGGCg&feature=plcp&noredirect=1>

**Through The Wormhole with Morgan Freeman “Is the Universe Alive?”**

**Science Channel Televised June 2012**

<http://science.discovery.com/tv/through-the-wormhole/episodes/season-three/is-the-universe-alive.html>

**Adam Frank NPR and University of Rochester June 2012**

**To the Best of our Knowledge – Wisconsin Public Radio October 2012**

Interview by Steve Paulson “City as Organism”

<http://ttbook.org/book/city-organism>

**Film by Paul Hunter on Jane Jacobs. (title/date TBD)**

**Dubai TV at the World Economic Forum in DAVOS** Interview by Nada Saba for  
*Regarding the “Rules that govern urbanization”*

**ForumLive DAVOS**

**Discussing the Global Economic Council white paper “Perspectives on a Hyperconnected World” January 2013**

Interview by Gary Regenstein from Thomson Reuters

<http://new.livestream.com/wef/am13channel2jan25>

**Interview by Joel Fernandes January 2013**

Infrastructure and Urban Development Initiative. A film by The Forum Media Team

**Video Interview for Skoll Foundation “Dare to Imagine” April 2013**

<http://youtu.be/Q1eIYZjzO7A>

**Paul Cooke for “Horizon” BBC Documentary Series February 2013**

Interview by BBC (TELEVISION)

**Pardee lecture on radio - WBUR, Boston NPR affiliate – “World of Ideas” hosted by Glenn Alexander May 2013**

<http://worldofideas.wbur.org/2013/05/12/west>

**Interview with Wesley Stephenson for “The Why Factor”**

**BBC world service June 2013**

**Interview with Melanie Fall (air date TBD) June 2013**

Film for the BBC on why the First World War happened and exposing the myths that continue to cloud our understanding of the conflict

**Interview by Peter McManus BBC 'Radio Features August 2013**

"Cities are the source of but also the solution to our problems"

**Interview with Mary-Charlotte Domandi for Santa Fe Radio Café, February 2014**

Discussing Science on the Screen's Particle Fever

<http://www.santaferadiocafe.org/podcasts/?p=5585>

**Interview on The Big Show with Honey Harris (KABC 98.1), February 2014**

Discussing Science on the Screen's Particle Fever

<http://www.santafe.com/blogs/honey-harris>)

**Edge.org a conversation with Geoffrey West**

Why Cities Keep Growing, Corporations and People Always Die, and Life Gets Faster  
May 2014

<http://edge.org/conversation/geoffrey-west>

**Aspen Ideas Festival, Interview with Natalie Mayer June 2014**

<http://www.aspenideas.org/session/science-cities-good-bad-and-ugly>

**Aspen Ideas Festival, "How Will Climate Change Transform U.S. Cities?" Interview with The Atlantic June 2014**

<http://theatl.in.tc/19KSFh0>

**Interview with Jason Fields for Reuters June 2014**

<http://reut.rs/1FDumi4>

**Aspen Ideas Festival, Interview by Baruch Shemtov for genConnect June 2014**

<http://yhoo.it/1MFIPNK>

**Interview with John Elledge for the New Statesman June 2014**

<http://bit.ly/1DH0ijj>

**"The functioning of cities by the laws of physics" Interview with Rafael Garcia for Folha de Sao Paulo August 2014**

<http://bit.ly/1EdW3fK>

**Interview with Lara Eli for Zero Hora, Brazil August 2014**

<http://bit.ly/19KUsCF>

**The Julia Goldberg Show KVSF 101.5**

Discussion on the upcoming event at SFI with Tony Hsieh August 2014

<http://www.santafe.com/the-voice/podcast/burn-him#.VAHoyEivxxQ>

**The Richard Eeds Show KVSF 101.5**

Discussion on the upcoming event at SFI with Tony Hsieh September 2014

<http://www.santafe.com/the-voice/show/the-richard-eeds-show1#.VAXWXf3Bq1w>

**Interview with Isabella Kaminska for Financial Times**

Article for Financial Times House and Home on City Evolution – September 2014

<http://on.ft.com/1CVkVXO>

**Interview with Susan Lazarus for South China Morning Post**

Article for the Nobel Laureates Symposium, Hong Kong September 2014

[Nobel laureates offer ideas on battling climate change](#)

**The Richard Eeds Show KVSF 101.5**

Discussing on “The Theory of Almost Everything” January 2015

**SELECTED CONFERENCES ORGANIZED**

Co-Chair and Organizer of 1st Joint US-USSR Gauge Theory Workshop, Yerevan, Armenia, USSR (1983).

Chair and Organizer of APS Particle Theory Meeting, Baltimore, MD (1983).

Organizing Committee, First Snowmass Meeting on Future of High Energy Physics, Snowmass, CO (1982).

Chair, Organizing Committee, DPF Meeting, Santa Fe, NM (1984).

Organizing Committee, Theoretical Advanced Summer Institute for Graduate Students (TASI), Santa Fe, NM (1987).

Organizing Committee, Theoretical Advanced Summer Institute for Graduate Students (TASI), Santa Fe, NM (1987).

Co-Chair, Organizing Committee, Santa Fe QCD Workshop (1989-1999).

Organizing Committee, 1994 DPF Meeting, Albuquerque, NM.

Co-Chair, Organizing Committee, Gluonia95, Corsica, France (1995).

International Advisory Committee for the Conference Celebrating 100 years of the Electron, Perugia, 1997

Advisory Committee to Orbis Scientiae Coral Gables Conference (1995 - present).

Advisory Committee for the International Workshop on Hadron Dynamics, Frascati, November, 1996.

Advisory Committee for the International Conference Celebrating 100 years of the Electron, Frascati, 1997.

Co-organizer, Workshop on “Scaling in Biology,” Santa Fe, NM, October, 1997.

Organizing Committee, International Conference on Biological Physics, Santa Fe, NM, September, 1998.

Organizing Committee, Weak Interactions in Nuclei (WEIN 98), Santa Fe, NM, June, 1998.

Chair of Committee, Global Agenda Council on Complex Systems, World Economic Forum, Dubai, Nov 2012

Advisory and organizing committees for many conferences and workshops in both physics and biology (including advisory committee to the NSF and the API).

Chair of Committee, Global Agenda Council on Complex Systems, World Economic Forum, Abu Dhabi, Nov 2013

Co-organizer, Workshop on the “General Principles of Physical Aging”  
Connecting the Biological and Physical Principles of Mammalian Aging,  
Washington DC April 2014

## **SELECTED RESEARCH AWARDS**

Program PI and mentor participant in Santa Fe Institute’s undergraduate intern program, 1998-present.

PI or Co-PI for \$1.3M Annual External Funding (DOE and NSF)

Co-PI (with Paul Ginsparg) for the successful and much-publicized EPrint Archive to the communication and dissemination of scientific research (1994-2000).

Co-PI “New Mexico Adventures in Modeling: Integrating IT into the Curriculum through Computer Modeling Approaches.” NSF (2003-2007)

Co-PI Universal Scaling Laws in Biology: Origins, Applications, and Ramifications.” NSF (2002-2007)

Co-PI “A Broad Research Program in the Sciences of Complexity.” NSF (2002-2007).

Co-PI “Research Experiences for Undergraduate Interns at the Santa Fe Institute.” NSF (2004-2007).

Co-PI “A Broad Research Program in the Sciences of Complexity.” NSF (2007-2012).

P.I. “Fundamental Scaling Laws in Biology,” Thaw Charitable Trust 2004-2009

P.I. “ Universal Scaling Laws in Biology: Origins, Applications, Ramifications, and Extensions” NSF(2008 -2012)

P.I. “Research Experiences for Undergraduates Site at the Santa Fe Institute” NSF (2009 -2010)

P.I. “The Physical Foundations and Systems Biology of Aging” American Federation for Aging Research (2009- 2010)

P.I. The Physical Foundations and Systems Biology of Aging NSF (2009 -2011)

P.I. Research in Biological Mechanisms of Aging Glenn Foundation for Medical Research (2009 -2010)

Co -P.I. “ Towards a Predictive Theory of Social Organization and Dynamics” JSMF (2009 -2012)

Co- P.I. “Comprehensive Program to Develop the Theory and Application of Urban Organization and Dynamics” Rockefeller Foundation (2010 -2012)

P.I. “Grand Unified Theory of Sustainability” Thaw Charitable Trust (2010 -2014)

P.I. “Innovation and Growth of Human and Social Organizations from Cities to Corporations” NSF EAGER (2010 -2012)

Co- P.I. “ The Principles of Complexity” John Templeton Foundation (2011 – 2014)

Co- P.I. “ The Principles of Complexity” John Templeton Foundation (2015 – 2018)

## **SELECTED MEMBERSHIPS**

Executive Committee, Division of Particles and Fields of the American Physical Society (1981-83).

Program Advisory Committee, LAMPF (1981-83).

Chair, Advisory Committee, Institute for Particle Physics, University of California, Santa Cruz (1986-98).

Postdoctoral Committee (1986-1990).

Nuclear Science Advisory Committee (to the DOE and NSF) on the Future of Nuclear Theory (1987).

Chair, Theoretical Postdoctoral Prize Committee (1987).

ISR Funding in Nuclear and Particle Physics Committee (1987).

Chair, Search Committee for the Theoretical Division Leader (1988).  
High Energy Physics Task Force for the Superconducting Supercollider (1990-1993).  
Chair, External Advisory Committee, Department of Physics, University of Arizona (1990-91).  
Chair, Search Committee for the Director of LAMPF (1991).  
National Science Foundation (NSF) Advisory Committee for Physics (1989-1993).  
National Science Foundation (NSF) Advisory Committee for Physics (1989-1993).  
Committee on Metrics for Evaluating Research (1993).  
NSF Review Committee for the Institute for Theoretical Physics (ITP), University of California, Santa Barbara (1989); Chair, 10-Year Review, 1994).  
External Review Committee, Department of Physics, Brown University (1992-93).  
American Institute of Physics (AIP) Review Committee for "Physics Today" (1993).  
National Science Foundation (NSF) Visitors Oversight Committee (1995).  
Tactical Planning Committee (1995).  
Fellows Executive Committee (1995-1996).  
University of California President's Search Committee for the Director of Los Alamos National Laboratory (1997).  
Science Board, Santa Fe Institute, (1999 – 2005, 2005 – present).  
Search Committee, P-Division Director (2001).  
NSF Advisory Committee for Mathematical and Physical Sciences (2009 -2014)  
NTU Complexity Program Scientific Advisory Board (2012 – present)  
Future Cities Laboratory Scientific Advisory Committee (2012 – present)  
Board of Advisors Nautilus Feb (2013 – present)  
Biodesign Institute External Advisory Board (ASU) (Mar 2013 – present)  
Advisory Board Stockholm Resilience Center "What is Urban" project (Mar 2014 – present)

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