

CHEN Kan

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Academic Experience:

- **Professor** (practice track), Risk Management Institute and Department of Mathematics, November 2019 --- Present
- **Deputy Director** (industry), Risk Management Institute, November 2019 --- Present
- **Associate Professor (tenured)**, Department of Computational Science/Department of Physics, National University of Singapore (NUS), Jan. 1998 --- March 2006
- **Senior Lecturer**, Department of Physics/Department of Computational Science, NUS, July 1994 --- July 1998
- **Lecturer**, Department of Physics, NUS, June 1992 --- June 1994
- **Postdoctoral Fellow**, Simon Fraser University, Burnaby, B.C., Canada, Sept. 1990 -- May 1992
- **Research Associate in Physics**, Brookhaven National Laboratory, Upton, Long Island, New York, US, Oct. 1988 -- Aug. 1990
- **Acting Head, Deputy Head**, Department of Computational Science, National University of Singapore (NUS), Jan. 2001 --- Dec. 2001; Jan. 2004 --- Dec. 2005
- **Deputy Director**, Institute for Mathematical Sciences, NUS, July 2000 --- July 2001

Industry Experience: Quant Trading and Research

- **Executive Director**, Capital Market Investment, CreditEase, Beijing, June 2018 – July 2019.
- **Portfolio Manager**, Capstone Investment Advisors, New York, May 2015 – March 2018
- **Portfolio Manager**, WorldQuant, New York, April 2013 – Jan 2015.
- **Executive Director**, Prop. Trading Desk, Global Equity, JP Morgan, New York. April 2006 – Feb 2013.
From Oct 2011 – Feb 2013 managed quantitative principal strategy (QPS) group; the group started at Bear Stearns, which was taken over by JPMorgan in 2008.

Industry Qualifications:

Past FINRA Licenses: Series 7, 55, 63, 24

Quantitative trading experience:

- **Equity Data:** Extensive experience working with a variety of equity market and fundamental datasets including Datastream, IBES, Compustat, Bloomberg, datasets for news, short-interest, supply-chain, and geographical exposures.

- **Model Construction:** Utilizing multi-factor linear regression, logistic regression to develop multi-horizon equity portfolio strategies as well as strategies for trading earnings announcements.
- **Portfolio Construction:** Employ quadratic and conic optimization techniques for portfolio construction, experienced user of MOSEK. Experience with Barra and APT risk models.
- **Portfolio Execution:** Experience in cost model analysis and execution algorithms.

Research on Quant Strategies:

- **Statistical Arbitrage Equity Market-Neutral Strategies for US and Global Markets:** Develop models with factors based on multi-horizon mean reversion, IBES detailed estimates and recommendations, market reactions to earnings announcement, company guidance and other company news, short interest, implied volatility, and option skews.
- **Adapt Black-Litterman asset allocation model** for constructing portfolios of Chinese mutual funds, ETFs, and hedge (private) funds.
- **Strategies for Trading Earnings Announcements:** Develop earnings models for predicting magnitude and probability for the direction of earnings moves.
- **Other research experiences:** Research on text-based industry classification based on similarity in business description contained in 10-K/10-Q reports, volatility modeling, and equity portfolio optimization.

Research on Complex Systems:

- Econophysics and Computational Finance
- Information theoretic approach to learning and prediction
- Learning algorithms and general search algorithms for solving optimization problems
- Modeling neural network
- Self-organized Criticality

Research on Condensed Matter Physics

- Quantum many-body problems
- Quantum Numerical Renormalization Group approach for studying Kondo systems.
- Magnetic/transport properties of nano-scale systems

IT Experience:

- 30 years of programming experiences and more than 20 years of programming experiences in C/C++.
- Developed proprietary portable C++ classes for matrix computation, linear equation solver, FFT, non-linear data fitting, etc.
- Other programming languages/tools used: Python, Matlab, Mathematica, R, SQL.

Education:

- PhD in Physics, Ohio State University, Columbus, Ohio, USA, Sept. 1988.
- BSc in Physics, University of Science and Technology of China, Hefei, Anhui, China, Aug. 1983.

Teaching Experience:

I have taught many courses at National University of Singapore for 13 years:

- Data Structures and Algorithms
- Neural Computing
- Numerical Recipes/Advanced Computational Techniques
- Modeling and Simulation of Complex Systems
- Scientific Modeling
- Thinking Science on Computer (General Education Module)
- Introduction to Computational Science
- Symbolic Computing
- Computational Techniques in Theoretical Physics
- Computational Condensed Matter Physics
- Basic Computer Graphics
- Computer Graphics
- Computer Graphics II
- Fortran Programming
- Asymptotic and Perturbative Analysis
- Mathematical Methods III
- Nonlinear Dynamics
- Classical Mechanics
- Advanced Classical Mechanics

Distinctions:

- Presidential Fellowship (Ohio State University), April 1987 -- April 1988
- Guo Mo-ruo Prize (University of Science and Technology of China), 1983

Selected Invited Lectures on Complex Systems and Econophysics

- CCAST Workshop on **Complex Systems**, Nov 21-25, 2005, Beijing, China
- **Nonlinear Dynamics of Earth, Oceans and Space, EOS2004**, July 2004, Singapore
- Workshop on **Nonlinear Dynamics and Complex Systems**, 27-29 November 2003, Academia Sinica, Taipei, Taiwan.
- NBI Symposium in memory of Per Bak, "**Complexity and Criticality**", Copenhagen, August 21-23, 2003
- The International **Econophysics** Conference, Bali, Indonesia, August 29-31, 2002
- **STATPHYS21**, Cancun, Mexico, July 2001 (**Plenary Lecture**)
- International Advanced Workshop and Conference on **Econophysics and Financial Complexity**, USTC, Hefei, Anhui, China, Sept. 2000

Publications: Journal Papers

- 1) Spatial Correlations Around a Kondo Impurity, Kan Chen, C. Jayaprakash and H.R. Krishnamurthy, **Phys. Rev. Lett.** 58, 929-932(1987)
- 2) Microemulsions in Oil-water-surfactant Mixtures: an Ising-lattice-gas Model, Kan Chen, C. Ebner, C. Jayaprakash, and Rahul Pandit, **J. Phys. C Lett.** 20, L361-L366(1987)
- 3) Numerical Study of the Critical Properties of an Irreversible Probabilistic Cellular Automata, Yu He, Kan Chen, and C. Jayaprakash, **Phys. Rev. A** (Rapid Communication), 36, 2999(1987)
- 4) Microemulsions in Oil-water-surfactant Mixtures: Systematics of a Lattice-gas Model, Kan Chen, C. Ebner, C. Jayaprakash, and Rahul Pandit, **Phys. Rev. A** 38, 6240-6254(1988)
- 5) Spatially Dependent Correlation-functions in the Anderson Model, Kan Chen, H. R. Krishnamurthy, C. Jayaprakash, **J Appl Phys** 63, 3903-3903 (1988)
- 6) Is the Universe Operating at a Self-Organized Critical State? Kan Chen and Per Bak, **Phys. Lett. A** 140, 299-302 (1989)
- 7) The Physics of Fractals, Per Bak and Kan Chen, **Physica D** 38, 5-12 (1989).
- 8) Self-Organized Criticality in the "Game of Life", Per Bak, Kan Chen, and Michael Creutz, **Nature** 342, 780-782 (1989).
- 9) A Forest-Fire Model and Some Thoughts on Turbulence, Per Bak, Kan Chen, and Chao Tang, **Phys. Lett. A**, 147, 297 (1990).
- 10) A deterministic critical forest fire model, Kan Chen, Per Bak, and M. H. Jensen, **Phys. Lett. A**, 149, 295 (1990).
- 11) Microemulsions: A Landau-Ginzburg Theory, Kan Chen, C. Jayaprakash, Rahul Pandit, and Wolfgang Wenzel, **Phys. Rev. Lett.**, 65, 2736-2739 (1990).
- 12) Self-organized Criticality in a Crack-Propagation Model of Earthquakes, Kan Chen, Per Bak, and S. P. Obukhov, **Physics Review A**, 43, 625 (1991).
- 13) Spatially-Dependent Zero-frequency Response Functions and Correlation Functions in the Kondo Model (with C. Jayaprakash and H. R. Krishnamurthy), **Phys. Rev. B.**, 45, 5368 (1992).
- 14) Self-organized Ruptures in an Elastic Medium: A Possible Model for Earthquakes, H. J. Xu, B. Bergersen, and Kan Chen, **J. Phys. A Lett.**, 25, L1251-L1256(1992).
- 15) Aggregate fluctuations from independent sectoral shocks: self-organized criticality in a model of production and inventory dynamics, Per Bak, Kan Chen, Jose A. Scheinkman, and M. Woodford, **Ricerche Economiche**, 47, 3-30(1993).
- 16) A Plaquet Representation of Ruptures and Models for Earthquakes, H.J. Xu, B. Bergersen, and Kan Chen, **Journal de Physique I**, 3, 2029-2040(1993).
- 17) Green's Function Method for Random Fuse Problems, Ravi Bhagavatula, Kan Chen, C. Jayaprakash, and Huang-Jian Xu, **Phys. Rev. E** 49, 5001-5006(1994).
- 18) A Self-Consistent Description of Ruptures in an Elastic Medium: An Application to Earthquakes, Ravi Bhagavatula, Kan Chen, and C. Jayaprakash, **J. Phys. A: Math. Gen.** 27, L155-162 (1994).
- 19) Earthquakes in a Model of Seismic Zone with Embedded Pre-Existing Faults, Ravi Bhagavatula, Kan Chen, and C. Jayaprakash, **Geophysical Research Letters**, 22, 1301-1304 (1995).

- 20) X-ray Edge Singularities with Non-Constant Density of States -A Renormalization Group Approach, Kan Chen and C. Jayaprakash, **Phys. Rev. B** 52, 14436-14440(1995).
- 21) Kondo Effect in Pseudo-Gap Fermi Systems: A Renormalization Group Study, Kan Chen and C. Jayaprakash, **Journal of Physics: Condensed Matter**, 7 L491-498 (1995).
- 22) A Simple Learning Algorithm for the Traveling Salesman Problem, Kan Chen, **Physical Review E**, 55, 7809 (1997).
- 23) Earthquakes in Quasi-Static Models of Fractures in Elastic Media: Formalism and Numerical Techniques, Kan Chen, R. Bhagavatula, C. Jayaprakash, **J. Physics A: Math. Gen.**, 30, No. 7, 2297-2315(1997).
- 24) Kondo Effect in Fermi Systems with a Gap: A Renormalization-group Study, Kan Chen and C. Jayaprakash, **Phys. Rev. B**, 57, No. 5, 5225-5234 (1998)
- 25) Learning Algorithm for the Uniform Graph Partitioning Problem, C. B. Chua and Kan Chen, **International Journal of Modern Physics C**, 9, 331 (1998).
- 26) A general learning algorithm for solving optimization problems and its application to the spin glass problem, Kan Chen, **Europhys. Lett**, 43 (6), pp. 635-640 (1998).
- 27) Dynamics of Dry Friction: A Numerical Investigation, Y.F. Lim and Kan Chen, **Phys. Rev. E** 58, 5637 (1998)
- 28) Scale-dependent dimension in the forest fire model, Kan Chen and Per Bak, **Phys. Rev. E** 62, 1613 (2000)
- 29) Scale Dependent Dimension of Luminous Matter in the Universe, Per Bak and Kan Chen, **Phys. Rev. Lett.** 86, 4215 (2001).
- 30) Solitons in the one-dimensional forest fire model, Per Bak, Kan Chen, and Maya Paczuski, **Phys. Rev. Lett.** 86, 2475 (2001)
- 31) Scale-invariant behavior in a spatial game of prisoners' dilemma, Y. F. Lim, Kan Chen, and C. Jayaprakash, **Phys. Rev. E.** 65, 26134 (2002)
- 32) Forest fires and the structure of the universe, Kan Chen and Per Bak, **Physica A**, 306, 15-24 (2002).
- 33) Emergence of complex dissipative structures in the Bak-Chen-Tang forest fire model, Kan Chen and Per Bak, **Physica A**, 321, 256 (2003)
- 34) Statistical analysis of Straits Times Index and a simple model for trend and trend reversal, Kan Chen and C. Jayaprakash, **Physica A**, 324, 258 (2003)
- 35) Adiabatic theory for the population distribution in the evolutionary minority game, Kan Chen, Bing-Hong Wang, and Baosheng Yuan, **Phys. Rev. E (Rapid Communication)**, 69, 025102(R) (2004)
- 36) Theory of the three-group minority game, Kan Chen, Bing-Hong Wang, and Baosheng Yuan, **International Journal of Modern Physics B**, 18, 2387 (2004)
- 37) Evolutionary dynamics and the phase structure of the minority game, Baosheng Yuan and Kan Chen, **Phys. Rev. E.**, 69, 067106 (2004)
- 38) Log-Poisson statistics and extended self-similarity in driven dissipative systems, Kan Chen and C. Jayaprakash, **Physica A**, 340, 566 (2004).
- 39) Model and empirical study on some collaboration networks, Pei-Pei Zhang, Kan Chen, Yue He, Tao Zhou, Bei-Bei Su, Yingdi Jin, Hui Chang, Yue-Ping Zhou, Li-Cheng Sun, Bing-Hong Wang and Da-Ren He **Physica A**, 359, 835-852 (2006)

- 40) The emergence of racial segregation in an agent-based model of residential location: the role of competing preferences. **Computational and Mathematical Organizational Theory**, Kan Chen, Elena Irwin, C. Jayaprakash, Keith Warren, 11, No. 4, 333(2005)

Publication: Chapters in Book:

- 1) Forest Fires and Luminous Matter in the Universe, Per Bak and Kan Chen, in "More is Different: Fifty Years of Condensed Matter Physics", ed. by N.-Phuan Ong and Ravin Bhatt, Princeton Press (2001).
- 2) Predicting Earthquakes, Per Bak and Kan Chen, in "Nonlinear Structure in Physical Systems -- Pattern Formation, Chaos and Waves", edited by Lui Lam and Hedley C. Morris (Springer, 1990).
- 3) Forest Fires and Luminous Matter in the Universe, Per Bak and Kan Chen, in "More is Different: Fifty Years of Condensed Matter Physics", ed. by N.-Phuan Ong and Ravin Bhatt, Princeton Press (2001).
- 4) Dynamics of Earthquakes, Per Bak and Kan Chen, in "Fractals and their Application to Geology", edited by C. Barton and P. LaPointe (Geological Society of America, Denver, 1995).
- 5) Landau-Ginzburg Theories of Microemulsions, Kan Chen, C. Jayaprakash, R. Pandit, and W. Wenzel, in "Phase Transitions in Complex Fluids", ed. by P. Toledano and A. M. Figueiredo Neto, World Scientific (1998).
- 6) Forest Fires and Luminous Matter in the Universe, Per Bak and Kan Chen, in "More is Different: Fifty Years of Condensed Matter Physics", ed. by N.-Phuan Ong and Ravin Bhatt, Princeton Press (2001).

Publication: Invited Article for Cover Story in Scientific American:

Self-organized Criticality, Per Bak and Kan Chen, **Scientific American**, 264, 46-53 (1991)

Publication: Articles in Newsletter/Conference Proceeding:

- 1) Lattice Representation of Ruptures in an Elastic Medium and Models for Earthquakes, Kan Chen and H.J. Xu, Overseas Chinese Physics Association Newsletter, 1, No. 9 (1993).
- 2) Towards an Evolutionary Algorithm: A Comparison of Two Feature Selection Algorithms, Congress on Evolutionary Computation (Conference proceedings), Kan Chen and Huan Liu, p.1309-1313 (1999)

Preprints:

- 1) Evolutionary Dynamics in Complex Networks of Competing Boolean Agents, Baosheng Yuan, Bing-hong Wang, and Kan Chen, arXiv: cond-mat/0411664
- 2) Growing Directed Networks: Organization and Dynamics, Baosheng Yuan, Bing-hong Wang, and Kan Chen, arXiv: cond-mat/0408391
- 3) Conditional Probability as a Measure of Volatility Clustering in Financial Time Series, Kan Chen, C. Jayaprakash and Baosheng Yuan, arXiv: physics/0503157