

## Kwok Yee Michael Wong

### Academic qualifications:

- Ph.D. in Physics (UCLA, 1986)
- M.S. in Physics (UCLA, 1981)
- B.Sc. in Physics (HKU, 1978)

### Academic positions:

- Professor (HKUST, 2006-now)
- Associate Professor (HKUST, 1998-2006)
- Lecturer (HKUST, 1992-1997)
- Postdoc (Oxford, 1989-1991)
- Postdoc (Imperial, 1986-1989)

### Professional positions and honors

- Physical Society of Hong Kong: Secretary (1996-1999), Council (1995-2001, 2016-present), Council Chairman (2002-2006)
- Member, Institute of Physics (1990-present)
- Editor, Journal of Statistical Mechanics: Theory and Experiment (2007-present)
- Guest Editor, Research Topic on Neural Information Processing with Dynamical Synapses, Frontiers in Computational Neuroscience (2012-2013)
- EPL Distinguished Referee 2014

### Teaching in 2016-2017

- Introduction to Stellar Astrophysics (PHYS 3071)
- Physics of Management Science (PHYS 4059)

### Research interest

Physics of complex and disordered systems; optimization; neural networks; multiagent systems; spin glasses; machine learning; optimal control in telecommunications networks.

### Publications

169 published or accepted, 1 under review, 1 software, 1 editorship, 2 book reviews

### Representative publications in recent five years

- Bo Li and K. Y. Michael Wong, “Optimizing Synchronization Stability of the Kuramoto Model in Complex Networks and Power Grids”, Phys. Rev. E **95**, 012207 (2017).
- Si Wu, K. Y. Michael Wong, C. C. Alan Fung, Yuanyuan Mi, Wenhao Zhang, “Continuous Attractor Neural Networks: Candidate of a Canonical Model for Neural Information Representation”, F1000Research 2016, 5(F1000 Faculty Rev):156 (2016).
- He Wang, Kin Lam, C. C. Alan Fung, K. Y. Michael Wong, and Si Wu, “Rich Spectrum of Neural Field Dynamics in the Presence of Short-Term Synaptic Depression”, Phys. Rev. E **92**, 032908 (2015).

- Chi Ho Yeung, David Saad and K. Y. Michael Wong, “From the Physics of Interacting Polymers to Optimizing Routes on the London Underground”, *Proc. Natl. Acad. Sci. USA*, 2013 Aug 20;110(34):13717-22.
- C. C. Alan Fung, K. Y. Michael Wong, He Wang, and Si Wu, “Dynamical Synapses Enhance Neural Information Processing: Gracefulness, Accuracy, and Mobility”, *Neural Computation* 24, 1147-1185 (2012).

#### Representative publications beyond the recent five-year period

- C. C. Alan Fung, K. Y. Michael Wong, and Si Wu, “A Moving Bump in a Continuous Manifold: A Comprehensive Study of the Tracking Dynamics of Continuous Attractor Neural Networks”, *Neural Computation* 22, 752-792 (2010).
- S. Wu, K. Y. M. Wong and B. Li, “A Dynamic Call Admission Policy with Precision QoS Guarantee Using Stochastic Control for Mobile Wireless Networks”, *IEEE/ACM Trans. on Networking* 10, 257-271 (2002).
- H. Nishimori and K. Y. Michael Wong, “Statistical Mechanics of Image Restoration and Error-Correcting Codes”, *Phys. Rev. E* 60, 132-144 (1999).
- K. Y. M. Wong, “Microscopic Equations and Stability Conditions in Optimal Neural Networks”, *Europhys. Lett.* 30, 245-250 (1995).
- K. Y. M. Wong and D. Sherrington, “Graph Bipartitioning and Spin Glasses on a Random Network of Fixed Finite Valence”, *J. Phys. A* 20, L793-L799 (1987).

#### Recent invited talks

- 9<sup>th</sup> Joint Meeting of Chinese Physicists Worldwide (OCPA9), Beijing, 2017.
- Chinese Physical Society 2016 Fall Meeting, Beijing, 2016.
- New Horizons of Quantum and Classical Information 2015 (NHQCI2015), Tokyo, 2015.
- The 8th Cross-Strait Conference on Statistical Physics, Hsinchu, 2015.
- Symposium on Neural Biology and Networks, 8<sup>th</sup> IUPAP International Conference on Biological Physics, Beijing, 2014.
- 12<sup>th</sup> Taiwan International Symposium on Statistical Physics and Complex Systems, Taipei, 2014.
- 3<sup>rd</sup> Japan-Korea Joint Workshop on Complex Communication Sciences (JKCCS'14), Busan, 2014.
- 14<sup>th</sup> Japan-China-Korea Joint Workshop on Neurobiology and Neuroinformatics, (NBNI2014), Okazaki, 2014.
- Workshop on Intelligence Science (WIS 2013), IJCAI 2013 Workshops, Beijing, 2013.
- Dynamics Days Asia Pacific (DDAP7), Taipei, 2012.
- 2012 Autumn Conference of the Chinese Physical Society, Guangzhou, 2013.

#### Supervised M. Phil. And Ph. D. Theses in recent five years

- Kin Yau Tsang, “Stable bandwidth allocation against fluctuations in complex networks” (MPhil 2016)
- Min Yan, “The dynamics of two-layer continuous attractor neural network model with different stimuli” (MPhil 2015)
- Bo Li, “Optimal facility location from the physics of long range interacting lattice gases” (MPhil 2014)

- Tat Shing Choi, “Information dependence of pricing behavior in duopolistic markets” (MPhil 2014)
- Chi Chung Fung, “Dynamics of Continuous Attractor Neural Networks with Dynamical Synapses” (PhD 2013)
- He Wang, “Neural Field Dynamics with Short-Term Synaptic Depression” (MPhil 2013)
- Yat Hong Lam, “Network Trading Model and Its Nonlinear Behaviors” (MPhil 2012)
- Yu Ting Chow, “Networks with Multi-class Labeled Traffic” (MPhil 2011).

#### Research Grants

- Synchronization in oscillator networks with probabilistic drivers and applications to power grids (RGC 2018-20, \$314,900)
- Integration and Segregation in Multisensory Information Processing (RGC 2017-19, \$488,501)
- Dynamical Network Mechanisms of Information Processing in Neural Systems (NSFC/RGC Joint Research Scheme 2013-16, \$967,332)
- Robustness Control and Enhancement in Transportation Networks (RGC 2014-16, \$423,562)
- Processing Stimuli in Neuronal Networks (RGC 2013-15, \$466,600)
- Processing Stimuli in Neuronal Networks with Dynamical Synapses (RIG 2012, \$50,000)
- The Source Location Problem in Network Optimization (RGC 2010-12, \$466,700)
- The Colour Diversity Problem and Potts Glass (RGC 2008-10, \$293,700)
- A Statistical Physics Approach to Optimization of Multiclass and Labelled Traffic on Networks (RGC 2007-09, \$361,000)
- Statistical Mechanics of Optimization on Networks and Applications to Resource Allocation (RGC 2006-08, \$250,000)
- Novel Statistical Physics Approach to Network Routing and Storage (DAG 2005, \$57,000)
- Global Resource Allocation on Networks through Local Optimization (DAG 2004, \$65,387)
- Green's Function Approach to the Control of Complexity in Information Processing (RGC 2002-04, \$350,000)
- Dynamics of Learning with Recycled Examples (RGC 2001-03, \$293,370)
- Multistage Dynamics in Spin Models and Applications to Information Processing (RGC 1999-01, \$573,000)
- Statistical Dynamics of Learning in Information Processing (RGC 1997-2000, \$421,000)
- Telecommunication Networks: A Neurocomputing Approach to Design, Management and Control (HKTIIT 1993-97, \$2,757,308)
- Statistical Mechanics of Neural Networks (DAG 1991, \$38,935)