

Ole B. Peters

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LANGUAGES	<i>Fluent:</i> English, German. <i>Conversational:</i> French.	
RESEARCH INTERESTS	Statistical mechanics, ergodic theory, stochastic processes, economics, finance, non-equilibrium critical phenomena, self-organized systems, atmospheric dynamics.	
Scientific Vita	I work on the concepts and historical development surrounding randomness, in particular ergodicity and how this late-19th century concept can inform economic theory. Since 2013 I have been an external professor at the Santa Fe Institute. In 2012 I co-founded the London Mathematical Laboratory (LML). LML currently employs three full-time resident fellows and runs various programs to promote and support basic science. It is funded purely through philanthropy, with the aim to provide an environment for curiosity-driven scientific research. In 2010 I founded the R&D firm Zonlab ltd. that translates my theoretical work into practical applications. Most of Zonlab's business is in the field of risk management. My Ph.D. work (2001–2004) in theoretical physics dealt with systems that self-tune to critical states in their phase spaces, where order and spatio-temporal structure emerge. These systems operate on the “edge of chaos”, where predictability is limited due to diverging susceptibility to perturbations. I applied my theoretical findings to atmospheric dynamics and climatology. Since 2007 I have held a visiting position at UCLA's Atmospheric and Oceanic Sciences department.	
CURRENT POSITIONS	2013–present Santa Fe Institute, Santa Fe, USA. External Professor. 2012–present London Mathematical Laboratory, London, UK. Fellow. 2010–present ZONlab ltd., London, UK. Director. 2007–present Department of Atmospheric and Oceanic Sciences, UCLA, LA, USA. Visiting Scientist.	
POSTDOCTORAL RESEARCH	Imperial College London, Dept. of Mathematics, UK. 2009 - 2012: Research Associate. Los Alamos National Laboratory, Center for Nonlinear Studies, Los Alamos, USA. 2004 - 2006: Postdoctoral Research Associate. Santa Fe Institute, Santa Fe, USA. 2004 - 2006: Postdoctoral Fellow.	

EDUCATION

Imperial College London, London, UK.

2001 - 2004: Ph.D., Condensed Matter Theory Group, Physics Department.
Supervisor: Kim Christensen.

1998 - 2001: BSc, Physics, 1st class honours.

Christianeum and Goethe Gymnasium, Hamburg, Germany.

1989 - 1997: Abitur, average mark 1.0.

TEACHING

Institute for Pure and Applied Mathematics, UCLA, USA.

2010: “Stochastic Processes for Complex Systems”.

Max-Planck Institute for Meteorology, Hamburg, Germany.

2009: “Stochastic Processes for Complex Systems”, International Max-Planck Research School.

Santa Fe Institute, Santa Fe, USA.

2013: Non-ergodic economics. Complex Systems Summer School.

2012: Non-ergodic economics. Complex Systems Summer School.

2005: An overview of self-organized criticality. Complex Systems Summer School.

Imperial College London, London, UK.

2002 and 2003: Supplementary lectures to a course in statistical mechanics for 3rd and 4th year undergraduate physics students.

PUBLICATIONS

SUBMITTED

[24] O. Peters and A. Adamou,
Rational insurance with linear utility and perfect information.
<http://arxiv.org/abs/1507.04655> (2015).

[23] O. Peters and A. Adamou,
The evolutionary advantage of cooperation.
<http://arxiv.org/abs/1506.03414> (2015).

[22] O. Peters and M. Gell-Mann,
Evaluating gambles using dynamics.
<http://arxiv.org/abs/1405.0585> (2014).

[21] O. Peters,
Menger 1934 revisited.
<http://arxiv.org/abs/1110.1578> (2011).

[20] O. Peters and A. Adamou,
Stochastic Market Efficiency.
SFI working paper # 13-06-022 (2013)
<http://arxiv.org/abs/1101.4548> (2011).

[19] O. Peters and G. Pruessner,
Tuning- and order parameter in the SOC ensemble.
<http://arxiv.org/abs/0912.2305> (2009).

PEER-REVIEWED

[18] O. Peters and W. Klein,
Ergodicity breaking in geometric Brownian motion.
Phys. Rev. Lett. **110**, 100603 (2013).
doi:10.1103/PhysRevLett.110.100603

- [17] O. Peters, K. Christensen and D. Neelin,
Rainfall and dragon-kings.
Eur. Phys. J. Special Topics **205**, 147–158 (2012).
doi:10.1140/epjst/e2012-1567-5
- [16] O. Peters,
The time resolution of the St. Petersburg paradox.
Phil. Trans. R. Soc. A **369**, 1956, 4913–4931 (2011).
doi:10.1098/rsta.2011.0065
- [15] O. Peters,
Optimal leverage from non-ergodicity.
Quant. Fin. **11**, 1593–1602 (2011).
doi:10.1080/14697688.2010.513338
- [14] O. Peters, A. Deluca, A. Corral, D. Neelin and C. Holloway,
Universality of rain event size distributions.
J. Stat. Mech. P11030 (2010).
doi:10.1088/1742-5468/2010/11/P11030
- [13] O. Peters and M. Girvan
Universality under conditions of self-tuning.
J. Stat. Phys. **141**, 1, 53–59 (2010).
doi:10.1007/s10955-010-0039-0
- [12] J. D. Neelin, O. Peters, J. W.-B. Lin, K. Hales and C. Holloway, in “Stochastic Physics and Climate Modelling”, eds. T. Palmer and P. Williams, Cambridge University Press (2010), Ch. 16.
Rethinking convective quasi-equilibrium: observational constraints for stochastic convective schemes in climate models.
doi:10.1098/rsta.2008.0056
- [11] O. Peters and D. Neelin,
Atmospheric convection as a continuous phase transition: further evidence.
Int. J. Mod. Phys. B **23**, 28–29, 5453–5465 (2009).
doi:10.1142/S0217979209063778
- [10] O. Peters, J. D. Neelin and S. Nesbitt
Mesoscale convective systems and critical clusters.
J. Atmos. Sci. **66**, 9, 2912–2924 (2009).
doi: 10.1175/2008JAS2761.1
- [9] D. Neelin, O. Peters and K. Hales
The transition to strong convection.
J. Atmos. Sci. **66**, 8, 2367–2384 (2009).
doi: 10.1175/2009JAS2962.1
- [8] J. D. Neelin, O. Peters, J. W.-B. Lin, K. Hales and C. Holloway,
Rethinking convective quasi-equilibrium: observational constraints for stochastic convective schemes in climate models.
Phil. Trans. R. Soc. A **366**, 2581–2604 (2008).
doi:10.1098/rsta.2008.0056
- [7] G. Pruessner and O. Peters,
Reply to “Comment on ‘Self-organized criticality and absorbing states: Lessons from the Ising

model' ".

Phys. Rev. E **77**, 048102 (2008).

doi:10.1103/PhysRevE.77.048102

[6] O. Peters and D. Neelin,
Critical Phenomena in Atmospheric Precipitation.

Nature Physics **2**, 393-396 (2006).

doi: 0.1038/Nphys314

[5] G. Pruessner and O. Peters,

Self-Organized Criticality and Absorbing States: Lessons from the Ising model.

Phys. Rev. E **73**, 025106(R) (2006).

doi: 10.1103/PhysRevE.73.025106

[4] O. Peters and K. Christensen,
Rain Viewed as Relaxational Events.

J. Hydrol. **328**, 46-55(2006).

doi:10.1016/j.hydrol.2005.11.045

[3] Avalanche behaviour in an Absorbing State Oslo Model.

Phys. Rev. E **70**, 067101(R) (2004).

doi: 10.1103/PhysRevE.70.067101

[2] Rain: Relaxations in the Sky.

Phys. Rev. E **66**, 036120 (2002).

doi: 10.1103/PhysRevE.66.036120

[1] O. Peters, C. Hertlein, and K. Christensen,

A complexity view of rainfall.

Phys. Rev. Lett. **88**, 018701 (2002).

doi: 10.1103/PhysRevLett.88.01871

CONFERENCE PROCEEDINGS

O. Peters and K. Christensen,

Micro Rain Measurements reveal evidence of self-organised criticality in precipitation processes.
6th International Symposium for Tropospheric Profiling, 312-314 (2003).

Institute for Tropospheric Research, Leipzig.

COMPUTING

C, Unix environment: Monte Carlo simulations and data analysis of equilibrium and non-equilibrium statistical mechanics models, focusing on continuous phase transitions.

Matlab: Programming for analysis of geophysical and financial data sets.