

BIOGRAPHICAL SKETCH

Bruno Nachtergaele

Address

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Professional Preparation

UG Inst.:	University of Leuven	Physics	Licenciaat 1984
G Inst.:	University of Leuven	Theoretical Physics	Ph.D. 1987
P Inst.:	Princeton University	Mathematical Physics	09/01/1991–06/30/1993

Appointments

2007–2010 Department Chair of Mathematics, University of California, Davis.
2000– Professor of Mathematics, University of California, Davis.
1996–2000 Associate Professor of Mathematics, University of California, Davis.
1993–1996 Assistant Professor of Physics, Princeton University.
1991–1993 Instructor, Department of Physics, Princeton University.
1991 Research Associate, Physics Department, K.U. Leuven, Belgium.
1989–1990 Research Associate, Depto de Física, U. de Chile, Santiago de Chile.
1984–1988 Researcher I.I.K.W., Physics Department, K.U. Leuven, Belgium.

Synergistic Activities

1) Graduate Group in Applied Mathematics, UC Davis, member (10/1996–present), chair (07/2001–07/2004). 2) UC Davis Academic Senate Committee on Research, chair (08/1999–08/2001). 3) UC Davis Academic Senate Committee on Planning and Budget, chair (2006-07 and 2008-09). 4) UC Davis Academic Senate, vice-chair (2011-12) and chair (2012-14). 5) The [arXiv](#): moderator [math-ph/math.MP](#) section (05/1998–02/2014, member of Physics Advisory Board (04/2005–present). 6) International Association of Mathematical Physics, member Executive Committee (01/2006–2011); Vice-President (2009-11).

Editorial Activities

1) Reviews in Mathematical Physics, Associate Editor, 01/01/2004–present. 2) Journal of Mathematical Physics, Editor-in-Chief, 01/01/2006–12/31/2018. 3) Mathematical Physics Electronic Journal, Editorial Board, 03/01/2002–2009. 4) Springer Briefs in Mathematical Physics, Series Editor, 08/2013–present. 5) Mathematical Physics Studies, Series Editor, 06/2018–present. 6) Journal of Statistical Physics, Associate Editor, 09/2018–present. 7) Forum of Mathematics, Editor for Mathematical Physics, 07/2019–present.

Funding history

Current and recent funding (National Science Foundation): DMS-1813149 (\$320,000): Quasi-Locality Properties of Quantum Many-Body Dynamics and Applications, DMS-1838991 (\$22,960): Workshops on Mathematical Challenges in Many-Body Physics and Quantum Information, DMS-1813177 (\$21,000): Mathematical Challenges in Many-Body Physics and Quantum Information: CRM Thematic Program, DMS-1515850 (\$375,000): Dynamics, Ground States, and Elementary Excitations of Quantum Many-Body Systems.

Honors

International Congress of Mathematicians, Beijing, 2002, invited lecture.
Fellow of the American Association for the Advancement of Science, 2007.

Senior Research Fellow, Erwin Schrödinger Institute for Mathematical Physics, Spring 2011.
Fellow of the American Mathematical Society (Inaugural Class), 2012.
John von Neumann Guest Professor, Technical University Munich, Spring 2016.
Distinguished Professor of Mathematics, UC Davis, 2017.

Thesis Advisor and Postgraduate-Scholar Sponsor

Thesis Advisor: Shannon Starr (U Alabama at Birmingham), Justin Abbott (Northrop Corporation), Li Lei, Nigie Shi, Austin Calder (National Security Agency), Jeremy Clark (U Mississippi), Spyridon Michalakis (Caltech), Hillel Raz (BoundIT, Israel), Katy Marchand, Jaideep Mulherkar (Dhirubhai Ambani Institute of Information and Communication Technology), Stephen Ng (Exelis, Rochester, NY), Anna Vershynina (U Houston), Amanda Young (U Arizona), Matthew Cha (Michigan State U, East Lansing), Alvin Moon (UC Davis), Jake Reschke (UC Davis).

Postgraduate-Scholar Sponsor: Oscar Bolina (Kaplan-China.), Jean-Bernard Bru (University of the Basque Country), Pierluigi Contucci (U. Bologna), Wolfgang Spitzer (Fern-Universität Hagen), Daniel Ueltschi (U Warwick), Tom Michoel (Roslin Institute, U Edingburgh), Robert Sims (U Arizona), Yoshiko Ogata (U of Tokyo), Motohisa Fukuda (Yamagata U), Sven Bachmann (UBC, Vancouver), Jopia Bandyopadhyay, Michael Bishop (CSU Fresno), Dirk-André Deckert (LMU, Munich), Pieter Naaijken (U Complutense de Madrid), Martin Gebert (UC Davis).

Selected Publications

1. M. Fannes, B. Nachtergaele, and R.F. Werner, *Finitely Correlated States on Quantum Spin Chains*, Comm. Math. Phys. **144**, 443-490 (1992)
2. M. Aizenman and B. Nachtergaele, *Geometric Aspects of Quantum Spin States*, Commun. Math. Phys., **164**, 17-63 (1994)
3. B. Nachtergaele, *The spectral gap for some quantum spin chains with discrete symmetry breaking*, Commun. Math. Phys., **175**, 565-606 (1996)
4. B. Nachtergaele and R. Sims, *Lieb-Robinson Bounds and the Exponential Clustering Theorem*, Commun. Math. Phys., **265**, 119-130 (2006), [arXiv:math-ph/0506030](#).
5. S. Bachmann, S. Michalakis, B. Nachtergaele and R. Sims, *Automorphic Equivalence within Gapped Phases of Quantum Lattice Systems*, Commun. Math. Phys. **309**, 835–871 (2012) [arXiv:1102.0842](#)
6. S. Bachmann, and B. Nachtergaele, *Product vacua with boundary states and the classification of gapped phases*, Commun. Math. Phys., **329**, 509-544 (2014) [arXiv:1212.3718](#).
7. B. Nachtergaele and D Ueltschi, *A direct proof of dimerization in a family of $SU(n)$ -invariant quantum spin chains*, Lett. Math. Phys., **107**,1629–1647 (2017) [arXiv:1701.03983](#)
8. M. Cha, P. Naaijken, and B. Nachtergaele, *The complete set of infinite volume ground states for Kitaev’s abelian quantum double models*, Commun. Math. Phys., **357**, 125–157 (2018) [arXiv:1608.04449](#)
9. M. Cha, P. Naaijken, and B. Nachtergaele, *On the stability of charges in infinite quantum spin systems*, Commun. Math. Phys. (2019), to appear, [arXiv:1804.03203](#)
10. B. Nachtergaele, R. Sims, and A. Young, *Quasi-Locality Bounds for Quantum Lattice Systems. Part I. Lieb-Robinson Bounds, Quasi-Local Maps, and Spectral Flow Automorphisms*, J. Math. Phys. **60**, 061101 (2019), [arXiv:1810.02428](#)