

Curriculum Vitae for Martin Bier

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Education

1983-1990: Ph.D. in Mathematics from Clarkson University in Potsdam, NY.

1981-1983: “Doctoral Degree” (roughly Master’s) in Theoretical Physics from the
University of Amsterdam, the Netherlands.

1977-1981: B.S. in Physics from the University of Amsterdam, the Netherlands.

Professional Experience

May-Aug 2018: Guest Professor at the University of Technology and Life Sciences
in Bydgoszcz, Poland.

2016-present: Full Professor at the Department of Physics of East Carolina
University.

Jan-Aug 2015: Smoluchowski Guest Professor at the Jagielloński University in
Kraków, Poland.

2006-2016: Tenured Associate Professor at the Department of Physics of East Carolina
University.

2000-2006: Tenure Track Assistant Professor at the Department of Physics of East
Carolina University.

1993-2000: Research Associate (Assistant Professor) at the Departments of Surgery,
Biochemistry and Molecular Biology of the University of Chicago.

1991-1993: Research Associate at the Department of Biology of the Free University in
Amsterdam, the Netherlands.

1990-1991: Assistant Professor of Mathematics and Physics at Franklin College in
Lugano, Switzerland.

1987-1990: Assistant Professor of Mathematics at Colby College in Waterville, Maine.

Publications in Refereed Journals

- 59) S. Yuvan and M. Bier, “The Breaking of Time-Reversal Symmetry for a Particle in a Parabolic Potential that is Subjected to Lévy Noise - Theory and an Application to Solar Flare Data” *Physical Review E* **104**, 014119, 2021.
- 58) B.T. Kassahun, M. Bier, and J. Ding, “Perturbing Circadian Oscillations in an *in vitro* Suprachiasmatic Nucleus with Magnetic Stimulation” *Bioelectromagnetics* **41**, 63-72, 2020.
- 57) A. Gadomski, M. Bier, and J. Siódmiak, “Spatiotemporal Models in Biology and the Health Sciences” *BioSystems* **179**, 15-16, 2019.
- 56) B. Lisowski, S. Yuvan, and M. Bier, “Outbreaks of the Measles in the Dutch Bible Belt and in Other Places - New Prospects for a 1000 Year Old Virus” *BioSystems* **177**, 16-23, 2019.
- 55) M. Bier and D. Pravica, “Limits on Quantum Coherent Domains in Liquid Water” *Acta Physica Polonica B* **49**(9), 1717-1731, 2018.
- 54) P. Weber, P. Bełdowski, M. Bier, and A. Gadomski, “Entropy Production Associated with Aggregation into Granules in a Subdiffusive Environment” *Entropy* **20**, 651-656, 2018.
- 53) M. Bier, “Boltzmann-Distribution-Equivalent for Lévy Noise and How it Leads to Thermodynamically Consistent Epicatalysis” *Physical Review E* **97**, 022113, 2018.
- 52) S. Yuvan and M. Bier, “A Reaction-Diffusion Model for Market Fluctuations - A Relation between Price Change and Traded Volumes” *Physics Letters A* **382**(6), 367-371, 2018.
- 51) Ł. Kuśmierz, M. Bier, and E. Gudowska-Nowak, “Optimal potentials for diffusive search strategies” *Journal of Physics A: Mathematical and Theoretical* **50**, 185003, 2017.
- 50) Ł. Kuśmierz, A. Chechkin, E. Gudowska-Nowak, and M. Bier, “Breaking Microscopic Reversibility with Lévy Flights” *Europhysics Letters* **114**, 60009, 2016.
- 49) M. Bier, B. Lisowski, and E. Gudowska-Nowak, “Phase Transitions and Entropies for Synchronizing Oscillators” *Physical Review E* **93**, 012143, 2016.
- 48) F.R. Brown, D. Pravica, and M. Bier, “Self-similarity and non-Markovian Behavior in Traded Stock Volumes” *European Physical Journal B* **88**, 300-308, 2015.
- 47) M. Bier and B. Brak, “A Simple Model to Quantitatively Account for Periodic Outbreaks of the Measles in the Dutch Bible Belt” *European Physical Journal B* **88**(4), 107-117, 2015.
- 46) B. Lisowski, D. Valenti, B. Spagnolo, M. Bier, and E. Gudowska-Nowak, “Stepping Molecular Motor amid Lévy White Noise” *Physical Review E* **91**, 042713, 2015.
- 45) B. Lisowski, Ł. Kuśmierz, M. Żabicki, and M. Bier, “Cargo-mooring as an Operating Principle for Molecular Motors” *Journal of Theoretical Biology* **374**, 26-34, 2015.

- 44) M. Bier and F.J. Cao, “Szilard-Machine-like Features in a Processive Motor Protein” *Acta Physica Polonica B* **43**(5), 889-908, 2012.
- 43) M. Bier and J. Gallaher, “Ion Traffic through a Cell Membrane - and How Its 1/f Noise Connects to Gambler’s Ruin, Catalan Numbers, and Zipf’s Law” *Fluctuation and Noise Letters* **10**(4), 419-430, (2012).
- 42) M. Bier and F.J. Cao, “How Occasional Backstepping Can Speed up a Processive Motor Protein” *BioSystems* **103**, 355-359, 2011.
- 41) M. Bier, “Quantum Consciousness and Other Spooky Myths” *Skeptic Magazine* **16**(1), 40-43, 2010.
- 40) J. Gallaher, M. Bier, and J. Siegenbeek van Heukelom, “First Order Phase Transition and Hysteresis in a Cell’s Maintenance of the Membrane Potential - An Essential Role for the Inward Potassium Rectifiers” *BioSystems* **101**, 149-155, 2010.
- 39) J. Gallaher, K. Wodzinska, T. Heimburg, and M. Bier, “Ion-channel-like Behavior in Lipid Bilayer Membranes at the Melting Transition” *Physical Review E* **81**, 061925, 2010.
- 38) B.T. Kassahun, A.K. Murashov, and M. Bier, “A Thermodynamic Mechanism behind an Action Potential and behind Anesthesia” *Biophysical Reviews and Letters* **5**(1), 35-41, 2010.
- 37) J. Gallaher, M. Bier, and J. Siegenbeek van Heukelom, “The Role of Chloride Transport in the Control of the Membrane Potential in Skeletal Muscle - Theory and Experiment” *Biophysical Chemistry* **143**, 18-25, 2009.
- 36) M. Bier, “The Energetics, Chemistry, and Mechanics of a Processive Motor Protein” *BioSystems* **93**, 23-28, 2008.
- 35) M. Bier, “Accounting for the Energies and Entropies of Kinesin’s Catalytic Cycle” *European Physical Journal B* **65**, 415-418, 2008.
- 34) M. Bier, “The Stepping Motor Protein as a Feedback Control Ratchet” *BioSystems* **88**, 301-307, 2007.
- 33) M. Bier, O.W. Day, and D. Pravica, “Murmurs and Noise Caused by Arterial Narrowing - Theory and Clinical Practice” *Fluctuation and Noise Letters* **6**(4), 415-425, 2006
- 32) M. Bier, “How to Evaluate the Electric Noise in a Cell Membrane?” *Acta Physica Polonica B* **37**(5), 1409-1424, 2006.
- 31) D.W. Pravica, M. Bier, R.S. Brock, and O.W. Day Jr., “Stable Stationary Vortices and Traveling Oscillatory Vortices in a Stenotic Fluid-Flow Channel” *Physical Review E* **72**, 067303, 2005.

- 30) M. Bier, “Gauging the Strength of Power Frequency Fields against Membrane Electric Noise” *Bioelectromagnetics* **26**, 595-609, 2005.
- 29) M. Bier, W. Chen, E. Bodnar, and R.C. Lee, “Biophysical Injury Mechanisms associated with Lightning Injury” *Neurorehabilitation* **20**(1), 53-62, 2005.
- 28) M. Bier, “Critical Exponents near a Bifurcation Point in Noise Induced Escape over a Fluctuating Barrier” *Physical Review E* **71**(1), 011108, 2005.
- 27) M. Bier, “Modeling Processive Motor Proteins - Moving on Two Legs in the Microscopic Realm” *Contemporary Physics* **46**(1), 41-51, 2005.
- 26) M. Bier, T.R. Gowrishankar, W. Chen, and R.C. Lee, “The Electroporation of a Lipid Bilayer as a Chemical Reaction” *Bioelectromagnetics* **25**(8), 634-637, 2004.
- 25) H. van Mil, J. Siegenbeek van Heukelom, and M. Bier, “A Bistable Membrane Potential at Low Extracellular Potassium Concentration” *Biophysical Chemistry* **106**, 15-21, 2003.
- 24) M. Bier, “Processive Motor Protein as an Overdamped Brownian Stepper” *Physical Review Letters* **91**, 148104, 2003.
- 23) M. Bier, T.R. Gowrishankar, W. Chen, R.D. Astumian, and R.C. Lee, “Resealing Dynamics of a Cell Membrane after Electroporation” *Physical Review E* **66**, 062905-062908, 2002.
- 22) M. Bier, “Motor Proteins - Mechanochemical Energy Transduction on the Microscopic Scale” *Acta Physica Polonica B* **32**(2), 287-294, 2001.
- 21) M. Bier, M. Kostur, I. Derenyi, and R.D. Astumian, “Nonlinearly Coupled Flows” *Physical Review E* **61**(6), 7184-7187, 2000.
- 20) M. Bier, B.M. Bakker, and H.V. Westerhoff, “How Yeast Cells Synchronize their Glycolytic Oscillations - A Perturbation Analytic Treatment” *Biophysical Journal* **78**, 1166-1175, 2000.
- 19) I. Derenyi, M. Bier, and R.D. Astumian, “The Generalized Efficiency and its Application to Microscopic Engines” *Physical Review Letters* **83**(5), 903-906, 1999.
- 18) M. Bier, I. Derenyi, M. Kostur, and R.D. Astumian, “The Intrawell Relaxation of Overdamped Brownian Particles” *Physical Review E* **59**(6), 6422-6432, 1999.
- 17) M. Bier, S.M. Hammer, D.J. Canaday, and R.C. Lee, “Kinetics of Sealing for Transient Electropores in Isolated Skeletal Muscle” *Bioelectromagnetics* **20**(3), 194-201, 1999.
- 16) M. Bier and R.D. Astumian, “What is Adiabaticity? - Suggestions from a Fluctuating Linear Potential” *Physics Letters A* **247**(6), 385 - 390, 1998.
- 15) M. Bier, “Brownian Ratchets in Physics and Biology” *Contemporary Physics* **38**(6), 371-379, 1997.

- 14) M. Bier, B. Teusink, B.N. Kholodenko, and H.V. Westerhoff, "Control Analysis of Glycolytic Oscillations" *Biophysical Chemistry* **62**, 15-24, 1996
- 13) G.S. Abramov, M. Bier, M. Capelli-Schellpfeffer, and R.C. Lee, "Alteration in Sensory Nerve Function Following Electrical Shock" *Burns* **22**(8), 602-606, 1996.
- 12) M. Bier and R.D. Astumian, "Biasing Brownian Motion in Different Directions in a 3 State Fluctuating Potential and an Application for the Separation of Small Particles" *Physical Review Letters* **76**, 4277-4280, 1996.
- 11) M. Bier, K.S. Kits, and J.G.G. Borst, "The Relation between Risetimes and Amplitudes of GABA-ergic Postsynaptic Currents" *Journal of Neurophysiology* **75**(3), 1008-1012, 1996.
- 10) R.D. Astumian and M. Bier, "Mechanochemical Coupling of of the Motion of Molecular Motors to ATP Hydrolysis" *Biophysical Journal* **70**, 637-653, 1996.
- 9) M. Bier and R.D. Astumian, "Biased Brownian Motion as the Operating Principle for Microscopic Engines" *Bioelectrochemistry & Bioenergetics* **39**, 67-75, 1996.
- 8) M. Bier, "Reversals of Noise Induced Flow" *Physics Letters A* **211**(1), 12-18, 1996.
- 7) P.R. Jensen, A.A. Van der Gugten, M. Bier, W.C. Van Heeswijk, J. Rohwer, D. Molenaar, D. Van Workum, P. Richard, B. Teusink, B.M. Bakker, B.N. Kholodenko, and H.V. Westerhoff, "Hierarchies in Control" *Journal of Biological Systems* **3**(1), 187-196, 1995.
- 6) J.G.G. Borst, K.S. Kits, and M. Bier, "Variance analysis of GABA-ergic in IPSCs of Melanotropes from *Xenopus Laevis*" *Biophysical Journal* **67**, 183-189, 1994.
- 5) R.D. Astumian and M. Bier, "Fluctuation Driven Ratchets - Molecular Motors" *Physical Review Letters* **72**(11), 1766-1769, 1994.
- 4) M. Bier and R.D. Astumian, "Matching a Diffusive and a Kinetic Approach for Escape over a Fluctuating Barrier" *Physical Review Letters* **71**(10), 1649-1652, 1993.
- 3) T. Bountis, V. Papageorgiou, and M. Bier, "On the Singularity Analysis of Intersecting Separatrices in Near-Integrable Dynamical Systems" *Physica* **24D**, 292-304, 1987.
- 2) M. Bier and T. Bountis, "Remerging Feigenbaum Trees in Dynamical Systems" *Physics Letters* **104A**(5), 239-244, 1984.
- 1) T. Bountis, M. Bier, and J. Hijmans, "On the Integrability of Some Generalized Lotka-Volterra Systems" *Physics Letters* **97A**(1,2), 11-14, 1983.

Book Chapters

- 12) S. Yuvan and M. Bier, *Sense and Nonsense about Water* in "Water in Biomechanical and

- Related Systems,” Edited by Adam Gadomski, Springer International Publishing, 2021. p19-36.
- 11) S. Yuvan and M. Bier, *Synchronization of Coupled Oscillators - Phase Transitions and Entropy Production*, in “The Physics of Biological Oscillators: New Insights into Non-Equilibrium & Non-Autonomous Systems,” Edited by Peter V.E. McClintock and Aneta Stefanovska, Springer Nature Switzerland AG, 2021. p131-149.
 - 10) M.P. Milner, R.C. Hickner, and M. Bier, *Scaling Relations of Speed, Acceleration, and Strength in Collegiate American Football Players* in “Multiscale (Loco)motion - Towards its Active Matter Addressing Physical Principles,” Edited by Adam Gadomski, Wydawnictwa Uczelniane Uniwersytetu Technologiczno-Przyrodniczego, Bydgoszcz, Poland 2019. p13-23.
 - 9) M. Bier and J.C. Weaver, *Signals, Noise, and Thresholds* in “CRC Handbook of Biological Effects of Electromagnetic Fields - Bioengineering and Biophysical Aspects of Electromagnetic Fields,” Edited by B. Greenebaum and F.S. Barnes, 4th edition, CRC Press - Taylor and Francis Group, Boca Raton, FL 2019. p261-298.
 - 8) J.C. Weaver and M. Bier, *Signals, Noise, and Thresholds* in “CRC Handbook of Biological Effects of Electromagnetic Fields,” Edited by B. Greenebaum and F.S. Barnes, 2nd edition, CRC Press - Taylor and Francis Group, Boca Raton, FL 2007. p169-202.
 - 7) M. Bier, *The Noisy Steps of a Motor Protein* in “UPoN 2002: 3rd International Conference on Unsolved Problems of Noise and Fluctuations in Physics, Biology, and High Technology,” AIP Conference Proceedings 665, Edited by S.M. Bezrukov, Washington, DC 2002. p290-297.
 - 6) M. Bier and M. Kostur, *Nonlinearly Coupled Chemical Reactions* in “Stochastic Processes in Physics, Chemistry and Biology” Eds. J.A. Freund and T. Poeschel, Springer Series “Lecture Notes on Physics 557” Springer-Verlag, Berlin 2000. p206-211.
 - 5) M. Bier, *A Motor Protein Model and how it Relates to Stochastic Resonance, Feynman’s Ratchet and Maxwell’s Demon* in “Lectures on Stochastic Dynamics,” Springer-Verlag, Edited by L. Schimansky-Geier and T. Poeschel, Springer-Verlag, 1997. p29-35.
 - 4) H.V. Westerhoff, M. Bier, D. Molenaar, E.C. Spoelstra, J. Lankelma, A.P.M. Jongsma, P.R. Jensen, P. Richard, and B.N. Kholodenko, *Control of Dynamics and Steady State; Theory and Applications to Multidrug Resistance* in “Biomedical Physics Horizons,” Edited by D.N. Ghista, Vieweg Verlag, Wiesbaden, 1996. p25-31.
 - 3) M. Bier, J.G.G. Borst, and K.S. Kits, *On Inferring the Kinetic Scheme of an Ion Chan-*

nel from Postsynaptic Currents in “Biomedical Physics Horizons,” Edited by D.N. Ghista, Vieweg Verlag, Wiesbaden, 1996. p115-124.

- 2) R.D. Astumian, B. Robertson, and M. Bier, *Free Energy Coupling Mediated by Dynamic Interactions between Membrane Proteins* in “Modern Trends in Biothermokinetics,” Edited by S. Schuster et al., Plenum Press, 1993. p61-66.
- 1) T. Bountis, M. Bier, and V. Papageorgiou, *A Singularity Analysis Approach to the Solutions of Duffing’s Equation* in “Symmetries and Singularity Structures,” eds. M. Lakshmanan and M. Daniel, Springer, Heidelberg, 1991. p112-120.

Patents

- “MicroCapillary Devices Using High Dielectric Constant Materials and Related Methods,” US Patent 60/5564,755 - 2004
- “Separation of Small Particles,” US Patent 09/083,571 - 1997 - Licensed to Arrayx, Inc in 2003

Courses Taught

- Graduate Mathematical Physics (2 semesters), Mathematical Methods for Physics, Modern Physics, Calculus based and Non-Calculus based Physics, Physics and the Universe (Astronomy), and The Physics of Sound (Musical Acoustics), Graduate Classical Mechanics, Graduate Biomedical Physics, Undergraduate Quantum Mechanics, and two semesters of Graduate Quantum Mechanics at East Carolina University
- Part of a graduate level course in Membrane Biophysics at the University of Chicago.
- Part of a graduate level course in Nonlinear Responses in Structured Fluids at the University of Chicago.
- Precalculus, Calculus and Physics I at Franklin College
- Calculus 1, Calculus 2, Calculus 3, Numerical Analysis, Mathematical Modeling, and Discrete Mathematics at Colby College

Supervised Master’s and Ph.D. Theses

- Binyam Tassew Kassahun, Master’s thesis: “The Thermodynamics of Nerve Pulse Propagation and the Mechanism behind Anesthesia.” Defended July 2009.
- Jill Ashley Gallaher, Ph.D. thesis: “Ion transport across Cell Membranes.” Defended April 2010.

Grants and Awards

- Outstanding Referee Award from the American Physical Society, 2017
- Co-PI on ECU Research Development Award 2008, \$19,820
- Recipient of Sigma Xi's Helms Award, January 2007
- College Research Award (semester off from teaching to pursue research) in Spring 2005
- \$25,000 Research grant from the Eppley Foundation, 2004-2005

Selected Conferences and Lectures of the Last 15 Years

- Plenary Speaker at the Biennial Congress of Polish Physicists in Bydgoszcz. September 2020. Presentation Title: “Lévy Noise, Time-Reversal Symmetry, and the Nonequilibrium Bath.”
- Invited Presentation at the Swammerdam Institute for Life Sciences, University of Amsterdam, December 2018. Presentation Title: “A Boltzmann-Distribution-Equivalent for Lévy Noise and How it Leads to Thermodynamically Consistent Epicatalysis.”
- Invited Presentation at the Laboratoire de Physique, Ecole Normale Supérieure de Lyon, France, December 2018. Presentation Title: “Breaking Microscopic Reversibility with Lévy Flights.”
- Speaker and Member of the International Scientific Committee at the Workshop on the Physics of Biological Oscillators in Buckinghamshire, UK, in November 2018. Presentation Title: “Phase transitions and entropies for synchronizing oscillators.”
- Keynote Speaker and Scientific Committee Member at the 3rd Jędrzej Śniadecki Biomedical Workshop in Bydgoszcz, Poland, in June 2018. Presentation Title: “Periodic Outbursts of the Measles in the Netherlands.”
- Invited Presentation at the 30th Marian Smoluchowski Symposium in Kraków, Poland, in September 2017. Presentation Title: “A Boltzmann-Distribution-Equivalent for Lévy Noise and How it Leads to Thermodynamically Consistent Epicatalysis.”
- Invited Presentation at the Institute of Physics of the Universidade de Brasilia, Brasilia, Brazil, in December 2016. Presentation Title: “EconoBiophysics - Antimomentum, Self-similarity, and non-Markovian Behavior in Stock Trading Volumes.”
- Invited Presentations at the 3rd Workshop on Statistical Physics at the Universidade de Brasilia, Brasilia, Brazil, in December 2016. Presentation Titles: “A Boltzmann-Distribution-Equivalent for Lévy Noise and How it Leads to Thermodynamically Consistent Epicatalysis” and “Phase transitions and entropies for synchronizing oscillators.”
- Invited Presentation at FIOCRUZ, an institute of the Brazilian Ministry of Health, Brasilia, Brazil, in December 2016. Presentation Title: “Periodic outbursts of the measles in the Netherlands.”
- Invited Presentation for the Klub Skeptyków Polskich at the Uniwersytet SWPS in Warsaw, Poland, in July 2016. Presentation Title: “Poświata Kirliana - wyladowanie koronowe, pseudonauka i szalbiertwo (Kirlian’s Glow - corona discharge, pseudoscience, and deceit).”

- Invited Presentation at the Silesian University in Katowice, Poland, in June 2016. Presentation Title: “Breaking Microscopic Reversibility and Time Reversal Symmetry with Lévy Flights.”
- Invited Presentation at the Polish Academy of Learning, in Kraków, Poland, in February 2015. Presentation Title: “Modeling Periodic Outbreaks of the Measles in the Dutch Bible Belt.”
- Invited Seminar Speaker at the Institute of Physical Science and Technology of the University of Maryland in College Park, Md., in October 2013. Presentation Title: “Szilard-Machine-Like Features in a Processive Motor Protein & Afterthoughts on Dolphins and Winnetou.”
- Invited Speaker at 25th Smoluchowski Symposium in Kraków, Poland, in September 2012. Presentation title: “Power Law Behavior in the Ion Traffic through a Lipid Bilayer at the Melting Transition.”
- A 4-Lecture Minicourse on “Molecular Motors, Ion Channels, Lipids, and Water” at the University of Palermo, in Sicily, Italy, in June 2012.
- Invited Speaker at BioComp 2012 in Salerno, Italy, in June 2012. Presentation title: “Why Liquid Water Probably Does Not ‘Remember’.”
- Invited Speaker at 24th Smoluchowski Symposium in Zakopane, Poland, in September 2011. Presentation title: “Szilard-Machine-Like Features in a Processive Motor Protein.”
- Invited Speaker at Conference: “Thermodynamics and Kinetics of Molecular Motors” in Santa Fe, NM, in May 2010. Presentation title: “The Processive Motor Protein as a Reverse Szilard Engine with ‘Wiggle Room’.”
- Colloquium presentation at the Liquid Crystal Institute at Kent State University in September 2009. Presentation title: “The Biological Significance of the Lipid Bilayer’s Melting Transition.”
- Invited seminar speaker at the Physics Department of the University of Barcelona in Barcelona, Spain in September 2008. Presentation title: “The Roles of Energy and Entropy for a Stepping Motor Protein.”
- Two lectures on Brownian Ratchets and one colloquium on Microscopic Swimmers at the Facultat de Física of the Universitat de Barcelona in May 2008.
- Invited seminar speaker at the Nanobiology Group of the National Cancer Institute in Frederick, Maryland, March 27, 2008: Presentation title: “Motor Proteins, Dolphins, and Winnetou - or - How irregular motion can sometimes be the fastest and most efficient.”

- Participant of the annual March meeting of the American Physical Society in New Orleans, Louisiana, March 10-14, 2008, with one 12 minute presentation: “Backstepping Speeds up Kinesin” and chairmanship of two sessions: “Brownian Motors” and “Biological Physics.”
- Invited seminar speaker at the Biomathematics Department of North Carolina State University in Raleigh, North Carolina on January 22, 2008. Presentation title: “Motor Proteins, Dolphins, and Winnetou - or - How irregular motion can sometimes be the fastest and most efficient.”
- Three invited lectures at the Humboldt Universität in Berlin, Germany, in December 2007, Presentation titles:
 - December 17: “The Roles of Energy and Entropy for a Stepping Motor Protein.”
 - December 20: “Motor Proteins, Dolphins, and Winnetou: How irregular motion can sometimes be the fastest and most efficient.”
 - December 21: (at the Sonderforschungsbereich Symposium in the Fritz Haber Institut on “Transport in Deterministic and Stochastic Systems”) “How a Brownian Stepper Speeds up by Occasionally Disconnecting.”
- Invited seminar speaker at the Physics Department of Complutense University in Madrid, Spain, in September 2007. Presentation title: “The Processive Motor Protein as a Feedback Control Ratchet.”
- Invited speaker at “Biocomp 2007 - Collective Dynamics: Topics on Competition and Cooperation in the Biosciences” in Salerno, Italy, September 24-28, 2007. Presentation title: “The Energetics, Chemistry, and Mechanics of a Processive Motor Protein.” (<http://biocomp.unina.it/2007/index.html>)
- Invited speaker at International Workshop on Ecological Complex Systems: Stochastic Dynamics and Patterns, Città del Mare - Terrasini, Palermo, Sicily, Italy - July 22-26, 2007. Presentation title: “Accounting for the energies and entropies of kinesin’s catalytic cycle.” (http://gip.dft.unipa.it/workshop_ECS_Pa07/)
- Invited speaker at the University of Palermo, Sicily in November 2006. Presentation title: “The Motor Protein - A Microscopic Brownian Stepper.”
- Invited lecturer at “International School of Bioelectromagnetics ‘Alessandro Chiabrera’ - Mechanisms of Interaction between Electromagnetic Fields and Biological System” in Erice, Sicily in November 2006. Presentation title: “Macromolecular Modeling.”
- Invited speaker at “Biocomp 2005 - Diffusion in Neurobiology and Subcellular Biology” con-

- ference in Vietri sul Mare, Italy in December 2005. (<http://www.biocomp2005.unina.it/>)
Presentation title: “The Processive Motor Protein as an Overdamped Brownian Stepper.”
- Invited speaker at the 18th Marian Smoluchowski Symposium in Zakopane, Poland in September 2005. Presentation title: “How to Evaluate Electric Noise in a Cell membrane?”
 - Invited seminar speaker at the University of Southern Florida in Tampa, Florida in July 2005. Presentation title: “Darwin’s Engines.”
 - Invited Colloquium speaker at Physics Dept. of Michigan State University, East Lansing, Michigan in January 2004. Presentation title: “Imposing Oscillations on Systems with Multiple Relaxation Times.”

Current Interests

When, as a 22-year old, I was working towards my Master’s degree, I fell in love with modeling dynamical systems and working them out. Setting up a model, coming up with clever approximations, comparing these with computer simulation results, and deriving some verifiable implications was sort of like solving a crossword puzzle, but infinitely more intellectually satisfying. However, in the mid 80s Dynamical Systems Theory became more and more the playground for pure mathematicians on one side and engineers on the other side. I then moved into the direction of Theoretical Biophysics. At the time experimental techniques to study biological processes on a molecular level, like patch clamp and biomotility assays, were newly developed. The analysis of the ensuing data and the verification of models required knowledge of statistical mechanics, nonequilibrium thermodynamics, condensed matter physics, dynamical systems, and advanced mathematics. I have continued to do theoretical work on the interface of physics and biology for more than two decades. I have many collaborators, I have authored a large number of papers, I am a frequent invitee at conferences, and about every month I am sent a manuscript to referee from journals like *Physical Review Letters*, *Physical Review E*, *Physics Letters A*, *Physica D*, *Europhysics Letters*, *Bioelectromagnetics*, *Proceedings of the National Academy of Science*, etc.

Focusing on one narrow research area and wallowing in self-reference has never been my way. I have always liked getting into new subject matter. Biomolecules brought me to the Brownian motion that all molecules are subject to. So I have written a number of very theoretical papers on dynamical systems in which particles are subjected to both Brownian noise and imposed fluctuations or oscillations. In this respect my work

on motor proteins has led to some papers that are now considered classics (https://scholar.google.com/citations?view_op=view_citation&hl=en&user=UYTae2IAAAAJ&citation_for_view=UYTae2IAAAAJ:u5HHmVD_u08C). Experimentalists have often approached me with problems they had run into. From the ensuing collaborations papers emerged on glycolytic oscillations, on electroporation (punching holes in cell membranes with electric fields), and on the maintenance of the cell's membrane potential. I have written several papers on how the intensity of the electrical noise in a cell membrane compares with the effect of the 60 Hz AC fields that we are subjected to from electrical appliances and power lines. With collaborators at ECU I have published on the effects of arterial narrowing on bloodflow. Several of my articles have been cited more than a hundred times.

In the Spring of 2015 I published an article in which a simple mathematical model is used to quantitatively account for the 12 year periodicity in massive outbreaks of the measles in the Dutch Bible Belt. My subsequent article on this issue in a Dutch medical journal has been discussed in Dutch news media and is reviewed on the Dutch wikipedia page about the Dutch Bible Belt. With other collaborators I recently published on patterns in volumes of traded stock. We observed these patterns after we applied a kind of statistical analysis that is commonly used to study the opening and closing of ion channels.

It has always been with great interest that I have followed what goes on in the world of quackery and pseudoscience. It amuses, astounds and sometimes horrifies, but it is never dull. Over the last few years I have also written numerous articles on some of the issues. In an article in Skeptic Magazine I have tried to expose some of the nonsense that goes around about “quantum consciousness.” Most of my work in this realm has been in my native Dutch language. In blog columns (see <http://kloptdatwel.nl/author/martinbier/>) I have taken on the manufacturers of expensive gadgets that are supposed to protect against “electrosmog” (radiation from cell phones, computers, etc.). My columns have evoked much response. I see taking on fraud and hogwash as a form of public service. The toga and the ivory tower are not of this century.