Curriculum Vitae

|  |  |  |
| --- | --- | --- |
| Date Prepared: Name:Address:Phone: Email: | December 1, 2015Ronny Bartsch Department of Physics, Bar-Ilan University,Ramat-Gan, 5290002 Israel+972-3-7384408 bartsch.ronny@gmail.com |  |
| Education |  |
| 07/2003 | MSc | Theoretical Physics(advisor: Philipp Maass) | University of Konstanz,Baden-Wu¨rttemberg, Germany. |
| 06/2009 | PhD | Statistical Physics applied to physiologic dynamics (advisor: Shlomo Havlin) | Bar-Ilan University, Ramat Gan, Israel. |
| Faculty Academic Appointments |
| 08/2013–03/2014 | Instructor | Division of Sleep Medicine, Harvard Medical School, Boston, MA. |
| 04/2014–09/2014 | Assistant Research Professor | Physics Department, Boston University, Boston, MA. |
| 10/2014– | Senior Lecturer | Department of Physics, Bar-Ilan University, Israel. |

Postdoctoral Training

09/2008–07/2013 Postdoctoral Fellow Division of Sleep Medicine, Harvard Medical School and, Brigham and Women’s Hospital, Boston, MA.

Appointments at Hospitals/Affiliated Institutions

|  |  |  |  |
| --- | --- | --- | --- |
| 10/1998–08/2003 | X-Ray and MR Imaging Assistant | Medicine, Radiology | Institute of Radiology and Radiotherapy Prof. Zwicker, Konstanz, Germany. |
| 08/2013–03/2014 | Associated Physiologist | Medicine,Sleep Medicine | Department of Medicine, Brigham and Women’s Hospital, Boston, MA. |
| 01/2013–03/2014 | Visiting Scholar | Statistical Physics andBrain Networks | Physics Department,Boston University, Boston, MA. |
| Other |  |  |  |

|  |  |  |
| --- | --- | --- |
| 08/1996–10/1997 | Civil Service | White Storks Ornithological Research Station atAffenberg Salem, Germany. |
| 09/1999–10/2001 | Teaching Assistant | Physics and Mathematics (high school, undergrad engineering) Studienkreis Konstanz, Germany |

10/2000–06/2002 Research Student Photovoltaics Lab, Physics Department, University of Konstanz, Germany.

09/2003–04/2004 Research Scientist Cardiovascular MRI Applications Development, Siemens Medical Solutions, Erlangen, Germany.

Honors and Prizes

|  |  |  |
| --- | --- | --- |
| 2004–2006 | Minerva Research Fellowship | Minerva Foundation, Max-Planck-Society, Germany. |
| 2006–2008 | President’s Scholarship | Bar-Ilan University, Ramat Gan, Israel. |
| 2010–2012 | DAAD Research Fellowship | German Academic Exchange Service (DAAD), Germany. |
| 2012 | Young Investigator of the Year | German Society of Sleep Medicine (DGSM), Germany. |
| 2014–2016 | Marie Curie InternationalIncoming Fellowship | The European Commission. |

Oral Presentations and Lectures

2006 DAPHNet workshop, ETH Zurich, Switzerland.

2007 2nd SENSATION International Conference in Chania, Crete, Greece.

2007 18th Meeting of the International Society for Posture and Gait Research, Burlington, Vermont, USA.

2007 Division of Sleep Medicine, Harvard Medical School, Boston, MA, USA

2007 Theory Colloquium at the Institute of Physics, Martin-Luther-University Halle-Wittenberg, Germany.

2008 DAPHNet Review Meeting, Atos Origin, Madrid, Spain.

2009 Final DAPHNet workshop, Rauischholzhausen, Germany.

2009 Sleep Disorders Research Program, Harvard Medical School, Boston, MA, USA.

2011 MURI Winter School on Nonlinear Dynamics, University of California, San Diego, La Jolla, California.

2012 APS March Meeting, Boston, MA, USA.

2012 Faculty of Medicine, Bar-Ilan University, Safed, Israel.

2013 Faculty of Engineering, Bar-Ilan University, Ramat Gan, Israel.

2013 Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel.

2013 Department of Biomedical Engineering, Tel Aviv University, Tel Aviv, Israel.

2013 Joseph Sagol Neuroscience Center, Chaim Sheba Medical Center, Tel Hashomer, Israel.

2013 Department of Biomedical Engineering, Ben Gurion University, Beer Sheva, Israel.

2013 Faculty of Health Sciences, Ben-Gurion University, Beer-Sheva, Israel.

2013 Gonda Multidisciplinary Brain Research Center, Bar-Ilan University, Ramat Gan, Israel.

2013 Department of Physics, Bar-Ilan University, Ramat Gan, Israel.

2013 Faculty of Medicine, Hebrew University of Jerusalem, Israel.

Peer Reviewed Publications

1. Bartsch R, Hennig T, Heinen A, Heinrichs S, Maass P. Statistical analysis of fluctuations in the ECG

morphology. Physica A 2005;354:415–431.

2. Bartsch R, Kantelhardt JW, Penzel T, Havlin S. Experimental evidence for phase synchronization tran- sitions in the human cardiorespiratory system. Phys Rev Lett 2007;98:054102(4).

3. Bartsch R, Plotnik M, Kantelhardt JW, Havlin S, Giladi N, Hausdorff JM. Fluctuation and synchro- nization of gait intervals and gait force profiles distinguish stages of Parkinson’s disease. Physica A

2007;383:455–465.

4. Bashan A, Bartsch R, Kantelhardt JW, Havlin S. Comparison of detrending methods for fluctuation analysis. Physica A 2008;387:5080–5090.

5. Hamann C, Bartsch RP, Schumann AY, Penzel T, Havlin S, Kantelhardt JW. Automated synchrogram analysis applied to heartbeat and reconstructed respiration. Chaos 2009;19:015106(8).

6. Ivanov PCh, Ma QDY, Bartsch RP, Hausdorff JM, Amaral LAN, Schulte-Frohlinde V, Stanley HE, Yoneyama M. Levels of complexity in scale-invariant neural signals. Phys Rev E 2009;79:041920(12).

7. Ivanov PCh, Ma QDY, Bartsch RP. Maternal-fetal heartbeat phase synchronization. Proc Natl Acad

Sci USA 2009;106:13641–13642.

8. Ma QDY, Bartsch RP, Bernaola-Galvan P, Yoneyama M, Ivanov PCh. Effects of extreme data loss on detrended fluctuation analysis. Phys Rev E 2010;81:031101(17).

9. Schumann AY, Bartsch RP, Penzel T, Ivanov PCh, Kantelhardt JW. Aging effects on cardiac and respiratory dynamics in healthy subjects across sleep stages. Sleep 2010;33:943–955.

10. Bashan A, Bartsch RP, Kantelhardt JW, Havlin S, Ivanov PCh. Network Physiology reveals relations be- tween network topology and physiologic function. Nature Communications 3:702 doi: 10.1038/ncomms1705 (2012).

11. Bartsch RP, Schumann AY, Kantelhardt JW, Penzel T, Ivanov PCh. Phase transitions in physiologic coupling. Proc Natl Acad Sci USA 2012;109:10181–10186.

12. Lo C-C, Bartsch RP, Ivanov PCh. Basic pathways and asymmetry in the dynamics of sleep-stage transitions. Europhysics Letters 2013;102:10008(6).

13. Plotnik M, Bartsch RP, Zeev A, Giladi N, Hausdorff JM. Effects of walking speed on asymmetry and bilateral coordination of gait. Gait and Posture 2013;38:864–869.

14. Bartsch RP, Ivanov PCh. Coexisting forms of coupling and phase-transitions in physiological networks.

Nonlinear Dynamics of Electronic Systems 2014;270–287.

15. Bartsch RP, Liu KKL, Ma QDY, Ivanov PCh. Three independent forms of cardio-respiratory coupling: Transitions across sleep stages. Computing in Cardiology 2014;41:781–784.

16. Liu KKL, Bartsch RP, Ma QDY, Ivanov PCh. Major component analysis of dynamic networks of physiologic organ interactions. Journal of Physics 2015;640:012013.

17. Penzel T, Garcia C, Glos M, Renelt M, Sch¨obel C, Kantelhardt JW, Bartsch RP, Mu¨ller A, Riedl M, Wessel N, Fietze I. Herzfrequenz und EKG in der Polysomnographie. Somnologie–Schlafforschung und Schlafmedizin 2015;1–9.

18. Liu KKL, Bartsch RP, Lin A, Mantegna RN, Ivanov PCh. Plasticity of brain wave network interactions and evolution across physiologic states. Frontiers in Neural Circuits 2015;9:62(15).

19. Bartsch RP, Liu KKL, Bashan A, Ivanov PCh. Network Physiology: How organ systems dynamically interact PLOS ONE 2015;10(11):e0142143(36).

Book Chapters

1. Parmeggiani PL, Bartsch RP, Ivanov PCh. “Physiologic Regulation in Sleep.” Atlas of Clinical Sleep

Medicine (2nd edition 2013, editor: Kryger MH).

2. Ivanov PCh, Bartsch RP. “Network Physiology: mapping interactions between networks of physio- logic networks.” Networks of Networks: Systemic Risk and Infrastructural dependencies (2013) (editors: D’Agostino G and Scala A).

Conference Proceedings and Abstracts

1. Bartsch R, Plotnik M, Havlin S, Gurevich T, Hausdorff JM. Fluctuations in gait force profiles in patients with Parkinson’s disease. Movement Disorders 2005;20:S93-S94.

2. Plotnik M, Bartsch R, Yogev G, Hausdorff JM, Havlin S, Giladi N. Synchronization of right-left stepping while walking is compromised in patients with Parkinson’s disease during mental loading. Movement Disorders 2006;21:S592–S592.

3. Galil Y, Tamir I, Zivotofsky A, Gruendlinger L, Bartsch R, Plotnik M, Hausdorff JM. Modality-specific feedback affects gait synchronization during side-by-side walking. Proceedings of the 18th International Conference of the International Society for Posture and Gait 2007; p143.

4. Plotnik M, Bartsch R, Leshem M, Giladi N, Havlin S, Hausdorff JM. Bilateral coordination of stepping while walking along a straight line or a circle in healthy adults. Proceedings of the 18th International Conference of the International Society for Posture and Gait 2007; p156.

5. Penzel T, Bartsch R, Kantelhardt JW, Fietze I. Coupling of respiration and heart beat differs between sleep stages. Sleep 2008;31:A331–A331.

6. Schumann AY, Kuhnhold A, Fuchs K, Bartsch RP, Bauer A, Schmidt G, Kantelhardt JW. Reconstructed respiration and cardio-respiratory phase synchronization in post-infarction patients. Proceedings of the

6th Conference of the European Study Group on Cardiovascular Oscillations (ESGCO) 2010.

7. Bartsch RP, Kantelhardt JW, Schumann AY, Havlin S, Ivanov PCh. Sleep stage and age dependence of cardio-respiratory coupling in healthy subjects. Proceedings of the 24th Annual Meeting of the Associated Professional Sleep Societies (APSS) 2010.

8. Kuhnhold A, Schumann AY, Bartsch RP, Schmidt G, Kantelhardt JW. Reconstructed respiration and cardio-respiratory phase synchronization in post-infarction patients. Proceedings of BIOSIGNAL 2010.

9. Ivanov PCh, Lo C-C, Bartsch RP. Scale-invariant pattern in arousals during sleep. Proceedings of

BIOSIGNAL 2010.

10. Bartsch RP, Ivanov PCh. Transitions in physiologic coupling: Sleep stage and age dependence of cardio- respiratory phase synchronization American Physical Society (APS) March Meeting Abstracts 2012;1:1282.

11. Bartsch RP, Bashan A, Kantelhardt JW, Havlin S, Ivanov PCh. Physiological Networks: towards systems physiology. APS March Meeting Abstracts 2012;1:54012.

12. Ivanov PCh, Bartsch RP. Self Organized Criticality as a new paradigm of sleep regulation. APS March

Meeting Abstracts 2012;1:41003.

13. Bartsch RP, Schumann AY, Kantelhardt JW, Penzel T, Ivanov PCh. Sleep-stage stratification patterns in cardio-respiratory phase synchronization. Proceedings of the 26th Annual Meeting of the Associated Professional Sleep Societies (APSS 2012). Sleep 2012;35:A52–A52.

14. Ivanov PCh, Bartsch RP, Bashan A, Kantelhardt JW, Havlin S. Physiological Networks: Topological and functional transitions across sleep stages. APSS 2012. Sleep 2012;35:A52–A53.

Theses

1. R. Bartsch “Wavelet based fluctuation analysis of long-term ECG data sets to discriminate heart-failure patients from healthy subjects.” [M.Sc. Dissertation (in German)] (University of Konstanz, Germany,

2003). Thesis advisor Prof. Philipp Maass.

2. R. Bartsch “Scaling and synchronization methods from statistical physics applied to physiological data.” [Ph.D. Dissertation] (Bar-Ilan University, Ramat Gan, Israel, 2008). Thesis advisor Prof. Shlomo Havlin.

Media Reviews Featuring my Work:

1. Elizabeth Quill: “When Networks Network: Once studied solo, systems display surprising behavior when they interact.” Science News, vol. 182(6) p.18, 22 September, 2012. <http://www.sciencenews.org/view/feature/id/343939/title/When_Networks_Network>

2. Preetam Schramm: “Sleep Disorders and Neurodegenerative Diseases.” July, 2012. e-Journal of Age Management Medicine, Age Management Medicine Group (AMMG) [www.agemed.org/AMMGejournal/July2012/](http://www.agemed.org/AMMGejournal/July2012/)

3. “ Phase Synchronization: A New Form of Cardio-Respiratory Coupling.” BWH Clinical and Research News Highlights, 6 August, 2012. [http://www.brighamandwomens.org/about\_bwh/publicaffairs/news/publications/DisplayCRN.aspx? articleid=2031](http://www.brighamandwomens.org/about_bwh/publicaffairs/news/publications/DisplayCRN.aspx)

4. Marjorie Montemayor-Quellenberg: “Physiological Networks and the Body’s Complex Communications.” BWH Clinical and Research News Highlights, 12 April, 2012. [http://www.brighamandwomens.org/about\_bwh/publicaffairs/news/publications/DisplayCRN.aspx? articleid=1993](http://www.brighamandwomens.org/about_bwh/publicaffairs/news/publications/DisplayCRN.aspx)

5. Jason S. Bardi: “New way to analyze sleep disorders.” American Institute of Physics, 14 April, 2009.

<http://www.aip.org/press_release/chaos_sleep_disorders.html>

6. Phil Schewe, Ben Stein, and Davide Castelvecchi: “Heartbeat and Breathing Synchronicity.” American

Institute of Physics, January 30, 2007.

<http://www.aip.org/pnu/2007/split/810-1.html>

7. Carsten Heckmann: “Herz und Atmung im Takt des Schlafs.” pro-physik.de, January 30, 2007.

[http://www.pro-physik.de/Phy/leadArticle.do?mid=0&laid=8822](http://www.pro-physik.de/Phy/leadArticle.do)

Editorial Activities

Reviewer for the following Journals:

2004 – Physica A.

2006 – Chaos.

2006 – Europhysics Letters.

2007 – New Journal of Physics.

2009 – Applied Mathematical Modelling.

2009 – Biomedical Signal Processing and Control.

2011 – Frontiers in Fractal Physiology.

2013 – Physical Biology.

2014 – Physical Review E.

2014 – PLOS ONE.