

Dr. Peter beim Graben – Curriculum Vitae

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1. Education

1995 – 2000. Ph.D. studies in Physics (Nonlinear Dynamics / Theoretical Physics) at the University of Potsdam (Advisors: Prof. Dr. Jürgen Kurths (Physics), Prof. Dr. Douglas Saddy (Linguistics), Prof. Dr. Arne Wunderlin (Physics, University of Stuttgart)); title: “Symbolic Dynamics of Event-Related Brain Potentials in Language Processing” (in German). Ph.D.

1987 – 1995. Studies in Physics and Philosophy at the University of Hamburg, Diploma in Theoretical Physics (Advisors: Prof. Dr. Gerhard Mack, Prof. Dr. Klaus Fredenhagen); title: “Solvable Lattice Models with a Truncated Quantum Group as Symmetry” (in German).

2. Professional Positions

2010 – . DFG Heisenberg Fellow at the Department of German Language and Linguistics at the Humboldt-Universität zu Berlin and at the Berlin Bernstein Center for Computational Neuroscience, and at the Berlin School for Mind and Brain.

2006 – 2009. Senior Research Fellow at the Department of Clinical Language Sciences, University of Reading, United Kingdom.

2000 – 2006. Research Associate in the DFG Research Unit “Conflicting Rules in Cognitive Systems” (KU 837/14-4) at the University of Potsdam.

1997 – 2000. Research Assistant at the Institute of Linguistics at the University of Potsdam. Managing EEG laboratory.

1996 – 1997. Research Assistant in the DFG Center of Excellence “Formal Models of Cognitive Complexity” (INK 12) at the University of Potsdam.

3. Professional Activities

Computational Psycholinguistics: Planning, designing and conducting language-processing ERP experiments. Probabilistic and weighted grammars (Zipf’s law); Stochastic Optimality Theory (stOT). Parsing with Harmonic Minimalist Grammars and dynamical systems;

connectionist parsing. Dynamic semantics and pragmatic information theory. Dynamical automata and dynamic field theories.

Computational Neuroscience: Developing the ERP analysis toolbox ERSY (Event-Related Symbolic Dynamics Evaluation Package) for improved ERP analysis; especially the Symbolic Resonance Analysis (SRA). Observation models for LFP, EEG and ephaptic interactions of neural mass potentials. Neural networks and neural field theories. Emergence of macroscopic properties in neural networks.

Philosophy: Conceptual and epistemic foundations of symbolic dynamics and cognitive science (neural correlates of consciousness). Contextual emergence; Philosophy of Mind; Philosophy of Science. Intentionality.

4. Funding

- Co-investigator of Fetzer Franklin Trust grant “Towards a New Paradigmatic Framework: Weak Quantum Theory, Generalized Entanglement and Generalized Complementarity– Explorations of Holism” 2011 (US\$ 200,000).
- DFG Heisenberg Fellowship for Cognitive Neurodynamics 2010.
- Co-investigator of grant “Cognitive Systems Sciences” of the EPSRC program “Bridging The Gaps” (BGT2_RDG) at University of Reading 2008 (£ 466,531).
- Co-investigator of British Academy Small Research Grant for project “Structural and semantic licensing of negative polarity dependencies in sentence Comprehension: evidence from Basque and Spanish” 2008 (£ 6,872).
- Application for ESF EUROCORES Program *LogICCC*: “Multi-Agent Systems Modelling Language Change (MASMOL)”. Reviewed with grade *AABC*.
- Application for ERC Starting Grant “Modelling Language Processing-Related Brain Potentials with Nonlinear Dynamical Systems”. Reviewed with 7.97 points (of 8 necessary).
- Co-investigator of the DFG Research Unit “Conflicting Rules in Cognitive Systems” (KU 837/14-4) at the University of Potsdam 2000 (first period) and 2003(renewal).

5. Professional Services

Acting as reviewer for *BioSystems*, *Biological Cybernetics*, *Biological Psychology*, *Bulletin of Mathematical Biology*, *Cerebral Cortex*, *Chaos and Complexity Letters*, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, *Cognitive Systems Research*, *IEEE Transactions of Biomedical Engineering*, *International Journal of Bifurcation and Chaos*, *Journal of Mathematical Biology*, *Journal of Neuroscience Methods*, *Journal of Semantics*, *Mind and Matter*, *Neurocomputing*, *Physical Review Letters*, *Physical Reviews E*, *Physics Letters A und Second Language Research*.

Web administration, project coordination, advising master and PhD students.

6. Editorial Activities

- Editing *Springer Mathematical Neuroscience Series: Neural Field Theory* (2012, together with S. Coombes, R. Potthast & J. J. Wright).
- Editorial Board Member of *Cognitive Neurodynamics*.
- Curator for Scholarpedia article “Contextual Emergence” (together with H. Atmanspacher).
- Special theme issue “Brain Dynamics” of *Bulletin of Mathematical Biology* 73(2), 2011 (together with J. J. Wright).
- Special theme issue “Language Dynamics” of *Cognitive Neurodynamics* 3(4), 2009 (together with R. Potthast).
- Special theme issue “Brain Waves” of *Cognitive Neurodynamics*, 2(2), 2008 (together with R. Potthast and D. Saddy).
- Edited *Springer Complexity Series: Lectures in Supercomputational Neuroscience* of the Fifth Summer School of the *Helmholtz Institute for Supercomputational Physics* on “Complex Networks in Brain Dynamics” (2008, together with C. Zhou, M. Thiel, & J. Kurths).
- Edited special theme issue of *Chaos and Complexity Letters* 2(2/3), 2007 (together with C. Allefeld and J. Kurths).
- Edited special theme issue “Pragmatic Information” of *Mind and Matter* 4(2), 2006 (together with H. Atmanspacher).
- Edited special theme issue on “Cognition and Complex Brain Dynamics” of *International Journal of Bifurcation and Chaos*, 14(2), 2004 (together with D. Saddy and J. Kurths).

7. Teaching Activities

Teaching classes in electrophysiology of language, computational neurolinguistics, neurophysics, computational psycholinguistics, neuroimaging, computational neuroscience, cognitive science, and principles of ERP measurement and data analysis techniques:

- Winter 2011/2012 Seminar “Dynamical Systems and Neural Network Models in Psycholinguistics”
- Summer 2011 Seminar “Computational Psycholinguistics”
- Summer 2011 Lecture “Linear algebra and the geometry of meaning”, together with R. Blutner. European Summer School in Logic, Language and Information (ESSLLI), Ljubljana, Slovenia
- Winter 2010/2011 Seminar “Electrophysiology of Language”
- Summer 2010 Lecture “Dynamic Cognitive Modeling”, Summer School for Computational Linguistics, Zadar, Croatia.
- Summer 2009 Lecture “Dynamic Cognitive Modeling”
- Winter 2008/2009 Lecture “Statistics for Clinical Language Scientists”
- Winter 2007/2008 Lecture “Statistics for Clinical Language Scientists”
- Winter 2007 Research Seminar “Mathematics in the Life Sciences II” together with R. Potthast
- Summer 2007 Research Seminar “Mathematics in the Life Sciences I” together with R. Potthast

- Summer 2005 Three lectures for the Fifth Summer School of the *Helmholtz Institute for Supercomputational Physics* on “Complex Networks in Brain Dynamics”
- Summer 2005 Seminar: “Dynamical Models in Language Science” (computational psycholinguistics) together with J. Haack
- Summer 2004 Blockseminar: “Critical Consideration of Particular Topics in Parapsychology” together with S. Frisch
- Summer 2004 Seminar: “Dynamical Models in Cognitive Science” together with J. Haack
- Winter 2003/04 Seminar: “Physical Principles of Neuroimaging Techniques”
- Winter 2002/03 “Neurophysical Seminar“ together with J. Kurths
- Summer 2002 Lecture: “Introduction to Neurophysics” (computational neuroscience) together with J. Kurths
- Winter 2000/01 Blockseminar: “Introduction to ERP Technique”
- Summer 2000 Lecture: “Introduction to Neurophysics” (computational neuroscience) together with T. Liebscher und D. Saddy
- Winter 1997/98 Blockseminar: “Introduction to ERP Technique” together with D. Saddy

8. Organizational Activities

- *Partition Workshop 2012*, Humboldt Universität zu Berlin, September 17 – 20, 2012.
- *Second International Conference on Neural Field Theory*, University of Reading, April, 2012.
- Tandem Workshop on *Optimality in Language and Geometric Approaches to Cognition*, ZAS Berlin, December 11 – 13, 2010.
- International Conference *Progress in Neural Field Theory*, University of Reading, September 16 – 18, 2010.
- Program Committee Member of 2nd *International Conference on Cognitive Neurodynamics (ICCN)*, Hangzhou, China, November 15 – 19, 2009.
- Workshop *Dynamical Systems in Language*, University of Reading, September 08 – 09, 2008 (together with R. Potthast, S. Nasuto, P. Grindrod, and D. Saddy).
- Minisymposium “Brain Waves and Cognitive Neurodynamics” at *Waves 2007, The 8th International Conference on Mathematical and Numerical Aspects of Waves* at the University of Reading, July 23 – 27, 2007 (together with R. Potthast and D. Saddy).
- Scientific Director of the Fifth Summer School of the *Helmholtz Institute for Supercomputational Physics* on “Complex Networks in Brain Dynamics” at the University of Potsdam, September 05 – 30, 2005 (together with C. Zhou and M. Thiel).
- Tandem-Workshop *Advanced Methods of Electrophysiological Signal Analysis (Part A) and Symbol Grounding? Dynamical Systems Approaches to Language (Part B)* at the University of Potsdam, March 14 – 17, 2005 (together with C. Allefeld, D. Saddy, J. Kurths, A. D. Friederici und M. Schlesewsky).
- Workshop on *Analyzing and Modeling Event-related Brain Potentials – Cognitive and Neural Approaches*, hold at University of Potsdam, fall 2001 (together with D. Saddy, J. Kurths, A. D. Friederici and M. Schlesewsky).

9. Skills

Solid training in physics, and mathematics. Background in neurobiology, computational neuroscience, linguistics and cognitive psychology (especially computational linguistics). Computer: Windows, Unix, Linux; Programming languages: C/C++, Pascal, MATLAB, Mathematica; Website administration, LaTeX, MS-Office. Experience in ERP programming, measurement and data analysis (ERTS, EEProbe, ERSY, EEGLAB). Languages: German, English.

10. Memberships in Professional Associations

- Deutsche Physikalische Gesellschaft (German Physical Society)
- EuCOG II Network
- Cognitive Neuroscience Society

11. Local and International Cooperations

Harald Atmanspacher (Nonlinear Dynamics, Freiburg, Germany)
Reinhard Blutner (Computational Psycholinguistics, Amsterdam, The Netherlands)
Heiner Drenhaus (Psycholinguistics, Saarbrücken, Germany)
Stefan Frisch (Psycholinguistics, Frankfurt, Germany)
Karl Friston (Neuroscience, London, UK)
Sabrina Gerth (Computational Psycholinguistics, Potsdam, Germany)
Manfred Krifka (Linguistics, Berlin, Germany)
Jürgen Kurths (Nonlinear Dynamics, Berlin, Germany)
Klaus-Robert Müller (Neurotechnology, Berlin, Germany)
Slawomir Nasuto (Neuroscience, Reading, UK)
Leticia Pablos Robles (Psycholinguistics, Leiden, The Netherlands)
Roland Potthast (Mathematics, Reading, UK)
Serafim Rodrigues (Neuroscience, Plymouth, UK)
Bettina Stangneth (Philosophy, Hamburg, Germany)
James J. Wright (Neuroscience, Auckland, New Zealand)

12. Awards and Honors

DFG Heisenberg Fellowship for Cognitive Neurodynamics 2010.

Paper award: ‘beim Graben, P. & Potthast, R. (2009). Inverse problems in dynamic cognitive modeling. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 19, 015103’ selected for *Virtual Journal of Biological Physics Research*, 17(7), April 1, 2009 by the American Physical Society.

Hermann Lotze Price 2009.

Paper award: ‘beim Graben, P., Drenhaus, H., Brehm, E., Rhode, B., Saddy, D. & Frisch, S. (2007). Enhancing dominant modes in nonstationary time series by means of the symbolic resonance analysis. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 17, 043106’ selected for *Virtual Journal of Biological Physics Research*, 14(9), November 1, 2007 by the American Physical Society.

Paper award: 'beim Graben, P., Frisch, S., Fink, A., Saddy, D. & Kurths, J. (2005). Topographic voltage and coherence mapping of brain potentials by means of the symbolic resonance analysis. *Physical Review E*, 72, 051916' selected for *Virtual Journal of Biological Physics Research* 10(10), November 15, 2005 by the American Physical Society.

13. Publications

A. Papers in Referred Journals

Potthast, R. & beim Graben, P. (2009). Inverse problems in neural field theory. *SIAM Journal on Applied Dynamical Systems*, 8(4), 1405 – 1433.

Gerth S. & beim Graben P. (2009). Unifying syntactic theory and sentence processing difficulty through a connectionist minimalist parser. *Cognitive Neurodynamics*, 3(4), 297 – 316.

Potthast, R. & beim Graben, P. (2009). Dimensional reduction for the inverse problem of neural field theory. *Frontiers in Computational Neuroscience*, 3, 17. Invited paper.

Potthast, R. & beim Graben, P. (2009). Existence and properties of solutions for neural field equations. *Mathematical Methods in the Applied Sciences*, 33(8), 935 – 949.

beim Graben, P., Barrett, A. & Atmanspacher, H. (2009). Stability criteria for the contextual emergence of macrostates in neural networks. *Network: Computation in Neural Systems*, 20(3), 177 – 195.

beim Graben, P. & Potthast, R. (2009). Inverse problems in dynamic cognitive modeling. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 19, 015103. Invited focus article.

beim Graben, P., Gerth, S. & Vasishth, S. (2008). Towards dynamical system models of language-related brain potentials. *Cognitive Neurodynamics*, 2(3), 229 – 255.

beim Graben, P., Pinotsis, D., Saddy, D. & Potthast, R. (2008). Language processing with dynamic fields. *Cognitive Neurodynamics*, 2(2), 79 – 88.

beim Graben, P. & Kurths, J. (2008). Simulating global properties of electroencephalograms with minimal random neural networks. *Neurocomputing*, 71(4), 999 – 1007.

beim Graben, P., Drenhaus, H., Brehm, E., Rhode, B., Saddy, D. & Frisch, S. (2007). Enhancing dominant modes in nonstationary time series by means of the symbolic resonance analysis. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 17, 043106.

Atmanspacher, H. & beim Graben, P. (2007). Contextual emergence of mental states from neurodynamics. *Chaos and Complexity Letters*, 2(2/3), 151 – 168.

beim Graben, P. (2006). Pragmatic information in dynamic semantics. *Mind and Matter* 4(2), 169 – 193.

Drenhaus, H., beim Graben, P., Saddy, D. & Frisch, S. (2006). Diagnosis and repair of negative polarity constructions in the light of symbolic resonance analysis. *Brain and Language*, 96(3), 255 – 268.

beim Graben, P. & Atmanspacher, H. (2006). Complementarity in classical dynamical systems. *Foundations of Physics*, 36(2), 291 – 306.

beim Graben, P., Frisch, S., Fink, A., Saddy, D. & Kurths, J. (2005). Topographic voltage and coherence mapping of brain potentials by means of the symbolic resonance analysis. *Physical Review E*, 72, 051916.

Frisch, S. & beim Graben, P. (2005). Finding needles in haystacks: symbolic resonance analysis of event-related potentials unveils different processing demands. *Cognitive Brain Research* 24, 476 – 491.

beim Graben, P. (2004). Incompatible implementations of physical symbol systems. *Mind and Matter*, 2(2), 29 – 51.

beim Graben, P. & Frisch, S. (2004). Is it positive or negative? On determining ERP components. *IEEE Transactions on Biomedical Engineering*, 51(8), 1374 – 1382.

beim Graben, P., Jurish, B., Saddy, D. & Frisch, S. (2004). Language processing by dynamical systems. *International Journal of Bifurcation and Chaos*, 14(2), 599 – 621.

Frisch, S., beim Graben, P. & Schlesewsky, M. (2004). Parallelizing grammatical functions: P600 and P345 reflect different cost of reanalysis. *International Journal of Bifurcation and Chaos*, 14(2), 531 – 550.

beim Graben, P. & Kurths, J. (2003). Detecting subthreshold events in noisy data by symbolic dynamics. *Physical Review Letters*, 90(10), 100602.

beim Graben, P. (2001). Estimating and improving the signal-to-noise ratio of time series by symbolic dynamics. *Physical Review E*, 64, 051104.

beim Graben, P., Saddy, J. D., Schlesewsky, M. & J. Kurths (2000). Symbolic dynamics of event-related brain potentials. *Physical Review E*, 62(4), 5518 – 5541.

Troll, G. & beim Graben, P. (1998). Zipf's law is not a consequence of the central limit theorem. *Physical Review E*, 57(2), 1347 – 1355.

B. Books, Book Chapters, Manuscripts, Proceedings and Abstracts

beim Graben, P. & Potthast, R. (to appear). A dynamic field account to language-related brain potentials. Invited Paper in: M. Rabinovich, K. Friston, and P. Varona: *Principles of Brain Dynamics: Global State Interactions*, MIT Press: Cambridge (MA).

Atmanspacher, H., Filk, T. & beim Graben, P. (2011). Can classical epistemic states be entangled? In P. Bruza et al. (Eds.) *Quantum Interaction – QI 2011*, Springer: Berlin.

beim Graben, P. (2011). Naphtas Visionen. Perspektivität in der Naturwissenschaft. Invited Paper in M. Knaup, T. Müller & P. Spät (Eds.) *Post-Physikalismus*, pp. 122 – 141. Freiburg: Karl-Alber.

beim Graben, P. & Gerth, S. (2011). Geometric representations for minimalist grammars. arXiv.org/cs.cl/arXiv:1101.5076.

beim Graben, P. & Rodrigues, S. (2010). Coupling continuous neural networks to the electromagnetic field in nervous tissue. arXiv.org/cond-mat.dis-nn/arXiv:1006.5841.

Gerth, S. & beim Graben, P. (2009). Unifying syntactic theory and sentence processing difficulty through a connectionist minimalist parser. In A. Howes, D. Peebles, R. Cooper (Eds.), *Proceedings of the 9th International Conference on Computational Modeling – ICCM2009*, Manchester, UK.

Gerth, S., beim Graben, P. & Vasishth, S. (2009). Tensor product models for language-related brain potentials. *Journal of Cognitive Neuroscience*, Supplement, 121.

beim Graben, P., Drenhaus, H. & Frisch, S. (2009). Enhancing dominant modes in event-related brain potentials by means of the symbolic resonance analysis. *Journal of Cognitive Neuroscience*, Supplement, 203.

beim Graben, P. & Atmanspacher, H. (2009). Extending the philosophical significance of the idea of complementarity. In: H. Atmanspacher & H. Primas (Eds.), *Recasting Reality*, pp. 99 – 113. Berlin: Springer.

beim Graben, P. (2008). Quantum representation theory for nonlinear dynamical automata. In: R. Wang, F. Gu, & E. Shen (Eds.), *Advances in Cognitive Neurodynamics – Proceedings of the International Conference on Cognitive Neurodynamics, ICCN 2007*, pp. 469 – 473. Berlin: Springer.

beim Graben, P., Zhou, C., Thiel, M. & Kurths, J. (Eds.). (2008). *Lectures in Supercomputational Neuroscience: Dynamics in Complex Brain Networks*. Berlin: Springer.

beim Graben, P. (2008). Foundations of neurophysics. In: P. beim Graben, C. Zhou, M. Thiel, & J. Kurths (Eds.), *Lectures in Supercomputational Neuroscience: Dynamics in Complex Brain Networks*, pp. 3 – 46. Berlin: Springer.

beim Graben, P., Liebscher, T. & Kurths, J. (2008). Neural and cognitive modeling with networks of leaky integrator units. In: P. beim Graben, C. Zhou, M. Thiel, & J. Kurths (Eds.), *Lectures in Supercomputational Neuroscience: Dynamics in Complex Brain Networks*, pp. 195 – 223. Berlin: Springer.

beim Graben, P., Gerth, S., Saddy, D. & Potthast, R. (2007). Fock space representations in neural field theories. In: N. Biggs et al. (Eds.), *Proceedings of Waves 2007. The 8th International Conference on Mathematical and Numerical Aspects of Waves*, pp. 120 – 122, Dept. of Mathematics, University of Reading.

beim Graben, P. & Frisch, S. & Drenhaus, H. (2006). Evidence for nonlinear dynamics during sentence processing. *Journal of Cognitive Neuroscience*, Supplement, 128.

Drenhaus, H., beim Graben, P. & Frisch, S. (2006). Not all but some ERP results on the scalar expressions 'some' and 'all'. *Journal of Cognitive Neuroscience*, Supplement, 219.

Drenhaus, H., beim Graben, P., Saddy, D. & Frisch, S. (2005). On the processing of negative polarity constructions revealed by the symbolic resonance analysis. *Journal of Cognitive Neuroscience*, Supplement, 93.

beim Graben, P. (2005). Symbolic resonance analysis of event-related potentials distinguishes different physiological processes. *Journal of Cognitive Neuroscience*, Supplement, 31.

Saddy, D., beim Graben, P., Drenhaus, H. & Frisch, S. (2004). Distinguishing process from content in language processing: a new answer to an old question. In: Boccaletti, S., Gluckman, B., Kurths, J., Pecora, L. M., Meucci, R., & Yordanov, O. (Eds.), *Proc. 8th Experimental Chaos Conference (ECC)*, pp. 94 – 105. Melville (NY): American Institute of Physics.

beim Graben, P. & Frisch, S. (2004). Symbolic resonance analysis of event-related potentials unveils different cognitive processing demands. *Evoked Potentials International Conference XIV*, pp. 92 – 93. Leipzig: Leipziger Universitätsverlag.

beim Graben, P. & Frisch, S. (2003). Determining the polarity of ERP components by symbolic dynamics. *Journal of Cognitive Neuroscience*, Supplement, 184.

beim Graben, P., Saddy, J. D. & Frisch, S. (2002). Using stochastic resonance for analyzing event-related brain potentials. *Journal of Cognitive Neuroscience*, Supplement, 63.

Saddy, J. D. & beim Graben, P. (2002). Measuring the neural dynamics of language comprehension processes. In: Witruk, E., Friederici, A. D. and Lachmann, T. (Eds.), *Basic Functions of Language, Reading and Reading Disorder*, pp. 41 - 60. Boston: Kluwer Academic Press.

beim Graben, P. (2001). *Symbolische Dynamik ereigniskorrelierter Gehirnpotentiale in der Sprachverarbeitung*, PhD Dissertation, Aachen: Shaker-Verlag (in German).

Frisch, S., beim Graben, P., Schlesewsky, M. & Saddy, J. D. (2001). How to turn the subject preference into an object preference: A comparison of voltage event-related brain potentials and symbolic dynamics. *Journal of Cognitive Neuroscience*, Supplement, 166.

beim Graben, P., Liebscher, T. & Saddy, J. D. (2000). Parsing ambiguous context-free languages by dynamical systems: Disambiguation and phase transitions in neural networks with evidence from event-related brain potentials (ERP). In Jokinen, K., Heylen, D. and Nijholt, A. (Eds.), *Learning to behave*, Vol II: *Internalising Knowledge* of TWLT 18, p. 119 – 135, Enschede: University of Twente (Netherlands).

Saddy, J. D., beim Graben, P. & Schlesewsky, M. (1999). Measuring entropies during sentence processing. *Journal of Cognitive Neuroscience*, Supplement, 95.

beim Graben, P. (1995). *Lösbare Gittermodelle mit einer trunkierten Quantengruppe als Symmetrie*. unpublished Diploma Thesis, University of Hamburg (in German).

C. Poster Presentations and Conference Contributions

beim Graben, P. & Potthast, R. (2009). Dynamic cognitive modeling of syntactic language processing. Poster presented at the 15th *Annual Conference on Architectures and Mechanisms for Language Processing (AMLaP)*, September, 7 – 9, 2009, Barcelona.

Gerth S. & beim Graben P. (2009). Unifying syntactic theory and sentence processing difficulty through a connectionist minimalist parser. Poster presented at the 9th *International Conference on Cognitive Modeling (ICCM)*, July, 24 – 26, Manchester (UK).

Rodrigues, S., beim Graben, P., Lilith, M., Bedard, C. & Destexhe, A. (2009). Modelling the coupling of single neuron activity to local field potentials. Poster presented at the 18th *Annual Computational Neuroscience Meeting (CNS*2009)*, July, 18 – 23, Berlin.

Gerth, S. & beim Graben, P. (2009). Syntactic theory and sentence processing difficulty: A unification. Poster presented at the *CUNY Conference on Human Sentence Processing 2009*, March, 26 – 28, Davis (CA).

Drenhaus, H., beim Graben, P. & Frisch, S. (2009). When negation does make a difference: Processing German positive polarity items. Poster presented at the *CUNY Conference on Human Sentence Processing 2009*, March, 26 – 28, Davis (CA).

beim Graben, P., Drenhaus, H. & Frisch, S. (2009). Enhancing dominant modes in event-related brain potentials by means of the symbolic resonance analysis. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society, 2009*, March, 21 – 24, San Francisco (CA).

Gerth, S., beim Graben, P. & Vasishth, S. (2009). Tensor product models for language-related brain potentials. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society, 2009*, March, 21 – 24, San Francisco (CA).

beim Graben, P., Barrett, A. & Atmanspacher, H. (2008). Emergence of macrostates from partitions of neural state spaces. Poster presented at the *Mathematical Neuroscience Meeting of the Royal Society of Edinburgh*, March, 17 – 19, Edinburgh.

beim Graben, P., Gerth, S. & Vasishth, S. (2008). Modeling language-related brain potentials by dynamical recognizers. Poster presented at the *CUNY Conference on Human Sentence Processing 2008*, March, 13 – 15, Chapel Hill (NC).

Gerth, S., beim Graben, P. & Vasishth, S. (2008). Tensor product models for language-related brain potentials. Poster presented at the *CUNY Conference on Human Sentence Processing 2008*, March, 13 – 15, Chapel Hill (NC).

beim Graben, P. & Atmanspacher, H. (2006). Contextual emergence of mental states from neurodynamics. Poster presented at the 10th *Association for the Scientific Study of Consciousness Conference (ASSC)*, June, 24, Oxford (UK).

beim Graben, P. & Frisch, S. & Drenhaus, H. (2006). Evidence for nonlinear dynamics during sentence processing. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society*, San Francisco (CA).

beim Graben, P. & Kurths, J. (2006). Simulating global properties of electroencephalograms with minimal random neural networks. Poster presented at the *Japan-Germany Symposium on Computational Neuroscience*, RIKEN Brain Science Institute, February, 01 – 04, Saitama (Japan).

Drenhaus, H., beim Graben, P., Saddy, D. & Frisch, S. (2005). On the interaction between pragmatics and syntax: When a negative polarity item is not licensed. Poster presented at the *Conference on Experimental Pragmatics: Exploring the Cognitive Basis of Conversation* (alternate paper) at the University of Cambridge, April, 14 – 16, Cambridge (UK).

Drenhaus, H., beim Graben, P., Saddy, D. & Frisch, S. (2005). On the processing of negative polarity constructions revealed by the symbolic resonance analysis. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society*, New York.

beim Graben, P. (2005). Symbolic resonance analysis of event-related potentials distinguishes different physiological processes. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society*, New York.

Drenhaus, H., beim Graben, P., Saddy, D. & Frisch, S. (2005). On the processing of negative polarity constructions revealed by the symbolic resonance analysis. Poster presented at the *Tandem-Workshop “Advanced Methods of Electrophysiological Signal Analysis (Part A) and Symbol Grounding? Dynamical Systems Approaches to Language (Part B)”* at the University of Potsdam, March, 14 – 17.

beim Graben, P. & Frisch, S. (2004). Symbolic resonance analysis of event-related potentials unveils different cognitive processing demands. Poster presented at the *XIVth Evoked Potentials International Conference (EPIC)*, March 28 – 31, Leipzig.

beim Graben, P., Jurish, B., Saddy, J. D. & Frisch, S. (2003). Modeling language processing ERPs by dynamical systems. Poster presented at the *Monte Verita Herbstakademie*, October 18 – 20, Ascona (Switzerland).

beim Graben, P. & Frisch, S. (2003). Determining the polarity of ERP components by symbolic dynamics. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society*, New York.

beim Graben, P., Saddy, J. D. & Frisch, S. (2002). Using stochastic resonance for analyzing event-related brain potentials. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society*, San Francisco.

beim Graben, P., Saddy, J. D., Drenhaus, H., Frisch, S., Schlesewsky, M. & Brehm, E. (2001). Symbolic dynamics of neurophysiological data. Poster presented at the 6th *Experimental Chaos Conference (ECC)*, July, 22 – 26, Potsdam.

D. Invited Talks

beim Graben, P. (2011). The horse raced past: Gardenpath processing in dynamical systems. Talk presented at the *Ninth Tbilisi Symposium on Logic, Language, and Computation*. September 26 – 30, Kutaisi (Georgia).

beim Graben, P. (2011). Dynamic cognitive modeling of language-related brain potentials. Talk to be presented at the Max Planck Institute for Human Cognitive and Brain Sciences, July 20, Leipzig.

beim Graben, P. (2011). Dynamic cognitive modeling in computational neurolinguistics. Talk to be presented at the Department of Computer Science, University of Sheffield, May 24, London.

beim Graben, P. (2011). Dynamic cognitive modeling in computational neurolinguistics. Talk presented at the *Institute of Neurology*, University College London, May 16, London.

beim Graben, P. (2011). Dynamic cognitive modeling in psycholinguistics. Talk presented at the *Department of Cognitive Science*, Johns Hopkins University, May 04, Baltimore.

beim Graben, P. (2011). Dynamic cognitive modeling in psycholinguistics. Talk presented at the *Sección Biofísica Seminar*, Universidad de la República Uruguay. April 26, Montevideo.

beim Graben, P. (2011). Dynamical systems in psycholinguistics. Talk presented at the *International Symposium Living Nonlinear Dynamics*. University of California at San Diego, April 21, San Diego.

beim Graben, P. & Rodrigues, S. (2011). Microscopic coupling of neural activity to the electromagnetic field. Talk presented at the *Applied Nonlinear Mathematics Seminar*, University of Bristol, March, 18, Bristol (UK).

beim Graben, P. (2011). Coarse grainings in neuroscience. Talk presented at the Bernstein Center Freiburg, February 23, Freiburg.

beim Graben, P. (2010). Dynamic cognitive modeling of syntactic language processing. Talk presented at the *Faculty of Linguistics and Literary Studies*, University of Bielefeld, November 24, Bielefeld.

beim Graben, P. (2010). Epistemic quantization of classical dynamical and neural systems. Talk presented at the *Symposium on Generalized Quantum Theory*, July 4 – 7, Frankfurt/Oder.

beim Graben, P. (2010). Stable heteroclinic sequences as a paradigm for dynamic psycholinguistics. Talk presented at *The First Peripatetic Workshop in Dynamic Psycholinguistics*, May 28, Zakopane (Poland).

beim Graben, P. (2009). Contextual emergence in neurodynamics. *Whitehead Lecture in Cognition, Computation & Creativity* at Goldsmiths College, University of London, December 02, London.

beim Graben, P. (2009). Dynamic cognitive modeling of syntactic language processing. Talk presented at the *Center for Cognitive Science and Cognitive Systems*, University of Kent, December 01, Canterbury.

Gerth, S. & beim Graben, P. (2009). A unification of symbolic and connectionist computation – A minimalist connectionist parser. Talk presented at the *Zentrum für Allgemeine Sprachwissenschaft (ZAS)*, November 19, Berlin.

beim Graben, P. (2009). Contextual emergence in neurodynamical systems. Talk presented at the *Neurodynamics and Consciousness Laboratory*, University of Sussex, August 24, Brighton.

beim Graben, P. (2009). Dynamic cognitive modeling of syntactic language processing. Talk presented at the *Institute for Logic, Language and Computation*, University of Amsterdam, June 29, Amsterdam.

beim Graben, P., Gerth, S., Hale, J. T. & Vasishth, S. (2009). Harmonic minimalist grammars. Talk presented at the Psycholinguistics Colloquium, University of Potsdam, May 19, Potsdam.

beim Graben, P. (2009). Symbolic dynamics as a unifying framework for cognitive modeling and ERP analysis. Talk presented at the *Information and Cognition Research Group*, Middlesex University London, January 23, London.

beim Graben, P. (2008). Pragmatic information for cognitive agents. Talk presented at the Workshop *Coordination of Agents*, King's College London, November 4 – 5, London.

beim Graben, P. (2008). Dynamical system approaches to event-related brain potentials. Talk presented at the Colloquium of the Department for Cognitive Neurology, *Max Planck Institute for Human Cognitive and Brain Sciences*, September 16, Leipzig.

beim Graben, P. & Atmanspacher, H. (2008). Epistemic quantization of classical dynamical systems. Talk presented at the *Perspective in Physics and Philosophy Conference*, June 16 – 19, Paris.

beim Graben, P. (2008). Symbolic dynamics of event-related brain potentials. Talk presented at the EEG Workshop of the DFG Research Unit *Computational Modeling of Behavioral, Cognitive, and Neural Dynamics* at the University of Potsdam, April 06 – 08, Potsdam.

beim Graben, P. (2008). Der Parser hüpft im Carré: Ein nichtlineares dynamisches Sprachverarbeitungsmodell. Talk presented at the Faculty of Philology, Ruhr University Bochum, January 24, Bochum.

beim Graben, P., Gerth, S. & Vasishth, S. (2007). Fock space models of language-related brain potentials. Talk presented at the Institute of Linguistics, University of Potsdam, December 12, Potsdam.

beim Graben, P. (2007). Language processing with atom orbitals. Talk presented at the *Kolloquium des IGPP*, September 12, Freiburg / Breisgau.

beim Graben, P. (2007). Symbolic dynamics as a unifying framework for cognitive modeling and ERP analysis. Talk presented at the *Bernstein Center for Computational Neuroscience Berlin (BCCN)*, Technical University Berlin, August 29, Berlin.

beim Graben, P. (2007). Contextual emergence of conscious states from neurodynamics. Talk presented at the *Institute for Adaptive and Neural Computation*, University of Edinburgh, August 21, Edinburgh.

beim Graben, P. (2007). Symbolic dynamics of neurophysiological data. Talk presented at the *PASCAL Workshop on Methods of Data Analysis in Computational Neuroscience and Brain Computer Interfaces* June, 29, Berlin.

beim Graben, P. (2006). Pragmatic information in dynamic semantics. Talk presented at the *Zentrum für Allgemeine Sprachwissenschaft (ZAS)*, November 13, Berlin.

beim Graben, P. & Atmanspacher, H. (2006). Contextual emergence of mental states from neurodynamics. Talk presented at the *Workshop on Aspects of Mind-Matter Research*, July 03, Wildbad Kreuth.

beim Graben, P., Drenhaus, H., Saddy, D. & Frisch, S. (2006). When the average is not enough – On the processing of negative polarity items revealed by the Symbolic Resonance Analysis. Talk presented at the *Biopsychologisches Kolloquium der Humboldt-Universität Berlin*, February 01, Berlin.

beim Graben, P. & Atmanspacher, H. (2005). Contextual emergence of neural correlates of consciousness. Talk presented at the *IGPP Mini-Workshop on Neural Correlates of Consciousness*, October 11, Freiburg / Breisgau.

beim Graben, P. (2005). Modeling language processing ERPs by dynamical systems. Talk presented at the *IGERT Program in Cognitive Science of the Michigan State University*, May 30, East Lansing (USA).

beim Graben, P. (2005). Simulation of EEG properties with random networks of leaky integrator neurons. Talk presented at the “Minisymposium on Synchronisation in Complex Neural Systems” at the *SIAM Conference on Applications of Dynamical Systems*, May 24, Snowbird (USA).

beim Graben, P. & Frisch, S. (2004). Case-specific processing differences as revealed by symbolic resonance analysis of event-related brain potentials. Talk presented at the *Biopsychologisches Kolloquium der Universität Magdeburg*, November 19, Magdeburg.

beim Graben, P. (2004). Pragmatic information in dynamic semantics. Talk presented at the *IGPP-Seminar*, July 27, Freiburg / Breisgau.

beim Graben, P. (2004). Symbolic dynamics of neurophysiological data. Talk presented at the *Mathematisches Seminar der Universität Lübeck*, July 14, Lübeck.

beim Graben, P. & Frisch, S. (2004). Case-specific processing differences as revealed by symbolic resonance analysis of event-related brain potentials. Talk presented at the *Biopsychologisches Kolloquium der Humboldt-Universität Berlin*, June 03, Berlin.

beim Graben, P. & Jurish, B. (2004). Context-free parsing by dynamical systems. Talk presented at the *Workshop on Mathematical Methods in Computational Linguistics*, April 28, Potsdam.

beim Graben, P. & Atmanspacher, H. (2003). Complementarity in dynamical systems – some preliminary ideas. Talk presented at the *IGPP-Seminar*, October 29, Freiburg / Breisgau.

beim Graben, P. (2003). Random networks of leaky integrator units. Talk presented at the *IGGP*, October 24, Freiburg / Breisgau.

beim Graben, P. & Frisch, S. (2003). Detecting subthreshold events in brain potentials. Talk presented at the *Max Planck Institute for Cognitive Neuroscience*, July 28, Leipzig.

beim Graben, P., Frisch, S. & Jäger, G. (2003). Applications of symbolic dynamics to ERP and stochastic OT. Talk presented at the *Workshop on Logic, Neural Networks, and Optimality Theory*, July 24, Berlin.

beim Graben, P. (2003). Complementarity in symbolic dynamics. Talk presented at the *Workshop on Aspects of Mind-Matter Research*, June 26, Wildbad Kreuth.

beim Graben, P. (2003). Symbolic dynamics of neurophysiological data. Talk presented at the *Kolloquium des IGPP*, January 16, Freiburg / Breisgau.

beim Graben, P. (2002). Language processing by dynamical systems. Talk presented at the *Colloquium of the Institute for Mathematical Behavioral Science at the University of California at Irvine*, April 14, Irvine (USA).

beim Graben, P. (2002). Language processing by dynamical systems. Talk presented at the *Colloquium of the Center for Complex Systems and Brain Sciences at the Florida Atlantic University*, April 12, Boca Raton (USA).

beim Graben, P., Saddy, J. D., Meinke, A. & Jarick, S. (2001). Symbolic dynamics of neurophysiological data. Talk presented at the *Neurophysikalisches Kolloquium der FU-Berlin*, May 28, Berlin.

E. Contributed Talks

beim Graben, P. (2010). Stable heteroclinic sequences as a paradigm for dynamic psycholinguistics. Talk presented at the *Tandem Workshop on Optimality in Language and Geometric Approaches to Cognition, Zentrum für Allgemeine Sprachwissenschaft (ZAS)*, December 11 – 13, Berlin.

beim Graben, P., Rodrigues, S., Potthast, R., & Wright, J. J. (2010). Coupling fields together: Towards a grand unified neural field theory. Talk presented at the International Conference *Progress in Neural Field Theory*, September 16 – 18, 2010, Reading.

beim Graben, P. (2010). Contextual emergence of cognitive computation. Talk presented at the 11th *Szklarska Poreba Workshop*, March 12 – 15, Szrenica (Poland).

beim Graben, P. & Atmanspacher, H. (2009). Contextual emergence of mental states from their neural correlates. Talk presented at the *Joint Annual Meeting of the Society for Mathematical Psychology and the European Mathematical Psychology Group (MathPsych)*, August 1 – 4, Amsterdam.

beim Graben, P., Gerth, S., Hale, J. T. & Vasishth, S. (2009). Modeling processing gradience through harmonic minimalist grammars. Talk presented at the 10th *Szklarska Poreba Workshop*, March 12 – 16, Szrenica (Poland).

Gerth, S. & beim Graben, P. Tensor product models for language-related brain potentials. Talk presented at the *Workshop on Dynamical Systems in Language*, University of Reading, September 08 – 09, Reading (UK).

beim Graben, P. & Potthast, R. Language processing with dynamic fields. Talk presented at the *Workshop on Dynamical Systems in Language*, University of Reading, September 08 – 09, Reading (UK).

beim Graben, P. (2007). Quantum representation theory for nonlinear dynamical automata. Talk presented at the *1st International Conference on Cognitive Neurodynamics (ICCN)*, November 19, Shanghai (China).

beim Graben, P. & Atmanspacher, H. (2007). Contextual emergence of macroscopic states in neural networks. Talk presented at the *14th Fall Academy "Theory in Cognitive Neuroscience"*, November 7, Wildbad Kreuth (Germany).

beim Graben, P., Gerth, S., Saddy, D. & Potthast, R. (2007). Fock space representations in neural field theories. Talk presented at *Waves 2007. The 8th International Conference on Mathematical and Numerical Aspects of Waves*, July 24, University of Reading.

beim Graben, P. (2007). Quantum representation theory for nonlinear dynamical automata. Talk presented at the *8th Szklarska Poreba Workshop*, February 23 – 26, Szrenica (Poland).

Drenhaus, H., beim Graben, P., Saddy, D. & Frisch, S. (2006). Diagnosis and repair of negative polarity constructions. Talk presented at the *7th Szklarska Poreba Workshop*, March 03 – 07, Szrenica (Poland).

beim Graben, P. (2006). Pragmatic information in dynamic semantics. Talk presented at the *7th Szklarska Poreba Workshop*, March 03 – 07, Szrenica (Poland).

beim Graben, P., Drenhaus, H., Saddy, D. & Frisch, S. (2005). When the average is not enough – On the processing of negative polarity items revealed by the Symbolic Resonance Analysis. Talk presented at the *Workshop "Polarity Meets Psycholinguistics"* at the University of Potsdam, December 08 – 09, Potsdam.

beim Graben, P. (2005). Grounding symbols in dynamical systems. Talk presented at the *Tandem-Workshop "Advanced Methods of Electrophysiological Signal Analysis (Part A) and Symbol Grounding? Dynamical Systems Approaches to Language (Part B)"* at the University of Potsdam, March 14 – 17, Potsdam.

beim Graben, P. & Frisch, S. (2001). Modeling language processing ERP by dynamical systems. Talk presented at the *Workshop on Analyzing and Modeling Event-Related Brain Potentials. Cognitive and Neural Approaches*, November 30, Potsdam.

beim Graben, P., Liebscher, T. & Saddy, J. D. (2000). Parsing ambiguous context-free languages by dynamical systems: Disambiguation and phase transitions in neural networks with evidence from event-related brain potentials (ERP). Talk presented at the *18th CELE-Twente Workshop on Language Technology*, November 22 – 24, Ieper (Belgium).

F. Other Writings

beim Graben, P. & Wright, J. J. (2011). Editorial for theme issue “Brain Dynamics” of *Bulletin of Mathematical Biology*, 73(2), 261 – 265.

beim Graben, P. & Potthast, R. (2009). Editorial for theme issue “Language Dynamics” of *Cognitive Neurodynamics*, 3(4), 295 – 296.

beim Graben, P., Potthast, R. & Saddy, D. (2008). Editorial for theme issue “Brain Waves” of *Cognitive Neurodynamics*, 2(2).

Allefeld, C., beim Graben, P. & Kurths, J. (2007). Editorial for theme issue “Advanced Analysis of Electrophysiological Data and Symbol Grounding” of *Chaos and Complexity Letters*, 2(2/3), 135 – 138.

Frisch, S. & beim Graben, P. (2007). The electrophysiology of vegetable language: A case study. *Journal of Irreproducible Results*, 50, 25 – 27.

beim Graben, P. (2007). Lems Solaris im Lichte der Kybernetik. *SchriftZüge. Brandenburgische Blätter für Kunst und Literatur Nr. 10*, 9(1), 126 – 132.

beim Graben, P. & Atmanspacher, H. (2006). Editorial for theme issue “Pragmatic Information”. *Mind and Matter* 4(2), 131 – 139.

beim Graben, P. (2006). Maxwells Dämon. In Literaturkollegium Brandenburg e.V. (Ed.), *Die Erde dreht sich unter meinen Füßen. Märkischer Almanach Nr. 2*, pp. 49 – 58. Magdeburg: Docupoint Verlag.

beim Graben, P. (2006). Fabeln. In N. Gorbatyuk and W. Flegel (Eds.), *Konturen. Brandenburgisches Mosaik: Deutsche und russische Lyrik und Prosa*, pp. 221 – 228, Magdeburg: Docupoint Verlag.

beim Graben, P. (2005). Hoch am Ätherwind. *SchriftZüge. Brandenburgische Blätter für Kunst und Literatur Nr. 9*, 7(1), 60 – 66.

beim Graben, P. (2005). Das Band des Herrn Möbius. *SchriftZüge. Brandenburgische Blätter für Kunst und Literatur Nr. 9*, 7(1), 66 – 70.

beim Graben, P., Saddy, D. & Kurths, J. (2004). Editorial for theme issue “Cognition and Complex Brain Dynamics”. *International Journal of Bifurcation and Chaos*, 14(2), 355 – 662.

beim Graben, P. (2003). Der Frosch des Eratosthenes. In Literaturkollegium Brandenburg e.V. (Ed.), *Herr Anton. Märkischer Almanach Nr. 1*, pp. 52 – 57. Norderstedt: Book on Demand.

G. In Preparation

Potthast, R., beim Graben, P. & Wright, J. J. (subm.). Emergence of cortical maps through synaptic competition and cooperation dynamics. *Bulletin of Mathematical Biology*.

beim Graben, P., Drenhaus, H., Gerth, S. & Frisch, S. (in prep.). Grundzüge der computationellen Neurolinguistik. Invited Paper for *Zeitschrift für Germanistische Linguistik*.

beim Graben, P. & Rodrigues, S. (in prep.). An observation model for field potentials of networks of leaky integrate-and-fire neurons.