

Jan Drewes

CV

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EDUCATION

- PostDoc** **2013-**
with Prof. David Melcher
Centre for Mind/Brain Sciences (CIMEC), Trento University, Rovereto, Italy
- PostDoc** **2011-2013**
with Prof. James H. Elder
Centre for Vision Research (CVR) at York University, Toronto, Canada
- PostDoc** **2009-2011**
with Prof. Rufin VanRullen
Centre de Recherche Cerveau et Cognition (CerCo) of the CNRS Toulouse, France
- PostDoc** **2008-2009**
with Prof. Julia Trommershäuser and Prof. K. R. Gegenfurtner
Experimental Psychology, Giessen University, Germany
- PostDoc** **2006-2008**
with Prof. Guillaume. Masson
Institut de Neurosciences Cognitives de la Méditerranée (INCM) of the CNRS Marseille, France
- Ph.D., Natural Sciences (Computational Neuroscience)** **2006**
Dept. of Experimental Psychology, Giessen University, Germany
Area: classification of natural scenes, both algorithmic and in humans
Thesis: "Classification of Natural Scenes"
Advisors: Prof. K. R. Gegenfurtner and Prof. Simon J. Thorpe
- Diploma (M.S.), Computer Science** **2003**
University of Luebeck, Germany
Minor: medical applications of computer science
Thesis: "Predictions of Saccadic Eye Movements with Dynamic Scenes"
Advisors: Prof. T. Martinez and Dr. E. Barth

PROFESSIONAL ACTIVITY

Co-Organizer and member of the scientific committee of ECVF 2011

28. August – 1. September 2011, Toulouse, France

Workshop "Cue combination – Unifying perceptual theory"

12.-15. October 2008, Rauischholzhausen, Germany

Organized by Konrad P. Körding, Michael S. Landy and Julia Trommershäuser

Workshop "An interdisciplinary approach to Textures and Natural Images Processing"

8.-9. January 2007

Institut Henri Poincaré, Paris, France

International Workshop on Bioinspired Information Processing (BIP2005):

Cognitive modeling and gaze-based communication, Luebeck, Germany, 20.-22. September 2005

Hosted by [ModKog](#), a project funded by the German Federal Ministry of Education and Research

Visual Neuroscience 2004, 2006, 2008

"From Spikes to Awareness" Summer School, Rauischholzhausen, Germany

Organized by Prof. J. Braun, Prof. F. Bremmer and Prof. K. R. Gegenfurtner

Machine Learning Summer School (mlss03)

Tübingen, Germany, 4.-13. August, 2003

Organized by Dr. O. Bousquet, Prof. B. Schoelkopf and Dr. U. von Luxburg

Associations:

NeuroAct Graduate School (emeritus), The Vision Sciences Society, The Society for Neuroscience

Reviewed articles for Journal of Vision, Vision Research, Behavior Research Methods, FrontiersIn, IEE/IET Computer Vision, IEEE Canada, ECVF, ETRA, CVPR

SKILLS

Experimental psychology:

conceptualization, design, execution and statistical analysis of human perception experiments, in particular rapid serial visual classification, visual search; video display / analysis, motion stimuli, ocular following and eye tracking applications and methodology in general (optical/camera based, magnetic search coil, EOG), EEG recording and analysis, psychophysics

Computer Vision:

proficient in general image processing with an emphasis on computer vision; experienced in Fourier transforms, spectral analysis, PCA, ICA and applications of Support Vector Machines and other classifiers to image-based data

Programming languages:

fluent in Matlab, Pascal, C/C++; experienced in UNIX shell scripting (e. g. bash)

Operating systems:

fluent in UNIX (notably Linux), Windows and DOS; expert user and systems administrator including server/network administration

Hardware:

expert with current computer hardware and controlling software.

Other:

expert photographer

RESEARCH INTEREST

My main research interest is to understand human visual perception and the associated information processing mechanisms. Of particular interest to me is the relation between the statistics of natural scenes and the various optimizations of the human visual system, from the lowest level up to higher cognitive layers. These optimizations may play a crucial role in the general understanding of the inner workings of the visual system.

Better understanding of individual mechanisms in the visual system will lead to more insights on how both actively directed (top-down) and non-directed (bottom-up) visual perception combine to shape the world that we "see". I have been using eye movements as my main research tool, due to the very close relationship of eye movements and ongoing visual processing. Recently I have additionally utilized EEG to investigate the influence of ongoing oscillatory activity on saccadic responses. In the future, I seek to combine gaze position and other indicators of visual processing (e. g. electroencephalography) to investigate how the visual system integrates different kinds of information to create the impression of the world as we "see" it.

As a secondary line of research, I have made efforts to improve aspects of current eye tracking methodology, a first result of which has recently been published.

TEACHING EXPERIENCE

Psychophysics, Natural Scene Statistics, Computational Vision, Image Processing, Programming Languages (C/C++, Matlab)

Instruction of undergraduate and graduate (PhD-) students

PERSONAL INFORMATION

Citizenship

German

Languages

Native German speaker; English spoken, read and written on near-native level. French spoken and read on intermediate level. Certified in Latin.

PUBLICATIONS

Peer-Reviewed Articles:

Zhu, W., Drewes, J. & Gegenfurtner, K. R. (2013). Animal Detection in Natural Images: Effects of Color and Image Database. *PLoS ONE* 8, no. 10 (October 10, 2013): e75816. doi:10.1371/journal.pone.0075816.

Drewes, J., Masson, G. S., & Montagnini, A. (2012). Shifts in reported gaze position due to changes in pupil size: ground truth and compensation. *Proceedings of the Symposium on Eye Tracking Research and Applications, ETRA '12* (pp. 209–212). New York, NY, USA: ACM. doi:10.1145/2168556.2168596

Drewes, J., & VanRullen, R. (2011). This Is the Rhythm of Your Eyes: The Phase of Ongoing Electroencephalogram Oscillations Modulates Saccadic Reaction Time. *The Journal of Neuroscience*, 31(12), 4698–4708. doi:10.1523/JNEUROSCI.4795-10.2011

Drewes, J., Trommershäuser, J., Gegenfurtner, K. R. (2011). Parallel visual search and rapid animal detection in natural scenes. *Journal of Vision*, 11(2), 20. doi:10.1167/11.2.20

VanRullen R, Busch NA, Drewes J, Dubois J (2011). "Ongoing EEG phase as a trial-by-trial predictor of perceptual and attentional variability". *Frontiers in Perception Science*, 2:, 60. doi:10.3389/fpsyg.2011.00060

Wichmann FA, Drewes J, Rosas P, Gegenfurtner KR (2010). "Animal detection in natural scenes: critical features revisited", *Journal of Vision* 10(4):6.1-27, doi:10.1167/10.4.6

Erhardt Barth, Jan Drewes, and Thomas Martinetz. Individual predictions of eye-movements with dynamic scenes. In Bernice Rogowitz and Thrasyvoulos Pappas, editors, *Electronic Imaging 2003*, volume 5007, pages 252-259. SPIE, 2003.

Abstracts / Posters / Talks:

Drewes J, Melcher D (2014). Dissociating temporal and spatial integration windows: the case of Vernier Fusion. VSS Annual Meeting 2014.

Drewes J, Zhu W, Li Y, Hu Y, Yang F, Du X, Hu X, 2013, A binocular evaluation of pupil-size dependent deviation in measured gaze position. *Perception* 42 ECVF Abstract Supplement, page 42

Drewes J, Goren G, Elder J H, 2012, Psychophysical indications of recurrent processing in shape perception. *Perception* 41 ECVF Abstract Supplement, page 219

Drewes J, Goren G, Elder JH (2012). A temporal window of facilitation in the formation of shape percepts. *Journal of Vision*, 12(9): 314; doi: 10.1167/12.9.314

Drewes J, Montagnini A, Masson GS (2011). Effects of pupil size on recorded gaze position: a live comparison of two eyetracking systems. *Journal of Vision*, 11(11): 494; doi:10.1167/11.11.494

Drewes J, VanRullen R (2010). Ongoing EEG oscillations and saccadic latency. *Journal of Vision*, 10(7): 508, doi:10.1167/10.7.508

Drewes J, Trommershäuser J, Gegenfurtner KR (2009). The effect of context on rapid animal detection. *Journal of Vision*, 9(8): 1177, doi:10.1167/9.8.1177

Drewes J, Trommershäuser J and Gegenfurtner R K (2009). Context effects on visual search and rapid animal detection. *Frontiers in Systems Neuroscience. Conference Abstract: Computational and systems neuroscience*. doi: 10.3389/conf.neuro.06.2009.03.186

Drewes J, Hübner G, Wichmann FA, Gegenfurtner KR (2008). "How natural are natural images?" *Perception* 37 ECVF Abstract Supplement, page 160

Drewes J, Barthelemy F, Masson GS (2008). Human ocular following and natural scene statistics [Abstract]. *Journal of Vision*, 8(6):383, 383a, doi:10.1167/8.6.383. (talk)

"Optimal speed estimation for ocular following responses in humans is based on natural scene statistics", J. Drewes, F. Barthelemy, G. Masson, The Society for Neuroscience annual meeting 2007.

Drewes J, Barthelemy FV, Masson GS (2007). "Optimal speed estimations for ocular following responses in humans are based on natural-scene statistics" *Perception* 36 ECVF Abstract Supplement

Drewes J, Wichmann FA, Gegenfurtner KR (2006). Classification of natural scenes: Critical features revisited [Abstract]. *Journal of Vision*, 6(6), 561a, doi:10.1167/6.6.561 (VSS2006)

Classification of Natural Scenes: critical features revisited, Jan Drewes (Justus-Liebig-University Giessen, Giessen, Germany), Felix A. Wichmann (MPI for Biological Cybernetics, Tübingen, Germany), Karl R. Gegenfurtner (Justus-Liebig-University Giessen, Giessen, Germany), Proceedings of the 9th Tübinger Perception Conference, p. 92 (TWK 2006)

Drewes J, Wichmann F, & Gegenfurtner KR (2005). Classification of natural scenes using global image statistics [Abstract]. *Journal of Vision*, 5(8), 602a, doi:10.1167/5.8.602. (VSS 2005)

Variability of Eye Movements on High-Resolution Natural Videos, Michael Dorr (Universität zu Lübeck), Martin Böhme (Universität zu Lübeck), Jan Drewes (Justus-Liebig-Universität Gießen), Karl R. Gegenfurtner (Justus-Liebig-Universität Gießen) & Erhardt Barth (Universität zu Lübeck), Proceedings of the 8th Tübinger Perception Conference, p. 162 (TWK 2005)

Classification of Natural Scenes using Global Image Statistics, Jan Drewes (Justus-Liebig-University Giessen, Giessen, Germany), Felix A. Wichmann (MPI for Biological Cybernetics, Tübingen, Germany), Karl R. Gegenfurtner (Justus-Liebig-University Giessen, Giessen, Germany), Proceedings of the 8th Tübinger Perception Conference, p. 88 (TWK 2005)

Barth E, Drewes J, Martinetz T, (2003), "Predictions of eye movements based on tracked previous locations and salience measures" *Perception* 32 ECVF Abstract Supplement

E Barth, J Drewes, and T Martinetz. Dynamic predictions of tracked gaze. In Seventh International Symposium on Signal Processing and its Applications, Paris, 2003. Special Session on Foveated Vision in Image and Video Processing.