

Jan Drewes

CV

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Education

- PostDoc** 2017-
with Prof. Einhäuser-Treyer
Institute of Physics, Technical University of Chemnitz, Germany
- PostDoc** 2013-2017
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., Computational Neuroscience (Dr. rer. nat.)** 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. Martinetz and Dr. E. Barth

Professional Activity

- Organized symposium "Measuring and Interpreting Oscillations in Perception and Behavior", VSS 2015
15. May, 2015, St. Pete Beach, FL, USA.
- Co-Organizer and member of the scientific committee of ECVP 2011
28. August – 1. September 2011, Toulouse, France
- Workshop "Cue combination – Unifying perceptual theory"
12.-15. October 2008, Rauschholzhausen, Germany
- 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, Lübeck, Germany, 20.-22. September 2005
- Visual Neuroscience 2004, 2006, 2008
"From Spikes to Awareness" Summer School, Rauschholzhausen, Germany
- Machine Learning Summer School (mlss03)
Tübingen, Germany, 4.-13. August, 2003

Skills

Experimental psychology:

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

Computer Vision:

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

Programming languages:

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

Operating systems:

fluent in Linux, OSX, Windows and DOS

Hardware:

expert with current computer hardware and controlling software.

Other:

expert photographer
15+ years experience in systems and network administration

Research Interests

- Human visual perception and the associated information processing mechanisms
- How does our brain construct the world that we perceive?
- Secondary interest in eye tracking methodology

Current focus

- temporal structure: relations between basic visual input and the resulting perceptual sensations
- Is visual perception continuous, or is it made of snapshots, known as perceptual moments?
- Under what circumstances does visual perception show the signs of rhythmic processing?

Methodology

- Psychophysics
- Eye tracking
- EEG/MEG
- CFS (binocular rivalry)

Teaching Experience

Cognitive Psychology, Psychophysics, Visual Processing, Signal Detection Theory, Scientific Methods, Natural Scene Statistics, Computational Vision, Image Processing, Matlab

Instruction of undergraduate and graduate (PhD-) students, research assistants

Reviewer Activity

Reviewed articles for Nature Communications, Scientific Reports, Journal of Vision, Visual Cognition, Vision Research, Behavior Research Methods, FrontiersIn, Transactions on Applied Perception, Perception, International Journal of Human-Computer Studies, IEE/IET Computer Vision, IEEE Canada, ECVP, ETRA, CVPR

Associations

The COGAIN Association, The Vision Sciences Society, The Society for Neuroscience, NeuroAct Graduate School

Personal Information

German citizen
Born 29th August 1975 in Mainz, Germany. Married, father of one daughter.
Native German speaker; English spoken, read and written on near-native level. French spoken and read on intermediate level. Certified in Latin.

Grants and Funding

Principal Investigator on “Recruitment Program of High-Level Foreign Experts” by the State Administration of Foreign Experts Affairs, People's Republic of China, 2015-2017 (3-year program, GDT20155300084, 170,000 CNY/year). Collaborators: David Melcher (PI), Weina Zhu (host)

2nd Investigator on National Science Foundation of China (NSFC) 2015 grant “Unconscious object processing in natural scenes” (61563056, 450,000CNY). PI: Weina Zhu.

2nd Investigator on Yunnan Education Department Key Project 2015 “Perception of the self-face in conscious and unconscious conditions” (2015Z010, 40,000CNY). PI: Weina Zhu.

Publications

Peer-Reviewed Articles:

Drewes J, Zhu W, & Melcher D (2017). The edge of awareness: mask spatial density, but not color, determines optimal temporal frequency for continuous flash suppression. *Journal of Vision*, 18(1), 12–12. <https://doi.org/10.1167/18.1.12>

Zhu W, **Drewes J (co-first author)**, Peatfield N, & Melcher D (2016). Differential visual processing of animal images, with and without conscious awareness. *Frontiers in Human Neuroscience* 10 (2016): 513. doi:10.3389/fnhum.2016.00513

Wutz A, **Drewes J**, & Melcher D (2016). Non-retinotopic perception of orientation: temporal integration of basic features operates in object-based coordinates. *Journal of Vision* 16, no. 10 (August 1, 2016): 3. doi:10.1167/16.10.3

Zhu W, **Drewes J (co-first author)**, & Melcher D (2016). Time for awareness: mask temporal frequency determines continuous flash suppression effectiveness. *PLOS ONE* 11(7), e0159206. doi:10.1371/journal.pone.0159206

Drewes J, Goren G, Zhu W, & Elder J (2016). Recurrent processing in the formation of shape percepts. *The Journal of Neuroscience* 36, no. 1 (January 6, 2016): 185–92. doi:10.1523/JNEUROSCI.2347-15.2016

Drewes J, Zhu W, Wutz A, & Melcher D (2015). Dense sampling reveals behavioral oscillations in rapid visual categorization. *Nature: Scientific Reports*, 5, 16290; doi: 10.1038/srep16290

Drewes J, Zhu W, Hu Y, & Hu X (2014). Smaller Is Better: Drift in Gaze Measurements due to Pupil Dynamics. *PLOS ONE* 9(10), e111197. doi:10.1371/journal.pone.0111197

Drewes J, Zhu W, & Melcher D (2014). Dissociation between spatial and temporal integration mechanisms in Vernier fusion. *Vision Research*, 105, 21–28. doi:10.1016/j.visres.2014.08.017

Zhu W, & **Drewes J** (2013). Emotion-Based Music Classification. *Information Technology Journal*, 12: 4472-4475.

Zhu W, **Drewes J**, & Gegenfurtner KR (2013). Animal Detection in Natural Images: Effects of Color and Image Database. *PLoS ONE*, 8(10), e75816. doi:10.1371/journal.pone.0075816

Drewes J, Masson GS, & 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, KR (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

Barth E, **Drewes J**, and Martinez T (2003). 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.

Current first-author manuscripts:

“Temporal sampling and resting state activity: an MEG study of the visual processing” (submitted), Jan Drewes & David Melcher

+2 further manuscripts in preparation

Conference Abstracts / Posters / Talks:

Drewes J, Zhu W, & Melcher D (2017). Mask spatial density determines optimal masking frequency. *European Conference on Visual Perception (ECPV 2017, ref to be assigned)*, Berlin.

Zhu W, & **Drewes J** (2017). Does our brain need awareness to “recognize” familiar faces? *European Conference on Visual Perception (ECPV 2017, ref to be assigned)*, Berlin.

Drewes J, Zhu W, & Melcher D (2017). Unmasking the temporal mechanisms of awareness using Continuous Flash Suppression. *Association for the Scientific Study of Consciousness annual meeting (ASSC 2017)*, Beijing.

Zhu W, **Drewes J**, & Ma Y (2017). Does face familiarity depend on consciousness? *Association for the Scientific Study of Consciousness annual meeting (ASSC 2017)*, Beijing.

Drewes J, Zhu W, Muschter E, & Melcher D (2017). Long vs. short integrators: resting state alpha frequency predicts individual differences in temporal integration. *Journal of Vision*, 17(10):725-725. doi: 10.1167/17.10.725

Zhu W, **Drewes J**, & Melcher D (2017). Mechanisms of suppression: How the classic Mondrian beats noise in CFS masking. *Journal of Vision*, 17(10):141-141. doi: 10.1167/17.10.141

Drewes J, Zhu W, Muschter E, & Melcher D (2016). Individual temporal integration window durations correlate with resting state alpha. *European Conference on Visual Perception (ECPV 2016, ref. to be assigned)*, Barcelona, Spain.

Zhu W, **Drewes J**, & Melcher D (2016). The interaction between temporal properties and spatial density of the mask on continuous flash suppression effectiveness. *European Conference on Visual Perception (ECPV 2016, ref. to be assigned)*, Barcelona, Spain.

Drewes J, Muschter E, Zhu W, & Melcher D (2016). Resting state characteristics predict visual processing speed. *Rovereto Workshop on Concepts, Actions and Objects (CAOs 2016)*, Rovereto, Italy

Drewes J, Zhu W, Wutz A, & Melcher D (2015). Dense sampling reveals behavioral oscillations in rapid visual categorization. *Rovereto Attention Workshop (RAW 2015)*, Rovereto, Italy.

Drewes J, Muschter E, Zhu W, & Melcher D (2015). Detection of brief visual events: an MEG study. *European Conference on Visual Perception (ECPV 2015)*, Liverpool, UK, doi: 10.1177/0301006615598674

Zhu W, **Drewes J**, & Melcher D (2015). Time for awareness: mask temporal frequency determines continuous flash suppression effectiveness. *European Conference on Visual Perception (ECPV 2015)*, Liverpool, UK, doi: 10.1177/0301006615598674

Drewes J, Zhu W, Melcher D (2015). Oscillations in behavioral performance for rapidly presented natural scenes. *Journal of Vision*, 2015 Sep 1;15(12):1402. doi: 10.1167/15.12.1402

Zhu W, **Drewes J**, and Melcher D (2015). Continuous Flash Suppression Depends on Mask Temporal Frequency. *Journal of Vision*, 2015 Sep 1;15(12):812. doi: 10.1167/15.12.812.

Drewes J, Zhu W, Melcher D (2014). Temporal integration in rapidly presented natural scenes. *Perception* 43 ECPV Abstract Supplement, page 81

Drewes J and Melcher D (2014). Temporal and Spatial integration windows: the case of Vernier Fusion. *56th Conference of Experimental Psychologists (TeaP)*, Giessen, Germany

Zhu W, **Drewes J**, Li Yue, Du Xiaoxuan and Yang F (2014). The time course of the covert processing of facial identity and expression: effects on attention. *56th Conference of Experimental Psychologists (TeaP)*, Giessen, Germany

Melcher D, Wutz A, **Drewes J**, & Fairhall S (2014). The Role of Temporal Integration Windows in Visual Perception. *Procedia - Social and Behavioral Sciences*, 126, 92–93. doi:10.1016/j.sbspro.2014.02.323

Drewes J & Melcher D (2014). Dissociating temporal and spatial integration windows: the case of Vernier Fusion. *Journal of Vision*, 14(10), 1143–1143. doi:10.1167/14.10.1143

- Drewes J**, Alley L, & Melcher D (2014). Psychophysical evidence of recurrent processing in object discrimination. *Rovereto Workshop on Concepts, Actions and Objects (CAOs 2014)*, Rovereto, Italy
- 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**, & Melcher D (2013). Vernier Fusion as a means to investigate temporal and spatial integration windows. *Rovereto Attention Workshop (RAW 2013)*, Rovereto, Italy.
- Drewes J**, Goren G, Elder JH (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**, Trommershaeuser 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)
- Drewes J**, Barthelemy F, Masson GS (2007). Optimal speed estimation for ocular following responses in humans is based on natural scene statistics. *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
- Drewes J**, Wichmann FA, Gegenfurtner KR (2006). Classification of Natural Scenes: critical features revisited. *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.
- Dorr M, Böhme M, **Drewes J**, Gegenfurtner KR & Barth E (2005). Variability of Eye Movements on High-Resolution Natural Videos. *Proceedings of the 8th Tübinger Perception Conference*, p. 162 (TWK 2005)
- Drewes J**, Wichmann FA, Gegenfurtner KR (2005) Classification of Natural Scenes using Global Image Statistics. *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
- Barth E, **Drewes J**, and Martinetz T (2003). 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.