

# DAVID PAUL MELCHER

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Melcher Active Perception Group: <http://r.unitn.it/en/cimec/map>

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## ACADEMIC QUALIFICATIONS

2001            PhD in Psychology, Rutgers University (New Jersey, USA)  
1998            MSc in Psychology, Rutgers University  
1994            BA (Magna Cum Laude), Transylvania University (Kentucky, USA)

## EXPERIENCE

12/2006-        Associate Professor, Faculty of Cognitive Sciences,  
present        University of Trento  
                  -Head of the *Doctoral School in Cognitive and Brain Sciences*  
                  (2010 – 2013)  
                  -Coordinator, *Masters in Cognitive Science* (2009 - 2014)

08/2016-        Visiting researcher, University of South Florida and UMass-Boston  
05/2017

06/2015-        Visiting researcher, Harvard and NYU Medical Schools  
09/2015

07/2013-        Visiting professor, Harvard Summer School  
07/2014        -Course on “Art, Mind and Brain” (Summer 2013 and 2014)

2011-            Visiting professor, Bocconi University (Milan, Italy)  
2012            -Course on “Neuroscience of everyday life”

2010-            Visiting professor, San Raffaele University (Milan, Italy)  
2012            -Courses on “Cognition” and “Neuroscience of vision”

09/2003-        Principal Lecturer, Oxford Brookes University  
12/2006        -Leader of the Masters in Cognitive Neuropsychology (2004-2006)  
                  -Quality Assessment Officer (2003-2006)

03/2006-        Visiting Fellow, College de France  
07/2006

02/2005-        Research Fellow, Oxford University  
09/2006

06/2001- Research Fellow, San Raffaele University (Milan, Italy)  
08/2003

## **AWARDS AND HONORS**

### **High-level Foreign Expert Grant, Chinese Ministry of Foreign Expert Affairs**

Title: Neural mechanisms of temporal integration of sensory information  
- Project leader

### **Autonomous Province of Trento “Grandi Progetti” Grant (2013-2017)**

Title: Characterizing and improving brain mechanisms of attention (circa 2 million euros)  
-Principal Investigator of the Project

### **European Research Council Starting Grant (2013-2018)**

Title: Construction of perceptual space-time (1 million euros)

### **American Psychological Association (2011)**

Distinguished Scientific Award for Early Career Contribution to Psychology  
<http://www.ncbi.nlm.nih.gov/pubmed/22082390>

### **India-Trento Advanced Research Programme (2008- present)**

Title: Behavioral and neural correlates of brain plasticity  
-Leader of cognitive neuroscience initiative, with joint funding for approximately 300,000 euros from Italian and Indian research ministries

### **PRIN 2009, Ministero dell’Università e della Ricerca (2011-2013)**

Title: Perceiving spatiotemporal events across saccades  
-Unit coordinator

### **CARITRO Foundation (2011-2012)**

Title: Capolavori della mente”, in collaboration with the MART museum  
-Research coordinator

### **Erasmus Mundus Programme**

-*Project IDEALAB*- International Doctorate for Experimental Approaches to Language and Brain (co-applicant) <http://em-idealab.com/index.html>  
-*Project AREAS* – Academic Relations between Europe and Asia (local coordinator) <http://www.areas.polito.it/>

### **PRIN 2007, Ministero dell’Università e della Ricerca (2008-2010)**

Title: Cambiamenti predittivi delle caratteristiche percepite degli stimoli visivi prima delle saccadi

### **British Academy (2005-2008)**

Title: Mechanisms and locus of implicit attentional selection

**The Wellcome Trust (2007)**

Title: Art and the Senses project, awarded to F. Bacci, D. Melcher and D. Mike

**RNID (2004-2006)**

Title: Using deaf children's visual skills to promote mathematics learning: An early intervention project, awarded to T. Nunes, P. Bryant & D. Melcher

**Royal Society (2004-2005)**

Title: Behavioural effects of suppressed and unattended information

**British Academy (2004-2005)**

Title: The duration of visual attributes of natural scenes

**National Institutes of Health**

F32 Research Fellowship (2003)

NRSA Fellowship (1999-2001)

**National Merit Scholar (1990)****SERVICE (Selected)**

Editorial Board, *Journal of Vision* (2013 – present)

Editorial Board, *Perception* and *i-Perception* (2016 – present)

Head of the *Doctoral School in Cognitive and Brain Sciences* (2010 – 2013)

Coordinator, *Masters in Cognitive Science* Program (2009 - 2014)

Coordinator of the Cognitive Neuroscience program in the India-Trento Program for Advanced Research (ITPAR) (2010 – 2016)

Delegate for the University of Trento committees on Internationalization (2014), Equality and Diversity (2015-present), manager of University outreach for North America (2015) and coordinator of Erasmus Mundus project "AREAS" (2011-2014)

Guest editor, special issue on "Visual stability" for the journal *Philosophical Transactions of the Royal Society B: Biological Sciences* (2011)

External expert member on assistant professor position hiring committee for San Raffaele University (2016)

Dissertation examination committee member for San Raffaele University (2010) and Umea University (2007)

Co-organizer of the *Rovereto Attention Workshops*, October 2009, 2011, 2013, 2015.

Co-organizer of the Renaissance Vision workshop (ECVP, Arezzo, Italy, 2007).

Co-organizer of the symposium “Making Sense of Art, Making Art of Sense”, Oxford University, 27-29 October, 2006.

Member of the scientific committee of the European Conference on Visual Perception (2004, 2005, 2007, 2012, 2014, 2015, 2016).

Member of the Program Committee, 6<sup>th</sup> International workshop on Attention in Cognitive Systems (ISACS 2013), in conjunction with IJCAI 2013.

Member of the Program Committee for CEA 2013 (International Conference on Cognition, Emotion and Action), IIT Gandhinagar, India.

Grant reviewer for the European Research Council (2015), Research Foundation Flanders (2014, 2015), MIUR (2012-2014), Agence Nationale de la Recherche (2012), Trieste University (2012), Israel Science Foundation (2011), National Science Foundation NSF (2008, 2009), BBSRC (2009, 2010), Netherlands Organization for Scientific Research (2009), Royal Society of New Zealand (2005, 2006), RNID (2004) and the National Institute of Mental Health (2002).

Ad-hoc reviewer of articles for: *Cerebral Cortex*, *Cognition*, *Cortex*, *Current Biology*, *Experimental Brain Research*, *Frontiers in Psychology*, *J. Experimental Psychology: Human Perception and Performance*, *J. Experimental Psychology: Learning, Memory & Perception*, *J. Neuroscience*, *J. Vision*, *Memory and Cognition*, *Perception*, *Perception & Psychophysics*, *PloS One*, *PNAS*, *Psychological Science*, *Psychonomic Bulletin & Review*, *Spatial Vision*, *Vision Research*, *Visual Cognition*.

## PUBLICATIONS

### International peer-reviewed journal articles

Wutz A, Muschter E, van Koningsbruggen MG, Weisz N & **Melcher D** (2016) Temporal integration windows in neural processing and perception aligned to saccadic eye movements. *Current Biology*, in press.

Buonocore A, McIntosh RD & **Melcher D** (2015) Beyond the point of no return: effects of visual distractors on saccade amplitude and velocity. *Journal of Neurophysiology* Dec 2:jn.00939.2015. doi: 10.1152/jn.00939.2015.

Buonocore A & **Melcher D** (2015) Interference during eye movement preparation shifts the timing of peri-saccadic compression. *Journal of Vision*, 15(15):3.

Buonocore A & **Melcher D** (2015). Disrupting saccadic updating: visual interference prior to the first saccade elicits spatial errors in the secondary saccade in a double-step task. *Experimental Brain Research*, 233(6):1893-1905.

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

Fracasso A, Kaunitz L & **Melcher D** (2015). Saccade kinematics modulate perisaccadic perception. *Journal of Vision*, 15(3). pii: 4.

Hartzell JF, Davis B, **Melcher D** et al. (2015). Brains of verbal memory specialists show anatomical differences in language, memory and visual systems. *Neuroimage*, Jul 15. pii: S1053-8119(15)00638-2 [Epub ahead of print]

**Melcher D** & Morrone MC (2015). Non-retinotopic visual processing in the brain. *Visual Neuroscience*, 32, E017.

Wutz A, Shukla A, Bapi RS & **Melcher, D.** (2015) Expansion and Compression of Time Correlate with Information Processing in an Enumeration Task. *PLoS One*, 10(8):e0135794.

Van Paaschen J, Bacci F & **Melcher, D** (2015). The Influence of Art Expertise and Training on Emotion and Preference Ratings for Representational and Abstract Artworks. *PLoS One*, 10(8): e0134241.

Cavicchio F, **Melcher D** & Poesio M (2014). The effect of linguistic and visual salience in visual world studies. *Frontiers in Psychology*, 5:176.

Corbett, JE & **Melcher D** (2014). Stable statistical representations facilitate visual search. *Journal of Experimental Psychology: Human Perception Performance*, 40(5), 1915-25.

Corbett, JE & **Melcher D.** (2014). Characterizing ensemble statistics: Mean size is represented across multiple frames of reference. *Attention, Perception, & Psychophysics*, 76(3), 746-58.

Drewes J, Zhu W & **Melcher D** (2014) Dissociation Between Spatial and Temporal Integration Mechanisms in Vernier Fusion. *Vision Research*, 105, 21-28.

Fairhall SL, Albi A & **Melcher D** (2014). Temporal Integration Windows for Naturalistic Visual Sequences. *PLOS One*. 9(7):e102248.

Kaunitz L., Fracasso A., Skujevskis M. & **Melcher D.** (2014). Waves of visibility: probing the depth of inter-ocular suppression with transient and sustained targets. *Frontiers in Psychology*, 5:804.

Knops A, Piazza M, Sengupta R, Eger E & **Melcher D** (2014). A shared, flexible neural map architecture reflects capacity limits in both visual short term memory and enumeration. *Journal of Neuroscience*, 34(30), 9857-9866.

Lanzoni L, **Melcher D**, Miceli G, Corbett JE (2014). Global statistical regularities modulate the speed of visual search in patients with focal attentional deficits. *Frontiers in Psychology*, 5:514.

Sengupta R, Surampudi BR, & **Melcher D** (2014). A visual sense of number emerges from the dynamics of a recurrent on-center off-surround neural network. *Brain Research*, 1582:114-24.

Subramanian R., Shankar D., Sebe N. & **Melcher D.** (2014) Emotion modulates eye movement patterns and subsequent memory for the gist and details of movie scenes. *Journal of Vision*, 14(3):31.

Wutz A., Weisz N., Braun C. & **Melcher D.** (2014). Temporal windows in visual processing: 'Pre-stimulus brain state' and 'post-stimulus phase reset' segregate visual transients on different temporal scales. *Journal of Neuroscience*, 34(4), 1554-65.

Wutz A., & **Melcher D.** (2014). The temporal window of individuation limits visual capacity. *Frontiers in Psychology: Perception Science*, 5:952.

Fracasso, A., Targher, S., Zampini, M. & **Melcher D.** (2013) Fooling the eyes: the influence of a sound-induced visual motion illusion on eye movements. *PLoS One*. 26;8(4):e62131.

Kaunitz, L., Fracasso, A., Lingnau, A. & **Melcher D.** (2013) Non-conscious processing of motion coherence can boost conscious access. *PLoS One*. 8(4):e60787.

- Melcher, D.** & Bacci F. (2013) Perception of emotion in abstract artworks: a multidisciplinary approach. *Progress in Brain Research*, 204:191-216.
- Wutz, A. & **Melcher, D.** (2013) Temporal buffering and visual capacity: the time course of object formation underlies capacity limits in visual cognition. *Attention, Perception & Psychophysics*, 75(5): 921-933.
- Dempere-Marco, L., **Melcher, D.** & Deco, G. (2012) Effective visual working memory capacity : an emergent effect from the neural dynamics in an attractor network. *PLoS One*, 7(8) :e42719
- Melcher, D.** & Fracasso, A. (2012) Remapping of the line motion illusion across eye movements. *Experimental Brain Research*, 218(4) : 503-14.
- Wutz, A., Caramazza, A. & **Melcher, D.** (2012) Rapid enumeration within a fraction of a single glance : the role of visible persistence in object individuation capacity. *Visual Cognition*, 20(6) : 717-32.
- Kaunitz, L.N., Fracasso, A. & **Melcher, D.** (2011) Unseen complex motion is modulated by attention and generates a visual aftereffect. *Journal of Vision*, 11(13), 10.
- Kaunitz LN, Kamienkowski JE, Olivetti E, Murphy B, Avesani P & **Melcher D.** (2011) Intercepting the first pass: rapid categorization is suppressed for unseen stimuli. *Frontiers in Psychology*, 2:198.
- Melcher, D.** (2011) Visual stability. *Philosophical Transactions of the Royal Society B.*, 366, 468-475.
- Melcher, D.** & Murphy, B. (2011) The role of semantic interference in limiting memory for the details of visual scenes. *Frontiers in Psychology*. DOI :10.3389/fpsyg.2011.00262.
- Melcher, D.** & Piazza, M. (2011) The role of attentional priority and saliency in determining capacity limits in enumeration and visual working memory. *PLoS One*, 6(12) : e29296
- Piazza M, Fumarola A, Chinello A, **Melcher D.** (2011) Subitizing reflects visuo-spatial object individuation capacity. *Cognition*, 121(1):147-53.
- De Pisapia, N., Kaunitz, L. & **Melcher, D.** (2010) Backward masking and unmasking across saccadic eye movements. *Current Biology*, 20, 613-7.
- Fracasso, A., Caramazza, A. & **Melcher, D.** (2010) Continuous perception of motion and shape across saccadic eye movements. *Journal of Vision*, 10(13):14.
- Melcher, D.** (2010) Accumulating and remembering the details of neutral and emotional scenes. *Perception*, 39(8), 1011-1025.

- Melcher, D.** (2010) The missing link for attentional pointers: comment on Cavanagh et al. *Trends in Cognitive Sciences*, 14(11), 473.
- Melcher, D.** (2009) Selective attention and the active remapping of object features in trans-saccadic perception. *Vision Research*, 49, 1249-55.
- Melcher, D. & Colby, C.L.** (2008) Trans-saccadic perception. *Trends in Cognitive Sciences*, 12, 466-73.
- Melcher, D.** (2008) Dynamic object-based remapping of visual features in trans-saccadic perception. *Journal of Vision* (special issue on Visual Stability), 8, 1-17.
- Melcher, D. & Bacci, F.** (2008) The visual system as a constraint on the survival and success of specific artworks. *Spatial Vision*, 21, 347-62.
- Alais, D. & **Melcher, D.** (2007) Strength and coherence of binocular rivalry depends on shared stimulus complexity. *Vision Research*, 47, 269-79.
- Tatler, B. & **Melcher, D.** (2007) Pictures in mind: Initial encoding of object properties varies with the realism of the scene stimulus. *Perception*, 36, 1715-29.
- Melcher, D.** (2007) Predictive re-mapping of visual features precedes saccadic eye movements. *Nature Neuroscience*, 10, 903-7.
- Melcher, D.** (2006) Accumulation and persistence of memory for natural scenes, *Journal of Vision*, 6, 8-17.
- Melcher, D. & Vidnyanszky, Z.** (2006) Subthreshold features of visual objects: Unseen but not unbound, *Vision Research*, 46, 1863-1867.
- Melcher, D. & Wade, N.** (2006) Cave art interpretation II. *Perception*, 35, 719-22.
- Wade, N. & **Melcher, D.** (2006) Cave art interpretation I. *Perception*, 35, 577-80.
- Melcher, D.** (2005) Spatiotopic transfer of visual form adaptation across saccadic eye movements. *Current Biology*, 15, 1745-1748.
- Melcher, D.** (2005) When the brain doesn't see eye to eye. *Trends in Cognitive Science*, 9, 216-217.
- Melcher, D., Papathomas, T.V. & Vidnyanszky, Z.** (2005) Implicit attentional selection of bound visual features. *Neuron*, 46, 723-729.
- Melcher, D., Crespi, S., Bruno, A. & Morrone, M.C.** (2004) The role of attention in central and peripheral motion integration. *Vision Research*, 44, 1367-74.



**Melcher, D. & Bacci, F.** (2003) A moment's monument: The central vision of Italian sculptor Medardo Rosso (1858-1928). *Perception*, 32, 1051-8.

**Melcher, D. & Morrone, M.C.** (2003) Spatiotopic temporal integration of visual motion across saccadic eye movements. *Nature Neuroscience*, 6, 877-881.

**Melcher, D.** (2001) Persistence of visual memory for scenes. *Nature*, 412, 401.

**Melcher, D. & Kowler, E.** (2001) Visual scene memory and the guidance of saccadic eye movements. *Vision Research*, 41, 3597-3611.

**Melcher, D. & Kowler, E.** (1999) Shape, surfaces and saccades. *Vision Research*, 39, 2929-46.

### Book

Bacci, F. and **Melcher, D.**, Editors (2011) *Art and the Senses*, Oxford University Press. ISBN13: 9780199230600; ISBN10: 0199230609 (now in its second printing in a paperback edition)

### Book chapters

**Melcher, D. & Cavanagh, P.** (2011) Pictorial cues in art and in visual perception. In F. Bacci & D. Melcher (Eds.) *Art and the Senses*, Oxford University Press.

**Melcher, D. & Zampini, M.** (2011) Audio-visual integration in science and the arts. In F. Bacci & D. Melcher (Eds.) *Art and the Senses*, Oxford University Press.

Muniz, V. & **Melcher, D.** (2011) The mystery of representation: A conversation with Vik Muniz. In F. Bacci & D. Melcher (Eds.) *Art and the Senses*, Oxford University Press.

**Melcher, D. & Morrone, M.C.** (2007) Trans-saccadic memory: building a stable world from glance to glance. In R. Van Gompel et al., *Eye movement research: A window on mind and brain* (Amsterdam: Elsevier).

## **INVITED TALKS AND PUBLIC DISSEMINATION (SELECTED)**

Invited talks at universities and research centers including Tsinghua, Beijing Normal and Kunming Universities (China), College de France, INSERM Cognitive Neuroimaging Unit Paris and Renee Descartes University Paris (France), Humboldt University Berlin, Justus-Liebig-University Giessen, Ludwig-Maximilians University Munich, Muenster and Regensburg Universities (Germany), PPKE and Semmelweis Universities (Hungary), Banaras and Hyderabad Universities (India), Bocconi, Parma, Pisa and San Raffaele Universities (Italy), Riken Brain Institute and Tokyo Institute of Technology (Japan), Donders Institute for Brain,

Cognition and Behaviour//Radboud University (Netherlands), Umea University (Sweden), Bristol, Dundee, Kingston University London, Oxford, Royal Holloway and University College London (United Kingdom), Harvard, Rutgers, University of South Florida and University of Massachusetts-Boston (United States), and Hanoi University of Technology (Vietnam). Invited speaker at the meeting on the “Trentino system of higher education and research” at the European Parliament (2012), the *Festival della Scienza* (Genova, 2014) and the “Wired Next Fest” (Milan, 2016).

Interviewed for National Public Radio program “Morning Edition” (US), *New Scientist* magazine, *Airone* magazine, *Internazionale* magazine, Italian Radio 24, Italian television channels RAI2 (national news story) and RAI3 (*E se domani* science show), and for numerous stories in newspapers including *Il Messaggero*, *Il Corriere della Sera*, *La Repubblica*, *La Stampa*, *L'Adige* and *Il Trentino*.