The Art of Perception - The Perception of Art

Official Satellite Symposium of the European Conference on Visual Perception (ECVP)

Abstracts

Prof. Dr. Michael Bach

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Neuroscience, visual illusions, and art – not necessarily a happy union

I will explore relations between neuroscience –specifically visual phenomena– and art, both fine arts and commercial arts. Transfers from neuroscience to art have occurred with a range of effectiveness. Amongst the successful transfers I count Magritte's 'Carte blanche', Penrose, Penrose & Escher, and Casati's 'rabbit shadow'. Forensic controversy resulted from transferring Harmon & Julesz' 'The recognition of faces' by Dali. Amongst the unsuccessful transfers, I count the San Lorenzo mosaic interpretation and 'café wall paintings'. Puritan censoring and other constraints affect the transfer of neuroscience to art, which I will illustrate in a "Silence of the lambs" movie poster and through an experience with Georgia's school authorities.

One could count as "translational research" transfers that have appeared in advertisement and fashion. As examples of successful ones, I will demonstrate Magnum and Vin Uno advertisement posters. Among the doubtful examples are shading in clothing that strives to render body silhouettes more (or less) curvaceous, and for an unsuccessful example I will show the "leopard" car advertisement, based on the Simon gorilla.

I will finish up by suggesting that it may not really be useful for artistic endeavours to be too academic. Von Kleist (1810, "Über das Marionettentheater") gave a beautiful example of a dancer loosing his graceful and enchanting pose when trying to render it wilfully. As more concrete examples I suggest the Golden Ratio, which has largely ex post been read into art, and the standard explanation of pointillism, which falls apart by simply examining a painting close up.

This exploration has led me to assert that neuroscience contributes little, if anything, to the understanding of art: Full scientific understanding would lead to rules how to create art, and art created solely by rules lacks art.

Dr. Andreas Bartels

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Movies, motion and emotion: brain function underlying perception of dynamic stimuli

Not all art is static, some of it is designed to be explored through self- or object motion, such as sculptures, installations and movies. Our key interest lies in understanding high-level processing of visual motion. Even though we are not explicitly studying art, our interest led us to study cinematic movies and motion-illusions that may count as modern forms of art. Using these stimuli, or controlled stimuli that

were inspired from them, allowed us to gain fundamental insights in neural mechanisms related to processing dynamic visual stimuli.

Our brains are experts in processing dynamic visual input: we rarely ever sit still or stop moving our eyes, and even if we did, there is enough motion in our environment to keep the signals reaching our retinae changing. Despite decades of research on visual motion processing, surprisingly little is known about processes that allow us to perceive the world as stable, and to segregate self-induced motion from external motion. Cinematic films however use and rely on simulated self-motion to put us right into the role of an active observer on site.

In my talk I will present several studies from our lab that shed some light on neural substrates involved in solving the self- vs. external motion problem that we addressed using feature movies and controlled visual stimuli. Since self-motion leads to spatial self-displacement, we complemented our motion studies with ones looking at the representation of ego-centric space in the brain that I will briefly touch on.

I will also show evidence on mechanisms helping us to use motion cues to 'bind' and recognize global Gestalt from local cues, using a beautiful illusion, and present new evidence on how distinct aspects of face-motion are extracted in distinct face-processing regions to extract emotional meaning from motion. If time permits, I may digress briefly to discuss the relationship between motion and color in both perception and neural integration.

This will be a neuroscience talk – but hopefully nevertheless relevant to artists, as most fundamental insights into the visual brain are relevant for artists, just as most relevant visual art provides insights into vision.

Prof. Dr. Bevil Conway

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Art and aesthetics: challenges for neuroscience

Works of art are the product of the complex neural machinery that translates physical light signals into behavior, experience and emotion. The brain mechanisms responsible for vision and perception have been sculpted during evolution, and further modified by cultural exposure and development. Recent developments in neuroscience have come tantalizingly close to tackling long-standing questions of aesthetics. In my presentation, I will consider what questions this new field is poised to answer, and will attempt to underscore the substantial differences between beauty, art and perception, terms often conflated by "aesthetics". Although I will touch upon adjacent fields of neuroscience such as sensation, perception, attention, reward, learning, memory, emotions, and decision making, where discoveries will likely be informative, the bulk of my presentation will focus on a close examination of artists' paintings and practices, representing a return to the original definition of aesthetics (sensory knowledge). This examination aims to achieve insight into the discoveries and inventions of artists and their impact on culture, sidestepping the thorny issues of what constitutes beauty. In particular, I will address color contrast, which poses a challenge for artists: a mark situated on an otherwise blank canvas will appear a different color in the context of the finished painting. How do artists account for this change in color during the production of a painting? In the broader context of neural and philosophical considerations of color, I discuss the practices of several modern masters, including Henri Matisse, Paul Cézanne, Claude

Monet, and Milton Avery, and suggest that the strategies they developed not only capitalized on the neural mechanisms of color, but also influenced the trajectory of western art history.

Prof. Dr. Anya Hurlbert

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The meaning of colour in art and vision science

The 'disegno vs colore' debate in art history mirrors a divide in the scientific approach to the understanding of human visual perception. In the mid-1800s, the Poussinistes argued for the dominance of drawing, line and form, against the Rubenistes' championing of the sensual, dramatic – but ultimately unreliable -- properties of colour. Likewise, early theories of visual processing proposed that colour was segregated from form, and much of what we understand about the perception of objects -- their motion, depth, and texture -- has been learned from the analysis of images devoid of colour. Although it is now accepted that the neural processing of colour and form converges early in visual processing, the two attributes are still often treated as distinct in behavioural studies. Theories of visual object recognition, for example, treat colour as separable from and secondary to shape in signalling object identity. The 20th century abstract artists also release colour from form, but celebrate colour as having its own identity. In doing so, the abstract tradition also faces the challenge of conjuring up the multiple modalities that colour possesses: a surface attribute, tied to the material properties of objects, as well an extended property of voids, volumes, and lights. In fact, the genius of every painter is to capture with pigments – limited by subtractive mixing -- this variety of modes of colour and material appearance.

In this talk, I will trace the outlines of the colour-form debate using examples from key artists, describe some of the ways pigments have been used to capture colour modes, and use the duality of art and vision science to illustrate the fundamental phenomena of human colour perception. For example, JMW Turner himself evolved from a painter obsessed with light, shade and geometry into one consumed by colour; as he aged, his use of colour become freer, his line less pronounced, his subject matter more primitive and abstract. The abundant use of yellows and blues in Turner's later works echoes Poussin's use of the same colours – those "which most participate in light and air" (Le Brun 1667). The colour palettes of both reflect the fact that the human visual system has adapted to its environment and captured the essential variations of daylight and natural objects in its neural coding of colour. Turner's love of the sky and its colours also points to the natural development of affective responses to colour – these are also fundamental to human colour perception and may arise from the emotional responses to objects to which particular colours are normally attached. Diagnostic colours of familiar colours also give rise to memory colours, which are embedded in neural representations and affect our immediate perception of incoming stimuli. Lastly, I will consider the role of colour constancy – the perceptual phenomenon by which object colours remain constant under changing illumination spectra -- in the production and display of paintings, using as examples Monet's series paintings as well as recent laboratory work on the perception and optimisation of chromatic illuminations.

Prof. Dr. Robert Pepperell

Cardiff School of Art and Design, Cardiff, UK

Painting Perception

For many centuries artists have studied the nature of visual perception in order to better understand, and therefore better represent, how they see the world. I will argue that in doing so they have discovered several interesting features of visual perception that are yet to be fully investigated by the relevant sciences.

In this talk I will discuss some of these features and show how I and other artists have explored them through painting and drawing. I will present the results of some recent empirical studies on pictorial double vision and the depiction of the full field of view.

Pictorial double vision, which simulates the everyday experience of physiological diplopia, is not generally recognised as one of the monocular depth cues. Yet some artists have used it in their paintings and drawings, and we have shown that under certain conditions it can effectively enhance the perception of depth in pictures (Pepperell and Ruschkowski, in press).

The problem of how to fit the contents of the field of view into the boundary of a picture while retaining the perceived scale of the objects being depicted is one that has long troubled artists. Zoom out too far from the object of interest and it shrinks into insignificance; zoom in too close and the surrounding space is cropped. I will argue certain artists have found a unique solution to this problem that may also tell us something about the visual perception of space.

I will close by considering the implications of this work for the future of image making and by stressing the need for art and science to work closely together in order to widen and deepen our knowledge of visual experience.

Pepperell, R. and Ruschkowski, A. (in press). Double Vision as a Pictorial Depth Cue. Art & Perception.

Prof. Dr. Johan Wagemans

University of Leuven (KU Leuven), Laboratory of Experimental Psychology, Belgium

How we look and what we know determines how we see and appreciate art

Both visual perception and art appreciation are known to be influenced by a mixture of "bottom-up" and "top-down" factors. In art perception and appreciation, Gombrich's "beholder's share" is now widely acknowledged, and recent frameworks have tried to include all relevant components and influencing factors (e.g., Leder et al., 2004, British Journal of Psychology, 95, 489-508). Against this background, we have used a variety of research methods (eye movement recordings, rating scales, questionnaires and qualitative interviews) to try to understand how visual perception affects aesthetic appreciation in both naïve and expert viewers. I will illustrate this approach with some research projects in collaboration with three contemporary artists: Wendy Morris, Ruth Loos, and Anne-Mie Van Kerckhoven. Findings about ambient versus focal viewing styles will be related to the viewer's background and purpose, and their effects on appreciation will be demonstrated. I will also discuss some of the advantages of working with living artists rather than with classic art works.