

Perceiving Art: Physics Principles & Research Challenges

A workshop funded by NSF and hosted by Institut Henri Poincaré

Paris, 15-18 October, 2023

Organizers

Beata Bajno (artist, architect)

Sylvie Benzoni, Director, Institut Henri Poincaré, Paris

Andrzej Herczyński, Boston College

Jacek Rogala, University of Warsaw

PROGRAM

Sunday, October 15

Arrival. Welcome Reception in *Galerie Wagner*, 18:00 – 21:00.

Monday, October 16

9:00 – 9:15 Welcome & Opening Remarks

Session 1: Physics & Art

Chair: Jacek Rogala

9:15 – 9:50 Manoel Veiga

How painters guide the viewer's perception

10:00 – 10:35 Jean Herzberg

Aesthetics and student attitudes in flow visualization

10:45 – 11:05 Coffee Break

11:05 – 11:40 Andrzej Herczyński

Paul Klee: The Thinking Eye

11:50 – 12:25 Remi Coulon

Curvature. Between Geometry and Art

Lunch Break 12:35 – 14:00

Session 2: Mathematics & Art

Chair: Sylvie Benzoni

14:00 – 14:35 Tamara Friebe

Listen2Intuition: Mathematics/Arts/Society (Part I)

14:45 – 16:20 Karin Baur

Listen2Intuition: Mathematics/Arts/Society (Part II)

15:30 – 15:50 Coffee Break

15:50 – 16:25 Paul Glendinning

Perception, Art, Aesthetic Response & the Mathematical Sciences

16:35 – 17:10 Olga Paris-Romaskevich

Sharing Mathematics Through Art: Experiences and Perspectives

Evening free

Tuesday, October 17

Session 3: Perception & Aesthetics I

Chair: Andrzej Herczynski

9:15 – 9:50 Beata Bajno

Light as a Conduit to Perception

10:00 – 10:35 Johan Wagemans

*Gestalts Relate Aesthetic Preferences to Perceptual Analysis:
*An outline of the GRAPPA project**

10:45 – 11:05 Coffee Break

11:05 – 11:40 Christoph Redies

Statistical image properties of artworks

11:50 – 12:25 Helmut Leder

From lab to field – new paths of empirical aesthetics

Lunch Break: 12:35 – 14:00

Session 4: Perception & Aesthetics II

Chair: Jean Herzberg

14:00 – 14:35 Rebecca Chamberlain

*Understanding and enhancing aesthetic experience
in the lab and the gallery*

14:45 – 16:20 Jacek Rogala

Receiving the artistic message

15:30 – 15:50 Coffee Break

15:50 – 16:25 Shabnam Kadir

Visual experience, topology, and the perception of art

16:35 – 17:10 Yoed Kenett

Empirically investigating the complexity of aesthetics

Workshop Dinner: 19:00 (place TBA)

Wednesday, October 18

Session 5: Art & Time

Chair: Paul Glendinning

9:15 – 9:50 Neo Chung

Artificial Intelligence as New Media

10:00 – 10:35 Ernst Pöppel

A time window of some three seconds for art appreciation

10:45 – 11:05 Coffee Break

11:05 – 11:40 Eva Ruhnau

Time Holism

11:50 – 12:25 Matthew Pelowski

*Empirically and theoretically capturing and Latent Profile Modelling
of our shared ways of responding to art*

Lunch Break 12:35 – 14:00

Session 6: Perception & Cognition

Chair: Shabnam Kadir

14:00 – 14:35 Lao Zhu

The Third Abstraction: Removing the Connection with Things

14:45 – 16:20 Ian Verstegen

A Metaphorics of Dynamic Form: Analogues of Being

15:30 – 15:50 Coffee Break

15:50 – 16:25 William Seeley

Art and Attention: Resolving the Puzzle of Locating Art

16:35 – 17:10 Aaron Kozbelt

*Visual Processing in Artists: Perceptual Advantages
and Evolutionary Constraints*

17:20 Concluding remarks & discussion

ABSTRACTS

1. Beata Bajno, Visual art

Title: Light as a Conduit to Perception

In the talk, I will present my process of elaboration of light-constructed environments illustrated by chosen projects. I will explore the dynamic relationship between attendees and the light installation, analysing the affordances offered by the experience encompassing not only the visual aspect but also a tangible interaction with the images.

I will share the responses of the viewers who have previously encountered my work to illustrate the spectrum of impressions and emotional resonances evoked by these installations. In addition, I will give insights into how my contribution to the design and planning of interdisciplinary art perception study has shaped my reflection on my own art practice.

2. Karin Baur, School of Mathematics, University of Leeds and **Tamara Friebe**, Composer

Title: Listen2Intuition: Mathematics|Arts|Society -- Part I & II

We present aspects of an interdisciplinary project bridging mathematics and arts. We emphasise the role of intuition crucial both to mathematical research and artistic creation, in particular composition. Structures from on-going mathematical research were step by step appropriated by an artist/composer using visual art and design software and finally composition principles. In this way, new music was composed using uniquely formed degrees of freedom and shades of constraints. This artistic crystallization process led in return to ideas of a conceptual nature, which translated back into a mathematical research proposal; thus confirming a true eye-to-eye interdisciplinary process.

3. Rebecca Chamberlain, Department of Psychology, Goldsmiths University of London

Title: Understanding and enhancing aesthetic experience in the laboratory and the gallery

In this talk I will share insights from a range of projects on aesthetic experience conducted in the laboratory and in the gallery. The first part of the talk will focus on embodied and empathic engagement with artistic traces. Theories of embodied aesthetics suggest that aesthetic pleasure is partly derived via motor simulation of the content of the artwork as well as the artist's movements. Such engagement is argued to forge an empathic connection between the viewer and the artist. I will present a series of studies designed to test the motor simulation account, in addition to studies investigating the impact of artistic depiction on perception of pain and emotion detection. In the second part of the talk, I will turn to some recent research in which we investigate whether we can enhance aesthetic experience in the gallery, through modulating mindfulness and social interaction. Finally, I will reflect on the value of these different kinds of methodological approaches for explaining aesthetic experience.

4. Remi Coulon: CNRS, Université de Bourgogne

Title: Curvature. Between Geometry and Art

Classical mechanics can be formalized using Euclidean geometry (the one we learn at school, with Pythagorean's theorem, similar triangles, etc.). In such a world light travels along straight lines as these paths are the one minimizing their travel time. Since the 19th century mathematicians have created and studied new geometrical "worlds" where the axioms of Euclidean geometry no longer hold. These geometries have been a source of inspiration for some artists such as M. C. Escher, who drew remarkable pictures of the hyperbolic space in two dimensions. Using the power of modern computers, one can now simulate what it would be to live on a non-Euclidean three-dimensional space. In such a world light rays may bend, thus changing our perception of the surrounding world. In this talk we will explore the idea of curvature, a fundamental notion in non-Euclidean geometry, and its impact on arts.

5. Neo Christopher Chung, Institute of Informatics, University of Warsaw, New Media

Title: Artificial Intelligence as New Media

The world is being reconstructed and reimagined by artificial intelligence (AI). From how we think to what we do, neural processing of massive data is nudging us towards post-human conditions. Recently, generative AI – ranging from large language models (e.g., GPT) to diffusion probabilistic models (e.g., Stable Diffusion) – has been worked into art and design. On the Internet and galleries alike, AI-generated and -assisted artworks are flourishing. Beyond the technical capabilities of AI models, their historical and philosophical implications are deliberated critically in contemporary art. Thus, there is no doubt that AI is becoming a routine creative tool, as well as an addition to the arsenal of new media. In this talk, I discuss how AI is used and viewed as new media in art practices. Primarily, I draw examples from my deep learning research, multimedia installations, and on-going interdisciplinary projects. Through new media works, I explore authorship, intentionality, emergent aesthetics of AI systems.

6. Paul Glendinning, Department of Mathematics, University of Manchester

Title: Perception, Art, Aesthetic Response and the Mathematical Sciences

It is well-established by neuroscientists (e.g. Kandel 2016) that visual processing by the brain includes parallel processing. Let us also assume that object recognition has parallels with machine learning algorithms and that the brain has many features which make it a hybrid system in mathematical modelling terms. Then, independent of details, mathematical phenomena associated with parallel processing, machine learning and hybrid systems are present in the brain and have consequences for how humans look at and process or interpret art. I will argue that the phenomenology of such mathematical systems corresponds closely to narratives describing peoples' reactions to art, including time dependent changes in the appreciation of artistic spaces.

7. **Andrzej Herczyński**, Department of Physics, Boston College
Title: Paul Klee: The Thinking Eye

In the first decades of the 20th century, avant-garde painters in Europe began to chart a path away from figurative or impressionistic art and toward abstraction. These creative explorations took various forms, and lead in diverse directions – cubism, fauvism, color field, surrealism, and later abstract expressionism. Paul Klee occupies a unique place among artists of this period because of his enormous productivity, variety of the styles he embraced, and also because his impact was amplified by his lectures at the Bauhaus school during the years 1921-1931. The two extensive notebooks he created to document and support his teaching are a trove of ideas on the development of abstract style from the patterns and forms of nature. They also include numerous geometrical constructions and commentary on rendering dynamic physics in a static medium. This talk offers a brief review of mathematical and physical considerations in Klee's notebooks, which underlie his geometrical language, and which can facilitate the "reading" of his art.

8. **Jean Hertzberg**, Department of Mechanical Engineering, University of Colorado, Boulder
Title: Aesthetics and Student Attitudes in Flow Visualization

Flow visualization sits at the intersection of science and art - images of fluid flows are often quite striking while retaining scientific importance. If we define an aesthetic to be a metric for judging the success of a work of art, then Flow Vis as art can be loosely categorized into four aesthetics: beauty, power, destruction and oddness. Since 2003, the University of Colorado Boulder has offered a Flow Visualization course that brings together mixed teams of engineering and fine arts photography, film and web students. It focuses on the production of images of fluid flows while requiring engineering students to be artists, and art students to take a scientific approach. Flow Vis students have responded enthusiastically, with exit survey comments such as "I'll never ignore the sky again" or "I see examples of flow vis all the time now." We want this reaction to all our courses. We have undertaken a research program that includes 1) how students acquire visual expertise in fluid mechanics and 2) evidence of a 'transformative experience' (motivated use, expanded perception and affective value), via a mixed-methods sociocultural approach. Results indicate that significant creative effort is needed to shift student attitudes.

9. **Shabnam Kadir**, Department of Computer Science, University of Hertfordshire
Title: Visual experience, topology, and the perception of art

Animal studies have revealed that the brain's visual cortices have access to visual information via a variety of neural codes, e.g. there are cells tuned to edge orientation, spatial frequency, edges, corners, contrasts and colour. Higher cortical areas are thought to then further process visual information as well as integrate a visual scene with other senses and the conscious mind. How this information is combined with prior experience to form a holistic visual experience that elicits an emotional response of pleasure, distress and/or other forms of meaning is an active research question. The human perception of art and the question of what constitutes art touch upon all these elements of perception and integration.

We discuss recent work where methods from applied topology, namely persistent homology of certain cubical complexes, are applied to paintings produced by both a human artist and a neural network shown in two exhibitions in Warsaw. The latter were matched for certain information theoretic pixel-based characteristics.

Nevertheless, in an experiment where measurements of EEG, tracking of eye-movement, as well as conscious perception/appreciation of these paintings were collected from art students who visited both exhibitions, clear differences were detected. There is an abundance of metrics designed to describe and quantify visual features of images in the literature, but our topological approach provided highly effective methods of disambiguation not only between artist vs. AI-generated art but also provided an easily computable, information dense method to quantify the characteristics of art produced by famous modern abstract painters. We speculate on how aspects of our topological approach may be insightful to Gestalt psychologists and other theories of perceptual integration.

- 10. Yoed N. Kenett**, Faculty of Data and Decision Sciences, Technion, Israel Institute of Technology
Title: Empirically investigating the complexity of aesthetics

Aesthetic experience is a complex experience, arising from bodily, emotional, and cognitive signals. How can we study the complex cognitive and neural processes and dynamics that give rise to aesthetics? An increasingly popular approach to study the complexity of neural and cognitive systems is via network science methodologies. Network science is based on mathematical graph theory, and offers quantitative methods to represent complex systems as graphs, or networks. Although cognitive theories in different domains are strongly based on a network perspective, the application of network science methodologies to quantitatively study cognition has so far been limited in scope. The application of network science in cognitive science provides a powerful quantitative approach to represent cognitive systems (such as memory and language); enables a deeper understanding of cognition by capturing how the structure and processes operating on a network structure interact to produce behavioral phenomena; and provides a quantitative framework to model the dynamics of cognitive systems. Here, I will present a few examples to demonstrate the feasibility and potential of applying network science methodologies in aesthetics research. These examples relate to architectural preferences, appreciation of abstract art, conceptual representation of beauty and wellness across different age generations, and aesthetic emotions.

- 11. Aaron Kozbelt**, Department of Psychology, City University of New York - Brooklyn College
Title: Visual Processing in Artists: Perceptual Advantages and Evolutionary Constraints

To what extent is the ability to draw realistically associated with demonstrable advantages in visual perception? Over the last twenty-five years, researchers have explored this issue with increasing sophistication and depth, examining laboratory-based perceptual tasks, their associations with realistic drawing ability, comparisons between and among special populations, and case study reports. In this talk, I will describe empirical evidence bearing on this question. Realistic drawing requires artists to solve many of the same basic problems as the visual system itself, using both bottom-up and top-down processes. Compared to non-artists, trained visual artists do appear to have numerous objectively measurable advantages in visual processing and performance. Such advantages mainly involve the flexible top-down deployment of visual attention, rather than constituting basic advantages in low-level processing parameters. Recent longitudinal research has also detailed how some of these advantages grow over the course of intensive drawing training. Time permitting, I will also explore the question of how artists' perception and aesthetic decision-making interfaces with creative thought and how all of these are potentially strongly constrained by evolutionarily canalized processing biases.

12. LaoZhu: The Han Art Institute, Peking University

Title: The Third Abstraction: Removing the Connection with Things

Two Levels. Firstly, to cut the linkage among things in reality. Secondly, to abandon the images imagined on the basis of experience and memory in the mind without direct connection with concrete objects. (anti-“We could look at what the neural encoding is for this” which says Mitchell). The third abstraction is rooted in a non-Western ontology, namely the Chinese Taoist thought and the Indian Buddhist thought. Although the two have significant differences, they both take the *Nenone* (or “*wai*,” which means being in non-being), as their noumenon. The third abstraction is an art history completely different from the aesthetics originating in Greece and Western representational art. The most basic work in this art history is Chinese Calligraphy, an art resulted from the fusion of Chinese thought and Indian thought (occurring in the first half of the 4th century). Another major development was the replacement of depicting by calligraphy, which basically cut the direct simulative relationship between the work and depicted object (occurring in the 13th to 14th centuries). The inherent nature of the third abstraction is consistent with the non-simulative artistic relics such as dots and lines in early Paleolithic cave paintings. The third abstraction overlaps with American abstract expressionism, as well as partly corresponding with the peculiar abstraction that later emerged in the West, such as the art of Rothko and CY Twombly.

13. Helmut Leder, Faculty of Psychology, University of Vienna

Title: From lab to field – new paths of empirical aesthetics

In Vienna, in the EVA labs (Empirical visual arts research), our research over the past years has moved from studying aesthetic phenomena mostly in lab studies (e.g. Leder et al., 2010) towards more and more valid field studies (Mitschke, Goller & Leder, 2017). This shift marks the inclusion of portable physiological measurements, an explicit acknowledgment of the context as a moderating variable (Brieber et al., 2015; Grüner et al., 2019), and a number of studies that aim to test the impact of art where it occurs in our lives, in museums (Pelowski et al., 2018, 2019; Gartus & Leder, 2015), in parks (Mitschke et al. 2017), and more recently on the street (Chana, Mikuni, Schnebel & Leder, in press). In this talk, I present our past and current research projects, and methods, as well as our studies and show how we aim to empirically demonstrate the impact of art on emotion, well-being, and even health, in the lab, but even more in real life.

14. Olga Paris-Romaskevich, CNRS, Aix-Marseille Université

Title: Sharing mathematics through art: experiences and perspectives

I am a mathematician working in the area of dynamical systems. In the last six years I have developed some experience in sharing mathematics through different art forms: from storytelling (I am a script-writer for math movie series such as *Voyages au pays des maths* and *Grande Aventure des Mathématiques*, writer for the *МАТЕМАТИКА* blog around portraits of women in mathematics in Russia, and one of the authors of the site *Mathématiques du ciel*) to collaborative (as in *Streetmath* project) and performance art (as in theater play *Letters from the fourth dimension*). In my « outreach » practice I have noticed that people who didn't do university studies in mathematics did not perceive it in the same way I did. Gradually I came to understand that appreciation of the so often brought up « beauty of mathematics » was something that my colleagues and myself were trained and selected for rather than something coming from our individuality, contrary to what I thought for a long time!

Pierre Bourdieu in his seminal work « The Distinction » has shown that taste in art is strongly correlated with social background and explained how the construction of taste operates in society. Thanks to a recent collaboration with a sociologist Clémence Perronnet on a project on French teenage girls and their interest in mathematics, I have learned about how scientific culture and interest to science is constructed socially (e.g. how math perception in girls differs depending on a social background), following the patterns similar to those that Bourdieu notices for the interest and love of the « legitimate art ».

15. Matthew Pelowski, Faculty of Psychology, University of Vienna.

Title: Move me, astonish me, make me shudder, rage, ...or don't: Empirically and theoretically capturing and Latent Profile Modelling of our shared ways of responding to art.

A constant argument throughout the history of humans' interactions with art is that we may have certain reactions that are both notable and perhaps unique. Standing in awe at a painting, gripped with thrill, anger; mesmerized by beauty, finding oneself transformed—these reactions stand as both a constant basis for the lasting interest in the arts from humanities and science. They also—precisely because our art experiences can appear so nuanced and individual—tend to stand just out of reach of empirical and theoretical investigations, leaving us without a firm understanding of what kinds of reactions we might actually have, how these are explained, and how reactions might (or might not) connect or even be shared across individuals and artworks. I discuss a project, part of an ongoing EU H2020 program, to collect thousands of participants' art experiences, using a representative sample of artworks and theory-driven survey of phenomenal factors. Results were combined via Network modelling to produce a 'map of experience' and with subsequent Latent Profile analysis in fact uncovering shared patterns below the level of person, setting, or artwork, but providing a platform for understanding, appreciating, and further testing the power and nuance of our engagements with art.

16. Ernst Pöppel, Institute of Medical Psychology, Ludwig-Maximilians-University of Munich

Title: A time window of some three seconds for art appreciation

The concept of continuity of time as expressed in Newtonian physics has become like a dogma, but for living organisms continuous temporal processing does not make sense. One reason being that the transduction mechanisms of the sensory modalities are rather different which would create a substantial computational burden for intersensory integration. "Mother Nature" has decided otherwise and "time windows" of different duration have evolved for complexity reduction. One such time window is observed in the range of some 3 seconds which is observed in movement control, speech segmentation, sensorimotor synchronization, short memory, ambiguous figures or brain activities measured with different imaging technologies. It may not be a surprise on the basis of this widespread temporal phenomenon that cultural artefacts are also characterized by this 3-second time window; this time window has to be understood as a temporal operating range, not as a physical constant; it can mathematically be modeled by relaxation oscillations (not pendulum oscillations). This time window of some 3 seconds can be extracted from poetry in many languages, from musical motifs, and also from visual art like in cubism as a basis for art appreciation.

- 17. Christoph Redies**, Institute of Anatomy, Jena University Hospital, University of Jena
Title: Statistical Image Properties of Artworks

The aesthetic judgment of artworks is based on the triad of cognition, affect and perception. While cognitive features, such as image content and cultural context, are well-studied and have variable (idiosyncratic) effects on individual beholders, the role of measurable (objective) image properties in aesthetic perception remains more elusive. Here, I will review a series of studies that focus on perceptual processing of visually preferred stimuli, including artworks. We calculated statistical image properties of traditional and abstract artworks, such as Fourier spectral properties, complexity, self-similarity and the (un-)predictability of edge orientations. Results indicate that large subsets of traditional and abstract artworks share particular statistical image properties. We speculate that some of these features may relate to the perception of visual rightness and image composition in artworks. Moreover, we used features derived from artificial intelligence methods, such as filter responses from deep (convolutional) neural networks, to characterize artworks. Our results indicate that many (but not all) artworks represent a subset of images with perceptual qualities that relate to low- and mid-level perceptual processing. I will conclude by giving an example of how artificial intelligence can assist humans to produce artworks.

- 18. Jacek Rogala**, Faculty of Physics, University of Warsaw
Title: Receiving the artistic message

Psychological investigations indicate that the experience evoked by an artwork may evolve during the decoding of the encrypted artist's message. This decoding may occur in the same way that information is passed from sender to receiver via an information channel, here the art piece, as described in the information theory proposed by Shannon. In our opinion transfer of information from the author to audience is critical for the reception of artistic intent, and for the understanding of the experience of art. The information embedded in art, along with its reception, is often implicit therefore it is not obvious whether the transfer occurred. To test for possible transfer and reception by the audience of the intent and information encoded by the artist we designed an experiment where audience was exposed to either artistic or artificial (produced by neural networks) images. Both types of images were presented in the art gallery in a form of regular exhibition and in the laboratory on computer screen. Information collected during the experiment included flow questionnaire, eye tracking and EEG data. Here we present preliminary results of the questionnaire and eye tracking analyses.

- 19. Eva Ruhnau**, Human Science Center, Ludwig Maximilians University, Munich
Title: Time Holism

Lyotard: The NOW is a point. Nobody can understand this. The task of ART is that we can experience what we cannot understand."

First the notion of time in special and general relativity theory is discussed. Then the use of time concepts is worked out in the following way: the concept of mathematical-physical Time and its dependency on facticity are discussed. Next, the Now is not correlated with the present, as is customarily done. This provides the basis for a deeper analysis and deconstruction of time. A Derrida-like method of deconstruction is chosen. The idea is to search for a concept which is "inter" two opposing concepts, uniting and differentiating them to create a new nondual concept from which the former ones derive as complementary. Deconstruction with respect to Time leads to non-Time, i.e. a concept of the Now as nontemporal.

In reverse, taking the Now as dominant provides the basis for displacement. In the open space, the “inter” between Time and Now, Temporality is located. Temporality unites and differentiates the two concepts, it is the new nondual concept, and it is neither reducible to Time nor to the Now. This notion of Temporality has direct links to time concepts in neuroscience. And it may create interesting ideas concerning art.

20. William P. Seeley, Communication Arts & Sciences, University of New Hampshire – Manchester
Title: Art and Attention: Resolving the Puzzle of Locating Art

What are we talking about when we talk about art? What aspects of artworks and artistic practice do we need to focus attention on to explain art in the lab? We can call this the puzzle of locating art. Despite fairly robust common-sense conception of art this is a surprisingly difficult puzzle to resolve. A lack of consensus on how to resolve this puzzle can therefore be impediment to progress in empirical Researchers in different disciplines within the behavioral sciences and humanities have different, and sometimes conflicting ideas of what needs to be explained to explain art grounded in different ideas about what art is. Is art primarily an aesthetic domain or is it the meanings of artworks that matter. Is conceptual art an outlier or the norm? What role do emotions play in understanding of art? I propose a cognitivist model for understanding and explaining art derived from a biased competition theory of attention and Arthur Danto and Noel Carroll’s discussions of the role played by background art historical and art critical knowledge in our interactions with artworks that can be used to motivate a shared ontology of art and dissolve the puzzle.

21. Manoel Veiga, Painter
Title: How painters guide the viewer's perception

Through the study of some very particular cases, we will bring strategies created by painters throughout history to subtly guide the viewer's gaze and influence their understanding of the content. Sometimes a new technical painting procedure, a different treatment of light or the very choice of subject, characters or support. Great artists have a broad understanding of how our visual perception works and its limitations, which is fundamental for adapting their work process to create and deepen a new visual language. From an 11th century Chinese master, through Caravaggio, Velazquez and my own work, we will analyze remarkable achievements of our cultural heritage.

22. Ian Verstegen, Visual Studies, University of Pennsylvania
Title: A Metaphorics of Dynamic Form: Analogues of Being

This paper explains the utility of dynamic approaches to visual form – whether they be formal or material – for explaining the ultimate meaning of art. In 1988, Rudolf Arnheim explained in *The Power of the Center* that in the relation of centers and vectors “the two tendencies represent a fundamental task of life.” Basic pictorial dynamics are necessarily and automatically metaphorized as relations of centers to each other. Using three case studies, Wolfgang Wildgen’s catastrophe visual semiotics, Michael Leyton’s generative geometry and Steve Lehar’s harmonic oscillations, I show how each of these paradigms embodying in some way complex systems solves a fundamental problem of symbolism; the dynamics of stable and unstable states can be seen as the travails of a center or actant. Each create analogues of being. In a weak sense, this could be because of the search for relevance (Dan Sperber) but if Thom and others are correct they reflect basic symbolism because they embody the world the way it is – thus returning us to the worldview of Arnheim’s teacher, Wolfgang Köhler’s *physische Gestalten* (1920).

- 23. Johan Wagemans**, Faculty of Psychology and Educational Sciences, University of Leuven
Title: Gestalts Relate Aesthetic Preferences to Perceptual Analysis: An outline of the GRAPPA project

Since Fechner (1876), empirical aesthetics has studied the factors determining people's aesthetic responses to art works and objects, scenes or events encountered in everyday life. Most accounts focus either on high-level concepts such as style, meaning and personal associations, or on low-level statistical properties. While the latter are supposed to be universal and biologically determined, the former are subject to cultural influences, art expertise and individual experiences. Progress in this tradition has reached its limits, which I propose to try to overcome by investigating how Gestalts relate aesthetic preferences to perceptual analysis. The pioneering working hypothesis of my research program called "GRAPPA" is that the way perceivers organize their sensory inputs into meaningful entities (Gestalts) provides the missing link between the two traditional sets of explanations. This hypothesis will be fleshed out and tested in a coherent research program linking aesthetic preferences for images of paintings and everyday photographs to general principles of perceptual organization as well as to specific aesthetic concepts like composition, balance and visual rightness. I will sketch the different steps of the research program in broad strokes, along with some recent and ongoing studies, to enable further discussion of the challenges.