International Association of Empirical Aesthetics 2024

Programme

Wednesday, May 08, 2024

(Hanging up Posters 1, Sala Sa Roqueta)

9:00 AM	**Registration**	Lluís Domènech Auditòrium
9:30 AM	**Opening Remarks**	Lluís Domènech Auditòrium
10:00 AM	**Keynote speaker Carlos Velasco:** *Applied Empirical Aesthetics: How visual features influence motivated behavior.*	Lluís Domènech Auditòrium
11:00 AM	**Coffee break & Posters 1**	
11:30 AM	**Symposium** *The place of aesthetic experience in psychological aesthetics and neuroaesthetics.* (M. Skov & M. Nadal)	Lluís Domènech Auditòrium
	Session *Performance*	Sala George Bernanos
	Session *Art and well-being*	Sala Miquel dels Sants Oliver
1:00 PM	**Lunch & Posters 1**	
2:30 PM	**Symposium** *What behaviour genetics tell us about aesthetics* (G. Bignardi & R. Chamberlain)	Lluís Domènech Auditòrium
	Session *Living spaces*	Sala George Bernanos
	Session *Music appreciation*	Sala Miquel dels Sants Oliver
4:00 PM	**Coffee break & Posters 1**	
4:30 PM	**Symposium** *The Impact of AI on the Artworld, the Artist and Empirical Aesthetics* (A. Brielmann & G. Hayn-Leichsenring)	Lluís Domènech Auditòrium
	Session *Development and expertise*	Sala George Bernanos
	Session *Visual art action and perception*	Sala Miquel dels Sants Oliver

(Taking down Posters 1)

Thursday, May 09, 2024

(Hanging up Posters 2, Sala Sa Roqueta)

9:00 AM	**Symposium** *The role of curvature in aesthetic appeal* (D. Walther & M. Bertamini)	Lluís Domènech Auditòrium
	Symposium *The Neurocognition of Liveness* (G. Orgs)	Sala George Bernanos
	Session *Gender*	Sala Miquel dels Sants Oliver
10:30 AM	**Coffee break & Posters 2**	
11:00 AM	**Keynote speaker Gerald Cupchik** **With Andrea Carraro (Carraro Lab, Palazzolo)**: *What would Dan Berlyne have to say about the new stimulus world of VR and AI?*	Lluís Domènech Auditòrium
12:00 PM	**Gustav T. Fechner Award**	Lluís Domènech Auditòrium
12:30 PM	**Margaret Floy Washburn Award**	Lluís Domènech Auditòrium
1:00 PM	**Lunch & Posters 2**	
2:30 PM	**Symposium** *Urban Aesthetics: The Past, Present and Future* (H. Leder)	Lluís Domènech Auditòrium
	Session *Models of hedonic value*	Sala George Bernanos
	Session *Narrative*	Sala Miquel dels Sants Oliver
4:00 PM	**OCTA Workshop**	Sala Alexandre Rosselló
4:00 PM	**Coffee break & Posters 2**	
4:30 PM	**Symposium** *Integrating Psychological Insights into Urban Design and Planning* (N. Ruta & C. Damiano)	Lluís Domènech Auditòrium
	Session *Visual art appreciation*	Sala George Bernanos
	Session *Music action and perception*	Sala Miquel dels Sants Oliver

(Taking down Posters 2)

6:30 PM	**Es Baluard Museum Tour and Reception**	6:30 - 10:00 PM

Friday, May 10, 2024

(Hanging up Posters 3, Sala Sa Roqueta)

9:00 AM	**Symposium** *Empirical insights into performing arts aesthetics from multiple perspectives on the performative situation* (E. Cross & J. Christensen)	Lluís Domènech Auditòrium
	Session *Methods*	Sala George Bernanos
	Session *Creation and appreciation*	Sala Miquel dels Sants Oliver
10:30 AM	**Coffee break & Posters 3**	
11:00 AM	**Keynote speaker Amy Belfi:** *Aesthetic Judgments of Music: Contributing Features, Context Effects, and Comparisons with Other Artistic Domains.*	Lluís Domènech Auditòrium
12:00 PM	**Alexander Baumgarten Award**	Lluís Domènech Auditòrium
12:30 PM	**Robert Francès Award**	Lluís Domènech Auditòrium
1:00 PM	**Lunch & Posters 3**	
2:30 PM	**Symposium** *What is Arts and Health: Challenges and Future Horizons* (M. Trupp & E. Vessel)	Lluís Domènech Auditòrium
	Session *Stimulus features*	Sala George Bernanos
	Session *Exhibitions*	Sala Miquel dels Sants Oliver

(Taking down Posters 3)

4:00 PM	**Membership Committee**	Sala Miquel dels Sants Oliver & George Bernanos
5:00 PM	**General Meeting**	Sala Miquel dels Sants Oliver & George Bernanos

Wednesday, May 08, 2024

Keynote speaker: Carlos Velasco: *Applied Empirical Aesthetics: How visual features influence motivated behavior.*
10:00 – 11:00 AM Lluís Domènech Auditòrium

Coffee break & Posters 1
11:00 – 11:30 AM

Symposium: The place of aesthetic experience in psychological aesthetics and neuroaesthetics.
11:30 AM – 1:00 PM Lluís Domènech Auditòrium
Moderators: Martin Skov & Marcos Nadal
- *How the concept of aesthetic experience has (mis)guided experimental research in neuroaesthetics.* Marcos Nadal.
- *A new theory of aesthetic experience*. Martin Skov.
- *Aesthetic experience and its discontents*. Anjan Chatterjee.
- *Aesthetic experience as a fruitful concept for empirical art research*. Helmut Leder.

Session: Performance (Moderator: Melanie Wald-Fuhrman).
11:30 AM – 1:00 PM Sala George Bernanos
- *Audiences' aesthetic experiences: Onsite and streaming concert situations*. Pietro Modestini.
- *What are you Doing in a Concert? Exploring the Listening Activity of Concertgoers.* Christian Weining.
- *Effects of classical concert formats on audience experience, physiology, and facial expression*. Melanie Wald-Fuhrmann.
- *Emotion perception through dance movements is goal-based*. Amruthavalli V. Vasudevan.
- *The Acting Self: using fNIRS to measure the sense of self of actors whilst they perform a monologue*. Dwaynica Greaves.

Session: Art and well-being (Moderator: Stefano Mastandrea).
11:30 AM – 1:00 PM Sala Miquel dels Sants Oliver
- *To what extent does multisensory space design foster well-being?* Nooshin Momenzadeh.
- *Visiting the museum as a form of art therapy.* Stefano Mastandrea.
- *Cultivating well-being through virtual art engagement: Examining the mechanistic roles of immersion and reflection.* Katherine Cotter.
- *Group discussions in the gallery heighten aesthetic experience and well-being.* Aleksandra Igdalova.
- *The powerful experience. Emotion regulation and self-image in personality disorders in arts and psychomotor therapies.* Suzanne Haeyen.

Lunch & Posters 1
1:00 – 2:30 PM

Symposium: What behaviour genetics tell us about aesthetics.
2:30 – 4:00 PM Lluís Domènech Auditòrium
Moderators: Giacomo Bignardi & Rebecca Chamberlain

- *Ways of experiencing: quantitative behaviour genetics of music reward sensitivity.* Giacomo Bignardi.
- *The relationship between music listening and mental health in a genetically informed population study.* Laura W. Wesseldijk.
- *Unravelling the relationship between creativity and mental health using a genetically informative sample.* Penghao Xia.
- *Can Flow Experiences Be Protective Against Mental and Cardiovascular Health Problems?* Miriam Mosing.
- *Beyond born versus made: gene-environment interplay in musical expertise.* Fredrik Ullén.

Session: Living spaces (Moderator: Oshin Vartanian).
2:30 – 4:00 PM Sala George Bernanos
- *Probing the neural bases of biophilia using low-level visual features*. Oshin Vartanian.
- *Mental Imagery modulates the evaluation of paintings and photographs*. Fatima Felisberti.
- *Investigating positive and threat-based awe in natural and built environments*. Hanna Negami.
- *Art in urban spaces: Assessing the psychological and societal effects of two public art exhibitions in Berlin*. Corinna Kühnapfel.
- *Bridging perspectives: Exploring the empirical aesthetics of bridge design*. Claudia Damiano.

Session: Music appreciation (Moderator: Jonna Vuoskoski).
2:30 – 4:00 PM Sala Miquel dels Sants Oliver
- *Musical beauty is more than just pleasurable.* Yuko Arthurs.
- *Musical dislikes: Rationales, functions, and physiological reactions.* Julia Merrill.
- *The attribution of virtual agency to music predicts liking*. Jonna Vuoskoski.
- *Measuring shared taste across contrasting types of vocalizations*. Camila Bruder.
- *Studying a global network of cultural diffusion through large-scale music discovery behaviour*. Harin Lee.

Coffee break & Posters 1
4:00 – 4:30 PM

Symposium: The Impact of AI on the Artworld, the Artist and Empirical Aesthetics.
4:30 – 6:00 PM Lluís Domènech Auditòrium
Moderators: Aenne Brielmann & Gregor Hayn-Leichsenring
- *Art Notions in the Culture of (Mis)anthropic AI*. Dejan Grba.
- *Navigating the Human-AI Artistic Landscape: Cognitive Perspectives on AI as a Collaborator in Human Creativity*. Lena K. Vogl.
- *Adversarial AI Art*. Martin Zeilinger.
- *Quantifying Complexity in Synthetic and Natural Images*. Surabhi Nath.
- *A theoretical approach to AI "artworks" and their suitability for empirical aesthetics research*. Gregor U. Hayn-Leichsenring.

Session: Development and expertise (Moderator: Edward A. Vessel).
4:30 – 6:00 PM Sala George Bernanos
- *Perception of beauty in art, music, and religion: The relevance of prenatal psychology*. Richard Parncutt.

- *Awe sparks prosociality in children*. Eftychia Stamkou.
- *Aesthetic appreciation for musical consonance and implicit learning processes across the life span: a series of EEG studies on newborns, adult participants, and elderly*. Irene Ronga.
- *The effects of short-term visual art-related training on aesthetic judgment of painting*. Dexian He.
- *Formal training in a visual aesthetic domain increases shared taste in a domain-specific manner*. Edward A. Vessel.

Session: Visual art action and perception (Moderator: William P. Seeley).
4:30 – 6:00 PM Sala Miquel dels Sants Oliver
- *All eyes on the cyber canvas: Expert and non-expert online viewing patterns, preferences and memory of AI and human paintings*. Bernard Vaernes.
- *Mapping visual attention to important and unimportant details in art photographs and paintings*. Maarten Leemans.
- *Does thinking of other's minds impact the looking behaviour and aesthetic judgements?* Ionela Bara.
- *Category-based attention, biased competition, and engaging artworks*. William P. Seeley.
- *Immersion in Ganzfeld art experiences: the role of bodily sensations and abstract cognition*. Eleftheria Pistolas.

Thursday, May 09, 2024

Symposium: The role of curvature in aesthetic appeal.
9:00 – 10:30 AM Lluís Domènech Auditòrium
Moderators: Dirk B. Walther & Marco Bertamini
- *Explaining the curvature effect*. Nicole Ruta.
- *Preference for curvature: the role of individual differences and object attributes*. Letizia Palumbo.
- *Individual differences in the preference for certain types of spirals*. Ronald Hübner.
- *The (lack of) effect of movement on visual aesthetic judgments*. Marco Bertamini.
- *Neural Dissociation Between Computational and Perceived Measures of Curvature*. Dirk B. Walther.

Symposium: The Neurocognition of Liveness.
9:00 – 10:30 AM Sala George Bernanos
Moderator: Guido Orgs
- *Towards a measure of liveness: Collecting and processing brain activity and body movements in the live performance context*. Jamie A. Ward.
- *Performance 1: Detective Work*. Laura Rai.
- *Performance 2: How Shall We Begin Again?* Albane Arthuis.
- *Beyond a measures of liveness: Generating and understanding liveness through dance and choreography*. Matthias Sperling.

Session: Gender (Moderator: Young-Jin Hur).
9:00 – 10:30 AM Sala Miquel dels Sants Oliver
- *Aesthetic perception of body image as a spiritual discipline for contemporary Chinese women*. Danni Yang.
- *Fashion psychology: The predictors of everyday clothing preference among UK and USA participants*. Young-Jin Hur.
- *Moved by art in a gendered world*. Héctor Gerardo Gallegos González.
- *Gender bias in popular recognition of visual artists: Evidence from Artle*. Ann Piper.
- *Art has no gender, only gender bias*. Stefanie De Winter.

Coffee break & Posters 2
10:30 – 11:00 AM

Keynote speaker: Gerald Cupchik with Andrea Carraro (Carraro Lab, Palazzolo):
What would Dan Berlyne have to say about the new stimulus world of VR and AI?
11:00 AM – 12:00 PM Lluís Domènech Auditòrium

Gustav T. Fechner Award
12:00 – 12:30 PM Lluís Domènech Auditòrium

Margaret Floy Washburn Award
12:30 – 1:00 PM Lluís Domènech Auditòrium

Lunch & Posters 2
1:00 – 2:30 PM

Symposium: Urban Aesthetics: The Past, Present and Future.

2:30 – 4:00 PM Lluís Domènech Auditòrium
Moderator: Helmut Leder
- *What is an aesthetic experience? Let's talk about breadth, length, and depth*. Eva Specker.
- *The aesthetics of man-made components within urban environments: A scoping review*. Kirren Chana.
- *Experiencing Beauty in Everyday Life*. Anna Lena Knoll.
- *The Function of Aesthetics in Everyday Life: A Mobile Eye-Tracking Approach*. Tristan Barrière.
- *Walk with me in the City: Impact of Urban Street Interventions on Wellbeing and Attraction*. Margot Dehove.

Session: Models of hedonic value (Moderator: Ana Clemente).
2:30 – 4:00 PM Sala George Bernanos
- *Can fundamental physical principles explain aesthetic experience?* Robert Pepperell.
- *Aesthetic value is dissociable but not independent of incentive salience*. Adam Reynolds.
- *The status of predictive processing as a framework in empirical aesthetics*. Jacopo Frascaroli.
- *A computational approach to empirical aesthetics*. Aenne A. Brielmann.
- *Hedonic foraging: Active inference and hedonic evaluation*. Ana Clemente.

Session: Narrative (Moderator: Monika Płużyczka).
2:30 – 4:00 PM Sala Miquel dels Sants Oliver
- *Tracking prose rhythm: A validated coding manual for prosodic phrasing and syllable prominence*. Christine A. Knoop.
- *Aesthetic evaluation of literary text in a foreign language: What influences the aesthetic appreciation of metaphors?* Monika Płużyczka and Ainur Kakimova.
- *Ancient manuscripts in the eyes of modern beholders: A data-driven approach to empirical aesthetics*. Alejandro Bahena-Rivera.
- *Experts find interest in ambiguous haiku poetry, but not novices*. Jimpei Hitsuwari.
- *Hidden Message? Anomalous-is-bad Stereotype in Top-grossing Films*. Mariola Paruzel-Czachura.

OCTA Workshop
4:00 – 6:00 PM Sala Alexandre Rosselló

Coffee break & Posters 2
4:00 – 4:30 PM

Symposium: Integrating Psychological Insights into Urban Design and Planning.
4:30 – 6:00 PM Lluís Domènech Auditòrium
Moderators: Nicole Ruta & Claudia Damiano
- *Urban architecture: a vision science perspective*. Olivier Pennacchio.
- *Toward Inclusive Architectural Design – a view from the vision sciences*. Ute Leonards.
- *The City of Milan urban planning experience*. Stefania Lamaddalena.
- *The aesthetics of disorder in urban design*. Colin Ellard.
- *Can place attachment be designed?* Sarah Williams Goldhagen.

Session: Visual art appreciation (Moderator: Claus-Christian Carbon).
4:30 – 6:00 PM Sala George Bernanos

- *Across minds and masterpieces: A multi-brain approach to identifying 'universal resonance' to art*. Theresa Rahel Demmer.
- *Awe elicits enhancement of deep pulling space: portraits and landscapes*. Despina Stamatopoulou.
- *Time-resolved EEG decoding of meaning making during 'aha' experiences with visual art and their titles*. Dominik Welke.
- *Where comes the light from in art?* Claus-Christian Carbon.
- *Internet memes for empirical aesthetics: Frontiers and challenges*. Samrawit Ayele.

Session: Music action and perception (Moderator: Diana Omigie).
4:30 – 6:00 PM Sala Miquel dels Sants Oliver
- *Aesthetic appreciation and the interplay between action and perception*. Maria-Chiara Villa.
- *"Music" as a perceptual category – the role of perspective, stimulus duration and repetition*. Pauline Larrouy-Maestri.
- *Examining how auditory profiles of autobiographical memory-evoking songs relate to memory characterisation and retrieval*. Safiyyah Nawaz.
- *The effect of musical expressivity and technical difficulty on musicians' movements and physiological parameters: an exploratory study with violinists*. Nicola Di Stefano.
- *Curiosity, attention and the temporal dynamics of music engagement*. Diana Omigie.

Es Baluard Museum Tour and Reception
6:30 – 10:00 PM

Friday, May 10, 2024

Symposium: Empirical insights into performing arts aesthetics from multiple perspectives on the performative situation.
9:00 – 10:30 AM Lluís Domènech Auditòrium
Moderators: Emily S. Cross & Julia F. Christensen
- *What does the conductor do?* Ophelia Deroy.
- *Internal body signals influence dance aesthetics*. Andrea Orlandi.
- *What makes dance audiences come back for more? Aesthetic appeal of dance depends on location and audience factors*. Emily S. Cross.
- *Studying the performing arts with tools from behavior genetics*. Fredrik Ullén.
- *The Dancer Personality: Comparing dancers and non-dancers in Germany and Sweden*. Julia F. Christensen.

Session: Methods (Moderator: Jeffrey Vadala).
9:00 – 10:30 AM Sala George Bernanos
- *PsyNet: Software for next-generation behavioural experiments in empirical aesthetics*. Peter Harrison.
- *Research methods and guidelines for using human dance to investigate human cognitive systems*. Vasiliki Meletaki.
- *Music performance assessment: Noise in judgments and reliability of measurements*. Edoardo Passarotto.
- *Empirically investigating the complexity of aesthetics*. Yoed Kenett.
- *Mapping subjective aesthetic experiences to objective analysis of art impacts*. Jeffrey Vadala.

Session: Creation and appreciation (Moderator: Pablo Tinio).
9:00 – 10:30 AM Sala Miquel dels Sants Oliver
- *Studying the dynamics of collective creativity in simulated social networks using large-scale singing experiments*. Manuel Anglada-Tort.
- *The prospect and promise of neuromodulation in creativity research*. Franz Roman Schmid.
- *Mirror to the world: Art, understanding, and creativity*. Pablo Tinio.
- *Longer is worse*. Michał Białek.
- *Bridging minds: Toward a theoretical confluence of neuropsychoanalysis and neuroaesthetics*. Theodoros Pantazopoulos.

Coffee break & Posters 3
10:30 – 11:00 AM

Keynote speaker: Amy Belfi: *Aesthetic Judgments of Music: Contributing Features, Context Effects, and Comparisons with Other Artistic Domains.*
11:00 AM – 12:00 PM Lluís Domènech Auditòrium

Alexander Baumgarten Award
12:00 – 12:30 PM Lluís Domènech Auditòrium

Robert Francès Award
12:30 – 1:00 PM Lluís Domènech Auditòrium

Lunch & Posters 3
1:00 – 2:30 PM

Symposium: What is Arts and Health: Challenges and Future Horizons.
2:30 – 4:00 PM Lluís Domènech Auditòrium
Moderators: MacKenzie Trupp & Edward Vessel
- *The Path to a Matched Activity-based Control Condition for an Arts-based Intervention for Highly Sensitive People*. MacKenzie Trupp.
- *Investigating the Effectiveness of Arts-Based, Person-Centred Creative Engagement Interventions for People with Parkinson's Disease: A Journey from Transformative Learning to Randomized Control Trials*. Blanca T.M. Spee and Jan-Jurgen Koksma.
- *Co-creating knowledge exchange to inform alcohol policy work in Nepal: report on a creative methodological process*. Ranjita Dhital.
- *Designing the Autism-CHIME music therapy clinical trial: striking the balance between creative approaches, scientific rigour, and neuroinclusivity*. Claire Howlin.
- *Engaging in group-based arts interventions to reduce depression and anxiety in later life: A systematic review and meta-analysis*. Elizabeth Quinn.
- *A critique of the claim that arts-based interventions can improve health*. Martin Skov and Marcos Nadal.

Session: Stimulus features (Moderator: Erick G. Chuquichambi).
2:30 – 4:00 PM Sala George Bernanos
- *Preference for symmetry: Fechner and modern empirical aesthetics*. Andreas Gartus.
- *Aesthetic ratings of homogeneous and heterogeneous sets of stimuli*. Johan Wagemans.
- *Complexity, liking and compression: Exploring the relationship between aesthetic appreciation and visual complexity in abstract geometric stimuli*. Greta Varesio.
- *Please do not touch! Neural correlates of aesthetic processing of material surfaces*. Thomas Jacobsen.
- *Individual differences in sensitivity to taste-shape crossmodal correspondences*. Erick G. Chuquichambi.

Session: Exhibitions (Moderator: Tobiasz Trawinski).
2:30 – 4:00 PM Sala Miquel dels Sants Oliver
- *Free exploration of materiality and space across three contemporary art exhibitions*. Christopher Linden.
- *While viewing the artwork, I felt… Using network and latent profile analyses to identify and characterize supraordinate varieties of art-experience*. Stephanie Miller.
- *Cross-cultural differences in spectatorship of paintings*. Tobiasz Trawinski.
- *Digital versus physical experiences in art and artifact encounters*. Vicente Estrada Gonzalez.
- *A collaborative study on visitor experiences and societal impact at Amsterdam Light Festival Edition 12*. Gemma Schino.

Membership Committee
4:00 – 5:00 PM Sala Miquel dels Sants Oliver & George Bernanos

General Meeting
5:00 – 6:00 PM Sala Miquel dels Sants Oliver & George Bernanos

Abstracts

Symposia & Talks

Wednesday, May 08, 2024

Registration
9:00 AM

Opening Remarks
9:30 – 10:00 AM
Lluís Domènech Auditòrium

Keynote speaker: Carlos Velasco: Applied Empirical Aesthetics: How visual features influence motivated behavior.
10:00 – 11:00 AM
Lluís Domènech Auditòrium

Coffee break & Posters 1
11:00 – 11:30 AM

Symposium: The place of aesthetic experience in psychological aesthetics and neuroaesthetics.
11:30 AM – 1:00 PM
Lluís Domènech Auditòrium

Moderators: Martin Skov[1] & Marcos Nadal[2]
[1]Danish Research Centre for Magnetic Resonance, Copenhagen University Hospital Hvidovre, Copenhagen, Denmark
[2]Department of Psychology, University of the Balearic Islands, Palma, Spain

The concept of aesthetic experience is fundamental to the enterprise of psychological aesthetics and neuroaesthetics. It is, in the eyes of most researchers, the central explanandum of the two fields, the phenomenon that they seek to understand: “Neuroaesthetics is [...] concerned with understanding the biological bases of aesthetic experiences.” (Chatterjee & Vartanian, 2014, p. 370). Yet, despite decades of active research, the two fields have failed to agree on a definition of aesthetic experience and to show that it differs from other kinds of experience in psychologically and neuroscientifically significant ways. Indeed, it has been called “one of the most poorly defined concepts in psychology and neuroscience” (Brattico, Bogert & Jacobsen, 2013, p. 1). Should psychological aesthetics and neuroaesthetics continue to conceive of their experimental work as directed at establishing a psychological and neurobiological understanding of aesthetic experience if the concept of aesthetic experience itself is controversial? This symposium seeks to explore this contradiction in depth, providing a platform for a balanced and rigorous debate on whether psychological aesthetics and neuroaesthetics should retain or discard the notion of aesthetic experience. It aims to explore the historical evolution of this concept, its current usage, and its relevance in light of modern empirical findings and theoretical developments: What is the place of aesthetic experience in psychological aesthetics and neuroaesthetics?
The symposium will feature four speakers, each with a unique perspective on the topic. Nadal and Skov will provide a critical assessment of the role aesthetic experience has played in the work of neuroaesthetics. Chatterjee and Leder will discuss how the concept of aesthetic

experience has yielded fruitful experimental research and advanced our understanding of human neurobiology.

How the concept of aesthetic experience has (mis)guided experimental research in neuroaesthetics.

Marcos Nadal
Department of Psychology, University of the Balearic Islands, Palma, Spain

Research in neuroaesthetics is predicated on the idea that human engage in distinct aesthetic experience. Central to this idea is the assumption that aesthetic experience is distinguished from other human experiences by having unique and specialized functions and mechanisms. The overarching aim of neuroaesthetics research has been to identify and explain these functions and mechanisms. However, as I will show, the attribution of functions and mechanisms to aesthetic experience is derived not from observation but from an amalgam of pre-modern philosophical ideas (Skov, 2023) that have turned out not to be supported by empirical evidence (Skov & Nadal, 2020a, 2020b, 2021). I will argue that for experimental work in neuroaesthetics to progress the field needs to discard the philosophical concept of aesthetic experience and develop a new, evidence-based, theory of aesthetic experience.

A new theory of aesthetic experience.

Martin Skov
Danish Research Centre for Magnetic Resonance, Copenhagen University Hospital Hvidovre, Copenhagen, Denmark

Aesthetic experience has traditionally been conceived as a unique class of human experience that occurs when humans engage with sensory objects with a special evaluative stance or attitude and that is characterized by distinctive emotional or cognitive features. However, psychological aesthetics and neuroaesthetics have shown experimentally that aesthetic experiences are rooted in neurobiological mechanisms that are common to hedonic evaluations of objects and shared by other animals (Nadal & Skov, 2024). This casts serious doubt on the traditional view that aesthetic experience is distinct and unique to Homo sapiens. In this talk I will synthesize recent experimental findings and propose an updated theory of aesthetic experience that is in line with the current empirical evidence. This account views aesthetic evaluations as computational events involving the application of affective tags of pleasure and displeasure to sensory representations in a way that is substantially influenced by contextual and personal factors such as prior experience, knowledge, expectations, predictions, and task conditions.

Aesthetic experience and its discontents.

Anjan Chatterjee
Center for Neuroaesthetics, University of Pennsylvania, Philadelphia, USA

Aesthetics experiences are felt values that we imposed on objects in the world. The objects can be natural kinds (e.g., faces, landscapes) and human artifacts (e.g., architecture, art). Aesthetic experiences are triggered by exteroceptive and interoceptive inputs. While animal models can inform our understanding of sensory valuation, they are inherently limited for two reasons. Firstly, the mapping of the “Umwelt” of any animal and their preferences onto human preferences is far from straightforward. Secondly, animals relative to humans are less adept in their ability to communicate symbolically using language and to create cultural/environmental niches. Studying the content of human aesthetics is done most directly

by studying humans. Using the framework of the aesthetic triad (Chatterjee & Vartanian 2014) which encompass sensory-motor, emotion-valuation, and semantics-meaning systems as underpinning aesthetic experiences, I will focus on the role of language (Chatterjee, 2023; Christensen et al, 2022; Kenett et al., 2023) as part of semantic-meaning to gives us purchase on the effects of context on aesthetic experiences.

Aesthetic experience as a fruitful concept for empirical art research.
Helmut Leder
Department of Psychology, University of Vienna, Vienna, Austria

Twenty years ago, we published a theoretical model that aimed at describing and explaining aesthetic experience in the context of the processing of art (Leder et al., 2004). This theory has been influential as a framework for situating empirical studies in various areas of empirical aesthetics in terms of the psychological processes involved. Ten years later, we added a more historical, long- and short-term perspective and discussed how the model had "raised fundamental conceptual questions about the relation between art and aesthetics [and] the features that make an experience aesthetic" (Leder & Nadal, 2014, p. 445), and also presented some overlooked aspects and possible future topics for empirical aesthetics. Questioning the concept of aesthetic experience was not among these topics, but of course, the question of whether and how aesthetic experience differs from other experiences remains necessary and important, as, for example, revealed in current debates about the nature of aesthetic emotions (Skov & Nadal, 2020). In this talk I will discuss how the concept of aesthetic experience has continued to evolve in lockstep with scientific advances made by psychological and neuroscientific aesthetics.

Session: Performance

11:30 AM – 1:00 PM
Sala George Bernanos
Moderator: Melanie Wald-Fuhrman

Audiences' aesthetic experiences: Onsite and streaming concert situations
Pietro Modestini*, Emma Becke, Julia Merrill, Guido Orgs, Carlos Trenado, Melanie Wald-Fuhrmann, and Christian Weining.
*Music Department, Max Planck Institute for Empirical Aesthetics, Frankfurt am Main, Germany

The advent of music reproduction technologies in the 19th century fostered new ways of listening to music other than live concerts (see Thorau & Ziemer, 2019). They also shaped our understanding of performances as live (Auslander, 2023). Other than onsite – in the co-presence of the performers – concerts can be attended in cinemas or one's living room, thanks to their streaming on screens (e.g., Baade & Deaville, 2016). How do the video-streaming and the different settings influence the aesthetic experience and the perception of liveness? What characterizes performances as live?
In four concert experiments (Live vs. Stream, Neurolive, Digital Concert Experiences, and Multilive), we investigate and compare audiences' experiences during onsite and various forms of video-streaming concert situations. We employ both inductive and deductive approaches and combine quantitative and qualitative methods, such as questionnaires, physiological measures, and interviews. Experimental designs are both within- and between-subject.

Results show specificities for each concert situation. The experiences of communion and closeness to the musicians are relevant features of onsite concerts but are also triggered during streaming versions of performances. The traditional idea of live indicating co-presence is challenged by media technologies. More data will uncover further variables that determine a situated perception of liveness and eventually depict what characterizes onsite concerts more specifically. These studies also assess methodologies to empirically investigate audiences' experiences in naturalistic environments. Systematic integration of mixed-methods approaches in reproducible research designs is essential to increase repeatability and validity in future studies.

What are you Doing in a Concert? Exploring the Listening Activity of Concertgoers

Christian Weining
Department of Cultural Studies & Communication Studies, Zeppelin University, Friedrichshafen, Germany

The directedness of the listening activity in the context of musical live experiences has been rarely considered in empirical and theoretical research. While some models of musical experience integrate the listener's directedness of attention and intention (e.g., Brattico et al., 2013; Hargreaves, 2012), empirical evidence regarding the role of auditory directedness is lacking. The question arises: what do music listeners actually listen for when listening to music (e.g., structure, emotions, sound cause) and how does this change within a listening period?
A total of 83 individuals were interviewed following public chamber music concerts to explore their aesthetic experiences. A central part of the guideline-based interviews focused on the directedness of listening, aiming to investigate concertgoer's listening activity and the situational factors that influence it.
A qualitative content analysis reveals a significant connection between the directedness of listening and visual perception. Often, gaze determines the listening mode and the shift of directedness and vice versa. Furthermore, it becomes evident that even in the seemingly attentive setting of Western classical concerts, various listening modes and levels of attention are activated in the audience, influenced by factors such as the music itself, stage events, or social factors. Various concrete listening modes and mechanisms of listening mode shifting are presented from the coded data.
The results are discussed in the context of a 4E understanding of cognition, referencing previous psychological and philosophical perspectives on the active role of music listeners. The study contributes significantly to conceptualizing musical experience in live music contexts as a multi-modal perceptual activity based on the listener's cognitive directedness. From a methodological perspective, the qualitative analysis provides profound insights into musical auditory activity, which can build the basis for the development of currently lacking quantitative questionnaires for researching listening directness in the future.

Effects of classical concert formats on audience experience, physiology, and facial expression

Melanie Wald-Fuhrmann*, Ann-Kristin Herget, Martin Kreuzer, and Hauke Egermann.
*Department of music, Max Planck Institute for Empirical Aesthetics, Frankfurt/M., Germany

In the contemporary landscape of musical consumption, live concerts compete with individualized and flexible modes of music listening facilitated by recording and streaming technologies. Within the realm of classical music, there has been a lingering discourse about

a crisis of the concert. Responding to this challenge, endeavors have emerged to innovate and revitalize the conventional concert structure.
This prompted the ""Experimental Concert Research"" project, grounded in the hypothesis that altering the traditional concert format can positively impact the audience's musical experience. In our talk, we present findings from a study involving N = 802 participants (mean age of 44 years, 54% female, 41% male). These individuals attended one of eleven experimental chamber music concerts in Berlin, each presenting the same musical program but varying in multiple format aspects. Their experience was measured with self-reports (exit questionnaires), continuous monitoring of physiological responses, and camera recordings of their facial expression.
General and hierarchical linear models were used to identify significant format effects while controlling for sociodemographic variables. Results revealed significant effects of concert venue on three dimensions of subjective experience, ensemble type on a dimension of social experience, moderation on aesthetic emotions and facial expressions in response to one specific piece, lighting on subjective experience and heart rate, a modified program structure on experience dimensions and aesthetic emotions, audience participation on aesthetic emotions and heart rate, visual augmentation on two dimensions of social experience, aesthetic emotions, skin conductance, and heart rate, and immersive sound on heart rate.
We draw connections between these effects and the artistic hypotheses underlying the experimental concerts, critically examine the merits and drawbacks of large-scale real-life experiments, and explore potential implications of our findings for the future of classical concerts. This research sheds light on innovative strategies to enhance the concert experience in an evolving musical landscape.

Emotion perception through dance movements is goal-based.
Amruthavalli V. Vasudevan* and Bhoomika R. Kar
*Centre of Behavioural and Cognitive Sciences (CBCS), University of Allahabad, Prayagraj, India.

Using goal-based emotion concepts leads naturally to variability in emotion perception. This is clearly demonstrated when language acts as a constraining variable in emotion categorisation. The present study manipulated performer’s intentionality and access to discrete emotion terms in a sorting task using the McNorm videos as stimuli. 50 participants were randomly assigned to either condition, Free or Anchored Sort. Ten original choreographies (10-40s) of the same dancer were used where each intended to communicate one of 4 emotions: happiness, sadness, neutrality, or anger. Videos were stripped of audio and reduced to point-light displays. Both groups were matched on participatory and observatory dance experience using the Gold-DSI. In the Free Sort, participants were asked to sort stimuli such that individuals displaying the same emotion were piled together. In the Anchored Sort, participants were additionally provided with emotion category labels: anger, fear, neutral, sad, happy. All participants then labelled the piles they had created. Sorting behaviour was summarised with unsupervised hierarchical agglomerative clustering. Dendrograms were plotted in R by converting 10 X 10 co-occurrence matrices into distance matrices for each condition and in the intended case. The Free dendrogram resembled the Intended dendrogram more than the Anchored dendrogram (r : 0.62, 0.49). Free and Anchored dendrograms were significantly different (Baker’s Gamma Index : 0.34). There was a significant association between sorting condition and type of label (2 X 4 contingency test, chi-squared(230) : 180) with a greater proportion of discrete emotion labels used in Anchored Sort (0.94, 0.28). Free Sort resembled intended categorisation as it was most likely affect-based and universal however Anchored Sort was constructed by conceptual access using goal-based, culturally

relative emotion words. This has implications for emotion-sharing in art and the role language plays in concretising the aesthetic experience.

The Acting Self: using fNIRS to measure the sense of self of actors whilst they perform a monologue

Dwaynica Greaves*, Anastasia Kokkinou, Joachim Nicolodi, and Antonia Hamilton.
*Social Neuroscience, Institute of Cognitive Neuroscience, London, United Kingdom

Actors are trained to develop techniques enabling the embodiment of a character whilst also being aware of themselves. In this present study, we were interested in how performing a character may affect an actor's sense of self. One way to measure the sense of self is by measuring the mPFC's activation when hearing your own name compared to other names. In our study, we measured actors' mPFC responses to hearing their own, character and stranger names during acting and non-acting conditions. 38 UK-based professional actors with 2+ years of industry experience participated. Shimadzu LIGHTNIRS functional near-infrared system with 22 channels was used to measure PFC activity. Biosignalsplux physiology system was used to measure breathing rate. Actors performed a monologue, coloured in a mandala colouring book, and read aloud from a telephone book. Each of these three tasks was conducted whilst seated, lasted 2 minutes and was repeated 4 times in the same listed order. During each task, the actor's first name, character name and a stranger's name were called out from a speaker at randomised time intervals between 17-22 seconds within 2 minutes. The entire session lasted 24 minutes. Our preliminary analysis revealed that own name had higher activation compared to stranger name in the mPFC during the monologue condition, but stranger name had higher activation compared to own and character name in control conditions in the L_IFG, L_DLPFC and the R_FPC. Our preliminary conclusion is that actors may be more grounded in self when playing a character. Also, that the novelty of the stranger name may have led to higher activation compared to own and character name in control conditions. Data is currently being reanalysed hence, concrete findings will also be discussed at the conference.

Session: Art and well-being

11:30 AM – 1:00 PM
Sala Miquel dels Sants Oliver
Moderator: Stefano Mastandrea

To what extent does multisensory space design foster well-being?

Nooshin Momenzadeh*, Tobiasz Trawinski, Irene Senna, Galina Paramei, Mayukha Pillay, and Letizia Palumbo
*Department of Psychology, Liverpool Hope University

The adoption of multisensory rooms (MSR) to reduce anxiety and positively impact people's mood is rapidly increasing, especially in therapeutic and educational settings. However, empirical evidence on the effectiveness of these spaces is scarce. The current study aimed to gather data that inform evidence-based practice in how to design a multisensory space to foster wellbeing. The study comprised a questionnaire (N=111) and an experiment (N=40) conducted in a multisensory room. The questionnaire measured sensitivity to a wide range of sensory stimulations and preference for MSR settings. The experiment presented a within-subjects design with six conditions, lasting 5 minutes each. Galvanic Skin Response (GSR) was recorded with a portable device and subjective valence and arousal were rated with a Self-Assessment Manikin (SAM) at the end of each condition. Participants began with a rest

condition (baseline), where the sensory devices were inactive. Following, they were presented with 60 emotional pictures (30 positive and 30 negative in counterbalanced blocks) from the International Affective Pictures System (IAPS). An MSR experience entailed first a contemplative phase of visual stimulations (passive MSR) followed by an interaction with one sensory device of choice (active MSR). Before each MSR experience participants underwent the baseline and the IAPS conditions. The results of the sensory room showed that only the active MSR experience lowered GSR (adjusted to baseline) as compared to the IAPS condition. In terms of subjective arousal and valance, both passive and active MSR conditions were effective as compared to the IAPS conditions. Taken together, the findings suggest that individuals differ in their preferences for sensory stimulations, and that engaging with multisensory spaces impact positively on arousal and mood. This study contributes to the development of guidelines for the design and use of multisensory spaces.

Visiting the museum as a form of art therapy

Stefano Mastandrea
Department of Education, Roma Tre University, Rome, Italy

Art can act as a mirror, broadening awareness and encouraging us to investigate our inner selves. Traditional art therapy aims to create expressive graphic products whereas museum visits focus on mental and emotional processes in finding meaning in - and giving meaning to - what is already created, both of which can facilitate a personal narrative.
Given these premises an art museum visit aimed at enabling participants to become freely involved in exploring an art collection, establishing connections with the artworks and finding connections between the artworks and personal, intimate experiences. Personal abilities and personality traits may be used in grasping what the works communicate.
Thirty participants took part in a visit at the National Gallery of Modern and Contemporary Art in Rome. A questionnaire, including the affective scale PANAS and items on self-perceived wellbeing and satisfaction, was administered before and after the visit. The questionnaire concluded with an open-ended question asking participants to describe what they felt during the visit. Scores in the PANAS measurements of positive affective state and perceived well-being increased after the visit, while scores on a negative affective state remained unchanged. Almost all participants reported satisfaction with the visit.
A content analysis assessed several factors, including positive and negative emotions, openness to the experience, enrichment of knowledge, amount of stimulation and discovery. Participants frequently reported mixed and contrasting experiences such as sadness, excitement, anxiety and pleasure. It is argued that this wide variety of experience may be due to the specific type of visit that was conducted.
The research is continuing. Other groups of participants will visit the same museum and the experiences of different groups will be compared.

Cultivating well-being through virtual art engagement: Examining the mechanistic roles of immersion and reflection

Katherine Cotter
Humanities and Human Flourishing Project, Positive Psychology Center, University of Pennsylvania, Philadelphia, USA

Research suggests visiting art museums and engaging with art are beneficial to well-being. Much of this research, however, has emphasized typical art engagement practices or programs developed to address the needs of specific populations (e.g., the social isolation of older adults). But just as the arts can impact well-being outcomes directly, the arts have also

been examined as a way for people to cultivate skills via educational content (e.g., medical humanities programs designed to hone observational techniques). In this study, we experimentally examined the ability of psychoeducational interventions to cultivate perspective-taking and social connection over the course of a 5-week longitudinal study and what role the mechanisms of immersion and reflection play in the effects of the interventions. A sample of 397 U.S. adults recruited via Prolific were randomly assigned to one of three conditions: perspective-taking, social connection, and art control. The perspective-taking condition received video content explaining the benefits of perspective-taking and how to engage in different forms of perspective taking when viewing. The social connection condition received video content explaining different components of social connection (e.g., belonging, social support) and how to reflect on connections in their lives via art viewing. The art control condition received video content describing artistic elements (e.g., color, line) and how to focus on these when viewing art. Participants then completed a series of virtual art gallery sessions applying the techniques contained in the respective videos. Measures of empathy, social connection, loneliness, and well-being were taken prior to the intervention, following each viewing session, and one week following the end of the intervention. Here we focus on changes in the outcomes of interest over time, how the intervention conditions shape the type of changes observed, and how immersion and reflection during the viewing sessions impacts the intervention effects.

Group discussions in the gallery heighten aesthetic experience and well-being

Aleksandra Igdalova*, Safiyyah Nawaz, and Rebecca Chamberlain
*Goldsmiths, University of London, London, UK

Museums are inherently social spaces. Groups account for the majority of museum visits as compared to individual viewers (Hein, 2002). But whether visitors prefer co-engaging in the arts for social connection or for enhanced aesthetic experience remains unknown. This talk presents the first experimental, large-scale study to systematically investigate how social contexts, especially conversation, contribute to the subjective experience of art and related well-being benefits. Conducted within a real exhibition space at Manchester Art Gallery, this experiment employed a between-participant design in which visitors (N = 241) were randomly assigned to either an individual viewing condition, a synchronized, silent group viewing condition, or a discussion-based group viewing condition. Participants viewed two paintings for 10 min each while listening to a series of slow-looking prompts. While we found increases in pre vs. post well-being markers such as increased positive affect and decreased stress across all the groups, the individual and discussion groups both demonstrated heightened emotional activation and aesthetic experience scores as compared to the synchronized group. However, only participants in the discussion group exhibited significant well-being impacts, reporting elevated positive affect, social connectedness, and group closeness as compared to the synchronized group. The differences between individual and group viewing with regards to social connection and aesthetic experience will be considered, especially in light of the perspective shifts that may occur during discussions of visually ambiguous artworks. Preliminary results from a laboratory replication study at the University of Pennsylvania will also be discussed to evaluate the generalizability of the results outside of naturalistic art settings. Contributing to the discourse on emergent tools for increasing art engagement in museum spaces, this presentation will offer practical insights for museum curators and educators to use art experiences to promote well-being and deeper engagement with artworks.

The powerful experience. Emotion regulation and self-image in personality disorders in arts and psychomotor therapies

Suzanne Haeyen
GGNet, Centre for Mental Health, Scelta, Centre of Expertise for Personality Disorders Apeldoorn, The Netherlands; HAN University of Applied Sciences, Academy of Health and Vitality, Research Group Arts & Psychomotor Therapies in Health Care, Nijmegen, The Netherlands, and KenVaK, Research Centre for the Arts Therapies, Heerlen, The Netherlands

Introduction and objective: Arts & psychomotor therapies are experience-based and use tools like drama, dance, images, exercise, movement or music. Multidisciplinary treatment programs for people diagnosed with personality disorders often include these forms of therapies. Personality disorders are complex mental disorders and people with this diagnosis are often difficult to reach from an emotional perspective. But how are these therapies perceived, what are the effects and what are the working mechanisms? How are these therapies perceived by patients? In this presentation I will introduce the use of arts & psychomotor therapies within this target group and point out core themes of art therapy: the powerful experience, emotion regulation and self-image regulation.
Methods: Multiple recent quantitative as well as qualitative studies will be presented and discussed.
Results: The available studies show promising results regarding effects of arts and psychomotor therapies. Patients perceive these therapies as a positive and effective way to improve the felt connection with their emotions, gain self-insight and improve personal behavior and social functioning.
Conclusion: Arts & psychomotor therapies may help people diagnosed with a personality disorder to gain access to their emotions, to be able to regulate their emotions and to develop a stable, more positive self-image. Although the evidence base is growing there is still a considerable need for more knowledge on this topic - theoretical, scientific and practical.

Lunch & Posters 1

1:00 – 2:30 PM

Symposium: What behaviour genetics tell us about aesthetics

2:30 – 4:00 PM
Lluís Domènech Auditòrium

Moderators: Giacomo Bignardi[1] & Rebecca Chamberlain[2]

[1] Language and Genetics Department, Max Planck Institute for Psycholinguistics, Nijmegen, the Netherlands, and Max Planck School of Cognition, Stephanstrasse 1a, Leipzig, Germany.
[2] Department of Psychology, Goldsmiths University of London, London, UK.

There are large inter-individual differences in the evaluation, perception, production, and creation of the arts. Why is this the case? In this symposium, we introduce an emerging field that deals with this question —quantitative behaviour genetics of aesthetics. In the first talk, G.Bignardi will discuss the genetic contributions to individual differences in music-specific reward sensitivity and its relationship with perceptual and affective processes. Here, particular attention will be given to the twin design and what twin modelling can tell us about the nature of sensory evaluations. In the second talk, L.Wesseldijk will present novel findings on the relationship between music listening and mental health. By combining the twin design with molecular genetics, this talk will elucidate why the music listening and mental health

relationship is more complex than we previously thought. In the third talk, P.Xia will expand more on mental health, this time shifting the focus to its relationship with creativity. Here, Xia will introduce individual genetic propensity indices for creativity obtained from a genome-wide association study of creative professions and discuss their relationship with various mental health outcomes. In the fourth talk, M.Mosing will address the complex relationship between flow experiences, commonly elicited by creative engagement, and mental health, taking familial confounding and neuroticism into account. Finally, the fifth talk will focus on a different core topic of empirical aesthetics: expertise. F.Ullén will give an overview of behaviour genetic and neuroimaging studies of musical skill learning and expert performance. By highlighting pervasive gene-environment interaction and correlations, Ullén will paint a story in which a simplistic nature-nurture narrative does not hold. In summary, the symposium aims to illustrate how approaches from behaviour genetics can shed new light on a wide range of both new and old questions in the field of empirical aesthetics.

Ways of experiencing: quantitative behaviour genetics of music reward sensitivity

Giacomo Bignardi
Language and Genetics Department, Max Planck Institute for Psycholinguistics, Nijmegen, the Netherlands, and Max Planck School of Cognition, Stephanstrasse 1a, Leipzig, Germany.

There are large inter-individual differences in individuals' ways of experiencing the same sensory world. Recent work focusing on music affective experiences has opened a window into what makes individuals differ so much. However, one question remains unanswered: do genetic factors substantially contribute to such individual differences? In my talk, I will present a study that provides a conclusive answer to this question. We focused the study on music-reward sensitivity, i.e., the individual's sensitivity to music as a source of pleasure. To quantify the relationship of music reward sensitivity with genetic differences between individuals (heritability or h2), we collected Barcelona Music Reward Questionnaire (BMRQ) data from a sample of 9,169 Monozygotic and Dizygotic Swedish twins and applied the twin design. Additionally, to assess the degree to which such genetic effects might be independent of those contributing to general perceptual and affective processes, we jointly analysed objectively assessed music discrimination abilities and general reward sensitivities. Our results highlight substantial heritability estimates for music-reward sensitivity (h2 = .54; 95%CI [.51,.58]), even after accounting for common genetic causes shared with general perceptual and affective processes (deconfounded-h2 = .33, 95%CI [.28,.38]). Further exploratory analysis exploiting the multivariate twin design revealed that such genetic effects are primarily distinct across different aspects of how individuals are affected by music. These results collectively indicate that genetic effects substantially contribute to making the experience of the same class of sensory stimuli different between individuals. Yet they are inconsistent with the existence of just one pathway via which genetic differences might impact individual differences, even for a defined sensory stimulus such as music. Instead, the findings paint a complex picture in which genetic differences contribute to the multidimensional nature of affective experiences and, in turn, also partially contribute to what makes ways of experiencing music unique.

The relationship between music listening and mental health in a genetically informed population study

Laura W. Wesseldijk
Department of Neuroscience, Karolinska Institutet, Stockholm, Sweden; Department of Psychiatry, Amsterdam UMC, University of Amsterdam, the Netherlands; and Department of

Cognitive Neuropsychology, Max Planck Institute for Empirical Aesthetics, Frankfurt am Main, Germany.

While some actively play instruments, most people primarily engage with music through listening. Building upon our prior research on music playing and mental health, in this talk, I will delve into the association between music listening and mental health. In this study, we analysed weekly music listening habits from approximately 10,500 Swedish twins in 2011 and about 9,000 in 2022 - with roughly 5,500 participants overlapping. We tested whether the amount of music listening was indicative of a diagnosis of depression, anxiety, schizophrenia, bipolar or stress-related disorders based on nationwide patient registers or of self-reported symptoms like depressive episodes and burnout in 2011 and well-being in 2022. For a 5,500-participant subset, we generated polygenic scores for several mental health conditions to explore associations with music listening frequency. Survival analyses were used to test effects of musical listening on the incidence of psychiatric disorders, while regression analyses were applied for self-reported mental health and polygenic score analyses. The amount of music listening correlated .49 (95% CI .47-.51) over time. Initial findings reveal that frequent listeners, across both years, had a higher likelihood of stress-related diagnosis (HR 1.08). In 2022, frequent music listening was also associated with an anxiety diagnosis (HR 1.08). Correspondingly, individuals genetically predisposed to major depression, depressive symptoms, and neuroticism listened more frequently (betas ranging from .05 to .06, $p < .001$). No link was found between music listening and self-reported mental health. We will extend these findings by applying longitudinal, co-twin-control, and gene-environment interaction analyses to study relationships between mental health fluctuations and music listening, and underlying gene-environment interplay.

Unravelling the relationship between creativity and mental health using a genetically informative sample

Penghao Xia
Department of Neuroscience, Karolinska Institutet, Stockholm, Sweden, and Department of Cognitive Neuropsychology, Max Planck Institute for Empirical Aesthetics, Frankfurt am Main, Germany.

There is a common mad-genius belief suggesting that desirable abilities, like creativity, come with the cost of mental health. This belief is not in a vacuum. Some studies found creativity to be positively correlated with certain mental complaints (e.g., schizophrenia), phenotypically and genetically. Besides, creative professionals like musicians are found to be more susceptible to some psychiatric disorders. While past research suggests that genetics play an important role, still little is understood about potential causal influences and the underlying genetic architecture of the above relationships. Recently, for the first time, a large-scale genome-wide association study (GWAS) searching for genetic variants associated with creativity has been conducted, which enables us to explore the relationship between creativity and mental health in further depth. Applying longstanding and novel methods from the field of behaviour and molecular genetics, we can take familial confounding into account and test causality. In a large sample of genotyped Swedish twins, we have calculated individuals' genetic predisposition for creativity based on summary statistics from the creativity GWAS, the so-called polygenic score (PGS), to test how it predicts two indicators of creativity, (1) divergent thinking and (2) achievement in creative domains, as well as various registry-based and self-reported mental health outcomes. Using Mendelian Randomization and the co-twin control design, we also address potential causal associations between the concepts. In this

talk, I will present novel findings on the intricate nature of the relationship between creativity and mental health and address the role of underlying genetic confounding.

Can Flow Experiences Be Protective Against Mental and Cardiovascular Health Problems?

Miriam Mosing
Department of Neuroscience, Karolinska Institutet, Stockholm, Sweden; Department of Cognitive Neuropsychology, Max Planck Institute for Empirical Aesthetics, Frankfurt am Main, Germany; Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden; and Melbourne School of Psychological Sciences, University of Melbourne, Melbourne, Australia.

Flow is the phenomenon of being "in the zone", marked by an intense, effortless, and rewarding concentration on a task. Engagement in music and the arts is known to be flow-promoting. It has been suggested that flow proneness (i.e. the tendency to experience flow) is associated with good mental and cardiovascular health. However, the design of past studies has been primarily cross-sectional, based on self-report data, and has not controlled for potential confounding effects of neuroticism. As such, these studies do not allow for conclusions to be drawn about a potential causal protective effect of flow proneness on health. The present talk will explore the nature of the relationship between flow proneness and health outcomes, primarily focusing on two recent studies utilizing data from the Swedish Twin and the Swedish National Patient Registries. In this large, longitudinal twin sample ($N > 9,000$), we investigated whether flow proneness predicted self-reported and registry-based diagnoses of burnout, depression, anxiety, schizophrenia, bipolar disorder, stress-related disorders, or cardiovascular diseases. Specifically, we tested if (a) there is a relationship between flow proneness and health diagnoses over time, (b) neuroticism confounds this relationship, and (c) the relationship remains present within discordant monozygotic twin pairs, thereby controlling for genetic and shared environmental confounding. Our findings are in line with a causal protective role of flow experiences on depression and potentially anxiety and highlight that neuroticism and familial factors are notable confounding factors in observed associations between flow proneness and health outcomes.

Beyond born versus made: gene-environment interplay in musical expertise

Fredrik Ullén
Department of Neuroscience, Karolinska Institutet, Stockholm, Sweden, and Department of Cognitive Neuropsychology, Max Planck Institute for Empirical Aesthetics, Frankfurt am Main, Germany.

Expertise, i.e. a high level of skill within a specific domain, has traditionally been considered to depend essentially on one factor, long-term practice. However, recent research on large genetically informative samples shows that reality is more complex and interesting. In my talk, I will discuss key findings from our work on musical expertise, where we use a combination of approaches from behaviour genetics and neuroimaging to analyze individual differences in musical expertise, and the neural representation of musical skills in the auditory-motor system. The overall picture provided by this work is that the acquisition of expertise is a complex process, which is shaped by an interplay between many variables that include practice but also genetic factors, traits of the individual and properties of the environment. With examples from studies using twin modelling as well as, more recently, analyses of genotyped data, I will illustrate how studying expertise in genetically informative

samples provides unique possibilities to disentangle genetic from non-genetic influences, and analyze causal mechanisms. Specifically, I will provide evidence for that gene-environment interplay in expertise involves both gene-environment interactions, i.e. that genetic influences on expertise are moderated by environmental factors, and covariation between genes and relevant environmental variables.

Session: Living spaces

2:30 – 4:00 PM
Sala George Bernanos
Moderator: Oshin Vartanian

Probing the neural bases of biophilia using low-level visual features
Oshin Vartanian
Department of Psychology, University of Toronto, Toronto, Canada

There is growing evidence to suggest that people prefer natural patterns in architecture. This observation is consistent with the biophilia hypothesis, according to which people have a genetically-rooted need to seek natural environments, based on our species' evolution in biological rather than manufactured environments. One approach to testing this hypothesis involves examining whether the brain is sensitive to variations in low-level visual features that reflect naturalness, such as contrast (i.e., discernible differences in texture, colour, etc.) and levels of scale (i.e., incremental, hierarchical organization of parts), among others. Building on behavioural research showing that people prefer interior and exterior architecture that appears natural, we calculated four low-level visual features associated with naturalness for a set of 200 images of architectural interiors used in prior research: Edge density (a measure of the quantity of straight and curved edges), 2-dimensional fractal dimension (a measure of the visual complexity of edge maps), diversity of brightness (measured by the SD of lightness in HSL) and diversity of colour intensity (measured by the SD of saturation in HSL). Reanalyzing data from a previous fMRI study, we found that edge density and diversity of brightness and colour intensity predicted approach-avoidance decisions (i.e., enter vs. exit), whereas diversity of brightness and 2-dimensional fractal dimension predicted beauty judgments (i.e., beautiful vs. not beautiful). Furthermore, neural activation in the lingual gyrus (BA 17) covaried in relation to edge density under both task conditions. Consistent with the biophilia hypothesis, these results suggest that preference for architectural interiors is influenced by low-level visual features that reflect naturalness, as is brain function. The next steps involve a series of behavioural studies to examine the reliability of this preference, as well as its magnitude in populations that vary in expertise and formal training in architecture.

Mental Imagery modulates the evaluation of paintings and photographs
Fatima Felisberti
Psychology Department, Kingston University London, UK

Mental imagery, a quasi-perceptual experience in the absence of external stimuli, is involved in the modulation of vicarious emotions and assorted forms of perception, but little is known about its role in affective and aesthetic evaluations of cultural artefacts, which was addressed in two studies. Study 1 examined the association of cognitive styles of mental imagery with the evaluations of paintings and photos of daily scenes, while Study 2 focused on the association of sensory mental imagery with the evaluations of paintings and photos of environmental scenes.

The findings from Study 1 showed that object and spatial cognitive styles of mental imagery predicted the aesthetic ratings for photos, which in turn were moderated by the vividness of the imagery, but not by art experience. Conversely, imagery and its vividness had no effect on the ratings for paintings, but art experience was a significant moderator of the response. Findings from Study 2 showed that visual mental imagery was a strong predictor of affective and aesthetic evaluations of images of environmental scenes in terms of their man-made content, chromatic contrast, and their green, yellow, blue, and pink pixel content.
The set of findings indicate that mental imagery (with regards to visual cognitive style and sensory channel) can fine-tune the enjoyment of images depicting a wide range of scenes. They underpin the importance of understanding the relationship between mental imagery and the aesthetic and affective appreciation of visual images when planning/designing living spaces where access to the outdoors and nature are restricted (e.g., jails, hospitals, underground).

Investigating positive and threat-based awe in natural and built environments
Hanna Negami
Perkins Eastman, Toronto, Canada

Awe has long shaped our relationship to nature and the built environment, such as through religious monumental architecture, yet research is only beginning to uncover specific psychosocial and physiological effects of feeling awe through architecture. Most psychological work relies on nature imagery to evoke awe; yet architecturally-induced awe has enormous implications for how awe-eliciting architecture, such as cultural and religious sites, facilitate their sociocultural functions through built form. While demonstrated positive effects of feeling awe include increased prosocial behavior and feelings of connection to others, less is known about threat-based awe, or awe elicited through a threatening stimulus, such as that experienced when witnessing natural disasters. Across three online studies, we explore effects of positive and threat-based awe elicited through nature and architecture. Study 1 (N = 116) uses videos of natural phenomena to replicate previous findings comparing effects of positive and threat-based awe on feelings of powerlessness and self-size. Study 2 (N = 100) extends these findings to architectural environments chosen to elicit positive and threat-based awe. However, the video meant to elicit threat-based awe elicited positive awe for most participants. Because we failed to elicit threat-based awe with architectural stimuli in Study 2, Study 3 (N = 85) compared only effects of positive awe elicited through natural and architectural environments on feelings of universality and identification with others. We found that both natural and architecturally induced positive awe similarly promote feelings of universality and connection with people all over the world, compared to a control condition. This research broadens our understanding of how we respond to awe-inspiring spaces in urban environments, from natural oases to ancient structures and supertall skyscrapers, and the implications these responses have for architectural and urban design.

Art in urban spaces: Assessing the psychological and societal effects of two public art exhibitions in Berlin
Corinna Kühnapfel*, MacKenzie Trupp, Matthew Pelowski, and Joerg Fingerhut.
*Berlin School of Mind and Brain, Department of Philosophy, Humboldt-Universität zu Berlin, Berlin, Germany

Art that is publicly displayed has the potential to captivate us. It offers opportunities to emotionally connect, reflect, and possibly alter our perspectives. This can apply to outdoor sculptures and murals, but also to art showcased in public street-level galleries. In two free,

street-level contemporary exhibitions at Gallery Wedding (Berlin), curated by Solvej Ovesen, we engaged pedestrians with the exhibitions and assessed mood, values, and attitudes before and after the experience.
The first exhibition, “The Mine Gives, the Mine Takes” by Ana Alenso highlighted the link between Venezuela's socio-economic crisis and unregulated gold mining, aiming to raise awareness about the impacts of metal purchases. We found that this exhibition influenced visitors (N = 50) by increasing their awareness of nature while diminishing their mood and hedonic values.
The second exhibition, ""Job Center. Psychic Places"" by Emily Hunt, focused on community engagement and perceptions of local relationships in the neighborhood the gallery is situated in. Participants (N = 64) reported a heightened sense of neighborhood connection and improved subjective wellbeing after interacting with the exhibit.
Furthermore, in these studies, we included approaches taking into consideration the perspective of the artists and curator by interviewing them about their aims to instill emotional engagement in the viewers. Preliminary results show that in both studies, the extent to which feeling the emotions the artist intended to evoke in the viewer, yet not those of the curator, as well as subjective aesthetic evaluation of each exhibition (as good, interesting, etc.), predicted changes in the variables we measured pre- and post-exposure. We discuss our findings regarding insights into the impacts of brief art engagements in urban and accessible everyday settings on the transformative potential of art concerning our moods, well-being, the attitudes we hold, the cognitive processing enabled in art settings, and potential behavioral changes.

Bridging perspectives: Exploring the empirical aesthetics of bridge design
Claudia Damiano
Department of Psychology, University of Toronto, Toronto, Canada

Bridges frequently emerge as iconic landmarks that are emblematic of a city. People readily recognize London by the Tower Bridge or San Francisco by the Golden Gate Bridge. However, bridges can also go unnoticed or even be downright ugly. Bridges are designed as practical public infrastructure, yet also have the potential to define and influence their surroundings. Nonetheless, little is known about what shapes the aesthetic appeal of bridges. Here we explore how aesthetic judgements of bridges relate to engineering and design features. Our dataset comprises 318 images of 118 bridges from around the world, rated by 200 participants for aesthetic pleasure, interest, complexity, and safety. A group of civil engineers annotated each image for type, depth, material, apparent age, and aesthetic premium. Using Factorial Analysis of Mixed Data, we found two significant dimensions. The first, aesthetics, dimension shows strong correlations among aesthetic, complexity, and interest ratings and is related to bridge type. The second, safety, dimension relates subjective ratings of safety to bridge age and material. Analysis of visual features of bridges, using the Mid-Level Vision Toolbox, shows that contour length is a predictor of both bridge type and the aesthetic, complexity, and interest ratings. For example, truss bridges, made up of several interconnected beams, are represented by many short contours and are generally rated as more complex, interesting, and aesthetically pleasing. On the other hand, the visually simple slab and girder bridges are often represented by a few long contours and are rated as uninteresting and not aesthetically pleasing. Our study offers the first attempt to systematically collect and analyze subjective ratings of bridge aesthetics, paving the way for empirically supported decisions for the design of bridges and, potentially, other public infrastructure projects.

Session: Music appreciation

2:30 – 4:00 PM
Sala Miquel dels Sants Oliver
Moderator: Jonna Vuoskoski

Musical beauty is more than just pleasurable

Yuko Arthurs* and Diana Omigie
*Department of Psychology, Goldsmiths, University of London, London, the UK, and Department of Psychology, Waseda University, Tokyo, Japan.

While beauty may no longer be considered the central concept in the aesthetic experiences of arts (Leder et al., 2004, Schubert, 2023), it remains a quality that composers and performers strive to attain, and which listeners seek out and appreciate. It has been argued that the experience of pleasure is a prerequisite for the experience of beauty (e.g., Skov & Nadal, 2021; Brielmann & Pelli, 2019). However, less is known about what differentiates the experience of musical beauty from other highly valued music experiences. To throw light on this, a questionnaire with open-ended questions was administered to people with various musical backgrounds, with questions focusing on the sonic features of music that participants found beautiful, the feelings they had when listened to said music and finally the impact that the named beautiful music had had on them. Critically, listeners answered the same questions for music they didn't find beautiful but which they listened to regularly. Preliminary analysis reveals that music found beautiful tends to have rich harmony and striking melodies, and tends to make respondents feel low arousal, mixed valence emotions. It also revealed that pieces found beautiful are associated with vivid autobiographical memories. This contrasts with non-beautiful music, which was associated with a range of features and which listeners tended to associate with fun, joyfulness, and wanting to dance. These findings highlight that the experience of beauty in music is not just characterised by pleasure, but has a clear musico-acoustic and emotional signature that differentiates it from other highly valued music. It also highlights the "greater impact" on identity and self that beautiful music may have beyond the listening experience.

Musical dislikes: Rationales, functions, and physiological reactions

Julia Merrill
Music department, Max Planck Institute for Empirical Aesthetics, Frankfurt am Main, Germany

Most research on musical taste predominantly relies on individuals' likes or preferences for specific music genres. A set of studies was designed to underscore the intricacies and multifaceted nature of aesthetic judgments, elucidating the significance of considering musical dislikes as pivotal elements in conceptualizing musical taste. Initially, an investigation into the rationales behind disliked music was conducted through in-depth interviews. The results showed pertinent categories encompassing social, music-related, and self-related reasons contributing to the dislike of various musical genres. Subsequently, an online survey was administered to delineate the structure of these rationales, resulting in the identification of two latent profiles. The 'highbrow' profile revolves around the dislike of music deemed 'Too Simple,' intertwined with notions of being 'Too Mainstream' and 'Not Authentic,' all linked to the concept of 'Social Incongruence.' This elevated form of thinking leads to a disdain for popular music, culminating in outcomes ranging from 'No Impact' to active 'Displeasure.' This displeasure appears to be mediated, if not instigated, by perceived social incongruence. On the other hand, the 'lowbrow' profile centers on dislikes of 'Too

Niche' and 'Too Complex' music. The former is connected to 'Displeasure,' potentially due to visceral responses. In a further study, an examination of bodily reactions to disliked music was undertaken, employing psychophysiological measures. The findings revealed heightened arousal responses and increased facial muscle activity when listening to disliked music as opposed to neutral music. This suggests that physiological arousal serves not only as an indicator of pleasure derived from preferred music but also as a marker for disliked music. This series of studies underscores the inadequacy of exclusively focusing on listeners' preferences in musical taste research. It emphasizes the necessity of considering the diverse aesthetic criteria that underlie everyday evaluations of music, including the often overlooked aspect of musical dislikes.

The attribution of virtual agency to music predicts liking

Jonna Vuoskoski*, John Melvin Treider, and David Huron.
*Department of psychology, University of Oslo, Oslo, Norway

Following up past research linking the enjoyment of sad music to the fantasy facet of trait empathy, we investigated the hypothesis that listeners with high trait fantasy are more likely to impute virtual agency to instrumental music. Three studies were carried out. The first two were online surveys involving 112 and 137 participants (respectively) who rated sets of words in terms of their implied agency, synonymousness, or applicability for describing music. The third involved a listening task in which 299 participants listened to 24 short excerpts of instrumental music, rated their enjoyment, and selected up to three words that best described each excerpt. A list of 16 words was compiled based on the results of the first two studies and comprised 8 pairs of words that differed in terms of their level of implied agency but were matched in terms of their meaning and applicability to music. Participants also completed the Fantasy subscale of the Interpersonal Reactivity Index (Davis, 1980). The results did not support the hypothesis that high-fantasy listeners would be more likely to impute (virtual) agency to music. Instead, linear mixed-effects models revealed that the attribution of agency was significantly associated with enjoyment and musical arousal. The arousal dimension is positively associated with energy and activity, and thus it is possible that the perception of high activity contributes to an increased sense of agency. The fact that enjoyment was positively associated with the tendency to favour high-agency descriptors supports the view that social cognition and social emotions play an important role in our experience of music (Huron & Vuoskoski, 2020).

Measuring shared taste across contrasting types of vocalizations

Camila Bruder*, Klaus Frieler, and Pauline Larrouy-Maestri.
*Music Department, Max Planck Institute for Empirical Aesthetics, Frankfurt am Main, Germany

In the visual domain, studies have shown that participants agree more on their preferred stimuli (i.e., there is more shared taste) for natural types of stimuli, such as faces and landscapes, than for more artifactual types of stimuli, such as visual art (Vessel et al., 2018). We have recently proposed a registered report (Bruder et al., under review) to investigate if this principle of higher shared taste for more natural types of stimuli can also be observed in the auditory domain, namely in the aesthetic appreciation of voices. In this study, 71 participants rate how much they like 330 vocal performances, corresponding to three melodies performed by 22 singers in three different singing styles (as a lullaby, as a pop song, as an opera aria), and two speaking styles (as if directed to an adult or to an infant), in two testing sessions [we anticipate completing data analysis by April and being able to present the

final results at the conference in May]. Using different measures of agreement ("mean-minus-one" - Vessel et al., 2018; and the beholder index - Hönekopp, 2006), we propose to test the prediction that there should be more shared taste for lullabies, a more "natural"/universal type of singing, than for operatic singing, a more "artificial" type of singing; and to assess how consistent are preferences for some voices across the five contrasting vocalization styles. This approach will help us integrate findings on spoken voice attractiveness with recent research on the singing voice and thus better characterize preferences for highly relevant vocalizations.

Studying a global network of cultural diffusion through large-scale music discovery behaviour

Harin Lee*, Manuel Anglada-Tort, Marc Schönwiesner, Minsu Park, and Nori Jacoby.
*Max Planck Institute for Empirical Aesthetics, Frankfurt am Main, Germany; Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany, and Department of Life Sciences, Leipzig University, Leipzig, Germany.

Are cultures becoming more homogenous as a result of one-way global cultural flows? Or are we instead moving towards a cosmopolitan world with greater cultural diversity? What are the layers and substructures that transmit and sustain these cultural flows? Empirically addressing these questions has been challenging due to the lack of large-scale comparative data with high temporal and geographical resolution. Here, we quantify cultural flows through temporal patterns of music consumption spanning 1,423 cities across 53 countries, encompassing 17.8 million events and 112,568 unique song trajectories over two years. Our approach combines network science, music information retrieval, and computational sociology to map the global network of cultural diffusion and examine the roles of cities within it. Key findings illustrate a complex, polycentric network of 21 distinct cultural communities that transcend national borders, each with unique music consumption patterns. Cities within this network adopt roles as cultural bridges, gatekeepers, national hubs, or peripheries. Cultural bridges and gatekeepers, usually in populous areas, are characterized by diverse musical tastes, and early adoption of trends, and serve as epicenters for cultural mixing and globalization. Conversely, national hubs and peripheries, smaller and less globally connected, play critical roles in maintaining national culture and local traditions. Our study reveals an intricate global network of cultural diffusion, with music serving as a metric for understanding cultural processes. More broadly, our research contributes significantly to the discourse on globalization, cultural hybridization, and the formation of cultural niches, offering a comprehensive view of the contemporary cultural landscape.

Coffee break & Posters 1

4:00 – 4:30 PM

Symposium: The Impact of AI on the Artworld, the Artist and Empirical Aesthetics

4:30 – 6:00 PM
Lluís Domènech Auditòrium

Moderators: Aenne Brielmann[1] & Gregor Hayn-Leichsenring[2]

[1] Hector Research Institute of Education Sciences and Psychology, University of Tuebingen, Tuebingen, Germany.
[2] Institute for Anatomy I, University Hospital Jena, Jena, Germany.

This symposium hosted by Aenne Brielmann examines how artificial intelligence (AI) alters the artworld and identifies opportunities and problems for the artistic process and empirical aesthetics that are created by the use of AI.
The first talk focuses on the sociocultural impact of AI on the artworld. Dejan Grba investigates the influence of AI on the perception of art in popular culture and describes several aspects like a coexistence of anthropomorphism and misanthropy in an AI-influenced culture that affect the assumptions about art's identity and functions.
Talk two and three focus on artists and their positions in relation to AI. The topic of the second talk is art that has been co-created by humans and AI. Lena Vogl examines the possible interplay between human creativity and artificial intelligence in the art-making process and identifies authenticity and trust as the main ingredients for a successful cooperation. Martin Zeilinger (talk three) explores strategies and tools that give artists the opportunity to fight back against generative AI. Based on similarities between AI-generated abstract visual art and the concept of 'adversarial machine learning', he analyses the function of adversarial behavior in artistic processes.
Talks four and five investigate AI in relation to empirical aesthetics. Surabhi Nath (talk four) will focus on the power of algorithms for both stimulus generation and evaluation. She shows that subjective complexity can be predicted by algorithmic measures of spatial complexity and disorder and that the same measures also predict beauty ratings. Then (talk five), Gregor Hayn-Leichsenring argues based on an intensional analysis of the term "artwork" that AI-created artistic items necessarily must be considered as proper "artworks" and identifies challenges that AI artworks cause for empirical aesthetics research. The symposium will close with a joined panel discussion including the speakers and Ed Vessel as special guest.

Art Notions in the Culture of (Mis)anthropic AI

Dejan Grba
Digital Art Program, Interdisciplinary Graduate Center, University of the Arts, Belgrade, Serbia.

In this talk, I take the current hype around the proliferation of artefacts with large multimodal generative models as a pretext to explore a broader perspective of AI's influence on the notions of art and creativity in popular culture and the artworld. An assortment of anthropomorphic fallacies, the manipulative rhetoric around the machinic agency and democratization of artmaking spun by the AI industry and art market, the closely related "receding artist" syndrome, and the naïve or superficial art knowledge across AI science/tech cultures converge in that perspective to affect the assumptions about art's identity, functions, and future. Their momentum comes from a largely unexplored confluence of anthropomorphic ideas and weird tendencies with misanthropic overtones in deep philosophical and ideological layers of computer science and modern AI.
While my focus is on artistically relevant manifestations of AI's cultural sway, knowing its conceptual undercurrents is crucial for cultivating an informed and responsible approach to contemporary art and AI. It is equally conducive to understanding AI's economic successes achieved, inter alia, by fostering the info-capitalist suppression of the social rootage of AI technologies, concealing human roles behind their performative power, filtering human benefits from making and using them, and misrepresenting human interests driving the social conflicts they foment.
The coexistence of anthropomorphism and misanthropy in the AI-influenced culture can be viewed and should be critiqued as an amalgamation of economic interests, self-indulgent anthropocentric fallacies, immanent psychological mechanisms of self-deception, deception,

and cognitive compartmentalization, as well as virtue-signaling, competitiveness, and exploitative drives. The fact that shady motives and unflattering features of human nature like these remain insufficiently considered in modern AI studies may explain the ease with which (mis)anthropic contradictions infuse the artworld's and popular notions of the "nature" of artmaking, sometimes with detrimental effects.

Navigating the Human-AI Artistic Landscape: Cognitive Perspectives on AI as a Collaborator in Human Creativity

Lena K. Vogl & Claus-Christian Carbon
Department of General Psychology and Methodology, University of Bamberg, Bamberg, Germany.

This paper examines the dynamic interplay between human creativity and artificial intelligence (AI) in art. Specifically, it explores how we perceive the quality and role of AI as a collaborative partner in generating art. We considered key factors of artistic quality, derived from recent aesthetic research, such as authenticity, trust and aesthetical quality, to understand the complex cognitive processes underlying human-AI artistic collaboration and its reception by viewers. Authenticity appears to be a fundamental aspect in evaluating the success of AI-human partnerships in art production. Trust, a critical element in human-AI interaction, is viewed through the lens of cognitive psychology. We highlight cognitive factors that shape trust in AI as a creative collaborator, and the cognitive mechanisms that influence the establishment of trust between human artists and AI systems. Applying theories of aesthetics, we aim to decode the aesthetic peculiarities of AI-generated art and attempt to understand the cognitive processes underlying specific aesthetic experiences. This will expand the evolving discourse on human-AI collaboration in art by understanding the cognitive characteristics of perception and appreciation of art co-created by humans and AI.

Adversarial AI Art

Martin Zeilinger
School for Design & Informatics, Abertay University, Dundee, United Kingdom.

Bridging aesthetics, critical perspectives, and technical discussion, this paper links AI-generated abstract visual art to the concept of 'adversarial machine learning.' In aesthetic contexts, abstraction can be described as a strategy that deliberately obstructs content-legibility and determinacy for human audiences. In AI contexts, something conceptually similar is achieved through the creation of adversarial images that interfere with the integrity of machine learning datasets and the functionality of AI algorithms. My discussion introduces and connects these domains, to explore artistic practices that mobilise 'adversarial' processes alongside a survey of how such processes are perceived and negotiated within AI research & development communities. The examples discussed will frame the following guiding questions: What is the function and critical valence of 'adversarial' behaviours at a moment when AI-generated outputs are beginning to dominate the landscape of digital visual culture, and when AI is frequently perceived as having a tendency to misappropriate and exploit the creativity of human artists? What aesthetic and technical tactics are available to respond to the disruptions caused by adversarial behaviours? My discussion will draw on the work of artists including Zach Blas and Jake Elwes, and touch on adversarial tools such as the MIT-developed 'dataset-poisoning' protocol called Nightshade.

Quantifying Complexity in Synthetic and Natural Images

Surabhi Nath[1], Kevin Shen[1], Peter Dayan[1], & Aenne Brielmann[2]

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[2] Hector Research Institute of Education Sciences and Psychology, University of Tübingen, Tübingen, Germany.

Subjective complexity judgements play a crucial role in perception. Complexity is a major driver of aesthetic judgements, along with other cognitive characteristics such as memorability or engagement. Many studies have tried to identify the factors influencing the complexity of images. Despite an overall lack of consensus, studies have suggested that features from different levels of abstraction jointly contribute to complexity. We developed computational objective complexity measures to predict the subjective complexity of synthetic and natural images, and tested them in two studies. In study 1, we synthetically generated 2D binary pixel patterns using cellular automata, calculated multiple statistical objective measures including density, entropy, local spatial complexity, Kolmogorov complexity, intricacy and asymmetry, and related them to subjective ratings of complexity. The low-level measure of local spatial complexity, assessing the mean information gain of pairwise pixels, and the high-level measure of intricacy, counting the number of connected components in an image, together best predicted subjective complexity. In study 2, we collated four publicly available datasets (RSIVL, VISC, Savoias and IC9600) which report subjective complexity ratings for natural images including scenes and artworks. We adopted an object-centric approach, quantifying complexity as a function of the objects in an image. We found that subjective complexity was well explained by a low-level measure of number of objects, extracted using a hierarchical segmentation model, SAM, and a high-level measure of the number of named classes in the image, extracted using a semantic segmentation model, FC-CLIP. Across both studies, we applied algorithmic, information theoretic and deep-learning based methods to quantify the complexity of images. Through our work, we advocate for the use of similar computational methods in the aesthetics community, enabling large-scale, reproducible, and broadly interpretable analyses of experimental data.

A theoretical approach to AI "artworks" and their suitability for empirical aesthetics research

Gregor U. Hayn-Leichsenring
Institute for Anatomy I, University Hospital Jena, Jena, Germany.

So-called "AI art" has been discussed within the art world, news media and research for quite some time now. Some critical voices claim that AI (Artificial Intelligence) cannot produce artworks – often arguing that artworks must be human-made items. Within this theoretical study, I investigated the hypothesis that AI can create artworks and, additionally, examined their suitability for research. AI is the intelligence of machines or software, as opposed to human intelligence. It can generate various solutions to problems and also create items that resemble artworks. The term "artwork" is often considered as undefinable. However, it is possible to approach this term by its intensional definitions. These intensional definitions provide the meaning of a term by specifying necessary and sufficient conditions for when the term should be applied. Consequently, intensions aim at the internal concept that constitutes a formal definition. For the term "artwork", commonly used intensions are essentialism, intentionalism, functionalism, historicism, and institutionalism. Due to the philosophical nature of the term, none of the intensions for "artwork" are necessary features – but all can be sufficient features. Especially modern artworks do not fulfill every intension. Yet, they are still considered as artworks. Henceforth, AI-created artistic items also must be considered as

artworks, because – depending on the item – one or more intensions can be applied and thus assign the respective item as "artwork". While the intensions of the term "artwork" might be rather irrelevant for the perceiver, they are of importance in empirical aesthetics research. Depending on the research question, AI artworks might be problematic. If one investigates the message of the artist or the historic meaning, the use of some AI artworks as stimuli might lead to insufficient interpretations. Overall, AI-created artistic items should be considered as artworks, but they might be inadequate stimuli for aesthetics research.

Session: Development and expertise

4:30 – 6:00 PM
Sala George Bernanos
Moderator: Edward A. Vessel

Perception of beauty in art, music, and religion: The relevance of prenatal psychology
Richard Parncutt* and Klaus Evertz
*University of Graz, Austria

Visual beauty may depend on evolution (care for beautiful infants, sexual attraction, landscapes with plentiful food/water), cognition (symmetry, balance, unity), or familiarity (hence large individual and cultural differences). In (Western) music, auditory beauty (consonance) depends on smoothness (lack of psychoacoustic roughness), harmonicity (spectral similarity to harmonic series), and familiarity (e.g., specific chords or progressions). Alternatively, consonance depends on speech: a friendly/loving person produces undistorted harmonic complex tones, whereas an angry/dangerous person sounds rough.
In both art and music, perceptual familiarity may begin before birth. The third-trimester human fetus can perceive and recognize patterns in all senses (habituation, classical conditioning). An evolutionary approach predicts that the fetus associates the mother (upon whom its survival depends) with positive emotion.
Like a pet dog, the human fetus perceives prenatal situation without consciousness. The fetal situation is characterized by safe enclosure, bent postures, dull sound (amniotic fluid absorbing high frequencies), dull light (more perceptible in summer), weightlessness (similar to floating or flying), muffled maternal voice (fundamental frequency trajectory, plus a few overtones), maternal heartbeat (faster and slower with breath and arousal), and maternal walking (with sound phase-locked to movement).
Postnatal situations that are prenatally familiar may trigger mysterious or magical positive emotions. Temples and churches may be architectural representations of intrauterine experience: spaces for experiencing warmth (even without heating), comfort (on hard seats), and social connection (despite a small congregation). Musical-religious rituals imitate the prenatal situation in other ways: melody (maternal voice), rhythm (maternal heartbeat/walk), prayer/worship (maternal attachment). Prenatal theory might similarly explain the beauty of a starry sky (enclosure; entoptics) or sunset (enclosure; reddish color), especially at the seaside (fluid). Connections of this kind may manifest themselves differently across cultures.

Awe sparks prosociality in children
Eftychia Stamkou*, Eddie Brummelman, Rohan Dunham, Milica Nikolic, and Dacher Keltner.
*Department of Psychology, University of Amsterdam, Amsterdam, the Netherlands

Rooted in the novel and the mysterious, awe is a common experience in childhood, but research is almost silent with respect to the import of this emotion for children. Awe makes

individuals feel small, thereby shifting their attention to the social world. Here we study the effects of art-elicited awe on children's prosocial behavior towards an outgroup and its unique physiological correlates. Critically, to date, there are no validated ways to elicit and measure awe in children. To address this lacuna, we developed and validated age-appropriate methods to elicit and measure awe in children. In two pre-registered studies (N or Study 1=159, N of Study 2=353), children aged 8-13 viewed validated movie clips that elicited awe or joy, or a neutral control clip. Results showed that children who watched the awe-eliciting clip were more likely to spare their time on an effortful, tedious task (Study 1) and to donate their experimental earnings (a museum ticket in Study 1 and their favorite chocolate snack in Study 2), all towards benefiting refugees. They also exhibited increased respiratory sinus arrhythmia (RSA), an index of parasympathetic nervous system activation associated with social engagement. We discuss implications for fostering prosociality by reimagining children's environments to inspire awe at a critical age.

Aesthetic appreciation for musical consonance and implicit learning processes across the life span: a series of EEG studies on newborns, adult participants, and elderly
Irene Ronga*, Paolo Barbieri, Francesca Piovesan, Maria-Chiara Villa, Jacopo Frascaroli, Pietro Sarasso, Greta Varesio, and Katiuscia Sacco.
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Four out of five adults exhibit an aesthetic preference for consonant sounds over dissonant ones. EEG Mismatch Negativity (MMN), a well-validated index of implicit learning processes, is also enhanced for preferred consonant sounds compared to non-preferred dissonant sounds. Previous studies have suggested that this alignment between aesthetic preference and enhancements in implicit learning may indicate an evolutionary neural tuning towards the processing of consonant inputs. However, whether this effect is maintained across the lifespan remains unknown. To investigate the neural tuning for consonance, we conducted a series of EEG studies in newborns and in healthy elders. Twenty-two full-term healthy newborns (EXP.1) and twenty healthy elders (age: 73.1±5.2; EXP.2) were exposed to a sequence of auditory stimuli while recording their EEG. Our paradigm consisted of sounds varying in frequency (high and low pitch) and consonance level (fifth-consonant and tritone-dissonant intervals). Participants underwent six runs of the auditory paradigm. Three runs were exclusively composed of consonant sounds, while the remaining runs were selectively composed of dissonant sounds. Within each run, standard-repeated sounds alternated with deviant-novel sounds. We then computed the MMN, i.e., deviant minus standard responses, separately for consonant and dissonant sounds. Results indicate that more consonant sounds elicited a significantly larger MMN as compared to dissonant sounds in both newborns (EXP.1) and elderly (EXP.2) participants. Overall our data show that, in both age groups, electrophysiological indexes of implicit learning are enhanced for consonant sounds. These findings seem to confirm the presence of an evolutionary neural tuning toward the processing of consonant inputs, which is present since a few hours after birth and is preserved in aging. The present results might open up possibilities for developing clinical and educational applications aimed at enhancing memory and learning during the neurodevelopment and in physiological aging.

The effects of short-term visual art-related training on aesthetic judgment of painting
Dexian He* and Xianyou He
*Department of Psychology, Guangdong University of Education, Guangzhou, China

Knowledge-meaning (expertise, context, training, and culture) has been shown to influence people's aesthetic experiences. However, empirical work is lacking, and the mechanism underlying this process is also unclear. The present study investigated whether short-term visual art-related training affects laypeople's aesthetic responses to artworks and the psychological mechanism underlying this effect. Participants viewed and made aesthetic judgments (e.g., beauty, pleasure, liking, interest) of paintings before and after short-term art-related training. We found that participants rated paintings as more aesthetically pleasing and likable after the training. Differences in beauty ratings between the two time points were not detected. These results suggest that artistic training alters novices' aesthetic responses to artworks. Moreover, this effect was modulated by the degree of processing fluency and engagement when making aesthetic judgments. Participants appraised paintings as easier to understand after short-term artistic training. The training might deepen the ability to appreciate paintings, hence increasing processing fluency. Participants also found paintings more interesting and spent more time engaging to judge the artworks. Short-term training in art might increase the level of cognitive engagement in art viewing, which is associated with more nuanced viewer-derived top-down processing. This study further extends our understanding of the influence of art knowledge on aesthetic experience.

Formal training in a visual aesthetic domain increases shared taste in a domain-specific manner

Edward A. Vessel*, Claire Reymond, and Nancy Etcoff.
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Although there is a high degree of agreement for aesthetic preferences ("shared taste") for natural kinds such as faces and landscapes, preferences for cultural artifacts such as artwork and architecture tend to be more individual (Vessel et al., 2018, Cognition). These differences in aesthetic tastes may reflect differences in how a person makes sense of the world around them. Changes in how one makes sense of the visual world should therefore change aesthetic tastes. We examined the aesthetic preferences of students enrolled in training programs for visual communication and architecture and hypothesized that formal training in an artistic domain would lead to shifts in which features individuals use to aesthetically evaluate that domain, causing changes in which images are preferred and to an increase in shared taste (convergence) across individuals. In a longitudinal study, 27 architecture and 21 visual communication students were asked to look at images of buildings, posters, and artworks and rate them for both understanding and aesthetic appeal at 3 timepoints: the beginning of their first semester (T1), the beginning of their second semester (T2) and the end of their fifth semester (T3). A single set of ratings were also collected from 69 online control participants. After two years of training (T3), a double-dissociation pattern emerged: architecture students agreed more on which buildings were aesthetically pleasing and understood, but visual communication students agreed more on which posters were aesthetically pleasing and understood. Average aesthetic ratings, on the other hand, were higher for the domain of study only at T1. These findings demonstrate a clear link between the development of expertise, a key form of learning, and aesthetic appeal. Rather than being a function of stimulus-computable features, aesthetic appeal is a function of how a person understands their visual world, reflecting personal biographies of visual experience and knowledge.

Session: Visual art action and perception

4:30 – 6:00 PM
Sala Miquel dels Sants Oliver
Moderator: William P. Seeley

All eyes on the cyber canvas: Expert and non-expert online viewing patterns, preferences and memory of AI and human paintings

Bernard Vaernes* and Thomas Espeseth
*Psychological Institute, University of Oslo, Oslo, Norway

Digitization has given artists and non-artists easy access to a variety of art forms, from abstract to figurative, and even works created by artificial intelligence. This study aims to assess how visual art expertise impacts viewing patterns, decision making and memory retention of different works when viewed online. In other words, it explores the differences in consumption of art in a modern real-life setting. To achieve this, 200 images of different works of art from the collection of the Norwegian National Gallery, and 200 equivalent AI generated works are presented to graphic art, fine art and new media arts students from Fine Art Academies and University Art programs, and non-art University students around the World on their own smartphone screens, while their integrated smartphone selfie camera records their eye-movements. Participants rate the aesthetic appeal of the paintings, and in a second experiment complete a memory test of previously viewed and new human and AI-generated works. Eye tracking data is analyzed for the different groups and stimuli, and correlated with memory scores (while controlling for stimulus memorability) in order to objectively compare expert's and non-expert's visual processing differences, aesthetic preferences and memory of images of different types of works in a real life setting. The findings and their relevance for galleries, artists, graphic, UX and product design, and educators are then briefly presented and discussed, followed by limitations and a short presentation of possible follow-up studies.

Mapping visual attention to important and unimportant details in art photographs and paintings

Maarten Leemans* and Johan Wagemans
*KU Leuven (University of Leuven)

When inspecting an artwork, one is often struck by details that prompt further exploration. Details often convey an iconographically important role and are often carefully placed by the artist to balance the composition of an artwork. Moreover, noticing a detail can sometimes drastically alter the aesthetic appreciation of the full artwork. We therefore start from a broad notion of "details" as all possible image inhomogeneities, that can differ widely in terms of size and importance, and in the impact they can have on the perception and appreciation of an artwork. In the present study, we explore the effects of viewing such details on the appreciation of the full image. In the first experiment, we validated a theoretically informed stimulus set by asking participants to indicate which image regions they consider important for appreciating the image as a whole. Based on this validation, we selected 200 stimuli, balanced between paintings and artistic photographs. In a second experiment, we will systematically map the appreciation of details across the whole image by applying a newly developed aesthetic map technique. To generate aesthetic maps, we will borrow from, and go beyond, the meaning map approach applied in scene perception. Specifically, we will decompose the image into square-shaped local image patches, which are then rated by a large pool of participants on appreciation and importance. After a series of pooling, averaging, and smoothing stages, these ratings yield the spatial distribution of the local aesthetic density ratings of that image. In the third experiment, we will record eye-movements to examine how viewers allocate visual attention to these validated images, to elucidate the relation between visual attention to local image regions and aesthetic appreciation of the whole image.

Does thinking of other's minds impact the looking behaviour and aesthetic judgements?

Ionela Bara*, Lorin Schöni, and Emily Cross.
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An important prerequisite for understanding and appreciating art is believed to be reasoning about the mental states of others, such as the artist's intention or the fictional characters portrayed. Thinking about others' mental states or mentalizing is an essential ability for general social cognition – in guiding social interactions, preparing, and predicting behaviours. However, little is known about the impact of thinking about others' minds on looking behaviour and aesthetic judgements. Given the essential role of aesthetics in guiding how we evaluate objects, people, and experiences in our environment, in this pre-registered study we investigated whether thinking about other's minds impacts the looking behaviour and aesthetic judgements of artworks. We recorded the eye movements of 50 participants and judgements of liking, understanding and emotions of Impressionist artworks depicting people and landscapes from self-perspective and other-perspective. Using a multi-level Bayesian modelling approach, we found that adopting other people's perspectives rather than self-perspective led to greater fixation duration and count for artworks depicting people rather than landscape while making aesthetic judgements. These findings suggest that thinking of other people's minds impacts gaze behaviour and aesthetic judgements. Overall, this study contributes to a deeper understanding of the ability to attribute mental states to oneself and others, and how such mentalizing states impact looking behaviour and aesthetic experience of art.

Category-based attention, biased competition, and engaging artworks.

William P. Seeley
University of Southern Maine

The perception, understanding, and appreciation of artworks are shaped by our prior knowledge of categories of art (Carroll, 1993; Seeley, 2020). The concepts we construct to represent categories of art encode recipes for how to attend to the surface features of a work and evaluate whether its content has been rendered well or poorly, whether its formal attributes and composition are fit to express its point, purpose, or meaning. These cognitive processes enable viewers to recognize different aspects of the formal structure of a work as reflections of stylistic and expressive choices made by the artist. We can refer to these elements of an artwork as artistically salient features, or formal-compositional features that carry information about, and so are diagnostic for its identity as a member of a category of art and the point, purpose or meaning it expresses. A biased competition theory of selective attention can be used to model these aspects of our engagement with works of art (Boshra & Kastner, 2022; Maunsell, 2015). Reciprocal attentional circuits bias sensory processing relative to the initial perceptual categorization of a target, enhancing the sensory encoding of task salient information while inhibiting the encoding of task irrelevant distractors. Recent research has employed multi-voxel pattern analysis to more explicitly explore the role categorization plays in perceptual processing (Keller et al, 2022; Peelen & Kastner, 2014). We review this research to explore how category-based attention shapes sensory and perceptual processing and evaluate how it might generalize to model the way categories of art shape our perceptual, affective, and cognitive engagement with artworks.

Immersion in Ganzfeld art experiences: the role of bodily sensations and abstract cognition

Eleftheria Pistolas*, Boris Quétard, Corinna Kühnapfel, and Johan Wagemans.
*Laboratory of Experimental Psychology, Department of Brain and Cognition, University of Leuven, Belgium

Viewing a Ganzfeld, i.e., a homogeneous visual field containing no shapes nor objects of focus but merely homogeneous colored light, results in a peculiar experience. Perceptual deprivation through Ganzfeld stimulation is characterized by the occurrence of hallucinations and perceptual blackouts. Artists such as James Turrell have employed the Ganzfeld effect in art installations resulting in immersive aesthetic experiences. Here, we investigated the appeal of Ganzfeld art and its immersive component using a mixed-method approach by combining behavioral and neural measures with questionnaires, rating scales, and interviews. 67 Participants experienced a museum-based Ganzfeld artwork. Participants wore an EEG device, eye-tracking glasses and headphones, and were given a dial to report the occurrence of hallucinations and blackouts. A remarkable factor of the immersive Ganzfeld is the inward-directed thoughts it seems to elicit. Whether the appeal of this art experience merely lies in its imaginary nature is not evident. The qualitative data pose somewhat of a discrepancy. Some participants described it as a meditative experience, emphasizing they had no awareness of their body, with one participant even calling it a "transcendental experience". Others stressed the elicited bodily sensations such as floating, feelings of imbalance and dizziness in some cases. This raises questions regarding the body's role in the immersion in Ganzfeld art. A loss of balance seems to coincide with the loss of depth perception due to the lack of reference points in the Ganzfeld. An inductive content analysis of the interview data aims to clarify how immersion in Ganzfeld experiences emerges and what role the body plays. Inter-rater-validated immersion scores will be used to test the relation between immersion and abstract cognition versus feelings and thoughts that are directed inward or externally. The potential of vergence eye movements as a behavioral signature of internally directed cognition is currently being explored.

Thursday, May 09, 2024

Symposium: The role of curvature in aesthetic appeal

9:00 – 10:30 AM
Lluís Domènech Auditòrium

Moderators: Dirk B. Walther[1] & Marco Bertamini[2]
[1] Department of Psychology, University of Toronto, Canada.
[2] University of Padova.

Humans exhibit a pronounced preference for smooth curvature over angular shapes, a phenomenon widely leveraged by artists throughout history, with notable references such as Hogarth's exposition in 1753. This preference constitutes a foundational tenet of empirical aesthetics, yet many curious nuances remain unexplored, which is where the significance of this symposium emerges. Delving into the intricacies of this phenomenon, Ruta and colleagues meticulously analyze the specific geometric attributes that elicit a preference for smooth curves, considering the role of individual differences in aesthetic predilection. Extending this thread, Palumbo and colleagues probe the variability in curvature preference among people with high-functioning autism in comparison to a neurotypical cohort, thus broadening our understanding of perceptual diversity. The symposium then shifts focus to convey the significance of shape in aesthetic appraisal. Spirals, with their continuously changing curvature, serve as a unique focal point, and Hübner and Goodarzi elucidate the public's aesthetic preferences toward various spiral forms. Contrasting with familiar archetypes, Bertamini and colleagues employ unfamiliar shapes to reaffirm an inherent preference for smooth curvature, suggesting this predilection transcends familiarity and movement. Finally, Walther and colleagues reveal a dichotomy between the brain's perceptual representation of curvature and its computational quantification, giving rise to discussions on the cerebral underpinnings of aesthetic judgements. In their synthesis, the contributions to this symposium represent a pivotal step forward for the field of empirical aesthetics, by dissecting and expanding upon the foundational understanding of human preference for smooth curvature. The diverse range of studies presented, from the neuropsychological differences to computational representation, underscores the multifaceted nature of the relationship between shape and aesthetic appreciation and opens new avenues for interdisciplinary research. Importantly, the symposium lays the groundwork for future studies to build upon these insights.

Explaining the curvature effect

Nicole Ruta
Laboratory of Experimental Psychology, Department of Brain and Cognition, KU Leuven, Belgium.

Preference for curvature, the curvature effect, seems to transcend cultures, species and stimulus kinds. However, its nature and psychological mechanisms remain obscure because studies often overlook the complexity of contour characterisation and disregard personal and contextual factors. To investigate the curvature effect, we propose a continuous and multidimensional manipulation and contrasting experimental conditions examined at the group and individual levels that unveil a complex picture, not reducible to monotonous relationships: Perceptual and hedonic evaluations relied on multiple geometric features defining contour and shape. These features were specifically weighted to characterise each

construct, depending on the individual and contingent on whether evaluating perceptually or hedonically. Crucially, the curvature effect was not robust to preference with respect to the median and continuous manipulations of contour for varying shapes. As curved contours are more easily perceived and processed than polygons, we hypothesised that perceived contour might explain liking for a figure beyond the effect of geometric features, finding that this association was subordinated to shape categorisations. Finally, domain-specific, personality and cognitive-preference traits moderated how people used each geometric feature in their perceptual and hedonic evaluations. We conclude that research on perception and appreciation of contour and shape should factor in their complexity and defining features. Additionally, embracing individual sensitivities opens potential avenues to advance the understanding of psychological phenomena. In summary, our approach unpacks a complex picture of contour preference that prompts critical reflections on past research and advice for future research, and it is applicable to other psychological constructs.

Preference for curvature: the role of individual differences and object attributes
Letizia Palumbo
Department of Psychology, Liverpool Hope University, UK.

Visual preference for smooth curvature, as opposed to angularity, has been documented for a variety of stimuli, participant groups and different tasks. However, the strength of the effect of curvature on preference varies depending on the type of object and is subject to individual differences (Chuquichambi et al., 2022). Two studies will be presented that provides further evidence for the variations observed on the curvature effect. In Study 1 we examined preference for curvature in three different groups of participants: high functioning autism, control neurotypicals matched for age and gender, and quasi-experts in design (ASD=16; NT=20 and QE=24 respectively). We employed abstract configurations and interior design spaces with angular vs. curved contours. Preference for curvature was confirmed with abstract stimuli with all groups of participants. For interior design, the curvature effect diminished in magnitude, and this was especially evident in individuals with autism. Interestingly, quasi-experts preferred rectilinear as compared to curvilinear designs. In Study 2 we aimed to test whether liking for common use objects (chairs and tables) depends on object contour or object category using eye tracker. Participants (N=40) liked the design of angular objects more than the design of curved objects. However, in terms of visual behaviour, the contour of the objects was only relevant when interacting with object category on mean fixation durations. This suggests that the perceptual attributes and object category play a different role on subjective preference and visual processing. Taken together, the findings are discussed in relation to the role played by individual differences and the impact of stimuli attributes in determining participants' preferences.

Individual differences in the preference for certain types of spirals
Ronald Hübner
Department of Psychology, University of Konstanz, Germany.

Spirals, an omnipresent phenomenon in both nature and culture, have been created by humans since as early as 11,000 BC and have independently emerged in various locations. Their significance transcends mathematics and natural sciences, serving as popular motifs in art and design. Over time, various types of spirals have been identified or invented. Despite the widespread assertion that each type has its own aesthetic appeal, there is little empirical evidence to support such claims. To address this question, we conducted a study where participants were asked to rate different types of spirals - Archimedean, logarithmic, and

golden – in terms of their beauty. The results revealed significant differences in the beauty ratings among the spirals. Upon analyzing the potential characteristics of the spirals, we found mean curvature and path length to be the most influential factors in explaining the preference differences. Further analysis also identified two participant groups with contrasting preferences: one group favored Archimedean spirals and disliked logarithmic ones, while the other group's preferences were the opposite. To explore what other aspects might differentiate the two groups, we conducted a second experiment similar to the first, but with the addition of the Big Five Inventory (short version). The results suggest that emotional stability might be related to these preference differences.

The (lack of) effect of movement on visual aesthetic judgments
Marco Bertamini
University of Padova.

There is strong evidence that humans have a preference for smooth curvature as opposed to angularity. In this sense curvature is among a short list of universal aesthetics factors. There may be multiple factors contributing to this effect, including avoidance for angularity, efficient coding of contours, and biophilia given the correlation between smooth curvature and biological bodies. We report new evidence about the interplay between curvature and complexity of abstract and unfamiliar shapes. By combining different factors we can best understand how for instance, curvature relates to complexity. Moreover, we introduced movement and tested whether it is a component of complexity, or it has its own separate effect. Results show that both curvature and complexity affect aesthetic preferences. Smooth contours are preferred over shapes with angles, and shapes with few vertices preferred over more complex shapes. However, no effect of movement and no interaction effects were recorded between movement and the other two variables. This suggests that rigid movement cannot be considered a component of complexity, although the results might differ for intrinsic movements of complex objects like human bodies.

Neural Dissociation Between Computational and Perceived Measures of Curvature
Dirk B. Walther
Department of Psychology, University of Toronto.

There is substantial evidence to suggest that preference for visual curvature is a reliable phenomenon. Yet, little is known about the ways in which the encoding of curvature in the brain contributes to hedonic evaluation while participants are actively engaged in making choices about objects varying in curvature. To address this question, we reanalyzed fMRI data collected while participants made aesthetic judgments (beautiful vs. not beautiful) and approach-avoidance decisions (enter vs. exit) in relation to measures of (a) computational curvature, (b) perceived curvature, (c) perceived angularity, and (d) aesthetic pleasure in the domain of architecture. Our results show that a region in early visual cortex (BA 17) encompassing largely areas V2-V3 is sensitive to variation in computational curvature across both beauty judgments and approach-avoidance decisions, whereas a region encompassing the fusiform gyrus (BA 37) exhibits sensitivity to perceived curvature only when participants made beauty judgments. These results contribute to our understanding of the neurobiological basis of curvature preference by demonstrating that the sensitivity of the visual cortex to computational curvature is context invariant, whereas the sensitivity of the fusiform gyrus to perceived curvature varies by context.

Symposium: The Neurocognition of Liveness

9:00 – 10:30 AM
Sala George Bernanos

Moderator: Guido Orgs, Institute of Cognitive Neuroscience, University College London, London, UK; Department of Psychology, Goldsmiths, University of London, London, UK; and Department of Music, Max-Planck-Institute for Empirical Aesthetics, Frankfurt, Germany.

Neurolive is a 5-year interdisciplinary research project that brings artists, scientists and audiences together to study what makes live experiences special. Liveness is vital to dance, theatre and music performances – and to many other kinds of events, including gallery and museum exhibitions, political rallies and sports events – but what exactly sets live experiences apart from recorded, streamed or simulated ones and how does liveness relate to the aesthetic experience of the performing arts?
In this symposium, we will present the results of the first two live dance performances of the Neurolive project. We collected behavioural, brain and eye movement data from up to 23 spectators simultaneously, while they watched one of two dance performances, commissioned by Neurolive as both artistic and scientific investigations into liveness. Performance 1, Detective Work is a duet by Seke Chimutengwende in collaboration with Steph McMann, which explores choreography as a process of creating and solving mysteries. Performance 2, How Shall We Begin Again? is a two-day live installation, created and performed by 50 people, initiated by artist Jo Fong. Talks on the findings from these two live performances will be framed by two additional presentations: The first talk will focus on the methodological challenges and chances of collecting mobile EEG and other body and movement measures outside the laboratory, in a live theatre context. The final talk will challenge and expand on the neuroscientific perspective by exploring artistic research as part of both performances as an independent and complementary route to investigating liveness. Beyond dance and the performing arts, the symposium will highlight to role of artists and artistic co-production for empirical aesthetics research.

Towards a measure of liveness: Collecting and processing brain activity and body movements in the live performance context.

Jamie A. Ward[1] & Carlos Trenado[2]
[1]Department of Computing, Goldsmiths, University of London, London, UK
[2]Department of Music, Max-Planck-Institute for Empirical Aesthetics, Frankfurt, Germany

Live performances represent naturalistic scenarios that are complex, sometimes unpredictable and full of uncertainty, pertaining to environmental factors and unexpected behavioral patterns of participants. As part of the Neurolive project, we collect and analyse brain, eye and body data from multiple people during live performances, with the aim of exploring the interplay between audience behaviour and physiology in relation to particular performance features. However, the simultaneous recording of multimodal data across large groups of spectators poses challenges related to data synchronization, removal of measurement artifacts, and integration of multimodal measures. Here, we discuss our experiences of tackling these issues from the first two Neurolive performances – Detective Work, and How Shall We Begin Again – using electroencephalogram (EEG) and eye gaze data. In the first part of the talk, we will introduce practical methods for recording multi-person, multi-modal data during live events, and in particular how to maintain temporal synchrony between different sensor devices. In the second part of the talk, we will discuss how this data is pre-

processed to remove measurement artefacts and the importance of data quality measures, as well as introducing ways of integrating different sensor modalities.

Performance 1: Detective Work

Laura Rai[1], Haeeun Lee[2], & Emma Becke[3]
[1]Institute of Cognitive Neuroscience, University College London, London, UK.
[2]Department of Psychology, Goldsmiths, University of London, London, UK.
[3]Department of Music, Max-Planck-Institute for Empirical Aesthetics, Frankfurt, Germany.

Watching live dance, theatre, or music events is an inherently social activity in which people often share a highly emotional experience. Yet, neuroscientific research into aesthetic appreciation of the performing arts has been almost exclusively conducted on individual people watching or listening to video or music recordings in a laboratory. Here we present results from three (mobile) EEG studies measuring neural synchrony between audience members while watching live and recorded dance performances ('Detective Work'). In Study 1 (N = 69), we computed intersubject correlations (ISC) and phase lag values (PLV) between audiences watching live dance and found that delta-band synchrony among audience members varied with structural features of the choreography. Dancer movement and the choreographer's artistic intentions were the best predictors of audience synchrony. In Study 2, we computed brain synchrony among a group of audience members watching a video screening of Detective Work in a cinema setting. In Study 3, we measured synchrony among a group of participants watching the video recording individually, rather than as a group. Collectively, these findings allow us to delineate whether audience brain synchrony reflects a genuinely shared co-present experience or simply the perception of a common stimulus. We will discuss our results by comparing neural synchrony for live and recorded conditions and consider whether this may be a unique marker of liveness.

Performance 2: How Shall We Begin Again?

Albane Arthuis[1], Sonia Abad-Hernando[2], & Febbo, Mirko[3]
[1]Institute of Cognitive Neuroscience, University College London, London, UK.
[2]Department of Psychology, Goldsmiths, University of London, London, UK.
[3]Department of Computing, Goldsmiths, University of London, London, UK.

During How Shall We Begin Again?, we simultaneously collected data from wearable eye-trackers (Pupil Lab Invisible) and mobile electroencephalogram (EEG). We gathered data from 83 participants, with up to 16 participants at the same time, as participants could enter and leave the performance at their discretion . Eye-movement data, including fixations and blinking patterns, are correlated with participants' experience of the performance and social connectedness. EEG data was used to look at brain synchrony between participants, exploring the relationship with behavioural measures of engagement and connectedness. Using both mobile EEG and eye-tracking data allows us to analyse data based on participants' actual attentional focus, in the rich complex environment of a live performance. To effectively interpret and contextualise this wealth of information, we designed an advanced data visualization tool with a dynamic timeline tool and video references. This innovative approach allows for a more intuitive understanding and exploration of the data.

Beyond a measures of liveness: Generating and understanding liveness through dance and choreography.

Matthias Sperling[1,2] & Guido Orgs[3,4,5]
[1]Independent artist and choreographer, London, UK.

[2]Siobhan Davies Studios, London, UK.
[3]Institute of Cognitive Neuroscience, University College London, London, UK.
[4]Department of Psychology, Goldsmiths, University of London, London, UK.
[5]Department of Music, Max-Planck-Institute for Empirical Aesthetics, Frankfurt, Germany.

The symposium's final talk explores the core role of artistic research and interdisciplinarity in the Neurolive project. The first part of the talk outlines two artistic perspectives on liveness, based on the project's first two co-designed artistic-scientific research processes outlined above. In the context of Detective Work, this includes the role of improvisation, ambiguity and mystery for the creation and staging of the work. For How Shall We Begin Again? we will focus on notions of uniqueness, non-reproducibility and the sense of community that underlies liveness as a shared experience between spectators and performers. We will conclude with a more general reflection on the relationship between artistic and scientific research methodologies: ultimately, we argue that a co-productive process between artists and scientists is essential to ensuring relevance and ecological validity of neuroscientific research in and with the performing arts.

Session: Gender

9:00 – 10:30 AM
Sala Miquel dels Sants Oliver
Moderator: Young-Jin Hur.

Aesthetic perception of body image as a spiritual discipline for contemporary Chinese women

Danni Yang* and He Xianyou
*School of Psychology, South China Normal University, 510631 Guangzhou, China

This study examines the societal promotion of thinness and women's self-discipline within this framework and proposes a fresh perspective: that self-discipline is rooted in aesthetic pleasure from social training on slenderness. We believe that external variables rather than genetic predispositions generate a good aesthetic perception of a slender frame, and that human instinct prefers a robust, healthy physique for both men and women. In Experiment 1, participants from three age groups (3-5, 10-15, and 20-25) were shown photographs of male and female body forms ranging from 5% to 50% BMI. We used eye-tracking and subjective ratings to determine which body shapes would evoke aesthetic responses. We expected the ideal female body shape's BMI index to decline with age. After the body size rating task, subjects completed the Gender Stereotypes Scale to show the relationship between aesthetic pleasure in a slim body and gender stereotypes and to show that stronger gender stereotypes may predict a propensity to enjoy extremely thin female figures. Experiment 2 captured fMRI data as participants viewed BMI-varying images at various speeds. We expected that individuals would choose images with a healthy BMI during fast displays and thinner feminine body sizes during slower presentations. After the scan, individuals completed the gender stereotyping measure again, expecting stronger aesthetic experiences with extremely slim feminine forms to increase gender stereotypes of women. Experiment 3: Aesthetic training of subjects by presenting them with strong women. Eye movements and fMRI were utilized to confirm that respondents had aesthetic pleasure with the powerful female figure after training and to determine if it reduced gender stereotypes. Investigating and regulating aesthetic experiences is important because they are natural motivators that strongly influence women's life goals. Women must truly appreciate healthy, fit, and feminine bodies, not just cognitively avoid the aesthetic limitations associated with thinness.

Fashion psychology: The predictors of everyday clothing preference among UK and USA participants

Young-Jin Hur*, Nancy Etcoff, Nancy Segal, and Emmanuel Silva.
*Fashion Business School, London College of Fashion, University of the Arts London, London, UK

Fashion is one of the most common and accessible (aesthetic) activities in everyday life, yet still missing in the literature is a systematic study on clothing preference. Two studies explored whether a preference structure of clothing style can be established and whether this clothing preference structure can be further understood through individual differences. The first study – published in Empirical Studies of the Arts (Hur, Etcoff, & Silva, 2023) – was based on an online survey consisting of 500 participants living in the UK. Factor analyses revealed a four-factor preference structure, the Everyday Clothing Preference Factors (ECPF). The preference structure consisted of Feminine, Essential, Comfortable, and Trendy styles. The findings further revealed that the preference for each of these clothing styles was correlated with certain individual difference variables (e.g. personality & demographics). The second study aimed to replicate and expand the ECPF, employing gender-balanced samples from the UK (N = 402) and the USA (N = 400). The work further explored the predictors of the ECPF through path analyses, incorporating a wide range of individual differences (e.g. fashion expertise, fashion attitude, etc.). Analyses revealed that while the ECPF was replicated among UK participants in its original four-factor structure, the ECPF could be expanded into five (Feminine/Pretty, Sporty/Trendy, Formal/Elegant, Classic, and Sporty) or six factors (adding Hip/Unique), depending on the sample. Overall, notable overlaps were found between the UK and USA ECPF structures. The path analyses identified extraversion, gender, and age as important predictors of fashion behaviors in both samples. These findings provide a theoretical basis for understanding how people choose and like certain styles of clothes. The studies' insights could inform retail marketing strategies and sustainable fashion, enhancing the understanding of fashion consumption mechanisms.

Moved by art in a gendered world

Héctor Gerardo Gallegos González*, Ralf F. A. Cox, Lisa-Maria van Klaveren, Branislava Ćurčić-Blake, Mark Span, and Barend van Heusden.
*Department of Arts, Culture, and Media, University of Groningen, Groningen, Netherlands, and Research School of Behavioural and Cognitive Neurosciences, University of Groningen, Groningen, Netherlands.

Motor (re)actions are a foundational element for understanding the artistic experience as a complex interaction between subject(s) and environment. Accordingly, the embodied experience of art is a growing field of inquiry in empirical aesthetics. At the same time, humans live in a heavily gendered world. They are subjected to social pressures and expectations that exert an influence on how they walk, talk, interact with each other, and demonstrate love; in synthesis, on how to move. However, it would be shortsighted to assume a uniform gender experience and movement in terms of the biological binary. Gender identity provides an alternative to dichotomic perspectives on sex/gender. Within this framework, people’s identities are understood as malleable and complex.
Departing from an understanding of art as an embodied process of reflective imagination (van Heusden, 2009), our objective was to test whether gender identity (comprised by the factors of male typicality, female typicality, and pressure to conform to gender roles) (Egan and Perry, 2001) had an impact on the motor responses of participants when experiencing digital

visual art. We also aimed to evaluate the interaction between participants' bodily movements and the semiotic layer of their sense-making processes.
We conducted a multimethod experiment in which 44 Dutch-speaking participants experienced 5 digital artworks in a laboratory while standing on a Wii Balance Board. Participants' postural sway and neuronal activity in the PFC (using fNIRS) were measured for each of the pieces. After the presentation of each work of art, participants were asked to describe their experience of each piece in some detail. These experiential reports were analyzed using Cognitive Discourse Analysis (Tenbrink, 2020), and later employed to explore the connection between the semiotic and embodied layers of the artistic experience.

Gender bias in popular recognition of visual artists: Evidence from Artle
Ann Piper* and Christopher Zorn
*Department of Art and Design, Susquehanna University, Selinsgrove PA, USA.

Decades of research have described the persistent "gender gap" in visual art: broadly speaking, female artists are viewed less favorably, are underrepresented in collections and surveys, and command lower prices for their work than their male counterparts. We investigate the extent to which these differences are driven by recognition. In collaboration with the U.S. National Gallery of Art (NGA), we analyze more than 7.5 million completions of Artle, an on-line puzzle game that challengers viewers to identify visual artists based on up to four depictions of their work. Our analyses show that even after holding other factors constant, female artists were less likely to be successfully identified; moreover, when they are, viewers took more guesses to do so. Interestingly, however, female artists also were slightly more likely to prompt readers to "click through" and learn more about them than their male counterparts. Our findings reinforce existing work on gender inequities in the visual arts, but also suggest latent demand for greater information on and integration of women in that field.

Art has no gender, only gender bias
Stefanie De Winter*, Nicole Ruta, Claudia Damiano, and Johan Wagemans.
*Art History, KU Leuven, Leuven, Belgium

The Abstract Expressionism art movement was predominantly showcased by men, leading to the exclusion of women from the art canon. Art critics of the time also deemed women's art as "decoration" whereas men's art was considered "real art", further marginalizing women artists. Based on this context, our study examined whether and how the appreciation of art is influenced by gender biases. Across three experiments (N=800) using 160 Abstract Expressionist paintings by an equal number of men (Pollock, Louis, Twombly, Kline) and women (Krasner, Frankenthaler, Mitchell, Hartigan) artists, we tested whether people show a bias for attributing authorship of artworks to men, and investigated whether artworks created by men and women are evaluated differently. Results confirmed that participants were significantly more likely to judge that the artworks were painted by men (57.07%, $p < 0.001$), regardless of the actual gender of the artist, specifically if the artworks contained higher levels of black paint (beta = 0.36, $t(466) = 6.28$, $p < 0.001$) and angular lines (beta = 0.15, $t(466) = 2.37$, $p = 0.018$). Experiments 2 and 3 revealed that artworks thought to be painted by men received significantly lower scores for attributes describing so-called "woman art" (e.g., "decorative", "childish"), but also for attributes describing "good art" (e.g., "vibrant", "memorable"), as well as for liking, pleasure, interest, and order (all $p < 0.005$). These findings suggest that art criticism of the 60s is no longer reflected in art perception by a general audience nowadays. While there appears to be a general bias in assuming the

paintings were created by men, the actual gender of the artists did not significantly impact overall appreciation of the artworks. Instead, the authorship bias, influenced by stylistic elements within the paintings, plays a more significant role.

Coffee break & Posters 2
10:30 – 11:00 AM

Keynote speaker: Gerald Cupchik with Andrea Carraro (Carraro Lab, Palazzolo): What would Dan Berlyne have to say about the new stimulus world of VR and AI?
11:00 AM – 12:00 PM
Lluís Domènech Auditòrium

Gustav T. Fechner Award
12:00 – 12:30 PM
Lluís Domènech Auditòrium

Margaret Floy Washburn Award
12:30 – 1:00 PM
Lluís Domènech Auditòrium

Lunch & Posters 2
1:00 – 2:30 PM

Symposium: Urban Aesthetics: The Past, Present and Future
2:30 – 4:00 PM
Lluís Domènech Auditòrium

Moderator: Helmut Leder, Faculty of Psychology, University of Vienna, Austria.
Vienna Cognitive Science Hub, University of Vienna, Austria.

In this symposium we discuss aesthetic experiences within the urban environment from various standpoints. Eva Specker will begin with a theoretical perspective on aesthetic experience in general and the position of everyday aesthetic experiences within this broader spectrum. Kirren Chana then specifically addresses how aesthetics is conceptualised in regard to the study of the urban environment with findings from a scoping review. This then leads to the presentation of three empirical studies employing different methods to capture urban aesthetics. In the third talk, Anna Lena Knoll will present a set of experience sampling (ESM) studies showing that these experiences are common in everyday life, fitting within an evolutionary framework where aesthetics can help us successfully navigate the world. She will also discuss exploratory results regarding the impact of these experiences on mood as well as looking at repeated or prolonged engagement. Nonetheless, a limitation of ESM is that it cannot capture the more subconscious aesthetic processes that theoretically would be the more frequent kind of aesthetic experience in daily life. The fourth talk, by Tristan Barrière addresses exactly this point. Using mobile eye-tracking, his field studies are capable of assessing if beauty captures attention in everyday settings. He will present two studies: one in an everyday setting (The Donaukanal in Vienna) and one in a museum setting (The

Belvedere Museum in Vienna), enabling him to also discuss potential moderating effects of context on the connection between beauty and visual attention. Finally, this approach is brought one step further in the last talk by Margot Dehove, where she will discuss field studies, assessing the impact of urban street interventions with artistic stimuli. She will discuss how interacting with these interventions impacts wellbeing, and can thus discuss how increasing aesthetic engagement in everyday life can be used to inform healthy urban planning.

What is an aesthetic experience? Let's talk about breadth, length, and depth.

Eva Specker
Faculty of Psychology, University of Vienna, Austria.

There has been much discussion on how to define "aesthetic experience" both within psychology as well as philosophy, but none of this discussion has led to a clear definition, leading to both philosophers and psychologists arguing to abandon the term (Shusterman, 1996; Skov & Nadal, 2021).
Rather than aiming to end this discussion, I aim to shape future discussions by proposing this mid-way continuum perspective, as well as proposing 3 dimensions—breadth, length, depth—as a way to organize our thinking, to systemize different aspects, and to reshape our discussion.
By breadth, I mean the wide variety of experiences that have been referred to as "aesthetic experience". By length, the temporal aspect can vary from (milli)seconds to hours, which warrants a more explicit discussion. By depth, the stark contrast in the intensity of this wide variety of experiences.
My argument will be that some contrasting views of aesthetic experience can be united by acknowledging the breadth and allowing for variations in length and depth. Specifically, I will argue that defining "aesthetic experience" is like a sorites problem: one grain of sand doesn't make a pile, nor does it make a desert. Nonetheless if I keep adding grains of sand then at some point a pile or even a desert will appear. This means that a categorization of aesthetic vs. non-aesthetic is misleading, and we should rather conceptualize aesthetic experience as a continuum: from rather short and subconscious experiences to prolonged engagements with (art) objects or stimuli that can impact us deeply.
Specific to the current symposium, this discussion should also clarify and theoretically conceptualize everyday aesthetic experiences (within an urban environment) as mainly (though not exclusively!) these short, subconscious experiences which can provide a meaningful starting point for studying aesthetic experience in daily life with empirical methods.

The aesthetics of man-made components within urban environments: A scoping review

Kirren Chana
Faculty of Psychology, University of Vienna, Austria, and Department of Foreign Languages and Literatures, University of Verona, Italy.

Our cities, despite the stereotype of a 'concrete jungle', are much more than an infrastructure of streets and buildings. Rather, cities form remarkably complex environments that awaken all of our senses; they are brimming with smells, noises, sights and the hubbub of daily life. The city's central position within our human world leads us to carefully consider its design and aesthetics. As such, in this talk I present key findings from a scoping review with the aim to gain further understanding of the study of such urban environments and, in particular, the aesthetics of its man-made components.

The urban environment has been explored from an array of fields, but with different approaches – some scientific research has placed an emphasis on greenspaces, usability, or general aspects of design. However, the importance and extent to which aesthetic aspects have been considered within this research is not yet clear. With the notion of urban aesthetics gaining popularity as a research topic, we conducted a scoping review to obtain a more comprehensive overview of how and which components have been investigated in the existing literature. Moreover, given the widespread literature centring on wellbeing in our cities, a further interest is the extent to which wellbeing outcomes have been considered for such aesthetic components within the urban environment. Thus, to gain a deeper understanding as to how urban environments are explored through the lens of aesthetics, we identify what components of the urban environment are considered, how they have been aesthetically evaluated, and whether they have any wellbeing benefits.

Experiencing Beauty in Everyday Life
Anna Lena Knoll
Faculty of Psychology, University of Vienna, Austria.

Beauty surrounds us in many ways every day; we may seek out beauty intentionally or happen upon it by accident. While everyday stimuli can and have been used in lab settings this fails to capture the impact and embeddedness of encounters with aesthetics, particularly beauty, within our daily lives. It is unclear how common aesthetic experiences are and what the quality of these experiences really is.
In a series of 3 experience sampling (ESM) studies, we thus investigated frequency, category of eliciting stimuli (natural vs man-made) and, the potential moderating role of several individual difference measures (Art Knowledge, Nature & City Relatedness, Engagement with Beauty, Personality) on everyday experiences of beauty in an ecologically valid manner. Further, we explored the impact of such experiences on mood (valence & arousal). Study 1 re-analysed data from Weigand et al. (2022), in line with the current aims. In Studies 2 and 3, we asked participants to report daily experiences of beauty using a mixed random and event-contingent sampling schedule. Mobile notifications (random sampling) prompted participants to take a photo and rate the beauty of their surroundings. Further, current valence and arousal were assessed. Notification frequency and total days of participation differed between these two studies. Participants were able to report additional experiences outside of the notification windows (event-contingent sampling).
Our results indicate that we indeed frequently encounter beauty in everyday life. Although stimuli we encounter are often man-made, natural stimuli are perceived as more beautiful. Our results further suggest a mood-boosting effect of encounters with beauty with more beautiful experiences leading to more positive valence and lower (i.e., calmer) arousal ratings. Here, repetition of highly beautiful experiences, in particular, may play an important moderating role. Lastly, our results indicate influences of individual differences however, these were inconclusive and require further attention.

The Function of Aesthetics in Everyday Life: A Mobile Eye-Tracking Approach
Tristan Barrière
Faculty of Psychology, University of Vienna, Austria.

Urban environments offer plenty of beauty if only we look for it: from trees to (street-) art, buildings, and people. The preference for natural over manmade objects/scenes is well documented, outside of and within urban environments (Batool et al., 2021; Li et al., 2020; Kaplan et al., 1972). Nonetheless, man-made aesthetic objects (such as architecture or street

art) can still lead to significant aesthetic experiences in urban settings outside of a museum (Isaacs, 2000; Mitschke et al., 2017).
We demonstrate that aesthetic experiences not only occur in an everyday setting but that they are significant enough to measurably influence individuals even outside of prototypical aesthetic environments. Our ongoing studies specifically explore differences between nature and art using mobile eye-tracking, subjective beauty ratings and physiological measurements in urban and museum contexts. These studies emphasise the importance of multi-method designs in real-world environments.
Study 1 involved participants freely navigating a city section displaying street art and nature. We used mobile eye-tracking to measure differences in gaze behaviour, while heart-rate variability (HRV), mood and subjective beauty ratings were measured to study the interplay between subjective aesthetic evaluations and physiological changes. In a lab follow-up, we showed participants footage from their walk, while measuring gaze behaviour, HRV, subjective beauty ratings and mood. Individual differences in art interest (VAIAK) and nature-relatedness (NRS) were also assessed. Comparing field results with lab follow-up, with the same visual stimuli, we can better understand the effectiveness of laboratory experiments for studying aesthetic experiences.
Study 2 replicated the procedure of study 1 in a museum exhibit with artworks displaying natural and manmade objects. Participants navigated freely and a lab follow-up replicated the process. The selected artworks allowed us to investigate whether differences in preference and gaze behaviour between natural and manmade objects persisted in representational artworks in a controlled setting.

Walk with me in the City: Impact of Urban Street Interventions on Wellbeing and Attraction

Margot Dehove
Vienna Cognitive Science Hub, University of Vienna, Austria.

With urban populations growing rapidly and everyday life also being linked with a range of health-related issues, it is becoming more crucial to understand how our cities could be designed to be more considerate of their citizens' wellbeing. Past literature highlights a positive effect of urban green spaces (e.g., plants, trees, parks, etc) on wellbeing. In recent years, increasing evidence also points to the contribution of art towards improving wellbeing. Despite this, the effect of implementing art in an urban context has received little attention. Mitschke et al. (2017) is one of the few studies to investigate urban art. More specifically, they looked at urban art in terms of how aesthetic evaluation influences viewing behaviour. The aim of the present experiment was thus to investigate the impact of artistic installations in public urban spaces on wellbeing and attraction, principally, and also on aesthetic experiences. To do so, two temporary parking-lot sized interventions were built on two different Viennese city streets, and equipped with either artworks or greenery. In the literature investigating wellbeing benefits, it is common to employ a pre/post type of procedure where participants' wellbeing metrics before and after the exposure to the tested item are compared. The present experiment adopts this procedure but also goes beyond it and proposes different methodological perspectives for the evaluation of the impact of urban artistic installations. Indeed, the experimental procedure was split into two main parts: (1) a pre/post investigation of the effects of the exposure to either green or artistic interventions on subjective and physiological wellbeing, (2) a more continuous assessment of physiological wellbeing and attraction. In this talk I will present the procedure we used in more detail, as well as a discussion of the results and their implications.

Session: Models of hedonic value

2:30 – 4:00 PM
Sala George Bernanos
Moderator: Ana Clemente

Can fundamental physical principles explain aesthetic experience?
Robert Pepperell
Cardiff Metropolitan University

We would ideally like to explain the variety and complexity of aesthetic experience using fundamental physical principles. While several proposals of this kind have been made over the last two centuries or so, we still lack a physically grounded theory of aesthetic preference and affect. Here I discuss some general principles that might ultimately explain why we find stimuli attractive or repulsive. Following nineteenth century researchers such as Gustav Fechner and twentieth century pioneers of Gestalt theory, I highlight the role of energy flow in nature and the well-known tendency of physical systems, including living systems, to minimise free energy and maximise entropy. Less well known are the proposals from earlier scientists that energy transfer and entropy production in physical systems is hedonically valenced; that is, it has the property of feeling good or bad for the system at a fundamental level. On this account, energy gain, which increases stress or tension, has a negative valence while energy loss, which reduces tension, has a positive valence. I develop this proposal by suggesting that the property of hedonic valence is harnessed in living systems to drive adaptive behaviour, from approach-avoidance reactions in simple organisms to aesthetic responses in humans. Focusing on these fundamental principles allows us to combine the quantitative methods of physics with the qualitative concerns of psychology to inform a biologically grounded science of aesthetics. The aim is to foster a deeply integrative research programme with profound explanatory potential across art and science.

Aesthetic value is dissociable but not independent of incentive salience
Adam Reynolds* and Ed Vessel
*IMT Institute for Advanced Studies Lucca

Is aesthetic value represented separately from other value signals? Theoretical accounts of aesthetic value suggest that it results from sense-making (“pleasure of understanding”), while reinforcement value arises from conditioning with tangible rewards (food, money) that produce approach/avoidance (incentive salience). Previous work with faces suggests that facial attractiveness is dissociable from incentive salience, but little evidence exists for non-social, abstract visual stimuli. We gathered behavioural and neuroimaging evidence to investigate whether individuals represent aesthetic appeal and incentive salience independently. Observers viewed and rated abstract images (e.g. fractals) for their aesthetic appeal. Then, images of low, middle and high aesthetic value were associated with either positive, neutral or negative outcomes (small monetary wins/losses) using a monetary reinforcement learning paradigm. Incentive salience was assessed through performance on a modified attention cueing task: participants were shown two images on the screen (e.g. a ‘positive’ and ‘neutral’ abstract image) and had to identify the presence of a target letter as fast and accurately as possible. Finally, observers again rated the aesthetic appeal of the images. Behavioral analysis of these post-reinforcement final aesthetic ratings revealed that although both reinforcement and initial aesthetic ratings predicted final aesthetic ratings, final aesthetic ratings were primarily anchored to the initial aesthetic ratings, and reinforcement had a smaller effect. Monetary reinforcement successfully manipulated incentive salience

(better performance on attention task for positively reinforced images), but effect sizes were small. Average fMRI activation of regions of the Default Mode Network (DMN) were sensitive to reinforcement and final aesthetic value, but only visual regions significantly reflected initial aesthetic value. A more fine-grained multivoxel pattern analysis found that only final aesthetic value could be significantly decoded from local patterns of neural activity in DMN and Reward Networks. Aesthetic value is thus dissociable from incentive salience but not entirely independent from it.

The status of predictive processing as a framework in empirical aesthetics

Jacopo Frascaroli
Department of Psychology, University of Turin, Turin, Italy

In the last few years, a remarkable convergence of interests and results has emerged between scholars interested in the arts and aesthetics from a variety of perspectives and cognitive scientists studying the mind and brain within the predictive processing (PP) framework. This convergence has so far proven fruitful for both sides: while PP is increasingly adopted as a framework for understanding aesthetic phenomena, the arts and aesthetics, examined under the lens of PP, are starting to be seen as important windows into our mental functioning. The result is a fast-growing research programme that promises to deliver important insights into our aesthetic encounters as well as a wide range of psychological phenomena of general interest.
Despite the increasing interest in the topic, however, a systematic attempt to bring the PP picture in contact with the major frameworks and results in empirical aesthetics is still missing. Such an attempt would of course be crucial for the advocates of the importance of PP in aesthetics: if PP cannot accommodate many classic findings in the field, its significance would be diminished. In this talk, I will try to show that PP can indeed enter into productive contact with—if not incorporate—a good part of past and present research in the field. In fact, as I will try to show, PP allows us to bring into focus a thread that runs throughout the history of the field, from Fechner's pioneering work to the Gestalt approaches to art, from Berlyne’s psychobiological theory to Martindale’s prototype theory, and up to present-day approaches that stress the importance of processing fluency, learning, interest, empathy and motor simulation in aesthetic experience. The upshot is a pleasingly general picture – no doubt tentative and to be further articulated – that allows a much-needed move towards a more unified empirical aesthetics.

A computational approach to empirical aesthetics

Aenne A. Brielmann
Hector Research Institute of Education Sciences and Psychology, University of Tübingen, Tübingen, Germany

"Listening to music, watching a sunset, eating your favorite ice cream even when you are full – all these sensory experiences are rewarding. Why?
We propose that some sensory experiences are intrinsically rewarding because they help training a sensory system to effectively processes objects that it expects to encounter, both now and in the future. A computational model formalizes this theory. Here, two interlinked components generate an object’s aesthetic value: 1) processing fluency – the likelihood of a stimulus given an observer's state; 2) learning – the change in the average likelihood of expected future stimuli. Crucially, the observer’s states constantly adapt to the features of the current sensory environment, i.e., the observer learns.

We first demonstrate the feasibility of an implementation of this model by means of simulation studies. These show that the dynamic predictions of our model allow us to simulate well-known effects of exposure, familiarity, and expertise on aesthetic value judgments. In a second study, we collect new liking ratings for 50 images to test whether our model can predict rating changes over time for individual observers. We find that our model's predictions outperform such based on population averages and that the model's learning component plays a crucial part in its success.
The implications of a successful reward learning model for empirical aesthetics are far-reaching. It captures dynamics in aesthetic valuation rather than dismissing them as measurement error, is compatible with the use of neural network encodings of stimuli, and builds a direct connection between aesthetics and previous work on primary and secondary rewards."

Hedonic foraging: Active inference and hedonic evaluation
Ana Clemente
Department of Cognitive Neuropsychology, Max Plank Institute for Empirical Aesthetics, Frankfurt, Germany

Our behaviours, from choosing food to engaging in cultural activities, are largely driven by the hedonic value we assign to the corresponding experiences. Whilst the literature has proposed common biological principles for sensory valuation, the understanding of underlying mechanisms and the potential inclusion of complex behaviours like art appreciation remains an object of debate. We propose that active inference—which encompasses predictive processing—accounts for such a range of experiences. In so doing, we formally address the question of whether there is any behaviour or experience unique to humans, categorically distinct from other behaviours and experiences. Active inference posits a unified perspective on adaptive behaviour in which learning interacts with perception and action to minimise divergence between an organism's actual and preferred states. The framework accounts for a continuum of behaviours across species, from the simplest (e.g., how bacteria operate in a gradient of nutrients to maintain bodily functions) to the most complex (e.g., how humans engage in long-term sophisticated endeavours). We argue that hedonic evaluation—the process of assigning hedonic value to sensory information—can naturally be understood within this continuum. We show that with the proposed framework, the essential balance between choosing to exploit or explore leads to the concept of hedonic foraging. This ascribes complex cognitive functions such as appreciating art to the set of behaviours already accounted for by active inference, therefore welding core biological (e.g., allostatic) mechanisms common to all organisms and sophisticated cultural pursuits (e.g., revisiting a museum, discovering a new visual artist).

Session: Narrative

2:30 – 4:00 PM
Sala Miquel dels Sants Oliver
Moderator: Monika Płużyczka

Tracking prose rhythm: A validated coding manual for prosodic phrasing and syllable prominence
Christine A. Knoop*, Isabelle Franz, Gerrit Kentner, Sascha Rothbart, Vanessa Kegel, Julia Vasilieva, Sanja Methner, Mathias Scharinger, and Winfried Menninghaus.
*Music Department, Max Planck Institute for Empirical Aesthetics, Frankfurt, Germany

Attempts to track and describe the rhythm of artful prose texts date back to Cicero and beyond. Based on a complex metrical grid, this paper presents a validated coding manual for annotating two primary factors influencing prose rhythm: prosodic phrasing and syllable prominence (Franz et al., 2022, preprint). While its uses extend far beyond the systematic study of literature, it was developed to provide the basis for comparing the rhythm of literary prose at different times, by different authors and in different individual texts. Metrical grids reflect relative syllable prominence (Liberman & Prince, 1977). However, their use for empirical studies of literature was limited in the past because most only work on highly controlled and short sentences (e.g., Lerdahl, 2001; Windmann et al., 2011). A replicable system for coding syllable prominence and prosodic boundaries in longer texts without prior syntatic annotation was lacking. Building on research in the fields of metrical phonology and existing prominence and pause coding systems, we developed a manual for coding syllable prominence and prosodic boundaries in German. The coding system is based on the understanding that syllable prominence and boundary strength determine each other. Three annotators applied our coding system to the 6-8 beginning pages of four German novels. For the phonetic validation, we recorded eight speakers reading the texts aloud, annotated the speech signal with MAUS (Schiel, 1999), and extracted F0 range and duration for each syllable and compared it to predicted syllable prominence using PRAAT (Boersma & Weenink, 2019). We further compared pause duration to predicted prosodic boundary strength. The validation shows that our annotation system reliably predicts syllable prominence and prosodic boundaries. Additional potential applications of the coding system include synthetic speech and (psycho)linguistic prosody research.

Aesthetic evaluation of literary text in a foreign language: What influences the aesthetic appreciation of metaphors?

Monika Płużyczka* and Ainur Kakimova
*Faculty of Applied Linguistics, University of Warsaw, Warsaw, Poland

Metaphors foreground a literary text making familiar seem unfamiliar. According to the neurocognitive model of literary reading (Jacobs, 2011), foregrounding devices are processed slower and are aesthetically appreciated in contrast to backgrounding elements. Studies that support the model involve native speakers. However, empirical research on the processing of foregrounding in a foreign language is scarce. It is of special relevance, as we live in a multicultural society where reading literature in a second language is becoming increasingly common.

The results of the pilot eye-tracking experiment, presented at the recent IAEA Congress in Philadelphia, showed that metaphors are processed slower and associated with higher aesthetic appreciation in comparison to equivalent non-metaphorical expressions. We found also a correlation between the difficulty of the metaphor and the higher aesthetic rating. To explore this topic in more depth, we carried out eye-tracking experiments on a larger group of subjects and added selected methodological tools.

We used self-response questionnaires such as complexity assessment and aesthetical evaluation (based on Knoop et al. 2016) to check the correlation between the two variables. We also received feedback from participants on why they found specific metaphors aesthetically pleasing using retrospective think aloud protocols. Additionally, we checked the correlation between foregrounding and absorption, as recent studies suggest that these features are not mutually exclusive (e.g., Balint et al., 2017). By using triangulation of methods, we aimed to gain a more comprehensive understanding of how non-native readers engage with foregrounding in a literary text and what affects the aesthetic appreciation of metaphors in a foreign language.

Ancient manuscripts in the eyes of modern beholders: A data-driven approach to empirical aesthetics

Alejandro Bahena-Rivera*, Kelsie Rodenbiker, Garrick Allen, and Christoph Scheepers.
*School of Psychology and Neuroscience, University of Glasgow, Glasgow, Scotland

Aesthetic judgment has been a critical concept in assessing and understanding the impact of art. But how, and to what extent, are various aspects of judgement related? Is the impression of an artwork's meaningfulness associated with a sense of joy? Do structure and coherence support positive feelings towards the artwork? How do such judgements relate to actual engagement with art, e.g., in terms of how long people spend looking at an item? The present study took a decidedly data-driven approach to answer such questions, focusing on the appreciation of ancient manuscripts. Four-hundred participants completed an online survey on a sample of 100 manuscripts from various religious and non-religious traditions and cultures. These were taken from the Chester Beatty collection in Dublin, and ranged from 'plain text' to richly illuminated examples. Participants were asked to rate each manuscript on 12 subjective features that were inspired by previous quantitative studies of aesthetics. Using oblique factoring, these features were reduced into four general (but partly related) dimensions of aesthetic judgement: Impressiveness (loading positively on ratings of distinctiveness, excitingness, skillfulness, value, lavishness, likability, and positive feelings), Orderliness (loading positively on ratings of coherence and structuredness), Gravitas (loading positively on perceived seriousness and purposefulness), and finally, Negative Emotion (to what extent the manuscript evokes negative feelings). We then used these factors to predict actual dwell times on the manuscript images (mixed effects regression). Results showed that dwell times were positively affected by a manuscript's Impressiveness, but negatively by its perceived Gravitas. Interestingly, Negative Emotion also had a positive influence (negativity bias?), and the effect of Gravitas on dwell time was significantly modulated by the participant's self-rated religiosity. We shall discuss our findings in light of recent models of art perception (e.g., VIMAP, Pelowsky, 2017) and point to avenues for future research.

Experts find interest in ambiguous haiku poetry, but not novices

Jimpei Hitsuwari* and Michio Nomura
*Graduate School of Education, Kyoto University, Kyoto, Japan

Haiku, the world's shortest form of poetry, has always been ambiguous because of its length (17 syllables). Our previous study showed that the more ambiguity participants perceive when reading haikus, the lower the aesthetic evaluation (Hitsuwari & Nomura, 2022). There, we also made a cultural comparison between Japanese and Germans and found that the degree to which ambiguity lowers aesthetic evaluation is more moderate in Japanese participants. In other words, culture moderated the degree to which ambiguity lowered aesthetic evaluation. Then the question arises: does ambiguity lower aesthetic evaluation among Japanese people? The present study examined the influence of expertise, an important topic in the psychology of aesthetics (for poetry, see Nenadić et al., 2019). A total of 20 experts and 20 novices participated in an online experiment. Experts were recruited if they had participated in haiku gatherings or submitted to haiku magazines for at least ten years. Participants appreciated 20 low ambiguity haikus and 20 high ambiguity haikus that had been previously rated by novices (who did not participate in the main experiment). Each haiku was evaluated from six perspectives: ambiguity, beauty, liking, valence, arousal, and interest. The results indicated that novices' appreciation for haikus diminished with increased ambiguity, whereas experts maintained consistent levels of appreciation for both highly ambiguous and

less ambiguous haikus. The tendency for perceived ambiguity to decrease liking was more moderate among experts. Only among experts did interest mediate this relationship between ambiguity and liking. Higher ambiguity was found to be associated with interest and, consequently, with liking. The results are aligned with a previous study where experts found ambiguous paintings more interesting and less confusing (Silvia, 2013). This present study suggests that increased expertise can lead to higher interest and appreciation of even ambiguous haikus.

Hidden Message? Anomalous-is-bad Stereotype in Top-grossing Films
Mariola Paruzel-Czachura*, Connor S. Wagner, Clifford I. Workman, Satvika L. Kumar, Lauren K. Salinero, Carlos E. Barrero, Matthew E. Pontell, Jesse A. Taylor, and Anjan Chatterjee.
*Penn Center for Neuroaesthetics, ChatLab, University of Pennsylvania, Philadelphia, USA, and Institute of Psychology, University of Silesia in Katowice, Katowice, Poland.

We will present results of a preregistered study about the prevalence of facial anomalies like scars in film actors across cultures (US vs. India) and time (US: 1980-2019, India: 2000-2019). Many films like The Dark Knight use facial anomalies to signify the immoral character of villains who possess them. Negative inferences of people with facial differences are referred to as the "anomalous-is-bad" stereotype, which refers to a suite of negative beliefs (e.g., they are untrustworthy or immoral), behaviors, and brain states linked to dehumanization.
But do only villains possess facial anomalies? What about heroes? What type of anomalies are the most common in main characters? We tested the hypothesis that negative stereotypes for people with anomalous faces are culturally reinforced and predicted that facial anomaly characteristics differ between villains and heroes in popular movies. We screened top-grossing films by country and decade for characters with facial differences. We found that the scarred villain trope worsened with time, although in tandem with substantial increase in representing non-villainous characters with facial anomalies. Country of origin did not predict the presence of facial differences in villains or heroes. "Action" and "fantasy" movie genres were the most likely to depict villains with facial anomalies. Finally, villains' facial differences differed from heroes; they crossed more facial subunits and were more likely to involve the lips, chin, and mandible.
Due to the limited contact most people have with people whose faces harbor visible differences, film and other mediums may play an outsized role in promoting negative evaluations of people with visibly different faces. Understanding whether and how the cinematic representation of facial differences has changed over time stands to inform policy aimed at protecting a vulnerable population from undue social harm.

OCTA Workshop
4:00 – 6:00 PM
Sala Alexandre Rosselló

Coffee break & Posters 2
4:00 – 4:30 PM

Symposium: Integrating Psychological Insights into Urban Design and Planning

4:30 – 6:00 PM
Lluís Domènech Auditòrium

Moderators: Nicole Ruta[1] & Claudia Damiano[2]
[1]GestaltReVision Lab, Department of Brain and Cognition, KU Leuven, Leuven, Belgium.
[2]Department of Psychology, University of Toronto, Toronto, Canada.

At the core of architectural design lies a balance between functional necessity and aesthetic allure. This equilibrium echoes Vitruvian ancient architectural principles of form, function, and beauty. These timeless tenets have sculpted design approaches from antiquity through to the modern era. With over 55% of the global population already residing in urban areas — a figure projected by the United Nations Population Division to rise to 68% by 2050—the importance of investigating the relevant variables driving preferences for built environments becomes increasingly crucial in urban planning and design.
Our symposium aims to explore how different elements of cityscapes and built environments impact our emotional responses and the overall approachability of these spaces. For example, there is increasing scientific evidence that interacting with nature improves cognition and boosts feelings of emotional well-being. However, as more of the world is developed, our exposure to nature is being threatened. Therefore, a crucial step may be to investigate how nature is integrated in urban environments. Which (natural or built) elements contribute to the aesthetic appeal of city landscapes? What underlies our reactions to urban spaces?
Experts across psychology, vision science and urban planning will present insights from their research, offering a multidisciplinary perspective on what we know so far about aesthetic appreciation of architecture, and how we can progress knowledge in the field. Engaging in a comprehensive dialogue about architectural design can help to better integrate knowledge from the field of psychology into urban planning, possibly enhancing quality of life in a rapidly urbanizing world.

Urban architecture: a vision science perspective
Olivier Pennacchio
Computer Science Department, Universitat Autònoma de Barcelona, Barcelona, Spain.

We humans spend most of our time in man-made, artificial environments. Yet, our senses have been shaped by millions of years of evolution in natural environments. Evolutionary selective pressure has led to a close match between what we are likely to see in natural environments and the stimuli our senses process most efficiently. The mismatch between what we now have to look at and what evolution has prepared us to look at comes at a price. For example, visual patterns made of stripes, which are virtually absent in nature but pervasive in modern architecture and interior design—partly because of their modular structure—, have detrimental effects on the viewer that range from eyestrain to headache, and to seizures in individuals with photosensitive epilepsy. To be able to mitigate the effects of visual stress and develop healthier and more inclusive cities it is imperative to identify the features in the urban landscape that drive positive and negative neurological effects. To this end, we will first draw on the theory of efficient coding of natural scenes. We will show how measuring deviation with respect to the statistics (i.e. regularities) of natural scenes predicts adverse effects from urban architecture. More generally, we will propose a novel mechanistic characterization whereby adverse visual scenes overload adaptive perceptual mechanisms in

the early visual cortex. We will next explore how these predictions are modified through green interventions taking as example a recently greenified axe in Barcelona's Eixample. In a final part, we will identify a series of relevant variables that need further investigation at the behavioural and neurophysiological level for a more thorough assessment of the effect of modern urban environments.

Toward Inclusive Architectural Design – a view from the vision sciences

Ute Leonards
School of Psychological Science, University of Bristol, Bristol, UK.

More than 70 years ago, world-renowned architects such as Frank Lloyd Wright and Richard Neutra already raised concerns that the environments we create might directly impact our ability to function as human beings, affecting our physiology, emotion, behaviour and ability to think. Today, scientific evidence is overwhelming that people's sensory (in particular, visual) perception of their environment has profound consequences for their cognition, health and wellbeing. Yet, crosstalk between sensory sciences and architecture remains limited, preventing us from understanding how different sensory environments in the real world affect us as the embodied beings we are. Approaching the topic from an evolutionary perspective, I will propose that following a Vision and Action approach could help us find solutions to pressing societal issues such as understanding how the environments we create impact the health and wellbeing of an ageing and increasingly neurodiverse population, including issues such as fall risk. Presenting quantitative and qualitative data, I will provide first evidence how the visual environment affects our gait, even in hazard-free environments during walking on even ground, and how this relates to visual (dis)comfort and aesthetics as well as individual differences. I will finish my talk with a first attempt at a theoretical framework of sustainable, inclusive architectural design informed by vision science.

The City of Milan urban planning experience

Stefania Lamaddalena
Urban Planning Department, City of Milan, Milan, Italy.

Urban density and city infrastructure impact quality of life and human well-being. Efficient and improved urban planning plays a key role in showcasing new development models. Our talk aims to present the City of Milan's experience of a green and sustainable urban planning and its implementation strategies. In particular, we will explore actions for protection as well as improvement of landscape and green environment features and for urban forestation and ecological network development. In order to react in an innovative way to environmental emergencies, Milan aims to establish a green footprint, acting on emission sources and implementing policies, actions and adaptive measures to climate change, including increasing green and permeable areas. City of Milan's General Urban Plan, in force since 2020, pays close attention to the theme of the allocation of green spaces and the growth of permeable surfaces, introducing new environmental standards for constructions that demand higher energy efficiency, re-naturalization and de-pavement (including green roofs). The city Plan set the "Reduction of climate impact index", which defines a relation between green surfaces and territorial surfaces of the intervention. The index is applied to whole municipal territories and impacts building design. The Plan aims at monitoring the effects of these rules on the territory and environment, in order to update them and make them more ambitious. In April 2023 Milan started reviewing the General Urban Plan in order to set even more effective strategies to face climate change. This new draft Plan identifies a new vision for the city, according to which every single future project will have to guarantee the following 4

standards (so called “4 cities”): “beauty”, “sustainability”, “proximity” and “affordability”. In this context, a transdisciplinary dialogue exploring possible collaborations with psychology researchers allows us to embrace new perspectives in the process of updating and policy making.

The aesthetics of disorder in urban design
Colin Ellard
Department of Psychology, University of Waterloo, Waterloo, Canada.

We often think of an effective urban design as one that contains order, harmony, and efficiency. But some theory and research in urban psychology suggests that there can be virtue in disorder. I will describe some studies that show the human attraction to complexity, vitality and perhaps even disorder. I will speculate that the foundation of our attraction to such qualities is that we see in them the wellspring of freedom and autonomy, important parts of the bedrock of human wellbeing.

Can place attachment be designed?
Sarah Williams Goldhagen
Author, Welcome to Your World: How the Built Environment Shapes Our Lives.

The overarching imperative of the emerging discipline of neuro-architecture is to promote human flourishing by helping architects develop design strategies consonant with the realities of human perceptual and embodied needs and experience. This involves precisely articulating the array of what humans want and need from their built environments; and a central element—if not the central element-- in this array is this: humans need to develop deep emotional connections to the places they inhabit and use. In this lecture, we will explore examples of neuro-architectural design strategies that promote meaningful place attachment by instigating bottom-up and top-down cognitive processing in delicate orchestration. It concludes with a discussion of the possibilities for widespread adoption of place attachment strategies and proposes avenues for further research.

Session: Visual art appreciation
4:30 – 6:00 PM
Sala George Bernanos
Moderator: Claus-Christian Carbon

Across minds and masterpieces: A multi-brain approach to identifying ‘universal resonance’ to art
Theresa Rahel Demmer*, Young Ah Kim, Julia Schabasser, Tao Liu, and Matthew Pelowski.
*Department of Psychology, University of Vienna, Vienna, Austria

If form is the source of aesthetic experience, and form is unchanged by the circumstances, it follows that Great art remains stable and unobscured because the feelings that it awakens are independent of time and place (Clive Bell,1914, p. 37). There is a long-standing argument in the field of art studies that great art has some sort of ‘universal resonance’ that transcends time and space. Whether speaking to the human condition, bringing up shared human issues or associations, or revealing skills depictions that stand out, it is well accepted that there are art examples that do seem to survive the test of time and remain relevant and beloved by audiences. Following this idea, great art’s resonance with audiences should be detectable or measurable. This study introduces a novel approach employing functional near-infrared

spectroscopy (fNIRS) and multi-brain network analysis to examine both behavioral measures and inter-brain synchrony in an attempt to quantify such universal resonance in art. This follows a recent paper that found a link between shared activity patterns in cognitive empathy region (rIFG) and higher ratings of liking and willingness to pay for media in advertising and music and applied it to visual art (Western and Japanese Masterpieces). The results support the previous findings, showing a correlation of shared activity patterns in the rIFG with overall higher willingness to pay to see the painting again in a gallery/museum. The results also suggest that this correlation was mediated by participants' subjective felt familiarity with the artworks. Further, artworks with higher shared activity patterns in the rIFG were collectively liked more. Overall, it appears that interpersonal synchrony in the rIFG is important in driving shared resonance related to art appreciation, which is reflected by the higher rating scores. Findings support this novel multi-brain approach for identifying universally resonant art.

Awe elicits enhancement of deep pulling space: portraits and landscapes
Despina Stamatopoulou
Department of Theatrical Studies, University of Patras, Greece

Interest in studying the underlying mechanisms of awe has increased recently. It has been suggested that the use of artwork could be an effective way of inducing awe. In the present study, to investigate awe induction, 7 paintings were used as experimental perceptual stimuli: three artistic self-portraits with a frontal view and four immersive landscapes suggesting different perspectival depth organizations. Fifty-two participants, controlled for various self-characteristics (self-relationships, attachment patterns, and imagination type), reported the degree to which they felt awe (DV) in front of each stimulus, while judging the paintings--beyond, the standard affective semantic-differential scales, and across some specific perceived, dynamic spatiotemporal parameters of the stimulus such as: the sense that the work draws you into it - immersion, the sense of floating or expanding space, silence, self-reflexive feelings of judgment, connectedness, high power of the painting, shock, distortion in the stimulus, and focal point that captured the participants' interest. The results showed that increased feelings of awe were reported when the paintings were judged to elicit enhancement of deep pulling space and immersion in landscapes, while reflexive feelings of being judged, silence, and stimulus strength served as predictors of awe in the portraits. However, deep space effects - immersion had a mediating effect for portraits as well. Two points are further discussed here: the self-reflexive aspect of awe pronounced in the portraits and the underlying deep, spatiotemporal interaction with the stimuli. Of specific interest is the sense of silence in portraits in relation to self-reflexive feeling of being judged.

Time-resolved EEG decoding of meaning making during 'aha' experiences with visual art and their titles
Dominik Welke* and Edward A. Vessel
*School of Psychology, University of Leeds, Leeds, UK

Previous work on the "title effect" has shown that presenting visual art together with titles (versus without) can affect perceived understanding and (less consistently) aesthetic liking. We partly replicated these findings and showed that the additional semantic information of titles can further prompt strong "Aha! experiences" - the sudden feeling insight. Participants viewed paintings (5s trials) and rated their curiosity for seeing the title. This was followed either by the original title or a dummy title lacking additional information ("untitled"), and a second presentation of the painting, after which participants rated strength of 'aha', aesthetic

liking, and feeling of understanding the artwork. In an EEG and eye tracking study with the same paradigm (N=50 participants) we investigated how these ratings were represented in the observers' (neuro)physiological recordings, focusing on their temporal sequence. Using a time-resolved decoding approach we were able to detect the categorical experimental conditions, and some of the graded ratings. In EEG, curiosity for the title could be decoded early in the trial (significant 0.845-1.648s after onset) while the felt understanding signal built up over time (significant 1.527-4.177s after onset). Pupil dilation reflected information on felt understanding (significant 1.568-3.294s after onset) but also on 'aha' ratings and aesthetic liking (significant 1.728-2.451s [aha] and 1.748-2.471s [liking] after onset). All these effects show up long after the time frames typically investigated in EEG studies, and we believe that our multimodal approach can lead to more mechanistic understanding of the aesthetic evaluation process. Together with the behavioral findings, our decoding results suggest that the neuronal processing interacts with the material at hand – 'aha' can predict understanding but understanding is not just a consequence of insight moments. 'Aha' and aesthetic liking, however, are more linearly related.

Where comes the light from in art?

Claus-Christian Carbon* and Alexander Sasha Pastukhov
*Department of General Psychology and Methodology, University of Bamberg, Bamberg, Bavaria, Germany, Research Group EPÆG (Ergonomics, Psychological Æsthetics, Gestalt), Bamberg, Bavaria, Germany, and Bamberg Graduate School of Affective and Cognitive Sciences (BaGrACS), Bamberg, Bavaria, Germany

Our perceptual system shows a peculiar bias: When we estimate the position of a light source, we assume that it is above us (which makes sense for the sun) and slightly to the left. By analyzing 10,000 artworks from 1500 BC to 2000 AD, in Study 1, we revealed a robust preference for painting from the top left across Western art history, from the Early Renaissance to the Fin-de-Siecle. We investigated whether the same pattern was observed when non-artists who have no explicit training in art, create pictures. In Study 2, N=224 participants in an online study composed a picture using pre-drawn, drawn, and unrendered sketchy elements that could be freely selected from a pool of 30 everyday objects typically used in simple figurative scenes (e.g., a house, a car, human figures) plus a sun. 170 participants (76%) included the sun in their painting, placing it at the top (the average height was 85% of the maximum height of the picture frame). Participants mostly put the sun away from the vertical centreline, but not with a lateral bias. We also found no effect of participant age on position. This suggests that professional artists' placement of the light source in the top left corner most likely reflects implicit perceptual preferences (a painting 'looks better' this way) rather than explicit cognitive knowledge. In Study 3 (N=44), using rendered objects with an inherent light source from left or right, we again found no specific top-left sun bias, as multiple objects that participants used (14.5±6 per image) were an equal mix of two sets of objects (49%±10% of objects had an inherent light source from the left). The results demonstrate that artistic amateurs did not adopt the early Renaissance art invention of light coming from the top left for their own works.

Internet memes for empirical aesthetics: Frontiers and challenges

Samrawit Ayele*, Luca Cecchetti, and Rolf Reber.
*Social and Affective Neuroscience Group, IMT School for Advanced Studies Lucca, Lucca, Italy

In the digital age, internet memes have emerged as a pervasive form of communication and cultural expression, shaping online interactions and reflecting societal trends. Despite their ubiquity and influence, there exists a significant gap in the empirical aesthetic literature concerning internet memes. This paper addresses this void by exploring the frontiers and challenges associated with using memes as a subject for systematic empirical investigation. In an exploratory study, 1,153 online participants evaluated 300 user-generated internet memes, unveiling the robust predictors of humor, amusement, and the absence of boredom. Additionally, positive emotions were found to enhance liking, while negative emotions led to lower ratings. Striking a balance between fluency variables, such as level of understanding and prototypicality, and disfluency factors, like exclusivity and confusion, emerged as positive predictors for overall liking. Building on these findings, a subsequent study investigated psychophysiological differences between fluent and disfluent internet memes. Thirty-four participants rated 84 multimodal memes while skin conductance (SCR) and facial electromyography (EMG) were recorded. Fluent memes garnered greater aesthetic liking, faster dwell times, and ease of processing, consistent with the processing fluency bias. Disfluent meme processing was characterized by a higher SCR magnitude and prolonged latency of psychophysiological responses. This research pioneers the empirical investigation of internet memes, offering insights into the intricate relationship between cognitive processes, emotional reactivity, and aesthetic preferences. As we navigate the uncharted waters of meme aesthetics, challenges such as defining and measuring preferences, accounting for individual differences, and establishing a theoretical framework emerge as crucial focal points for future research. This study marks a crucial step toward understanding the aesthetic dimensions of internet memes and opens avenues for further interdisciplinary exploration in the realms of aesthetics, psychology, communication, and digital media studies.

Session: Music action and perception

4:30 – 6:00 PM
Sala Miquel dels Sants Oliver
Moderator: Diana Omigie

Aesthetic appreciation and the interplay between action and perception
Maria-Chiara Villa*, Jacopo Frascaroli, Greta Varesio, Giuliano Geminiani, Pietro Sarasso, Katiuscia Sacco, and Irene Ronga.
*Department of Psychology, University of Turin, Turin, Italy

Recent strands of research in empirical aesthetics have painted a complex picture of the involvement of the motor system in our aesthetic encounters. On the one hand, the "Embodied Simulation" theory (Freedberg & Gallese, 2007) posits a crucial role of the simulation of action (via the Mirror Neuron System) in our aesthetic encounters. On the other hand, the "Stopping for Knowledge" (Sarasso et al., 2020) hypothesis suggests that moments of aesthetic appreciation are accompanied by motor inhibition with the parallel enhancement of perceptual activity. However, the details of the influence of aesthetic experience on our motor system are still largely to be defined. In this research, we will present two experiments designed to shed light on the influences of aesthetic appreciation on the interplay between motor and sensory processes, and how these influences might be modulated by the complexity of the task. In Experiment 1, we focus on investigating the differential effects of preferred and less preferred background music on the performance of a simple detection task. In experiment 2, we investigate the influence of the same preferred and less preferred background music within the context of the imitation-inhibition task to detect motor

resonance effects. Results from experiment 1 shows slower reaction times with preferred music compared to less preferred music, reinforcing the hypothesis of a relationship between aesthetic appreciation and motor inhibition. Experiment 2 failed to show a significant difference in motor resonance effects for preferred and less preferred music, suggesting that the role of embodied simulation in our aesthetic encounter might be more complex than previously thought. Overall, these experiments shed some light on the intricate relationships between aesthetic appreciation and motor/sensory processes in contexts of varying complexity.

"Music" as a perceptual category – the role of perspective, stimulus duration and repetition

Pauline Larrouy-Maestri* and Melanie Wald-Fuhrmann
*Music Department, Max-Planck-Institute for Empirical Aesthetics, Frankfurt-am-Main, Germany, and Centre for Language, Music, and Emotion (CLaME), USA – Germany

Music, like other art forms, is a construct that is sensitive to cultural and historical aspects as well as to individual differences. In a series of experiments, we examine how people categorize sounds by 1) studying what they consider to be "music" (as opposed to non-music), 2) investigating whether they believe that their concept of "music" is similar to what others would say, and 3) testing the effect of duration and repetition on such a concept. A total of six hundred thirty seven participants (range: 19-67 years old, without specific music training), recruited online from European countries, were asked to identify auditory stimuli selected from various databases, as music or not. In exp. 1, participants were asked to evaluate ninety 5-seconds long stimuli according to a first or third person perspective. In exp. 2, we presented a subset of the stimuli with different durations (2- and 10-seconds long) and in exp. 3, we implemented three different repetition conditions (consecutive presentation, randomized within blocks, and across blocks). The mixed effects logistic regressions applied to predict the response (i.e., "Music" or "Not music") reveals that the notion of music differs between a first and third person perspective (exp. 1) and that duration (exp. 2) as well as repetition (exp. 3) slightly affect sound categorization. However, the high agreement between participants supports that the individuals' concept of music is highly shared. Altogether, this study reveals that European listeners share a similar construct of music, although they think their point of view is somehow unique. Interestingly, this concept is not dichotomic. Indeed, a cluster analysis on the answers shows a three-group solution that differentiates between musical, non-musical, and ambiguous stimuli, providing key material to investigate the cognitive processes behind "music" perception.

Examining how auditory profiles of autobiographical memory-evoking songs relate to memory characterisation and retrieval

Safiyyah Nawaz* and Diana Omigie
*Department of Psychology, Goldsmiths University of London, London, United Kingdom

Studies of music-evoked autobiographical memories (MEAMs) demonstrate that music is a salient cue for retrieving vivid and highly self-relevant memories. However, the influence of music's stimulus features on qualities of retrieved memories remains to be investigated. Accordingly, the present study aimed to examine whether musical features predict qualities of MEAMs, focusing on emotional and phenomenological content of MEAMs, as well as the efficiency with which memories are retrieved.
A large sample of adult participants (N=169) identified a piece of music that brought an autobiographical memory (AM) to mind, before providing a written description and

evaluations of emotional and other phenomenological content of the memory. Each participant was then presented with ten clips of songs that were popular in their childhood and early adulthood, and reported the same details as provided for their self-selected memory. Features of all songs were extracted using the Spotify API, before being submitted to a principal components analysis to reduce dimensionality. This analysis revealed one primary component that characterised songs as ranging from upbeat/lively (Starships – Nicki Minaj) to sombre/contemplative (Miss You - trentemøller). Linear mixed models revealed that more upbeat songs were more likely to cue memories, with memories cued by such songs being more likely to be described as arousing and highly social. In contrast, sombre songs prompted quicker memory retrieval, with memories described as more vivid, unique, and important to listeners.
These preliminary findings suggest that musical features are important in determining the emotional qualities, content, and speed of retrieval of AMs. Consequently, they add nuance to previous work, which emphasised that MEAMs are positive, vivid and self-relevant without showing how musical features influence these qualities. In planned future studies, we will take this work further, by examining the specific mechanisms by which music may influence encoding and retrieval of AMs.

The effect of musical expressivity and technical difficulty on musicians' movements and physiological parameters: an exploratory study with violinists
Nicola Di Stefano*, Daniela Lo Presti, Luigi Raiano, Carlo Massaroni, Chiara Romano, Emiliano Schena, Marc Leman, and Domenico Formica.
*Institute of Cognitive Sciences and Technologies, National Research Council of Italy (CNR), Rome, Italy

Playing music is a highly complex task that relies on the unique combination of musicians' technical and expressive skills. While literature has extensively investigated the effects of musical expressivity on listeners, the impact of technical difficulty and emotional expressivity on musicians during performance has surprisingly received little or no attention. We address this gap in the literature by collecting behavioral and physiological data from twelve violinists while they perform pieces with varying degrees of emotional expressivity and technical difficulty. The musical excerpts (n=29) include technical exercises (e.g., scales, arpeggios, and etudes) and classical repertoire for the violin (e.g., Bach, Mozart, Paganini). Participants rated each excerpt for technical difficulty and emotional expressivity. During performances, violinists wore a customized set of wearable sensors that allowed us to gather data on the subjects' autonomic nervous system and their bowing movements. The subjective ratings of emotional expressivity and technical difficulty were found to be consistent across subjects. Additionally, preliminary results suggested that emotional expressivity significantly affected the fluidity of bowing, with more expressive excerpts being performed less smoothly. No effects of expressivity and technical difficulty were found on any of the physiological parameters of violinists. By unveiling the motor mechanisms underlying music expressivity, our results shed light on the investigation of the psychophysiological dynamics that characterize music performance and might offer novel insights into the nature of aesthetic emotions.

Curiosity, attention and the temporal dynamics of music engagement
Diana Omigie
Department of Psychology, Goldsmiths, University of London, London, United Kingdom.

Over the course of any music listening experience, an individual may find their focus switching between the music and other thoughts or actions. Accordingly, the study of music-induced curiosity promises a better understanding of the dynamics of listeners' engagement with music over time. In this talk, I will present laboratory-based studies demonstrating that the experience of curiosity during music listening is influenced by the heard music's unfolding structure, before illustrating how these and other findings inform a deeper understanding of everyday music listening in all its complexity. First, I will present studies showing that the experience of curiosity during music listening is explainable both by listeners' perception of change in the music, as well as by the local and global complexity of what is being heard. Second, I will show that -in line with predictive coding accounts- curiosity is triggered by high information content events in more predictable music contexts, as well as by low information in more uncertain contexts. Third, given that listeners' subjective report of their felt curiosity is best corroborated using implicit measures, I will present a study showing that listeners' reports of peak curiosity during music listening are associated with a lower incidence of mind-wandering. Finally, I will present a novel model of time-varying music engagement that is informed by a growing body of work across various relevant disciplines. Thanks to its ecological validity, its ubiquity, and the decades of music cognition research couching it in information theoretic terms, music listening presents a still relatively untapped resource in the goal towards better understanding curiosity and aesthetic engagement. I will end the talk by proposing a number of different promising avenues for future research.

Es Baluard Museum Tour and Reception

6:30 – 10:00 PM

Friday, May 10, 2024

Symposium: Empirical insights into performing arts aesthetics from multiple perspectives on the performative situation

9:00 – 10:30 AM
Lluís Domènech Auditòrium

Moderators: Emily S. Cross[1] & Julia F. Christensen[2]
[1]Department of Humanities, Social and Political Sciences, ETH Zürich, Switzerland.
[2]Department of Cognitive Neuropsychology, Max-Planck-Institute for Empirical Aesthetics, Frankfurt/M, Germany.

The performance situation offers a wealth of opportunities for exploring multivariate research questions related to empirical aesthetics. Focussing on performers alone, we might wish to consider the perspectives of the dancers, singers, instrumentalist musicians, the orchestra conductor, or the actors. These agents sometimes interact, synchronize, or desynchronize – all sharing an intention regarding the performance. How these performers shape the perspective of the audience is crucial in the empirical aesthetics of performing arts. But who are these performing and perceiving agents? Before we study how they interact and collaborate as a collective, valuable insights can be gained by taking a step back to analyse the variables that compose the whole. In this symposium, we aim to do just this, by bringing together perspectives from empirical aesthetics' foundational disciplines, spanning the humanities, the arts and the sciences. The five contributions composing this symposium focus on those active agents of the performative situation: The conductor, the audience, and the various genetic and personality makeups of different performers, including dancers, instrumentalist musicians and singers. Ophelia Deroy takes an empirically-informed philosophical stance on the role of the conductor in large-scale orchestras. The role of the observers' (or audiences') internal physiological signals in the aesthetic appreciation process is explored by Andrea Orlandi, while Emily Cross discusses decisive variables of the performative situation that induce audiences to come back for more. Fredrik Ullén presents evidence showing that behavioural genetics approaches to music, song and dance practice reveal distinct gene-environment interactions for practitioners of these artforms, while Julia F. Christensen uses a large population-based sample, to show that we may be able to disentangle distinct personality profiles of dancers, instrumentalist musicians and singers. Together, these eclectic methodological approaches and diverse perspectives on the performative situation provide exciting and timely insights into the factors shaping performing arts aesthetics.

What does the conductor do?

Ophelia Deroy
The Munich Center for Neurosciences – Brain & Mind (MCN), Faculty of Philosophy, Philosophy of Science and the Study of Religion, Ludwig-Maximilian University Munich, Munich, Germany.

A hundred musicians are on the stage, each tuning their instrument. Seconds later, the strings all start in perfect unison, joined by the winds and the drums. Orchestral music is a striking case of coordinated performance which requires not only synchronisation, but also constant adaptation; and it is a case of individual contributions synergically converging into a bigger whole. Playing music together is studied and discussed as a canonical case of joint action:

broadly speaking, actions which depend on individuals coordinating for a shared goal. Current theoretical models of joint action successfully explain smaller groups' coordination, such as duets, chamber music-, or jazz bands improvising together, but if these models pretended to tell the whole story, they would be failing to account for the role of the conductor during the performance. What is the conductor's role? This question remains a big enigma in empirical and theoretical aesthetics, and is variously described by conductors themselves or theorised in musicology. The role is also paradoxical: on the one hand, the conductor is a not part of the orchestra in that the conductor does not produce any sound; on the other hand, the conductor is the central part of the orchestra in that a large ensemble, beyond two dozen or so of instrumentalists, will be unable play without a conductor, especially when the orchestra includes different instruments.
Informed by recent large-scale empirical concert research of our team, I will present a philosophical account of participatory intentions that takes us out of this paradox, and addresses these three questions:
1. How should we think of the role of the conductor in the joint orchestral performance?
2. What kind of existing or new evidence speaks in support of the account I propose?
3. Does the proposed account have other implications, notably for the performative arts?

Internal body signals influence dance aesthetics

Andrea Orlandi[1,2,3] & Emily S. Cross[4]
[1]Department of Psychology, Sapienza University, Rome, Italy.
[2]IRCCS Santa Lucia Foundation, Rome, Italy.
[3]School of Psychological Sciences, Macquarie University, Sydney, NSW, Australia.
[4]Department of Humanities, Social and Political Sciences, ETH Zürich, Switzerland.

Dance has proven to be an excellent framework for neuroscientific investigations on body and movement representation and aesthetic evaluation. While the embodied cognition framework has revealed the significance of an observer's body in the aesthetic appraisal of artworks and dance (e.g., sensorimotor resonance), a deeper exploration of the role of internal body signals and the ability to focus on them (e.g., interoception) in modulating this experience is required. Previous studies have highlighted that the perceived intensity of emotional facial expressions varies based on their presentation during an observer's cardiac phase (diastole vs systole). Additionally, a modulatory role of interoception on the link between the expressivity evaluation of dance movement and autonomic responses has been reported. The current study aims to unravel the role of internal body signals, particularly the cardiac phase, in modulating the aesthetic and emotional evaluation of non-symbolic dance postures, obtained by digitizing the kinematics of dancers and creating 3D avatar versions of their bodies. Non-dancer participants evaluated the perceived emotional intensity and likability of dance postures presented in both upright and inverted orientations, during systolic or diastolic cardiac phases. Evaluations of perceived arousal and emotional valence were also collected, alongside participants' empathic and cognitive dispositional traits, interoceptive capabilities, and anxiety state-traits. Our findings reveal a positive link between the aesthetic appreciation of dance postures and their perceived emotional valence and arousal levels. Importantly, the relationship between likability and emotional valence appears to be modulated by the observer's cardiac phase. Postures perceived as negative were evaluated as more likable to watch when presented during the diastolic phase compared to the systolic phase. These findings might suggest a visceral connection between dance aesthetics and perceived emotions.

What makes dance audiences come back for more? Aesthetic appeal of dance depends on location and audience factors

Emily S. Cross[1], Julia F. Christensen[2], Eva-Madeleine Schmidt[2,3], Rebecca A. Smith[4], Georgios Michalareas[2], Luisa Sancho-Escanero[5], & Fredrik Ullén[2]
[1]Department of Humanities, Social and Political Sciences, ETH Zürich, Switzerland.
[2]Department of Cognitive Neuropsychology, Max-Planck-Institute for Empirical Aesthetics, Germany.
[3]Max Planck School of Cognition, Leipzig, Germany.
[4]Institute of Neuroscience and Psychology, University of Glasgow, UK.
[5]Dance Company, Pfalztheater Kaiserslautern, Germany.

After the Covid-19 pandemic, dance performances were among the cultural activities most impacted by audience shrinkage. Here we tested what makes audiences wish to want to watch a dance performance again. Across one live and one online experiment, we investigated effects of movement timing (velocity, acceleration), as well as location (home, theatre), mode (recorded, live) and type of dancer (avatar, human). We replicated previous research showing that variations in movement timing are successfully detected by observers, and that varied movement timing is preferred over uniform movements. However, when taking into account traits of the participants (openness to experience, general aesthetic responsiveness), and their subjective preferences, assessed with the Aesthetic Emotions Scale (AESTHEMOS), a more granular picture emerged. The wish to watch a dance piece again was greater among participants who watched the original work in a live performance setting than at home, and personal preferences also played a major role. A cognitive science of audience behaviour must take into account interactions between objective and subjective factors in art reception; how both objective as well as subjective meaning-making processes interact to modulate audiences wish to attend performances.

Studying the performing arts with tools from behavior genetics

FredrikUllén
Department of Cognitive Neuropsychology, Max-Planck-Institute for Empirical Aesthetics, Germany.

The performing arts, such as music and dance, have long been used as model behaviors in the cognitive sciences. This research spans a broad range of questions, from mechanisms of perception and emotional processing to social cognition, creativity, skill learning, and motor performance. Another phenomenon which has intrigued scientists for a long time is the association between artistic engagement, well-being and health, and its underlying mechanisms. During the last decade there has been a dramatic increase in behavior genetic research on artistic behaviors. Twin modelling and, more recently, analyses based on genotyped data, have provided new, often surprising insights into what underlies individual differences in artistic engagement and its correlations with other outcomes. In my talk, I will discuss key findings from this line of research, illustrating how tools from behavior genetics provide unique possibilities to analyze causal mechanisms and different forms of interplay between genes and the environment.

The Dancer Personality: Comparing dancers and non-dancers in Germany and Sweden

Julia F. Christensen[1], Laura Wesseldijk[1,2,3], Miriam Mosing[1,2], Kirill Fayn[1], Eva-Madeleine Schmidt[1,4], Matthias Blattmann[5], Luisa Sancho-Escanero[6], Fredrik Ullén[1,2]
[1]Department of Cognitive Neuropsychology, Max-Planck-Institute for Empirical Aesthetics, Frankfurt/M, Germany.

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[4]Max Planck School of Cognition, Leipzig, Germany.
[5]Tanzschule Gutmann, Freiburg, Germany.
[6]Dance Company, Pfalztheater Kaiserslautern, Germany.

Empirical data on the personality of dancers is sparse, and generally based on studies using small samples and heterogeneous measures of personality. We investigated Big Five personality profiles of dancers in two large representative samples from Sweden (n = 5435) and Germany (n = 574). Musicians have previously been found to be more open, agreeable and neurotic than control participants who were not performing artists. We hypothesized that professional dancers would also be more open and more extraverted than non-dancers. Further, we explored the personalities of dancers of different dance styles. Results showed that the personality of dancers is indeed more open, extraverted, agreeable, but less neurotic, than people who do not dance, and dance school entrepreneurs, who are both dancers and entrepreneurs, even more so. Thus, dancers and musicians share high levels of openness, while neuroticism differentiates them. Further, dancers and singers share high levels of extraversion, perhaps because, in dancing and singing, the expressivity comes directly from the performers' body instead of indirectly via an instrument. With regards to dance styles, personality differences emerged, yet, these could be due to other factors than dance style choice, including musical genre or the distinct social communities.

Session: Methods

9:00 – 10:30 AM
Sala George Bernanos
Moderator: Jeffrey Vadala

PsyNet: Software for next-generation behavioural experiments in empirical aesthetics
Peter Harrison*, Pol van Rijn, Frank Höger, and Nori Jacoby.
*Faculty of Music, University of Cambridge, Cambridge, United Kingdom

Behavioural experiments have long been important for empirical aesthetics research. Originally such experiments were painstaking to conduct, as stimuli had to be constructed using physical materials and data had to be recorded by hand. Nowadays, modern computers make it much easier: stimuli can be designed digitally and data can be recorded electronically. Online data collection theoretically provides further advantages: researchers can test hundreds of participants simultaneously, making high statistical power much more affordable, and unlocking new kinds of research paradigms that only work with many coordinated participants, for example cultural evolution or social cognition paradigms. However, such experiments are hard to implement using current software frameworks, which mostly do not support interaction between participants and only provide limited support for programmatically generated or recorded stimuli. To this end we have developed PsyNet, an open-source Python framework for implementing advanced experiments such as these. PsyNet provides a highly modular and customisable language for designing experiments, whereby researchers can draw on a vocabulary of fundamental concepts from stimuli (e.g. Shepard tones, Gabor patterns) to tasks (e.g. two-alternative forced choice, slider optimisation) to paradigms (e.g. 1-up-N-down, iterated learning). Support is provided for resource-intensive computing, for example the online generation of stimuli from a deep neural network, or the application of time-consuming audio or image analysis algorithms to participants' responses. PsyNet also integrates with tools such as Dallinger, Amazon

Mechanical Turk, and Prolific in order to automate almost all steps involved in launching an online experiment, including app deployment, participant recruitment and payment, data quality screening, et cetera. In this presentation we will introduce PsyNet in more detail, further motivate its utility for empirical aesthetics research, and give examples of recent research using PsyNet.

Research methods and guidelines for using human dance to investigate human cognitive systems

Vasiliki Meletaki*, Julia Christensen, Kohinoor Darda, Andrea Orlandi, and Laura Rai.
*Penn Center for Neuroaesthetics, University of Pennsylvania, Philadelphia, PA, USA

Dance and movement research lies uniquely at the intersection of cognitive psychology, neuroscience, cultural studies, and the performing arts. The field has seen significant growth over the years, encompassing research on the physical, psychological, and physiological aspects of dance and movement, and succoring our understanding of human cognition. As this field continues to expand, it has become increasingly important to establish guidelines and best practices to ensure the rigor, quality, reproducibility, and relevance of research in this domain. Our work aims to represent a synthesis of the current state of research and proposes a comprehensive framework with suggested guidelines that researchers, practitioners, and educators can follow to ensure robust, rigorous, and impactful studies in the realm of dance and movement science. Key areas of our framework include the operationalization of what is dance in the empirical sciences, the definition of who is a dancer, current measures of expertise and additional parameters that need to be considered when quantifying dance expertise, and a culturally sensitive, holistic, and interdisciplinary approach toward its empirical investigation both in controlled laboratory and ecologically valid settings. We discuss the practical implications of our proposed framework beyond empirical investigations, demonstrating how it can be applied to real-world scenarios, such as enhancing dance education and choreographic practices. Our framework of guidelines and best practices for research on dance and movement is not only beneficial for the domain of dance and movement aesthetics, but also for investigations in social cognition, affective neuroscience, computer and vision science, and artificial intelligence. We aim to provide a valuable resource to researchers and practitioners interested in the psychology of aesthetics within the context of dance and movement, and we believe that our work can foster meaningful advances in the field.

Music performance assessment: Noise in judgments and reliability of measurements

Edoardo Passarotto*, Sebastian Silas, Eckart Altenmüller, and Daniel Müllensiefen.
*Department of Neurosciences - Section of Rehabilitation, University of Padova, Padova, Italy

Aggregating ratings from multiple evaluators is commonly applied to overcome individual biases in the assessment of aesthetic objects. However, high degrees of subjectivity inevitably lower the reliability of aggregated ratings.
This project presents a novel procedure, the Multi-Perspective Assessment Protocol (MPAP) for reliably measuring performance quality. The approach proposed brings together the Noise (Kahneman et al., 2021) and Generalizability Theory (Brennan, 2001) frameworks.
Changes in performance quality in 37 musicians were monitored for four consecutive days: during this period, participants practiced and recorded a 60-second musical excerpt on each day. The resulting recordings were assessed by different cohorts of raters: a self-assessment

group (N = 37), a group of expert musicians (N = 137), and a general public group (N = 174), without formal music training.
Ratings from different evaluators were aggregated using Bayesian random effects models which accounted for rater-related variability. Data simulations were used to evaluate the effectiveness of model-aggregating scores under different levels of noise and sample sizes. Results show how the approach can quantify interrater agreement as Generalizability and Dependability coefficients. These coefficients fell within a good range (>0.85) for the general public group and in an acceptable range (>0.7) for the expert group. The data simulations showed that Generalizability and Dependability are closely related (>0.8) to the correlations between model-aggregated and simulated true scores. Aggregate judgments from expert evaluators were strongly correlated to those from the general public group (r = .786). In contrast, self-assessment scores from the performing musicians were unrelated to any peer-evaluation ratings.
In conclusion, the present study shows a new and principled approach for understanding and increasing the quality and reliability of performance evaluation data. The approach provides a bias-free way to estimate assessment scores for aesthetic objects, in cases where true aesthetic values are absent or unknown in principle."

Empirically investigating the complexity of aesthetics
Yoed Kenett* and Anjan Chatterjee
*Faculty of Data and Decision Sciences, Technion - Israel Institute of Technology, Haifa, Israel

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 quantiatve methods to represent complex systems as graophs, 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.

Mapping subjective aesthetic experiences to objective analysis of art impacts
Jeffrey Vadala*, Anjan Chatterjee, Alex Christensen, Kohinoor Darda, Vicente Estrada Gonzalez, and Eileen Cardillo.
*Penn Center for Neuroaesthetics, Department of Neurology, University of Pennsylvania, Philadelphia, United States

This study integrates Large Language Models (LLMs) with traditional Natural Language Processing (NLP) to measure subjective emotional and cognitive responses to art. The hypothesis posits that while NLP provides a structured baseline through predefined verbal terms, LLMs enable a more nuanced understanding of art experiences, translating subjective

into objective data. We collected open-ended responses from Barnes Foundation and Penn Museum visitors, inviting viewers' personal art experiences. Initially, these responses are analyzed using NLP's predefined categories, allowing hypothesis-driven insights and comparison points for LLM analysis. The LLMs quantify these responses by identifying and mapping complex emotional and conceptual relationships. Preliminary findings indicate that LLMs not only align with traditional NLP results but also reveal a broader spectrum of terms and structures, revealing a deeper, more complex experiential landscape than captured by predefined NLP categories.
For example, the LLM identified 'curiosity' as leading to diverse emotional states such as 'terror' and 'motivation,' highlighting the what could be called emotional pathways. The models detected a common association of 'beauty' with 'sadness,' revealing the often contradictory nature of human responses to art. Our approach also uncovered cause-and-effect patterns, like 'intricacy' leading to 'spirituality,' highlighting the direct impact of artistic elements on viewers' psychological experiences. Cultural and emotional reflections, such as the connections between 'origin' and 'culture' or 'colonialism' and 'anger,' were mapped, demonstrating the role of cultural resonance in art perception. Lastly, the transformation of emotions, evidenced in data trends like the progression from 'nostalgia' to 'appreciation,' underscored the evolving nature of emotional responses. These findings demonstrate that LLMs can transform subjective experience into structured quantified output that can be interpreted as holistic and quantifiable understanding of the intricate nature of art perception.

Session: Creation and appreciation

9:00 – 10:30 AM
Sala Miquel dels Sants Oliver
Moderator: Pablo Tinio

Studying the dynamics of collective creativity in simulated social networks using large-scale singing experiments

Manuel Anglada-Tort*, Raja Marjieh, Peter Harrison, and Nori Jacoby.
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Recent breakthroughs in computational and experimental psychology show that social network structures can improve collective intelligence and creativity across various problem-solving tasks (Centola, 2022). These findings are well-established in objective domains, such as health and technology, where optimal answers are discoverable within the solution space. However, their generalizability to subjective domains, such as collective creativity in music and art, remains unclear.
This study examines the effect of network structure on collective creativity by studying the spread of musical melodies in artificially structured social networks. Participants (N = 198) were randomly assigned to either a structured or a random network. Both network conditions had the same number of nodes and neighbors (number of connections per node) but differed in their patterns of connectedness in which participants interacted with each other. Participants in each condition selected melodies from their network neighbors and reproduced them by singing, using an automated method to run singing experiments online (Anglada-Tort et al., 2023). This process was iterated over 10 generations, allowing us to measure how network structure dynamically shapes the creation and transmission of melodies. To compare the melodies created in the two conditions (40,000 melodies), we

asked a separate group of listeners to rate them on aesthetic 'pleasantness' (N = 357 participants).
The results show that network structure has a significant effect on the dynamics of collective creativity. Melodies in both conditions rapidly converged toward more appealing melodic prototypes. However, the higher spatial organization in the structured network led participants toward greater collective creativity, allowing them to discover more appealing solutions than in the random network. These results shed light on how collective creativity arises from the complex interplay of human cognition, social interactions, and cultural transmission. These findings also carry practical implications for teams and organizations facing complex problem-solving tasks within creative industries.

The prospect and promise of neuromodulation in creativity research

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Creativity is a fundamental aspect of human existence. However, little is known about the underlying neurobiological mechanisms (Dietrich, 2019). Recent research suggests that creativity is the result of specific brain dynamics (Beaty et al., 2016) and that dopaminergic modulation has a vital function (Boot et al., 2017). Yet, as insightful as those findings may be, they are mostly correlative in nature – the causative mechanisms remain largely unknown (Crone, 2023). This project aims to advance the status quo by applying ultrasound neuromodulation in order to gain novel insights into the causative mechanisms underlying creativity.
We hypothesize that modulation of crucial hubs (i.e., nucleus caudate; prefrontal regions) within the dopaminergic pathways leads to observable changes a) in behavior related to creativity and b) in the corresponding brain dynamics.
To test this, we employ a series of behavioral tests measuring aspects of creative cognition (Benedek et al., 2019) and neuromodulation via low-intensity focused ultrasound stimulation. This recently established non-invasive neuromodulation technique allows to precisely target even deep structures (Rezayat & Toostani, 2016) and modulates neurotransmitter levels (Yaakub et al., 2023).
We expect to elicit changes in the balance between cognitive flexibility and focus reflected by changes in network variability and stability. This balance has been discussed as the main source of creative cognition (Benedek & Fink, 2019).
With this study, which is in the stage of data collection, we will eventually provide a major contribution to the neuroscience of creativity by probing prominent theories and by gathering data to inform future models of creativity. Recently, the link between creativity, dopaminergic pathways, and Parkinson's Disease has been discussed in the literature (Kathofer et al., 2023; Lauring et al., 2019; Pelowski et al., 2022). The results of our study will contribute to this new line of research, and hence, yield potential clinical relevance."

Mirror to the world: Art, understanding, and creativity

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Drawing on the mirror model of art from psychology (Tinio, 2013) and the theory of aesthetic cognitivism from philosophy (Baumberger, 2013; Graham, 2015), this research examined the meaningful and profound outcomes of art engagement in a museum. The objectives were

two-fold: to characterize museum visitors' lived experiences engaging with artworks that they find personally meaningful and to determine the effects of meaningful art engagement on creative thinking abilities. We used a mixed-methods design that involved the think-aloud protocol to assess museum visitors' aesthetic experiences as well as an experiment to evaluate the effects of three types of art engagement on creative thinking abilities—measured using a collage task and a metaphor generation task. The research led to the identification of overarching themes that illustrate how art engagement could lead to profound aesthetic experiences and outcomes related to creativity. The results provide insight into our personal experiences with art and informs museum programming.

Longer is worse

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People gauge a product's quality using various cues, including how long it takes to make it. Through four experiments involving 1512 English participants and another with 101 from Papua New Guinea, we discovered that when a product takes longer to create, people tend to assume it's of lower quality due to their perception of the creator's skill. Essentially, extended creation time suggests lower talent, which in turn influences how people perceive the quality of the product, a trend seen across both art and crafts. However, in Experiment 5, we observed that perceived effort, not just duration, positively influences quality by enhancing the perceived talent of the creator. This challenges previous assumptions that longer creation time directly implies greater effort and better quality. Our data shows that longer creation times actually tend to negatively impact the perceived quality of an artefact.

Bridging minds: Toward a theoretical confluence of neuropsychoanalysis and neuroaesthetics

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Aesthetic preferences, apart from the qualities related to pleasure, have a significant impact on how we form our decisions and personality. We identify and navigate ourselves in life both as individuals and members of broader groups through our likes and dislikes. However, the formation of individual aesthetic preferences is a complex process.
This proposal advocates for the strategic investment in exploring the theoretical confluence between neuropsychoanalysis and neuroaesthetics, aiming to deepen our understanding of the complex neural dynamics underlying aesthetic experiences. Positioned at the intersection of psychoanalytic theory and neuroscience, this research endeavors to elucidate the intricate relationship between the unconscious mind and the aesthetic realm, urging the conference to recognize the profound implications of such an interdisciplinary initiative.
Our inquiry is rooted in four theoretical pillars: (1) Unconscious Processes and Aesthetic Preferences, investigating how the underexplored realms of the unconscious, as delineated by neuropsychoanalytic theories, shape individual aesthetic inclinations and emotional responses to art. (2) The Neural Correlates of Symbolism and Metaphor, aiming to identify and unravel the neural substrates associated with the symbolic and metaphorical dimensions of art, thereby aligning psychoanalytic perspectives with neuroaesthetic inquiry. (3) Neurobiological Basis of Creativity, a theoretical exploration seeking to establish a common ground between psychoanalytic principles and neuroscientific inquiry in deciphering the intricate neural architecture of creativity. (4) Impact of Personal History on Aesthetic Preferences, delving

into the theoretical discourse to understand how personal histories, emphasized by psychoanalytic theories, shape individual neural responses to art.
This theoretical framework, grounded in both neuropsychoanalytic and neuroaesthetic perspectives, calls for a dedicated investment in interdisciplinary research initiatives. By embracing this theoretical confluence, we aim to not only advance our understanding of aesthetic experiences but also to encourage a collaborative intellectual environment that transcends disciplinary boundaries and foster groundbreaking insights that hold promise for future research.

Coffee break & Posters 3
10:30 – 11:00 AM

Keynote speaker: Amy Belfi: Aesthetic Judgments of Music: Contributing Features, Context Effects, and Comparisons with Other Artistic Domains.
11:00 AM – 12:00 PM
Lluís Domènech Auditòrium

Alexander Baumgarten Award
12:00 – 12:30 PM
Lluís Domènech Auditòrium

Robert Francès Award
12:30 – 1:00 PM
Lluís Domènech Auditòrium

Lunch & Posters 3
1:00 – 2:30 PM

Symposium: What is Arts and Health: Challenges and Future Horizons
2:30 – 4:00 PM
Lluís Domènech Auditòrium

Moderators: MacKenzie Trupp[1,2] & Edward Vessel[3]
[1]Department of Cognitive Neuroscience, Radboudumc, Donders Institute for Brain, Cognition and Behavior, Nijmegen, The Netherlands.
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How can engagement with the arts, aesthetics, and creativity impact health and well-being? The Arts and Health movement, which began in the 1960s, is growing in momentum and recently received support from the World Health Organisation and several national health services. Yet despite a growing evidence base on the efficacy of arts engagement and art therapies in various health contexts, many questions remain, and resistance to wider adoption of arts-based interventions is strong. A core challenge within the field is that it straddles both

clinical and community settings with different research aims and methodologies. Yet, as an inclusive movement, Arts and Health embraces both medical and creative research practices. Furthermore, another challenge is a research gap between clinical studies focusing on the effectiveness of interventions and therapies versus experimental studies focusing on isolating and understanding underlying mechanisms of change. To address this gap between clinical, experimental, and creative research studies, it is important to consider specific health and well-being outcomes and precisely identify how different types of art, creative practices, or therapies can benefit each outcome and population. This symposium presents an overview of recent developments within the Arts and Health field. We explore the potential for developing beauty appreciation interventions, evaluate the value of art-making for individuals with Parkinson's disease, examine co-creation and knowledge exchange at the community level, introduce a large music therapy randomised controlled trial, and demonstrate the positive impact of community arts on older adults' mental health. We close the session with a critique and a discussion panel on the future horizons of arts and health research. Through critical interrogation, our speakers will identify major research gaps across the field and address key issues such as the appropriate selection of control conditions, the importance of co-creation, and the risk of over-medicalising everyday arts experiences.

The Path to a Matched Activity-based Control Condition for an Arts-based Intervention for Highly Sensitive People

MacKenzie Trupp
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The field of arts and health has struggled with choosing comparison conditions. Combined with randomization, the proper control condition can isolate essential mechanisms of intervention; however, many past studies do not include one. In a forthcoming review on the impacts of art viewing on well-being—by our team—only 15 of 44 papers had non-art comparisons and mainly were not matched in duration, intensity, or credibility. Despite the known difficulty of choosing control conditions, the lack of randomized controlled trials has left an open question of whether positive outcomes in the burgeoning field of art viewing and health are due to the art experience or other factors. In this talk, we discuss our journey to develop an activity-based control condition that isolates art and beauty appreciation skill development and increases in aesthetic sensitivity, which we predict is a crucial ingredient of our art-based beauty appreciation intervention.
Population: 20-30% of the population who have a natural heightened sensitivity to sensory stimuli are at risk of experiencing stress-related problems such as anxiety, burnout, depression, and fatigue; however, they are pre-disposed to intense art experiences. This group is referred to as highly sensitive people (HSP) and has a greater depth of processing, emotional reactivity, empathy, awareness of subtleties, and ease of overstimulation. We create and evaluate an art-based beauty appreciation intervention to address this. We work with HSPs to design the intervention and control program through iterative feedback, redesign, and retesting. Our intervention aims to enhance aesthetic sensitivity and well-being by training beauty observation, promoting an aesthetic mindset, and teaching sensory emotion regulation. We do this through art viewing and daily beauty appreciation. Our control condition is matched on each task but focuses on pragmatic observation skills. We present the development, preliminary results, and implications for designing control conditions.

Investigating the Effectiveness of Arts-Based, Person-Centred Creative Engagement Interventions for People with Parkinson's Disease: A Journey from Transformative Learning to Randomized Control Trials

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Parkinson's disease (PD) profoundly impacts motor, cognitive, social, and emotional aspects of life. Our research explores the effectiveness of arts-based, person-centred creative engagement interventions in enhancing quality of life and well- being in individuals with PD. Objectives included assessing feasibility, acceptability, and perceived effects of an intervention promoting individual creative engagement using art. We also aimed to understand the impact along diverse aspects such as anxiety, depression, resilience, mental-flexibility, executive functioning, and self-efficacy. We adopted a mixed-method explorative approach. The qualitative inquiry was supported by transformative learning theory, using action and arts-based research to gain deep insights into the subjective experience of and dynamics between people with PD and creative therapists, who guided the intervention. In the 10-week pilot program, people with PD engaged in various creative activities (e.g., drawing, playing theatre, making and listening to music, reading, and writing). Creative activities were self-determined and could change throughout the program. Quantitative data were collected through pre-post self-report questionnaires. The qualitative results provided key elements for an arts-based, person-centered creative engagement intervention framework, demonstrating feasibility and acceptability. Participants reported enhanced well-being, including feelings of flow, presence, fun, joy, and freedom in self-expression. Collaborative meaning-making and existential reflection helped participants digest their experiences and steer their creative engagement journey. Quantitative findings indicated significant improvements, especially in anxiety levels, which will be further explored in future randomized control trials. The study lays the groundwork for advancing PD-care beyond conventional treatments. Our findings underscore the benefits of person-centered and arts-based approaches in PD management. We advocate for their comprehensive assessment through randomized control trials to rigorously evaluate the effectiveness of such interventions in PD-care. Additionally, future directions in transformative learning will address co-creation and flow as promising potential candidates, increasing the effectiveness of the intervention program.

Co-creating knowledge exchange to inform alcohol policy work in Nepal: report on a creative methodological process

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Alcohol has complex, historic, and deep cultural significance in Nepal. For example, around 70% of drinkers consume homemade alcohol, usually made from grain containing up to 40% pure ethanol. Although most people in Nepal do not consume alcohol (72%), there is a worrying increase in heavy episodic drinking. Around 12% of Nepali population are estimated to be dependent drinkers (Bista et al, 2021) compared to around 2% in the UK (Saunders, 2019). LMICs countries like Nepal experience the highest burden of harm from

alcohol. Therefore, alcohol harm reduction initiatives and policies which engage meaningfully with cultural and community practices are urgently needed. This Alcohol Co-design and Community Engagement (ACE) project aims to co-create new understanding through applying creative and participatory approaches to inform alcohol policy development and implementation in Nepal. Creative methodological process will be used to co-create knowledge exchange with diverse communities and policymakers in Nepal. We will engage in a range of creative alcohol policy review activities, including ethnographic scoping of community and cultural assets which could be optimised to reduce alcohol harm. This will allow us to better understand the nature of any existing support available, while highlighting the absence of much needed support services and understanding of this area. We will achieve this through using multi-modal, participatory approaches to critically review current policy development work and explore other forms of knowledge –centring indigenous knowledge– for its cultural and contextual relevance to reduce alcohol harm. We will present the preliminary findings of the scoping and critical realist review work. We will highlight recommendations to support alcohol policy development and implementation in Nepal.

Designing the Autism-CHIME music therapy clinical trial: striking the balance between creative approaches, scientific rigour, and neuroinclusivity

Claire Howlin
Autism Research Centre, University of Cambridge, UK.

Anticipation of musical rhythm, can be particularly appealing to autistic children, who sometimes have enhanced pattern recognition and rhythm perception skills. Music therapy is a child-led social interaction through music, which encourages children to explore music and express themselves. The social interaction may support autistic children's social and communication skill development, and the greater degree of control may help build confidence and benefit mental health and wellbeing. However a recent meta-analyses based on 26 studies, with 1165 participants including 6 assessor-blind randomised controlled trials, show mixed results. It is not yet known if the reciprocity developed in musical interactions can translate to non-musical social communication skills, or enhanced wellbeing. The aim of this talk is to introduce the Autism-CHIME trial; a large longitudinal, assessor blind randomised controlled trial, evaluating the impact of improvisational music therapy on autistic children's communication skills, anxiety and wellbeing. Data will be collected from 200 autistic children aged 7-11 years from 2023 until 2025. Participant's in the music therapy group will engage in 24 individual bi-weekly improvisational music therapy sessions in school, and the control group will continue their normal routine. A combination of previously validated direct observational measures and parent self-report measures will be used to measure the primary outcome of social communication and secondary outcomes of well-being, anxiety, and adaptive behaviour. Individual factors that may mediate how autistic children interact with improvisational music therapy, will also be examined. Liner mixed modelling will be used to estimate the relative importance of cognitive style, musicality, autistic traits, and IQ, to help predict the likelihood of successful outcomes at an individual level. Finally we will discuss the research design process highlighting the need to balance creativity, scientific rigour, and neuroinclusivity.

Engaging in group-based arts interventions to reduce depression and anxiety in later life: A systematic review and meta-analysis

Elizabeth Quinn
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Countries across the world are experiencing higher life expectancies and ageing populations. However, while people are living longer, they are not always living well. Getting older can be a risk factor for poor mental health, and the prevalence of depression and anxiety in later life is increasing. This meta-analysis investigates the potential of group arts interventions, where older adults come together to engage in a shared artistic experience (e.g., choir, group dance), as a means of reducing depression and anxiety. A systematic search found forty controlled studies eligible for the review. Thirty-one controlled studies were included in the meta-analysis. Twenty-nine studies investigated the impact of group arts interventions on depression (n=2784), and nine investigated their impact on anxiety (n=679). Subgroup analyses were used to explore whether these relationships were moderated by various participant, contextual, intervention, and study characteristics (age, country, setting, art, intervention type, length, session length, and control group type). The results showed that group arts interventions were associated with a moderate reduction in depression symptoms and a strong reduction in anxiety symptoms. The subgroup analyses found that taking part in group arts interventions was associated with a greater reduction in depression symptoms in care home settings compared to community settings and shorter interventions (session and intervention length) were associated with a greater reduction in anxiety symptoms relative to longer interventions. This work provides key evidence supporting the use of group arts interventions as a front-line treatment for depression and anxiety in later life. Additionally, this work provides useful information about for whom and in what circumstances these interventions work, which can help GPs, healthcare providers, and arts practitioners in prescribing, tailoring, and implementing these interventions.

A critique of the claim that arts-based interventions can improve health
Martin Skov[1] and Marcos Nadal[2]
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The growing literature on arts-based interventions suggests that art significantly benefits mental and physical health, and wellbeing. This claim, often used to justify arts-based clinical interventions and health policies, lacks robust evidence. The research supporting the effectiveness of arts-based interventions has conceptual and methodological issues. Conceptually, it doesn't define 'art,' making it impossible to compare its effects with 'non-art' stimuli. It doesn't prove that art experiences distinctly impact disorder mechanisms or that art-induced processes affect disorder etiology. Methodologically, most studies lack essential clinical trial procedures, such as defining the therapeutic agent, randomized group assignments, and proper statistical analysis. We conclude that there is no strong evidence that art leads to physiological changes improving health.

Session: Stimulus features
2:30 – 4:00 PM
Sala George Bernanos
Moderator: Erick G. Chuquichambi

Preference for symmetry: Fechner and modern empirical aesthetics
Andreas Gartus* and Helmut Leder
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About 150 years ago, Gustav Theodor Fechner acknowledged that symmetry is generally preferred over asymmetry. Since then, numerous studies in empirical aesthetics have confirmed this fact.
Fechner also proposed that preference is not proportionally decreasing with deviation from symmetry. Instead, as soon as the deviation is big enough to recognize, it is supposed to cause a strong decrease of preference. This is also what we have found in an early study: Abstract patterns showing small random deviations from symmetry were clearly less liked than symmetric patterns.
However, it does not necessarily follow that all deviations from symmetry are equally disliked. In a study using Fechner's method of production, we instructed participants to change abstract patterns deviating from symmetry to improve their aesthetic appeal without making them symmetric. A follow-up study showed that the improved patterns were almost as much liked as symmetric ones.
Furthermore, as also predicted by Fechner, there are large inter-individual differences. In two studies comparing aesthetic evaluations of art experts and laypersons, we found either no difference in preference between symmetric and asymmetric patterns for art experts, or even a preference for asymmetric patterns in art experts.
In contrast, systematic cultural differences in preference for symmetry could not be confirmed. Several studies showed that despite different cultural habituations, Western, Islamic, African, and Japanese participants prefer symmetric over asymmetric patterns. Thus, symmetry can be regarded as a potential universal feature of beauty.
Finally, it was also shown that preference for symmetry is domain-specific. General preference for symmetry was found for shapes and faces, but for instance not for landscape images. A fact that equally has been already proposed by Fechner.
In sum, Fechner's predictions about preference for symmetry align astonishingly well with the results of modern studies in empirical aesthetics."

Aesthetic ratings of homogeneous and heterogeneous sets of stimuli
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Studies in empirical aesthetics vary largely in the kind of stimuli they use, while trying to make general claims about the effects of stimulus factors (e.g., complexity) on aesthetic attributes (e.g., beauty, pleasure, interest). Here, we wanted to investigate how stable these effects are when different stimulus categories are intermingled rather than presented in homogeneous blocks, which is more common. We selected five main stimulus categories that have frequently been used in past research, each with a rather abstract and more figurative/recognizable subset: fractals, geometric patterns, natural images, art photography, and paintings. All ten stimulus categories consisted of twenty images, evenly distributed across five levels of objectively computed complexity values. The total stimulus set of 200 images was either presented in 10 homogeneous blocks (one block per stimulus category) or in 10 heterogenous blocks (with all stimulus categories randomly intermingled), to two groups of >200 participants each. All participants rated how beautiful they found these images on a 7-point Likert scale. Different subgroups of participants also rated two additional scales, either pleasure and interest, or order and complexity, also on 7-point Likert scales. Results indicated that the aesthetic measures varied with the preselected levels of complexity in different ways for the ten stimulus categories and the five scales. More interestingly, some ratings were either higher or lower for heterogeneous compared to homogeneous blocks. In general, complex interactions were obtained, indicating that many effects are not only

stimulus-dependent but also context-dependent, in the sense of being affected by the other stimuli included in the set of stimuli to be judged. This study suggests that researchers have to be cautious in drawing general conclusions about effects of stimulus variables on aesthetic ratings from experiments with rather limited and homogeneous sets of stimuli.

Complexity, liking and compression: Exploring the relationship between aesthetic appreciation and visual complexity in abstract geometric stimuli

Greta Varesio*, Jacopo Frascaroli, Paolo Barbieri, Francesca Piovesan, Maria-Chiara Villa, Katiuscia Sacco, and Irene Ronga.
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For decades, researchers have sought to unravel the intricate relationship between the subjective or objective complexity of both natural and synthetic visual stimuli and aesthetic appreciation. A long-standing hypothesis (Wundt, 1874; Berlyne, 1971) is that there is an inverted-U relationship between complexity and aesthetic appreciation: appreciation increases with increasing complexity, but only up to an optimal point, after which it decreases again. This study aims at taking a fresh look at the interplay between aesthetic appreciation and visual complexity, building upon recent formulations of the ""language of thought"" hypothesis, according to which visual information processing relies on compressible abstract representations and compositional formats.
Building upon this theoretical framework, we investigate the relationship between aesthetic appreciation and visual complexity, where this latter is assessed based on the effectiveness of information compression and memorization of visual stimuli of an abstract and compositional character. Subjects are asked to rate for aesthetic appeal a set of visual displays composed of geometric elements varying in color, size, spatial distribution and orientation. To assess information compression and memorization, after each presentation participants engage in a delayed match-to-sample task where they are asked to recognise whether the elements in the subsequent image have changed or have remained unchanged in one of the stimulus properties. Eye movements are recorded to provide further insights into the relevant processes.
Preliminary results suggest that aesthetic appreciation accompanies cases of effective information compression and memorization, as evidenced by more accurate change detection responses. Physiological parameters such as blink rate and information related to visual search are used to shed further light on information compression and memorization strategies. Overall, we expect our study to shed new light on the complex relationships between complexity, information compression, memory and aesthetic appreciation.

Please do not touch! Neural correlates of aesthetic processing of material surfaces

Thomas Jacobsen*, Barbara Marschallek, and Andreas Löw
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Active fingertip exploration and aesthetic processing of a countless number of materials' surfaces are part of everyday life. The present study was performed to investigate the underlying brain correlates using functional near-infrared spectroscopy (fNIRS). In absence of other sensory modalities, individuals (n = 21) first performed lateral movements on a total of 48 textile and wood surfaces varying in terms of their roughness followed by aesthetic judgments of their pleasantness (feels good or bad?). Behavioral results supported the influence of the stimuli's roughness on aesthetic judgments, with smoother textures being rated as feeling better than rough textures. At the neural level, fNIRS activation results

revealed an overall increased engagement of the contralateral sensorimotor areas as well as left prefrontal areas. Furthermore, the assessed pleasantness modulated specific activations of left prefrontal areas with increasing pleasantness showing greater activations of these regions. Remarkably, this positive relationship was most pronounced for smooth woods. The present study demonstrates that positively valenced touch by actively exploring material surfaces is linked to left prefrontal activity and thus extends previous findings of affective touch underlying passive movements on hairy skin.

Individual differences in sensitivity to taste-shape crossmodal correspondences
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People generally associate curved and symmetrical shapes with sweetness, while associating angular and asymmetrical shapes with the other basic tastes (e.g., sour, bitter). However, these group-level taste-shape correspondences might conceal important variation at an individual- level. We examined the extent to which individuals vary in their sensitivity to crossmodal correspondence between curvature and symmetry, on the one hand, and the five basic taste qualities (sweet, bitter, salty, sour, and umami), on the other. In Experiment 1, participants matched shapes (curved vs. angular, symmetrical vs. asymmetrical) and taste words. In Experiment 2, participants performed a similar task, though this time using actual tastants. Given that people differ in their hedonic experience of such shapes and tastes, we also measured participants' liking for each taste and shape. Our results replicate the general crossmodal correspondences between curved-sweet and symmetrical-sweet stimuli. Furthermore, participants tended to match sour and bitter tastes with angular and asymmetrical stimuli. However, the results also reveal that these group-level taste-shape correspondences coexist alongside substantial variation at the level of the individual. While some participants consistently matched specific tastes with curved and symmetrical stimuli, others consistently matched these tastes with angular and asymmetrical stimuli or did not show consistent taste-shape correspondences. Liking for curved and symmetrical stimuli was higher than for angular and asymmetrical stimuli. However, participants also differed considerably in the extent to which these visual features affected their liking. Overall, our findings highlight the substantial individual differences that are associated with the degree to which people associate and like shapes and tastes.

Session: Exhibitions

2:30 – 4:00 PM
Sala Miquel dels Sants Oliver
Moderator: Tobiasz Trawinski

Free exploration of materiality and space across three contemporary art exhibitions
Christopher Linden*, Stefanie De Winter, and Johan Wagemans.
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Many contemporary artists incorporate myriad materials in their practice, whether these be paints with unique properties (fluorescent, reactive), picture planes (canvas, stone, plastic), or the composite materials of installation elements (lights, brickwork, found objects). When placed in an appropriate gallery space (i.e., one which affords enough physical space for unique types of engagement), these materials may elicit a wide array of viewing behaviours:

visitors can get closer to or further from various works, view from different angles, and engage with artworks' depth and texture. These explorative behaviours—not to mention the affordances of the gallery space—are difficult to emulate in a non-physical medium, yet they are critical to understanding how viewers perceive and engage with contemporary artworks. Over a series of three free-exploration mobile eye-tracking (MET) studies in museums and galleries in Belgium and the Netherlands, we assessed participants' explorative behaviours toward material aspects of contemporary artworks. The first study (n = 103) featured comparisons of fluorescent paintings and printed copies of two Frank Stella artworks. The second (n = 112) focussed on a Pieter Vermeersch exhibition, featuring painted marble slabs and architectural installations. The third (n = 104) explored a gallery featuring a group of contemporary artists (Hanne De Corte, Muesli Collective, Griet Moors, and Stefanie De Winter), whose works all play with the materiality of the artworks. We applied TaMuNaBe, our taxonomy of museum navigation behaviours, to the MET videos of each study to classify the explorative behaviours of the participants in each gallery space. We used hierarchical clustering models on the behavioural frequencies to determine common exploration patterns within and across studies. Some clusters clearly link to engagements with the materiality of the artworks (distance shifting, angle viewing) and installation elements (exploratory walks), and these tended to be predictive of visitors' appraisals of the artworks and exhibitions.

While viewing the artwork, I felt... Using network and latent profile analyses to identify and characterize supraordinate varieties of art-experience

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Standing in awe at a painting, mesmerized by beauty, gripped with anger or a moving sadness, finding oneself transformed—the range and intensity of these reactions stand as a constant basis for our lasting interest in the arts from both the humanities and science. However, because of the wide variety of factors in arts engagement, empirical investigations on the scope of possible experiences are scarce. This leaves us without a firm understanding of what kinds of reactions we might actually have, how they may relate to typically assessed evaluations, and if/how reactions might be shared across individuals and artworks.
In this talk, we present new results from a large-scale museum study, consisting of over 2700 responses from museum visitors across a wide range of artworks (31 total, from 11 art-institutions). After viewing a specified artwork, participants shared in-depth reports of their experience, indicating to what extent they subjectively felt/experienced each of 90 phenomenal, emotional, and cognitive terms while viewing the artwork. The list of terms was selected based on a literature review of both previous museum studies and theoretical models of aesthetic experience (VIMAP, Pelowski et al., 2017).
On the individual level, reports varied greatly, even between responses to the same artwork. However, at the same time, to investigate higher-order patterns in participant responses, Network Modelling and latent class methodologies were applied. From these analyses, five classes of art-experience were identified, representing supraordinate varieties of experience, each with a distinct phenomenal profile that reoccurs between individuals and across artworks.
We will discuss the identification and characterization of the Experience Types, as well as applications of this framework, including the development of a novel measure of phenomenal art-experience from this foundation. These findings provide a compelling and practical basis for conducting future research into contributing factors and underlying processing mechanisms.

Cross-cultural differences in spectatorship of paintings

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Our previous research consistently demonstrated the impact of culture on the allocation of fixations to faces in paintings. Specifically, participants tended to focus more on faces from their own culture compared to those from a different culture. However, the extent to which this cross-cultural effect in eye movements can be attributed to the socio-cognitive characteristics of the viewer remains unclear. In this study, we investigated how the preference judgments of paintings featuring both East-Asian and White sitters might be influenced by the viewer's individuation experience and implicit racial bias. Forty-eight British and sixty-five Chinese participants viewed a series of paintings while their eye movements were recorded. Participants made their preference judgement for each artwork and then completed the Implicit Association Test, a questionnaire assessing social contact and individuation experience with East-Asian and White individuals, and a face recognition ability test. The results indicated that the self-reported preference scores were not predicted by the socio-cognitive characteristics of the viewers in both groups. However, for British participants, the likelihood of fixating on unfamiliar faces was influenced by an interaction between face recognition ability, individuation experience with other communities, and implicit racial bias. These findings underscore the intricate interplay of perceptual and socio-cognitive factors in the spectatorship of paintings representing diverse communities. The results are discussed in terms of the functional role of viewers' experiences and attitudes when engaging with such artwork.

Digital versus physical experiences in art and artifact encounters

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This study tests the hypothesis that digital representations of museum objects differ in aesthetic impact from their physical counterparts. As art consumption increasingly migrates to social media and online galleries, understanding the effect of these differences becomes important for curators and artists.
Prior research (Brieber, Leder and Nadal, 2015; Grüner, Specker and Leder, 2019) report no differences in how individuals rate the aesthetic attributes of artworks, whether experienced physically or digitally. Our research extends these investigations by including not only paintings but also 3D museum artifacts. Considering the flatness of paintings versus the volume of artifacts, we predicted that paintings might more likely mirror their digital counterparts in aesthetic response, three-dimensional artifacts would present a more marked contrast between physical and digital experiences. Additionally, we used a granular assessment based on 11 aesthetic impact dimensions: anger, calmness, compassion, challenge, edification, enrapture, enlightenment, interest, inspiration, pleasure, and upset (Christensen, Cardillo and Chatterjee, 2023).
Participants were exposed to paintings from the The Barnes Foundation (BF) collection and 3D objects from the Penn Museum (PM), including sculptures, masks, and carvings. In the lab, different groups were presented with digital reproductions of both the paintings and artifacts. The study enrolled 119 participants for the PM collection (54 digital and 65 physical encounters) and 88 for the BF collection (40 physical and 48 digital encounters).

Preliminary analysis revealed no significant differences in aesthetic impact between physical and digital encounters for most dimensions, except that 'liking' was favored in the physical encounter in the Penn Museum.
These results imply a possible paradigm shift in art perception. It could be a generational effect-- young people are more comfortable with digital experiences than older cohorts. Or it might signal a deeper transformation in art engagement, with a shift towards iconoclasm for tangible artifacts and iconophilia for digital forms.

A collaborative study on visitor experiences and societal impact at Amsterdam Light Festival Edition 12
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Amsterdam Light Festival (ALF) is an international outdoor festival in which a large collection of light artworks is displayed across the center of Amsterdam. Edition 12 of ALF (30.11.2023 - 21.01.2024) is themed Loading… Revealing Art, AI and Tech. We investigated visitors' perceptions and emotional reactions to this theme and the festival. Visitors voluntarily participated in the study and answered a questionnaire before and after their visit. In addition, sometime after the festival visitors received a personalized dashboard to enhance the festival experience and provide additional layers of reflection. Codeveloped with the festival organization, our research aimed to strengthen the link between academia, art institutions, and the public, fostering societal impact and relevance for the art world. Five key issues guided this study: Understanding the societal impact of technology and AI; Gauging opinions on their integration into art; Evaluating the overall ALF experience; Zooming in on specific light artworks; and Investigating demographic variations in opinions and festival experiences. The study aims to understand the audience's engagement with light art in public spaces and people's perceptions of technology and AI.
It showcases an example case of collaborative research practice: Formulating research questions together with an art institution, embracing an interdisciplinary approach, and emphasizing the societal relevance of the research. Furthermore, our pursuit of enhancing visitor experiences through a post-festival dashboard is a shared goal for the scientific, artistic, and societal partners. Investigating what information truly enhances the experience is a research challenge, which forms a crucial point of connection and understanding between professionals within and outside academia. In conclusion, this study not only unveils insights into the nexus of technology, art, and society but also serves as a testament to the complexities and rewards of collaborative research endeavors between academia and art institutions.

Membership Committee
4:00 – 5:00 PM
Sala Miquel dels Sants Oliver & George Bernanos

General Meeting
5:00 – 6:00 PM
Sala Miquel dels Sants Oliver & George Bernanos