

## MANER Conference Mainz/Darmstadt 2025 (MANER 2025)

The Material Appearance Network for Education and Research (MANER) has organized the fourth MANER Conference, which this year took place in Mainz and Darmstadt, Germany, on 28-29 August, 2025.

MANER started in 2018 as an international partnership (INTPART) project funded by the Research Council of Norway and led by the Norwegian University of Science and Technology (NTNU). As the INTPART MANER project was approaching its end, the stakeholders decided to establish its namesake network with the long-term objectives to take MANER's commitments further and extend MANER beyond its original geographical limits and timeframe. MANER network aims to bring all professionals together with academic, industrial, and artistic background alike, who are interested in material appearance research and education. The primary objective of MANER is to organize material appearance sessions and sub-conferences at different well-established conferences, symposia and other fora, as well as standalone events, such as workshops or training schools, in order to raise awareness on material appearance and create an annual venue for all stakeholders interested in the topic.

This year, MANER Conference featured a two-day program: Day 1 was co-located with the European Conference on Visual Perception (ECVP) in Mainz, Germany, and included both talks and poster presentations. Day 2 was a standalone workshop with paper presentations and three keynotes at Fraunhofer IGD in Darmstadt, Germany, whose proceedings have been submitted for open-access publishing as a CEUR Workshop Proceedings volume. The Day 1 contributions will be published as a supplement to the journal Perception.

This volume includes the proceedings of the papers presented only on Day 2 in Darmstadt. Therefore, the location of this volume's workshop is specified as Darmstadt, while for consistency's sake, the name of the event is kept as *"MANER Conference Mainz/Darmstadt 2025"*.

The MANER 2025 committee received 11 submissions, out of which 9 were accepted for the publication to the proceedings. All papers went through a double-blind peer review process, and each paper was reviewed by two to three experts in the field. The volume includes 7 full/regular and 2 short papers. The paper selection criteria were methodology used and scientific quality in terms of novelty and originality, as well as the relevance of the topic to the conference theme. The authors were invited to submit original, unpublished work on material appearance. Topics of particular interest included, but were not limited to:

- Physics of material appearance: Measurement and modeling of optical properties (e.g., colorimetry, reflectance, BRDF, BSSRDF, etc.).
- Perception of material appearance: Visual and multisensory perception of attributes such as color, gloss, translucency, and texture.
- Simulation and rendering: Computational methods for simulating and rendering material appearance using graphics and machine learning.
- Material appearance in machine learning and computer vision: Analysis and recognition, including large vision models.

- Physical reproductions: Applications in 3D printing, fine arts, textiles, automotive finishes, cosmetics, etc.
- Material appearance in VR/AR/XR.
- Communication of material appearance: Naming conventions, linguistic aspects, and standardization efforts.
- Material appearance education and pedagogy.

The three keynotes contributed substantially to the success of the event.

## **Opening Keynote**

“Where We Look When We Interact with the World” by Constantin Rothkopf (Technical University of Darmstadt)

### **Abstract:**

During natural sequential everyday behavior, perception, memory, cognition, decision-making, planning, action selection, and learning are intimately intertwined. This fundamentally differs from the conceptualization of trial-based, controlled laboratory experiments. I will present several naturalistic tasks ranging from event detection to spatial navigation and pouring of liquids together with a unified account of the involved processes based on Partially Observable Markov Decision Processes (POMDP). Using this modeling framework shows that humans continuously and dynamically coordinate their eye, head, and body movements to shape their internal uncertainties actively, e.g. by shifting eye movements from active learning to active sensing, highlighting the importance of the ongoing task in understanding behavior. Taken together, the talk will present a parsimonious explanation of how patterns of human goal-directed sensorimotor behavior arise from the continuous and dynamic interactions of uncertainties in perception, cognition, and action.

## **Afternoon Keynote**

“From Loom to Screen: The Ongoing Quest for Realistic Digital Textiles” by Elena Garces (Adobe Inc.)

### **Abstract:**

From virtual fashion and digital marketplaces to AR/VR and gaming, lifelike digital representations of textiles are critical to creating realistic and interactive experiences. Yet building high-quality digital twins of fabrics is far from trivial—it involves capturing not only their complex visual appearance but also their mechanical behavior. In this talk, I will discuss the technical and practical challenges of digitizing textiles in 3D. This includes the design of custom optical capture devices, the difficulties of measuring mechanical properties, and the need for scalable, accurate representations. I will also highlight how recent advances in Artificial Intelligence are transforming inverse rendering and material digitization, making it possible to bridge the gap between physical textiles and their realistic digital counterparts.

## Closing Keynote

“Perception of Materials and Objects through Active Exploration” by Katja Doerschner (University of Giessen)

### **Abstract:**

Research on the visual perception of materials and objects focuses on understanding the link between image cues and visual appearance. Much of this research has been conducted with stationary observers viewing stationary scenes. However, in everyday life, we usually interact with the objects whose qualities we are trying to judge: we poke jelly to make it wobble, run our fingers through the plush of a pillow, or rotate our brand-new cell phone back and forth to witness specular highlights sliding across its surface or to observe its sparkle. Such interactions produce dynamic visual content, where a particular image motion pattern can be tied to the experience of a specific material quality, such as wobbliness, softness, shininess, or sparkle. In fact, several studies, including those from our group, have shown that image motion can indeed be a powerful source of information signaling a particular material property. In this presentation, I will discuss the potential link between how we interact with an object, the dynamic visual information we produce, and the material qualities we visually perceive. I will provide experimental evidence from our recent work demonstrating that the active exploration of objects with our hands is modulated by the material quality to be judged.

The conference was organized by the following *Organizing Committee*:

- **General Chairs:** Philipp Urban (Fraunhofer IGD, Germany) and Christoph Freiherr von Castell (Johannes Gutenberg University of Mainz, Germany)
- **Program Chairs:** Jon Yngve Hardeberg (NTNU, Norway) and Roland Fleming (University of Giessen, Germany)
- **Publication Chair:** Davit Gigilashvili (NTNU, Norway)

We express sincere gratitude to the following experts from the *Programme Committee* for participating in the paper review process:

- Lou Gevaux (Conservatoire national des arts et métiers – CNAM, France)
- Takahiko Horiuchi (Chiba University, Japan)
- Holly Rushmeier (Yale University, USA)
- Mathieu Hebert (Université Jean Monnet, France)
- Jiri Filip (UTIA - Czech Academy of Sciences, Czech Republic)
- Lionel Simonot (Institut Pprime, France)
- Aditya Sole (NTNU, Norway)
- Mobina Mobini (NTNU, Norway)
- Yoko Mizokami (Chiba University, Japan)