



CRC/Transregio TRR 169
Crossmodal Learning: Adaptivity, Prediction and Interaction

Autumn Symposium 2024

Hamburg, 28.-29. November 2024

- **Meeting Venue**

- Konrad-Zuse Lecture Hall B-201 · Informatikum · Vogt-Kölln-Str. 30, 22527 Hamburg
- 28/Nov/2024: 09:00 - 13:15 and 14:00 - 18:00
- 29/Nov/2024: 09:00 - 13:15 and 14:00 - 18:00

- **Zoom Online**

- Meeting-ID: 611 0407 8154
- Passcode: TRR169-24
- <https://uni-hamburg.zoom.us/meeting/register/u5Usd-2oqTMrH9C9uAqgbWVSn4t5lGwzi4wh>

- **Program Overview**

CET	Lecture Hall B-201 and Online	Lecture Hall B-201 and Online
	28 Nov 2024	29 Nov 2024
09:00–10:00	Welcome: Mathias Fischer Keynote: Uta Noppeney	Keynote: Wei-Ning Hsu
10:00–11:00	B2 (start 10:30)	Keynote: Mohit Shridhar
11:00–11:15	Coffee Break	Coffee Break
11:15–12:15	A3	B1 + B4
12:15–13:15	A4 + A5	C7 + C4
13:15–14:00	Lunch Break	Lunch Break
14:00–15:00	A6 + C8	A1 + A2
15:00–16:00	B3 + B5	C9 + C1
16:00–16:15	Coffee Break	Coffee Break
16:15–17:15	Z1/Z2 + Z3	General Assembly / Perspective Remarks
17:15–18:00	Demos	
19:00–21:00	Working Dinner (Yu Garden)	Dinner (Hamburger Elbspeicher)

**Thursday, 28 November 2024**

Hamburg	Beijing	Project	Title
09:00 – 09:15	16:00 – 17:00	Opening	Prof. Dr. Mathias Fischer (Dean Dept. Informatics) and Prof. Dr. Jianwei Zhang (Speaker CRC/TRR 169): Welcome and Symposium Introduction
09:15 – 10:15	16:15 – 17:15	Keynote	Prof. Dr. Uta Noppeney (Donders Institute for Brain, Cognition and Behaviour): To integrate or not to integrate: Solving the binding problem in a multisensory world Adaptive behavior in a complex, dynamic, and multisensory world requires the brain to solve the causal inference or binding problem, deciding whether signals come from common sources and should hence be integrated or from independent sources and be segregated. In this talk, I will delve into our recent research, spanning behavioral, computational, and neural systems levels, to explore how the brain tackles this challenge. Combining psychophysics, computational modelling and neuroimaging (fMRI, EEG) our results show that the brain arbitrates between sensory integration and segregation consistent with the principles of Bayesian Causal Inference by dynamically encoding multiple perceptual estimates across the cortical hierarchy. Next, I will explore how prior expectations and attentional mechanisms can modulate sensory integration. Finally, I will show how causal inference influences the brain’s rapid recalibration, enabling dynamic adaptation to changes in the external environment and within the sensorium.
10:15 – 11:00	17:15 – 18:00	B2	Jun Zhu: Reinforcement Learning with Diffusion Models
			Coffee Break
11:15 – 12:15	18:15 – 19:15	A3 A4	Focko Higgen: Crossmodal learning in health and neurological disease: neurocomputational representation and therapeutical application Changshui Zhang, Yizhou Wang: Crossmodal representation facilitating robust robot behaviour Niklas Fiedler: Clothes Perception and Manipulation
12:15 – 13:15	19:15 – 20:15	A5 A6	Stefan Wermtner, Fares Abawi, Hugo Carneiro: Neurorobotic models for crossmodal joint attention and social interaction Timo Gerkmann, Xiaolin Hu: Deep learning for robust audio- visual processing Julius Richter, Ehsan Yaghoubi, André Kelm
			Lunch Break (Mensa Informatikum)
14:00 – 15:00	21:00 – 22:00	C8 C9	Frank Steinicke, Simone Kühn, Lihan Chen: Crossmodal bindings and plasticity during visual-haptic interactions for novel forms of therapy Jan Gläscher, Xiaolan Fu, Ke Zhao: The role of Surprise and Theory of Mind in goal-oriented novel communication in humans - postponed to Friday
15:00 – 16:00	22:00 – 23:00	B3	Michael Rose, Qiufang Fu: Neurocognitive mechanisms for transfer and generalization in implicit crossmodal learning Marika C. Maack: The order of multisensory associative sequences is reinstated as context-feature during successful recognition Carina Jaap: Relevance of pre-stimulus oscillatory activity for the



		B5	perceived valence of emotional facial expressions Yikai Wang, Michael Görner: Crossmodal transfer of dexterous manipulation skills
			Coffee Break
16.15 – 17:15	23:15 – 00:15	Z1 Z2 Z3	Norman Hendrich: Report on Management and Coordination Alexander Maye: Report on Integrated Research Training Group Matthias Kerzel: Social HRI Laboratory Philipp Ruppel: Physical Collaboration Laboratory Philipp Allgeuer: Robotic Platform for Social Communication Yannick Jonetzko: Robotic Platform for Physical Collaboration
17:15 – 18:00		Z3	Lab Demonstration (CV, HCI, LT, SP, TAMS, WTM labs)
19:00			Working Dinner Yu Garden · Feldbrunnenstraße 67 · 20148 Hamburg https://www.yugarden.hamburg/

Friday, 29 November 2024

Hamburg	Beijing	Project	Title
09:00 – 10:00	16:00 – 17:00	Keynote	Wei-Ning Hsu (Meta): Large Scale Non-Autoregressive Audio Generative Models Abstract: Audio generation technologies have advanced rapidly over the past few years. In addition to the improved quality, audio generation models have also become much more universal and controllable, allowing users to leverage prompts from various modalities. In this talk, I will discuss the keys that led to the breakthrough, and also share recent studies on large scale diffusion-style models for audio generation from the Audiobox team at Meta FAIR. These works span speech generation, self-supervised generative pre-training, universal audio generation, and video conditioned audio generation.
10:00 – 11:00	17:00 – 18:00	Keynote	Mohit Shridhar (Google Deepmind): Acting with Vision and Language Recent advancements in vision and natural language processing (NLP) have demonstrated remarkable progress through simple paradigms that scale with data. How can these methods be adapted for robotics? In this talk, I will explore three paradigms — detection, image generation, and language modeling — and discuss simple ways of applying them to robotics problems. By modifying the training objective to predict actions, I will demonstrate how robot learning can achieve the generalization performance seen in vision and NLP. Bio: Mohit is a Research Scientist at Google Deepmind. He received his PhD from the University of Washington under Prof. Dieter Fox. His research focuses on connecting vision, language, and robotics through unifying problem formulations.
			Coffee Break
11:15 –	18:15 –	B1	Andreas Engel: Modulation of neural mechanisms underlying crossmodal predictions



12:15	19:15	B4	Andreas Engel, Guido Nolte, Xun Liu: Brain dynamics of top-down control over visual-auditory congruency
12:15 – 13:15	19:15 – 20:15	C7 C4	Chris Biemann: Crossmodal learning for improving human reading Cornelius Weber, Ozan Özdemir, Jae Hee Lee, Tianyu Yu: Neurocognitive mechanisms for transfer and generalization in implicit crossmodal learning
			Lunch Break (Mensa Informatikum)
14:00 – 15:00	21:00 – 22:00	A1 A2	Patrick Bruns: Adaptation of multisensory processing to changing priors and sensory evidence, Cora Kubetschek: EEG studies in adults, Sina Storm: Developmental studies in children Claus Hilgetag: Neural circuits for crossmodal memory
15:00 – 16:00	22:00 – 23:00	C9 C1	Jan Gläscher, Ke Zhao Dan Zhang: Crossmodal active perception of human speech
			Coffee Break
16.00 – 17:00	23:00 – 00:00		General Assembly Jianwei Zhang, Frank Steinicke: Perspective Remarks
18:30			Symposium Dinner: Hamburger Elbspeicher · Große Elbstraße 39 · 22767 Hamburg https://www.hamburger-elbspeicher.de

Speakers

Uta Noppeney (Donders Institute for Brain, Cognition and Behaviour)
Wei-Ning Hsu (Meta Research)
Mohit Shridhar (Google Deepmind)

Fares Abawi
Philipp Allgeuer
Patrick Bruns
Tatia Buidze
Lihan Chen
Wenkai Chen
Lin Cong
Li Dong
Andreas Engel
Niklas Fiedler
Time Gerkmann
Jan Gläscher
Michael Görner
Jasper Güldenstein
Jan-Gerrit Habekost

Fatemeh Hadaeghi
Judith Hartfill
Norman Hendrich
Focko Higgen
Claus C Hilgetag
Carina Jaap
Yannick Jonetzko
Dionysia Kaziki
André Kelm
Matthias Kerzel
Jae Hee Lee
Shang-Ching Liu
Xun Liu
Jonas Maack
Alexander Maÿe

Wolfgang Menzel
Ozan Özdemir
Shiqun Qiguan
Julius Richter
Philipp Ruppel
Marleen Schoenfeld
Frank Steinicke
Yuyang Tu
Peng Wang
Xintong Wang
Cornelius Weber
Stefan Wermter
Ehsan Yaghoubi
Jianwei Zhang