

Call for Proposals

No. 47

3 June 2024

Priority Programme “Understanding Gaze (UGaze)” (SPP 2481)

In 2024, the Senate of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) established the Priority Programme “Understanding Gaze (UGaze)” (SPP 2481). The programme is designed to run for six years. The present call invites proposals for the first three-year funding period.

Aims and Scope

Eyes, metaphorically the windows to our souls, have been a subject of eye tracking research in the last century. This research has successfully identified and isolated various gaze measures (e.g. fixations, saccades, pupil-related features, visual scanpaths) pivotal for perceptual and cognitive processing. As these results are frequently isolated and examined in specialised laboratory tasks, the next step is to approach the bigger picture in which both the measures and the tasks are combined and contextualised. Humans do not only move their eyes, they also observe others moving their eyes. Specific eye movements and movement sequences have meanings, such as attending or ignoring, or direct, averted, or mutual gaze. Hence, eye movements are instrumental and communicative in interactions and collaborative tasks.

The Priority Programme UGaze aims to investigate the role of gaze in conveying information about the dynamics and specifics of (preferably natural) tasks in order to understand how gaze patterns are interpreted by others during interactive and collaborative tasks, and to explore the use of gaze in multi-user scenarios, by fostering research within three key development areas:

(I) Gaze Expression: Understanding the information gained from gaze, with particular focus on how gaze measures are interpreted by those observed, requires eye tracking research with a view to the meanings attributed to gaze, exemplified by questions such as:

- How are particular gazes interpreted, what are the roles of gaze direction, eye shape, emotion, perspective, illumination, distance, etc. on the perception of direct gaze and object-directed gaze? What are influencing factors of the person observing, how is gaze perception expressed in eye movements?
- (How) can we detect intention, e.g. joking, lying, etc. by gaze behaviour? Is there a gaze pattern of surprise, puzzlement and distraction, which is generally understandable? What is the time course and what are the consequences of various gaze expressions for attention and perception?

(II) Gaze Sharing: Various gaze interactions, including joint viewing and mutual gaze, have mechanisms and effects that still remain unclear. Analysing these interactions is crucial for comprehending the signalling and the perceptual functions of gaze, for example:

- Categories of Gaze and their Relation: How frequently do we experience mutual eye contact; what are conditions, dynamics and effects? What are the similarities and differences between direct mutual gaze, referential gaze and averted gaze?
- How is joint attention and joint fixation established, how does it develop, what are determinants for sustaining joint attention? Is there a dominating person, how is dominance reflected in gaze behaviour?

(III) Gaze Interaction in Multi-User Scenarios: Using gaze can enhance new interaction technologies. In many settings, such as public displays or video conferencing tools, gaze-based interfaces can enable fast and remote interaction, for example via enriching video conferencing by showing your viewpoints. Exemplary research questions can be:

- What techniques can be developed to integrate the perception-action loop underlying individual gaze behaviour with the dynamics of the interactive gaze circuit, considering factors such as fixation selection, foveal positioning, field of view, blink rates and durations, the role of pupil adjustments, etc. in information intake?
- How can advancements in hardware miniaturisation and machine learning algorithms be leveraged to study natural gaze behaviour in diverse contexts, particularly in scenarios involving multiple participants or objects, and how can the complex interplay of gazes with objects and other gazes be analysed and understood?
- Privacy: With eye-tracking technology becoming more integrated into everyday devices and applications, privacy issues have become paramount. While offering a deep dive into cognition and behaviour, gaze can also inadvertently reveal sensitive and personal information about an individual. As we capture, analyse and interpret gaze data, ensuring the protection of individual privacy is essential. We hence encourage research on privacy in eye tracking in the context of this proposal.

Through UGaze, we intend to support investigators through winter schools, hybrid seminars, friendly and open collaboration, gender equality awareness and a family-friendly policy.

Expectations and Requirements for Individual Projects

In order to ensure that all researchers can collaborate fruitfully, all projects use eye tracking as the primary method. Moreover, they focus on patterns rather than single points, such as multimodal patterns of change at one point in time (e.g. saccades, pupil changes, head movements), patterns of change over time (e.g. fixation sequences) or patterns in interactions (e.g. reciprocally directing and averting gaze during collaborative tasks). Projects should refer to at least one of the main areas (I) Gaze Expression, (II) Gaze Sharing or (III) Gaze-Based Interaction in Multi-User Scenarios. Ideally, they show a path to bridging the gap to one or both of the other key development areas. Tandem projects are encouraged.

Preparatory Meeting

Our roundtable discussion, which will take place online on Wednesday, **10 July 2024, from 3pm to 6pm**, provides further information and an opportunity to ask questions (see link below). Please note that participating in this meeting is not mandatory; project proposals can be submitted without participating in the roundtable discussion.

Formal Requirements and Proposal Submission

Proposals must be written in English and submitted to the DFG by **3 December 2024**. Please note that proposals can only be submitted via elan, the DFG's electronic proposal processing system. To enter a new proposal, go to Proposal Submission – New Project/Draft Proposal – Priority Programmes and select “SPP 2481/1 UGAZE” from the current list of calls.

When preparing your proposal, please review the programme guidelines (DFG form 50.05_en, section B) and follow the proposal preparation instructions (DFG form 54.01_en). Please note that the forms have been recently updated and only proposals based on the current template can be accepted.

Applicants must register in elan prior to submitting a proposal to the DFG. Applicants who are not yet registered must do so by **19 November 2024** to submit a proposal under this call; registration requests received after that date cannot be considered. Successful registration will be automatically confirmed, usually by the next working day. Note that the appropriate Priority Programme call has to be selected both during the registration and the proposal submission process.

Review Process

Proposals will be reviewed by a panel in accordance with the DFG's review criteria (DFG form 10.20_en). The overall fit of the proposed project to the goals of UGAZE will be a crucial criterion.

Further Information

Link to roundtable discussion on 10 July 2024:

<https://uni-ulm.zoom-x.de/j/67310660863?pwd=S0hWYjNpZ1p6OHJiMjVXZXFPU1lzdz09>

The elan system can be accessed at:

<https://elan.dfg.de/en>

DFG forms 50.05 and 54.01 can be downloaded at:

www.dfg.de/formulare/50_05

www.dfg.de/formulare/54_01

For scientific enquiries, please contact the Priority Programme coordinators:

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Questions on the DFG proposal process can be directed to

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