2025 PPI-Led Funding Call

In 2025, we asked our participatory research group with ‘lived experience’ of neurodiversity to tell us about their priorities and how neurotechnology could make a positive difference.

The two research priorities that emerged from our surveys were:

- **Sensory processing**
- **Neurotechnologies for use in the home, or naturalistic, environments**

In line with these priorities, two projects have been awarded and are PPI-led.

Dr Nicolaas Puts, King’s College London

“SENSE: Linking Sensory Experiences and Neural Systems in Autism”

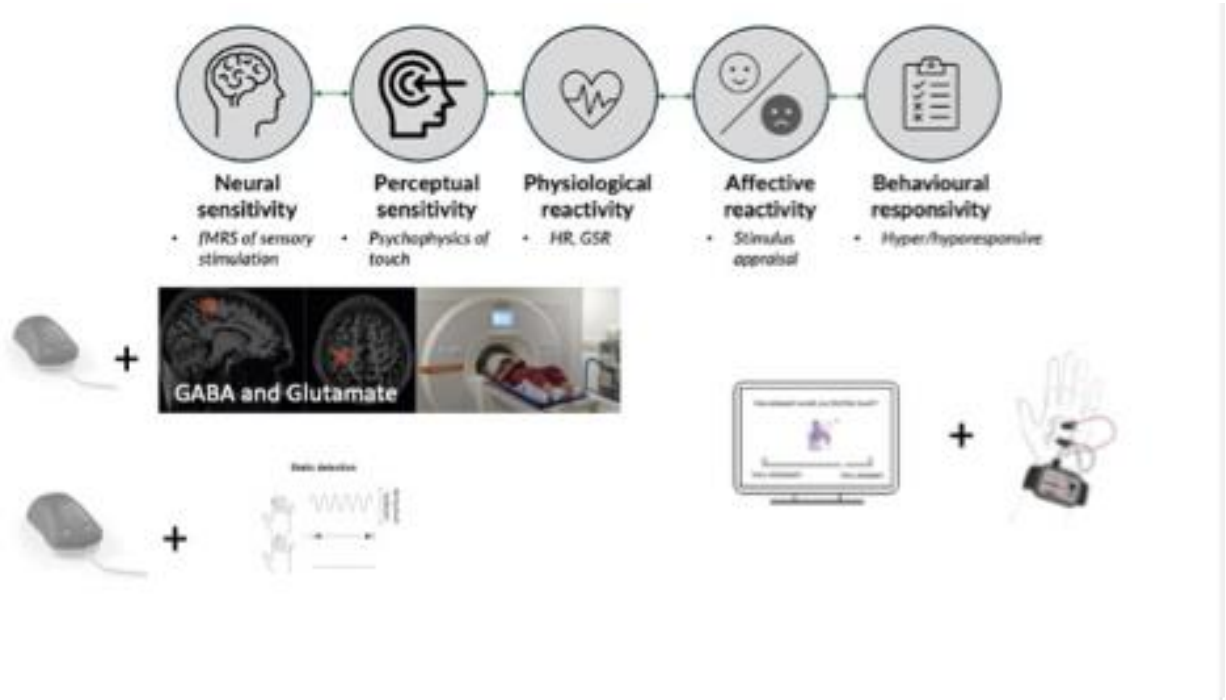
The interdisciplinary team include:

Dafnis Batalle (King’s College London), Carolline Lea-Carnall (University of Manchester) and Peirre Violland (Autism Peer Support Specialist)

Our overall aim is to better understand how differences in excitatory and inhibitory brain function gives rise to behavioural differences in sensory perception, appraisal, and hyper

and or hypo responsivity to sensory stimuli in neurotypical and neurodivergent participants using state-of-the-art multi-modal approaches, with an emphasis on the dynamic nature of sensory differences.

While sensory differences are increasingly acknowledged, and are a priority for the autistic community, the mechanisms underlying sensory differences in autism remain unclear. Most studies focusing on non-specific questionnaires with no link to perception and biology, focus on specific aspects of sensory processing (e.g. “just the brain” or “just perception”) or study it “statically”. No study to date has established how differences in neural sensitivity to sensory input give rise to individual differences in perception, and to physiological and affective reactivity (“do we like or dislike something”), and sensory responsivity (“our overall approach to sensory experiences”) Finally, sensory differences are highly dynamic and stimulus-dependent, and we know little about their dynamic nature. Understanding how increasingly complex markers of sensory differences are related may lead to development of tailored support, and treatment to improve quality of life.



RESPECT 4 NEURODEVELOPMENT

In this co-designed project we will examine how differences in how the brain responds to sensory processing give rise to perception and reactivity differences in autistic people by using multimodal approaches. Using a novel technique called functional Magnetic Resonance Spectroscopy, we can directly examine how neurotransmitters GABA and Glutamate change in response to sensory input. Using psychophysics we then use behavioural tasks to not only identify how sensitive (or not) autistic people are to detecting weak stimuli or discriminate between them, but also how this changes when we change the sensory environment. Using both physiological measures of arousal, and rating scales, we then examine how autistic people feel about sensory stimuli, and how aversive (or not) these might be, and whether this is also reflected in changes in heart rate and skin conductance. Finally, we will examine how these measures associate with broad measures of sensory hyper- and hyporeactivity, and use a newly co-designed questionnaire to assess how autistic people deal with sensory input in daily life, and whether they are aware of their sensory triggers.