



## INTERDEM MEMBERS – BRIEF CURRICULUM VITAE



**NAME:** Nahid Zokaei

**TITLE:** Dr

**PROFESIONAL GROUPING:** Lecturer/Clinical Director

**WORK ADDRESS:** Brain+ A/S, Købmagergade 53, 3<sup>rd</sup> floor, Denmark, 1150 Copenhagen (please note I work remotely)

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**PRESENT POSITION (e.g. Director of .....):** Clinical Director at Brain+ and Visiting Scholar at University of Oxford

**HIGHEST ACADEMIC QUALIFICATION (e.g. PhD, MD etc.):** PhD

**YEAR OF PHD QUALIFICATION:** 2013

**PROFILE OF MEMBER:**

Age-related neurodegenerative disorders such as Alzheimer's disease are associated with considerable decline in core cognitive abilities of *attention, long- and short-term memories*. Decline in these abilities can create functional

limitations in several domains essential for daily living, including everyday problem solving, driving, shopping, attending appointments, and even taking medication. Deficits in these core cognitive functions and those they support, have been shown to be a major determinant of health outcomes and well-being in disorders of old-age. The converse also appears to be true: better cognitive functions appear to be indicative of healthy ageing. My research so far has focused on investigating the interaction among these core cognitive systems, their associated brain networks, and their impairments in neurodegenerative disorders, by developing sensitive and novel experimental paradigms that mimic the more realistic and dynamic nature of these behaviourally critical processes.

So far, I have used a multimodal approach which includes computational modelling, psychophysics, eye-tracking and neuroimaging. I apply the novel advances in our understanding of these processes to upgrade the study of mental resilience vs. risk in healthy ageing and examine the impairments in these abilities and their possible predictive power as biomarkers for disorders that effect cognition. In other words, my work has focused on providing a better phenotypical description of disorders which in turn can results in a more accurate diagnosis, treatment monitoring and eventually the development of training regimens.

Building on this work, and upon joining Brain+, I am working towards developing software as medical device that firstly supports therapists in administering Cognitive Stimulation Therapy (CST) and secondly, an app for home-use for improving cognitive, language and quality of life in patients with dementia in conjunction with CST. As the clinical director in Brain+ and a visiting scholar in University of Oxford, I am working towards bridging the gap between industry and academia by promoting collaborative partnerships as well as jointly funded research projects.

#### **AREAS OF EXPERTISE:**

Cognitive Neuroscience/Clinical Neurology: Alzheimer's disease, Parkinson's disease, Healthy Ageing, Short- and Long-term Memories, Temporal Expectation and attention, Cognitive Biomarkers

#### **KEY PUBLICATIONS (Max. 5):**

Link to Google Scholar Profile: <https://scholar.google.co.uk/citations?user=6HrDF-QAAAAJ&hl=en>

- **Zokaei**, N. \*, Sillence, A., Kienast, A., Drew, D., Plant, O., Slavkova, E., Manohar, S. G., & Husain, M. (2020). Different patterns of short-term memory deficit in Alzheimer's disease, Parkinson's disease and subjective cognitive impairment. *Cortex*, 132, 41–50
- **Zokaei**, N. \*, Grogan, J., Fallon, S. J., Slavkova, E., Hadida, J., Manohar, S., Nobre, A. C., & Husain, M. (2020). Short-term memory advantage for brief durations in human APOE ε4 carriers. *Scientific Reports*, 10(1), 9503.
- **Zokaei**, N. \*, Gillebert, C. R., Chauvin, J. J., Gresch, D., Board, A. G., Rolinski, M., Hu, M. T., & Nobre, A. C. (2021). Temporal orienting in Parkinson's disease. *The European Journal of Neuroscience*, 53(8), 2713–2725.
- **Zokaei**, N. \*, Čepukaitytė, G., Board, A. G., Mackay, C. E., Husain, M., & Nobre, A. C. (2019). Dissociable effects of the apolipoprotein-E (APOE) gene on short- and long-term memories. *Neurobiology of Aging*, 73, 115–122.
- **Zokaei**, N. \*, Nour, M. M., Sillence, A., Drew, D., Adcock, J., Stacey, R., Voets, N., Sen, A., & Husain, M. (2018). Binding deficits in visual short-term memory in patients with temporal lobe lobectomy. *Hippocampus*, 29(2), 63–67.

#### **RELEVANT RESEARCH ACTIVITY:**

Please indicate for past 5 years only (i) Grants Awarded: Names of investigators; Years; Title of Project; name of awarding agency (ii) PhD and other projects: Title, start or competed date.

##### **(i) Grants**

If not included, NZ was the sole applicant on the grant.

2022: Co-applicant (+ Prof. Kia Nobre, Prof, Prof Paul Harrison & Dr Maxime Taquet) on grant titled: Post-covid cognitive characterisation, funded by Wolfson foundation- £380k

2021: Oxford ARUK Small Equipment Award- £1000

2021: National Institute for Health Research (NIHR) senior research fellowship - £15000

2021: Medical Science Division, University of Oxford, Returning Carer fund - £5000

2020: Oxford Wellcome Centre for Integrative Neuroimaging Seed Grant Scheme - £11000

2019: British Psychological Society Undergraduate Research Assistantship Scheme - £1600

2018: Oxford ARUK pilot project award- £3500

2016: Oxford ARUK pilot project award- £3500

2015: British Academy Postdoctoral fellowship— approx. £366k

2009: Brain Research Trust PhD Scholarship, Institute of Neurology and Institute of Cognitive Neuroscience, University College London

## (ii) PhD and other projects

- PhD (September 2009- February 2013): Modulation of working memory in health and disease.

- Short-term memory impairments in Alzheimer's disease and Parkinson's disease and individuals at risk of these disorders (2013 – 2020).

Selected Related Papers:

**Zokaei, N.**, et al. (2014). Visual short-term memory deficits associated with GBA mutation and Parkinson's disease. *Brain*.

Rolinski, M.†, **Zokaei, N.**† et al. (2015). Visual short-term memory deficits in REM sleep behaviour disorder mirror those in Parkinson's disease. *Brain*.

**Zokaei, N.**, et al. (2018). Binding deficits in visual short-term memory in patients with temporal lobe lobectomy. *Hippocampus*.

**Zokaei, N.\***, Husain, M. (2019). Working memory in Alzheimer's disease and Parkinson's disease. Book Chapter in *Current Topics in Behavioral Neuroscience*.

**Zokaei, N.**, et al. (2020). Short-term memory advantage for brief durations in human APOE ε4 carriers. *Scientific Reports*.

**Zokaei, N.**, et al. (2020). Different patterns of short-term memory deficit in Alzheimer's disease, Parkinson's disease and subjective cognitive impairment. *Cortex*.

**Zokaei, N.**, et al. (2021). Temporal orienting in Parkinson's disease. *The European Journal of Neuroscience*.

- Relationship between short- and long-term memories in healthy ageing (2017 – 2022).

Selected Related Papers:

**Zokaei, N.**, et al. (2019). Dissociable effects of the apolipoprotein-E (APOE) gene on short- and long-term memories. *Neurobiology of Aging*.

Čepukaitytė, G., Thom, JL., Kallmayer, M., Nobre, AC., **Zokaei, N.** (2023). The relationship between short- and long-term memory is preserved across the age range. *Brain Sciences*.

Atkinson, L., Thom, JL., Nobre, AC., **Zokaei, N.** (in press). Dissociable effects of mild COVID-19 on short- and long-term memories. *Brain Communications*.

- Developing sensitive behavioural measures for attention and memory (ongoing).

Selected Related Papers:

**Zokaei, N.**, et al. (2014). Working memory recall precision is a more sensitive index than span. *Journal of Neuropsychology*.

**Zokaei, N.**, et al. (2014). Causal evidence for a privileged working memory state in early visual cortex. *The Journal of Neuroscience*.

**Zokaei, N.**, et al. (2019). Modulation of the pupillary response by the content of visual working memory. *PNAS*.

† Shared first authorship

## CURRENT RESEARCH INTERESTS/ONGOING PROJECT TITLE:

- Cognitive Stimulation Therapy- Therapist Companion

Project Summary: As the clinical director of the Brain+, I am working on developing a second version of a product that aims to support therapist facilitating Cognitive Stimulation Therapy (CST) by providing a harmonised and standardised set of session material that are age-appropriate and culturally adapted to each place of delivery. We plan to soon conduct a clinical trial to examine the validity of this tool and its possible benefits in reducing variability in patient outcomes.

Collaborators: Prof. Rikke Gregersen

- Cognitive Stimulation Therapy – Home Companion

Project Summary: The CST-Home Companion aims to address identified limitations in providing scalable solutions for the delivery of CST. Considering that weekly dosage of CST sessions is a crucial determinant of health outcomes and in light of the finding that patients on average attend only 10 hours of CST therapy, we hope to provide a home-companion to CST sessions that focuses on aspects of the CST that can be trained in a home-setting. We are currently developing the new product and planning a clinical trial.

Collaborators: Prof. Aimee Spector

- Oxford Brain Health Centre: Cognitive testing

Project summary: The Oxford Brain Health Centre (BHC) is a joint clinical-research service that aims to bring UK National Health Service (NHS) memory services into the 21<sup>st</sup> century by addressing gaps between clinical practice and research advances into dementia. The BHC provides high-quality assessments not routinely available in

clinical service such as novel diagnostic tools sensitive to earlier pathological changes. Enhanced information will be fed into clinical note, improving the quality of information available to clinicians empowered to make more confident and accurate timely diagnoses. I have taken a leading role in putting together the cognitive-testing side of the BHC; designing and programming a battery of tests, as well as testing its acceptability with patient-based focus groups and preparing the final package for delivery. I currently supervise a PhD student who is solely working on this project in University of Oxford.

Collaborators: Prof. Clare Mackay, Prof Kia Nobre

- Oscillatory signatures of cognitive and motor impairments in Parkinson's disease and individuals at risk of developing Parkinson's disease

Project Summary: Cognitive and motor impairments are an important feature of Parkinson's disease (PD) and are apparent at very early stages of the disease. We have shown that specific short-term memory impairments are not only observed in patients with PD but also in those who are at risk of developing PD (Zokaei et al., 2014; Rolinski, Zokaei et al., 2015) and importantly are distinct from impairments observed in other neurodegenerative disorders (Zokaei et al., 2019; Zokaei et al., 2020). In this project we aim to explore the neural underpinnings of such memory impairments as well as motor deficits using Magnetoencephalography (MEG) in patients with PD and individuals with REM sleep behavioural disorder (who are at the highest known risk of developing PD). I currently supervise a PhD student who is solely working on this project in University of Oxford.

Collaborators: Prof Kia Nobre, Prof Mark Woolrich, Prof Michele Hu

Related paper:

**Zokaei, N.\***, Quinn, A. J., Hu, M. T., Husain, M., van Ede, F., & Nobre, A. C. (2021). Reduced cortico-muscular beta coupling in Parkinson's disease predicts motor impairment. *Brain Communications*.

#### **HOW DO YOU INTEND TO CONTRIBUTE TO INTERDEM:**

- Joining relevant task forces:

I hope to join the following task forces that fit with my current expertise and positions.

Assistive Technology: As the clinical director of Brain+, we hope to develop effective and scalable treatments for patients with dementia (and eventually for those with Mild Cognitive Impairment) using digital therapeutics. I hope to contribute to this task force by participating and organising symposia on this field, as well as to collaborate on research projects and papers.

Methodology: My work as a researcher has focused on bridging the gap between novel and recent advances in the cognitive neuroscience and clinical application that can improve diagnosis and treatment monitoring as well as cognitive improvement. I hope to contribute to this task force by continuing translating the most relevant yet novel tools for clinical use, by organising conference symposia as well as publishing opinion pieces and eventually editing a special issue on this topic. As an example, most clinical trials and trainings use n-back tests to measure short-term memory whereas novel advances in memory research have provided sensitive yet selective methods to test short-term memory using simpler tasks in conjunction with computational modelling. I hope to achieve this by setting up collaborations with relevant scientists from both cognitive neuroscience and applied psychiatry/psychology.

- Setting-up mentoring and internship program:

I have personally benefited from great mentors in my careers, people that I am still in touch with on a regular basis (Prof Masud Husain and Prof Kia Nobre). I hope to set-up a program for young academics interested in dementia research that includes possible internship opportunities both in academia but also with close industry partners such as Brain+.