WHAT DO YOU KNOW ABOUT YOUR BRAIN?
It is your most individual organ
It has about 100 billion neurons
with one quadrillion connections
It works a million times more
energy efficient than a computer
Preserving its health helps avoiding
the most burdensome diseases

We aim to understand
the mechanistic underpinnings
of human cognition and behaviour
in health and disease.
WE AIM TO APPLY

The objective of researchers working on this theme is to understand something that is uniquely human: language. The researchers focus on three key objectives: a) to understand how we speak, how we understand speech, how we learn language and to remember; b) to determine how the human capacity of language is rooted in the human brain; and c) to determine to what extent language abilities are the same across all languages of the world and across all speakers of any given language.

Donders' research themes are focused on four themes:

1. **HEALTH & HEALTHCARE**
   - Through its translational research into both the healthy and diseased brain, the Donders Institute is able to identify the brain basis of a healthy lifestyle to advance prevention, recognition and treatment of brain diseases. As part of the personal healthcare mission of the Radboud University Medical Centre, we specifically aim for precision diagnostics and treatment for individual patients with neural, psychiatric or sensory disorders.
   - **FOOD & COGNITION**
     - The Donders Institute addresses societal issues that centre on the complex interplay between nutrients, eating behaviour, brain development and disease. Understanding these interactions helps to optimise early-life development, to prevent diseases such as obesity, to promote a healthy lifestyle and healthy ageing, and to develop precision nutrition for brain disorders. Radboud University and Wageningen University & Research collaborate on this Donders programme.

2. **LEARNING & EDUCATION**
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   - **NEUROTECHNOLOGY & BIG DATA**
     - Developments in neuroscience are critical drivers to advance the creation, application and societal embedding in fundamental neuroscience. Research at the Donders Institute specifically shapes the next steps in the evolution of brain-computer interfacing, neuromodulation, machine learning, robotics, virtual reality, and sensing.

3. **PUBLIC & POLITICS**
   - The Donders Institute wants to educate the public, to share the things we learn about the brain, brain disorders and behaviour, and to communicate the relevance and wonders of neuroscience: it acts to do this through public lectures, social and traditional media, open days and books. Investigators have a seat on various public and governmental bodies, because the Donders Institute believes that neuroscientific insights should be used to guide discussions and decisions on societal issues and dilemmas.

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2. **PERCEPTION, ACTION & CONTROL**
   - Researchers working on this theme aim to understand how the world is perceived, how these perceptions are translated into motor action, how we control and decide what to do, and how all of these processes are integrated while interacting with other people. On each of these levels, researchers focus on disorders of movement, like Parkinson’s disease and neurodevelopmental disorders, and also on disorders of eye and ear.

3. **PLASTICITY & MEMORY**
   - These researchers tackle the mechanistic underpinnings and behavioural consequences of long-term changes in neural structure and function. More specifically, the aim is to unravel how neuroplasticity supports development during childhood, adaptation to environmental challenges, and learning and memory throughout life span. In addition to fundamental research, this theme also focuses on clinical topics in Alzheimer’s disease, neurodevelopmental disorders and stress-related disorders.

4. **NEURODEVELOPMENTAL DISORDERS**
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**LEARNING & EDUCATION**

Our research into learning, language and communication, memory, and brain development - in both the healthy and diseased state – has many societal implications. Examples include understanding the factors that influence personal development, the design of training of specific behaviours and skills, and reshaping school education programmes based on neuroscientific knowledge.

**NEUROTECHNOLOGY & BIG DATA**

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