

PhD Project Description

School/Department:	Department of Neuroscience Erasmus MC
Supervisor information:	<ul style="list-style-type: none"> • Dr. Zhenyu Gao, z.gao@erasmusmc.nl <ul style="list-style-type: none"> • https://neuro.nl/research/gao • Personal Grants: <ul style="list-style-type: none"> - ERC Starting Grant (ERC-Stg), 2019 - Dutch Scientific Organization (NWO-VIDI) Grant, 2019 - Dutch Scientific Organization (NWO-Klein) Grant, 2019 - Dutch Scientific Organization (NWO-CAS) Grant, 2017 - Erasmus MC Fellowship, 2016 - Dutch Scientific Organization (NWO-VENI) Grant, 2014 - Most important publications: <ul style="list-style-type: none"> - Nature 2018 563(7729):113-116 - Elife 2017 15;6 pii:e28132 - Neuron 2016 89(3):645-57 - Cell Reports 2013 253(4):1239-51 - Nature Reviews Neuroscience 2012 13: 619-635 - Journal of Neuroscience 2012 31;32(44):15533-46 - Neuron 2011 14;70(1):43-50
Project Title:	Dissecting the brain-wide connectome for motor planning
Abstract:	<p>All voluntary movements are directed by proper motor plans in the brain. How does the brain effectively generate these motor plans and use them to direct future movements? Previous studies suggested that the motor cortex play a key role in motor planning. Motor cortical neurons maintain their activity for seconds before the movement's onset, which allows the brain to temporarily retain valuable information to secure accurate execution of the motor plans. Our recent research provided evidence for the functional involvement of the cerebellum in motor planning (Gao <i>et al</i>, Nature 2018). For this PhD project we will focus on further dissecting the brain-wide circuits that are relevant for motor planning. We will examine whether the sensorimotor representation from the cerebral cortex is integrated in cerebellum during motor planning and that the computation in cerebro-cerebellar circuits is instrumental for supporting the preparatory activity. We will use an integrative approach to 1). identify the cerebrum-to-cerebellum inputs that are relevant for motor planning; 2). determine how cerebellar circuits integrate cerebral inputs and generate corresponding outputs during motor planning; 3). Identify the role of cerebellar outputs in motor planning and explore their computational mechanisms. This project will greatly advance our knowledge on the general computational principles underlying motor planning. In the future it will pave the way to a mechanistic understanding of brain-wide communication in cognitive tasks with its influence extended to future computer science, humanized prosthetics, and medicine.</p>
Requirements of candidate:	<ul style="list-style-type: none"> • We look for highly motivated students to join our multi-disciplinary team. We welcome students with Msc in biotechnology, neuroscience, bio-engineering, and other life sciences majors. Prior experience in molecular biology, imaging, electrophysiology and computational modelling is preferred, but not essential.

Erasmus MC, ranked world no. 32 for [Clinical Medicine US News 2020](#) no. 30 [Nature Index for Biomedical Sciences 2019](#)

PhD Project Description

	<ul style="list-style-type: none">• Scholarship that will cover subsistence allowance and international air plane ticket.• English language requirement: IELTS 7.0 (<i>min 6.0 for all subs</i>), TOEFL 100 (<i>min 20 for all subs</i>).
--	--

Application requirements & Deadlines:

<https://www.eur.nl/en/about-eur/erasmus-university-china-centre/csc-scholarship>

Erasmus MC, ranked world

** No.32 for Clinical Medicine US News 2020:*

<https://www.usnews.com/education/best-global-universities/clinical-medicine?page=3>

** No. 30 Nature Index for Biomedical Sciences 2019:*

<https://www.natureindex.com/supplements/nature-index-2019-biomedical-sciences/tables/healthcare>