



## China Scholarship Council – University Maastricht

### PhD Programme Application form 2024

#### Basic information

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*- To be filled in by the prospective UM supervisors -*

#### 1. Information on prospective UM supervisors and Promotor

##### 1a. First Supervisor/promoter:

- Title(s), initial(s), first name, surname: Dr. Jacco Briedé
- Research group: Toxicogenomics
- Address for correspondence: Universiteitssingel 50, 6229 ER Maastricht
  
- Telephone: +31 43 3881094
- E-mail: j.briede@maastrichtuniversity.nl

##### 1b. Second Supervisor/copromoter:

- Title(s), initial(s), first name, surname: Dr. Julian Krauskopf
- Research group: Toxicogenomics
- Address for correspondence: Universiteitssingel 50, 6229 ER Maastricht
  
- Telephone: +31 43 3881092
- E-mail: j.krauskopf@maastrichtuniversity.nl

##### 1c. Promotor (if applicable): – see above

- Title(s), initial(s), first name, surname: prof. Dr. Theo de Kok
- Research group:
- Address for correspondence: Universiteitssingel 40, 6229 ER Maastricht
- Telephone: +31 43 3881091
- E-mail: t.dekok@maastrichtuniversity.nl

#### 2. Information on UM Faculty/ Department/ Institute/ School contact person:

*When the application is granted by both the CSC and UM, the contact person is responsible for the practical arrangements of the integration of the PhD candidate:*

- Initial(s), first name, surname: Ankie Hochstenbach
- Research group: Research school MHeNS
- Address for correspondence: Universiteitssingel 40, 6229 ER Maastricht
- Telephone: +31 43 3881021
- E-mail: a.hochstenbach@maastrichtuniversity.nl

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- To be filled in by the applicant if already known -

### **1. Information on the applicant**

- Initial(s), first name, surname:
- Male/female:
- Current work/study address:
  
- E-mail:
- Private address:

### **2. Details of applicant's home university**

*Note! A separate letter of recommendation by the supervisor or faculty dean of the home university is required.*

- Name of home university:
- Address:
- E-mail:
- Website (if available):

### **3. Applicant's home university Master Thesis supervisor:**

- Title(s), initial(s), first name, surname:
- Address for correspondence:
- E-mail:

### **4. Research field(s)**

### **5. Title of research plan for CSC-UM PhD Programme**

Genomic Exploration of Alzheimer's Disease and Environmental Risk Factors

### **6. Short summary of research plan (max. 250 words) (A full plan must be submitted later)**

#### **Background:**

Alzheimer's disease (AD) is a common neurodegenerative disorder characterized by progressive memory loss with an increasing prevalence. While up to 5% of AD cases are

attributed to specific gene mutations (familial AD), the majority are sporadic, suggesting a potential role for environmental factors in AD development. Emerging evidence points to exogenous chemicals, including heavy metals and pesticides, as potential contributors to AD.

### **Study objective:**

This project delves into the effects of heavy metals and pesticides on Alzheimer's disease development. We'll analyze next-gen sequencing data from mRNA and microRNA (miRNA) expression profiles in iPSC-derived human neurons exposed to environmental toxins. Additionally, we'll utilize data from postmortem brain tissue, blood, and CSF samples from AD patients. Our primary objective is to employ complex data analysis techniques, including machine learning, to uncover the intricate molecular mechanisms underlying AD pathogenesis influenced by environmental toxins.

### **Expected Results:**

We anticipate that this study will provide critical insights into the role of heavy metals and pesticides in the development of AD. By analyzing miRNA expression patterns over time, we aim to identify potential diagnostic markers and improve the understanding of the molecular mechanisms involved in AD pathogenesis.

### **Requirements:**

For a potential PhD candidate, the following are required:

**Strong Bioinformatics and Data Analysis Skills:** Proficiency in bioinformatics and data analysis is essential.

**Interdisciplinary Aptitude:** Ability to work across biology, neuroscience, and data science disciplines.

**Communication and Collaboration Skills:** Effective communication and collaborative abilities are assets.

**Passion and Motivation:** A deep interest in unraveling neurodegenerative diseases, particularly Alzheimer's, is crucial.

### **Group's performance:**

Publications:

- 1) Lead-exposure associated miRNAs in humans and Alzheimer's disease as potential biomarkers of the disease and disease processes. Wen Q, Verheijen M, Wittens MMJ, Czuryło J, Engelborghs S, Hauser D, van Herwijnen MHM, Lundh T, Bergdahl IA, Kyrtopoulos SA, de Kok TM, Smeets HJM, Briedé JJ, Krauskopf J. *Sci Rep.* 2022;12(1):15966
- 2) iPSC-derived cortical neurons to study sporadic Alzheimer disease: A transcriptome comparison with post-mortem brain samples. Verheijen MCT, Krauskopf J, Caiment F, Nazaruk M, Wen QF, van Herwijnen MHM, Hauser DA, Gajjar M, Verfaillie C, Vermeiren Y, De Deyn PP, Wittens MMJ, Sieben A, Engelborghs S, Dejonckheere W, Princen K, Griffioen G, Roggen EL, Briedé JJ. *Toxicol Lett.* 2022;356:89-99
- 3) Blood Transcriptome Response to Environmental Metal Exposure Reveals Potential Biological Processes Related to Alzheimer's Disease. Krauskopf J, Bergdahl IA, Johansson A, Palli D, Lundh T, Kyrtopoulos SA, de Kok TM, Kleinjans JC. *Front Public Health.* 2020;8:557587
- 4) Circulating microRNAs as potential biomarkers for psychiatric and neurodegenerative disorders. van den Berg MMJ, Krauskopf J, Ramaekers JG, Kleinjans JCS, Prickaerts J, Briedé JJ. *Prog Neurobiol.* 2020 Feb;185:101732
- 5) Acetaminophen Overdose as a Potential Risk Factor for Parkinson's Disease. Bohler S, Liu X, Krauskopf J, Caiment F, Aubrecht J, Nicolaes GAF, Kleinjans JCS, Briedé JJ. *Clin Transl Sci.* 2019;12(6):609-61
- 6) MicroRNA regulation of persistent stress-enhanced memory. Sullivan SE, Jamieson S, de Nijs L, Jones M, Snijders C, Klengel T, Joseph NF, Krauskopf J, Kleinjans J, Vinkers CH, Boks MPM, Geuze E, Vermetten E, Berretta S, Ressler KJ, Rutten BPF, Rumbaugh G, Miller CA. *Mol Psychiatry.* 2020 May;25(5):965-976

H-Index; (number of citations): JB: 36 (4.597), JK: 14 (769); TdK: 43 (7.056)

Statements of recognition of the team: This team of supervisors from the department of Toxicogenomics (FHML) shares highly background of experiences in

research that includes bioinformatics, neurodegenerative diseases and bioinformatics order to successfully execute this project

### **7. Motivation for CSC-UM PhD application (max. 250 words)**

This is a follow-up of the 2019-2023 round application "Healthy aging and mental health in a healthy environment: Next generation sequencing tools as frontier technology for profiling circulating microRNAs with diagnostic potential in Alzheimer's disease". On this application the Ph.D. candidate Qingfeng Wen is currently appointed till December 1<sup>st</sup> 2024.

Two separate letters are required, one from the student and one from the promotion team.

### **Applicant's Curriculum Vitae**

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#### **8. Personal details**

##### Applicant

- Title(s), initial(s), first name, surname:

CSC-UM PhD programme start 1-9-2024

- Surname:

- Nationality: **Chinese**

- Date of Birth:

- Country and place of birth:

#### **9. Master's degree (if applicable)**

*Note! Add a copy of your Master's degree to your application*

University:

Faculty/discipline:

City and country:

Date:

Grade average:

Title Master's thesis (if applicable):

Thesis grade: