

## PhD Fellowship

### *Phase transitions and logical limit laws via analytical combinatorics*

Department of Mathematics, Ghent University

The Department of Mathematics: Analysis, Logic and Discrete Mathematics (WE16) at Ghent University invites applications for a **fully funded PhD position in mathematical logic and analytic combinatorics**, focusing on **phase transitions and logical limit laws via analytical combinatorics**. The position is funded through a **Senior Research Project of the Research Foundation - Flanders (FWO)** and will be supervised by **Andreas Weiermann**.

### Research Project

The project lies at the interface of analytic combinatorics, proof theory, and ordinal analysis. Many mathematically natural assertions exhibit phase transition phenomena when parametrized by growth-rate or complexity functions: they may be provable below a threshold while remaining true but becoming unprovable beyond it. The aim is to identify and characterize such thresholds using proof-theoretic tools together with analytic and combinatorial methods. Analytic combinatorics will be applied to ordinal-theoretic and tree-based structures, enabling precise asymptotic and density analyses and also leading to logical limit laws for ordinals. Building on earlier work by Weiermann and Woods, the project extends limit laws to large segments of proof-theoretic ordinals involving different natural complexity functions. The precise focus can be adapted to the candidate's background.

### Research Environment

The position is based in **Ghent (Belgium)**, within a strong international research environment in **logic, proof theory, analytic combinatorics, and foundations of mathematics**. The FWO project includes **dedicated travel funding** for conferences, workshops, and research visits. Opportunities exist to contribute to teaching, including **supervision of undergraduate and Master's projects**.

### Candidate Profile

Applicants should:

- hold (or soon obtain) a Master's degree in mathematics or a related field;
- have a strong background or interest in **analytic combinatorics, proof theory, ordinal analysis, or combinatorial probability**;
- be comfortable with asymptotic or combinatorial methods, or motivated to acquire them;
- demonstrate strong abstract reasoning skills;
- have a good command of **English** (working language).

No prior knowledge of **Dutch or French** is required; willingness to acquire basic Dutch is welcomed.

### We Offer

A fully funded PhD position (typically four years) with salary and benefits in accordance with **FWO regulations**. The project provides **travel funding** for international conferences, workshops, and research stays, and offers a stimulating, mathematically demanding, and internationally visible research environment.

### How to Apply

Applicants should submit a curriculum vitae, a motivation statement, an outline of academic background and research experience, and transcripts of all degree programs.

**Shortlisted candidates will be asked to arrange two confidential letters of recommendation.**

Applications can be submitted until 31-03-2026 to Prof. Dr. Andreas Weiermann of the Department of Mathematics: Analysis, Logic and Discrete Mathematics, Ghent University, via [Andreas.Weiermann@UGent.be](mailto:Andreas.Weiermann@UGent.be).

You can also contact Prof. Dr. Andreas Weiermann for informal inquiries via email.