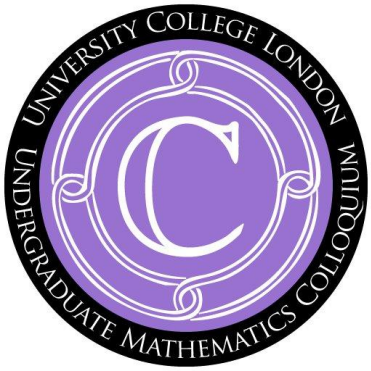

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Rewriting Analysis using Set Theory: Real Numbers in the Theory of Functionaries

21st, 28th January 2026

Speaker: **Matouš Vladimír Schnabel**

Abstract: This talk is a two-part series, presenting the Theory of Functionaries. Developed by Matouš Schnabel in 2nd year, it is a novel theory which rewrites elementary analysis through the viewpoint of set theory.

Part I: 21st January, Time: 4.30-5.30pm,
Location: Room 500, Maths department, 25 Gordon Street
Starting with basic set theory concepts such as natural numbers and functions, the talk will cover how to construct the real numbers as sets of functions on natural numbers.

Part II: 28th January, Time: 4-5pm,
Location: B03, Ricardo LT, Drayton House, 30 Gordon St The second talk will serve as a continuation and, time permitting, discuss potential uses and introduce functionaries. These presentations will not be recorded, so do not miss a unique opportunity!

A real number with an auxiliary base b is the set:

$$r_b := \{f \in N_\phi | \exists h \in b, \forall N \in \omega_+, \exists r \in \omega, \exists \alpha \in {}^{[1,r]_\omega}\omega_+, \forall n \in [0,N], [c_{\alpha(k)}]_{k=1}^{r}(f)(n) = h(n)\}$$

Addition of finite functions is

$$\begin{cases} \begin{cases} (f+g)(0) = f(0)g(0) \\ (f+g)(n) = f(n)+g(n) \quad n \in \omega_+ \end{cases} & \sigma(f) = \sigma(g) \wedge f \notin [0] \wedge g \notin [0] \\ \begin{cases} (f+g)(0) = \begin{cases} f(0) & |[f]| \geq |[g]| \\ g(0) & |[f]| < |[g]| \end{cases} \\ (f+g)(n) = \begin{cases} f_g(n) - g(n) & |[f]| \geq |[g]| \\ g_f(n) - f(n) & |[f]| < |[g]| \end{cases} \quad n \in \omega_+ \end{cases} & \sigma(f) \neq \sigma(g) \vee f \in [0] \vee g \in [0] \end{cases}$$