



Reykjavik, 5 September 2025

EPSRC

**Letter of support for the proposal “Foundations of directed type theory”**

Dear Panel,

I am writing to express my support for the grant project proposal “Foundations of directed type theory” by Prof. Thorsten Altenkirch, Dr. Ulrik Buchholtz and Prof. Nicolai Kraus of the University of Nottingham.

I am a full professor in the Computer Science Department of Reykjavik University. My research interests and contributions are in mathematical programming language theory and its underpinnings in logic (especially proof theory), type theory, category theory. I have followed the development of type-theoretical proof assistants for many years and been an active user thereof and carried out many formalization exercises. Among other topics, I have in the past worked on normalization by evaluation and on dinaturality and parametricity. I am leading a small team of coworkers in the ICE-TCS lab of the department, including Prof. Altenkirch’s former PhD student Mr. Jacob Neumann as a postdoctoral researcher. We all work on programming language theory and use proof assistants daily. I am currently leading an Icelandic grant project “Icelandic advantage in computer-assisted proof”.

I find the project visionary, important and timely. It focuses on vital topics in homotopy type theory and higher category theory and has the potential to bridge and unify these domains in until now unexplored illuminating ways. Importantly for me, it may do so in manners that can also help solve long-standing problems in programming language theory such as the question of finding a satisfactory foundational account of parametricity. The aims of the project intersect with our research interests and agenda significantly.

Thus I want to endorse this project in strongest terms and express our keen willingness to contribute.

We will be pleased to contribute to the research planned in WPs 1 and 3 of the proposed work plan on 1-DTT as well as in WP 5 on parametricity.

Resourcewise, I can commit to be able to contribute around 2 weeks a year of my time on the project, corresponding to an in-kind contribution of  $\sim 5200$  GBP per year. Mr. Neumann should be able to contribute the same amount of time, corresponding to  $\sim 2500$  GBP per year.

Yours sincerely,

(signed digitally)

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