



**Chapman University**

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September 8, 2025

**Letter of support for the EPSRC project proposal “Foundations of Directed Type Theory”**

To whom it may concern,

I am writing in strong support of the EPSRC proposal “Foundations of Directed Type Theory” submitted by Thorsten Altenkirch and Ulrik Buchholtz. I have been working for several years, jointly with Buchholtz and Daniel Gratzer, on the development of higher category theory in simplicial type theory. This was also my own PhD dissertation project. Recently our joint work culminated in the synthetic constructions of the  $\infty$ -category of  $\infty$ -category and  $\infty$ -groupoids, resp. Together with Nikolai Kudasov and Emily Riehl I have also contributed to the computer formalization of simplicial type theory in Kudasov’s proof assistant Rzk.

The next natural step is to use those collected insights for a fully directed type theory with semantics in  $\infty$ -categories. Finding a correct and expressive syntax has been a long-standing open challenge for several years, even just for ordinary 1-dimensional categories. Part of the reason is that the closure properties and inherent structure of the category of (small) categories is mismatched with standard features of dependent type theory.

A fully directed type theory as outlined in the proposal would be a breakthrough on many fronts which are comprehensively addressed in the proposal that I find to be excellent.

I will be particularly excited to contribute to WG 2 “Syntax and Semantics of  $\infty$ -DTT”, given my background in synthetic  $\infty$ -category theory in simplicial type theory.

I intend to spend about 10 days per year on the project, corresponding to an in-kind contribution of circa GBP 5,300.

Best regards,

A handwritten signature in black ink that reads "Jonathan Weinberger".

**Dr. Jonathan Weinberger**

**Dr. Jonathan Weinberger**

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