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## Minisymposium 10 - The use of proof theory in mathematics

### Observational Integration Theory with Applications to Riesz Spaces

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In this talk I will present a constructive theory of integration. It illustrates the general theme of developing mathematics observationally, connecting ideas by Kolmogorov, von Neumann and Segal on the one hand and point-free (also known as formal) topology on the other. This provides a nice illustration how ideas from logic (proof theory) can be used to obtain mathematical results. As an example I will show how to mechanically remove the axiom of choice from a proof in Riesz space (vector lattice) theory, thus obtaining an elementary proof and a more general result.