▶ GUILLAUME MASSAS, *Duality for fundamental logic.*
University of California, Berkeley.
E-mail: gmassas@berkeley.edu.

Holliday [2] recently introduced a non-classical logic called *fundamental logic*, which is meant to capture only those properties of the connectives $\wedge, \vee$ and $\neg$ that hold in virtue of their introduction and elimination rules in Fitch's natural deduction system for propositional logic. Holliday provides a semantics for fundamental logic in terms of *compatibility frames* (sets endowed with a relation of compatibility between its points) which generalizes both Goldblatt's semantics for orthologic and Kripke semantics for intuitionistic logic. In particular, any relation R on a set X determines a closure operator on $\mathcal{P}(X)$, and Holliday shows that any lattice can be represented as a sublattice of the fixpoints of such a closure operator for some compatibility frame (X, R).

In this talk, I will show how standard tools from duality theory allow one to lift Holliday's representation theorem to a full duality between the category of lattices and a category of topologized compatibility frames. The key idea is to embed any lattice into the fixpoints of a Galois connection on a distributive lattice in order to then use a version of the duality between modal distributive lattices and coalgebras of the Vietoris functor on the category of Priestley spaces [1, 3]. Time permitting, I will also show how this duality yields natural semantics for any extension of fundamental logic with connectives that are monotone (i.e., ordering-preserving or order-reversing) in each coordinate.

[1] Celani, Sergio and Jansana, Ramon, *Priestley duality, a Sahlqvist theorem and a Goldblatt-Thomason theorem for positive modal logic*, ***Logic Journal of IGPL***, vol. 7 (1999), no. 6, pp. 683–715.

[2] Holliday, Wesley H., *A fundamental non-classical logic*, ***arXiv preprint arXiv:2207.06993***, (2022).

[3] Palmigiano, Alessandra, *A coalgebraic view on positive modal logic*, ***Theoretical Computer Science***, vol. 327 (2004), pp. 175–195.