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Causal Specificity in Biological Systems

Specificity is argued to introduce asymmetry into causal relations as defined by a counterfactual dependence theory of causation. It has been suggested that specificity in biological systems, as found in relations between sequences of DNA, sequences of RNA, and sequences of amino acids in proteins, introduce an asymmetry that somehow privileges genes over other causes in biological systems. I will in this talk characterize biological specificity in relation to the ongoing debate on asymmetry of causation. I discuss how specificity can be gradual, that the grade of specificity is a tradeoff between efficiency and robustness/evolvability, and how these research results have implications for the philosophical debate. I suggest that specificity is not sufficient to claim causal priority of genes, and show how causal asymmetry is linked to context, frequency and functional significance.