COST Action IC1205 on Computational Social Choice: STSM Report

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I spent my STSM at the Institute for Logic, Language and Computation working with Ulle Endriss. We focused on a modal logic formalization of May's characterization of simple majority voting. Our main motivation to study May's theorem was that, while logical formalizations of negative results in social choice theory such as Arrow's impossiblity theorem and Sen's liberal paradox are becoming better understood, a logical approach to positive characterization theorems still needs to be developed. Building on a previous AAMAS-2015 paper by Giovanni Ciná and Ulle Endriss on *A Syntactic Proof of Arrow's Theorem in a Modal Logic of Social Choice Functions*, we used a modal language to formalize May's well-known axioms of Anonymity, Neutrality and Positive Responsiveness. We also provided an alternative, though equivalent, formulation of simple majority rule that does not require the voters supporting a candidate to be counted. We then started to work out a fully formal proof May's characterization theorem and found a derivation within the modal logic of simple majority voting from the axioms Anonymity, Neutrality and Positive Responsiveness. Our analysis revealed also that the inductive argument used by May in his original proof can be actually dispensed with. We are now drafting a paper based on the results obtained during my stay and I am confident that the STSM has started a long-term collaboration with Ulle Endriss.