

April 24<sup>th</sup>, 2017

KAP 414

2:00 P.M. – 3:00 P.M.

## Professor Mattheus Grasselli

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### “Macroeconomic Modeling with Heterogeneous Agents: The Master Equation Approach”

**Abstract:** Modern mainstream macroeconomics seeks to avoid ad hoc assumptions and inconsistent policy prescriptions by being micro-founded, meaning that models of aggregate behavior ought to be entirely derived from assumptions made on individual agents. The problem with this approach is that, as soon as some mild heterogeneity is introduced in the population of agents, the results of general equilibrium are not guaranteed to hold, as evidenced by the celebrated (albeit negative) Sonnenschein–Mantel–Debreu theorem. An alternative approach inspired by the older Keynesian revolution is to treat macroeconomics as a subject on its own right and consider the phenomenological relationships between aggregate quantities directly. This is effective and has the advantage of being much closer to available data, but still somewhat unsatisfactory, as it neglects decision making by individual agents. Another approach is to revert back to agents but abandon the constraints of equilibrium and utility optimization, often relying on numerical simulations to obtain aggregate behavior. In this talk I describe yet another alternative approach inspired by statistical physics, whereby heterogeneous agents transition between different ‘types’ according to rates that depend on aggregate variables, thereby providing an interaction between the fast time scale of individual decision making and the slower dynamics of macroeconomic aggregates.