Abstract (Prof. Giorgio Ferrari): In this talk we present recent results on stationary mean field games with singular controls in which the representative player interacts with a long-time weighted average of the population through a discounted and an ergodic performance criterion. This class of games finds natural applications in the context of optimal productivity expansion in dynamic oligopolies. We prove existence and uniqueness of the mean field equilibria, which are completely characterized through nonlinear equations. Furthermore, we relate the mean field equilibria for the discounted and the ergodic games by showing the validity of an Abelian limit. The latter allows also to approximate Nash equilibria of - so far unexplored - symmetric N-player ergodic singular control games through the mean field equilibrium of the discounted game. Numerical examples illustrate in a case study the dependency of the mean field equilibria with respect to the parameters of the games. Finally, if time allows, we will discuss a version of the model in which the profit of the representative company is affected by a macroeconomic shock playing the role of a common source of noise in the mean field game.

Abstract (Prof. Mogens Steffensen): We consider the standard problem of expected utility maximization in the particular case where the risk aversion itself is unknown. To circumvent a mix-of-units problem we propose a problem formulation based on certainty equivalents. What we thereby gain in economic sense is lost in mathematical simplicity, and we tackle the arising time-consistency issues by the equilibrium theory approach. We illustrate and discuss thoroughly our semi-explicit results in the cases of power and exponential utility. Finally, further perspectives are given on preferences towards preference uncertainty.

Abstract (Prof. Claudia Ceci): We investigate some optimal reinsurance and investment problems in a general framework, extending classical models which are based on the assumptions of constant claim arrival intensity and independence between insurance and financial markets.
First, we briefly discuss the case where claims arrival intensity and claim sizes distribution are affected by an unobservable stochastic factor. In this framework, the value process and the optimal reinsurance strategy are characterized in terms of a suitable backward stochastic differential equation.
Next, we propose a model under full information which takes into account dependence between financial and insurance components. Precisely, aggregate claims and stock prices are subject to common shocks. This is motivated by drastic events such as earthquakes, extreme weather conditions, or even pandemics, that have an immediate impact on the financial market and simultaneously induce insurance claims. Using the classical stochastic control approach based on the HJB-equation, we characterize the optimal reinsurance and investment strategies. Finally, we make a comparison analysis to discuss the effect of common shock dependence on the optimal strategy.

The talk is based on the two papers:

- M. Brachetta, C. Ceci: “A BSDE-based approach for the optimal reinsurance problem under partial information”, *Insurance: Mathematics and Economics*, **95**, pp. 1-16, 2020.
- C. Ceci, K. Colaneri, A. Cretarola “Optimal Reinsurance and Investment under Common Shock Dependence Between Financial and Actuarial Markets”, 2021, http://arxiv.org/abs/2105.07524