

Munich Risk and Insurance Days 2026

October 8 – 9, 2026

Venue

TUM School of Computation, Information and
Technology (CIT),
Department Informatics und Mathematics

Boltzmannstr. 3

85748 Garching b. München

Room

00.04.011

(MI Hörsaal 2)

Program

Thursday, October 8, 2026	
08:30 – 08:50	Registration
08:55 – 09:00	Welcome (Matthias Scherer)
09:00 – 09:40	An Chen: Green or Brown? Investing and Carbon Pricing under Climate Risk & Uncertainty
09:40 – 10:20	Ralf Werner: A novel construction of the minimal entropy martingale measure
10:20 – 10:40	Coffee Break
10:40 – 11:20	Carole Bernard: Optimal Risk Sharing with Infinite Mean Losses
11:20 – 12:00	Maren Schmeck: Asymptotics of Ruin Probabilities in a Subordinated Cramer-Lundberg Mode
12:00 – 13:00	Lunch Break
13:00 – 13:40	Felix Liebrich: Meyer Risk Measures
13:40 – 14:20	Corrado De Vecchi: Financial applications of almost stochastic dominance
14:20 – 15:00	Alfred Müller: Multivariate almost stochastic dominance and optimal transport
15:00 – 15:20	Coffee
15:20 – 16:00	Gerhard Stahl: How to Manage Dynamics under Solvency II -- Top-Down or Bottom-up?
16:00 – 16:40	Wolfgang Trutschnig: Total versus marginal independence revisited
16:40 – 16:45	Closing (Matthias Scherer)
16:50	Departure Bus (only for participants with ticket)
17:30 – 21:00	Social Event & Dinner (only for participants with ticket)

Titles and Abstracts

Prof. Dr. An Chen

Ulm University

Green or Brown? Investing and Carbon Pricing under Climate Risk & Uncertainty

We study portfolio choice and carbon pricing in a continuous-time green-brown economy with climate-related costs and ambiguity. An environmental cost lowers optimal holdings of carbon-intensive assets as if investors faced higher effective risk aversion toward brown positions. Ambiguity further compresses risky allocations and increases the welfare cost of brown exposure. Embedding tradable carbon allowances in the same economy yields a decomposition of allowance premia into transition-risk and uncertainty components. A calibration to green and brown equity proxies implies economically meaningful reallocations and welfare losses from ignoring ambiguity.

(Based on a joint work with Immacolata Oliva and Ilaria Stefani).

Prof. Dr. Ralf Werner

Augsburg University

A novel construction of the minimal entropy martingale measure

We present a novel construction method for the minimal entropy martingale measure in a discrete time settings. In the practically relevant setting of a discrete probability space, this construction method not only enables the direct computation of all pricing relevant quantities, but also ensures greater numerical stability and efficiency.

Prof. Dr. Carole Bernard

Grenoble École de Management

Optimal Risk Sharing with Infinite Mean Losses

"This paper studies optimal risk-sharing when losses exhibit infinite means, a situation where classical diversification and convex-order arguments can break down. We establish a generalized convex-order framework suitable for comparing heavy-tailed risks and show that, contrary to standard models, linear pooling may increase risk and be welfare-reducing. Motivated by practical limited-liability settings, we show that sharing only a capped portion of losses restores optimality, ensuring agents avoid certain bankruptcy while still benefiting from pooling. We characterize the optimal cap and show that limited-liability preferences lead to non-trivial sharing rules distinct from classical Arrow–Mossin insurance results. Numerical experiments with Pareto losses and dependence structures illustrate the optimal sharing threshold and highlight the influence of tail heaviness, wealth, risk aversion, and pool size.

(Authors: Carole Bernard, Alfred Müller)

Prof. Dr. Maren Diane Schmeck

Bielefeld University

Asymptotics of Ruin Probabilities in a Subordinated Cramer-Lundberg Mode

We study a dynamic model of a non-life insurance portfolio. The foundation of the model is a compound Poisson process that represents the claims side of the insurer. To introduce clusters of claims appearing, e.g. with catastrophic events, this process is time-changed by a Lévy subordinator. The subordinator is chosen so that it evolves, on average, at the same speed as calendar time, creating a trade-off between intensity and severity. We show that such a transformation always has a negative impact on the probability of ruin. Despite the expected total claim amount remaining invariant, it turns out that the probability of ruin as a function of the initial capital falls arbitrarily slowly depending on the choice of the subordinator.

Prof. Dr. Felix Liebrich

University Amsterdam

Meyer Risk Measures

We study monetary risk measures that are consistent with a refinement of the classical second-order stochastic dominance relation, originally proposed by Jack Meyer and later rediscovered by Huang et al. In Meyer's framework, test utilities are required to have absolute risk aversion that never undercuts a prescribed threshold risk-aversion profile. In case this threshold is constant, i.e., the threshold utility function is of CARA type, we discuss existence, representation, and applications of the associated Meyer risk measures. The main challenge arises when the threshold risk aversion varies with wealth and/or the risk measure is additionally required to satisfy standard properties such as convexity or positive homogeneity. In this more general setting, we establish a range of impossibility results.

(Based on joint work with Christian Laudagé, RPTU Kaiserslautern-Landau)

Dr. Corrado De Vecchi

University Verona

Financial applications of almost stochastic dominance

While the notion of almost stochastic dominance (AFSD) was originally developed to rank investment opportunities, its financial applications are still limited. With the goal of fostering the inclusion of AFSD into risk management processes, we derive a novel characterization of such stochastic dominance rule. The consequences of this result are investigated focusing on two directions. First, we illustrate how to use this characterization to derive new and economically relevant properties of AFSD, which can also simplify the comparison of random payoffs. Second, we show that our result offers a bridge between AFSD and the theory of monetary risk measures. While AFSD is usually introduced in terms of utility functions, less has been said in the literature regarding the structure of AFSD consistent risk measures. We show that such risk measures share interesting features that go beyond the classical notion of tail risk commonly adopted in the financial and insurance regulation.

(Based on a joint work with Felix-Benedikt Liebrich, Cosimo Munari and Matthias Scherer)

Prof. Dr. Alfred Müller

University Siegen

Multivariate almost stochastic dominance and optimal transport

"We study concepts of almost stochastic dominance as order relations that weaken first order stochastic dominance and that have the advantage of having some robustness properties, e.g. with respect to Wasserstein distance. We first consider the univariate case where such results are relatively easy to derive from characterizations in terms of quantile functions. The more interesting case is the multivariate case, where variants of multivariate almost stochastic dominance (MASD) have recently been introduced by Müller et al. (2025). We show how one can derive a general class of almost stochastic dominance rules from the solutions of optimal transport problems and how these are related to the recently introduced variants of MASD. This demonstrates that these can also be considered as robustifications of first order stochastic dominance.

(Based on joint work with Johannes Wiesel)

Dr. Gerhard Stahl

House of Energy, Climate & Finance Essen

How to Manage Dynamics under Solvency II -- Top-Down or Bottom-up?

Solvency II introduced in addition to common balance sheets like IFRS a solvency sheet as a yardstick for risk management and regulatory capital requirements. This paper addresses two new questions of high practical relevance. Does the models under Solvency II capture the stylized facts that their time series show up? To answer his question we consider in addition to the own also the assets and liabilities separately. This gives insights into dynamics and structural features of the time series of the Solvency II balance sheet, which the models can not capture adequately. Furthermore we ask, as our second question, how are the Solvency II and IFRS balance sheet related? This gains insight, how economic and regulatory yardsticks are related through risk models. Last but not least we consider a top-down approach to risk management as a remedy of some deficits shown-up by bottom-up models under Solvency II.

Prof. Dr. Wolfgang Trutschnig

University Salzburg

Total versus marginal independence revisited

We study the class of d -dimensional copulas whose $(d-1)$ -dimensional marginals are all equal to the product copula and show that this class is much more diverse than one might expect. In particular, we determine 'how far away' from total independence elements in the class may possibly be and sketch some direct consequences to dependence measures having received considerable attention in recent years. Moreover, we show that our class also contains various wild animals in the sense of being completely dependent and having a self-similar set as support.

Program

Friday, October 9, 2026	
08:55 – 09:00	Welcome (Matthias Scherer)
09:00 – 09:10	Welcome Thomas Rodewis VFVW
09:10 – 09:50	Steven Van Duffel: Does Randomization Improve Financial Payoffs?
09:50 – 10:30	Julia Eisenberg: Dividend Optimisation with Mean-Reverting and Mean-Avoiding Dynamics
10:30 – 10:50	Coffee Break
10:50 – 11:30	Stefan Weber: Anti-Discrimination and Risk-Adequacy in Insurance Pricing: A Tariff-Control Framework
11:30 – 12:10	Łukasz Delong: Measures of predictive accuracy, miscalibration and discrimination
12:10 – 13:00	Lunch Break
13:00 – 13:40	Mitja Stadje: Optimal Capital Structure for Life Insurance Companies Offering Surplus Participation
13:40 – 14:20	Anja Schmiedt: Record Statistics for Modeling and Prediction of Highest Claims in Non-Life Insurance
14:20 – 14:40	Coffee Break
14:40 – 15:20	Lorenz Schneider: Spatio-Temporal Modelling of Climate Risks in France: The Limits of Diversification in a Challenging Environment
15:20 – 16:00	Francesco Ungolo: Robust estimation and projection of portfolio-specific mortality rates leveraging larger population data
16:00 – 16:05	Closing (Matthias Scherer)

Titles and Abstracts

Prof. Dr. Steven Van Duffel

Vrije Universiteit Brussel

Does Randomization Improve Financial Payoffs?

We study whether external randomization (lottery-linked investment products) can improve optimal financial payoffs in static markets. In an atomless financial market with a continuously distributed state-price density, we first show that, for any law-invariant increasing objective, external randomization does not increase the optimal value. Second, we show that the conclusion changes in finite atomic markets. There, financial payoffs can only select whole atoms, but external randomization then allows atoms to be selected fractionally. In this case, external randomization may improve your objective function strictly. Finally, we propose to test whether empirically people would find lottery-linked pension products more attractive than standard saving products.

(Based on joint work with Carole Bernard.)

Prof. Dr. Julia Eisenberg

TU Wien

Dividend Optimisation with Mean-Reverting and Mean-Avoiding Dynamics

The expected discounted value of dividends is one of the key performance measures in non-life insurance, reflecting the stability of a business. We study dividend optimisation problems in models involving Ornstein–Uhlenbeck (OU) processes, either as interest rates or surplus processes. The objective is to identify strategies that maximise expected discounted dividends. While OU processes are widely used and well understood, they significantly increase mathematical complexity, leading to differential equations whose solutions involve parabolic cylinder functions. This makes the verification of optimality challenging. The talk presents several examples highlighting both the benefits and limitations of OU-based insurance models.

Prof. Dr. Stefan Weber

University Hannover

Anti-Discrimination and Risk-Adequacy in Insurance Pricing: A Tariff-Control Framework

The talk develops a tariff-control framework for insurance pricing under risk-adequacy and anti-discrimination constraints. A claim model and pricing functional determine type-level benchmark prices; a tariff control transforms these benchmarks into charged premiums by class assignment, within-class aggregation, and possible net class-level adjustments. This separates the fixed risk benchmark from the decision variables of tariff construction. Coverage, two-sided risk-adequacy, and anti-discrimination diagnostics form distinct objective components in a Pareto problem. The diagnostics inspect structural revelation, protected-variable inference, premium deviation, pooling, and transfer effects under specified portfolio or regulatory laws. If only admissible observable information may be used, implementability restricts the class assignment before optimization, while the objective logic remains unchanged. This clarifies why direct optimization over implementable tariffs can differ from projecting complete-

information tariff controls. Analytical examples illustrate forced pooling, inferential exposure, and projection-versus-direct-optimization effects.

(Based on joint work with Wiebke Hansen and Mario Wüthrich)

Prof. Dr. Łukasz Delong

Warsaw University

Measures of predictive accuracy, miscalibration and discrimination

We study the evaluation of real-valued point predictors under the decision-theoretic framework of mean-consistent loss functions given by the Bregman divergences. We first derive a new version of Murphy's decomposition of the expected loss which does not directly include the response itself but only its predictors. We then relate the miscalibration and the discrimination component of Murphy's decomposition to Lorenz-curve-based accuracy measures that are widely used in practice. Besides the usual area between the concentration and Lorenz curves, ABC, we introduce a mean-squared version ABC^2 that mitigates some of the weaknesses of the original ABC in identifying mean-calibration. More importantly, both ABC and ABC^2 are shown to rely on predictor-dependent weights, so they fail to align with the class of mean-consistent scoring functions. In the same spirit, we derive a similar result for the widely used Gini score. These results indicate that ABC, ABC^2 and Gini scores may lead to misleading evaluation of point predictions when used for model selection; this gives support to use mean-consistent loss functions and their Murphy's decomposition. Finally, we study forecast dominance when Lorenz curves intersect. In the one-crossing case, we establish weaker dominance criteria for subclasses of Bregman divergences through third-degree stochastic dominance.

Prof. Dr. Mitja Stadje

Ulm University

Optimal Capital Structure for Life Insurance Companies Offering Surplus Participation

We adapt Leland's dynamic capital structure model to the context of an insurance company selling participating life insurance contracts explaining the existence of life insurance contracts which provide both a guaranteed payment and surplus participation to the policyholders. Our derivation of the optimal participation rate reveals its pronounced sensitivity to the contract duration and the associated tax rate. Moreover, the asset substitution effect, which describes the tendency of equity holders to increase the riskiness of a company's investment decisions, decreases when adding surplus participation.

(Based on joint work with Felix Fießinger)

Prof. Dr. Anja Schmiedt

OTH Regensburg

Record Statistics for Modeling and Prediction of Highest Claims in Non-Life Insurance

Extreme losses are a central challenge in quantitative risk management, particularly in non-life insurance, where reliable forecasts of future large claims are crucial for risk assessment and decision-making. While classical extreme value methods typically focus on high thresholds and tail quantiles, this talk considers a complementary perspective based on record statistics: the successive highest claims or losses observed over time. We discuss statistical prediction of future record claims or losses based on previously observed record values, with particular emphasis on Pareto and generalized Pareto models. The focus is on exact and approximate one-sided prediction intervals for future record values and on the interpretation and practical relevance of their lower or upper bounds, depending on the type of interval considered. The

methods are illustrated using real data and practical issues such as the typically small number of observed records, the suitability of distributional assumptions, and the added value of record-based methods compared with classical extreme value approaches are addressed. This talk is based on joint work with Udo Kamps, RWTH Aachen University, and is part of a project funded by the Bavarian State Ministry of Science and the Arts.

Prof. Dr. Lorenz Schneider

EM Lyon

Spatio-Temporal Modelling of Climate Risks in France: The Limits of Diversification in a Challenging Environment

We propose a framework for analyzing climate-related risks through their spatial and temporal dependence structures. Our main objective is to quantify the systemic component of weather risk across a geographical territory using tools from spatial statistics. Focusing on temperature and rainfall as two major climate variables, we first remove seasonal patterns from the underlying time series and then study the spatial dependence of the resulting residuals and of insurance contracts written on them using covariograms. We then use this dependence structure to evaluate aggregate portfolio risk over a territory through a second-order risk measure, and to examine how the corresponding systemic component evolves over time. We illustrate the methodology on locations distributed across a large region such as France. The framework provides a quantitative basis for assessing spatial diversification, systemic weather risk, and the implications of evolving climate dependence structures for insurance design and adaptation.

Dr. Francesco Ungolo

UNSW Sydney

Robust estimation and projection of portfolio-specific mortality rates leveraging larger population data

The estimation and projection of mortality rates for pension scheme annuity portfolios is a fundamental task for annuity providers for the calculation of the value of the liabilities. These are normally observed over short observation windows and a comparably smaller number of lives compared to national population or actuarial associations data. When mortality rates are estimated using the scheme data alone, these can be characterized by a higher statistical uncertainty and unstable long-term projections. Therefore, it is proposed to improve the estimation and the projection of portfolio-specific mortality rates (the target) through a L1-regularized approach which adaptively borrows information from larger datasets (the source), as the data suggest. The method is illustrated through the analysis of regression models for the force of mortality, used to characterize the distribution of the individual future lifetime, as well as to stochastic mortality models for the analysis of the death rates and their projection. The proposed method yields substantial gains in terms of reduced uncertainty in the evaluation of the liabilities and actuarial pricing, and turns out particularly useful in situations of covariate shift or small target sample sizes. Overall, the approach provides a principled and practical way to enhance portfolio-specific mortality analysis by leveraging larger population data while respecting scheme-specific characteristics.