Title: Building up Cyber Resilience by Better Grasping Cyber Risk via a New Algorithm for Modelling Heavy-Tailed Data

Speaker: Marie Kratz, CREAR Risk Research Center at ESSEC Business School

Area: DS

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Abstract:

Cyber security and resilience are major challenges in our modern economies; this is why they are top priorities on the agenda of governments, security and defense forces, management of companies and organizations. Hence, the need of a deep understanding of cyber risks to improve resilience. We propose here an analysis of the database of the cyber complaints filed at the French *Gendarmerie Nationale*. We perform this analysis with a new algorithm developed for non-negative asymmetric heavy-tailed data, which could become a handy tool for applied fields, including operations research. This method gives a good estimation of the full distribution including the tail. Our study confirms the finiteness of the loss expectation, necessary condition for insurability. Finally, we draw the consequences of this model for risk management, compare its results to other standard EVT models, and lay the ground for a classification of attacks based on the fatness of the tail.

Speaker Profile:

Marie Kratz is Professor at ESSEC Business School and Director of its risk research center, CREAR. Marie is a Fellow (Actuaire Agrégée) of 'Institut des Actuaires'. She holds a Doctorate in Applied Mathematics (UPMC-Paris 6; carried out to a great extent at the *Center for Stochastic Processes* at Chapel Hill, North Carolina, USA) & Habilitation (HDR), did a post-doc at Cornell University, USA. She was a part-time visiting professor at Lund University, Sweden (2017-2020) and this last Fall at the University of Turin, Italy. Her research addresses a broad range of topics in probability, statistics and actuarial mathematics, with a focus on extreme value theory, risk analysis & management, and the study of random excursion sets. These fields find natural applications in Finance and Actuarial Science that she is developing at ESSEC, with academic and professional partners. Marie coordinates the ESSEC-ISUP (Sorbonne Université) Risk & Actuarial Track and is president of the Group 'Banque Finance Assurance' of the French Society of Statistics. Since 2010, she has been organizing fortnightly seminars (Working Group on Risk) at ESSEC – Paris La Défense (online with Singapore – ERM SAS) with Academics and Professionals, as well as international conferences.

Webpage Link: https://faculty.essec.edu/en/cv/en-kratz-marie/#carrer