Schedule: May 15, 2024 at 11:30 Italian time – Room A1.6, Alan Turing building

Speakers (in order of presentation):
Prof. Francesco Gullo, Dr. Gennaro Ciampa, Dr. Luca Traini
(Department of Information Engineering and Computer Science and Mathematics)

Francesco GULLO (11:30 – 12:00)

Bringing order into the AI and Data Management landscapes: latest research advances at the intersection of machine learning, data mining, graph analytics, NLP, and data ethics

Abstract. Artificial Intelligence (AI) and Data Management are broad and multidisciplinary fields of study which span a plethora of different scientific communities and topics. In this talk, we attempt to bring some order into the heterogeneous and reckless landscape of AI and Data Management by presenting recent research advances which establish synergies among different areas, including machine learning, data mining, graph analytics, natural language processing (NLP), and data ethics.

Short bio. Francesco Gullo is an associate professor of computer science at the University of L'Aquila (Italy), in the Department of Information Engineering, Computer Science, and Mathematics (DISIM). He received his PhD, in "Computer and Systems Engineering", from the University of Calabria (Italy), in 2010. During his PhD, he was an intern at the George Mason University (US), and a teaching/research assistant at the University of Catanzaro (Italy). After his graduation, he was a postdoc at the University of Calabria (Italy), a postdoc and a research scientist at the Yahoo Labs (Spain), a research scientist at the Fundacio Barcelona Media (Spain), and a senior associate researcher at the UniCredit banking group (Italy). His research falls into the broad areas of artificial intelligence and data science, with emphasis on algorithmic aspects. His recent interests include graph machine learning, graph data management, natural language processing, and trustworthy AI. His research has been published in premier venues such as SIGMOD, VLDB, KDD, WWW, ICDM, CIKM, EDBT, WSDM, ECML-PKDD, SDM, TODS, TKDE, TKDD, MACH, DAMI, JCSS, TNSE, PR. He has also been serving the scientific community: he was/is/will be Associate Editor of EPJ Data Science journal, Finance Chair of CIKM'24, Workshop Chair of KDD'24 and ICDM'16, Industry Track Program co-Chair of ASONAM'24, Program co-Chair of MIDAS workshop @ECML-PKDD['16-'24], MultiClust symposium @SDM'14, MultiClust workshop @KDD'13, 3Clust workshop @PAKDD'12), as well as (senior) program-committee member of major conferences, including SIGMOD, KDD, WWW, IJCAI, AAAI, CIKM, SIGIR, ICDM, WSDM, SDM, ECML-PKDD, ECAI, ICWSM.

Gennaro CIAMPA (12:00 – 12:30)

On the transport equation driven by irregular vector fields and the selection of solutions

Abstract. In this talk I will deal with the linear transport equation drifted by a divergence-free vector field. This equation is the main building block of mathematical models describing physical phenomena that exhibit transport features: physical quantities are advected by velocity fields that drive the dynamics of the system. The theory is simple and very classical in the case when b is sufficiently smooth, i.e. Lipschitz with respect to the spatial variable, uniformly with respect to the time variable. This is the so-called Cauchy–Lipschitz theory. However, an ubiquitous feature of transport phenomena is their intrinsic lack of regularity. For this reason, and mainly due to the applications to other kind of PDEs (fluid dynamics, conservation laws, Vlasov-Poisson, ...) the setting of smooth vector fields is too restrictive and a theory in weaker regularity settings has been developed in the last decades. The main goal of the talk is the analysis of the vanishing viscosity scheme: under general Sobolev assumptions on b, the equation can admit an infinite number of (weak) solutions. However, the vanishing viscosity limit single out a unique solution of the transport equation. The proof is based on the use of stochastic flows and yields quantitative rates of convergence. This offers a completely general selection criterion for the transport equation (even beyond the distributional regime) which compensates the wild non-uniqueness phenomenon for solutions with low integrability arising from convex integration constructions, and rules out the possibility of anomalous dissipation.

Short Bio. Gennaro Ciampa received his Ph.D. in "Mathematics in Natural, Social and Life Sciences" at Gran Sasso Science Institute in L'Aquila in 2019, under the supervision of Gianluca Crippa (University of Basel) and Stefano Spirito (University of L'Aquila). After the Ph.D., he obtained several postdoctoral positions (in the order) at the University of Basel with Gianluca Crippa, at the University of Padua with Francesco Rossi, at the Basque Center for Applied Mathematics with Renato Lucà, and finally at the University of Milan with Riccardo Montalto. He is now a RTDA in Mathematical Analysis at the University of L'Aquila. His research interests mainly concern with the analysis of PDEs arising from fluid dynamics. Much of his activity is based on the study of transport and continuity equations with rough velocity fields, the Euler and Navier-Stokes equations, singular limit problems and applications of KAM methods in fluid dynamics.

Luca TRAINI (12:30 – 13:00)

Holistic Software Performance Engineering

Abstract. Modern high-tech companies deliver new software into production every day and view this capability as a key competitive advantage. Unfortunately, frequent software releases might often compromise important software quality aspects, such as performance. Short iteration cycles and time constraints lessen the focus on non-functional requirements and hinder the adoption of traditional performance assurance approaches. Given these challenges, focusing solely on specific phases of the development process may prove insufficient for ensuring adequate software performance. In this talk, I will present a variety of studies and techniques that address software performance over different phases of the software lifecycle, encompassing both social and technical aspects. These studies cover four broad phases: (i) software project management, (ii) software development, (iii) software testing, and (iv) software operations.

Short bio. Luca Traini is an Assistant Professor (RTDa) with the Department of Computer Science and Engineering, and Mathematics of University of L'Aquila, and member of the SPENCER (Software PErformaNCe EngineeRing) Laboratory. His research interests centre around software performance engineering, encopassing both human and technical aspects, with the goal of improving techniques and methodologies for software performance assurance. His current research is focused on performance assurance processes, performance testing and debugging, and automated code optimization. For more information visit https://lucatraini.me.