

Marie Skłodowska Curie Individual Fellowship 2020

Expression of Interest for hosting Marie Curie Fellows

1. Supervisor (name and e-mail address)

Federico Cerutti, federico.cerutti@unibs.it

2. Department (name and address)

Department of Information Engineering
Via Branze 38
25123 Brescia
Italy

3. Panel (choose one)

- Chemistry (CHEM)
- Social Sciences and Humanities (SOC)
- Economic Sciences (ECO)
- Information Science and Engineering (ENG)
- Environment and Geosciences (ENV)
- Life Sciences (LIF)
- Mathematics (MAT)
- Physics (PHY)

4. Description of your research activities (max 10 lines)*

I am a researcher active in artificial intelligence, and my aim is to augment human sensemaking abilities to achieve causal insights from data and experience. I have been long active in the area of knowledge representation and reasoning dealing with qualitative uncertainty—such as argumentation theory—and I am interested in foundational aspects linked to causality for better situational understanding. However, in a world that is (perceived as?) stochastic, we need a careful assessment of the distribution of random variables to then quantify the quality of the inferences we can draw from the causal relations we discover in our sensemaking analysis. In this research avenue, I am active in robust learning and reasoning, with papers at AAAI leveraging both epistemic and aleatoric uncertainty in symbolic reasoning—a probabilistic extension of prolog—and in learning from data using neural networks with a better assessment of out-of-distribution samples thanks to the use of generative adversarial networks.

5. Key-words

Uncertainty; uncertainty-aware reasoning and learning; artificial intelligence; machine learning; symbolic reasoning; symbolic learning; neural network; argumentation; logic; knowledge-based system; knowledge representation and reasoning; aleatoric uncertainty; epistemic uncertainty; generative adversarial networks; GAN

6. Short CV of the supervisor (max 5 lines)

I am Rita Levi-Montalcini Research Fellow (8% success rate) at the University of Brescia (Italy), tenure track towards Associated Professor. I co-authored of more than 70 peer-reviewed papers, including several journal papers, and co-edited two books. I attracted ~1 million euros (combined) in research funding over 5 years. Prior to my personal fellowship, I was Academic Director of the Cardiff University Data Science Academy, and Senior Lecturer at the School of Computer Science and Informatics of Cardiff University.

7. List of 5 main publications of the supervisor

- Murat Sensoy, Lance Kaplan, Federico Cerutti, and Maryam Saleki. Uncertainty-Aware Deep Classifiers using Generative Models. In 34th AAAI Conference on Artificial Intelligence (AAAI 2020), 2020.
- Federico Cerutti, Lance M. Kaplan, Angelika Kimmig, and Murat Sensoy. Probabilistic Logic Programming with Beta-Distributed Random Variables. In 33rd AAAI Conference on Artificial Intelligence (AAAI-19), 2019.
- Federico Cerutti, Massimiliano Giacomin, and Mauro Vallati. How we designed winning algorithms for abstract argumentation and which insight we attained. In *Artificial Intelligence*, 276: 1-40, 2019.
- Federico Cerutti, and Matthias Thimm. A General Approach to Reasoning with Probabilities In *International Journal of Approximate Reasoning*, 111, 35–50, 2019
- Mauro Vallati, Federico Cerutti, and Massimiliano Giacomin. Predictive models and abstract argumentation: the case of high-complexity semantics In *Knowledge Engineering Review*, 34, E6, 2019

*Please consider that the preparation of a Marie Curie proposal requires some time. Fellow and supervisor have to agree on a project and training opportunities for the fellow.