CRISTINA CORNELIO

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RESEARCH INTERESTS

Reasoning, neuro-symbolic methods, automated theorem proving, knowledge representation/extraction, preference representation and automated scientific discovery.

EDUCATION

2016 - PhD in Mathematics (Computer Science Area) | University of Padua, Italy
2012 - Master's degree in Mathematics | University of Padua, Italy
2012 - Bachelor's degree in Mathematics | University of Udine, Italy

WORK EPERIENCE

- **Samsung AI** – Cambridge (*SAIC*)
- Role: Research Scientist
- *2021 – present*: Neuro-symbolic AI
- **IBM Research** – Watson Research Center (New York) & Zurich Research Center (Switzerland)
- Role: Research Staff Member
- *2016 –2021*: Reasoning, Neuro-symbolic AI, NLP, Knowledge Extraction

SELECTED PUBLICATIONS

Conference papers:

- **Learning where and when to reason in neuro-symbolic inference,** *Cristina Cornelio, Jan Stühmer, Shell Xu Hu, Timothy Hospedales,* Proceedings of the 11th International Conference on Learning Representations (ICLR) - *notable-top-5%,* 2023
- **Synthetic Datasets and Evaluation Tools for Inductive Neural Reasoning**, *C. Cornelio and V. Thost*, Proceedings of the 30th International Conference of Inductive Logic Programming (ILP21), 2021
- **A Deep Reinforcement Learning Approach to First-Order Logic Theorem Proving**, *M. Crouse, I. Abdelaziz, B. Makni, S. Whitehead, C. Cornelio, P. Kapanipathi, K. Srinivas, V. Thost, M. Witbrock, A. Fokoue*, Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence, (AAAI-21), 2021.

Journal papers:

- **Combining Data and Theory for Derivable Scientific Discovery with AI-Descartes,** *C. Cornelio, S. Dash, V. Austel, T. R. Josephson, J. Goncalves, K. Clarkson, N. Megiddo, B. El Khadir, L. Horesh,* Nature Communications, 2023.
- **Reasoning with PCP-net,** C. Cornelio, U. Grandi, J. Goldsmith, N. Mattei, F. Rossi and K.B. Venable, Journal of Artificial Intelligence Research (JAIR), 2021.
- **Deceased-donor-initiated chains: first report of a successful deliberate case and its ethical implications,** *L. Furian, C. Cornelio, C. Silvestre, F. Rossi, P. Rigotti, E. Cozzi, F. Neri and A. Nicolò*, Transplantation, 2019.

Patents:

- **Neuro-Symbolic system for constraint-based error correction,** C. Cornelio, J. Stuehmer, T. Hospedales, *2023*
- **Generative Reasoning for Symbolic Discovery,** C. Cornelio, L. Horesh, V. Pestun, R. Yan, *2020*
- **Automatic transformation of complex tables in documents into computer understandable structured format with mapped dependencies and providing schema-less query support for searching table data,** C. Cornelio, M. Canim, R. Musa, M. Rodriguez Muro, A. Iyengar*, 2019*

SELECTED PROFESSIONAL ACTIVITIES & ACHIEVEMENTS

- Co-author of the 2-years project **Accelerated Scientific Discovery via Globally Optimal Symbolic Regression** approved by **DARPA** (Advanced Research Projects Agency of the United States Department of Defense) for the AIRA program (Artificial Intelligence Research Associate).
- **DECK (DECeased Kidney) cross-over program**: Using deceased-donor kidneys to initiate chains of living donor kidney paired donations. In January 2018 the system started the pilot program in Padova (involving NITp - Nord Italia Transplant program); later it was **adopted nationally** in Italy. It received national media and press attentions.
- **Reviewing**: ECAI, ADT, IJCAI, AIES, AAMAS, AAAI, AAAI-Demo, NeurIPS.

INVITED talks

- **"Derivable Scientific Discovery",** IBM Neuro-Symbolic AI Workshop, *January 2023*.
- **"Derivable Scientific Discovery",** 2nd Workshop on Nobel Turing Challenge at the RIKEN Kobe campus, *Kobe, Japan, November 2022.*
- **"Affable Knowledge Elicitation",** Rensselaer Polytechnic Institute (RPI), *Troy (NY), USA, October 2017.*
- **"Potential gain of utilizing kidneys from deceased donors to initiate "Chain" Kidney Paired donations: quantification of benefit through a real-world retrospective analysis",** Workshop on Matching Theory and Applications, *University of Padua, Padua, Italy, December 2017.*