

# Filippo Bistaffa

## Academic Curriculum Vitae

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### Current Position

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- **Position:** Marie Skłodowska-Curie Fellow, Dept. of Multi-Agent Systems, IIIA-CSIC (Barcelona)  
**Project:** Collectiveware: highly-parallel algorithms for collective intelligence (HPA4CF)  
**Funding:** H2020-MSCA-IF-2016
- **Area of study:** my research focuses on multi-agent systems, a theoretic model used to describe and solve problems in many real-world scenarios, e.g., collective energy purchasing and ridesharing. The complex dynamics among the large number of entities in these systems usually result in very hard optimisation problems. My research aims at dealing with this complexity, both from a theoretical perspective (proposing novel algorithms and models) and from a practical one, using Graphics Processing Units (GPUs) to speed-up the execution of algorithms used to compute the solutions.
- **Webpage:** <https://filippobistaffa.github.io>
- **Contact:** `filippo[dot]bistaffa[at]iiaa[dot]csic[dot]es`

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### Previous Positions

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- **Position:** Research Associate, Dept. of Computer Science, University of Verona (Italy)  
**Project:** Development of AI techniques for sustainable commuting  
**Supervisor:** Prof. Alessandro Farinelli

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### Education

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- **Ph.D. (Doctor Europæus) Computer Science** (April 2016), University of Verona  
**Thesis:** Constraint Optimisation Techniques for Real-World Applications  
**Supervisor:** Prof. Alessandro Farinelli  
**Special mention:** AI\*IA Premio NeoDottori di Ricerca “Marco Cadoli” 2017
- **M.Sc. Engineering and Computer Science** (March 2012), University of Verona  
**Thesis:** Stable Coalition Formation in the Energy Market Using Graphical Model Based Approach  
**Supervisor:** Prof. Alessandro Farinelli  
**Grade:** 110/110 cum laude
- **B.Sc. Computer Engineering** (September 2009), University of Pavia  
**Thesis:** Implementazione di Lossy Link su Kernel Linux 2.6  
**Supervisor:** Prof. Giuseppe Rossi  
**Grade:** 110/110 cum laude

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## Research Collaborations

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- ECS Department at the University of Southampton, UK, June 2014–March 2015.
- IIIA-CSIC Research Institute, Barcelona, Spain, June 2013.

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## Supervised Students

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- Adrià Fenoy (M.Sc.), IIIA-CSIC, Barcelona, Spain, 2019.
- Carlos Mougan Navarro (M.Sc.), IIIA-CSIC, Barcelona, Spain, 2019.
- Francesco Donato (M.Sc.), Department of Computer Science, University of Verona, Verona, Italy, 2015.

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## Teaching Experience

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- Lecturer for “Constrained Optimisation for Multiagent Systems” at ACAI-2019 / HAIS-2019 Summer School
- Tutor for “Algorithms (Programming Laboratory II)” in the Bachelor Degree in Bioinformatics at the University of Verona during the academic years 2013/14 and 2015/2016.

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## Journal Publications

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- [1] Ewa Andrejczuk, Filippo Bistaffa, Christian Blum, Juan A. Rodríguez-Aguilar, and Carles Sierra. Synergistic Team Composition: A Computational Approach to Foster Diversity in Teams. In *Knowledge-Based Systems*, 2019. In press. DOI: <https://dx.doi.org/10.1016/j.knosys.2019.06.007>.
- [2] Filippo Bistaffa and Alessandro Farinelli. A COP Model for Graph-Constrained Coalition Formation. In *Journal of Artificial Intelligence Research*, volume 62, pages 133–153, 2018. DOI: <http://dx.doi.org/10.1613/jair.1.11205>.
- [3] Filippo Bistaffa, Georgios Chalkiadakis, Alessandro Farinelli, and Sarvapali D. Ramchurn. A Cooperative Game-Theoretic Approach to the Social Ridesharing Problem. In *Artificial Intelligence*, volume 246, pages 86–117, 2017. DOI: <http://dx.doi.org/10.1016/j.artint.2017.02.004>.
- [4] Filippo Bistaffa, Alessandro Farinelli, Jesús Cerquides, Juan A. Rodríguez-Aguilar, and Sarvapali D. Ramchurn. Algorithms for Graph-Constrained Coalition Formation in the Real World. In *ACM Transactions on Intelligent Systems and Technology*, volume 8, issue 4, 2017. DOI: <http://dx.doi.org/10.1145/3040967>.
- [5] Filippo Bistaffa, Nicola Bombieri, and Alessandro Farinelli. An Efficient Approach for Accelerating Bucket Elimination on GPUs. In *IEEE Transactions on Cybernetics*, volume 47, issue 11, 2017. DOI: <http://dx.doi.org/10.1109/TCYB.2016.2593773>.
- [6] Alessandro Farinelli, Manuele Bicego, Filippo Bistaffa, and Sarvapali D. Ramchurn. A Hierarchical Clustering Approach to Large-Scale Near-Optimal Coalition Formation with Quality Guarantees. In *Engineering Applications of Artificial Intelligence*, volume 59, pages 170–185, 2017. DOI: <http://dx.doi.org/10.1016/j.engappai.2016.12.018>.
- [7] Michele Roncalli, Filippo Bistaffa, and Alessandro Farinelli. Decentralized Power Distribution in the Smart Grid with Ancillary Lines. In *Mobile Networks and Applications*, pages 1–9, 2017. DOI: <http://dx.doi.org/10.1007/s11036-017-0893-y>.

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## Conference Publications

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- [8] Ewa Andrejczuk, Filippo Bistaffa, Christian Blum, Juan A. Rodríguez-Aguilar, and Carles Sierra. Heterogeneous Teams for Homogeneous Performance. In *International Conference on Principles and Practice of Multi-Agent Systems*, PRIMA, pages 89–105, 2018. DOI: [http://dx.doi.org/10.1007/978-3-030-03098-8\\_6](http://dx.doi.org/10.1007/978-3-030-03098-8_6).
- [9] Filippo Bistaffa and Alessandro Farinelli. A COP Model for Graph-Constrained Coalition Formation (Extended Abstract). In *International Joint Conference on Artificial Intelligence*, IJCAI, pages 5553–5557, 2018. DOI: <http://dx.doi.org/10.24963/ijcai.2018/783>.
- [10] Ewa Andrejczuk, Filippo Bistaffa, Christian Blum, Juan A. Rodríguez-Aguilar, and Carles Sierra. Solving the Synergistic Team Composition Problem (Extended Abstract). In *International Conference on Autonomous Agents and Multiagent Systems*, AAMAS, pages 1853–1854, 2018. URL: <https://dl.acm.org/citation.cfm?id=3238001>.
- [11] Filippo Bistaffa, Juan A. Rodríguez-Aguilar, Jesús Cerquides, and Christian Blum. A Simulation Tool for Large-Scale Online Ridesharing (Demonstration). In *International Conference on Autonomous Agents and Multiagent Systems*, AAMAS, pages 1797–1799, 2018. URL: <https://dl.acm.org/citation.cfm?id=3237981>.
- [12] Filippo Bistaffa, Nicola Bombieri, and Alessandro Farinelli. CUBE: A CUDA approach for Bucket Elimination on GPUs. In *European Conference on Artificial Intelligence*, ECAI, pages 125–132, 2016. DOI: <http://dx.doi.org/10.3233/978-1-61499-672-9-125>.
- [13] Filippo Bistaffa, Georgios Chalkiadakis, Alessandro Farinelli, and Sarvapali D. Ramchurn. Recommending Fair Payments for Large-Scale Social Ridesharing. In *ACM Conference on Recommender Systems*, RecSys, pages 139–146, 2015. DOI: <http://dx.doi.org/10.1145/2792838.2800177>.
- [14] Filippo Bistaffa, Alessandro Farinelli, and Sarvapali D. Ramchurn. Sharing Rides with Friends: a Coalition Formation Algorithm for Ridesharing. In *AAAI Conference on Artificial Intelligence*, AAAI, pages 608–614, 2015. URL: <http://www.aaai.org/ocs/index.php/AAAI/AAAI15/paper/view/9622>.
- [15] Filippo Bistaffa, Alessandro Farinelli, and Nicola Bombieri. Optimising Memory Management for Belief Propagation in Junction Trees Using GPGPUs. In *IEEE International Conference on Parallel and Distributed Systems*, ICPADS, pages 526–533, 2014. DOI: <http://dx.doi.org/10.1109/padsw.2014.7097850>.
- [16] Filippo Bistaffa, Alessandro Farinelli, Jesús Cerquides, Juan A. Rodríguez-Aguilar, and Sarvapali D. Ramchurn. Anytime Coalition Structure Generation on Synergy Graphs. In *International Conference on Autonomous Agents and Multiagent Systems*, AAMAS, pages 13–20, 2014. URL: <https://dl.acm.org/citation.cfm?id=2615737>.
- [17] Filippo Bistaffa and Alessandro Farinelli. A Fast Approach to Form Core-Stable Coalitions Based on a Dynamic Model. In *IEEE/WIC/ACM International Joint Conferences on Web Intelligence and Intelligent Agent Technologies*, WI/IAT, pages 122–129, 2013. DOI: <http://dx.doi.org/10.1109/WI-IAT.2013.100>.
- [18] Filippo Bistaffa, Alessandro Farinelli, Meritxell Vinyals, and Alex Rogers. Coalitional Energy Purchasing in the Smart Grid. In *IEEE International Energy Conference & Exhibition*, ENERGYCON, pages 848–853, 2012. DOI: <http://dx.doi.org/10.1109/energycon.2012.6348270>.
- [19] Filippo Bistaffa, Alessandro Farinelli, Meritxell Vinyals, and Alex Rogers. Decentralised Stable Coalition Formation Among Energy Consumers in the Smart Grid (Demonstration). In *International Conference on Autonomous Agents and Multiagent Systems*, AAMAS, pages 1461–1462, 2012. URL: <https://dl.acm.org/citation.cfm?id=2344061>.

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## Workshop Publications

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- [20] Filippo Bistaffa, Alessandro Farinelli, Jesús Cerquides, Juan A. Rodríguez-Aguilar, and Sarvapali D. Ramchurn. Anytime Coalition Structure Generation on Scale-Free and Community Networks. In *International Joint Workshop on Optimisation in Multi-Agent Systems and Distributed Constraint Reasoning*, OPTMAS-DCR, 2014.
- [21] Filippo Bistaffa, Alessandro Farinelli, Meritxell Vinyals, and Alex Rogers. Stable Coalition Formation Among Energy Consumers in the Smart Grid. In *International Workshop on Agent Technologies for Energy Systems*, ATES, 2012.

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## Doctoral Consortium Publications

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- [22] Filippo Bistaffa. Parallel Algorithms for Hard Combinatorial Optimisation Problems in Multi-Agent Systems. In *International Conference on Autonomous Agents and Multiagent Systems*, AAMAS, pages 1717–1718, 2014. URL: <https://dl.acm.org/citation.cfm?id=2616142>.

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## Professional Service

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- Reviewer for Artificial Intelligence (AIJ).
- Reviewer for IEEE Transactions on Cybernetics (IEEE CYB).
- Reviewer for Computers & Operations Research (COR).
- Reviewer for European Journal of Operational Research (EJOR).
- Reviewer for Autonomous Agents and Multi-Agent Systems (AGNT).
- PC member for AAAI Conference on Artificial Intelligence (AAAI).
- PC member for International Conference on Autonomous Agents and Multiagent Systems (AAMAS).
- PC member for International Joint Conference Conference on Artificial Intelligence (IJCAI).
- PC member and chair for European Conference on Artificial Intelligence (ECAI).
- PC member for Genetic and Evolutionary Computation Conference (GECCO).
- PC member for International Workshop on Optimisation in Multi-Agent Systems (OPTMAS).
- PC member for International Workshop on Teams in Multi-Agent Systems (TEAMAS).
- Reviewer for RoboCup International Symposium.

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## Conferences Attended

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- International Conference on Autonomous Agents and Multiagent Systems (AAMAS), May 2019.
- AAAI Conference on Artificial Intelligence (AAAI), January 2019.
- International Joint Conference on Artificial Intelligence (IJCAI), July 2018. Oral presentation.
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS), July 2018. Program demonstration, poster presentation.
- GPU Technology Conference Europe (GTC Europe), October 2017.
- European Conference on Artificial Intelligence (ECAI), September 2016. Oral presentation.
- ACM Conference on Recommender Systems (RecSys), September 2015. Oral presentation.
- AAAI Conference on Artificial Intelligence (AAAI), January 2015. Oral presentation.
- IEEE International Conference on Parallel and Distributed Systems (ICPADS), December 2014. Oral presentation.
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS), May 2014. Oral presentation.
- International Joint Workshop on Optimisation in Multi-Agent Systems and Distributed Constraint Reasoning (OPTMAS-DCR), May 2014. Oral presentation.
- International Conference on Intelligent Agent Technology (IAT), November 2013. Oral presentation.
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS), June 2012. Program demonstration, poster presentation, workshop attended.

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## Courses Attended

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- Programming and Tuning Massively Parallel Systems Summer School (PUMPS), July 2015.
- Advanced School on Computer Vision and Pattern Recognition (VIPS), May 2015.
- Social Computing, University of Southampton, September–December 2014.
- Advanced Computer Architecture, University of Verona, March–June 2014.
- European Agent Systems Summer School (EASSS), July 2013.

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## Talks Given

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- Oral presentation at the International Joint Conference on Artificial Intelligence (IJCAI) for the paper [9]. July 2018. Stockholm, Sweden.
- Seminary presentation: Constraint Optimisation Techniques for Real-World Applications. June 2017. Dept. of Computer Science, University of Verona.
- Oral presentation at the European Conference on Artificial Intelligence (ECAI) for the paper [12]. September 2016. The Hague, Netherlands.

- Ph.D. thesis defence. April 2016. Dept. of Computer Science, University of Verona.
- Departmental presentation for the admission to the final Ph.D. exam: Combinatorial Optimisation Problems in Large-Scale Multi-Agent Systems. October 2015. Dept. of Computer Science, University of Verona.
- Oral presentation at the ACM Conference on Recommender Systems (RecSys) for the paper [13]. September 2015. Vienna, Austria.
- Seminary presentation: Social Computing. June 2015. Dept. of Computer Science, University of Verona.
- Seminary presentation: Towards Optimal Solar Tracking. May 2015. Dept. of Computer Science, University of Verona.
- Tutorial presentation: Coalition Formation for Multi-Agent Systems. March 2015. ECS Department, University of Southampton.
- Oral presentation at the AAAI Conference on Artificial Intelligence (AAAI) for the paper [14]. January 2015. Austin, Texas, USA.
- Oral presentation at the IEEE International Conference on Parallel and Distributed Systems (ICPADS) for the paper [15]. December 2014. Hsinchu, Taiwan.
- Seminary presentation: Using GPGPUs to Speed-Up Computation: a Belief Propagation Example. November 2014. ECS Department, University of Southampton.
- Departmental presentation of Ph.D. thesis proposal: Combinatorial Optimisation Problems in Large-Scale Multi-Agent Systems. November 2014. Dept. of Computer Science, University of Verona.
- Oral presentation at the International Conference on Autonomous Agents and Multiagent Systems (AAMAS) for the paper [16]. May 2014. Paris, France.
- Oral presentation at the International Joint Workshop on Optimisation in Multi-Agent Systems and Distributed Constraint Reasoning (OPTMAS-DCR) for the paper [20]. May 2014. Paris, France.
- Oral presentation at the International Conference on Autonomous Agents and Multiagent Systems (AAMAS) for the paper [22]. May 2014. Paris, France.
- Seminary presentation: Game Theory for Computer Science. December 2013. Dept. of Computer Science, University of Verona.
- Oral presentation at the International Conference on Intelligent Agent Technology (IAT) for the paper [17]. November 2013. Atlanta, GA, United States of America.
- Departmental presentation of Ph.D. thesis proposal: Combinatorial optimisation problems in the collective energy purchasing domain. November 2013. Dept. of Computer Science, University of Verona.