Francesco Betti Sorbelli

Curriculum Vitæ

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Birth	November 14th, 1983
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Short Biography

I received the Bachelor and Master degrees *cum laude* in Computer Science from the University of Perugia, Italy, in 2007 and 2010, respectively, and my Ph.D. in Computer Science from the University of Florence, Italy, in 2018. From November 2018 to October 2019, I was a Post-doctoral researcher at the Department of Computer Science, University of Perugia, under the supervision of Cristina M. Pinotti. From January 2020 to January 2021, I was a Post-doctoral researcher at the Department of Computer Science, Missouri University of Science and Technology, Rolla, Missouri, USA, under the supervision of Sajal K. Das. From April 2021 to October 2022, I was a Post-doctoral researcher at the University of Perugia, under the supervision of Cristina M. Pinotti. From October 2022, I am a tenure-track Assistant Professor at the University of Perugia. My research interests include algorithms design, combinatorial optimization, unmanned vehicles.

Education

10/2014–03/2018 **Ph.D., Computer Science.** Thesis title: *"Localization of Terrestrial Objects Using a Drone with UWB Antennas"*. Advisor: Cristina M. Pinotti. Dept. of Computer Science and Mathematics, *University of Florence*.
Judgment: ***optimum***.

10/2007–02/2010 **MS, Computer Science.** Thesis title: *"Coloring and Routing in Wireless Sensor Networks"*. Advisor: Cristina M. Pinotti. Dept. of Computer Science and Mathematics, *University of Perugia*.
Final mark: ***110/110 cum laude***.

10/2003–05/2007 **BS, Computer Science.** Thesis title: *"Asynchronous Training in Wireless Sensor Networks: Two Level Algorithm and Cooperative Approach"*. Advisor: Ferruccio Barsi. Dept. of Computer Science and Mathematics, *University of Perugia*.
Final mark: ***110/110 cum laude***.

Qualifications

10/2022–now **National Scientific Qualification.** As **associate** in the Italian higher education system for the disciplinary field of 01/B1 – *Informatics*.

Work Experience

Research Positions

10/2022–now **Tenure-track Assistant Professor.** Dept. of Computer Science and Mathematics, *University of Perugia*. Tutor: Osvaldo Gervasi.
Responsibilities: Writing project proposals, research activities, teaching courses.

04/2021–10/2022 **Post-doctoral researcher.** Dept. of Computer Science and Mathematics, *University of Perugia*. Advisor: Cristina M. Pinotti. Project title: *HALY-ID: HALYomorpha halys IDentification*. Funded by: ICT-AGRI-FOOD.
Responsibilities: Investigate the use of drones in detecting the *halyomorpha halys* bug in orchards.

01/2020–01/2021 **Post-doctoral researcher.** Dept. of Computer Science, *Missouri University of Science and Technology*, Rolla, Missouri, USA. Advisor: Sajal K. Das.
Responsibilities: Devise efficient algorithms for precision agriculture, localization of sensors, and delivery of goods; Mentor undergraduate students; Assist classes, give lectures, and grade students.

11/2018–10/2019 **Post-doctoral researcher.** Dept. of Computer Science and Mathematics, *University of Perugia*. Advisor: Cristina M. Pinotti. Project title: *NALP-SAPR: Navigazione Autonoma e Localizzazione Precisa per Sistemi Aeromobili a Pilotaggio Remoto*. Funded by: POR UMBRIA FSE 2014-2020.
Responsibilities: Devise efficient algorithms for accurate localization and flights of drones.

Teaching Positions

2023–2024 **Lecturer.** Undergraduate Course "Algorithms and Data Structures" (INF/01–6 CFU; 42 hours), L-P03, Computer Science, Dept. of Computer Science and Mathematics, *University of Perugia*.

2023–2024 **Lecturer.** Undergraduate Course "Programming I" (INF/01–6 CFU; 42 hours), L-P03, Computer Science, Dept. of Computer Science and Mathematics, *University of Perugia*.

2023–2024 **Co-Lecturer.** Undergraduate Course "Algorithms and Data Structures with Lab: part I" (INF/01; 10 hours), L-31, Computer Science, Dept. of Computer Science and Mathematics, *University of Perugia*.

2023–2024 **Co-Lecturer.** Undergraduate Course "Algorithms and Data Structures with Lab: part II" (INF/01; 10 hours), L-31, Computer Science, Dept. of Computer Science and Mathematics, *University of Perugia*.

2022–2023 **Co-Lecturer.** Undergraduate Course "Algorithms and Data Structures with Lab: part II" (INF/01; 10 hours), L-31, Computer Science, Dept. of Computer Science and Mathematics, *University of Perugia*.

2023 **Lecturer.** Course "Operating Systems and BASH Programming" (45 hours), ITS, Higher Technical Institute.

2022–2023 **Lecturer.** Undergraduate Course "Coding, Big Data, and Artificial Intelligence" (INF/01–6 CFU; 36 hours), L-14, Jurisprudence, Dept. of Law, *University of Perugia*.

2021–2022 **Adjunct Professor.** Undergraduate Course "Informatics" (INF/01–6 CFU; 36 hours), L-14, Jurisprudence, Dept. of Law, *University of Perugia*.

2020–2021 **Adjunct Professor.** Undergraduate Course "Informatics" (INF/01–6 CFU; 36 hours), L-14, Jurisprudence, Dept. of Law, *University of Perugia*.

2014–2015 **Tutor.** Undergraduate Course "Informatics I" (INF/01–6 CFU; 14 hours), L-35, Mathematics, Dept. of Computer Science and Mathematics, *University of Perugia*.

2007–2008 **Tutor.** Undergraduate Course "Algorithms and Data Structures II" (INF/01–6 CFU; 30 hours), L-31, Computer Science, Dept. of Computer Science and Mathematics, *University of Perugia*.

2018–NOW **Teaching Assistant.** Undergraduate Course "Algorithms and Data Structures", L-31, Computer Science, Dept. of Computer Science and Mathematics, *University of Perugia*. *Expert in the field*. Assisting exams.

Industry

05/2013–08/2014 **Programmer.** Klimser/IBM Italy, Siena. Full stack developer at the Monte dei Paschi bank.

11/2012–04/2013 **Sysadmin.** Elektron, Bastia Umbra. Coding and configuration of virtual machines.

10/2011–11/2012 **Web developer.** NewComWeb, Ponte San Giovanni, Perugia. Realization of websites.

09/2010–10/2011 **Programmer.** Conesi/IBM Italy, Siena. Backend coding at the Monte dei Paschi bank.

05/2010–07/2010 **Web developer.** Media Division, Perugia. Search Engine Optimization of websites.

05/2010 **Sysadmin.** DesktopSrl, Ellera. Configuration of virtual machines.

Current Research Lines

Before my PhD, my research focused on finding efficient algorithms aimed at a logical coarse-grained localization of ground sensors unaware of their position, by exploiting a fixed main anchor/sink. Then, during my PhD I did a step forward, by studying new localization algorithms using a flying anchor in challenging applications. This fruitful experience brought me to investigate other exciting problems where flying vehicles can be efficiently and effectively used.

Autonomous unmanned vehicles such as drones or robots are now extensively used in a plethora of civilian applications, not only in the localization context, but also in other scenarios, like delivery of goods, smart agriculture, monitoring, and search and rescue.

Localization of Sensors with Drones

The localization of sensors paradigm usually refers to different concrete applications, such as searching for missing people, or monitoring particular areas. When I was a Master student, we studied coarse-grained localization algorithms based on a single fixed anchor [c1][c2][c3][j1][j2]. However, this method is not suitable when the area to be localized grows. This problem can be solved by introducing additional fixed anchors in the area: however, this raises scalability concerns. Therefore, in order to address this issue, we considered to use a single, but mobile (in our case, flying), anchor node. In general, two different techniques can be exploited when localizing sensors, that are: *range-free* and *range-based*. So, during my PhD we first studied several range-based localization algorithms. These algorithms are also able to provide a guaranteed maximum localization error given a few parameters in input [c5][c6][c8][j3][j4]. Subsequently, we also devised new range-free localization algorithms with similar guaranteed bounds [c7][j5]. Furthermore, by considering specialized hardware, specifically Ultra-wideband (UWB) devices, we conducted a set of real experiments (with a real drone too) for comparing first the range-based algorithms [c9][j8], and then also the range-free ones [c11][c13][j6].

Delivery of Goods with Drones

After my PhD, we start thinking possible approaches for the delivery of small packages with the help of drones. The drone-delivery system had been also taken into account by big companies like Amazon and Google at that time. From a combinatoric point of view, we investigated the use of a single drone for delivering packages to customers that can reside in two different contiguous areas, i.e., one rural and one urban, characterized by a different metric (Euclidean for the rural, Manhattan for the urban). The pursued goal is to find the optimal drone's position (in the area) that minimizes the traveled distance for performing all the deliveries. We found optimal and approximation algorithms for this scenario [c12] when we consider all the points of the area as candidate customers. Recently, we also devised other efficient algorithms for the general case [j11] when only a subset of customers should be served by the same drone. A similar approach has been used inside a warehouse for collecting items, from the shelves, that form orders that customers place online. In this more general scenario, the optimal drone's position only considers a subset of points [c10]. Then, we explored the effect of the wind on drones when they have to deliver packages inside a windy delivery area. Since drones are energy constrained, their autonomy is limited, and the wind can quickly drain their battery. So, by taking into consideration a physical energy model for drones, we studied how the wind can influence the number of deliveries in the presence of wind [j7][c19][j12]. Finally, we also investigated the situation when one or multiple drones are assisted by a wheeled truck able to carry them inside the city [c18][c21][j10].

Smart Agriculture with Unmanned Vehicles

Smart agriculture is another important thread of my research line. The first problem that we studied is the irrigation of vines inside a vineyard in extremely dry and wide territories with the help of a ground robot. Robots can easily perform this task, but they are mainly constrained by the peculiar structure of the vineyards. In fact, a robot (as well as a person) cannot cross an aisle from any point, but it has to necessarily go either at the first vine, or at the last one. Moreover, the robot has a limited battery, and its energy should be properly used. This data structure which models a vineyard is known as *aisle-graph*. The prior knowledge of the moisture level of the soil, and hence of the vines, provides a meaningful map for the robot. Indeed, the robot has to travel up to the vines that need the most to be visited for regulating the suitable quantity of water. The whole problem can be modeled as an instance of the well known orienteering problem (OP). We gave optimal, approximation, and heuristic algorithms for special cases in aisle-graphs [c14][c15][j9], while the general case is still intractable (it is indeed NP-hard). Recently, we considered a similar application inside orchards (whose structure is an enhanced aisle-graph) with the objective of scouting bugs. This is done with the help of a drone that flies through the orchard and takes pictures at different heights. In this scenario, we devised other time efficient algorithms [c22][c23].

BVLoS Flight of Drones

In this subject, we have initiated the study of potential models for BVLoS drone flight. Specifically, we introduced a multi-layer model where each layer stores fundamental information, such as ground risk, signal quality, potential obstacles, etc. The 3D space is divided into contiguous cells, effectively modeling it as a weighted graph with vertices and edges. The weights indicate the dependability of that edge, i.e., the probability that measures the degree of increased safety in flying along that edge (if discussing safety) or increased connectivity (if discussing signal). When the graph is modeled this way, the optimal path can be calculated using classical algorithms like Dijkstra's [c25].

Other Potential Applications with Drones

Parallely, we started other projects aimed at investigating other areas. In particular, we studied a scenario when multiple drones have to monitor points of interest by recording video first, and computing batches on the fly then [c16]; we studied different learning-based algorithms for drones when they are employed in search and rescue operations in a disaster response management [c20][j13]; we also surveyed cases when the drones are threatened by jamming or spoofing attacks [c17].

Research Publications

Journal Articles

[j17] **F. Betti Sorbelli**, A. Navarra, L. Palazzetti, C. M. Pinotti, and G. Prencipe, "*Wireless IoT Sensors Data Collection Reward Maximization by Leveraging Multiple Energy- and Storage-Constrained UAVs*", In: Elsevier Journal of Computer and System Sciences, vol. 139, pp. 103475, 2024.
(General Computer Science: Scimago=Q2, Scopus=56th; IF: Scopus=1.292, WOS=1.023)

[j16] **F. Betti Sorbelli**, L. Palazzetti, and C. M. Pinotti, "*YOLO-based Detection of Halyomorpha halys in Orchards Using RGB Cameras and Drones*", In: Elsevier Computers and Electronics in Agriculture, vol. 213, pp. 108228, 2023.
(Computer Science Applications: Scimago=Q1, Scopus=95th; IF: Scopus=8.045, WOS=5.565)

[j15] **F. Betti Sorbelli**, F. Corò, S. K. Das, C. M. Pinotti, and A. Shende, "*Dispatching Point Selection for a Drone-Based Delivery System Operating in a Mixed Euclidean-Manhattan Grid*", In: Springer Annals of Operations Research, 2023.
(Management Science and Operations Research: Scimago=Q1, Scopus=82nd; IF: Scopus=4.549, WOS=4.854)

[j14] A. Khochare, **F. Betti Sorbelli**, Y. Simmhan, and S. K. Das, "*Improved Algorithms for Co-scheduling of Edge Analytics and Routes for UAV Fleet Missions*", In: IEEE/ACM Transactions on Networking, 2023. (*to appear*).
(Computer Networks and Communications: Scimago=Q1, Scopus=87th; IF: Scopus=4.371, WOS=3.56)

[j13] C. Qu, **F. Betti Sorbelli**, R. Singh, P. Calyam, and S. K. Das, "*Environmentally-Aware and Energy-Efficient Multi-Drone Coordination and Networking for Disaster Response*", In: IEEE Transactions on Network and Service Management, vol. 20, no. 2, pp. 1093-1109, 2023.
(Computer Networks and Communications: Scimago=Q1, Scopus=83rd; IF: Scopus=5.502, WOS=4.195)

[j12] **F. Betti Sorbelli**, F. Corò, L. Palazzetti, C. M. Pinotti, and G. Rigoni, "*How the Wind Can Be Leveraged for Saving Energy in a Truck-Drone Delivery System*", In: IEEE Transactions on Intelligent Transportation Systems, vol. 24, no. 4, pp. 4038-4049, 2023.
(Computer Science Applications: Scimago=Q1, Scopus=96th; IF: Scopus=9.722, WOS=6.319)

[j11] **F. Betti Sorbelli**, G. Rigoni, and C. M. Pinotti, "*On the Evaluation of a Drone-Based Delivery System on a Mixed Euclidean-Manhattan Grid*", In: IEEE Transactions on Intelligent Transportation Systems, vol. 24, no. 1, pp. 1276-1287, 2023.
(Computer Science Applications: Scimago=Q1, Scopus=96th; IF: Scopus=9.722, WOS=6.319)

[j10] **F. Betti Sorbelli**, F. Corò, S. K. Das, L. Palazzetti, and C. M. Pinotti, "*On the Scheduling of Conflictual Deliveries in a Last-mile Delivery Scenario with Truck-carried Drones*", In: Elsevier Pervasive and Mobile Computing, vol. 87, pp. 101700, 2022.
(Computer Networks and Communications: Scimago=Q1, Scopus=90th; IF: Scopus=4.265, WOS=2.725)

[j9] **F. Betti Sorbelli**, S. Carpin, F. Corò, S. K. Das, A. Navarra, and C. M. Pinotti, "*Speeding up Routing Schedules on Aisle Graphs With Single Access*", In: IEEE Transactions on Robotics, vol. 38, no. 1, pp. 433-447, 2022.
(Computer Science Applications: Scimago=Q1, Scopus=98th; IF: Scopus=12.738, WOS=6.123)

[j8] **F. Betti Sorbelli**, C. M. Pinotti, S. Silvestri, and S. K. Das, "*Measurement Errors in Range-Based Localization Algorithms for UAVs: Analysis and Experimentation*", In: IEEE Transactions on Mobile Computing, vol. 21, no. 4, pp. 1291-1304, 2022.
(Computer Networks and Communications: Scimago=Q1, Scopus=95th; IF: Scopus=6.272, WOS=5.112)

[j7] **F. Betti Sorbelli**, F. Corò, S. K. Das, and C. M. Pinotti, "*Energy-Constrained Delivery of Goods With Drones Under Varying Wind Conditions*", In: IEEE Transactions on Intelligent Transportation Systems, vol. 22, no. 9, pp. 6048-6060, 2021.
(Computer Science Applications: Scimago=Q1, Scopus=96th; IF: Scopus=9.722, WOS=6.319)

[j6] **F. Betti Sorbelli**, S. K. Das, C. M. Pinotti, and G. Rigoni, "*A comprehensive investigation on range-free localization algorithms with mobile anchors at different altitudes*", In: Elsevier Pervasive and Mobile Computing, vol. 73, no. 1, pp. 101383, 2021.
(Computer Networks and Communications: Scimago=Q1, Scopus=90th; IF: Scopus=4.265, WOS=2.725)

[j5] **F. Betti Sorbelli**, C. M. Pinotti, and V. Ravelomanana, "*Range-Free Localization Algorithm Using a Customary Drone: Towards a Realistic Scenario*", In: Elsevier Pervasive and Mobile Computing, vol. 54, pp. 1-15, 2019.
(Computer Networks and Communications: Scimago=Q1, Scopus=90th; IF: Scopus=4.265, WOS=2.725)

[j4] **F. Betti Sorbelli**, S. K. Das, C. M. Pinotti, and S. Silvestri, "*Range-based Algorithms for Precise Localization of Terrestrial Objects using a Drone*", In: Elsevier Pervasive and Mobile Computing, vol. 48, pp. 20-42, 2018.
(Computer Networks and Communications: Scimago=Q1, Scopus=90th; IF: Scopus=4.265, WOS=2.725)

[j3] P. Perazzo, **F. Betti Sorbelli**, M. Conti, G. Dini, and C. M. Pinotti, "*Drone Path Planning for Secure Positioning and Secure Position Verification*", In: IEEE Transactions on Mobile Computing, vol. 16, no. 9, pp. 2478-2493, 2017.
(Computer Networks and Communications: Scimago=Q1, Scopus=95th; IF: Scopus=6.272, WOS=5.112)

[j2] A. Navarra, C. M. Pinotti, V. Ravelomanana, **F. Betti Sorbelli**, and R. Ciotti, "*Cooperative training for high density sensor and actor networks*", In: IEEE Journal on Selected Areas in Communications, vol. 28, no. 5, pp. 753-763, 2010.
(Computer Networks and Communications: Scimago=Q1, Scopus=99th; IF: Scopus=13.595, WOS=11.42)

[j1] F. Barsi, A. A. Bertossi, **F. Betti Sorbelli**, R. Ciotti, S. Olariu, and M. C. Pinotti, "*Asynchronous Corona Training Protocols in Wireless Sensor and Actor Networks*", In: IEEE Transactions on Parallel and Distributed Systems, vol. 20, no. 8, pp. 1216-1230, 2009.
(Hardware and Architecture: Scimago=Q1, Scopus=85th; IF: Scopus=4.531, WOS=2.6)

Conference and Workshop Papers

[c29] **F. Betti Sorbelli**, L. Palazzetti, and C. M. Pinotti, "*A Drone-Based Automated Halyomorpha Halys Scouting: A Case Study on Orchard Monitoring*", In: 2023 5th IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor), Pisa, Italy, November 6-8, 2023.

[c28] **F. Betti Sorbelli**, L. Palazzetti, and C. M. Pinotti, "*Preliminary Results for Halyomorpha Halys Monitoring Relying on a Custom Dataset*", In: 2023 5th IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor), Pisa, Italy, November 6-8, 2023.

[c27] **F. Betti Sorbelli**, F. Corò, C. M. Pinotti, and A. Shende, "*Exploring Mixed-Grid Environments for Drone-Based Last-Mile Logistics Optimization*", In: 2023 20th IEEE International Conference on Mobile Ad-Hoc and Smart Systems (UAV-IoT - MASS Workshop), Toronto, Canada, September 25-27, 2023.
(GGS: 3/B; CORE:B, LiveSHINE:A, MA:B)

[c26] L. Almstedt, D. Baltieri, **F. Betti Sorbelli**, D. Cattozzi, D. Giannetti, A. Kargar, L. Maistrello, A. Navarra, D. Niederprüm, B. O'Flynn, L. Palazzetti, N. Patelli, L. Piccinini, C. M. Pinotti, L. Wolf, and D. Zorbas, "*Technological Innovations in Agriculture for Scouting Halyomorpha halys in Orchards*", In: 2023 19th IEEE International Conference on Distributed Computing in Sensor Systems (ISIoT - DCOSS Workshop), Paphos, Cyprus, June 19-21, 2023.
(GGS: 3/B; CORE:B, MA:B)

[c25] **F. Betti Sorbelli**, P. Chatterjee, F. Corò, L. Palazzetti, and C. M. Pinotti, "*A Novel Multi-Layer Framework for Mainaging UAV Connectivity and Ground Risk in BVLoS Operations*", In: 2023 42th IEEE International Conference on Computer Communications (DroneCom - INFOCOM Workshop) New York area, May 17-20, 2023
(GGS: 1/A++; CORE:A++, LiveSHINE:A++, MA:A++)

[c24] **F. Betti Sorbelli**, A. Navarra, L. Palazzetti, C. M. Pinotti, and G. Prencipe, "*Optimal and Heuristic Algorithms for Data Collection by Using an Energy- and Storage-Constrained Drone*", In: 2022 18th International Symposium on Algorithms for Sensor Systems (ALGOSENSORS), Potsdam, Germany, September, 5-9, 2022.
(CORE:C, LiveSHINE:C, MA:C)

[c23] **F. Betti Sorbelli**, F. Corò, S. K. Das, L. Palazzetti, and C. M. Pinotti, "*Drone-based optimal and heuristic orienteering algorithms towards bug detection in orchards*", In: 2022 IEEE 18th International Conference on Distributed Computing in Sensor Systems (DCOSS), pp. 117-124, Marina Del Rey, California, USA, May 30-June 1, 2022.
(GGS: 3/B; CORE:B, MA:B)

[c22] **F. Betti Sorbelli**, F. Corò, S. K. Das, E. Di Bella, L. Maistrello, L. Palazzetti, and C. M. Pinotti, "*A Drone-based Application for Scouting Halyomorpha halys Bugs in Orchards with Multifunctional Nets*", In: 2022 IEEE 20th International Conference on Pervasive Computing and Communications (PerCom Demo), pp. 127-129, Pisa, Italy, March 21-25, 2022. (**Best demo paper award**).
(GGS: 1/A+; CORE:A++, LiveSHINE:A+, MA:A)

[c21] **F. Betti Sorbelli**, F. Corò, S. K. Das, L. Palazzetti, and C. M. Pinotti, "*Greedy Algorithms for Scheduling Package Delivery with Multiple Drones*", In: 2022 ACM 23rd International Conference on Distributed Computing and Networking (ICDCN), pp. 31–39 Virtual, January 4-7, 2022. (**Best paper award**).
(LiveSHINE:B-, MA:C)

[c20] C. Qu, R. Singh, A. E. Morel, **F. Betti Sorbelli**, P. Calyam, and S. K. Das, "*Obstacle-Aware and Energy-Efficient Multi-Drone Coordination and Networking for Disaster Response*", In: 2021 IEEE 17th International Conference on Network and Service Management (CNSM), pp. 446-454, Virtual, October 25-29, 2021.
(GGS: 3/B-; CORE:B, LiveSHINE:B, MA:C)

[c19] A. Khanda, F. Corò, **F. Betti Sorbelli**, C. M. Pinotti, and S. K. Das, "*Efficient Route Selection for Drone-based Delivery Under Time-varying Dynamics*", In: 2021 IEEE 18th International Conference on Mobile Ad Hoc and Smart Systems (MASS), pp. 437-445, Virtual, October 4-7, 2021.
(GGS: 3/B; CORE:B, LiveSHINE:A, MA:B)

[c18] **F. Betti Sorbelli**, F. Corò, S. K. Das, L. Palazzetti, and C. M. Pinotti, "*Cooperative Truck-Drone Scheduling Approach for Last-Mile Deliveries*", In: 2021 22nd Italian Conference on Theoretical Computer Science (ICTCS short paper), CEUR Workshop Proceedings, vol. 3072, pp. 40–45, Virtual, September 13-15, 2021.

[c17] **F. Betti Sorbelli**, M. Conti, C. M. Pinotti, and G. Rigoni, "*UAVs Path Deviation Attacks: Survey and Research Challenges*", In: 2020 IEEE 17th International Conference on Sensing, Communication and Networking (IAUV - SECON Workshop), pp. 1-6, Virtual, June 22-25, 2020.
(GGS: 2/A-; CORE:B, LiveSHINE:A, MA:A)

[c16] A. Khochare, Y. Simmhan, **F. Betti Sorbelli**, and S. K. Das, "*Heuristic Algorithms for Co-scheduling of Edge Analytics and Routes for UAV Fleet Missions*", In: 2021 IEEE 40th International Conference on Computer Communications (INFOCOM), pp. 1-10, Virtual, May 10-13, 2021.
(GGS: 1/A++; CORE:A++, LiveSHINE:A++, MA:A++)

[c15] **F. Betti Sorbelli**, F. Corò, S. K. Das, A. Navarra, and C. M. Pinotti, "*Speeding-up Routing Schedules on Aisle-Graphs*", In: 2020 IEEE 16th International Conference on Distributed Computing in Sensor Systems (DCOSS), pp. 69-76, Virtual, June 15-17, 2020.
(GGS: 3/B; CORE:B, MA:B)

[c14] **F. Betti Sorbelli**, S. Carpin, F. Corò, A. Navarra, and C. M. Pinotti, "*Optimal Routing Schedules for Robots Operating in Aisle-Structures*", In: 2020 IEEE 37th International Conference on Robotics and Automation (ICRA), pp. 4927-4933, Virtual, May 31-Aug 31, 2020.
(GGS: 2/A; CORE:B, LiveSHINE:A++, MA:A++)

[c13] **F. Betti Sorbelli**, C. M. Pinotti, and G. Rigoni. "*Range-free Localization Algorithms with Mobile Anchors at Different Altitudes: A Comparative Study*", In: 2020 ACM 21st International Conference on Distributed Computing and Networking (ICDCN), pp. 1-6, Kolkata, India, January 4-7, 2020. (**Best paper award**).
(LiveSHINE:B-, MA:C)

[c12] L. Bartoli, **F. Betti Sorbelli**, F. Corò, C. M. Pinotti, and A. Shende, "*Exact and Approximate Drone Warehouse for a Mixed Landscape Delivery System*", In: 2019 IEEE 5th International Conference on Smart Computing (SMARTCOMP), pp. 266-273, Washington, DC, USA, June 12-14, 2019.

[c11] **F. Betti Sorbelli**, and C. M. Pinotti, "*Ground Localization with a Drone and UWB Antennas: Experiments on the Field*", In: 2019 IEEE 20th International Symposium on "A World of Wireless, Mobile and Multimedia Networks" (SwarmNet - WoWMoM workshop), pp. 1-7, Washington, DC, USA, June 10-12, 2019.
(GGS: 3/B-; CORE:B, LiveSHINE:C, MA:B)

[c10] **F. Betti Sorbelli**, F. Corò, C. M. Pinotti, and A. Shende, "*Automated Picking System Employing a Drone*", In: 2019 IEEE 15th International Conference on Distributed Computing in Sensor Systems (Wi-DroIT - DCOSS Workshop), pp. 633-640, Santorini, Greece, May 29-31, 2019.
(GGS: 3/B; CORE:B, MA:B)

[c9] **F. Betti Sorbelli**, S. K. Das, C. M. Pinotti, and S. Silvestri, "*On the Accuracy of Localizing Terrestrial Objects Using Drones*", In: 2018 IEEE International Conference on Communications (ICC), pp. 1-7, Kansas City, MO, USA, May 20-24, 2018.
(GGS: 2/A; LiveSHINE:A+, MA:A+)

[c8] **F. Betti Sorbelli**, and C. M. Pinotti, "*On the Localization of Sensors using a Drone with UWB Antennas*", In: 2018 GEOSAFE Workshop on Robust Solutions for Fire Fighting (RSFF), CEUR Workshop Proceedings, vol. 2146, pp. 18-29, L'Aquila, Italy, July 19-20, 2018.

[c7] **F. Betti Sorbelli**, C. M. Pinotti, and V. Ravelomanana, "*Range-Free Localization Algorithm Using a Customary Drone*", In: 2018 IEEE 4th International Conference on Smart Computing (SMARTCOMP), pp. 9-16, Taormina, Italy, June 18-20, 2018. (**Best paper candidate**).

[c6] **F. Betti Sorbelli**, S. K. Das, C. M. Pinotti, and S. Silvestri, "*Precise Localization in Sparse Sensor Networks using a Drone with Directional Antennas*", In: 2018 ACM 19th International Conference on Distributed Computing and Networking (ICDCN), pp. 1-10, Varanasi, India, January 4-7, 2018.
(LiveSHINE:B-, MA:C)

[c5] C. M Pinotti, **F. Betti Sorbelli**, P. Perazzo, and G. Dini, "*Localization with Guaranteed Bound on the Position Error using a Drone*", In: 2016 ACM 14th International Symposium on Mobility Management and Wireless Access (MobiWac - MSWIM workshop), pp. 147–154, Malta, November 13-17, 2016.
(GGS: 3/B; CORE:A, LiveSHINE:B, MA:B)

[c4] A. Bagchi, **F. Betti Sorbelli**, C. M. Pinotti, and V. Ribeiro, "*Connectivity of a Dense Mesh of Randomly Oriented Directional Antennas Under a Realistic Fading Model*", In: 2015 11th International Symposium on Algorithms for Sensor Systems (ALGOSENSORS), Springer-Verlag, vol. 9536, Patras, Greece, September, 14-18, 2015.
(CORE:C, LiveSHINE:C, MA:C)

[c3] **F. Betti Sorbelli**, R. Ciotti, A. Navarra, M. C. Pinotti, and V. Ravelomanana, "*Cooperative Training in Wireless Sensor and Actor Networks*", In: 2009 Springer QSHINE, vol. 9, pp. 569–583.
(CORE:C, LiveSHINE:C, MA:C)

[c2] F. Barsi, A. A. Bertossi, **F. Betti Sorbelli**, R. Ciotti, S. Olariu, and C. M. Pinotti, "*Asynchronous Training in Wireless Sensor Networks*", In: 2007 3rd International Workshop on Algorithms for Sensor Systems (ALGOSENSORS), Wroclaw, Poland, pp. 46–57.
(CORE:C, LiveSHINE:C, MA:C)

[c1] F. Barsi, **F. Betti Sorbelli**, R. Ciotti, C. M. Pinotti, A. A. Bertossi, and S. Olariu, "*Asynchronous Training in SANET*", In: 2007 ACM 13th Annual International Conference On Mobile Computing And Networking 2007 (SANET - MobiCom workshop) pp. 43–50.
(GGS: 1/A++; CORE:A++, LiveSHINE:A++, MA:A++)

Other

[o3] C. Qu, R. Singh, A. E. Morel, **F. Betti Sorbelli**, P. Calyam, and S. K. Das. "*Multi-Drone Coordination and Networking Experiments for Disaster Response*". In: 2021 Aerial Experimentation and Research Platform for Advanced Wireless (AERPAW) (poster).

[o2] **F. Betti Sorbelli**. "*Localization of Terrestrial Objects Using a Drone with UWB Antennas*". PhD Thesis, University of Florence, 2018.

[o1] **F. Betti Sorbelli** and C. M. Pinotti. "*Localization in Sparse Sensor Networks using a Drone with Directional Antennas*". In: 2017 3rd Italian Conference on ICT for Smart Cities and Communities (I-CiTies).

Research Impact from Scopus

CITATIONS	**375**.
H-INDEX	**11**.

Funded Projects

National

PI - PRIN 2022 PNRR for the project "*BREADCRUMBS: Building up Robust and Efficient routing Algorithms for Drones by integrating Connectivity and Risk awareness in a Urban air Mobility Bvlos Scenario*".

Total funded: 240.000 EUR (104.000 EUR personal)

Awards and Travel Grants

Awards

Best demo paper award at the 20th Intl. Conf. on Pervasive Computing and Communications (PerCom), online conference, 2022, for the paper "*A Drone-based Application for Scouting Halyomorpha halys Bugs in Orchards with Multifunctional Nets*" [c22].

Best paper award at the 23rd Intl. Conf. on Distributed Computing and Networking (ICDCN), online conference, 2022, for the paper "*Greedy Algorithms for Scheduling Package Delivery with Multiple Drones*" [c21].

2020 Visiting Scholar Recognition at the Missouri University of Science and Technology, College of Engineering and Computing for my outstanding teaching and service contributions.
Best paper award at the 21st Intl. Conf. on Distributed Computing and Networking (ICDCN), Kolkata, India, 2020, for the paper "*Greedy Algorithms for Scheduling Package Delivery with Multiple Drones*" [c13].

Best paper candidate at the 4th IEEE Intl. Conf. on Smart Computing (SMARTCOMP), Taormina, 2018, for the paper "*Range-Free Localization Algorithm Using a Customary Drone*" [c7].

Travel Grants

2023 **INdAM/GNCS** Funding for Conferences (personal).

2023 **UNIPG** Funding for Mobility/Traveling Projects.

2022 **INdAM/GNCS** Funding for Research Projects (PI: Giuseppe Prencipe, University of Pisa).

2022 **INdAM/GNCS** Funding for Young Researchers (personal).

2020 **INdAM/GNCS** Funding for Research Projects (PI: Alfredo Navarra, University of Perugia).

2019 **INdAM/GNCS** Funding for Conferences, Schools, Workshops, and Seminars (personal).

2017 **INdAM/GNCS** Funding for Young Researchers (personal).

National or International Collaborations

Coordinator at the National Project *BREADCRUMBS: Building up Robust and Efficient routing Algorithms for Drones by integrating Connectivity and Risk awareness in a Urban air Mobility Bvlos Scenario*, Funded by: MUR (PRIN 2022 PNRR).
Participant at the European Project *HALY-ID: HALYomorpha halys IDentification*, Funded by: ICT-AGRI-FOOD (Horizon 2020), and coordinated by Cristina M. Pinotti, Full Professor at the Dept. of Computer Science and Mathematics, University of Perugia. From this collaboration, we currently published the following results: [j6][j9][c23][c22].

Member of the *GEAR Lab–Group of rEsearch in Algorithms for emeRgent models*, directed by Cristina M. Pinotti, Full Professor at the Dept. of Computer Science and Mathematics, University of Perugia.

Collaboration with the *UC Merced robotics laboratory*, directed by Stefano Carpin, Full Professor at the Dept. of Computer Science and Engineering, University of California, Merced, USA. From this collaboration, we published the following results: [c14][j9].

Collaboration with the *SPRITZ Lab–Security and Privacy Research Group*, directed by Mauro Conti, Full Professor at the Dept. of Mathematics, University of Padua. From this collaboration, we published the following results: [j3][c17].

Collaboration with the *DREAM:Lab–Distributed Research on Emerging Applications and Machines*, directed by Yogesh Simmhan, Associate Professor at the Dept. of Computational and Data Sciences, Indian Institute of Science (IISc), Bangalore, India. From this collaboration, we published the following results: [c16].

Collaboration with the *VIMAN Lab–Virtualization, Multimedia and Networking Lab*, directed by Prasad P. Calyam, Associate Professor at the Dept. of Electrical Engineering and Computer Science, University of Missouri-Columbia, Columbia, Missouri, USA. From this collaboration, we published the following results: [c20].

Collaboration with the *CReWMaN Lab–Creative Research in Wireless Mobility and Networking*, directed by Sajal K. Das, Professor and Daniel St. Clair Endowed Chair, Dept. of Computer Science, Missouri University of Science and Technology, Rolla, Missouri, USA. From this long-term collaboration, I obtained a third of my results.

Participant at the National Project *NALP-SAPR: Navigazione Autonoma e Localizzazione Precisa per Sistemi Aeromobili a Pilotaggio Remoto*, funded by POR UMBRIA FSE 2014-2020, 24.0k EUR, and directed by Cristina M. Pinotti, Full Professor at the Dept. of Computer Science and Mathematics, University of Perugia.

Memberships

04/2021–12/2022	**Volunteer Appointment**, Dept. of Computer Science, *Missouri University of Science and Technology*, Rolla, Missouri, USA.
2019–NOW	**Member**, IEEE Member.
2020–2023	**Member**, ACM Member.
2020–NOW	**Member**, Research institution "Consorzio Interuniversitario Nazionale per l'Informatica" (CINI) Group.
2019–NOW	**Member**, Research institution "GRuppo di INformatica" (GRIN) Group.
2016–NOW	**Member**, Research institution (INdAM/GNCS) Group.

Supervision of Students

Ph.D.

(1) **Shafaq Khan**, Dept. of Computer Science and Mathematics, *University of Florence*, Thesis topic about drones and BVLoS flights, from Nov 2023 (supervisor).

(2) **Papiya Das**, Dept. of Computer Science and Mathematics, *University of Naples*, Thesis topic about drones and BVLoS flights, from Nov 2023 (co-supervisor).

Master's

(1) **Alessandro Angeletti**, Thesis: "*Analysis of microclimate weather stations data aimed to scouting the brown marmorated stink bug*", Dept. of Computer Science and Mathematics, *University of Perugia*, Sep 2023 (supervisor).

Bachelor's

(1) **Samuele Bianchi**, Thesis: "*Drone-based algorithms for a last-mile delivery system on mixed Euclidean-Manhattan metric scenario*", Dept. of Computer Science and Mathematics, *University of Perugia*, May 2022 (co-supervisor).

Periods Abroad

07/2023	**Visit**, at the *Technical University of Braunschweig*, Germany.
03/2023	**Visiting Scholar**, at the *Missouri University of Science and Technology*, Rolla, Missouri, USA.
09/2019–01/2020	**Visiting Scholar**, at the *Missouri University of Science and Technology*, Rolla, Missouri, USA.
04/2018	**Visit**, at the *Université de Corse Pascal-Paoli*, Corte, France.
08/2016–01/2017	**Visiting Scholar**, at the *Missouri University of Science and Technology*, Rolla, Missouri, USA.

Academic Responsibilities

General Chair

IEEE Intl. Workshop on Wireless Sensors and Drones in Internet of Things (Wi-DroIT) (2021, 2022).

Posters and Demo

IEEE Intl. Conf. on Smart Computing (SMARTCOMP) (2024).

Steering Committee

IEEE Intl. Workshop on Wireless Sensors and Drones in Internet of Things (Wi-DroIT) (2023, 2024).

Technical Program Committee Member

IEEE Intl. Conf. on Communication (ICC) (2024).
ACM Intl. Conf. on Distributed Computing and Networking (ICDCN) (2022, 2023, 2024).
ACM Intl. Symposium on Mobility Management and Wireless (MobiWac) (2021, 2022, 2023).
IEEE Intl. Conf. on Sensing, Communication, and Networking (SECON) (2022, 2023).
IEEE Intl. Conf. on Pervasive Computing and Communications (PerCom Demo) (2023, 2024).
IEEE Intl. Conf. on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT) (2023, 2024).
IEEE Intl. Conf. on Smart Computing (SMARTCOMP) (2022, 2023).
IEEE Intl. Conf. on Mobility, Sensing and Networking (MSN) (2022).
IEEE Intl. Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM) (2021, 2022, 2023, 2024).
ACM Intl. Workshop on Emergency Response Technologies and Services (EmeRTeS) (2022, 2023).
ACM Intl. Workshop on Machine Learning and Blockchain for Smart Society (MLBSS) (2022, 2023, 2024).
ACM Intl. Workshop on Societal Computing for the Internet of Things & You (SoCIeTY) (2024).
IEEE Intl. Workshop on Internet of Autonomous Unmanned Vehicles (IAUV) (2019, 2020).
IEEE Intl. Workshop on Wireless Sensors and Drones in Internet of Things (Wi-DroIT) (2019).
IEEE Intl. Workshop on Wirelessly Powered Systems and Networks (WPSN) (2020).
IEEE Intl. Workshop on Real-life modeling in 5G/6G networks (REFRESH) (2023).
IEEE Intl. Workshop on Sensors and Smart Cities (SSC) (2022, 2023).
IEEE Intl. Workshop on Unmanned Autonomous Vehicles and IoT (UAV-IoT) (2023).

Intl. Conf. on Intelligent Vehicles (ICoIV) (2020, 2022).
Intl. Conf. on Advances in Future (AFIN) (2022, 2023).
Intl. Conf. on Evolving Internet (INTERNET) (2023).
Intl. Conf. on Sensor Technologies and Application (SENSORCOMM) (2020, 2022, 2023).
Intl. Conf. on Mechanical, Electronic and Robotic Engineering (Mere) (2021).
Intl. Conf. on Mechatronics and Electrical Engineering (MEEE) (2022, 2023).
Intl. Conf. on Intelligent Sustainable Systems (ICISS) (2024).

Publicity Chair

IEEE Intl. Workshop on Wireless Sensors and Drones in Internet of Things (Wi-DroIT) (2019, 2020).
IEEE Intl. Workshop on Unmanned Autonomous Vehicles and IoT (UAV-IoT) (2023).
IEEE Intl. Workshop on Metrology for Agriculture and Forestry (MetroAgriFood) (2023).
Intl. Symposium on Algorithmics of Wireless Networks (ALGOSENSORS) (2020).

Web Chair

IEEE Intl. Workshop on Wireless Sensors and Drones in Internet of Things (Wi-DroIT) (2020, 2021, 2022).

Reviewer Activity

International Journals

ACM Transactions on Sensor Networks (TOSN), IEEE Access, IEEE Networking Letters (NL), IEEE Sensors Journal, IEEE Robotics and Automation Letters (RA-L), IEEE Transactions on Intelligent Transportation (T-ITS), IEEE Transactions on Mobile Computing (TMC), IEEE Transactions on Emerging Topics in Computational Intelligence (TETCI), Elsevier Computer Communications (COMCOM), Elsevier Computer Networks (COMNET), Elsevier Expert Systems with Applications (ESWA), Elsevier Pervasive and Mobile Computing (PMC), Elsevier Theoretical Computer Science (TCS), Springer Applied Network Science (ANS), Operations Research and Decisions (ORD), ITU Journal on Future and Evolving Technologies (ITU J-FET).

International Conferences and Workshops

AAMAS (2021, 2023), ACM EmeRTeS (2020), ACM ICDCN (2020), ACM MobiWac (2018, 2019), ACM 6G-ABS (2021), ACM KDD (2022), IEEE CASE (2021), IEEE WCNC (2021), IEEE PerCom (2021), IEEE COMSNETS (2020), IEEE ICNP (2021), IEEE MetroAgriFor (2023), IEEE DCOSS (2019, 2020, 2021), IEEE GLOBECOM (2019, 2020), IEEE ICNC (2018), IEEE ICDCS (2022), IEEE INFOCOM (2019, 2020, 2021, 2023, 2024), IEEE SMARTCOMP (2020), IEEE Wi-DroIT (2019, 2020), IEEE WIFS (2018), IEEE WoWMoM (2018, 2020), IEEE LCN (2023), CALDAM (2023), GECON (2021), GPC (2019), ALGOSENSORS (2020).

Talks, Seminars, and Dissemination

Presentations at Conferences and Workshops

11/2023	Presentation at the 5th IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor), Pisa, 2023, for the workshop paper "*Preliminary Results for Halyomorpha Halys Monitoring Relying on a Custom Dataset*" [c28].
06/2023	Presentation at the 19th IEEE International Conference on Distributed Computing in Sensor Systems (ISIoT), Paphos, Cyprus, 2023, for the workshop paper "*Technological Innovations in Agriculture for Scouting Halyomorpha halys in Orchards*" [c26].
05/2023	Presentation at the 6th International Workshop Drone-Assisted Wireless Communications for 5G and Beyond (DroneCom), online conference, 2023, for the workshop paper "*A Novel Multi-Layer Framework for Managing UAV Connectivity and Ground Risk in BVLoS Operations*" [c25].
03/2022	Presentation at the 20th IEEE Intl. Conf. on Pervasive Computing and Communications (PerCom), online conference, 2022, for the demonstration paper "*A Drone-based Application for Scouting Halyomorpha halys Bugs in Orchards with Multifunctional Nets*" [c22]. (**Best demo paper award**).
06/2020	Presentation at the 18th IEEE Intl. Conf. on Distributed Computing in Sensor Systems (DCOSS), online conference, 2020, for the paper "*Speeding-up Routing Schedules on Aisle-Graphs*" [c15].
10/2019	Presentation at the Science, Technology and Human Rights Conference (AAAS), Washington, DC, USA, 2019, for the talk "*Monitoring human rights in conflict: The use of drones is still a chimera*".
06/2019	Presentation at the 5th IEEE Intl. Conf. on Smart Computing (SMARTCOMP), Washington, DC, USA, 2019, for the paper "*Exact and Approximate Drone Warehouse for a Mixed Landscape Delivery System*" [c12].

06/2019 Presentation at the 1st IEEE WoWMoM Workshop on Wireless Networking, Planning, and Computing for UAV Swarms (SwarmNet), Washington, DC, USA, 2019, for the paper "*Ground Localization with a Drone and UWB Antennas: Experiments on the Field*" [c11].

05/2019 Presentation at the 1st IEEE Intl. Workshop on Wireless Sensors and Drones in Internet of Things (Wi-DroIT), Santorini, Greece, 2019, for the paper "*Automated Picking System Employing a Drone*" [c10].

07/2018 Presentation at the GEO-SAFE workshop - Robust Solutions for Fire Fighting (RSFF), L'Aquila, 2018, for the paper "*On the Localization of Sensors using a Drone with UWB Antennas*" [c8].

06/2018 Presentation at the 4th IEEE Intl. Conf. on Smart Computing (SMARTCOMP), Taormina, 2018, for the paper "*Range-Free Localization Algorithm Using a Customary Drone*" [c7]. (**Best paper candidate**).

01/2018 Presentation at the 19th ACM Intl. Conf. on Distributed Computing and Networking (ICDCN), Varanasi, India, 2018, for the paper "*Precise Localization in Sparse Sensor Networks using a Drone with Directional Antennas*" [c6].

03/2017 Presentation at the 3rd Italian Conf. on ICT for Smart Cities & Communities (I-CiTies), Bari, 2017, for the work "*Localization in Sparse Sensor Networks using a Drone with Directional Antennas*" [o1].

Seminars and Lectures

07/2023 **Presentation** at the *Technical University of Braunschweig*, Germany. Title: "*Smart Agriculture Applications by Leveraging Robots/Drones Operating in Aisle-Structures*".

04/2023 **Presentation** at the *University of Pisa*. Title: "*Optimizing Data Collection in IoT Sensor Networks using Drones: The Single-Drone Data-Collection Maximization Problem and Orienteering Aisle-graphs Single-access Problem*".

03/2023 **Seminar** at the *Missouri University of Science and Technology*, Rolla, USA. Title: "*Optimizing Data Collection in IoT Sensor Networks using Drones: The Single-Drone Data-Collection Maximization Problem and Orienteering Aisle-graphs Single-access Problem*".

02/2023 **Presentation** at the "2023 Haly.ID Workshop", Perugia. Title: "*Exploring the Advancements in Real-Time Object Detection: An Insight into DJI Matrice's Application*".

02/2023 **Presentation** at the "2023 Young researchers@DMI", Perugia. Title: "*Optimal and Heuristic Algorithms for Data Collection by Using an Energy- and Storage-Constrained Drone*".

07/2022 **Lecture** in the "Smart Living in the Era of IoT, AI, Data Science and Cybersecurity" PhD course at the *University of Pisa*, held by Sajal K. Das. Title: "*Robots and Drones in Smart Agriculture: Possible Applications*".

06/2022 **Presentation** at the "2022 General INdAM/GNCS Group Meeting", Montecatini Terme. Title: "*Optimal and Approximated Routing Schedules for Robots Operating in Aisle-Structures*".

04/2022 **Lecture** in the "Algorithms and Data Structures" class at the *University of Perugia*. Title: "*How Autonomous Vehicles can be Employed?*".

12/2021 **Lecture** in the "Algorithms and Data Structures" class at the *University of Perugia*. Title: "*Heuristic Algorithms for Co-scheduling of Edge Analytics and Routes for UAV Fleet Missions*".

04/2021 **Lecture** in the "Cyber-Physical Systems" class at the *Missouri University of Science and Technology*, Rolla, USA. Title: "*Unmanned Aerial and Ground Vehicles in Cyber Physical Systems Applications*".

11/2020 **Lecture** in the "Applied Graph Theory" class at the *Missouri University of Science and Technology*, Rolla, USA. Title: "*Random Graphs and Applications*".

11/2020 **Seminar** at the *Missouri University of Science and Technology*, Rolla, USA. Title: "*Optimal and Approximated Routing Schedules for Robots Operating in Aisle-Structures*".

04/2020 **Seminar** at the *Missouri University of Science and Technology*, Rolla, USA. Title: "*Energy-Constrained Delivery of Goods with Drones Under Varying Wind Conditions*".

02/2020 **Seminar** at the *Missouri University of Science and Technology*, Rolla, USA. Title: "*Range-free Localization Algorithms with Mobile Anchors at Different Altitudes: A Comparative Study*".

10/2019 **Seminar** at the *Missouri University of Science and Technology*, Rolla, USA. Title: "*How Autonomous Vehicles can be Employed?*".

05/2017 **Lecture** in the "Algorithms and Data Structures" class at the *University of Perugia*. Title: "*The use of the k-d Trees*".

09/2016 **Seminar** at the *Missouri University of Science and Technology*, Rolla, USA. Title: "*Localization with Guaranteed Bound on the Position Error using a Drone*".

Dissemination events

09/2023 **Sharper 2023** at the *University of Perugia*. Title of discussion: "*How to use drones and artificial intelligence to counteract the infestation of the Asian stink bug in orchards*".

05/2023 **Open Day 2023** at the *University of Perugia*.

Miscellaneous

2021–NOW **Drone license** A1/A3 Open Sub Category.

2010–NOW **Blood donor** at AVIS Agello, Italian association.

2010–NOW **Eddington number**: ≈ 120.

2023 2023 Italian University Road Cycling Champ., **2nd** *Employees* cat.

2023 2023 Italian University Employees' Road Cycling Champ., **2nd** *Veteran A* cat., (2nd/108 overall).

2022 2022 Italian University Employees' Road Cycling Champ., **1st** *Seniores* cat., (4th/87 overall).