Lorenzo Palazzetti

Curriculum Vitæ

Last update: **September 18, 2024**

Short Biography

I received the Bachelor and Master degrees in Computer Science from the University of Perugia, Italy, in 2018 and 2020, respectively. I earned a PhD in Computer Science with praise at the University of Florence, Italy, in 2024. I was a HALY.ID Research Fellow at Univerisity of Perugia. I am currently a Postdoctoral researcher at University of Perugia. My research interests include design and analysis of algorithms, combinatorial optimization, unmanned vehicles, computer vision.

Research Interests

Algorithms Design, Combinatorial Optimization, Unmanned Vehicles, Computer Vision.

Education

11/2020–04/2024	**Ph.D., Computer Science.** Thesis title: *"Optimizing Drone-Based Applications for Delivery and Smart Agriculture "*. Advisor: Maria Cristina Pinotti, Dept. of Computer Science and Math., University of Florence (Italy). Judgment: ***Excellent with praise***.
12/2018–09/2020	**M.Sc., Computer Science.** Thesis title: *"Routing drones being aware of wind conditions: the wind impact on the drone's route"*. Advisor: Maria Cristina Pinotti. Dept. of Computer Science and Math., University of Perugia (Italy). Judgment: ***summa cum laude***.
09/2015–11/2018	**B.Sc., Computer Science.** Thesis title: *"Lattice-Based Cryptography"*. Advisor: Marco Baioletti. Dept. of Computer Science and Math., University of Perugia (Italy). Judgment: ***104/110***.
09/2010–07/2015	**Secondary School Diploma in IT.** Technical Pole Franchetti Salviani, Città di Castello (Italy). Judgment: ***100/100***.

Work Experience

07/24–11/25 **Postdoctoral Researcher.** Università degli Studi di Perugia, Perugia, Italy.
OBJECTIVES: Development of advanced algorithms based on computer vision and artificial intelligence for autonomous drone navigation in BVLoS mode in GNSS-less environments.

02/2024–NOW **Algorithm and Data Structures Teaching Assistant.** Università degli Studi di Perugia, Perugia, Italy.

11/23–06/24 **Haly.ID Project Scholarship.** Università degli Studi di Perugia, Perugia, Italy.
TITLE: *"IoT data integration with drones: from raw data to activity loogbook. Principles of certification"*.
OBJECTIVES:

- Integration of UAV and IoT: protocol definition and implementation;
- Designing and development of data harvesting and management algorithms (including image elaboration);
- Loogbook: designing, and implementation of a trusted loogbook for the data collected in the orchard; designing of certification techniques providing a preliminary implementation.

10/2023–01/2024 **Algorithm and Data Structures Tutoring.** Università degli Studi di Perugia, Perugia, Italy. (Total hours: 27)

11/2022–06/2023 **Algorithm and Data Structures Tutoring.** Università degli Studi di Perugia, Perugia, Italy. (Total hours: 57)

03/2022–06/2022 **Algorithm and Data Structures Tutoring.** Università degli Studi di Perugia, Perugia, Italy. (Total hours: 35)

10/2019–12/2019 **University Internship.** Advisor: Valentina Poggioni. Project title: *Neural Collaborative Filtering: a Framework for Recommendations*. Dept. of Computer Science and Math., University of Perugia.

04/2018–06/2018 **System Manager.** Comune di Umbertide, Perugia, Italy.

03/2014–05/2014 **System Manager.** Comune di Città di Castello, Perugia, Italy.

Research Publications

Journal Articles

(a) **Lorenzo Palazzetti**, Aravind Krishnaswamy Rangarajan, Alexandru Dinca, Bas Boom, Dan Popescu, Peter Offermans, and Cristina M. Pinotti, "*The hawk eye scan: Halyomorpha halys detection relying on aerial tele photos and neural networks*". In: Computers and Electronics in Agriculture (CEA).

(b) Lennart Almstedt, Davide Baltieri, Francesco Betti Sorbelli, Davide Cattozzi, Daniele Giannetti, Amin Kargar, Lara Maistrello, Alfredo Navarra, David Niederprüm, Brendan O'Flynn, **Lorenzo Palazzetti**, Niccolo Patelli, Luca Piccinini, Cristina M Pinotti, Lars Wolf, Dimitrios

Zorbas, "*Beyond The Naked Eye: Computer Vision for Detecting Brown Marmorated Stink Bug and Its Punctures*". **IEEE Transactions on AgriFood Electronics**.

(c) Francesco Betti Sorbelli, Federico Corò, Punyasha Chatterjee, Sajjad Ghobadi, **Lorenzo Palazzetti**, and Cristina M. Pinotti, "*A Novel Graph-Based Multi-Layer Framework for Managing Drone BVLoS Operations*". **IEEE Transactions on Network and Service Management**.

(d) Daniele Giannetti, Niccolò Patelli, **Lorenzo Palazzetti** , Francesco Betti Sorbelli, Cristina M. Pinotti, and Lara Maistrello. (2024), "*First use of unmanned aerial vehicles to monitor Halyomorpha halys and recognize it using artificial intelligence*". In: Wiley Pest Management Science.

(e) Francesco Betti Sorbelli, Federico Corò, Sajal K. Das, **Lorenzo Palazzetti**, and Cristina M. Pinotti, "*Drone-based Bug Detection in Orchards with Nets: A Novel Orienteering Approach*". In: ACM Transactions on Sensor Networks

(f) Francesco Betti Sorbelli, **Lorenzo Palazzetti**, Cristina M Pinotti, "*YOLO-based Detection of Halyomorpha halys in Orchards Using RGB Cameras and Drones*". In: Computers and Electronics in Agriculture (CEA).

(g) Francesco Betti Sorbelli, Alfredo Navarra, **Lorenzo Palazzetti**, Cristina M. Pinotti, and Giuseppe Prencipe. "*Wireless IoT Sensors Data Collection Reward Maximization by Leveraging Multiple Energy-and Storage-Constrained UAVs*". Journal of Computer and System Sciences (JCSS), 2023.

(h) Francesco Betti Sorbelli, Federico Corò, Sajal K Das, **Lorenzo Palazzetti**, Cristina M Pinotti. "*How the Wind Can Be Leveraged for Saving Energy in a Truck-Drone Delivery System*". IEEE Transactions on Intelligent Transportation Systems (T-ITS).

(i) Francesco Betti Sorbelli, Federico Corò, Sajal K Das, **Lorenzo Palazzetti**, Cristina M Pinotti. "*On the Scheduling of Conflictual Deliveries in a last-mile delivery scenario with truck-carried drones*". In: Pervasive and Mobile Computing (PMC) (2022).

Conference and Workshop Proceedings

(1) Francesco Betti Sorbelli, **Lorenzo Palazzetti**, Cristina M Pinotti, "*A Drone-Based Automated Halyomorpha Halys Scouting: A Case Study on Orchard Monitoring*". In: IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor) (2023)

(2) Francesco Betti Sorbelli, **Lorenzo Palazzetti**, Cristina M Pinotti, "*Preliminary Results for Halyomorpha Halys Monitoring Relying on a Custom Dataset*". In: IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor) (2023).

(3) Dinca Alexandru, Popescu Dan, Maria Cristina Pinotti, Ichim Loretta, **Lorenzo Palazzetti**, Angelescu Nicoleta, "*Halyomorpha Halys Detection in Orchard from UAV Images Using Convolutional Neural Networks*". In: IWANN International Work Conference on Artificial Neural Networks (2023).

(4) Lennart Almstedt, Davide Baltieri, Francesco Betti Sorbelli, Davide Cattozzi, Daniele Giannetti, Amin Kargar, Lara Maistrello, Alfredo Navarra, David Niederprüm, Brendan O'Flynn, **Lorenzo Palazzetti**, Niccolo Patelli, Luca Piccinini, Cristina M Pinotti, Lars Wolf, Dimitrios Zorbas, "*Technological Innovations in Agriculture for Scouting Halyomorpha halys in Orchards*". In: 5th International Workshop on Intelligent Systems for the Internet of Things (ISIOT) (2023).

(5) Francesco Betti Sorbelli, Punyasha Chatterjee, Federico Corò, **Lorenzo Palazzetti**, Cristina M Pinotti, "*A Novel Multi-Layer Framework for BVLoS Drone Operation: A Preliminary Study*". In: IEEE INFOCOM DroneCom 2023 workshop (2023).

(6) Francesco Betti Sorbelli, Alfredo Navarra, **Lorenzo Palazzetti**, Cristina M Pinotti, Giuseppe Prencipe "*Optimal and Heuristic Algorithms for Data Collection by Using an Energy-and Storage-Constrained Drone*". 18th International Symposium on Algorithms and Experiments for Wireless Sensor Networks, (ALGOSENSORS 2022) September 8-9, 2022.

(7) Francesco Betti Sorbelli, Federico Corò, Sajal K. Das, Emanuele Di Bella, Lara Maistrello, **Lorenzo Palazzetti**, Cristina M. Pinotti "*A Drone-based Application for Scouting Halyomorpha halys Bugs in Orchards with Multifunctional Nets*". The 20th International Conference on Pervasive Computing and Communications (PerCom 2022) March 21-25, 2022. (**best demo award**)

(8) Francesco Betti Sorbelli, Federico Corò, Sajal K. Das, **Lorenzo Palazzetti**, and Cristina M. Pinotti. "*Greedy Algorithms for Scheduling Package Delivery with Multiple Drones*". In: 23rd International Conference on Distributed Computing and Networking (ICDCN), New Delhi, India, January 4-7, 2022. (**best paper award**)

(9) Francesco Betti Sorbelli, Federico Corò, Sajal K Das, *Lorenzo Palazzetti*, Cristina M Pinotti "*Drone-based optimal and heuristic orienteering algorithms towards bug detection in orchards*". 18th Int. Conf. on Distr. Computing in Sensor Systems (DCOSS 2022) May 30 - June 1, 2022.

(10) Francesco Betti Sorbelli, Federico Corò, Sajal K. Das, **Lorenzo Palazzetti**, and Cristina M. Pinotti. "*Cooperative Truck-Drone Scheduling Approach for Last-Mile Deliveries*". In: Italian Conference on Theoretical Computer Science (ICTCS short paper), September 13-15, 2021.

(11) **Lorenzo Palazzetti**, Cristina M. Pinotti, and Giulio Rigoni. "*A run in the wind: Favorable winds make the difference in drone delivery*". 17th International Conference on Distributed Computing in Sensor Systems (DCOSS), July 14-16, 2021.

(12) **Lorenzo Palazzetti**. "*Routing Drones Being Aware of Wind Conditions: a Case Study*". 17th International Conference on Distributed Computing in Sensor Systems (DCOSS), July 14-16, 2021.

Miscellaneous Experience

Visiting periods abroad

07/2023	Technische Universität Braunschweig (TUBS), Braunschweig, Germany (Jul. 10th – 17th 2023).

Mentoring Activity

Master Thesis

(1) (2024) "Cimice Asiatica: Controllo e Monitoraggio con Dashboard Interattive e Algoritmi di Computer Vision su NVIDIA Jetson", Fabio Bocchini, University of Perugia.

Conferences and Workshops

Demonstration of "Hawk Eye Scan: Halyomorpha Halys Detection Relying on Aerial Tele Photos and Neural Networks", Haly.ID project, Carpi, Italy, 24-25 May, 2024 [**presenter**]

IEEE INFOCOM DroneCom 2023, Drone-Assisted Wireless Communications for 5G and Beyond workshop, New York, USA, 17-20 May, 2023 [**audience**]

Progetto Algoritmi per il controllo distribuito MIcro MAcro robots (MIMA) GCNS INDAM in Pisa, Italy, April 4-6, 2023 [**audience**]

NVIDIA GTC in Virtually, March 21-23, 2023 [**audience**]

2nd Workshop Haly.ID in Perugia, Italy February 13-14, 2023 [**presenter**]

ALGOSENSORS 2022, International Symposium on Algorithms and Experiments for Wireless Sensor Networks, Potsdam, Germany, September 8-9, 2022 [**presenter**]

IEEE DCOSS 2022, International Conference on Distributed Computing in Sensor Systems, Marina Del Rey, LA, California, May 30-June 1, 2022 [**presenter**]

IEEE PerCom 2022, International Conference on Pervasive Computing and Communications, in Pisa, Italy, March 21-25, 2022. [**audience**]

ACM ICDCN 2022, International Conference on Distributed Computing and Networking, in New Delhi, India, January 4-7, 2022 [**audience**]

IEEE DCOSS 2021, International Conference on Distributed Computing in Sensor Systems, in Coral Bay, Pafos, Cyprus, July 14-16, 2021 [**audience**]

ICTCS Italian Conference on Theoretical Computer Science, in Bologna, Italy September 13-15, 2021 [**presenter**].

IEEE Wi-DroIT 2021, International Workshop on Wireless sensors and Drones in Internet of Things, in Coral Bay, Pafos, Cyprus, July 14-16, 2021 [**presenter**].

HALG 2021, Highlights of Algorithms, online, May 31-3 June, 2021 [**audience**].

Awards and Achievements

Award, **Best paper** in 2022 International Conference on Distributed Computing and Networking (ICDCN 2022).

Award, **Best demo** in 2022 International Conference on Pervasive Computing and Communications (PerCom 2022).

Talks and Seminars Held

21/03/2024	"*A Gentle Introduction to Computer Vision for Pest Management*", Parma, Italy. **seminar**.
20/03/2024	"*Introduction to Computer Vision*", Perugia, Italy. **class**.
11/07/2023	"*Next-Generation Farming: Drone Technology and Computer Vision to Mitigate Stink Bug Infestations*", Braunschweig, Germany. **seminar**.

10/05/2023	"*Transforming Farming with Drones: Harnessing Data for Precision Agriculture*", Perugia, Italy. **class**.
13/02/2023	"*Halyomorpha Halys Detection using Drone-Captured Images and YOLOv5*", Perugia, Italy. **seminar**.
14/02/2023	"*Exploring the Advancements in Real-Time Object Detection: An Insight into DJI Matrice's Application*", Perugia, Italy. **seminar**.
21/04/2023	"*UNIPG Report: Release of the Latest Drone Application, Machine Learning Advancements, and Preliminary Time Series Analysis*", Perugia, Italy. **seminar**.
16/06/2023	"*Machine Learning Advancements in Haly.ID project*", Perugia, Italy. **seminar**.
14/10/2022	"*A Discussion about Smart Agriculture Technologies for Scouting Halyomorpha halys in Orchards*", Rolla, MO, USA. **seminar**.
05/04/2022	"*Routing Drones Being Aware of Wind Conditions*", Perugia, Italy. **class**.
14/12/2021	"*Drones & their Applications*", Perugia, Italy. **class**.
14/03/2021	"*Transaction & Fork Bitcoin*", Perugia, Italy. **seminar**.
14/03/2021	"*Tor & deanonymization attacks*", Perugia, Italy. **seminar**.

Talks and Seminars Attended

31/01/2024	"*Future Satellite Communications for 5G/6G*", **Speaker:** Zhili Sun, University of Surrey, UK.
05/11/2023	"*Use Your Own CUDA ROS Node with NITROS on NVIDIA Jetson*", **Speaker:** NVIDIA Corporation.
04/10/2023	"*Single machine scheduling in additive manufacturing with two-dimensional packing constraints*", **Speaker:** Kan Fang Tianjin University.
28/07/2023	"*Spatially-Coupled Hidden Markov Models for Short-Term Forecasting of Wind Speed*", **Speaker:** Vianey Leos Barajas University of Toronto.
18/01/2023	"*Recent Advances in Flow Time Scheduling*", **Speaker:** Lars Rohwedder Maastricht University.
02/12/2022	"*Machine-Learning Applications in Process-understanding and Prediction of Wildfire*", **Speaker:** Jiafu Mao, from Oak Ridge National Laboratory.
14/03/2022	"*Trustworthy Machine Learning with Differential Privacy and Certified Robustness*", **Speaker:** Dr. Ardhendu Tripathy, Missouri S&T.
21/02/2022	"*Towards High-Throughput Cryptocurrency Transactions in Payment Channel Networks*", **Speaker:** Dr. Dejun Yang, Department of Computer Science, Colorado School of Mines.
14/02/2022	"*Data Integration: The Forgotten Stepchild of Data Science*", **Speaker:** Dr. Roger D. Chamberlain, CSE Department, Washington University in St. Louis.

16/12/2021	"*Genomic Analysis at Scale: Mapping Irregular Computations to Advanced Architectures*", **Speaker:** Katherine Yelick, University of California Berkeley and Lawrence Berkeley National Laboratory.
24/11/2021	"*Tabu search for the time-dependent vehicle routing problem with time windows on a road network*", **Speaker:** Michel Gendreau, Polytech Montréal.
10/11/2021	"*Train Scheduling: Models, decomposition methods and practice*", **Speaker:** Carlo Mannino, SINTEF & Oslo University.
25/10/2021	"*The Impact of Transportation Networks, Vaccines, and Vaccine Hesitancy on Epidemic Spreading*", **Speaker:** Dr. Philip E. Paré, Purdue University.
30/08/2021	"*Computational Sustainability: Computing for a Better World and a Sustainable Future*", **Speaker:** Carla P. Gomes, Department of Computer Science Cornell University.
04/05/2021	"*Toward efficient and safe intelligent aerial robotics and aerial manipulation, AIDA lectures*", **Speaker:** Prof. Anibal Ollero, University of Seville.
30/04/2021	"*Secure Information Forwarding through Fragmentation in Delay-tolerant Networks*", **Speaker:** Dr. Sanjay K Madria, Department of Computer Science, Missouri S&T.
23/04/2021	"*Advanced Computing for NASA Science and Engineering*", **Speaker:** Dr. Rupak Biswas, NASA Ames Research Center.

Technical Program Committee Member

International Conference on Smart Computing (SMARTCOMP 2024).

International Workshop on Unmanned Vehicles and IoT (UAV-IoT 2024).

IEEE ASDRoNet (2024).

IEEE MetroAgriFor (2024).

ALLSENSORS (2024).

SENSORCOMM (2024).

SENSORDEVICES (2024).

International Conference on Accessible Digital Agriculture Technologies (CADAT 2024).

Web Chair

IEEE ASDRoNet (2024).

IEEE Wi-DroIT (2023).

Publicity Chair

IEEE ASDRoNet (2024).

IEEE MetroAgriFor (2024).

IEEE Wi-DroIT (2024).

Reviewer activity

Journals

Taylor and Francis Transportmetrica B: Transport Dynamics.

ACM Transactions on Sensor Networks (TOSN).

F1000Research.

Elsevier Pervasive and Mobile Computing (PMC).

IEEE Transactions on Mobile Computing (TMC).

IEEE Transactions on Network Science and Engineering (TNSE).

PAGEPress Journal of Agricultural Engineering (JAE).

Tech Science Press Computers, Materials & Continua (CMC).

Elsevier Computer and Electronics in Agriculture (CEA).

Elsevier Computers and Operations Research (COR).

Workshops and Conferences

ACM SIGKDD (2022).

IEEE WoWMoM (2022).

AAMAS (2022).

IEEE MetroAgriFor (2023).

IEEE Wi-DroIT (2023).

IEEE WoWMoM (2024).

IEEE DCOSS (2024).

IEEE Wi-DroIT (2024).

International Conference on Smart Computing (SMARTCOMP 2024).

International Workshop on Unmanned Vehicles and IoT (UAV-IoT 2024).

IEEE ASDRoNet (2024).

IEEE MetroAgriFor (2024).

Research Groups and Funds to Which I Belong

2024–2025	**Affiliation**, BREADCRUMBS group. Head: Prof. Francesco Betti Sorbelli.

2020–2023	**Member**, Association for Computing Machinery (ACM).
2022–NOW	**Member**, Institute of Electrical and Electronics Engineers (IEEE).
2020–NOW	**Member**, International Project Haly.ID. Head: Prof. Cristina M. Pinotti.
2020–2024	**Affiliation**, Haly.ID Group. Head: Prof. Cristina M. Pinotti.
2020–NOW	**Affiliation**, Research institution (INdAM), GNCS Group. Head: Prof. Alfredo Navarra.

Skills

Computer

OS	Android, Linux, Microsoft Windows.
CODING	Bash, C, C++, Java, JavaScript, LaTeX, MATLAB, Python, PHP, Visual Basic, Visual Basic for Applications, Pasqual, OCamel.
FRAMEWORK	Lavarel, Bootstrap.
DATABASES	MySQL, PostgreSQL, SQLite.
WEB	jQuery, Ajax, JSON, CMS.
SERVER	Tomcat, Apache.
IDE	PyCharm, NetBeans.
SOFTWARE	Photoshop, Illustrator, Libreoffice, VirtualBox, Docker, BlueSky.

Languages

ITALIAN	Mother tongue.
ENGLISH	B2 Level.
FRENCH	A2 Level.

Other

DRONE LICENSE	A1/A3 Open Sub Category.