Antonia BRUNO

Nationality: Italian

Email: antonia.bruno@unimib.it;

Orcid ID: 0000-0002-1929-6652

Work: Biotechnology and Biosciences Department, University of Milano-Bicocca, Milan (Italy).

Keywords

Microbiome; Ecology; Health; Drinking Water; Aquatic Ecosystems; Biodiversity; eDNA; (Micro)organisms Interactions; Built Environments; Food; High Throughput DNA Sequencing.

Research Field

More than one keyword can describe my research activity: I was always interested in ecosystems studies, thinking of biodiversity as a *value*. I have always approached this issue from a multidisciplinary perspective: I am convinced that only through the integration of different techniques and expertise we can achieve a deep knowledge and a correct interpretation of biological phenomena. Starting point and thread conductor of my research field is DNA analysis, first through DNA barcoding, then naturally switching to DNA metabarcoding, thanks to the technologies of High Throughput DNA Sequencing (HTS), to identify living organisms. I have a particular interest in microbiome studies to evaluate how microbial communities can interact with humans and the environment, an interest I further deepened thanks to my research activity.

Starting from my PhD project, I had the opportunity to explore the microbial communities harboured by unconventional environments, such as the groundwater ecosystem and drinking water treatment plants. Thanks to HTS techniques coupled with an accurate experimental design, I was able to detect even ultra-small unculturable bacteria and the so-called “microbial dark matter” in drinking water. Thus, I was involved in research activities related to the molecular characterization of complex matrices, spanning from tap water, grape and wine, plant-based processed food products, and insec-based novel food. From a broader

perspective, my final aim is to study the correlations that link microbial dynamics, environment, and health: characterizing the factors that can affect the community of organisms, and that can have an impact on the environment and on human health, can be useful for the identification of prospective indicators, allowing to develop and implement prevention measures.

From 2018, I am BEST4FOOD team member (Bicocca Center of Science and Technology for Food www. Best4food.it) and I am involved in research related to the topics “drinking water microbiome and environmental microbiomes” and “DNA barcoding and metabarcoding of food and environmental matrices”.

During these years, I attended several workshops and international congresses to improve knowledge, exchange of information and best practices related to these topics. In particular, I followed the DNA Metabarcoding School workshop co-organized by the University of Tromsø, ForBio – the Research School in Biosystematics, and Metabarcoding.org, and I earned the certificate for "Gut Check: Exploring Your Microbiome”, University of Colorado Boulder, University of Colorado System & University of California, San Diego on Coursera.

Education & Work Experience

2020 – now: Post Doc position (Assegnista di Ricerca) at the Biotechnologies and Biosciences Department, University of Milano-Bicocca, Milan (Italy).

Research project: "HTS-based approach to profile microbiome and biodiversity in the built environment context". Supervisor: Massimo Labra.

2016 – 2020: Post Doc position (Assegnista di Ricerca) at the Biotechnologies and Biosciences Department, University of Milano-Bicocca, Milan (Italy).

Research project: “eDNA: un modo innovativo per studiare le dinamiche evolutive di sistemi ambientali complessi" / "eDNA: an innovative way to study evolutive dynamics in complex ecosystems". Supervisor: Maurizio Casiraghi.

From 2018, BEST4FOOD team member (Bicocca Center of Science and Technology for Food www. Best4food.it) and involved in research related to the topics “drinking water microbiome and environmental microbiomes” and “DNA barcoding and metabarcoding of food and environmental matrices”.

2016/02/15: PhD, Biology (XXVIII cycle), Biotechnologies and Biosciences Department, University of Milano-Bicocca (Milan, Italy).

Dissertation: “Drinking water microbiota: from the source to the tap”. Supervisor: Maurizio Casiraghi.

2012/07 – 2012/09: External collaboration with the Biotechnologies and Biosciences Department, University of Milano-Bicocca (Milan, Italy).

The collaboration concerned the development of criteria for environmental assessment for the project “Vivilaterra”.

2012/04 – 2012/07: stage at FEM2 – Ambiente S.r.l, spin-off of the Biotechnologies and Biosciences Department, University of Milano-Bicocca (Milan, Italy). The work plan dealt with molecular diagnosis of avian pathologies.

2012/03/29: Master’s Degree in Biology (110/110 cum laude), Biotechnologies and Biosciences Department, University of Milano-Bicocca (Milan, Italy).

Teaching

A.A. 2020-2021; 2019-2020; 2018-2019; 2017-2018; 2016-2017; 2015-2016; 2014-15; 2013-14: Biotechnologies and Biosciences Department, University of Milano-Bicocca (Milan, Italy).
Zoology Laboratory activity, Bachelor's Degree in Biological Sciences.
“**Cultore della Materia**” in Zoology.

A.A. 2020-2021; 2019-2020; 2018-2019; A.A. 2017-2018; 2016-2017: Biotechnologies and Biosciences Department, University of Milano-Bicocca (Milan, Italy).
Zoology Tutoring activity, Bachelor's Degree in Biological Sciences.

A.A. 2019-2020; 2018-2019: Biotechnologies and Biosciences Department, University of Milano-Bicocca (Milan, Italy).
Chemistry Laboratory activity, Bachelor's Degree in Biological Sciences.

Supervision and Mentoring

From 2014, co-supervisor of seven Master Students in the Biotechnologies and Biosciences Department, University of Milano-Bicocca (Milan, Italy).

Scientific Publications

1. **Bruno, A.**, Sandionigi, A., Magnani, D., Bernasconi, M., Pannuzzo, B., Consolandi, C., ... & Casiraghi, M. (2021). Different Effects of Mineral versus Vegetal Granular Activated Carbon Filters on the Microbial Community Composition of a Drinking Water Treatment Plant. Frontiers in Ecology and Evolution, 9, 166.
2. Scolari, F., Sandionigi, A., Carlassara, M., **Bruno, A.**, Casiraghi, M., & Bonizzoni, M. (2021). Exploring Changes in the Microbiota of Aedes albopictus: Comparison Among Breeding Site Water, Larvae, and Adults. Frontiers in Microbiology, 12, 23.
3. Galimberti, A., **Bruno, A**., Agostinetto, G., Casiraghi, M., Guzzetti, L., & Labra, M. (2020). Fermented food products in the era of globalization: tradition meets biotechnology innovations. Current Opinion in Biotechnology, 70, 36-41.
4. Agostinetto, G., Sandionigi, A., Chahed, A., Brusati, A., Parladori, E., Balech, B., **Bruno, A**., Pescini, D., & Casiraghi, M. (2020). ExTaxsI: an exploration tool of biodiversity molecular data. ***bioRxiv.***
5. Frigerio, J., Agostinetto, G., Galimberti, A., De Mattia, F., Labra, M., & **Bruno, A**. (2020). Tasting the differences: microbiota analysis of different insect-based novel food. Food Research International, 109426.
6. Panio, A., Corsarini, S. F., **Bruno, A.**, Lasagni, M., Labra, M., & Saliu, F. (2020). Determination of phthalates in fish fillets by liquid chromatography tandem mass spectrometry (LC-MS/MS): A comparison of direct immersion solid phase microextraction (SPME) versus ultrasonic assisted solvent extraction (UASE). Chemosphere, 127034.
7. **Bruno, A.**, Sandionigi, A., Agostinetto, G., Bernabovi, L., Frigerio, J., ,Casiraghi, M., & Labra, M. (2019). Food Tracking Perspective: DNA Metabarcoding to Identify Plant Composition in Complex and Processed Food Products. Genes, 10, 248.
8. **Bruno, A.**, Sandionigi, A., Bernasconi, M., Panio, A., Labra, M., & Casiraghi, M. (2018). Changes in the drinking water microbiome: effects of water treatments along the flow of two drinking water treatment plants in a urbanized area, Milan (Italy). Frontiers in Microbiology, 9, 2557.
9. Nardone, V., Bosso, L., Della Corte, M., Sasso, M., Galimberti, A., **Bruno, A.**, Casiraghi, M., Russo, D. (2018). Native red foxes depredate nests of alien pond sliders: Evidence from molecular detection of prey in scats. MAMMALIAN BIOLOGY, vol. 88, p. 72-74, ISSN: 1616-5047.

10. **Bruno, A.**, Sandionigi, A., Rizzi, E., Bernasconi, M., Vicario, S., Galimberti, A., Cocuzza, C., Labra, M. and Casiraghi, M., 2017. Exploring the under-investigated “microbial dark matter” of drinking water treatment plants. Scientific Reports, 7.
11. Mezzasalma, V, Sandionigi, A, Bruni, I, **Bruno, A**, Lovicu, G, Casiraghi, M, Labra, M. (2017). Grape microbiome as a reliable and persistent signature of field origin and environmental conditions in Cannonau wine production. PLOS ONE, vol. 12, e0184615, ISSN: 1932-6203, doi: 10.1371/journal.pone.0184615
12. **Bruno, A.**, Sandionigi, A., Galimberti, A., Siani, E., Labra, M., Cocuzza, C., Ferri, E. and Casiraghi, M., 2017. One step forwards for the routine use of high-throughput DNA sequencing in environmental monitoring. An efficient and standardizable method to maximize the detection of environmental bacteria. MicrobiologyOpen, 6(1).
13. Casiraghi, M., Galimberti, A., Sandionigi, A., **Bruno, A.** and Labra, M., 2016. Life With or Without Names. Evolutionary Biology, pp.1-14.
14. Galimberti, A., Spinelli, S., **Bruno, A.**, Mezzasalma, V., Mattia, F., Cortis, P. and Labra, M., 2016. Evaluating the efficacy of restoration plantings through DNA barcoding of frugivorous bird diets. Conservation Biology, 30(4), 763-773.
15. Galimberti, A., Sandionigi, A., **Bruno, A.**, Bellati, A. and Casiraghi, M., 2015. DNA barcoding in mammals: what's new and where next?. Hystrix, the Italian Journal of Mammalogy, 26(1), pp.13-24.
16. Marsoni, M., De Mattia, F., Labra, M., **Bruno, A.**, Bracale, M. and Vannini, C., 2014. Uptake and effects of a mixture of widely used therapeutic drugs in Eruca sativa L. and Zea mays L. plants. Ecotoxicology and environmental safety, 108, pp.52-57.
17. Galimberti, A., **Bruno, A.**, Mezzasalma, V., De Mattia, F., Bruni, I. and Labra, M., 2015. Emerging DNA-based technologies to characterize food ecosystems. Food Research International, 69, pp.424-433.
18. Galimberti, A., Sandionigi, A., **Bruno, A.**, Bruni, I., Barbuto, M., Casiraghi, M., & Labra, M. (2015). Towards a universal molecular approach for the quality control of new foodstuffs. Advances in Food Biotechnology, 37.
19. Sandionigi, A., Vicario, S., Prosdocimi, E.M., Galimberti, A., Ferri, E., **Bruno, A.**, Balech, B., Mezzasalma, V. and Casiraghi, M., 2015. Towards a better understanding of Apis mellifera and Varroa destructor microbiomes: introducing ‘phyloh’as a novel phylogenetic diversity analysis tool. Molecular ecology resources, 15(4), pp.697-710.
20. Galimberti, A., Labra, M., Sandionigi, A., **Bruno, A**., Mezzasalma, V. and De Mattia, F., 2014. DNA barcoding for minor crops and food traceability. Advances in Agriculture, 2014.

Awards

2020 Bicocca Starting Grants
Funded project: “Revolutionizing SEAfood TRACEability using a multi-OMICS approach (SEATRACEOMICS)” **Bruno A.**, Maggioni D.

Conferences

2020 ASM Conference on Rapid Applied Microbial Next Generation Sequencing and Bioinformatic Pipelines, Online 07-11/12/2020

ePoster presentation: “Aquaculture Ecosystem Microbiota at the Water-Fish Interface: the Role of Water, Fish Skin and Insect-based Feed Formulation in the Microbial Community Structure”. Bruno A., Sandionigi A., Panio A., Agostinetto G., Terova G., Saroglia M., Gasco L., Orizio F., Labra M.

2019 BtBsDay2019, Milan (Italy)

Poster presentation: “Why we should invest in drinking water microbiome studies”. Bruno A., Sandionigi A., Magnani D., Panio A., Orizio F., Labra M., Casiraghi M.

2019 SIBE19, Padua (Italy)

Oral presentation: “Mining the microbial word of a drinking water treatment plant: unexplored biodiversity revealed”. Bruno A., Sandionigi A., Magnani D., Panio A., Bernasconi M., Labra M., Casiraghi M.

2019 BAGECO15, Lisbon (Portugal)

Oral presentation: “Drinking water microbiota: astounding biodiversity, almost unexplored”. Bruno A., Sandionigi A., Magnani D., Panio A., Orizio F., Bernasconi M., Labra M., Casiraghi M.

2019 UZI 2019, Rome (Italy)

Contribution for: “From DNA barcoding to e-DNA monitoring: new insights on italian odonate diversity”. Galimberti A., Assandri G., Ramazzotti F., Sandionigi A., Bruno A., Tommasi N., Casiraghi M.

2018 MicrobiotaMi 18, Milan (Italy)

Poster presentation: “Drinking water microbiota: exploring the neglected biodiversity from the source to the tap”. Bruno A., Sandionigi A., Magnani D., Panio A., Orizio F., Labra M., Casiraghi M.

Poster: “Evaluation of bioinformatic methods to reveal drinking water microbial community”. Agostinetto G., Sandionigi A., Bruno A., Bernabovi L., Casiraghi M.

2018 DATA4WATER Information Day - Research in Water Management, Milan (Italy)

Oral presentation: “It’s a long way to the tap: drinking water ecosystem and monitoring strategies in a prevention perspective”. Bruno A.

2018 FISV 2018, Rome (Italy)

Poster presentation: “Drinking water microbiota: where biodiversity rules”. Bruno A., Sandionigi A., Magnani D., Panio A., Cuccia M., Orizio F., Labra M., Casiraghi M.

2017 BtBsDay2017, Milan (Italy)

Poster presentation: “The unexplored world of drinking water biodiversity”. Bruno A., Panio A., Cuccia M., Magnani D., Tanzi B., Bernasconi M., Sandionigi A., Labra M., Casiraghi M.

2017 FEMS 2017, Valencia (Spain)

Poster presentation: “Drinking water microbiome: a neglected biodiversity revealed”. Bruno A., Sandionigi A., Bernasconi M., Siani E., Labra, M. Casiraghi.

2016 1° Congresso Nazionale Congiunto **SITE-UZI-SIB**, Milan (Italy)

Oral presentation: “eDNA metabarcoding: a troubleshooting guide”. Bruno A., Sandionigi A., Galimberti A., Mezzasalma V., Siani E., Casiraghi M.

2015 BAGECO13, Milan (Italy)

Poster presentation: “Drinking water microbiome: from groundwater to the tap”. Bruno A., Sandionigi A., Rizzi E., Mezzasalma V., Barbuto M., Labra M., Casiraghi M.

2015 FEMS 2015, Maastricht, (The Netherlands)

Poster presentation: “Drinking water microbiome: towards a method assessing microbial structure variability”. Bruno A., Sandionigi A., Mezzasalma V., Barbuto M., Rizzi E., Casiraghi M.

2015 SIBE15, Bologna (Italy)

Contribution for: “Next-gen monitoring strategies. A warning system for EXPO2015.” Sandionigi A., Bruno A., Chiodi A., Galimberti A., Manzari C., Pesole G., Casiraghi M.

2014 BtBsDay2014, Milan (Italy)

Poster presentation 1: “Drinking water microbiome: towards a method assessing microbial structure variability”. Bruno A., Sandionigi A., Mezzasalma V., Barbuto M., Rizzi E., Casiraghi M.

Poster presentation 2: “From oral probiotics to vaginal colonization”. Manfrini E., Mezzasalma V., Bruno A., Ferri E., Panunzi E., Bruni I, De Mattia F., Labra M.

2014 FISV 2014 Pisa (Italy)

Poster presentation: “A world inside a glass of drinking water: community analysis and dynamics of antibiotic resistance genes”. Bruno A., Sandionigi A., Barbuto M., Galimberti A., Mezzasalma V., Casiraghi M.

2014 Third Metabarcoding School, Tromso (Norway)

Oral presentation “Drinking water microbiome: preliminary study to assess how it can vary across a drinking water treatment plant”. Bruno A.

2012 Italian Gekko Meeting, Novellara (RE), (Italy)

Oral presentation: “Tecniche di sessaggio molecolare di erpetofauna”. Bruno A., Ferri E.

Seminars (invited)

2019 Fine Feed For Fish - Aquaculture Summer School Alghero (Italy)

“Tecnologie emergenti per la qualità ambientale: analisi del microbiota dell’acqua nell’allevamento ittico”

2018 Seminar for PhD School University of Milano, Milan (Italy)

“L’acqua: un dialogo interdisciplinare (antropologia, biotecnologie, scienze giuridiche)” - “Water ecosystem: where biodiversity rules”

2017 Seminar LabMeth, University of Milano, Milan (Italy)

“DNA metabarcoding to uncover environmental and communities biodiversity”

2017 Seminar for PhD School University of Milano, Milan (Italy)

“Metagenomics project design – The HowTo guide. Pros and cons in metagenomics approaches.”

2016 Coordination, management and teaching Fondazione Minoprio - Centro lombardo per l’incremento della floro-orto-frutticoltura - Vertemate con Minoprio (CO) (Italy)

“PRIMER DESIGN: TIPS, TOOLS… AND MORE” during the advanced training “Application of High-Throughput Sequencing Techniques for phytosanitary sector”

2016 Seminar LabMeth, University of Milano, Milan (Italy)

“DNA metabarcoding to uncover environmental and communities biodiversity”

Workshop & Courses attended (selection)

2020 “**Communicating Science to the Public**” webinar series, *Nature Research Academy*. 22–24 June 2020, University of Milano-Bicocca. Certificate of Attendance.

2018 “**Microinquinanti e contaminanti emergenti. Testimonianze, soluzioni e prospettive**”, Politecnico di Milano, Milan (Italy), 2018. Certificate of Attendance.

2017 "**Gut Check: Exploring Your Microbiome**”, University of Colorado Boulder, University of Colorado System & University of California, San Diego on Coursera. Certificate earned in June, 2017.

2016 "**Introduction to RAD-seq Data Analysis**", Edinburgh Genomics, Edinburgh (GB), 29-30 November 2016.

2016 "**NGS Day**", Milan, Italy, 2016. Certificate of Attendance.

2014 **"Professional Development for Young Scientists - ProDYS"**, Milan, Italy, July 2014. Certificate of Attendance.

2014 **"Third Metabarcoding School"**, Tromso, Norway, April 2014. ForBio Workshop attendance.

2013 **"Second Metabarcoding School"**, Heraklion, Greece, May 2013. Workshop attendance.

Science Communication

2021 Interview for **BicoccAlumni**: Bicocca Starting Grant: Seatraceomics. 10/03/2021 www.bicoccalumni.it/it/storie-di-bicoccalumni/bicocca-starting-grant-seatraceomics

2021 Interview for **Geo**, Rai3: *Milano-Bicocca investe sui giovani ricercatori. Con Antonia Bruno si parla del progetto sulla tracciabilità del pescato*. 16/02/2021

2021 Interview for **RadioInBlu**: *Cosa c'è di buono - Milano-Bicocca punta sui giovani ricercatori: al via nove progetti innovativi e multidisciplinari: Progetto SeaTraceOmics*. 13/01/2021

2020 Science communication webinar: *Aquatic ecosystem & aquaculture: challenges & perspectives.* Bruno A. (2020). www.progettoager.it

2020 Science communication article: *Le nuove frontiere della ricerca: la sfida del vaso di pandora*. Bruno A., Panio A. (2020). www.progettoager.it

2019 Science meetings **Le Strade della Salute**. *La ricerca nell'acqua per scoprirne i suoi segreti*. University of Milano-Bicocca, Milan (Italy). 16/05/2019

2018 Science communication article: *Acquacoltura, sostenibilità e innovazione: il microbioma dell'acqua può giocare un ruolo chiave*. Orizio, F., Bruno, A., Panio, A., & Labra, M. (2018). www.progettoager.it

2018 Science communication article: *La valutazione dell'impatto ambientale in acquacoltura*. Orizio, F., Bruno, A., Magatti, G., Magoni, C. & Labra, M. (2018). www.progettoager.it

2018 **World Water Day 2018**: "Local Researches for a Global Impact", University of Milano-Bicocca, Milan (Italy)

2018-2013 **MeetMeTonight** Milan (Italy)

2015 **Science Corner organized for EXPO 2015** Milan (Italy).

Funded Projects I was involved in

2017-2020 Sistemi Alimentari e Sviluppo Sostenibile: Creare sinergie tra ricerca e processi internazionali e africani (SASS) / Sustainable Agri-Food System Strategies. Funded by MIUR.

2016-2018 Xenogenetics of drinking water: Microbiome and Resistome analyses for the improvement of water safety assessment tools. Funded by Fondazione Cariplo.

2016-2018 Piattaforma ICT per La Gestione della Rete Idrica Milanese (PILGRIM) / ICT platform for the management of MIlan drinking water distribution system. REALIZZATO CON IL SOSTEGNO DI - UNIONE EUROPEA Regione Fondo europeo di sviluppo regionale POR FESR 2014-2020 / INNOVAZIONE E COMPETITIVITÀ.

2016-2020 Fine Feed For Fish - 4F. Progetto Ager Funded by Fondazione Cariplo.

2016 Progetto Galileo, MetaFOOD - Design, development and implementation of standardized bioinformatics workflows for applied food traceability.

2014-2015 Monitoraggio ambientale e valutazione precoce di un'eventuale diffusione di organismi alloctoni al fine di ridurre o azzerare l'impatto di un inquinamento genetico sulla biodiversità autoctona in occasione dell'Esposizione Universale di Milano. / Environmental monitoring and early warning of possible alien species distribution in the occasion of EXPO2015. Funded by EXPO S.p.a.

Other info

Reviewer for Food Research International, PlosONE, The International Journal of Food Science and Technologies, Microbial Cell Factories.

Topic editor for the research topic for **Frontiers in Ecology and Evolution**:
Stressors Acting on Aquatic Ecosystems: High-Throughput Sequencing Approaches to Shed Light on Human-Nature Interactions.

Topic editor for **Foods** (mdpi).

Member of the **ISME** (International Society for Microbial Ecology).
Member of the **ASM** (American Society of Microbiology).

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali".

25/03/2021