

Claudio Bandi – Curriculum Vitae

Current position, institutional address, contacts

Full Professor of Microbiology

Department of Biosciences and Pediatric Clinical Research Center “Romeo ed Enrica Invernizzi”, University of Milan, via Celoria 26, Milano, Italy

Member of the Technical-Scientific Committee of the National Antipandemic Centre

Member of the Scientific Committee of IRCAF – Invernizzi Reference Centre on Agri-Food

Current roles at the University of Milan

Full Professor of Microbiology

Coordinator of Sky-Net UNIMI – Platform for Genomic Epidemiology and Experimental Microbiology

Delegate of the Rector of the University of Milano for the coordination of PNRR partnership project PE13 -

Emerging Infectious Diseases – INF-ACT

Major teaching duties at the University of Milan

Evolutionary Biology and History of Biology (Biology, Bachelor)

History and Philosophy of Science (Biology, Master)

Evolutionary Biology (Natural Sciences, Bachelor)

Microbiology (Medicine and Surgery)

Bibliometric parameters

Author of over 260 peer-reviewed papers in international journals

H-index: 75 in Google Scholar (62 in Scopus)

Quotations: over 18.800 in Google Scholar (over 12.800 in Scopus)

Academic age: first paper published in 1993; PhD title in 1996

Studies and Academic career

MSc in Biology, with honour, University of Pavia, 1991

PhD in Comparative Pathology, University of Milan, 1996

Post Doc researcher, University of Milan, 1996-1998

Research Scientist, Univ. of Milan, 1998-2000

Associate Professor, Univ. of Milan, 2000-2010

Full Professor, Univ. of Milan, from 2010

PhD Students, Post Docs, and young visiting scientists in Claudio Bandi's lab, and their current positions

- Nathan Lo, PostDoc ‘rientro dei cervelli’, now Full Professor, University of Sydney
- Maurizio Casiraghi, PhD student and PostDoc, now Full Professor and Prorettore, Univ. Milano Bicocca
- Guido Favia, PostDoc, now Full Professor, Univ. of Camerino
- Chiara Bazzocchi, PhD student and PostDoc, now Associate Professor, Univ. of Milan
- Sara Epis, PhD student and PostDoc, now Associate Professor, Univ. of Milan
- Davide Sasseria, PhD student and PostDoc, now Associate Professor, Univ. of Pavia
- Matteo Montagna, PhD student and PostDoc, now Associate Professor, Univ. of Napoli Federico II
- Tim Anderson, young visiting scientist, now group leader at the South-Western Medical Foundation, Texas

Grants (last eight years)

- University of Milan 2024, project Grandi Sfide di Ateneo. PI of the proposal “Sistema integrato di Ateneo per lo Studio, il monitoraggio e il controllo delle infezioni, delle emergenze epidemiche e della resistenza ai farmaci antimicrobici (IDEA)”. Second grant (after the one in 2021, see below) Euro: 160,000.

- PRIN-PNRR. Project: Mitogenomes, nuclear markers and intra-mitochondrial symbiont genomes: a genetic triangulation to trace population movements of Ixodes ticks in the context of environmental change. National Coordinator. Euro 237,299.
- PNRR 2022, Extended Partnership PE13 (Emerging Infections), National Project INF-ACT, coordinator for the University of Milan. Euro 4,700,000.
- Grant 2022 from the Romeo ed Enrica Invernizzi Foundation, for the development of a novel vaccine platform, suitable for antigen production and for antigen delivery to APCs. Euro: 500,000.
- University of Milan 2021, project Grandi Sfide di Ateneo. PI of the proposal “Sistema integrato di Ateneo per lo Studio, il monitoraggio e il controllo delle infezioni, delle emergenze epidemiche e della resistenza ai farmaci antimicrobici (IDEA)”. Euro: 160,000.
- Finappo Grant 2021 for Research activity on Coronaviridae. PI. Euro 150,000.
- MIUR-PRIN 2017. PI of the proposal “Rafts on the water, for mosquito vector control: hydrogel-based delivery systems and inhibition of insect defense mechanisms, to improve sustainable use of insecticides and counteract resistance development (RAFTING)”. Euro: 548,000.
- Romeo ed Enrica Invernizzi Foundation grant 2016. PI of the project for the development of the “Platform for Genomic Epidemiology and Experimental Microbiology”. Euro 800,000.

Major collaborations

- Responsible for a collaboration agreement between the University of Milan and the Hospital IRCCS Policlinico San Matteo (Pavia), for the implementation of an IT platform for the application of genomic epidemiology tools for the control of nosocomial pathogens and for the analysis of hospital data, for the prediction and prevention of infections and outbreaks in the hospital (2021-2022).
- Temporary consultant of WHO for the development of the antisymbiotic chemotherapy, for the cure of filarial disease.
- Ongoing collaboration with VisMederi SrL, Siena, a leading company in the validation of serological assays and vaccines, for a preclinical study on a candidate vaccine.
- Collaborations with major hospitals in the Lombardy Region (Fatebenefratelli-Sacco, Milano; Papa Giovanni XXIII, Bergamo; IRCCS Fondazione Policlinico San Matteo, Pavia) for the reconstruction of nosocomial outbreaks through the application of bacterial whole genome sequencing.

Major achievements

- **Establishment of a platform for microbial genomics**, for the application of bioinformatics, genomics, and genomic epidemiology to microbial pathogens. Over 25 papers published in the last 10 years, on the genomics and genomic epidemiology of microbial pathogens and symbionts.
- **Several protein antigens produced in recombinant form**, used for the development of diagnostic assays and candidate vaccines (e.g. see: Front Microbiol 2021 doi: 10.3389/fmicb.2021.736530; Vaccines 2022 doi: 10.3390/vaccines10050803.).
- Experience and well-established collaboration in the area of **parasite immunology** (e.g. Pharmacol Res 2020 doi: 10.1016/j.phrs.2020.105288)
- Development of the **anti-symbiotic chemotherapy for the cure of filarial diseases** (e.g. Parasitol Res doi: 10.1007/s00436-008-1217-8)
- Discovery and **description of the first intra-mitochondrial bacterium** (e.g. Int J Syst Evol Microbiol. 2006 doi: 10.1099/ijs.0.64386-0).

Patents

- National Patent application N. IT 102021000004160 for "*Leishmania tarentolae* as an expression system for the production of antigens of the viruses of the Coronaviridae family, for their use in serological diagnosis" (February 23, 2021).
- International Patent application N. IT 102021000004172 for "Realization of an immunomodulating vaccine vehicle based on the use of *Leishmania tarentolae*" (December 23, 2021).
- National Patent application N. 102021000029279 "*Leishmania* ghosts, micro-ghost, micro-and nano-vesicles as vehicles for the targeted delivery of antigens and molecules" (November 19, 2021).

Short biographical narrative

Claudio Bandi is Full Professor of Microbiology at the University of Milan. He obtained the Laurea degree with Honour at the University of Pavia (1991) and then the PhD in comparative Pathology at the University of Milan (1996). He is author of over 220, highly quoted papers in peer-reviewed journals (H-index: 62; quotations: >12,800; Scopus). Since his master thesis, CB pioneered the introduction of molecular methodologies in microbiology and parasitology, with the development of protocols that have been applied for years at the International *Trichinella* Reference Centre in Rome (<http://w3.iss.it/site/Trichinella/>), and in clinical diagnostic laboratories (e.g. see PubMed papers published by CB in the period 1993-1998). Besides the above-mentioned interest for diagnostic applications, most of the scientific interest of CB's career has been devoted to the study of uncultured bacteria and other microbial symbionts. This led CB to pioneer the study of the microbiota with the use, since 1993, of the now widely employed methodologies for 'amplicon-based metagenomics'. These studies allowed CB to discover important forms of symbiotic associations, among which the first description of a bacterium that invades and replicates inside mitochondria (*Midichloria mitochondrii*; e.g. Sasser D et al. IJSEM 2006), and the description of the obligate symbiont of filarial nematode parasites (*Wolbachia* spp.; e.g. Bandi C et al Proc Roy Soc B 1998; Casiraghi M et al 2001). This last discovery led to the development of a novel therapeutic approach for the therapy of filarial diseases (see Bandi C et al IJP 1999), a major health problem in the tropics that afflicts over 250 million people. Other outcomes that derived from these studies on symbiosis in filarial parasites have been a complete reinterpretation of the immunology of filarial diseases, and the identification of novel potential diagnostics (e.g. Brattig N et al JI 2004; Bandi C et al 2001). The interest of CB for uncultured bacteria led him to launch one of the first international initiatives for the full genome sequencing of obligate intracellular bacteria (e.g. Bandi C et al Parasit Today 1999; Godel C et al FASEB J 2012). This experience allowed CB to establish, at the University of Milan, an integrated research group for bacterial genomic epidemiology, that included know-how in comparative genomics, phylogenomics, molecular evolutionary analyses, and advanced bioinformatics. This allowed the group to sequence the genome of the intra-mitochondrial bacterium *Midichloria* (Sasser D et al MBE 2012), a challenging project at that time, that required the acquisition of methods now used in single-cell genomics. Based on the above experiences, in 2016 CB established, at the University of Milan, the Sky Net UNIMI Platform, a genomic and bioinformatics research team totally dedicated to the study of the genomics, transcriptomics and genomic epidemiology of pathogens and disease vectors (e.g. see Gaiarsa S et al AAC 2015; Onori R et al JCM 2015). Finally, CB has always performed his scientific activity with a strong 'bias' towards application: development of novel PCR-based diagnostic methods; introduction of novel strategies for the control of filarial diseases; selection and production of recombinant antigens, for diagnostic assays; use of genomics in microbial epidemiology and in the study of nosocomial infections.

Claudio Bandi - Selection of 20 papers published since January 2022

Sterzi L, Nodari R, Di Marco F, Ferrando ML, Saluzzo F, Spitaleri A, Allahverdi H, Papaleo S, Panelli S, Rimoldi SG, Batisti Biffignandi G, Corbella M, Cavallero A, Prati P, Farina C, Cirillo DM, Zuccotti G, Bandi C, Comandatore F. Genetic barriers more than environmental associations explain *Serratia marcescens* population structure. *Commun Biol.* 2024 Apr 17;7(1):468.

La Rosa F, Varotto-Bocazzi I, Saresella M, Marventano I, Cattaneo GM, Hernis A, Piancone F, Otranto D, Epis S, Bandi C, Clerici M. The non-pathogenic protozoon *Leishmania tarentolae* interferes with the activation of NLRP3 inflammasome in human cells: new perspectives in the control of inflammation. *Front Immunol.* 2024 Apr 19;15:1298275.

Galli M, Nodari R, Perini M, Luconi E, Fois L, Vaglianti F, Bandi C, Biganzoli E, Comandatore F. A spatiotemporal reconstruction of the 1630 plague epidemic in Milan. *iScience.* 2023 Apr 20;26(5):106704.

D'Auria E, Cattaneo C, Panelli S, Pozzi C, Acunzo M, Papaleo S, Comandatore F, Mameli C, Bandi C, Zuccotti G, Pagliarini E. Alteration of taste perception, food neophobia and oral microbiota composition in children with food allergy. *Sci Rep.* 2023 Apr 28;13(1):7010.

Latrofa MS, Varotto-Bocazzi I, Louzada-Flores VN, Iatta R, Mendoza-Roldan JA, Roura X, Zatelli A, Epis S, Bandi C, Otranto D. Interaction between *Wolbachia pipientis* and *Leishmania infantum* in heartworm infected dogs. *Parasit Vectors.* 2023 Feb 27;16(1):77.

Pitton S, Negri A, Pezzali G, Piazzoni M, Locarno S, Gabrieli P, Quadri R, Mastrantonio V, Urbanelli S, Porretta D, Bandi C, Epis S, Caccia S. MosChito rafts as effective and eco-friendly tool for the delivery of a *Bacillus thuringiensis*-based insecticide to *Aedes albopictus* larvae. *Sci Rep*. 2023 Feb 21;13(1):3041.

Bandi C, Mendoza-Roldan JA, Otranto D, Alvaro A, Louzada-Flores VN, Pajoro M, Varotto-Boccazzi I, Brilli M, Manenti A, Montomoli E, Zuccotti G, Epis S. *Leishmania tarentolae*: a vaccine platform to target dendritic cells and a surrogate pathogen for next generation vaccine research in leishmaniases and viral infections. *Parasit Vectors*. 2023 Jan 26;16(1):35.

Epis S, Varotto-Boccazzi I, Manenti A, Rubolini D, Gabrieli P, Cattaneo GM, Gourlay L, Dapporto F, Monti M, Razzano I, Leonardi M, Iannacone M, Recordati C, Bertola L, Fiorina P, Marvasi L, Montomoli E, Zuccotti G, Bandi C. Efficacy of mucosal vaccination using a protozoan parasite as a vehicle for antigen delivery: IgG and neutralizing response after rectal administration of LeCoVax-2, a candidate vaccine against COVID-19. *Pharmacol Res*. 2022 Dec;186:106546.

Panelli S, D'Auria E, Papaleo S, Alvaro A, Bandi C, Comandatore F, Zuccotti G. Biotics in pediatrics: a short overview. *Minerva Pediatr (Torino)*. 2022 Dec;74(6):682-687.

Lucchesi V, Grimaldi L, Mastrantonio V, Porretta D, Di Bella L, Ruspandini T, Di Salvo ML, Vontas J, Bellini R, Negri A, Epis S, Caccia S, Bandi C, Urbanelli S. Cuticle Modifications and Over-Expression of the Chitin-Synthase Gene in Diflubenzuron-Resistant Phenotype. *Insects*. 2022 Nov 30;13(12):1109.

Calcaterra V, Rossi V, Massini G, Regalbuto C, Hruby C, Panelli S, Bandi C, Zuccotti G. Precocious puberty and microbiota: The role of the sex hormone-gut microbiome axis. *Front Endocrinol (Lausanne)*. 2022 Oct 21;13:1000919.

Sgroi G, Iatta R, Lovreglio P, Stufano A, Laidoudi Y, Mendoza-Roldan JA, Bezerra-Santos MA, Veneziano V, Di Gennaro F, Saracino A, Chironna M, Bandi C, Otranto D. Detection of Endosymbiont *Candidatus* *Midichloria mitochondrii* and Tickborne Pathogens in Humans Exposed to Tick Bites, Italy. *Emerg Infect Dis*. 2022 Sep;28(9):1824-1832.

Mendoza-Roldan JA, Votýpka J, Bandi C, Epis S, Modrý D, Tichá L, Volf P, Otranto D. *Leishmania tarentolae*: A new frontier in the epidemiology and control of the leishmaniases. *Transbound Emerg Dis*. 2022 Sep;69(5):e1326-e1337.

Piazzoni M, Negri A, Brambilla E, Giussani L, Pitton S, Caccia S, Epis S, Bandi C, Locarno S, Lenardi C. Biodegradable floating hydrogel baits as larvicide delivery systems against mosquitoes. *Soft Matter*. 2022 Aug 31;18(34):6443-6452.

Arnoldi I, Mancini G, Fumagalli M, Gastaldi D, D'Andrea L, Bandi C, Di Venere M, Iadarola P, Forneris F, Gabrieli P. A salivary factor binds a cuticular protein and modulates biting by inducing morphological changes in the mosquito labrum. *Curr Biol*. 2022 Aug 22;32(16):3493-3504.e11.

Arnoldi I, Negri A, Soresinetti L, Brambilla M, Carraretto D, Montarsi F, Roberto P, Mosca A, Rubolini D, Bandi C, Epis S, Gabrieli P. Assessing the distribution of invasive Asian mosquitoes in Northern Italy and modelling the potential spread of *Aedes koreicus* in Europe. *Acta Trop*. 2022 Aug;232:106536.

Gaiarsa S, Giardina F, Batisti Biffignandi G, Ferrari G, Piazza A, Tallarita M, Novazzi F, Bandi C, Paolucci S, Rovida F, Campanini G, Piralla A, Baldanti F. Comparative analysis of SARS-CoV-2 quasispecies in the upper and lower respiratory tract shows an ongoing evolution in the spike cleavage site. *Virus Res*. 2022 Jul 2;315:198786.

Colaneri M, Di Carlo D, Amatu A, Marvulli LN, Corbella M, Petazzoni G, Cambieri P, Muzzi A, Bandi C, Di Matteo A, Sacchi P, Mojoli F, Bruno R. Ventilator-Associated Pneumonia Due to MRSA vs. MSSA: What Should Guide Empiric Therapy? *Antibiotics (Basel)*. 2022 Jun 24;11(7):851.

Panelli S, Calcaterra V, Verduci E, Comandatore F, Pelizzo G, Borghi E, Bandi C, Zuccotti G. Dysbiosis in Children With Neurological Impairment and Long-Term Enteral Nutrition. *Front Nutr*. 2022 Jun 22;9:895046.

Varotto-Boccazzi I, Garziano M, Cattaneo GM, Bisaglia B, Gabrieli P, Biasin M, Manenti A, Rubolini D, Clerici M, Montomoli E, Zuccotti GV, Trabattoni D, Epis S, Bandi C. *Leishmania tarentolae* as an Antigen Delivery Platform: Dendritic Cell Maturation after Infection with a Clone Engineered to Express the SARS-CoV-2 Spike Protein. *Vaccines (Basel)*. 2022 May 19;10(5):803.

Claudio Bandi - Selection of 10 highly quoted publications
(Quotations, Q, as in Google Scholar)

- Bandi C. et al (1998) Phylogeny of *Wolbachia* in filarial nematodes. *Proceedings of the Royal Society of London B* 265: 2407-2413
Q 742
- Casiraghi M., Anderson T.J.C., Bandi C., Bazzocchi C., Genchi C. (2001) A phylogenetic analysis of filarial nematodes: comparison with the phylogeny of *Wolbachia* endosymbionts. *Parasitology* 122: 93-103
Q 526
- Taylor M.J., Bandi C., Hoerauf A. (2005) *Wolbachia* bacterial endosymbionts of filarial nematodes. *Advances in Parasitology* 60: 245-284
Q 523
- Favia G, ... Bandi C, Sacchi L, Daffonchio D (2007) Bacteria of the genus *Asaia* stably associate with *Anopheles stephensi*, an Asian malarial mosquito vector. *Proc Natl Acad Sci U S A*. 104: 9047-9051.
Q 517
- Bianciotto V., Bandi C. et al. (1996) An obligately endosymbiotic mycorrhizal fungus itself harbors obligately intracellular bacteria. *Applied and Environmental Microbiology* 62: 3005-3010
Q 470
- Lo N., ... Bandi C., Noda H. (2000) Evidence from multiple gene sequences indicates that termites evolved from wood-feeding cockroaches. *Current Biology* 10: 801-804
Q 396
- Lo N., ... Bandi C. (2002) How many *Wolbachia* supergroups exist? *Molecular Biology and Evolution* 19: 341-346
Q 380
- Sironi M., Bandi C., et al. (1995) Molecular evidence for a close relative of the arthropod endosymbiont *Wolbachia* in a filarial worm. *Molecular and Biochemical Parasitology* 74: 223-227
Q 347
- Bandi C. et al. (1999) Effects of tetracycline on the filarial worms *Brugia pahangi* and *Dirofilaria immitis* and their bacterial endosymbionts *Wolbachia*. *International Journal for Parasitology* 29:357-364
Q347
- Bandi C et al. (2001) *Wolbachia* in filarial nematodes: evolutionary aspects and implications for the pathogenesis and treatment of filarial diseases. *Veterinary Parasitology* 98:215-238.
Q. 296

According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV

Milano, 18 June 2024

Prof. Claudio Bandi