

Pamela Ferretti

Postdoctoral Researcher

Department of Medicine

University of Chicago, Chicago, IL, US

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[Google Scholar](#)

EDUCATION

European Molecular Biology Laboratory (EMBL)

Ph.D., Computational Biology

Advisors: Peer Bork, Sebastian Schmidt

Heidelberg, Germany

Dec 2021

University of Trento

MSc, Cellular and Molecular Biotechnology

Advisor: Nicola Segata

Trento, Italy

June 2016

University of Trento

BSc, Computer Science

Advisor: Nicola Segata

Trento, Italy

June 2014

EMPLOYMENT

University of Chicago

Postdoctoral Researcher

Advisor: Ran Blekhman

Chicago, IL, USA

Feb 2023 - Present

European Molecular Biology Laboratory (EMBL)

Bridging Postdoc

Advisors: Peer Bork, Sebastian Schmidt

Heidelberg, Germany

Jan 2022 – Jun 2022

University of Trento

Research Assistant

Advisor: Nicola Segata

Trento, Italy

Aug 2016 – Aug 2017

RESEARCH INTERESTS

I use strain-level metagenomics and machine learning approaches to study:

- Human breast milk composition and its role in shaping infant microbiome assembly and development.
- Microbiome transmission dynamics within social groups in both human and animal populations.

PUBLICATIONS

Total number of publications: 26; Total citations: 4,181; H-Index: 16. (* indicates shared authorship)

Preprints:

2025 Southworth C, Winans J, Gordon J, Learn N, Wilber W, Andreadis C, Andreasen G, Arandjelovic M, Campbell R, Chege M, Creighton M, Cromer C, Debray R, Dickson C, **Ferretti P**, George E, Gesquiere L, He S, Hey L, Jefferson E, Kulahci I, Lerch B, Nonnamaker L, Rivas-González I, Tuliozi B, Webb S, Alberts S, Archie E, and Tung J. *Demographic, behavioral, and ecological data from a long-term field study of wild baboons in Amboseli, Kenya*. [Scientific Data](#), in revision

Publications in peer-reviewed journals:

2025 **Ferretti P***, Allert M*, Johnson K, Rossi M, Heisel T, Gonia S, Knights D, Fields D, Albert FW, Demerath EW, Gale CA, and Blekhman R. *Assembly, stability, and dynamics of the infant gut microbiome are linked to bacterial strains and functions in mother's milk*. [Nature Communications](#), in press

2025 Kuhn M, Schmidt TSB, **Ferretti P**, Głazek A, Robbani M, Akanni W, Fullam A, Cetin E, Hassan, Noack

- K, Schwarz A, Thielemann R, Thomas L, Moritz von Stetten M, Alves R, Kartal E, Ivan Kel I, Iyappan A, Maistrenko O, Mankowski A, Nishijima S, Keller MI, Podlesny D, Schulz S, Van Rossum T, and Bork P. *Metalog: manually curated metadata for global metagenomics samples*. [Nucleic Acids Research, in press](#)
- 2025 Ferretti P. *The gut remembers: the long-lasting effect of medication use on the gut microbiome*. [mSystems](#)
- 2025 Ferretti P, Martignoni MM, McManus L, Sakal T, Liaghat A, Stevens B, K, Souza L, Cardon Z, Silveira C, Bordenstein S, and Roughgarden J. *Theory of host-microbe symbioses: challenges and opportunities*. [Cell Host & Microbe](#)
- 2025 Chege M, Ferretti P, Webb S, Macharia RW, Obiero G, Kamau J, Alberts S, Tung J, Akinyi M, and Archie E. *Eukaryotic composition across seasons and social groups in the gut microbiota of wild baboons*. [Animal Microbiome](#)
- 2025 Hug AL, Hatzenichler R, Moraru C, Soares A, Meyer F, Heyder A, **The Data Reuse Consortium**, and Probst A. *A roadmap for fair reuse of public microbiome data*. [Nature Microbiology](#)
- 2025 Ferretti P, Johnson K, Priya S, and Blekhman R. *Genomics of host-microbiome interactions in humans*. [Nature Reviews Genetics](#)
- 2025 Abdill R*, Graham* S, Rubinetti V, Ahmadian M, Hicks P, McDonald D, Chetty A, Ferretti P, Gibbons E, Rossi M, Knight R, Krishan A, Frank , Albert FW, Casey S, Greene CS, Sean Davis S, and Ran Blekhman R. *Integration of 168,000 samples reveals global patterns of the human gut microbiome*. [Cell](#)
 - Featured on the journal cover.
- 2024 Nishijima S, Stankevic E, Aasmets O, Schmidt TSB, Nagata N, Keller MI, Ferretti P, Juel H, Fullam A, Schudoma C, Robbani SM, Kragh Hansen J, Aas Holm L, Israelsen M, Schierwagen R, Broens C, Fonvig CE, Holm JC, Nielsen T, Steen Pedersen J, Thiele MS, Trebicka J, Org E, Krag A, Hansen T, Kuhn M, and Bork P. *Fecal microbial load is a major determinant of gut microbiome variation and a confounder for disease associations*. [Cell](#)
- 2023 Schmidt TSB*, Fullam A*, Ferretti P, Orakov A, Maistrenko OM, Ruscheweyh HJ, Duan Y, Van Rossum T, Sunagawa S, Mende D, Kuhn M, Coelho LP, and Bork P. *SPIRE: a Searchable, Planetary-scale, Integrated REsource of microbial diversity and function*. [Nucleic Acids Research](#)
- 2023 Ferretti P, Wirbel J, Maistrenko OM, Van Rossum T, Alves R, Fullam A, Akanni W, Schudoma C, Schwarz A, Thielemann R, Thomas L, Kuhn M, Zeller G, Schmidt TSB, and Bork P. *C. difficile may be overdiagnosed in adults and is a commensal in infants*. [eLife](#)
- 2021 Klopp J, Ferretti P, Meyer C, Hilbert K, Haiß A, Marißen J, Henneke P, Hudalla H, Pirr S, Viemann D, Zemlin M, Forslund SF, Härtel C, Bork P, Van Rossum T, and the PRIMAL consortium. *Meconium microbiome of very preterm infants across Germany*. [mSphere](#)
- 2021 Coelho LP, Alves R, del Río AR, Myers PN, Cantalapiedra CP, Giner-Lamia J, Schmidt TSB, Mende D, Orakov A, Letunic A, Hildebrand F, Van Rossum T, Forslund SF, Khedkar S, Maistrenko OM, Jia L, Ferretti P, Sunagawa S, Zhao ZM, Bjørn Nielsen H, Cepas JH, and Bork P. *Towards the biogeography of prokaryotic genes*. [Nature](#)
- 2021 Hildebrand F, Gossmann T, Frioux C, Öz kurt E, Myers PN, Ferretti P, Bahram M, Bjørn Nielsen H, and Bork P. *Dispersal strategies shape persistence and evolution of gut bacteria*. [Cell Host & Microbe](#)
- 2021 Bahram M, Netherway T, Frioux C, Ferretti P, Coelho LP, Geisen S, Bork P, and Hildebrand F. *Global distribution and diversity of bacteria and fungi across diverse habitats*. [Environmental Microbiology](#)
- 2020 Van Rossum T*, Ferretti P*, Maistrenko OM*, and Bork P. *Diversity within species: interpreting strains in microbiomes*. [Nature Reviews Microbiology](#)
 - Featured on the journal cover

- 2018 **Ferretti P**, Pasolli E, Tett A, Asnicar F, Gorfer V, Fedi S, Armanini F, Truong DT, Manara S, Zolfo M, Beghini F, Bertorelli R, De Sanctis V, Bariletti I, Canto R, Clementi R, Cologna M, Crifò T, Cusumano G, Gottardi S, Innamorati C, Masè C, Yassour M, Vlamakis H, Xavier R, Koren O, Tateo S, Soffiati M, Pedrotti A, Ventura M, Huttenhower C, Bork P, and Segata N. *Mother-to-infant microbiome transmission from different body sites shapes the developing infant gut microbiome*. [Cell Host & Microbe](#)
- Featured on the journal cover.
- 2018 Yassour M, Jason E, Hogstrom L, Siljander H, **Ferretti P**, Asnicar F, Segata N, Vlamakis H, Lander E, Huttenhower C, Knip M, and Xavier R. *Strain-level identification of mother-to-child bacterial transmission during the first few months of life*. [Cell Host & Microbe](#)
- 2018 Dassi E*, **Ferretti P***, Covello G, Bertorelli R, Denti MA, De Sanctis V, Tett A, and Segata N. *The short-term impact of probiotic consumption on the oral cavity microbiome*. [Scientific Reports](#)
- 2017 Duranti S, Lugli GA, Mancabelli L, Armanini F, Turroni F, Kieran James K, **Ferretti P**, Gorfer V, Milani C, Zolfo M, Viappiani V, Pasolli E, Masè C, Postai D, Tateo S, Pedrotti A, Segata N, Van Sinderen D, and Ventura M. *Maternal inheritance of bifidobacterial communities and bifidophages in infants through vertical transmission*. [Microbiome](#)
- 2017 Asnicar F, Manara S, Zolfo M, Truong DT, Scholz M, Armanini F, **Ferretti P**, Gorfer V, Pedrotti A, Tett A, and Segata N. *Studying vertical microbiome transmission from mothers to infants by strain-level metagenomic profiling*. [mSystems](#)
- 2016 **Ferretti P**, Farina S, Cristofolini M, Girolomoni G, Tett A, and Segata N. *Experimental metagenomics and ribosomal profiling of the human skin microbiome*. [Experimental Dermatology](#)
- 2015 Milani C, Mancabelli L, Lugli G, Duranti S, Turroni F, Ferrario C, **Ferretti P**, Gorfer V, Tett A, Segata N, Van Sinderen D, and Ventura M. *Exploring vertical transmission of the gut microbiota from mother to child*. [Applied and Environmental Microbiology](#)
- 2015 Da Costa ARF, Fedrizzi T, Lopes ML, Monica Pecorari M, Wanda Lailan Oliveira da Costa, **Ferretti P**, Olivier Jousson, Nicola Segata, and Enrico Tortoli. *Characterization of 17 strains belonging to the Mycobacterium simiae complex and description of Mycobacterium paraense sp. nov*. [International Journal of Systematic and Evolutionary Microbiology](#)
- 2014 Tortoli E, Fedrizzi T, Pecorari M, Giacobazzi E, De Sanctis V, Bertorelli R, **Ferretti P**, Tagliazucchi S, Jousson O, and Segata N. *The new phylogenesis of the genus Mycobacterium*. [International Journal of Systematic and Evolutionary Microbiology](#)

FUNDING

Pending:

K99/R00 NIH Pathway to Independence Award

2025-2030

PI: P. Ferretti

Impact of microbial transmission and diet on preterm infant health

Total Award Amount: \$971,042

Contributed:

Kenya Institute of Primate Research (KIPRE), Kenya.

2025-2026

PI: M. Chege, CO-I: P. Ferretti

Impact of diet and social structure on gut microbiome and antimicrobial resistance in captive Baboons at the Kenya Institute of Primate Research

Total Award Amount: \$20,000

Role: Conceptualization, co-developed study design and analysis plan, co-wrote first draft.

Awarded:

Scholarship

2017

Department of Cellular, Computational and Integrative Biology, University of Trento, Italy.

Total Award Amount: 6,000€ (Decreto n. 259 dd 19.12.2016)

Role: Research Assistant

Scholarship

2016

Department of Information Engineering and Computer Science, University of Trento, Italy.

Total Award Amount: 6,000€ (Decreto n. 134 dd 21.04.2016)

Role: Research Assistant

PRESENTATIONS

Invited Talks

- Eco-evolutionary modeling of host-symbiont communities workshop, Banff International Research Station (BIRS), Banff, Canada, February 2026 (scheduled).
- Department of Biology, Loyola University, IL, USA, April 2024.
- Centre for Microbiology and Environmental Systems Science (CMESS), University of Vienna, Austria, February 2024.
- Department of Medicine, University of Chicago, IL, USA, August 2022.
- Stanford University School of Medicine, IL, USA, April 2022.
- Leiden University Medical Centre, Netherlands, April 2021.
- Quadram & Earlham Institute, University of Norwich, UK, November 2020.
- Comano Thermal Center Research, Trento, Italy, May 2016.

Contributed Talks

- Microbiome Center, Department of Medicine, University of Chicago, Illinois, USA, October 2024.
- Microbiome Virtual International Forum (MVIF) n.9, October 2022.
- The 2nd Theodor Escherich Symposium on medical microbiome research, University of Graz, Austria, May 2015.

Posters (presenting author)

- Microbiome Center, University of Chicago, IL, USA, April 2025.
- Microbiome Conference, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, USA, October 2024.
- The Human Microbiome Conference, EMBL, Heidelberg, Germany, September 2023.
- International Human Microbiome Congress (IHMC22), Kobe, Japan, November 2022.
- International Society for Microbial Ecology (ISME18), Lausanne, Switzerland, August 2022.
- International Human Microbiome Congress (IHMC18), Killarney, Ireland, June 2018.
- The Human Microbiome Conference, EMBL, Heidelberg, Germany, September 2018.
- Symbiomes: Systems Biology of Host-Microbiome Interactions, Pultusk, Poland, June 2015.

HONORS & AWARDS

- Travel Award for The Human Microbiome Conference, Heidelberg, Germany, August 2023.
- Poster Award at International Society for Microbial Ecology (ISME18), Switzerland, August 2022.
- Poster Award at The Human Microbiome Conference, EMBL, Heidelberg, Germany, September 2018.
- Merit Award for the Master of Science in Cellular and Molecular Biotechnology, June 2017
- EMBO Travel Grant for Symbiomes: Systems Biology of Host-Microbiome Interactions, Pultusk, Poland, June 2015.

WORKSHOPS & TRAINING

- Machine Learning and AI Hackathon (3 days), University of Chicago, IL, USA, June 2025.
- Machine Learning and AI Workshop (2 weeks), University of Chicago, IL, USA, June 2025.
- Theory of Microbial Symbiosis Workshop (3 weeks), University of Hawai'i, USA, Feb 2024.
- Deep Learning and Neural Networks Workshop, EMBL Heidelberg, Germany, November 2022.

TEACHING EXPERIENCE

Guest Lecturer: “Microbiome Transmission in Social Groups”

Department of Biology, Loyola University, IL, USA, 2024.

Teaching Assistant: Data visualization

European Molecular Biology Laboratory (EMBL) Heidelberg, Germany, 2022.

Guest Lecturer: “Microbiome in infant’s health and clinical recommendations”

University of Trento, Italy, 2021.

Teaching Assistant: Python programming

European Molecular Biology Laboratory (EMBL) Heidelberg, Germany, 2018.

Guest Lecturer: “The Human Microbiome in Thermal Medicine”

“II level master in Hydrology and Thermal Medicine”, Comano Terme, Trento, Italy, April 2017.

Guest Lecturer: “The Human Microbiome”

“II level master in Hydrology and Thermal Medicine”, Comano Terme, Trento, Italy, April 2016.

Private Tutor

Master’s and Bachelor’s students in Computer Science and Management Engineering, including students with blindness, low vision, dyscalculia, and dyslexia, 2014-2016.

Guest Lecturer and Teaching Assistant: “Shotgun Metagenomics and Genome Assembly Approaches”

WebValley Summer School, University of Trento and Fondazione Bruno Kessler, Trento, Italy, 2014.

MENTORSHIP EXPERIENCE

Mary Chege

October 2023 – Present

Mary is a graduate student jointly affiliated with the Akinyi Lab at the University of Nairobi, Kenya, and the Archie Lab at the University of Notre Dame, US. I have been mentoring Mary on numerous projects on wild baboons in the Amboseli ecosystem, including the profiling of their gut microbial and eukaryotic communities, and the analysis of microbiome and antimicrobial resistance transmission patterns both within baboon social groups and between baboons and livestock.

Tess Brunnen

June 2024 – Present

Tess is a graduate student in the Blekhman Lab at the University of Chicago. I worked with Tess during her rotation in the Blekhman Lab, where she characterized the breast milk microbiome and metabolome and investigated their impact on infant gut microbiome composition. I continue to mentor her on her current project as a graduate student, focused on microbiome signatures associated with *Pseudomonas aeruginosa* infection in the hospital setting.

JJ Colgan

February 2024 – Present

JJ is a graduate student in the Blekhman Lab at the University of Chicago. His research focuses on characterizing the microbiome of non-Westernized human communities, with particular emphasis on populations affected by konzo, an irreversible paralytic disease. I mentor JJ on the reconstruction of metagenome-assembled genomes (MAGs) to identify previously uncharacterized members of the gut microbiome in these communities, as well as on his analysis of microbial strain-sharing across villages.

Mattea Allert

February 2023 – December 2024

I mentored Mattea during her graduate studies in the Blekhman Lab at the University of Minnesota, where she investigated the composition and functional characteristics of the human breast milk microbiome. She is now a postdoctoral scholar at the University of Minnesota.

Askarbek Orakov

October 2020 – June 2022

Askarbek completed his graduate studies in the Bork Lab at EMBL Heidelberg, where I worked with him on his meta-analysis of microbiome composition associated with the presence of *Fusobacterium* species, a clinically relevant bacterial clade. He is currently a postdoctoral scholar in the Huttenhower Lab at Harvard University.

EXTERNAL SCIENTIFIC OUTREACH & SERVICE

Public Outreach

- Penne Amiche della Scienza - Science correspondence program for students, October 2025 – Present.
- South Science Festival, Science Slam Finalist, University of Chicago, Illinois, USA, October 2024.
- Scienza in Gioco, Rome, Italy - outreach seminar series for high school students, virtual, May 2024.

Media & Interviews

- Spotlight Article, University of Chicago, March 2024.
- Interview, conducted by Roberta Raffaeta', October 2023, book in preparation.
- Book Interview, conducted by Roberta Raffaeta', Department of Philosophy and Cultural Heritage at Cà Foscari University of Venice, Italy, June 2020. Book title: "Antropologia dei microbi. Come la metagenomica sta configurando l'umano e la salute" - ISBN 9788879756983 2020.
- Regional News Coverage "Trentino Buongiorno Regione", Trento, Italy, June 2018.

Science Illustration and Visual Communication

- Multi-language infographics on COVID-19, January 2021.
- Co-designed the *Cell Host & Microbe* Cover, July 2018.

Conference Organization and Chaining

- The Microbiome Center (TMC) Symposium, University of Chicago, Illinois, USA, April 2025.
- Microbiome Virtual International Forum (MVIF), February 2023 – Present.

Professional Memberships

- The Wildlife Society (TWS) - Wildlife Diseases and Molecular Ecology Working Groups, 2025 – Present
- International Society for Microbial Ecology (ISME), 2023 – Present.

Peer Review

- Invited to author a commentary article on a published work in *mSystems*, September 2025.
- Invited reviewer for >25 manuscripts for: 2020 – Present
Nature (co-review), *Nature Communications*, *Nature Biofilms and Microbiomes*, *mSystems*, *ISME Journal*, *PLOS Computational Biology*, *FEMS Microbiology Ecology*, *Current Opinion in Microbiology*, *PeerJ*, *PLOS One*, and *Scientific Reports*.

REFERENCES

Prof. Ran Blekhman

Department of Medicine, University of Chicago, Chicago, IL, USA
Full Professor, Postdoc supervisor
blekhman@uchicago.edu

Prof. Peer Bork

European Molecular Biology Laboratory (EMBL), Heidelberg, Germany
Head of Unit, Senior Scientist and Strategic Head of Bioinformatics, PhD supervisor
bork@embl.de

Prof. Sebastian Schmidt

School of Medicine & APC Microbiome, University College Cork
Associate Professor, PhD supervisor
sebastian.schmidt@ucc.ie