

## **CURRICULUM VITAE**

**EUGENIO FERRARI**

### **Education**

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|-------------|---|
| 1978 - 1981 | Postdoctoral Fellow<br>Cellular Biology Department<br>Research Institute of Scripps Clinic<br>La Jolla, California, USA |
| 1975 - 1978 | Researcher<br>Istituto di Genetica<br>Università di Pavia, Pavia, Italia  |
| 1975 - 1977 | Specialization in Biophysics  |
| 1968 - 1974 | Master's degree in Biological Sciences<br>110/100 cum laude<br>Università di Pavia, Pavia, Italia                       |

### **Professional activity**

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| 2019-2024 | Adjunct professor<br>Course of Microbial Genetics and Biotechnology, master's in advanced biotechnologies<br>Dipartimento di Biologia e Biotecnologie<br>Università di Pavia, Pavia, Italia |
| 2015-2017 | Principal Research Fellow<br>Axcella Health<br>Cambridge, MA 02139, USA   |
| 2014-2015 | Senior Director<br>Axcella Health<br>Cambridge, MA 02139, USA   |
| 2013-2015 | Adjunct professor<br>Course of Industrial Biochemistry, master's in advanced biotechnologies<br>Dipartimento di Biologia e Biotecnologie<br>Università di Pavia, Pavia, Italia              |
| 2011      | Adjunct professor<br>Course of Microbial Genetics, master's in molecular biology and Genetics<br>Dipartimento di Biologia e Biotecnologie<br>Università di Pavia, Pavia, Italia             |

1996 - 2010	Senior Staff Scientist Expression and Molecular Biology Department Genencor International Palo Alto, CA, USA
1990 - 1996	Staff Scientist Molecular Biology Department Genencor International South San Francisco, CA, USA
1985 - 1990	Senior Scientist, Molecular Biology Department Genencor, Inc. South San Francisco, CA, USA
1983 - 1985	Scientist Molecular Biology Department Genentech, Inc. South San Francisco, CA, USA
1982 - 1983	Scientist Biocatalysis Department Genentech, Inc. South San Francisco, CA, USA
1981 - 1982	Researcher Istituto di Genetica Università di Pavia
1971 - 1974	Laboratory technician Istituto di Genetica Università di Pavia

### **Scientific interests**

My scientific interests have spanned, over the years, virtually every aspect of the *Bacillus* Genetics and Molecular biology, being involved in studies concerning metabolism, recombination, sporulation, germination and gene regulation and expression. In particular, most of the work carried out in the last 30 years at Genentech and Genencor, has centered on the expression and secretion of industrial enzymes in Bacilli. Because most of the industrial enzymes expression is temporally regulated, this effort has focused on understanding the role that transition state regulators play on the expression of such genes as well as on the performance of the bacterial host in small and large-scale fermentation. Because of the industrial setting working structure I have been involved in the isolation, engineering and characterization of several enzymes targeted for production, as well as in the inner works of purification and formulation of the same.

Other than the work on *Bacillus*, I have been involved, as a supervisor of junior employees, in the work carried out in other microbial systems utilized for the expression of industrial enzymes (*Streptomyces* and filamentous fungi) as well as in projects of biochemical pathway engineering (using *Escherichia coli* and *Pantoea citrea*) for the production of chemicals such as ascorbic acid and indigo.

### **Teaching and mentoring activities.**

One of my roles at Genencor was to teach, through appropriate series of lectures, new employees and summer students as well as supervise numerous research assistants and associates in their daily activities. I was also responsible for lecturing on microbial molecular genetics at other Genencor Research Centers, e.g. Brabrand (Denmark), Leiden (The Netherland) and Shanghai (China), and train the employees at these Centers on the laboratory techniques needed to implement the best practices in the area of bacterial gene expression

As an Adjunct Professor at the Biology Department of San Francisco State University (1990-2010) I had the responsibility to give several lectures and was responsible for the master thesis experimental work of several students. Furthermore, I have also mentored a number of Bachelor and Master students employed as Summer Interns at Genencor, as well as a number of High School students enrolled in the Biotechnology program at San Mateo High School.

I have been involved in the organization of the Biennial International Conference on Bacilli since 1991 and its sister International Conference on Gram+ Genomics since 2001. I have been invited speaker to numerous meetings such as the ones organized by the American Society for Microbiology (ASM), the Society for Industrial Microbiology (SIM), the Genetics for Industrial Microorganisms (GIM) and the American Chemical Society (ACS).

In 2011 I have thought the Microbial Genetics course for the Laurea Magistrale in Molecular Biology and Genetics at the University of Pavia. During the Academic years 2013-14 and 2014-15 I have thought the course of Biochimica Industriale della Laurea Magistrale in Biotecnologie Avanzate at the University of Pavia.

### **Affiliation to scientific societies**

American Association for the Advancement of Science  
American Society for Microbiology

### **Publications**

1. Barbieri, G., Ferrari, C., Mamberti, S., Gabrieli, P., Castelli, M., Sassera, D., Ursino, E., Scoffone, V. C., Radaelli, G., Clementi, E., Sacchi, L., Ferrari, E., Gasperi, G., and Albertini, A. M. (2021). Identification of a Novel *Brevibacillus laterosporus* Strain With Insecticidal Activity Against *Aedes albopictus* Larvae. *Frontiers in Microbiology* 12. doi: [10.3389/fmicb.2021.624014](https://doi.org/10.3389/fmicb.2021.624014)
2. Barbieri, G., Albertini, A. M., Ferrari, E., Sonenshein, A. L., Belitsky, B. R. (2016). Interplay of CodY and ScoC in the regulation of major extracellular protease genes of *Bacillus subtilis*. *Journal of Bacteriology* 198, 907–920. doi: [10.1128/JB.00894-15](https://doi.org/10.1128/JB.00894-15)
3. Belitsky, B. R., Barbieri, G., Albertini, A. M., Ferrari, E., Strauch, M. A., Sonenshein, A. L. (2015). Interactive regulation by the *Bacillus subtilis* global regulators CodY and ScoC. *Molecular Microbiology* 97, 698–716. doi: [10.1111/mmi.13056](https://doi.org/10.1111/mmi.13056)
4. Barbieri, G., Voigt, B., Albrecht, D., Hecker, M., Albertini, A. M., Sonenshein, A. L., Ferrari, E., and Belitsky, B. R. (2015). CodY regulates expression of the *Bacillus subtilis* extracellular proteases Vpr and Mpr. *Journal of Bacteriology* 197, 1423–1432. doi: [10.1128/JB.02588-14](https://doi.org/10.1128/JB.02588-14)

5. Kolkman, M. A., van der Ploeg, R., Bertels, M., van Dijk, M., van der Laan, J., van Dijk, J. M., and Ferrari, E. (2008). The twin-arginine signal peptide of *Bacillus subtilis* YwbN can direct either Tat- or Sec-dependent secretion of different cargo proteins: Secretion of active subtilisin via the *B. subtilis* Tat pathway. *Applied and Environmental Microbiology* 74, 7507–7513. doi: [10.1128/AEM.01401-08](https://doi.org/10.1128/AEM.01401-08)
6. Antelmann, H., Sapolsky, R., Miller, B., Ferrari, E., Chotani, G., Weyler, W., Gaertner, A., and Hecker, M. (2004). Quantitative proteome profiling during the fermentation process of pleiotropic *Bacillus subtilis* mutants. *Proteomics*, 4(8), 2408–2424. <https://doi.org/10.1002/pmic.200300752>
7. Tjalsma, H., Koetje, E. J., Kiewiet, R., Kuipers, O. P., Kolkman, M., van der Laan, J., Daskin, R., Ferrari, E., and Bron, S. (2004). Engineering of quorum-sensing systems for improved production of alkaline protease by *Bacillus subtilis*. *Journal of Applied Microbiology* 96, 569–578. doi: [10.1111/j.1365-2672.2004.02179.x](https://doi.org/10.1111/j.1365-2672.2004.02179.x)
8. Kolkman, M. A. B., and Ferrari, E. (2004). The fate of extracellular proteins tagged by the SsrA system of *Bacillus subtilis*. *Microbiology* 150, 427–436. doi: [10.1099/mic.0.26388-0](https://doi.org/10.1099/mic.0.26388-0)
9. Caldwell, R., Sapolsky, R., Weyler, W., Maile, R. R., Causey, S. C., and Ferrari, E. (2001). Correlation between *Bacillus subtilis* scoC phenotype and gene expression determined using microarrays for transcriptome analysis. *Journal of bacteriology*, 183(24), 7329–7340. <https://doi.org/10.1128/JB.183.24.7329-7340.2001>
10. Valbuzzi, A., Ferrari, E., and Albertini, A. M. (1999). A novel member of the subtilisin-like protease family from *Bacillus subtilis*. *Microbiology* 145, 3121–3127. doi: [10.1099/00221287-145-11-3121](https://doi.org/10.1099/00221287-145-11-3121)
11. Kunst, F., Ogasawara, N., Moszer, I., Albertini, A. M., Alloni, G., Azevedo, V., et al. (1997). The complete genome sequence of the gram-positive bacterium *Bacillus subtilis*. *Nature* 390, 249–256. doi: [10.1038/36786](https://doi.org/10.1038/36786)
12. Olmos, J., De Anda, R., Ferrari, E., Bolivar, F., and Valle, F. (1997). Effects of the *sinR* and *degU32* (Hy) mutations on the regulation of the *aprE* gene in *Bacillus subtilis*. *Molecular and General Genetics* 253, 562–567. doi: [10.1007/s004380050358](https://doi.org/10.1007/s004380050358)
13. Miller, B. S., Hsu, A. K. H., Ferrari, E., and Diaz-Torres, M. R. (1997). Solid medium labeling applied to two-dimensional gel electrophoresis. *Analytical Biochemistry* 245, 245–247. doi: [10.1006/abio.1996.9979](https://doi.org/10.1006/abio.1996.9979)
14. Shafikhani, S., Siegel, R. A., Ferrari, E., and Schellenberger, V. (1997). Generation of large libraries of random mutants in *Bacillus subtilis* by PCR-based plasmid multimerization. *BioTechniques* 23, 304–310. doi: [10.2144/97232rr01](https://doi.org/10.2144/97232rr01)
15. Olmos, J., Bolaños, V., Causey, S., Ferrari, E., Bolivar, F., and Valle, F. (1996). A functional Spo0A is required for maximal *aprE* expression in *Bacillus subtilis*. *FEBS Letters* 381, 29–31. doi: [10.1016/0014-5793\(96\)00070-1](https://doi.org/10.1016/0014-5793(96)00070-1)
16. Winters, P., Caldwell, R., Enfield, L., and Ferrari, E. (1996). The *ampS-nprE* (124°-127°) region of the *Bacillus subtilis* 168 chromosome: Sequencing of a 27 kb segment and identification of several genes in the area. *Microbiology* 142, 3033–3037. doi: [10.1099/13500872-142-11-3033](https://doi.org/10.1099/13500872-142-11-3033)
17. Marquez, L. M., Helmann, J. D., Ferrari, E., Parker, H. M., Ordal, G. W., and Chamberlin, M. J. (1990). Studies of  $\sigma$ (D)-dependent functions in *Bacillus subtilis*. *Journal of Bacteriology* 172, 3435–3443. doi: [10.1128/jb.172.6.3435-3443.1990](https://doi.org/10.1128/jb.172.6.3435-3443.1990)
18. Henner, D. J., Yang, M., and Ferrari, E. (1988). Localization of *Bacillus subtilis* *sacU*(Hy) mutations to two linked genes with similarities to the conserved procaryotic family of two-component signalling systems. *Journal of bacteriology* 170, 5102–5109. doi: [10.1128/jb.170.11.5102-5109.1988](https://doi.org/10.1128/jb.170.11.5102-5109.1988)

19. Ferrari, E., Henner, D. J., Perego, M., and Hoch, J. A. (1988). Transcription of *Bacillus subtilis* subtilisin and expression of subtilisin in sporulation mutants. *Journal of Bacteriology* 170, 289–295. doi: [10.1128/jb.170.1.289-295.1988](https://doi.org/10.1128/jb.170.1.289-295.1988)
20. Henner, D. J., Ferrari, E., Perego, M., and Hoch, J. A. (1988). Location of the targets of the *hpr-97*, *sacU32(Hy)*, and *sacQ36(Hy)* mutations in upstream regions of the subtilisin promoter. *Journal of bacteriology* 170, 296–300. doi: [10.1128/jb.170.1.296-300.1988](https://doi.org/10.1128/jb.170.1.296-300.1988)
21. Perego, M., Ferrari, E., Bassi, M. T., Galizzi, A., and Mazza, P. (1987). Molecular cloning of *Bacillus subtilis* genes involved in DNA metabolism. *MGG Molecular & General Genetics* 209, 8–14. doi: [10.1007/BF00329829](https://doi.org/10.1007/BF00329829)
22. Martin, I., Débarbouillé, M., Ferrari, E., Klier, A., and Rapoport, G. (1987). Characterization of the levanase gene of *Bacillus subtilis* which shows homology to yeast invertase. *MGG Molecular & General Genetics* 208, 177–184. doi: [10.1007/BF00330439](https://doi.org/10.1007/BF00330439)
23. Albertini, A. M., Caramori, T., Henner, D., Ferrari, E., and Galizzi, A. (1987). Nucleotide sequence of the *outB* locus of *Bacillus subtilis* and regulation of its expression. *Journal of Bacteriology* 169, 1480–1484. doi: [10.1128/jb.169.4.1480-1484.1987](https://doi.org/10.1128/jb.169.4.1480-1484.1987)
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28. Ferrari, E., Henner, D. J., and Yang, M. Y. (1985). Isolation of an alanine racemase gene from *Bacillus subtilis* and its use for plasmid maintenance in *B. subtilis*. *Bio/Technology* 3, 1003–1007. doi: [10.1038/nbt1185-1003](https://doi.org/10.1038/nbt1185-1003)
29. Stahl, M. L., and Ferrari, E. (1984). Replacement of the *Bacillus subtilis* subtilisin structural gene with an in vitro-derived deletion mutation. *Journal of Bacteriology* 158, 411–418.
30. Yang, M. Y., Ferrari, E., and Henner, D. J. (1984). Cloning of the neutral protease gene of *Bacillus subtilis* and the use of the cloned gene to create an in vitro-derived deletion mutation. *Journal of Bacteriology* 160, 15–21.
31. Wells, J. A., Ferrari, E., Henner, D. J., Estell, D. A., and Chen, E. Y. (1983). Cloning, sequencing, and secretion of *Bacillus amyloliquefaciens* subtilisin in *Bacillus subtilis*. *Nucleic Acids Research* 11, 7911–7925. doi: [10.1093/nar/11.22.7911](https://doi.org/10.1093/nar/11.22.7911)
32. Gay, P., Le Coq, D., Steinmetz, M., Ferrari, E., and Hoch, J. A. (1983). Cloning structural gene *sacB*, which codes for exoenzyme levansucrase of *Bacillus subtilis*: Expression of the gene in *Escherichia coli*. *Journal of Bacteriology* 153, 1424–1431.
33. Ferrari, E., and Hoch, J. A. (1983). A single copy, transducible system for complementation and dominance analysis in *Bacillus subtilis*. *MGG Molecular & General Genetics* 189, 321–325. doi: [10.1007/BF00337824](https://doi.org/10.1007/BF00337824)
34. Held, G. A., Bulla Jr., L. A., Ferrari, E., Hoch, J., Aronson, A. I., and Minnich, S. A. (1982). Cloning and localization of the lepidopteran protoxin gene of *Bacillus thuringiensis* subsp. *kurstaki*. *Proceedings of the National Academy of Sciences of the United States of America* 79, 6065–6069. doi: [10.1073/pnas.79.19.6065](https://doi.org/10.1073/pnas.79.19.6065)

35. Ferrari, F. A., Ferrari, E., and Hoch, J. A. (1982). Chromosomal location of a *Bacillus subtilis* DNA fragment uniquely transcribed by sigma-28-containing RNA polymerase. *Journal of Bacteriology* 152, 780–785.
36. Ferrari, F. A., Lang, D., Ferrari, E., and Hoch, J. A. (1982). Molecular cloning of the *spoOB* sporulation locus in bacteriophage lambda. *Journal of Bacteriology* 152, 809–814.
37. Hoch, J. A., Nguyen, A., and Ferrari, E. (1982). Strategies for cloning in *Bacillus subtilis*. *Basic life sciences* 19, 163–173. doi: [10.1007/978-1-4684-4142-0\\_15](https://doi.org/10.1007/978-1-4684-4142-0_15)
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39. Canosi, U., Ferrari, E., Falaschi, A., and Mazza, G. (1979). Effect of 6-(p-hydroxyphenylazo)-uracil on the homologous and heterologous transduction processes in *Bacillus subtilis*. *Journal of Bacteriology* 137, 124–128.
40. Albertini, A. M., Baldi, L. M., and Ferrari, E. (1979). Mutants of *Bacillus subtilis* affected in spore outgrowth. *Journal of General Microbiology* 110, 351–363. doi: [10.1099/00221287-110-2-351](https://doi.org/10.1099/00221287-110-2-351)
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42. Canosi, U., Ferrari, F. A., and Ferrari, E. U. (1978). PBSX induction in a temperature-sensitive mutant of *Bacillus subtilis*. *Journal of General Virology* 39, 81–90. doi: [10.1099/0022-1317-39-1-81](https://doi.org/10.1099/0022-1317-39-1-81)
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