

Davide Maspero

Education

- 2018–onward **PhD Student in Computer Science**, *University of Milan, Bicocca*.
Dept. of Informatics, Systems and Communication
- Research field *Methods for data integration in computational biology*
Supervisor Alex Graudenzi, PhD
- 2016–2017 **Master's degree in Industrial Biotechnology**, *University of Milan, Bicocca*, Vote: 110/110 with honors.
Thesis *Investigating tumor metabolic heterogeneity with multiscale models*
Supervisor Professor G. Mauri
Co-supervisor Dott. A. Graudenzi, PhD & Dott.sa C. Damiani, PhD
Description Aim was to investigate and characterize tumor heterogeneity both at inter tumor (between same tumor in different patients) and intra tumor (among cancer subpopulations) levels, using different modeling methodologies.
- 2014–2015 **Bachelor of Life Science**, *University of Milan, Bicocca*, Vote: 101/110.
Specialized in molecular biology
Thesis *A molecular basis for classic blond hair color in Europeans*
Supervisors Professor A. E. Ronchi & Professor S. Ottolenghi
Description This thesis explored the methodology to unveil the correlation between a Single Nucleotide Polymorphism with the classic blond phenotype of the north european women. This study paves the way to statistical analysis to associate polymorphism in non-coding region with specific phenotype.

Contracts and grants

- Jan 1, 2020 – **Research Grant**, *Institute of molecular bioimaging and physiology (IBFM)*, Consiglio Nazionale delle Ricerche, Supervisor: Dr. Alex Graudenzi.
Sysbionet: Research infrastructure accounted in the ESFRI roadmap
- Jan 1, 2018 – **Scholarship**, *Research, Genetic Epidemiology and Pharmacogenomic Unit*, IRCCS
Dec 31, 2019 *foundation Istituto Nazionale dei Tumori*, Supervisor: Dr. Tommaso Dragani.
Development and application of methodologies to analyse and integrate human genetic data in computational models
- Sep – Dic 2018 **Scholarship**, *Dept. of Informatics, Systems and Communication*, University of Milan – Bicocca, Supervisor: Prof. Marco Antoniotti.
Complex interactions between genetic variants and lung tissue transcription in the outcome of lung adenocarcinoma

Jun 21, 2018 **Occasional employment**, *Research, Genetic Epidemiology and Pharmacogenomic*
 – Unit, IRCCS foundation Istituto Nazionale dei Tumori, Supervisor: Dr. Tommaso
 Sep 30, 2018 Dragani.
Complex interactions between genetic variants and lung tissue transcription in the outcome of lung adenocarcinoma

Publications

International journals

- *Graudenzi, A., Maspero, D., *Angaroni, F., Piazza, R., and Ramazzotti, D. "Mutational signatures and heterogeneous host response revealed via large-scale characterization of SARS-CoV-2 genomic diversity". In: **iScience** 24.2 (Feb. 2021). DOI: 10.1016/j.isci.2021.102116. ***equal contribution.**
- Ramazzotti, D., Angaroni, F., Maspero, D., Gambacorti-Passerini, C., Antoniotti, M., Graudenzi, A., and Piazza, R. "VERSO: a comprehensive framework for the inference of robust phylogenies and the quantification of intra-host genomic diversity of viral samples". In: **Patterns** (Feb. 2021). DOI: 10.1016/j.patter.2021.100212.
- *Graudenzi, A., Maspero, D., and *Damiani, C. "FBCA, A Multiscale Modeling Framework Combining Cellular Automata and Flux Balance Analysis." In: **Journal of Cellular Automata** 15 (2020), pp. 75–95. URL: <https://www.oldcitypublishing.com/journals/jca-home/jca-issue-contents/jca-volume-15-number-1-2-2020/jca-15-1-2-p-75-95/>. ***equal contribution.**
- *Patrino, L., Maspero, D., Craighero, F., Angaroni, F., Antoniotti, M., and Graudenzi, A. "A review of computational strategies for denoising and imputation of single-cell transcriptomic data". In: **Briefings in Bioinformatics** (Oct. 2020). bbaa222. DOI: 10.1093/bib/bbaa222. ***equal contribution.**
- Angaroni, F., Graudenzi, A., Rossignolo, M., Maspero, D., Calarco, T., Piazza, R., Montangero, S., and Antoniotti, M. "An Optimal Control Framework for the Automated Design of Personalized Cancer Treatments". In: **Frontiers in Bioengineering and Biotechnology** 8 (2020), p. 523. DOI: 10.3389/fbioe.2020.00523.
- Damiani, C., Rovida, L., Maspero, D., Sala, I., Rosato, L., Di Filippo, M., Pescini, D., Graudenzi, A., Antoniotti, M., and Mauri, G. "MaREA4Galaxy: Metabolic reaction enrichment analysis and visualization of RNA-seq data within Galaxy". In: **Computational and Structural Biotechnology Journal** 18 (2020), pp. 993–999. DOI: <https://doi.org/10.1016/j.csbj.2020.04.008>.
- Maspero, D., Damiani, C., Antoniotti, M., Graudenzi, A., Di Filippo, M., Vanoni, M., Caravagna, G., Colombo, R., Ramazzotti, D., and Pescini, D. "The Influence of Nutrients Diffusion on a Metabolism-driven Model of a Multi-cellular System". In: **Fundamenta Informaticae** 171 (2020). 1-4, pp. 279–295. DOI: 10.3233/FI-2020-1883.
- Maspero, D., Dassano, A., Pintarelli, G., Noci, S., De Cecco, L., Incarbone, M., Tosi, D., Santambrogio, L., Dragani, T. A., and Colombo, F. "Read-through transcripts in lung: germline genetic regulation and correlation with the expression of other genes". In: **Carcinogenesis** 41.7 (Mar. 2020), pp. 918–926. DOI: 10.1093/carcin/bgaa020.
- Damiani, C., Maspero, D., Di Filippo, M., Colombo, R., Pescini, D., Graudenzi, A., Westerhoff, H. V., Alberghina, L., Vanoni, M., and Mauri, G. "Integration of single-cell RNA-seq data into population models to characterize cancer metabolism". In: **PLOS Computational Biology** 15.2 (Feb. 2019), pp. 1–25. DOI: 10.1371/journal.pcbi.1006733.

- Pintarelli, G., Noci, S., Maspero, D., Pettinicchio, A., Dugo, M., De Cecco, L., Incarbone, M., Tosi, D., Santambrogio, L., Dragani, T. A., and Colombo, F. "Cigarette smoke alters the transcriptome of non-involved lung tissue in lung adenocarcinoma patients". In: **Scientific Reports** 9.1 (Sept. 2019), p. 13039. DOI: 10.1038/s41598-019-49648-2.
- Graudenzi, A., Maspero, D., Di Filippo, M., Gnugnoli, M., Isella, C., Mauri, G., Medico, E., Antoniotti, M., and Damiani, C. "Integration of transcriptomic data and metabolic networks in cancer samples reveals highly significant prognostic power". In: **Journal of Biomedical Informatics** 87 (2018), pp. 37–49. DOI: <https://doi.org/10.1016/j.jbi.2018.09.010>.

Conference proceedings

- Angaroni, F., Pennati, M., Patruno, L., Maspero, D., Antoniotti, M., and Graudenzi, A. "A closed-loop optimization framework for personalized cancer therapy design". In: *2020 IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB)*. 2020, pp. 1–9. DOI: 10.1109/CIBCB48159.2020.9277647.
- Maspero, D., Di Filippo, M., Angaroni, F., Pescini, D., Mauri, G., Vanoni, M., Graudenzi, A., and Damiani, C. "Integration of single-cell RNA-sequencing data into Flux Balance Cellular Automata". In: *Lecture Notes in Computer Science*. Ed. by Springer. Proceedings of Computational Intelligence methods for Bioinformatics and Biostatistics. In press. Computational Intelligence Methods for Bioinformatics and Biostatistics, **CIBB 2019**. Bergamo, Italy, Sept. 2019.
- Graudenzi, A., Maspero, D., and Damiani, C. "Modeling spatio-temporal dynamics of metabolic networks with cellular automata and constraint-based methods". In: *Lecture Notes in Computer Science*. Ed. by Springer. Proceedings of 13th International Conference on Cellular Automata for Research and Industry. International Conference on Cellular Automata, **ACRI 2018**. Como, Italy, Sept. 2018, pp. 16–29.
- Maspero, D., Graudenzi, A., Singh, S., Pescini, D., Mauri, G., Antoniotti, M., and Damiani, C. "Synchronization Effects in a Metabolism-Driven Model of Multi-cellular System". In: *Communications in Computer and Information Science*. Ed. by Springer. Vol. 900. Proceedings of 13th Italian Workshop on Artificial Life and Evolutionary Computation. Italian Workshop on Artificial Life and Evolutionary Computation, **WIVACE 2018**. Parma, Italy, Sept. 2018, pp. 115–126.

Books

- Di Filippo, M., Damiani, C., Vanoni, M., Maspero, D., Mauri, G., Alberghina, L., and Pescini, D. "Single-cell digital twins for cancer preclinical investigation". In: **Metabolic Flux Analysis in Eukaryotic Cells**. Humana, New York, NY, 2020, pp. 331–343.

Experiences

Conferences and invited talks

- Nov 11, 2019 **Invited talk**, Inst. of Molecular Bioimaging and Physiology, Consiglio Nazionale delle Ricerche (IBFM-CNR), Segrate, Milan.
Omics data integration and multi-scale modeling to investigate metabolic heterogeneity in cancer.
- Jul 21 – 25, 2019 **ISMB/ECCB**, *27th Conference on Intelligent Systems for Molecular Biology and the 18th European Conference on Computational Biology*, Basel, Switzerland,
CORE2018 Rank: A - Primary Field Of Research: 0803 - Computer Software.
Constraint-based modeling of human single cells to investigate metabolic heterogeneity in cancer subpopulations

- Jul 9, 2019 **SIB**, Workshop on Computational and System Biology, University of Bologna.
Integration of single-cell transcriptomic data into metabolic models.
- Feb 14 – 15, 2019 **SysBio**, *Workshop on Understanding Complexity in Life Sciences*, University of Milan – Bicocca, Dept. of Biotechnology and Biosciences.
Integration of single-cell RNA-seq data into population models to characterize cancer metabolism
- Sep 10 – 12, 2018 **WIVACE 2018**, *XIII workshop on artificial life and evolutionary computation*, University of Parma, Department of Engineering and Architecture.
Synchronization effects in a metabolism-driven model of multi-cellular system.
- Invited Lesson**
- May 22, 2018 **System Biology**, *1 lezione (30min)*, University of Milan – Bicocca.
Single cell expression profile integration - scRNA seq - in cell population models.
Invited by: Professoressa Daniela Besozzi
- May 2018 **Data science for geoscience**, *2 lezioni (4h)*, University of Milan – Bicocca.
Matlab training.
Invited by: Professor Alex Graudenzi
- Nov 2017 **Computational Biology**, *1 lesson (2h)*, University of Milan – Bicocca.
Matlab practice for Flux Balance Analysis pipeline.
Invited by: Professor Marco Antoniotti
- Conference organized**
- May 27 – 31, 2019 **CDAC 2019**, Lake Como school of advanced studies.
<http://cdac2019.lakecomoschool.org/>
- Oct 9 – 13, 2017 **Combine 2017**, University of Milan – Bicocca.
http://co.mbine.org/events/COMBINE_2017
- May 22 – 26, 2018 **CDAC 2018**, Lake Como school of advanced studies.
<http://cdac2018.lakecomoschool.org/>
- Attended school**
- Sep 16 – 20, 2019 **Advances in Artificial Intelligence**, *CIBR 2019*.
Lake Como School for Advanced Studies
- May 27 – 31, 2019 **Cancer development and complexity**, *CDAC 2019*.
Lake Como School for Advanced Studies
- Oct 4 – 6, 2017 **Computational System Biology school**, *COSYS 2017*.
University of Milan – Bicocca
- May 23 – 26, 2017 **Cancer development and complexity III**, *CDAC 2017*.
Lake Como School for Advanced Studies
- Collaboration**
- Dr. Tommaso Dragani**, *Research, Genetic Epidemiology and Pharmacogenomic Unit*.
IRCCS foundation Istituto Nazionale dei Tumori of Milan
- Prof Hans Westeroff**, *Manchester Centre for Integrative Systems Biology*.
- Sysbio.it**, *Italian Centre of Systems Biology*.
University of Milan – Bicocca

Computer skills

Basic JAVA SCRIPT, Snakemake, Nextflow
Intermediate Unix, PYTHON, L^AT_EX
Advanced R, Matlab

Contribution to softwares

VERSO  - github.com/BIMIB-DISCO/VERSO - *manteiner*

Ramazzotti, D., Angaroni, F., Gambacorti-Passerini, C., Antoniotti, M., Graudenzi, A., & Piazza, R.

LACE  - bioconductor.org/packages/release/bioc/html/LACE.html - *manteiner*

Ramazzotti, D., Angaroni, F., Ascolani, G., Castiglioni, I., Piazza, R., Antoniotti, M., & Graudenzi, A.

MaREA4Galaxy  - galaxyproject.org/use/marea4galaxy/ - *supervisor*

Damiani, C., Rovida, L., Sala, I., Rosato, L., Di Filippo, M., Pescini, D., Graudenzi, A., Antoniotti, M., & Mauri, G.

scFBA  - github.com/BIMIB-DISCO/scFBA - *manteiner*

Damiani, C., Di Filippo, M., Colombo, R., Pescini, D., Graudenzi, A., Westerhoff, H. V., Alberghina, L., Vanoni, M., & Mauri, G.

MaREA  - github.com/BIMIB-DISCO/MaREA - *manteiner*

Graudenzi, A., Di Filippo, M., Gnugnoli, M., Isella, C., Mauri, G., Medico, E., Antoniotti, M., & Damiani, C.

Languages

Italian **Mothertongue**
English **Intermediate**

Well developed listening skills

In compliance with the Italian legislative Decree no. 196 dated 30/06/2003 and with the European GDPR 679/2016 art. 13; I hereby authorize you to use and process my personal details contained in this document.