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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 – onward **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 – Dec 31, 2019 **Scholarship**, *Research, Genetic Epidemiology and Pharmacogenomic Unit*, IRCCS 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 Dragani.
Sep 30, 2018 *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., Montanero, 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.

Under review

- *Ramazzotti, D., *Angaroni, F., *Maspero, D., Ascolani, G., Castiglioni, I., Piazza, R., Antoniotti, M., and Graudenzi, A. "Longitudinal cancer evolution from single cells". In: *bioRxiv* (2020). DOI: 10.1101/2020.01.14.906453. *equal contribution.

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

BIMIB, *Bioinformatics, Natural Calculus and Systems Biology.*

University of Milan – Bicocca

Computer skills

Basic JAVA SCRIPT, Snakemake, Nextflow

Intermediate Unix, PYTHON, \LaTeX

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.