Alexis Coullomb

Postdoctoral researcher

6 rue du Lavandou

31100 Toulouse, France

(+33) 6 22 16 81 60

alexis.coullomb.pro@gmail.com

Research experience

2019 - currently

Post-doc in single-cell transcriptomics and image analysis - *Cancer Research Center of Toulouse (CRCT), INSERM*

Team 21: Network Biology for Immuno-Oncology

- Implementation of spatial transcriptomics (osmFISH) on cancer spheroids
- Development of cellular spatial networks reconstruction and analysis methods
- Analysis of single-cell RNA-seq and CITE-seq data
- Multi-omics data integration for immuno-oncology
- Student supervision on image analysis and spatial transcriptomics experiments
- Involved in co-supervision of 2 PhD students on CITE-seq
- Reviewer for *Bioinformatics* and *PeerJ*
- Image analysis tools: scikit-image, opencv, Fiji (ImageJ), QuPath
- Programming: Python, napari, Dask & Zarr

2015 - 2018

PhD in Physics for Life Sciences - *University Grenoble Alpes*

Development of active substrates and of a quantitative FRET analysis method to decode mechanotransduction

- Quantitative fluorescence microscopy with FRET biosensors
- Modification of a home-made widefield fluorescence microscope
- FPGA programming to synchronize acousto-optic tunable filters, camera and electro-magnets
- Programming for fluorescence microscopy image analysis
- Composite material engineering for active substrates
- Wet lab tasks: DNA transfection, DNA and protein purification, cell culture, …

Academic training

2017 - 2020

Research schools

EMBL Super-Resolution Microscopy: Time-Resolved STED - *EMBL, virtual*
ESRIC Super-Resolution Summer School - *RMS, virtual*
Transcriptomics and epigenomics in single cell: theory and practice - *CNRS, Roscoff*
Networks and Molecular Biology - *CNRS, Marseille*
Biology at different scales - *CNRS, Les Houches*

2018 - 2019

MSc degree: Statistics and IT for machine learning - *University Lyon 2*

- Python and R programming
- Statistics, machine learning and deep learning

2013 - 2015

MSc in Physics: Biological Systems and Physics Concepts - *Universities Pierre et Marie Curie and Paris-Sud, Paris*

Specialization Physics of Matter and Biology, with honors

2012 - 2013

BSc degree in Physics - *University Pierre et Marie Curie, Paris*

Grants and awards

2021 - Spatial Transcriptomics for Immuno-Oncology approaches in PDAC, GSO Emergence
2020 - BIRS Mathematical Frameworks for Integrative Analysis of Emerging Biological Data Types
2019 - Deep learning enhanced multi-modal phenomics and spatial transcriptomics for predicting response to oncolytic virotherapy in PDAC, Janssen Horizon, 148 k€

Teaching

2018 - Introduction to algorithmics and Python programming, University Grenoble Alpes, France
2017 - Introduction to algorithmics and C programming, University Grenoble Alpes, France

References

Vera Pancaldi - Research Fellow, Cancer Research Center of Toulouse
vera.pancaldi@inserm.fr
Aurélie Dupont - Research Fellow, Laboratory of Interdisciplinary Physics
aurelie.dupont@univ-grenoble-alpes.fr
+33 476 63 58 16
Nicolas Borghi - Research Fellow, Institut Jacques Monod
nicolas.borghi@ijm.fr
+33 157 27 80 41

Publications

Coullomb, Alexis, and Pancaldi, Vera. "Tysserand - Fast and accurate reconstruction of spatial networks from bioimages." *Bioinformatics* 7.2 (2020)
Xie, Ting, et al. "GEM-DeCan: Improving tumor immune microenvironment profiling by the integration of novel gene expression and DNA methylation deconvolution signatures." *bioRxiv* (2021)
Coullomb, Alexis, et al. "QuanTI-FRET: a framework for quantitative FRET measurements in living cells." *Scientific reports* 10.1 (2020)

Bidan, Cécile M., et al. "Magneto-active substrates for local mechanical stimulation of living cells." *Scientific reports* 8.1 (2018)

Conference presentations

2021 - Tumor spatial analysis to predict response to immunotherapy - Combination in Cancer Immunotherapy and Overcoming Resistance symposium, Toulouse, France - Oral presentation
2020 - Neighbors Aggregation Statistics for the discovery of cell interactions in spatial omics datasets - 16èmes Journées Annuelles du Cancéropôle GSO, France, virtual - Oral presentation
2020 - Neighbors Aggregation Statistics for spatial omics data - Emerging Technologies in Single Cell Research, VIB Center for Cancer Biology, Belgique, virtual - Oral presentation
2020 - Integration of seqFISH and scRNA-seq data and spatial analysis of the transcriptome - Mathematical Frameworks for Integrative Analysis of Emerging Biological Data Types, Banff International Research Station (BIRS), Canada, virtual - Oral presentation exposing contribution to a hackathon.
2018 - Active substrates to decode mechanotransduction in single cells, BioPhysical Society annual meeting, San Francisco, USA - Poster
2018 - Magneto-active substrates for local mechanical stimulation of living cells - Mechanobiology and Physics of Life, Clermont-Ferrand, France - Oral presentation
2018 - Active substrates to study mechanotransduction - Scientific day of the Physics, Engineering, and Materials research hub, Grenoble, France - Oral presentation
2017 - Quantitative FRET to study mechanotransduction - Physics from cell to tissue, Mandres-les-Roses - France - Poster
2017 - Active substrates to decode mechanotransduction in single cells - Young physicists day, Grenoble, France - Oral presentation