Annaëlle BRUNET
Year of Birth :1987
Nationality: French

WebSite : Abrunet.com

Biophysicist researcher

Keywords : Single molecule approaches, Kinetic Monte-Carlo simulation, statistical physics, DNA polymer dynamics, soft matter, 3D genome conformation, circadian rhythm, ChipSeq & RNASeq analysis

SKILLS

Modeling

Approach : Kinetic Monte-Carlo simulation (C, C++)

Data analyses procedure

Developing an computing procedure to check the physical coherence (symmetry factor, correlation function) of gigabites of raw data and to applied first step of analyses

Genome-wide Analysis

Analysing ChipSeq and RNASeq data (pipeline process, BWT, algorithms, peakcaller software) to extract cycling pattern in a circadian system context

Informatics

Softwares :	Mathematica, Matlab, Labview, Scribus (PAO)
Languages :	C, C++,R, Fortran, bash script, sublimtext
Tools :	GIMP, Inkscape, Pymol, gnuplot
Office tools:	OpenOffice and Microsoft office, LaTeX, Beamer
Systems :	Linux (Ubuntu), Windows

Microscopy

Techniques :	STM, MEB, fluorescence and dark field microscopy
Analysis :	ImageJ

Characterization technique

DLS, Zetasizer, UV spectroscopy, quantification PCR

Visualization software

Chimeria, IGV, IGB

Surface treatment process

Chemical treatment : epoxydation, thiolisation, piranha
Physical treatment : Plasma cleaner, UV ozone
Method : spin coating, deposit convective self-assembly

Languages

English :	TOEIC Score 775 (in 2014)
German :	Conversational basics

TRAINING AND DIPLOMAS

2016-Now — **Researcher** (start by 2 years of Post-Doc) **in BioPhysics, BioInformatics** — **University of Oslo (Norway)**
Team : Collas Philippe (http://collaslab.org) — **Ins. Of Basic Medical Science,Oslo**
Lamina-associated domains as tuning actors configuring the mechanical constraints of the chromatin domain at nuclear periphery in a circadian system context

- Establishing how lamina-associated domains could modulate mechanical constraints and physical properties on the chromatin fiber and dynamically contribute of the regulation of these regions
- Performing a kinetic Monte-Carlo Simulations based on a mesoscopic statistical model of chromatin
- Analyzing genome wide RNASeq and ChiPSeq data to investigate how expression pattern of metabolic genes is relates to changes in LAD recruitment (cancerous, circadian context)
- Improving a computational procedure for the analysis of the large RNA and ChipSeq data

2012-2015 — **PhD in BioPhysics** — **University of Toulouse III (France)**
Specialty : Physics (3 years) — **LPT and IPBS, CNRS, Toulouse**
Single molecule study of DNA molecules conformations with local defects or under a large set of physicochemical conditions - Advisor : **Destainville N. (LPT) and Tardin C. (IPBS)**

- Measuring the impact of intrinsic bending, local denaturation or variation of ion concentration in solution on the DNA conformations with high-throughput Tethered Particle Motion (HT-TPM)
- Performing a kinetic Monte-Carlo Simulations based on a mesoscopic statistical model of DNA
- Developing a computational procedure for the analysis of the large data sets from HT-TPM

2011-2012 — **Master 2Research, Specialty :** Nanosciences, Nanomesures — **University of Toulouse III (France)**
Master's training period in nanotechnologies (6 months) — **LAAS-CNRS, Toulouse (France)**
Formation of nano-energetic material made of Al/CuO alloy driven by DNA auto-assembly and chip integration – Advisor : **Bancaud A. and Rossi C.**

- Constructing heterogeneous advanced material structured on 1D, 2D or 3D by using the complementarity of the double strand DNA, and optimize its stability and its energetic response

2010-2011 — **Master 1, Specialty :** Fundamental Physics — **University of Toulouse III (France)**
Master's training period in microscopy (2 months) — **CEMES-CNRS, Toulouse (France)**
Studies of the 2-(3-perylene) ethanoic acid molecular by Scanning Tunneling Microscopy (STM) at Low Temperature and Ultra High Vacuum – Advisor : **Coratger R.**

- Measure the value of the single negative charge appearing during the process

2009-2010 — **Licence 3, Specialty :** Physics and Applications — **University of Toulouse III (France)**
Training period at the Braley company — **Braley Company, Bozouls (France)**
Realization of a solar furnace coupled with a Stirling engine

- Realizing the solar furnace and animating a stand on the energies at the open day of the company

GRANTS,AWARDS AND FUNDING

2016-2019 — Grant of Marie Curie action : Scientia Fellowship, University of Oslo, Faculty of Medicine

Scientific Publications

Manuscript	**Brunet, A.**, Destainville, N., Collas P.., **Physical and mechanical constraints in polymer modeling of chromatin associations with the nuclear periphery.**
2019	**Brunet, A.**, Forsberg, F., Fan Q., Sæther T., Collas P., **Nuclear Lamin B1 Interactions with Chromatin during the Circadian Cycle Are Uncoupled from Periodic Gene Expression**, **Frontiers in Genetics**, DOI: 10.3389/fgene.2019.00917
2019	Manghi, M., **Brunet, A.,** Destainville, N., **Statistical physics and mesoscopic modeling to interpret tethered particle motion experiments**, **Methods**, DOI: 10.1016/j.ymeth.2019.07.006
2019	Collas, P., Ali, T. M. L., **Brunet, A.**, Germier, T., **Finding Friends in the Crowd: Three-Dimensional Cliques of Topological Genomic Domains**, **Frontiers in Genetics**, DOI: 10.3389/fgene.2019.00602
2019	Forsberg F., **Brunet A.**, Liyakat Ali T. M., and Collas P., **Interplay of lamin A and lamin B LADs on the radial positioning of chromatin**, **Nucleus,** 2019, DOI: 10.1080/19491034.2019.1570810
2017	**Brunet, A.**, Salomé, L., S., Rousseau, P. , Destainville, N., Manghi, M., Tardin, C., **How does temperature impact the conformation of single DNA molecules below melting temperature? Nucleic acids research,** 2017, DOI : 10.1093/nar/gkx1285
2015	**Brunet, A.**, Tardin, C., Salomé, L., Rousseau, P., Destainville, N., Manghi, M., **Dependence of DNA persistence length on ionic strength of solutions with monovalent and divalent salts: a joint theory-experiment study, Macromolecule**, 2015, DOI : 10.1021/acs.macromol.5b00735
2015	**Brunet, A.**, Chevalier, S., Destainville, N., Manghi, M., Rousseau, P., Salhi, M., Salomé, L., Tardin, C., **Probing a label-free local bend in DNA by single molecule tethered particle motion, Nucleic acids research,** 2015, DOI : 10.1093/nar/gkv201

Congresses and Thematic Schools

Oral Communications

August 2019	Gordon Research Conference : Genome Architecture in Cell Fate and Disease – **Hong Kong**
March 2018	Keystone Symposia : Chromatin Architecture and Chromosome Organization & Gene Control in Development and Disease **– Whistler (Canada)**
October 2015	1st meeting of nuclear organization modeling and its pathologies **– Millau (France)**
November 2014	3rd meeting of FRBT **– Toulouse (France)**
May 2013	3rd edition of the "Les Houches School" in computational physics: DNA, from molecules to evolution **– Les Houches (France)**

Thematic Schools and Conference

June 2016	Conference on Genome Architecture in Space & Time - **Trieste (Italy)**, (1 week)
August 2014	Summer school : SOFT-FIRE-2014 – **Cargèse (France)**, (2 weeks)
May 2013	3rd edition of the "Les Houches School" in computational physics: DNA, from molecules to evolution – **Les Houches (France)**, (2 weeks)

Poster Communications

August 2019	Gordon Research Conference : Genome Architecture in Cell Fate and Disease – **Hong Kong**
March 2018	Keystone Symposia : Chromatin Architecture and Chromosome Organization & Gene Control in Development and Disease – **Whistler (Canada)**
9 May 2017	Oslo Epigenetics Mini Symposium - **Oslo (Norway)**
8-14 August 2015	Gordon Research Conference (GRC) : Soft Condensed Matter Physics - **New London (USA)**
August 2014	Summer school : SOFT-FIRE-2014 – **Cargèse (France)**
May 2013	GDR Cell Tiss 2013 - **Lyon (France)**
May 2013	3rd edition of the "Les Houches School" in computational physics: DNA, from molecules to evolution – **Les Houches (France)**

Seminars

October 2018	Seminaire IPBS - **Toulouse (France)**
August 2014	Gordon Research Seminar (GRS) : Soft Condensed Matter Physics - **New London (USA)**
January 2014	Seminaire IRSAMC - **Toulouse (France)**

Student Supervision

PhD co-supervision

Oct 2018-Now	Tharvesh M. Liyakat Ali : **Analysis of the 3D genome**
April 2018- May 2020	Frida Forsberg : **Modulation of nuclear lamin-chromatin interactions by external cues**

Master's training period

Summer 2014 (2months)	Juliette Wilhem : **Probing the experimental effect of the ionic strength on the DNA conformation release by TPM, at the single molecule level**

References

Pr. Destainville Nicolas, LPT-Toulouse,
Dr. Bancaud Aurélien, LAAS-Toulouse
Pr. Allemand Jean-Francois, LPS-Paris
Pr. Collas Philippe, CollasLab-Oslo
Dr. Tardin Catherine, IPBS-Toulouse
Dr. Salomé Laurence, IPBS-Toulouse
Dr. Lesne Annick, LPTMC-Paris