Maxime Woringer

Research experience (current)

November 2016 – present **Christophe Zimmer Lab, Institut Pasteur (Paris, France) and Xavier Darzacq Lab (Berkeley, United States)**, *PhD student in biophysics working on gene expression regulation in mammalian cells*, .

- Dissertation: Tools to analyze single-particle tracking data in mammalian cells
- Thesis defended in June 2019
- Extra classes in structural biology/molecular dynamics (CNAM-BNF201), ethics and history of science

Research experience (past)

March 2016 - October 2016 **Christophe Zimmer Lab, Institut Pasteur (Paris, France) and Xavier Darzacq Lab (Berkeley, United States)**, *6 month internship to implement compressed sensing techniques to a 3D lattice lightsheet microscope in order to increase acquisition rate.*

September 2014 - April 2015 **Arnaud Fontanet Lab, Institut Pasteur (Paris, France)**, *8 month internship in a collaboration between Judith Mueller (Laboratoire d'épidémiologie des maladies émergentes, Institut Pasteur et ÉPIBIOSTAT/METIS, École des Hautes Études en santé Publique), Nadège Martiny (Centre de Recherches en Climatologie, Université de Bourgogne, Dijon), Avner Bar-Hen, Laboratoire de Mathématiques Appliquées de Paris 5*, .

Research topic: Association between meningitis and intense dust events in Burkina Faso.

February 2014 - June 2014 **Tjian Lab, Department of Molecular and Cellular Biology, University of California (Berkeley, USA)**, *Four month internship supervised by Lana Bosanac*, .

- Research topic: Study of the role of the oncogene c-Myc on chromatin remodelling
- Use of a combination of 3D superresolution microscopy, genome editing in mammalian cells, genomic data and modelling to understand the role of c-Myc in the complex, highly organized nuclear geometry. Internship report: link.

February 2014 **Functional Imaging of Transcription (FIT), Institut de Biologie de l'ENS (Paris, France)**, *Two week internship - Pr. Xavier Darzacq's lab, internship supervised by Xavier Darzacq*, .

Design of a package to perform statistical analysis of 3D spatial point pattern data, with a special emphasis on superresolution PALM/STORM datasets.

August 2013 **Biotechnology Center (BIOTEC) of the Technische Universität (Dresden, Germany)**, *One week internship – Pr. Jörg Mansfeld's team*, .

Summer 2013 **Functional Imaging of Transcription (FIT), Institut de Biologie de l'ENS (Paris, France)**, *Nine week internship - Pr. Xavier Darzacq's lab, internship supervised by Vincent Récamier, Ignacio Izeddin and Xavier Darzacq*, .

Research topic: Spatial correlation of chromatin and transcription machinery using single molecule microscopy.

Summer 2012 **Wellcome Trust and Cancer Research UK - The Gurdon Institute (Cambridge, UK)**, *Eight week internship - Pr. Jonathon Pines's lab, work supervised by Jörg Mansfeld*, .

- Research topic: Quantitative analysis of the Spindle Assembly Checkpoint.
- Design of *CellTracking*, a software implementing a partially automated approach to perform cell tracking (`http://maxime.woringer.fr/CellTracking`). Poster: Towards an automated measurement of proteolysis in vivo. (lien). Internship realized thanks to a grant provided by the AMGEN foundation.

Teaching

2019 **Conservatoire National des Arts et Métiers (Paris)**, *"Introduction to computation softwares", 32 hours.*

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2019 **PSL QBio Winter School**, *"Practical workshop in single-particle tracking", 4 hours.*

2018-present **IMOD Core Competence Course**, *"High level introduction on current questions in biology", 4x1hr hours*, Topics: Phase separation in biology (1hr) // Histones, chromatin and transcription (1hr) // Enhancer-promoter interactions and gene expression: the good, the bad and the ugly (2hrs) .

2018 **Conservatoire National des Arts et Métiers (Paris)**, *Co-referent of the course CSC014 "Introduction to computation softwares" (co-creation of the course), 32 hours.*

2013-2016 **École normale supérieure (Paris)**, *Student seminar: Groupe de travail Maths-Bio*, .

- **2016** : 3 hr introduction to sparse representations and Fourier transform
- **2015** : 3 hr introduction on diffusions in biology
- **2014** : 2 hr introduction on fractals in biology
- **2013** : 2 hr introduction to spatial point patterns

Supervision

Joshua Price (UC Berkeley) **2017-2018 (one year part-time project)**, Undergraduate honors thesis project: The role of Topologically Associating Domains in Enhancer-Promoter interactions.

Education

2015-2016 **Université Pierre et Marie Curie (Paris)**, *Master 2 Mathématiques de la Modélisation, Mathématiques appliquées à la Biologie minor*, .
Courses in partial differential equations, probabilities, molecular dynamics, probabilistic modelling in neuroscience, etc. Additional course in deep learning at Collège de France.

2012-2016 **École normale supérieure (Paris)**, *License and Master 1 degree*, .

- 4th year – Last year of the ENS diploma
  - Additional courses in environment and artificial neural networks
- 3rd year – Année de formation complémentaire - Sabbatical year
  - Ten month internship in epidemiology
  - Additional classes in statistics and environment.
- 2nd year – Master 1 in the Biology department (master Écologie-Biodiversité-Évolution, UPMC)
  - Training in cellular biology, biophysics, neuroscience, ecology
  - Additional classes in mathematics/statistics, physics and computational biology.
- First year – Licence 3 in the Biology department - equivalent to the last year of a bachelor degree
  - Pluridisciplinary training in cellular and molecular biology, neuroscience, ecology
  - Additional lectures in algorithmics, modelling, mathematics and environment.

2010-2012 **Lycée Joffre (Montpellier) / UPMC (Paris)**, *Preparation for the competitive examinations to the French "Grandes Écoles" (CPGE), additional classes in physics (UPMC)*, .

2009-2010 **Université Pierre et Marie Curie & Sciences-Po (Paris)**, *Double diploma in Sciences, social sciences and Politics - First Year only*, .

2009 **French "Baccalauréat général scientifique"**, *First class honours*, .

Computer & lab skills

Scientific programming	**Python, R, C**	*Regular use. e.g : bibliometry (2019), single-particle tracking simulation (2019), Compressed sensing (2016), Django & spatial statistics (2014), FFT (2013), Cell tracking (2012), processing of geographical data, OpenCV*
Other languages	**Java, C++**	*Basic experience, Fiji/Micro-Manager plugins or extensions*
Web development	**HTML/CSS/JS, jQuery, AngularJS, D3.js**	*Regular use. e.g : Kinetic modeling of single particle data (2017)*
Other tools	**LaTeX, emacs, git, unix administration, HPC (slurm)**	*gitlab repository (link)*
Microscopy	**Superresolution microscopy (PALM & SPT-PALM)**	*data acquisition, data processing and analysis*

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Wet lab **Genome editing, molecular biology, cell culture** *experience with U2OS, mESC, NT2 cells*

Publications

Maxime Woringer, Xavier Darzacq, and Ignacio Izeddin. Geometry of the nucleus: a perspective on gene expression regulation. *Current Opinion in Chemical Biology*, 20:112–119, June 2014.

Judith E. Mueller, Maxime Woringer, Souleymane Porgho, Yoann Madec, Haoua Tall, Nadège Martiny, and Brice W. Bicaba. The association between respiratory tract infection incidence and localised meningitis epidemics: an analysis of high-resolution surveillance data from burkina faso. *Scientific Reports*, 7(1):11570, September 2017.

William J. Ripple, Christopher Wolf, Thomas M. Newsome, Mauro Galetti, Mohammed Alamgir, Eileen Crist, Mahmoud I. Mahmoud, William F. Laurance, and 15364 scientist signatories from 184 countries. World scientists' warning to humanity: A second notice. *BioScience*, 2017.

Maxime Woringer, Xavier Darzacq, Christophe Zimmer, and Mustafa Mir. Faster and less phototoxic 3D fluorescence microscopy using a versatile compressed sensing scheme. *Optics Express*, 25(12):13668, June 2017.

Anders S. Hansen*, Maxime Woringer*, Jonathan B. Grimm, Luke D. Lavis, Robert Tjian, and Xavier Darzacq. Robust model-based analysis of single-particle tracking experiments with Spot-On. *eLife*, 7:e33125, January 2018.

Thibaut Koutangni, Pascal Crépey, Maxime Woringer, Souleymane Porgho, Brice W. Bicaba, Haoua Tall, and Judith E. Mueller. Compartmental models for seasonal hyperendemic bacterial meningitis in the african meningitis belt. *Epidemiology and Infection*, August 2018.

Maxime Woringer and Xavier Darzacq. Protein motion in the nucleus: from anomalous diffusion to weak interactions. *Biochemical Society Transactions*, page BST20170310, July 2018.

Maxime Woringer, Nadège Martiny, Souleymane Porgho, Brice W. Bicaba, Avner Bar-Hen, and Judith E. Mueller. Atmospheric dust, early cases, and localized meningitis epidemics in the african meningitis belt: An analysis using high spatial resolution data. *Environmental Health Perspectives*, 126(9):097002, September 2018.

Jyotsana J. Parmar, Maxime Woringer, and Christophe Zimmer. How the genome folds: The biophysics of four-dimensional chromatin organization. *Annual Review of Biophysics*, 48(1):pages not final, 2019.

* means equal contribution

Languages

French **Mother tongue**

English **Good writing and speaking skills**

Spanish **Basic communication skills** *Studied at school for seven years*

Miscellaneous

apr-nov 2015 **pre-COP21 international Conference of Youth** `http://coy11.org`, *Member of the coordination team (full-time occupation, approx. 90 hrs/week)*, .

First-aid diploma 2005 (renewed in 2012 and 2019)

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