

# Guillaume J. Filion

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## PERSONAL INFORMATION

**Born in** Drummondville (Canada) September 4, 1979.

**Languages** French, English, Spanish, Russian, Dutch, German.

## RESEARCH EXPERIENCE

### from 2012: Junior group leader

Center for Genomic Regulation (Barcelona, Spain)

*My current focus is to understand how genomes are organized. To this aim, we are developing technologies to study position effects. This requires new statistical and computational methods that are also developed within the team.*

### 2008-2011: Post-doctoral fellow in the lab of Bas van Steensel

Netherlands Cancer Institute (Amsterdam, The Netherlands)

*During my post-doc, my collaborators and myself redefined the Drosophila chromatin. Using genome-wide technologies and computational tools, we proposed a classification of chromatin in 5 basic states that suggests the existence of yet-to-discover silencing mechanisms.*

### 2004-2007: PhD thesis in the lab of Pierre-Antoine Defossez

Curie Institute (Paris, France)

*During my PhD, I discovered two new mammalian zinc finger proteins able to bind meCpGs (ZBTB4 and ZBTB38). Using an in vitro method that I developed, I could show that those proteins have different intrinsic binding specificities.*

## EDUCATION

### 2003-2004: M2, Human Genetics

Université Denis Diderot (Paris, France)

### 2001-2003: M2, Molecular Biology

Ecole Normale Supérieure (Lyon, France)

### 2000-2001: L3 (BSc) Biology

Concordia University (Montreal, Canada)

### 1998-2000: L2 Biology

Université Claude Bernard (Lyon, France)

## COMPETITIVE FUNDING

- 2017-2019 Plan Estatal.** 120 K€ for consumables.
- 2015-2017 AGAUR.** 13 K€ for consumables.
- 2014-2019 ERC Synergy Grant.** 2.2 M€ distributed in salaries and consumables.
- 2012-2015 EpiGeneSys RISE1.** 150 K€ for a post-doc position.
- 2012-2016 Marie Curie Career Integration Grant.** 80 K€ for consumables.
- 2013-2016 FPI grant.** 100 K€ for a PhD position.
- 2013-2016 Plan Nacional.** 150 K€ for a post-doc position.

## PRIZES AND AWARDS

- 2012 RISE1 member of the EpiGeneSys network.**
- 2006 EMBO Short-Term mobility fellowship.**
- 2000 École Normale Supérieure de Lyon (first rank).**

## MEETING ORGANIZATION

- Stat. meth. for post genomic data:** Spain, 2019
- 4D Synergy Meeting:** Spain, 2016
- CRG Symposium:** Spain, 2015
- EpiGeneSys Meeting:** Spain, 2014

## EDITORIAL EXPERIENCE

- PLOS Computational Biology
- PLOS Genetics

## TEACHING EXPERIENCE

- 2018:** University Pompeu Fabra  
Semester course (20 hours) on data visualization (Barcelona, Spain)
- 2014-2016:** Summer school SMTB  
Research practicals for highschool students (Puschino, Russia)
- 2008-2015:** Occasional university lectures  
M2 students, Universitat Pompeu Fabra (Barcelona, Spain)  
M1 students, Vrije Universiteit (Amsterdam, The Netherlands)  
Université Paul Sabatier (Toulouse, France).
- 2004-2007:** Mendelian genetics  
L2 students, Université Denis Diderot (Paris, France)

## PRESENTATIONS AT MEETINGS (selection from 22)

**Pairing Meeting:** Canada, 2018  
**Nuclear Landscapes:** Poland, 2018  
**Bioinformatics: from algorithms to applications:** Russia, 2017  
**Gene Regulation by the Numbers:** Germany, 2017  
**Second Danube Epigenetics Conference:** Hungary, 2016  
**Intelligent Systems for Molecular Biology:** Ireland, 2015  
**Network Models in Cellular Regulation:** Spain, 2015  
**Statistical Methods for Post Genomic Data:** Germany, 2015  
**Society for Bioinformatics in Northern Europe:** Norway, 2014  
**EpiGeneSys meeting:** United Kingdom, 2013  
**Boheringer meeting:** Germany, 2012  
**Epigenetics, from bases to pathology:** France, 2011  
**EMBL Functional Genomics meeting:** Germany, 2010

## REVIEWING EXPERIENCE

I wrote peer reviews for academic journals including Nature, Nature Biotechnology, Nature Methods, Genome Research, Nature Communications, PLOS Genetics, Cell Reports, Nucleic Acids Research, Genome Biology and Evolution, BMC Genomics, Bioinformatics, Chromosome Research, F1000 Research, Nucleus, Biophysical Journal, Scientific Reports, PLOS ONE. Text and statistics available at Publons (link below).

<https://publons.com/author/315077/guillaume-filion#stats>

In addition, I reviewed projects for organizations such as the Agence Nationale pour la Recherche (France) and the Polish Foundation for Science (Poland).

## EVALUATION PANELS

**2017 IRI Life Sciences.** Berlin, Germany.

## SOFTWARE DEVELOPMENT

**2015: Zerone** <https://github.com/nanakiksc/zerone>

**2014: Seeq** <https://github.com/ezorita/seeq>

**2014: Starcode** <https://github.com/guillaume/starcode>

## COMMUNITY & OUTREACH ACTIVITIES

**2012-present:** Author of a blog on statistics and their application to biology (<http://blog.thegrandlocus.com>)

**2017:** Presentation at the Pint of Science festival  
Grizzly 72 Sports Bar (Barcelona, Spain)

**2016:** Presentation at the 9th Barcelona DataBeers  
Antiga Fàbrica Estrella Damm (Barcelona, Spain)

## RESEARCH ARTICLES

1. Cortini R, **Filion GJ**, *Principles of transcription factor traffic on folded chromatin*, *Nature Communications*, Vol. 9 p. 1740 doi:10.1038/s41467-018-04130-x (2018).
2. Chen HC, Zorita E, **Filion GJ**, *Using Barcoded HIV Ensembles (B-HIVE) for Single Provirus Transcriptomics*, *Current Protocols in Molecular Biology*, Vol. 122 e56 doi:10.1002/cpmb.56 (2018)
3. Vidal E, le Dily F, Quilez J, Stadhouders R, Cuartero Y, Graf T, Martí-Renom MA, Beato M, **Filion GJ**, *OneD: increasing reproducibility of Hi-C Samples with abnormal karyotypes*, *Nucleic Acids Research*, gky064 doi:10.1093/nar/gky064 (2018).
4. Abner E, Stoszko M, Zeng L, Chen HC, Izquierdo-Bouldstridge A, Konuma T, Zorita E, Fanunza E, Zhang Q, Mahmoudi T, Zhou MM, **Filion GJ**, Jordan A *A new quinoline BRD4 inhibitor targets a distinct latent HIV-1 reservoir for re-activation from other 'shock' drugs*, *Journal of Virology*, pii: JVI.02056-17 doi:10.1128/JVI.02056-17 (2018).
5. Stadhouders R, Vidal E, Serra F, Di Stefano B, Le Dily F, Quilez J, Gomez A, Collombet S, Berenguer C, Cuartero Y, Hecht J, **Filion GJ**, Beato M, Marti-Renom MA, Graf T, *Transcription factors orchestrate dynamic interplay between genome topology and gene regulation during cell reprogramming*, *Nature Genetics*, Vol. 50 pp. 238–249 doi:10.1038/s41588-017-0030-7 (2018).
6. **Filion GJ**, *Analytic combinatorics for computing seeding probabilities*, *Algorithms*, Vol. 11 doi:10.3390/a11010003 (2018).
7. Ferry L, Fournier A, Tsusaka T, Adelmant G, Shimazu T, Matano S, Kirsh O, Amouroux R, Dohmae N, Suzuki T, **Filion GJ**, Deng W, de Dieuleveult M, Fritsch L, Kudithipudi S, Jeltsch A, Leonhardt H, Hajkova P, Marto JA, Arita K, Shinkai Y, Defosse PA, *Methylation of DNA Ligase 1 by G9a/GLP Recruits UHRF1 to Replicating DNA and Regulates DNA Methylation*, *Molecular Cell*, Vol. 67 pp. 550–565 (2017).
8. Serra F, Baù D, **Filion GJ**, Marti-Renom MA, *Structural features of the fly chromatin colors revealed by automatic three-dimensional modeling*, *PLoS Computational Biology*, Vol. 13 e1005665. doi:10.1371/journal.pcbi.1005665 (2017).
9. Corrales-Berjano M, Rosado-Díez A, Cortini R, van Arensbergen J, van Steensel B, **Filion GJ**, *Clustering of Drosophila housekeeping promoters facilitates their expression*, *Genome Research*, Vol. 27 pp. 1153–1161 (2017).
10. Chen HC, Martinez JP, Zorita E, Meyerhans A, **Filion GJ**, *Position effects influence HIV latency reversal*, *Nature Structural and Molecular Biology*, Vol. 24 pp. 47–54 (2017).
11. Cuscó P, **Filion GJ**, *Zerone: a ChIP-seq discretizer for multiple replicates with built-in quality control*, *Bioinformatics*, Vol. 32 pp. 2896–902 (2016).
12. Corrales-Berjano M, Cuscó P, Usmanova DR, Chen HC, Bogatyreva NS, **Filion GJ**, Ivankov DN, *Machine Learning: How Much Does It Tell about Protein Folding Rates?*, *PLoS ONE*, Vol. 10 e0143166. doi:10.1371/journal.pone.0143166 (2015).
13. Zorita E, Cuscó P, **Filion GJ**, *Starcode: sequence clustering based on all-pairs search*, *Bioinformatics*, Vol. 31 pp. 1913–9 (2015).
14. le Dily F, Baù D, Pohl A, Vicent GP, Serra F, Soronellas D, Castellano G, Wright RH, Bal-lare C, **Filion G**, Marti-Renom MA, Beato M, *Distinct structural transitions of chromatin topological domains correlate with coordinated hormone-induced gene regulation*, *Genes & Development*, Vol. 19 pp. 2151–62 (2014).

15. van Bemmelen J, **Filion GJ**, Rosado A, Talhout W, de Haas M, van Welsem T, van Leeuwen F, van Steensel B, *A network model of the molecular organization of chromatin in Drosophila*, **Molecular Cell**, Vol. 49 pp. 759–71 (2013).
16. Steglich B, **Filion G**, van Steensel B, Ekwall K, *The inner nuclear membrane proteins Man1 and Ima1 link to two different types of chromatin at the nuclear periphery in S. pombe*, **Nucleus**, Vol. 3 pp. 77–87 (2012).
17. **Filion GJ**, van Bemmelen JG, Braunschweig U, Talhout W, Kind J, Ward LD, Brugman W, de Castro Genebra de Jesus I, Kerkhoven RM, Bussemaker H, van Steensel B, *Systematic protein location mapping reveals five principal chromatin types in Drosophila cells*, **Cell**, Vol. 143, pp. 212–24 (2010).
18. van Steensel B, Braunschweig U, **Filion GJ**, Chen M, van Bemmelen JG, Ideker T, *Bayesian network analysis of targeting interactions in chromatin*, **Genome Research**, Vol. 20, pp. 190–200 (2010).
19. Yamada D, Pérez-Torrado R, **Filion GJ**, Caly M, Jammart B, Devignot V, Sasai N, Ravasard P, Mallet J, Sastre-Garau X, Schmitz ML, Defossez PA, *The Human protein kinase HIPK2 phosphorylates and downregulates the methyl-binding transcription factor ZBTB4*, **Oncogene**, Vol. 28, pp. 2535–44 (2009).
20. Augui S, **Filion GJ**, Huart S, Nora E, Guggiari M, Maresca M, Sterwart AF, Heard E, *Sensing X chromosome pairs before X inactivation via a novel X-pairing region of the Xic*, **Science**, Vol. 318, pp. 1632–6 (2007).
21. **Filion GJ**, Fouvry L, Defossez PA, *Using reverse electrophoretic mobility shift assay to measure and compare protein-DNA binding affinities*, **Analytical Biochemistry**, Vol. 357, pp. 156–8 (2006).
22. **Filion GJ**, Zhenilo S, Salozhin S, Yamada D, Prokhortchouk E, Defossez PA, *A family of human zinc finger proteins that bind methylated DNA and repress transcription* **Molecular and Cellular Biology**, Vol. 26, pp. 169–81 (2006).
23. Defossez PA, Kelly KF **Filion GJ**, Perez-Torrado R, Magdinier F, Menoni H, Nordgaard CL, Daniel JM, Gilson E, *The human enhancer blocker CTC-binding factor interacts with the transcription factor Kaiso* **Journal of Biological Chemistry**, Vol. 280, pp. 43017–23 (2005).

#### PREPRINTS UNDER REVISION

1. Pokusaeva V, Usmanova D, Putintseva E, Espinar L, Sarkisyan K, Mishin A, Bogatyreva N, Ivankov D, **Filion GJ**, Carey L, Kondrashov FA, *Experimental assay of a fitness landscape on a macroevolutionary scale* bioRxiv <https://doi.org/10.1101/222778> (2018).
2. Lucic B, Chen HC, Kuzman M, Zorita E, Wegner J, Minnerker V, Roukos V, Benkirane M, Weng W, Schmidt M, Fronza R, Stadhouders R, Vlahovicek K, **Filion GJ\***, Lucic M, *Spatially clustered loci with multiple enhancers are frequent targets of HIV-1* bioRxiv <https://doi.org/10.1101/287896> (2018).

#### REVIEWS, BOOK CHAPTERS AND OPINION ARTICLES

1. Quilez J, Vidal E, le Dily F, Serra F, Cuartero Y, Stadhouders R, Graf T, Martí-Renom MA, Beato M, **Filion GJ**, *Parallel sequencing lives, or what makes large sequencing projects successful*, **GigaScience**, gix100 doi:10.1093/gigascience/gix100 (2017).

2. Corrales-Berjano M, **Filion GJ**, *Modeling chromatin states*, ***Epigenetics and Systems Biology*** edited by Leonie Ringrose, pp. 25-43. Elsevier (2017).
3. **Filion GJ**, Betao M, *3D genome structure. Organization of the nucleus in space and time*, ***FEBS Letters***, Vol. 589 pp. 28678 (2015).
4. **Filion GJ**, *The signed Kolmogorov-Smirnov test: why it should not be used*, ***Gigascience***, Vol. 4 doi:10.1186/s13742-015-0048-7 (2015).
5. **Filion GJ**, van Steensel B, *Reassessing the abundance of H3K9me2 chromatin domains in embryonic stem cells*, ***Nature Genetics***, Vol. 42, p. 4 (2010).
6. **Filion GJ**, Paul RE, Robert V, *Transmission and immunity: the importance of heterogeneity in the fight against malaria*, ***Trends in Parasitology***, Vol. 22, pp. 345–8 (2006).