Clément Goubert, PhD

Research focus: Contribution of Mobile DNA to Molecular Variation, Health and Evolution

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Current position: Research Associate, Bourque Group, dpt. of Human Genetics, Canadian Center for Computational Genomics (C3G), McGill University (Canada)

Education

2015	**Ph.D. in Evolutionary Biology and Population Genomics**	*Université de Lyon 1* (France)
2012	**Graduate Degree in Population Genetics**	*Université d'Angers* (France)
2011	**M.Sc. in Ecology and Evolution**	*Université de Rennes 1* (France)
2009	**B.Sc. in Biology and Ecology**	*Université de La Rochelle* (France)

Academic Experience

2022-pres.	**Research Associate** (Pr. G. Bourque)	*McGill University, QC, CANADA*
2020-2022	**Postdoctoral Researcher** (Pr. G. Bourque)	*McGill University, QC, CANADA*
2017-2020	**Postdoctoral Researcher** (Pr. C. Feschotte)	*Cornell University, NY, USA*
2016-2017	**Postdoctoral Researcher** (Prs. C. Feschotte & L.B. Jorde)	*University of Utah, UT, USA*
2012-2015	**Ph.D. Candidate** (Dr. M. Boulesteix & Pr. C. Vieira)	*Université de Lyon 1, France*
2011-2012	**Graduate Degree Research Internship** (Dr. J.-C. Simon)	*INRA, Rennes, France*
2010-2011	**M.Sc. Research Internship** (Dr. D. Poinsot)	*Université de Rennes 1, France*

Teaching and Mentoring

Teaching assistant (2012-2015, 3 y.)	Population Genetics	Inbreeding, Evolutionary forces, HWE equilibrium, differentiation, selection, modeling, genetics lab,...
	Statistics	Descriptive statistics, distribution families, hypothesis tests (param. and non-param.), linear and generalized models, R (intro and advanced), multivariate analysis,...
	Informatics	Productivity suite (text, spreadsheets, databases), Internet safety, certification training.
Student mentoring (2013 to present)		Undergraduate: **9** (Since 2013) - Graduate: **3** (Since 2015)

Grants and Awards

2018	**Center for Vertebrate Genomics Travel Grant, Cornell University, USA**	US $500
2016	**Lyon 1 Alumni / Biomérieux Prize for PhD thesis**	US $1,100
2012	**3 year PhD fellowship, Education and Research Ministry, France**	US $60,000

Publications

Total = **22** — Citations **1297** — h-index **13**
*: equal contribution ♠: mentored student

2022

22 **Goubert C.** Assembly-free annotation and quantification of transposable elements with dnaPipeTE - *In: de Mendoza A. and Branco M. (eds) Transposable Elements: Methods and Protocols. Methods in Molecular Biology, Humana, New York, NY* **[Book Chapter]**

21 Chen X., Bourque G. and **Goubert C.** Methods to genotype transposable elements segregating in human populations using short-read re-alignments - *In: de Mendoza A. and Branco M. (eds) Transposable Elements: Methods and Protocols. Methods in Molecular Biology, Humana, New York, NY* **[Book Chapter]**

20 Groza C., Bourque G. and **Goubert C.** A Pangenome approach to detect and genotype Transposable Element insertion polymorphisms - *In: de Mendoza A. and Branco M. (eds) Transposable Elements: Methods and Protocols. Methods in Molecular Biology, Humana, New York, NY* **[Book Chapter]**

19 Barnada* S., Isopi* A., Tejada-Martinez D., **Goubert C.**, Patoori S., Pagliaroli L., Tracewell M., and Trizzino M. Genomic features underlie the co-option of SVA transposons as cis-regulatory elements in human pluripotent stem cells. *PLOS Genetics* 18(6): e1010225.

18 Billingsley K., Thomas J. and **Goubert C.** Transposable element structural variants in Parkinson's disease; focusing on genotyping *Alu* transposable element insertion's with TypeTE - *In: Proukakis, C. (eds) Genomic Structural Variants in Nervous System Disorders. Neuromethods, vol 182. Humana, New York, NY.* **[Book Chapter]**

17 **Goubert C.**, Bilat A., Craig R., Vogan A. and Protasio A.V. - A beginner's guide to the manual curation of transposable elements – *Mobile DNA*

16 Conart C., Saclier N., Foucher F., **Goubert C.**, [...] and Caissard J-C. Duplication and specialization of NUDX1 in Rosaceae led to geraniol production in rose petals – *Molecular Biology and Evolution*

2021

15 Parisot N.*, Vargas-Chavez C.*, **Goubert C.*** and the *Sitophilus oryzae* genome consortium **(2021)**. The transposable element-rich genome of the cereal pest *Sitophilus oryzae* - *BMC Biology*

14 **The TE Hub Consortium (2021)**, Elliott T. A., Heitkam T,, R. Hubley, H. Quesneville, A. Suh and Travis J. Wheeler. TE Hub: a community-oriented space for sharing and connecting tools, data, resources, and methods for transposable element annotation – *Mobile DNA*

2020

13 Watkins W.S, Feusier J.E., Thomas J., **Goubert C.**, Mallick S., Reich D. and Jorde L.B. **(2020)** A global analysis of human mobile element diversity: the Simons Genome Diversity Project). *Genome Biology and Evolution*

12 **The DrosEU Consortium (2020)** Genomic analysis of European Drosophila populations reveals longitudinal structure and continent-wide selection. *Molecular Biology and Evolution*

11 Flynn J.M.*♠, Hubley R*., **Goubert C.**, Rosen J., Clark A.G., Feschotte C. and Smit A.F. **(2020)** RepeatModeler2: automated genomic discovery of transposable element families – *P.N.A.S.*

10 Castro MRJ*♠, **Goubert C***, Monteiro F.A., Vieira C., Carareto C. M. A. **(2020)** Homology-free detection of transposable element unveil their dynamics in three ecologically distinct *Rhodnius* species – *Genes*

9 **Goubert C.***, Thomas J*., Payer L.M., Kidd J.M., Feusier J., Watkins W.S., Burns K.H., Jorde L.B. and Feschotte C. **(2020)** TypeTE: a tool to genotype mobile element insertions from whole genome resequencing data. *Nucleic Acids Research*

8 **Goubert C.**, Zevallos N.A.♠ and Feschotte C. **(2020)** Contribution of unfixed transposable element insertions to human regulatory variation – *Phil. Trans. Proc. B – Full Issue*

2019

7 Lerat E.*, **Goubert C.***, Guirao-Rico S.*, Merenciano M., Dufour A.B., Vieira C. and González J. **(2019)** Population specific dynamics and selection patterns of transposable element insertions in European natural populations. *Molecular Ecology*

2017

6 Feusier J., Witherspoon D.J., Watkins S., **Goubert C.**, Sasani T. and Jorde L.B. **(2017)** Discovery of rare, diagnostic AluYb8/9 elements in diverse human populations via an updated ME-Scan protocol. *Mobile DNA* **8**:9

5 **Goubert C.**, Henri H., Minard G., Valiente-Moro C., Mavingui P., Vieira C. and Boulesteix M. **(2017)** High-Throughput Sequencing of Transposable Elements Insertions Suggests Evidence for Adaptive Evolution of the Invasive Asian Tiger Mosquito Towards Temperate Environment.*Molecular Ecology* 26, 3968–3981

2016

4 **Goubert G.**, Minard G., Vieira C., Boulesteix M. **(2016)** Population genetics of the Asian tiger mosquito *Aedes albopictus*, an invasive vector of human diseases. *Heredity* 117, 125–134

2015

3 Minard G., Tran F., Tran Van V., **Goubert C.**, Bellet C., L'Ambert G., Khanh L., Trang H., Mavingui P. and Valiente-Moro C. **(2015)** French invasive Asian tiger mosquito populations harbor reduced bacterial microbiota and genetic diversity compared to Vietnamese autochthonous relatives. *Frontiers in Microbiology* 6, 970

2 **Goubert C.**, Modolo L., Mavingui P., Valiente-Moro C., Vieira C. and Boulesteix M. **(2015)** De-novo assembly and annotation of the repeatome of the Asian tiger mosquito *Aedes albopictus* with dnaPipeTE and comparative analysis with *Aedes aegypti*. *Genome Biology and Evolution* 7:**4**, 1192–1205

2013

1 **Goubert C.**, Josso C., Louâpre P., Cortesero A. M. and Poinsot D. **(2013)** Short- and long-range cues used by a ground-dweling parasitoids to find their hosts. *Naturwissenshaften* **100**:2, 177–184

Communications

Talks

2021 **Goubert C.** TE-Aid a computational tool to ease the manual curation of transposable element libraries. *5th Uppsala Transposon Symposium (Uppsala, Sweden* online*)*

2020 **Goubert C.**, Zevallos N.A. and Feschotte C. Contribution of unfixed transposable element insertions to human regulatory variation. *4th Uppsala Transposon Symposium (Uppsala, Sweden* online*)*

2016 **Goubert C.**, Lokey M.G. and Feschotte C. Gene regulation by polymorphic Mobile Elements Insertions in human populations. *Transposable Elements and Gene Regulation Workshop (Bellair Research Institute)*, Holetown, Barbados

2015 **Goubert C.**, Modolo L., Mavingui P., Valiente-Moro C., Vieira C. and Boulesteix M. dnaPipeTE, a new bioinformatic pipeline to assemble, annotate, estimate abundance and dynamics of repetitive DNA in low coverage sequencing: application to *Aedes* mosquitoes. *Annual meeting of the Society for Molecular Biology and Evolution (SMBE)*, Vienna, Austria

2015 **Goubert C.**, Modolo L., Mavingui P., Valiente-Moro C., Vieira C. and Boulesteix M. dnaPipeTE, a new bioinformatic pipeline to assemble, annotate, estimate abundance and dynamics of repetitive DNA in low coverage sequencing: application to *Aedes* mosquitoes. *Congrès National sur les Eléments Transposables*, Tours, France

2013 **Goubert C.**, Vieira C., Boulseteix M. and Heidi A. A massive repeatome found in the rice weevil *Sitophilus oryzae*. *GDRE Comparative Genomics*, Barcelona, Spain

2012 **Goubert C.**, Josso C., Louâpre P., Cortesero A.M. and Poinsot D. Cues used during search for an egg-laying site in an atypical parasitoid: *Aleochara bipustulata*. *Colloque national des Entomophagistes*, Montpellier, France

Posters

2020 **Goubert C.**, Zevallos N.A. and Feschotte C. Contribution of unfixed transposable element insertions to human regulatory variation. *Transposable Elements (CSHL Meetings)*, Cold Spring Harbor, NY, USA

2018 **Goubert C.**, Thomas J., Payer L.M., Kidd J.M., Feusier J., Watkins S., Burns K.H., Jorde L.B. and Feschotte C. Improving the Genotypes of Mobile Element Insertions with TypeTE: an example with the 1000 Genomes Project Alu Dataset. *Transposable Elements (CSHL Meetings)*, Cold Spring Harbor, NY, USA

2017	**Goubert C.**, Lokey M.G., Payer L.M., Burns K.H. and Feschotte C. Gene regulation by polymorphic mobile element insertions in human populations. *Mobile DNA in Mammalian Genomes (FASEB Conference)*, Big Sky, MN, USA
2013	**Goubert C.**, Henri H., Minard G., Mavingui P., Valiente-Moro C., Vieira C. and Boulesteix M. Adaptation genomics of the Asian tiger mosquito *Aedes albopictus*: development of polymorphic markers. *Demie-journée de la Fédération de Recherche 41*, Lyon, France
2012	**Goubert C.**, Jacquiéry J., Stoeckel S., Legeai F., Larose C., Bernard N. Mieuzet L., Mahéo F., Bonvoisin A., Rispe C. Tagu D. and Simon J.-C. Detection and evolutionary history of genomic regions linked to sex loss in the pea aphid. *Petit Pois Déridé*, Avignon, France
2011	**Goubert C.**, Josso C., Louâpre P., Cortesero A.M. and Poinsot D. Does the parasitoid beetle *Aleochara bilineata* counts pupae to assess host density ? *Ecology and Behaviour Meeting*, Rennes, France

Software/Tools

GraffiTE	Pangenomic toolbox to detect and genotype mobile element insertions.
TypeTE	Genotyping of segregating *Alu* elements insertions from whole genome re-sequencing data.
TypeREF	Genotyping of reference *Alu*, *LINE1* and *SVA* retroelements insertions with genome re-sequencing data.
dnaPipeTE	Assembly, annotation and quantification of Transposable Elements and repeated DNA from low coverage NGS data
TE-Aid	Graphical exploration of TE consensus sequence (Manual TE annotation)
RepeatModeler2	*De novo* identification and classification of Transposable Elements families from genomic assemblies – *mentor*

Skills

- **Informatics:** UNIX/LINUX/MacOS environments; Shell/Bash; Nextflow/Docker/Singularity; HPC/cluster computing, R (statistical analysis and scripting); Perl/Python code manipulation

- **Omics:** Genome assembly; genomic/epigenomic data mapping; genotyping; RNA-seq, differential expression; ATAC-seq; molecular QTL; genome scans (selection tests); transposable elements and multi-omics analyses

- **Molecular biology:** Nucleic acids extractions; cloning; PCR & RT-qPCR; STR genotyping; library prep.; transposon display; mammalian cell culture; transfection/ electroporation; reporter gene assays

Peer-review activities

Bioinformatics (2)
Genes (3)
Gen. Biol. Evol. (GBE) (6)
Heredity (1)
Human Mutation (1)
Journal of Insect Physiology (3)
Mobile DNA (8)
Mol. Biol. Evol. (MBE) (1)
Molecular Ecology Ressources (4)
Nature Communications (2)
PLOS Computational Biology (1)
P.N.A.S. (1)
Parasite and Vectors (1)

Academic References

Pr. Guillaume Bourque	**Pr. Cédric Feschotte**	**Pr. Cristina Vieira**
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