GECO EVOLUTIONARY AND COMPUTATIONAL GENOMICS

BIOINFORMATICS, PHYLOGENY AND EVOLUTIONARY GENOMICS GROUP

LERAT Emmanuelle

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My research concerns the study of the role of transposable elements (TEs) in the evolution of eukaryotic genomes using comparative genomics and bioinformatics approaches in different organisms. Since several years, I have developed expertise in the identification of TEs in sequenced genomes, the study of their effects on neighboring genes, but also in the evolutionary analysis of TE sequences.

Projects

• Detection of TE copies in whole genome sequences to analyze their dynamics and evolution. For this, we have developed several programs:

- Genome-wide statistic method to detect horizontally transferred sequences without any *a priori* (
  Modolo et al. 2014
) available
  here
  .
- Tool to parse RepeatMasker output file in order to obtain detailed information concerning the TE content in a genome at the family level (
  Bailly-Bechet et al. 2014
) available at
  One-code-to-find-them-all
  .
- Tool to performe transcriptomic analysis of TEs (
  Lerat et al. 2017
) available
  here
  .
- Tool to simulate a distribution of polymorphic TE insertions (Vernet et al. 2024) available
  here
  .

• Study of the link between TE insertions, epigenetic modifications and gene expression under various conditions (for example: normal cells vs tumor) in mammals and Drosophila.
• Influence of TEs on the evolution of duplicated genes .
• Participation in the development of a reference for the annotation of TEs in genomes with several international researchers (
Hoen et al. 2015
).

Short CV

- 2005-present : CNRS researcher
- 2010 : Accreditation to conduct research (HDR)
- 2004-2005 : Post-doc at the LBBE (FRM funding)
- 2002-2004 : Post-doc at the University of Arizona (Tucson, USA)
- 2001-2002 : ATER at University Lyon 1
- 1998-2001 : PhD at University Lyon 1

Membership and expertise

- Member of the "Society for Molecular Biology and Evolution" (
  SMBE
)
- Member of the French Society of Bioinformatics (
  SFBI
)
- Associate editor for "Genome Biology and Evolution" (
  GBE
)(2008-2023)
- Recommender for
  PCI Genomics
  since 2020
- ResearchGate
  .

Collaborations (present and past)

- Carène Rizzon (lab. Statistics and Genome, Université d'Evry, France)
- Anja Bockmann (IBCP - MMSB, Lyon, France)
- Hani Zakaria Girgis (Department of Electrical Engineering and Computer Science, Texas A&M, University-Kingsville, USA)
- Jocelyn Turpin and Caroline Leroux (UMR 754, INRAe, Univ Lyon)
- Sandra Duharcourt (Institut Jacques Monod, Paris, France), Linda Sperling (I2BC, Gif sur Yvette, France), Eric Meyer (IBENS, Paris, France)
- Anne Mey (CarMeN lab, France) et Jacques Samarut (IGFL, ENS Lyon, France)
- Eric Peyretaillade, Nicolas Parisot, et Pierre Peyret (EA CIDAM, Université d'Auvergne, France)
- Marc Bailly-Béchet (Institut Sophia Agrobiotech, Univ. Nice Sophia Antipolis)
- Marie-Pierre Chapuis (Centre de Biologie et de Gestion des Populations, Montpellier)
- Franck Picard (Lab. Biologie et Modélisation de la Cellule, ENS, Lyon)
- Claudia Carareto (UNESP, Brazil)
- Antoine Perasso (Lab. « Chrono-environnement », Université de Franche-Comté, France)
- Christophe Guyeux (FEMTO-ST institute, Université de France-Comté, France)
- Josefa Gonzalez (Institut de Biologie Evolutive (CSIC-Universitat Pompeu Fabra) Barcelone, Espagne)
- Mohamed Makni (Lab. de Génomique des insectes ravageurs de cultures d'intérêt agronomique, Univ Tunis El Manar, Tunisie)
- Gabriel da Luz Wallau (Department of Entomology, Aggeu Magalhães Institute (IAM), Recife, Brésil)

Student supervision

- L3: A. Mula (2006), E. Ohanyan (2016 ; co-supervision M Bailly-Béchet)
- M1: F. Giordano (2006), R. Kahoul (2007), C. Déchaud (2016), A. Benmehdia (2022; co-supervision C. Rizzon), C. Bompard (2022; co-supervision C. Rizzon), T. Haudicourt (2024; co-supervision C. Mugal), M. Kovacs (2024; co-supervision A. Haudry)
- M2: B. Cheaib (2007), H. Mortada (2008), L. Modolo (2011), L. Grégoire (2013 ; co-supervision A. Haudry), E. Saulnier (2013 ; co-supervision C. Rizzon), N. Bargues (2015), R. Lannes (2016), C. Déchaud (2017), V. A. Le (2019), M. Le Guet (2019 ; co-supervision G. da Luz Wallau), G. Pozo (2020; co-supervision C. Rizzon), T. Tesseraud (2021 ; co-supervision C. Rizzon), A. Benmehdia (2023; co-supervision C. Rizzon), S. Charles (2024; co-supervision C. Rizzon, M. Szafranski), S. Ortion (2025; co-supervision C. Rizzon, M. Szafranski)
- PhD: M. Deloger (2006-2009 ; co-direction C. Vieira et MF Sagot), A. Granzotto (2007-2011 ; co-direction C. Vieira et C. Carrareto), H. Mortada (2008-2011 ; co-direction C. Vieira), L. Modolo (2011-2014), S. Sedghiani (2016), M. Verneret (2022-2025; co-direction J. Turpin), S. Charles (2024-2027, co-direction A. Bockmann).