AMIB(io): **A**lgorithms and **M**odels for **I**ntegrative **Bio**logy

Discrete Bioinformatics for Molecular Biology
RNA Structure, Design and Evolution

AMIBio team
Ecole Polytechnique
CNRS UMR 7161 LIX

Yann Ponty (DR2 CNRS)

Members

Permanent staff:

Yann Ponty DR2 CNRS
(Head of AMIBio)

Sebastian Will PR X

Philippe Chassignet MCF X

Jean-Marc Steyaert PR X
(Aemeritus)

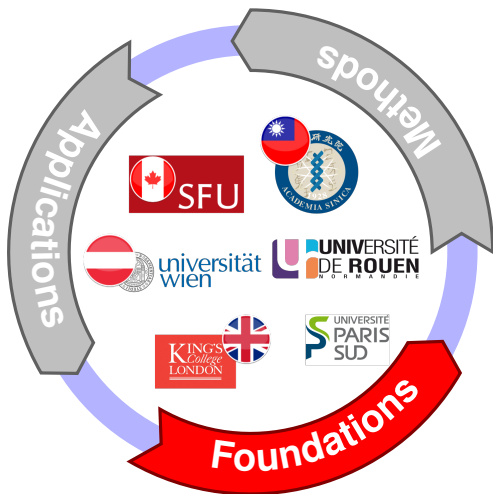Hélène Thibault ITA CNRS

Postdoc: Sarah Berkemer – 2021 CNRS

PhD Students:

Hua-Ting Yao – 2018 McGill

Bertrand Marchand – 2020 UNIVERSITÉ PARIS SUD

Taher Yacoub – 2020 UNIVERSITÉ PARIS SUD

Ha Nguyen Ngoc – 2017 I2BC

In a nutshell

- ▶ (Algebraic) Dynamic Programming
- ▶ Enumerative/analytic combinatorics
- ▶ Stringology
- ▶ Random generation
- ▶ Machine learning
- ▶ Discrete optim./FPT algorithms
- ▶ Comparative genomics
  [J Math Biol'19]
- ▶ Statistical genomics
- ▶ Structural Bioinformatics
  [NAR'20, RECOMB'20, Bioinfo'21]
- ▶ RNA Design
  [RECOMB'18'21, BMC Bioinf'19]
- ▶ Circular RNAs [RNA Biology'17]
- ▶ HIV structure modeling [NAR'17]
- ▶ Structural basis of myristoylation
  [Nature Chemistry'18]
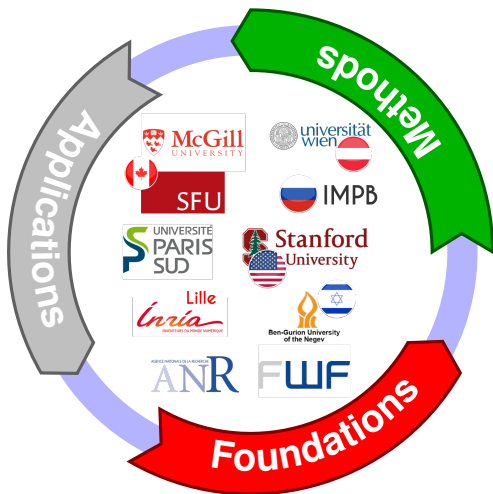- ▶ Chemical probing [NAR'17'20]

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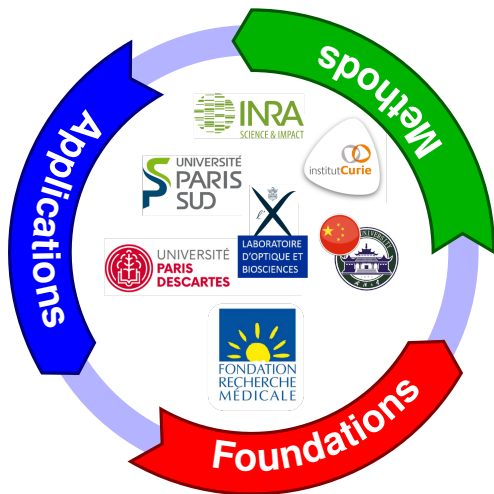- ▶ Chemical probing [NAR'17'20]

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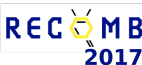- ▶ Chemical probing [NAR'17'20]

Community and visibility

Program Committees

Organizers

Editorial duties

Main software

▶ **LocaRNA/SPARSE** → Univ. Freiburg
De facto standard for structural alignment of homologous RNAs

▶ **VARNA** → Univ. Paris Saclay
Visualization/modeling of RNA secondary structure(s)

▶ **GenRGenS** → Univ. Paris Saclay
Random generation toolkit for genomic sequences

▶ **IPANEMAP** → Univ. Paris Descartes
RNA structure prediction from chemical probing experiment(s)

▶ **RNARedPrint/InfraRed**
Declarative FPT framework for constrained sequence generation

Current projects

- ▶ ANR/FWF PARNASSUS France/Austria → Univ. Descartes, Vienna

- ▶ ANR Decrypted → ENS Paris/Univ. Paris Descartes

- ▶ RNA design (PRC CNRS) → Univ Ben Gurion, Israel

- ▶ RNA modeling/geometric deep learning (CNRS?) → Univ McGill

- ▶ ArboRNA (DIM RFSI) → LIGM & Univ. Paris Descartes

- ▶ Reference-free cancer transcriptomics → Univ Paris Saclay

- ▶ RNA drug design for Alzheimer → Univ Paris Saclay

- ▶ SARS CoV-2 modeling → Univ. Paris Descartes & Univ. Wuhan

Teaching activities

- ▶ Engineering/Bachelor@X

- ▶ Bioinformatics Modal/project@X

- ▶ AMI2B@Paris Saclay

- ▶ BIM@Sorbonne université

MERCI