

## Research topics

Formal Methods **Concurrent and Timed systems (Timed automata, Higher Dimension Automata) , SMT, Monitoring, Robustness, Temporal Logic**

Geometry & Algebra **Polyedra, Symbolic Optimisation, Well Quasi-order, Randomly generated groups**

## Positions

2025–now **CNRS Researcher (« Chargé de recherche »)**, *LIPN*, Université Sorbonne Paris Nord, SAFER Team

2024 – 2025 **Post-doctoral researcher**, *LIPN*, Université Sorbonne Paris Nord, Under the supervision of **Étienne André**, SAFER Team  
Keywords : Monitoring, Verification, Hyperproperties, Temporal Logic

2023 – 2024 **A.T.E.R. (Teacher & Reseacher)**, *IRIF*, Université Paris Cité, **Verification and Modelisation Team**, Collaborators : Jeremy Ledent, Enzo Erlich, Uli Fahrenberg, Amazigh Amrane, Hugo Bazille, Sylvain Schmitz, Damien Bossato-Gaston, John Mackay  
Keywords : Higher Dimensional Automata, Linear Temporal Logic, Algebraic Topology, Well Quasi-order, Robustness

2022 – 2023 **Post-doctoral researcher**, *ISIR*, Sorbonne Université, Under the supervision of **Nicolas Perrin-Gilbert**  
Keywords : Multi-Agent systems, SMT, Reinforcement Learning, Collision Avoidance, Timed Automata

2018 – 2022 **PhD Candidate**, *Centre Inria de l'Université de Rennes & Mitsubishi Electric Centre R&D Europe*, Université de Rennes, Under the supervision of **Thierry Jéron**, **Nicolas Markey** and David Mentré  
Keywords : Robustness, Timed Automata

## Education

2018 – 2022 **PhD in Computer Science**, *Robustness of timed automata : computing the maximally-permissive strategies* , Defended on 11th of march 2022, University : **Université de Rennes**  
**Attended master courses** : Model-Checking, Formal methods techniques, SAT solvers, Category Theory, Side-channel attack

2017 – 2018 **Master 2 in Computer Science** **SIF**, *Université de Rennes & ENS Rennes*, AI & Cybersecurity  
**Attended courses** : Post-quantum cryptography, Security and Privacy (RGPD), Protocol Security, Game Theory, Statistical Machine Learning, Supervised Machine Learning, High Dimensional Statistical Learning  
**Research Internship** : Cryptanalysis for post-quantum cryptography under the supervision of **Adeline Roux-Langlois** at IRISA lab

2016 – 2017 **Master 2 in Mathematics**, *Université de Rennes*, Courses for **agregation competitive exam**  
Success for the competitive exam "Agregation", Speciality : Computer algebra

2015 – 2016 **Master 1 of Mathematics**, *Université de Rennes*,  
**Research Internship** : Classification of randomly generated groups, under the supervision of **John Mackay** (Bristol University, UK)

2014 – 2015 **Bachelor of Mathematics**, *Université de Rennes*  
Intitulé : sciences, technologies, santé, mention mathématiques  
**Research Internship** : Gabidulin correcting codes, under the supervision of **Alain Couvreur** (LIX, Saclay)

2014 – 2018 **Normalien Student at ENS Rennes**, *Mathematics*

2011 – 2014 **Classes Préparatoires aux Grandes Écoles**, *Maths-Physics*, Chateaubriand High School (Rennes)

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## Collaborations

- 2024-now **ANR project BisoUS**, *Better Synthesis for Underspecified Quantitative Systems*, Head : Didier Lime  
Labs : IRISA (Rennes), LIPN (Paris 13), LS2N (Nantes), LMF (Saclay)
- 2018-2023 **ANR Project TickTac**, *Efficient Techniques and Tools for the Verification and Synthesis of Real-Time Systems*, Head : Ocan SANKUR  
Labs : IRISA (Rennes), LaBRI (Bordeaux), LIS (Marseille), LSV (Cachan), ISIR (Paris), LRDE (Paris)

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## Talks (slides are one my webpage)

### Talks on Seminars

- 2025 **Veridis Team**, *Loria, Nancy*
- 2025 **Distributed Computing**, *LMF, Saclay*
- 2024 **Cosynus Team Seminar**, *LIX, Saclay*
- 2024 **LoVe Team Seminar**, *LIPN, Villetaneuse*
- 2024 **Lab Seminar**, *LACL, Créteil*
- 2024 **Modélisation et Vérification Team Seminar**, *Lip6, Paris*
- 2023 **Distributed Computing**, *LMF, Saclay*
- 2023 **Automata Team Seminar**, *IRIF, Paris*
- 2023 **Verification and Modelisation Team Seminar**, *IRIF, Paris*
- 2023 **AMAC Team Seminar**, *ISIR, Paris*
- 2022 **ELSE Seminar**, *IRISA/Centre Inria de l'Université de Rennes*
- 2022 **Syroco Team Seminar**, *ISIR, Paris*
- 2021 **Sumo Team Seminar**, *IRISA/Centre Inria de l'Université de Rennes*
- 2019 **Sumo Team Seminar**, *IRISA/Centre Inria de l'Université de Rennes*
- 2018 **School Seminar**, *ENS Rennes, Ker Lann (Rennes)*

### Talks on Conferences

- 2023 **FORMATS**, *Antwerp, Belgium*
- 2020 **FORMATS**, *Online*

### Talks or Posters at Research (GDR) & Work groups (GT)

- 2024 **National day of GT-Verif**, *Talk, IRCICA, Lille*
- 2024 **National of of GT-Daal**, *Talk, IRISA, Rennes*
- 2024 **National day of GDR-IFM**, *Poster, Université Grenoble Alpes*
- 2023 **National day of GT-Verif**, *Talk, IRIF, Paris*
- 2023 **National day of GDR-IM**, *Poster, IRIF, Paris*
- 2023 **National day of MT2V**, *Talk, LMF, Saclay*

### Talks at Schools

- 2024 **Summer School MOVEP**
- 2020 **Summer School MOVEP**

### Talk on ANR Projects

- 2025 **BisoUS ANR**, *LIPN, Villetaneuse*
- 2023 **Maveriq ANR**, *IRIF, Paris*
- 2023 **Ticktac ANR**, *ISIR, Paris*
- 2018 **TickTac ANR**, *EPITA LRE, Paris*

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## Supervisions

### Master students

- 2024 **Enzo Erlich**, *6 month internship*, Temporal Logic for Higher Dimensional Automata  
Co-supervision with Jeremy Ledent  
Now PhD with Uli Fahrenberg and Jeremy Ledent. I'm collaborating with them in the context of his PhD.

### Undergraduate students

- 2024 **Introduction to research**, *Robustness of one-clock Timed Automata*  
Co-Supervision with **Florian Renkin** of two students in Mathematics-Informatics Bachelor

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## Service

### Local responsibilities

- 2023-2024 **Equality commission** (<https://www.irif.fr/egalite-fh>), *Member*, IRIF, Paris  
2023 **HCERES**, *A.T.E.R. Representative*, IRIF, Paris  
2019-2022 « **Comité de centre** », *Representative of non-permanent members*, Centre Inria de l'Université de Rennes  
— Member of the office (preparation of the meeting agenda, ...) since mai 2021  
— Actions during COVID (Discord creation, Organisation & Participation of Livestrom Seminars to help organise (post-doc, begin of PhD...))  
2017-2018 **Student representative**, *Université de Rennes*, UFR Mathematics

### Teaching (Details in my webpage)

- 2023-2024 **A.T.E.R.**, *166 hours*  
Bachelor Students  
2018-2022 **PhD**, *130 hours*  
Bachelor and Master Students

### Articles and artifacts reviews

- 2024 **PC member for Artifact Evaluation**, *Formal Methods*  
2024 **Subreviewer**, *ICALP 2024*

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## Popularisation of Science

- 2025 **Scientific popularisation for High School Students**, *IRIF, Université Paris Cité*  
2023 **Fête de la Science**, *IRIF, Université Paris Cité*  
2019 **Je Peux Pas J'Ai Informatique**, *IRISA, Rennes*  
2018 - 2019 **LCodentLCreent**, *IRISA, Rennes*

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## Publication : Peer-reviewed Publications in International Conference

- RAMICS 2024 **Presenting Interval Pomsets with Interfaces**  
Amazigh AMRANE, Hugo BAZILLE, Emily CLEMENT, Uli FAHRENBERG, Krzysztof ZIEMIAŃSKI  
[arxiv.org/abs/2403.16626](https://arxiv.org/abs/2403.16626)
- PETRI NETS 2024 **Languages of Higher-Dimensional Timed Automata**  
Amazigh AMRANE, Hugo BAZILLE, Emily CLEMENT, Uli FAHRENBERG  
[hal.science/hal-04444648](https://hal.science/hal-04444648)
- FORMATS 2023 **Layered Controller Synthesis for Dynamic Multi-agent Systems**  
Emily CLEMENT, Nicolas PERRIN-GILBERT, Philipp SCHLEHUBER-CAISSIER [hal.science/hal-04237998](https://hal.science/hal-04237998)
- FORMATS 2020 **Computing maximally-permissive strategies in acyclic timed automata**  
Emily CLEMENT, Thierry JÉRON, Nicolas MARKEY, David MENTRÉ. [hal.science/hal-02895344](https://hal.science/hal-02895344)

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## Preprints

- October 2024 **Expressivity of Linear Temporal Logic for Pomset Languages of Higher Dimensional Automata**  
Emily CLEMENT, Enzo ERLICH, Jeremy LEDENT, [arxiv.org/abs/2410.12493](https://arxiv.org/abs/2410.12493)

## Implementations

- 2020- **Robustness of Timed Automata**, *Proof of concept*
  - Python, Licence : GNU AGPLv3, Dockerfile available.
  - **Link :**
    - [gitlab.inria.fr/emclemen/formats-symbolic-tools](https://gitlab.inria.fr/emclemen/formats-symbolic-tools) (7922 LoC)
    - [gitlab.inria.fr/emclemen/numpyrobustness](https://gitlab.inria.fr/emclemen/numpyrobustness) (6567 LoC)
- 2022 - 2023 **Synthesis of a multi-agent controler**, *Proof of concept*
  - Python, Licence : GNU AGPLv3, (partial) Dockerfile available
  - **Contributors :** Emily CLEMENT Philipp SCHLEHUBER-CAISSIER, Nicolas PERRIN-GILBERT
  - **Link :** [gitlab.com/Milly/robotic-synthesis](https://gitlab.com/Milly/robotic-synthesis) (3136 LoC) (3161 lignes de codes)
  - **Démo :** [perso.eleves.ens-rennes.fr/people/Emily.Clement/Implementation/multi-agent.html](https://perso.eleves.ens-rennes.fr/people/Emily.Clement/Implementation/multi-agent.html)