

# Rémy Torro

PHD STUDENT

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## Research experience

### Laboratoire Adhésion et inflammation (LAI), INSERM U1067 CNRS UMR 733 & Centre Interdisciplinaire de Nanoscience de Marseille (CINaM), UMR 7325

Marseille, France

PHD IN BIOPHYSICS, SUPERVISED BY DR. LIMOZIN & DR. SENGUPTA

Oct 2020 - Sept. 2023

- Subject : Map and classify immune cell interactions with high precision and speed, application to antibody-mediated cancer immunotherapy.
- Understanding of the processes of recruitment and activation of immune cells and their interactions with cancer cells in the context of ADCC immunotherapy. Knowledge of the factors that influence the efficacy of ADCC, including the resistance of cancer cells, the evolution of NK cell lytic activity, the impact of external factors, the polarization and morphology of NK cells during attack, etc.
- Skills in creating software to assess ADCC on cancer cells, using microscopy images with single-cell resolution.
- Deep learning in image analysis, applied it to automating and increasing the scale of bioimage analysis tasks.

### Institut de Biologie du Développement de Marseille (IBDM), UMR 7288, CNRS

Marseille, France

RESEARCH INTERSHIP (FOUR MONTHS), SUPERVISED BY DR. RECOUVREUX

March 2020 - Jun. 2020

- Subject : single particle tracking to investigate the diffusive behavior of a membrane receptor in developing *C. elegans* embryos.
- Extract trajectories from diffusing single molecule movies, recorded under different experimental conditions.
- Process the trajectories into quantities that can be compared and related to theories of anomalous Brownian motion.

### Institut de neurobiologie de la méditerranée (Inmed), UMR 1249, CNRS

Marseille, France

RESEARCH INTERSHIP (SIX WEEKS), SUPERVISED BY DR. ROBBE & DR. SARNO

Apr. 2019 - Jun. 2019

- Subject : investigate rats' energy expenditure in a time estimation task.
- Use optimal control theory to find a trajectory minimizing energy expenditure and maximizing reward on a specific task.
- Introduce cost functions that are space and time dependent. Relate any discrepancy between experimental data and theoretical predictions to the way the rat perceives the cost of time passing by.

### Institut des sciences moléculaires de Marseille (iSm2), UMR 7313, CNRS

Marseille, France

RESEARCH INTERSHIP (TWO MONTHS), SUPERVISED BY DR. HAGEBAUM-REIGNIER

Jun. 2016 - Jul. 2016

- Subject: investigate formation pathways of complex organic molecules in cometary environment.
- Use density functional theory-based programs (TURBOMOLE & MESMER) to compute the cost of low-temperature chemical reactions involving radical species found in the interstellar medium. Find the most likely polymerization pathway.
- Confront theoretical predictions to experimental data acquired simultaneously by another team.

## Publications

- P. Recouvreux, P. Pai, **R. Torro**, M. Ludanyi, P. Melenec, M. Boughzala, V. Bertrand, P.-F. Lenne: "Establishment of Wnt ligand-receptor organization and cell polarity in the *C. elegans* embryo", Preprint. *bioRxiv* 2023.01.17.524363
- F. Mustapha, M. Pelicot-Biarnes, **R. Torro**, K. Sengupta, P.-H. Puech: "Cellular forces during early spreading of T lymphocytes on ultra-soft substrates", Preprint. *bioRxiv* 2022.02.11.480084
- T. Butscher, F. Duvernay, G. Danger, **R. Torro**, G. Lucas, Y. Carissan, D. Hagebaum-Reignier, T. Chiavassa: "Radical-assisted polymerization in interstellar ice analogues: formyl radical and polyoxymethylene", *Monthly Notices of the Royal Astronomical Society*, Volume 486, Issue 2, June 2019.

## Education

### Aix-Marseille University

Marseille, France

PHD IN BIOPHYSICS

Oct. 2020 - today

- PhD financed by the Turing Centre for Living Systems (CENTURI) project taking place at both the Laboratoire Adhésion & Inflammation (LAI - INSERM U1067 CNRS UMR 7333) and the Centre Interdisciplinaire de Nanoscience de Marseille (CINaM - UMR 7325).
- Develop techniques to map and classify immune cell interactions with high precision and speed, applied to ADCC immunotherapy (Advanced image analysis, deep learning approaches, microscopy, cell culture).

### Aix-Marseille University

Marseille, France

MASTER (M.S.) IN FUNDAMENTAL PHYSICS

Sept. 2018 - Jul. 2020

- Specialization in the study of complex systems and statistical physics. Strong theoretical training.
- Selected courses: Living Systems, Soft Matter, Dynamical Systems, Statistical Physics (classical & quantum), Machine Learning & Networks.

## University of Calgary

LICENCE (B.Sc.) IN PHYSICS (THIRD YEAR)

- Final undergraduate year at the University of Calgary within the framework of an exchange agreement with Aix-Marseille University.

Calgary, Canada

Sept. 2017 - May 2018

## Aix-Marseille University

LICENCE (B.Sc.) IN PHYSICS

- Core-curriculum in physics & chemistry during the first year. General training in physics in the second and third year.
- Graduated with highest honour.

Aix-en-Provence, France

Sept. 2015 - Jun. 2017

## Teaching experience

### Aix-Marseille University

TUTORING IN B.SC. PHYSICS FIRST YEAR PROGRAM

- Scheduled tutoring sessions in the first-year physics courses of the B.Sc. Mathematics, Physics & Computer Science at Aix-Marseille University, namely: Newtonian mechanics and geometrical optics.
- Introduce students to both mathematical and computing tools that will help them tackle physical problems: time-management, prioritizing, how to be consistent, how to use Mathematica.
- Encourage students to solve selected problems on the blackboard, at different levels of difficulty.

Marseille, France

Oct. 2019 - Dec. 2019

### Aix-Marseille University

TUTORING IN B.SC. PHYSICS FIRST YEAR PROGRAM

- Scheduled tutoring sessions in the first-year physics courses of the new B.Sc. Physics, Chemistry & Engineering at Aix-Marseille University, namely: Newtonian mechanics, geometrical optics, electrokinetics, experimental physics, thermodynamics and mathematics.
- Prepare objectives for each session accompanied by a set of relevant problems at different levels of difficulty.
- Encourage students to solve problems on the blackboard and to suggest topics for the next tutoring session.

Marseille, France

Nov. 2018 - Apr. 2019

### Aix-Marseille University

TUTORING IN ATOMISM & CHEMISTRY OF SOLUTIONS

- Tutoring sessions at University in the aforementioned courses, for willing first-year undergraduate students.
- Solve problems that were skipped during the tutorials, under the guidance of the teachers.
- Provide satisfactory answers to the students' questions. Identify and help students in difficulty.

Aix-en-Provence, France

Sept. 2016 - May 2017

## Employment

### Calanques National Park

RANGER

- Inform visitors about hiking trails, swimming spots, wildlife, the rules of the National Park.
- Ensure the closure of the National Park on days with a severe forest fire risk.
- Monitor wildlife populations, degradations caused by human activity, gather information.

ASSOCIATED SKILLS:

ACTIVE LISTENING

OBSERVATION

CONFLICT MANAGEMENT

TEAMWORK

Marseille, France

Jun. 2019 - Aug. 2019

### Val d'Allos tourist office

TOURIST INFORMATION OFFICER

- Answer customers' questions in person, by mail and on the phone. Give satisfactory explanations and recommendations.
- Provide customers with suited activity and event suggestions.
- Continuously gather information and remain up-to-date. Update colleagues.

ASSOCIATED SKILLS:

DEDUCTIVE REASONING

PUBLIC SPEAKING

NON-VERBAL COMMUNICATION

PLANNING

Val d'Allos-La Foux, France

Jul. - Aug. 2017 and 2018

## Certifications

2023 **Machine learning in Python with scikit-learn**, France Université Numérique, course

2019 **PSC1**, the French first-aid certification

2016 **Digital Active**, Google course in digital marketing

2014 **Advanced Certificate in English (CAE)**, Grade C, University of Cambridge ESOL Examinations

Online

Gardanne, France

Online

Luynes, France

## Skills

### Programming

Python 3

Bash

ImageJ macro

Mathematica

C++

Fortran97

HTML/CSS

### Tools

Keras, PyQt,  $\LaTeX$ , Jupyter, Pelican, GitHub, Turbomole, Smoldyn

### Languages

French, English, Italian, French sign language

### Miscellaneous

Driving licence, boating permit