

LA ROCHELLE, France

+ A beautiful thousand years old city
with a mild and very sunny climate

A GREAT PLACE TO STUDY!

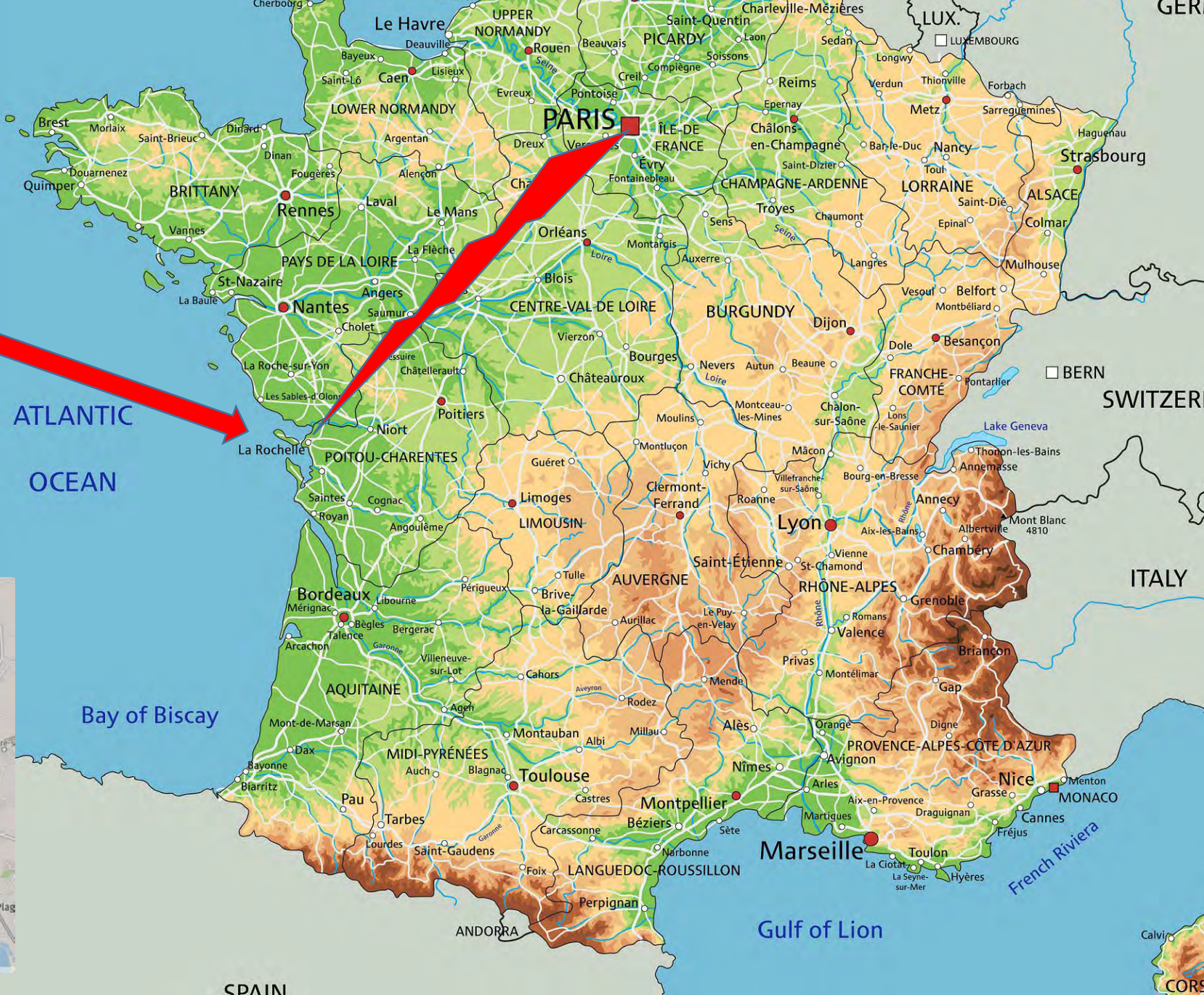
La Rochelle
Université

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La Rochelle

2.5 hours from Paris by TGV

Near the beautiful Ré island



La Rochelle
Université



Photo : Clément Mauduit



Historical fact: La Rochelle
proclaimed its
independence in 1621
which led to the terrible
siege of the city, recounted
in the famous novel and
movie "The 3 Musketeers"

La Rochelle

A city of art and history which offers cultural events (Francofolies, film festivals, boat show...).
A city known for its quality of life.

La Rochelle
Université

La Rochelle University



A young and friendly
university



8820 students
+80 diplomas offered



10 research laboratories
1 doctoral school



Photo : Thierry Guyot



A campus in the city, near the old harbour

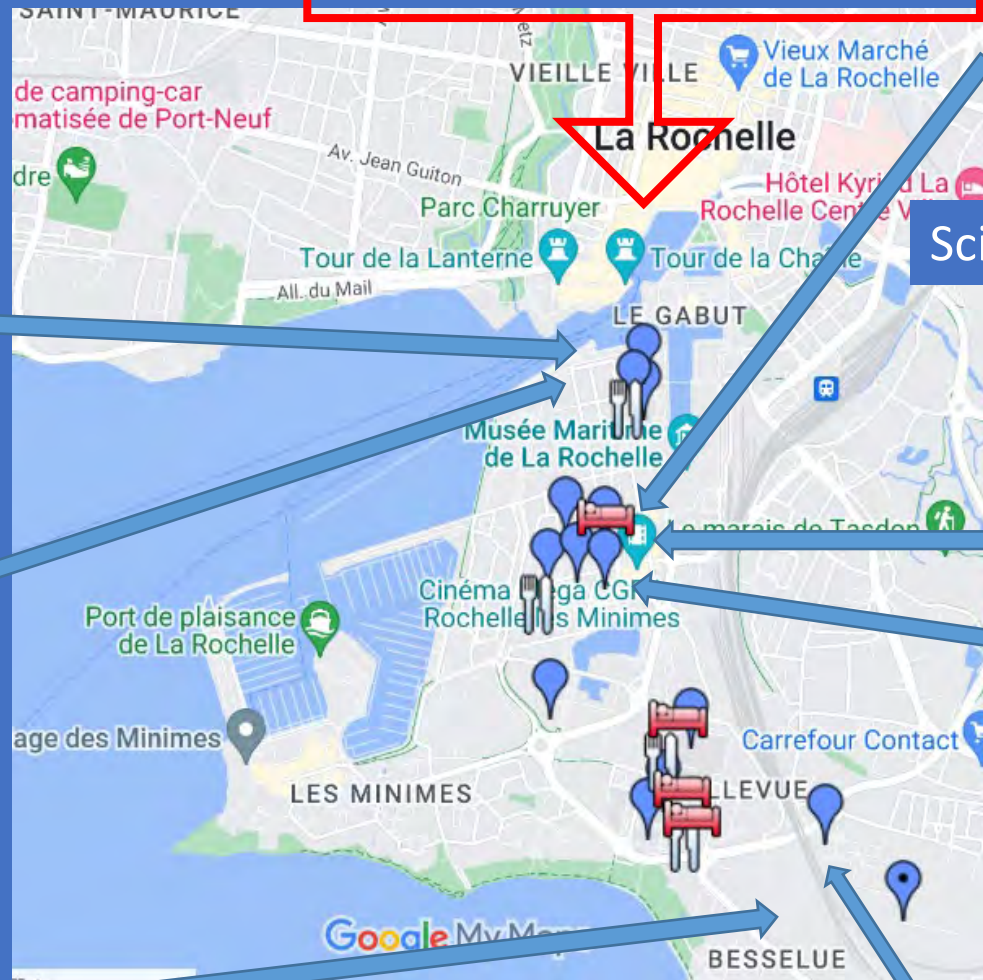


Photo : Thierry Guyot

University Library



Student house
Cultural activities



Science and Engineering Institute



Photo : Thierry Guyot



Photo : Thierry Guyot

Law and management
Institute



Sport : 40 activities



Photo : Thierry Guyot

La Rochelle
Université



For Master's students in Mathematics or Computer Sciences:

Full Autumn Semester with courses taught in English, at the graduate Level,
in the field of **Mathematics and Applications:**

- Advanced tools and methods for signal and image processing (6 ECTS)
- Deep Learning (6 ECTS)
- Geometry for science (6 ECTS)
- Machine learning and artificial intelligence (practical approach) (6 ECTS)

This can be completed with:

6 ECTS French Language (level A2, B1, B2 or C1)

6 ECTS Research methodology and data analysis (Code 222-1-02)



For Master'ss students in Mathematics or Computer Sciences:

Syllabus:

- **Advanced tools and methods for signal and image processing (6 ECTS) – Code 254-3-11**

48 hours: lecture (13.5 hours), tutorials (13.5 hours), practical work (21 hours).

Content:

Build and know how to implement a multi-resolution analysis using a filter bank.

Use the wavelet transform for signal or image processing (singularity detection, multi-scale analysis, non-linear denoising).

Introduce and manipulate the notions of compact acquisition (frame, parsimony, dictionary, etc.); know how to apply reconstruction methods and interpret the results.

Visualise methods for reconstructing a parsimonious signal; implement them in Python.

Required knowledge:

Basic knowledge of signal processing concerning the Fourier transform, its mathematical properties, and its use in Python, and basic image processing skills.

- **Deep Learning (6 ECTS) – Code 254-3-31**

69 hours: lecture (19.5 hours), tutorials (19.5 hours), practical work (30 hours).

Content:

Understand the issues of supervised and unsupervised learning.

Master the theoretical foundations of neural networks and deep learning.

Use the gradient backpropagation algorithm for training a neural network.

Master the specification and use of a neural network in a framework (pytorch, tensorflow).

Use a deep learning method for forward or inverse problems in PDE models.

Required knowledge:

Basic knowledge of linear algebra, probabilities and optimization; good skills in Python.



For Master's students in Mathematics or Computer Sciences:

- **Geometry for science (6 ECTS) – Code 254-3-21**

48 hours: lecture (13.5 hours), tutorials (13.5 hours), practical work (21 hours).

Content:

Provide spaces with structures of manifolds and submanifolds.

Provide spaces with Riemannian structures.

Characterise and describe the geodesics and Riemannian barycenters of the space of positive definite symmetric matrices.

Use Riemannian gradient, divergence and Laplacian.

Master the basic properties of mean curvature flow.

Implement a level-set algorithm.

Exploiting Riemannian structures for segmentation.

Required knowledge:

Basic knowledge of differential calculus, linear algebra and algebraic structures; basics knowledge of partial differential equations; basic knowledge of Python.

- **Machine learning and artificial intelligence (practical approach) (6 ECTS) – Code 254-3-41**

48 hours: lecture (4.5 hours), tutorials (4.5 hours), practical work (40 hours).

Content:

Use networks for classic learning tasks (classification, segmentation, regression, etc.).

Visualise the learning filters of a convolutional neural network (intermediate activation maps).

Visualise the activation maps of a convolutional neural network (activation maps).

View class activation maps.

Adapt a pre-existing network to a dataset (finetuning).

Required knowledge:

Basic knowledge of linear algebra, probabilities and optimization; good skills in Python.



For Master students in Mathematics or Computer Sciences:

Autumn or Spring semester
in the field of **Mathematics and Applications:**

- It is also possible to apply for an internship in the following laboratories of La Rochelle University for a few weeks to a few months:
- [Laboratory of Informatics Image Interaction \(L3I\)](#)
- [Laboratory of Engineering Sciences for the Environment \(LaSiE\)](#)

FOR EXCHANGE STUDENTS

- ESN Erasmus Student Network: office in La Rochelle
- University accommodation offer
- Buddy scheme
- Free student “pass culture”
- And an international office to help you

LEARNING FRENCH

Free access to 6 ECTS credits per semester
in French language for exchange students



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Welcome to La Rochelle University !

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