



<b>Research topics</b>	<b>Computational spatiotemporal atlas of the brain vessel tree – ERC Consolidator Grant CARAVEL</b>
<b>Position (M/F)</b>	PhD, thesis offer
<b>Reference offer</b>	DS/MAZ/CARAVEL2/032025
<b>Research Department</b>	Data Science (DS)
<b>Publication date</b>	10/03/2025
<b>Start date</b>	January 1st 2026
<b>Duration</b>	Duration of the thesis

### **Description**

Join our team within the ERC Consolidator Grant CARAVEL, a cutting-edge project focused on developing next-generation tools for extracting, modeling, and analyzing the brain vessel tree to study neurovascular aging. We seek a highly motivated PhD candidate to contribute to creating a computational spatio-temporal atlas of the neurovascular tree to study the effects of aging.

This PhD project aims to develop a novel computational spatiotemporal atlas of the neurovascular tree to investigate aging-related changes. Current state-of-the-art approaches, relying on image registration, often fail to capture the fine details of smaller-scale vessels. This project will explore innovative methods to represent the atlas in a detail-preserving manner, enabling capturing temporal changes at all scales. The atlas will be constructed using multiple neurovascular imaging sequences, capturing the behavior of both veins and arteries. Leveraging the power of generative models, the atlas will be designed to predict the aging trajectory of individual vascular trees.

### **Key Responsibilities:**

- Develop a computational spatiotemporal atlas of the neurovascular tree for aging studies by using multiple neurovascular imaging sequences, capturing the behavior of both veins and arteries.
- Investigate novel approaches to represent the atlas in a detail-preserving way, capturing changes at all scales.
- Integrate generative models to predict the aging trajectory of individual vascular trees
- Collaborate with clinicians to validate the atlas by studying the spatiotemporal changes in the neurovascular tree associated with aging from large public databases.
- Contribute to the dissemination of research findings through publications and presentations.
- Contribute to the animation of research activities by actively participating in the group's weekly meetings
- Contribute to teaching activities through lab assistance and marking

**About the team.** The successful candidate will be hosted within the AI4Health@EURECOM research group led by Prof. Maria A. Zuluaga. Prof. Zuluaga holds an ERC Consolidator Grant, providing access to cutting-edge research infrastructure and fostering a vibrant and competitive research environment. The candidate will benefit from such a dynamic and collaborative research environment. CARAVEL fosters strong interdisciplinary collaborations, providing opportunities to interact with researchers from diverse backgrounds, including national (Grenoble Institute of Neurosciences) and international (King's College London) institutions, as well as clinical institutes (CHU Nice and Guy and St Thomas Hospitals).

### **Requirements**

- Master's degree in Computer Science, Physics, Biomedical Engineering, or a related field.
- Proficiency in deep learning techniques and their application to image segmentation.
- Strong programming skills in Python (or similar languages).
- Experience with computer vision and algorithm development.
- Background in medical image analysis and processing is a plus
- Ability to work independently and as part of a collaborative research team.
- Strong problem-solving and analytical skills.
- Good command of English for reading/writing scientific articles and delivering oral presentations



## Application

The application must include:

- Detailed curriculum vitae,
- A cover letter stating your motivation and fit for this project
- Name and address of two references.
- List of publications, if available

Applications should be submitted by e-mail to [secretariat@eurecom.fr](mailto:secretariat@eurecom.fr) with the reference: **DS/MAZ/CARAVEL2/032025** before **June 30<sup>th</sup> 2025**.

## About EURECOM

EURECOM is a major Engineering School and a Research Center in digital sciences founded in 1991 as a consortium in the international technology park of Sophia Antipolis. The IMT is a founding member of the GIE. Teaching and research activities are organized around 3 promising fields: digital security, communication systems and Data Science.

EURECOM has a staff of 150 (researchers and support teams) and welcomes 400 international students on the Campus Sophia Tech, the largest information science and technology campus of the region. EURECOM enjoys a privileged geographical environment on the French Riviera (Côte d'Azur), between sea and mountains, at the heart of a dynamic and multidisciplinary ecosystem that promotes high-level scientific and technological innovation.

## Social advantages

- International and multicultural environment
- Attractive salary - Corporate saving plans
- Private retirement plan (executive, employer participation of 100%)
- Employee profit-sharing policy
- Company health insurance (mutuelle) with high levels of guarantees for the whole family (employer participation of 60%)
- Restaurant vouchers (employer contribution of 60%)

EURECOM is one of Europe's leading engineering schools specializing in digital technologies. It is located in the heart of the Côte d'Azur, in Europe's Silicon Valley (Tech Park Sophia-Antipolis). EURECOM's research teams work in an international, multicultural environment.

EURECOM has a dynamic policy in terms of **inclusion and quality of life at work**. We are committed to diversity and give equal consideration to all applicants, without discrimination. Above all, we look for competence and team spirit.

All our positions are open to **people with disabilities**. EURECOM has set up a disability advisor to provide support and advice, organize accommodation and make positive commitments to personal integration.

As part of its **gender equality plan**, EURECOM encourages gender diversity within its teams. As part of our gender equality action plan, we encourage male applications for administrative positions, traditionally held by women, and female applications for IT and research positions, traditionally held by men.

EURECOM is taking positive action as part of its **CSR policy**. A CSR representative oversees EURECOM's CSR and energy transition policies (electric charging stations, solar panels, waste sorting, etc.).

Web site EURECOM: <https://www.eurecom.fr/fr/eurecom/presentation>

EURECOM in VIDEO: <https://www.youtube.com/watch?v=u1IFcgNijnM>

Employee experience:

<https://www.youtube.com/watch?v=BHv9zlduzuQ>

<https://www.youtube.com/watch?v=hvbzzCBups8>