

## Ph.D. research topic

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- Title of the proposed topic: **Multimodal biomarker extraction for the prediction of lung cancer targeted therapy response**
  - Research axis of the 3iA: axis 2
  - **Supervisor (name, affiliation, email):** Hervé Delingette, Inria, Herve.Delingette@inria.fr
  - Potential co-supervisor (name, affiliation): Nicholas Ayache, Inria
  - The laboratory and/or research group: Inria, Epione team
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**Apply by sending an email directly to the supervisor.**

**The application will include:**

- Letter of recommendation of the supervisor indicated above
  - Curriculum vitæ.
  - Motivation Letter.
  - Academic transcripts of a master's degree(s) or equivalent.
  - At least, one letter of recommendation.
  - Internship report, if possible.
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- Description of the topic:

Lung cancer is today the first killer and cancer death cause in the world and there is an urgent need to have better prognosis and predictive biomarkers, in order to improve the optimal care of these patients. Many existing therapies lead to an improvement of the overall survival of lung cancer patient, notably those targeting different driver mutations such as *EGFR*, *ALK*, *KRAS*, and *ROS1*. The treatments targeting *KRAS* G12C mutation, one of the most frequent genomic alteration in non-small cell lung cancer, are very promising but their efficacy is variable among patients. Therefore this variability needs to be better understood and anticipated in order to avoid some harmful toxicities.

The proposed thesis aims to extract biomarkers that are predictive of the response to targeted therapy for patients with *KRAS*-mutant non-small cell lung cancer. To this end, machine learning algorithms will be developed to extract discriminative and predictive features from a multimodal dataset consisting of digital histopathological images, lung CT images, clinical, genomics, and multiproteomics data collected from more than 1000 lung cancer patients.

This work will take place in a multidisciplinary collaborative project with clinicians and biological experts from the Laboratory of Clinical and Experimental Pathology and the Department of Pneumology of the University Hospital of Nice and within the new IHU institute RespiERA.