

Research Project

Research Fellowship 2027 - Radiology Trainee Position

Name of Institution and department: Institut Curie - Department of Medical Imaging

Link to website: <https://www.curie.fr>

City and Country of Institution: Paris, France

Research framework: EIC Pathfinder-funded ILC programme; ELBCC European consortium; host PI co-leader of the imaging working group

RESEARCH GROUP

Institut Curie is the leading French comprehensive cancer centre and the leading European centre for breast cancer care. It brings together more than 2,405 collaborators across three hospital sites and cares for approximately 54,000 patients per year [1]. The Department of Medical Imaging is embedded within the Breast Oncology multidisciplinary pathway and provides a high-volume environment for clinical imaging research, radiology-pathology correlation, and evaluation of imaging innovations in women's oncology.

This fellowship will take place within the Department of Medical Imaging at Institut Curie, Paris, in close interaction with the Breast Oncology multidisciplinary team. The project will be conducted within the framework of an EIC Pathfinder-funded programme on invasive lobular carcinoma (ILC), with dedicated institutional resources for cohort constitution, data curation, imaging-pathology linkage, and dataset harmonisation. It will also be performed under the aegis of the European Lobular Breast Cancer Consortium (ELBCC), within which the host principal investigator is co-leader of the imaging working group. The fellow will work with breast radiologists, oncologists, pathologists, data managers, statisticians, and computational imaging collaborators. This project focuses on radiology-pathology correlation in ILC and is designed to be independent of AI model availability. ILC is histologically heterogeneous. Non-classic forms include pleomorphic, solid, alveolar, trabecular and tubulolobular patterns [2, 3], but these variants are often grouped together in imaging studies. Evidence remains limited regarding whether classic and non-classic ILC show reproducible differences across mammography, contrast-enhanced mammography (CEM), ultrasound and MRI. A recent study by Cserni et al. highlighted the diversity of mammographic and histological patterns in ILC and found no obvious association between histological pattern and mammographic presentation, supporting the need for larger and multimodal radiology-pathology correlation studies [4].

TITLE OF PROPOSED RESEARCH PROJECT

Multimodal Imaging Phenotypes of Classic versus Non-Classic Invasive Lobular Carcinoma

BRIEF DESCRIPTION OF THE PROJECT

Invasive lobular carcinoma includes classic and non-classic histological forms, including pleomorphic, solid, alveolar, trabecular and tubulolobular variants. These subtypes may differ in tumour architecture, cellularity, biological aggressiveness and clinical behaviour, but their multimodal imaging correlates remain insufficiently characterised.

This 3-month fellowship will investigate whether classic and non-classic ILC differ in their imaging phenotype across mammography, contrast-enhanced mammography, ultrasound and MRI. The primary comparison will be pragmatic: classic ILC versus non-classic ILC. Specific variants, including pleomorphic ILC and biologically aggressive subgroups, will be explored descriptively when sample size permits.

OBJECTIVES

The main objective is to determine whether classic and non-classic ILC show different multimodal imaging phenotypes. A secondary exploratory objective will be to assess whether imaging phenotypes of non-classic ILC are associated with adverse clinicopathological and prognostic features. These will include tumour size, nodal involvement, histological grade, proliferation index,

receptor status, multifocality or multicentricity, and, where available, recurrence data. Given the expected limited number of events and the 3-month duration of the fellowship, outcome analyses will be considered exploratory and descriptive.

- To curate a cohort of histologically confirmed ILC cases classified as classic or non-classic according to pathology reports and expert review when needed.
- To perform structured multimodal imaging annotation across mammography, contrast-enhanced mammography, ultrasound and MRI.
- To compare lesion type and conspicuity between classic and non-classic ILC, including mass, non-mass-like findings, architectural distortion, asymmetry, enhancement patterns and diffusion visibility.
- To assess imaging-pathology concordance for tumour extent, multifocality/multicentricity and staging.
- To explore associations between imaging phenotype and markers of biological aggressiveness, including grade, receptor status, Ki-67 and nodal involvement.
- To collect available recurrence or follow-up data for exploratory descriptive analyses.
- To prepare a final ESOR report and a draft congress abstract or manuscript section.

METHODS AND FEASIBILITY

This retrospective observational radiology-pathology correlation study will use a predefined institutional ILC cohort. Eligible cases will include patients with histologically confirmed ILC and at least one baseline breast imaging modality. A subset will have multimodal imaging including mammography, CEM, ultrasound and MRI. The reference standard will be based on pathology and multidisciplinary review. Imaging descriptors will be harmonised across modalities and compared between classic and non-classic ILC. Analyses will be descriptive and exploratory, with explicit attention to sample size limitations for rare variants. Feasibility will be supported by EIC Pathfinder-funded resources for cohort curation and pathology-imaging data linkage.

APPLICANT'S DUTIES

- Complete onboarding in breast imaging research methodology, data protection, structured multimodal annotation and radiology-pathology correlation.
- Screen the predefined ILC case list and verify imaging availability across mammography, CEM, ultrasound and MRI.
- Classify cases as classic versus non-classic ILC according to pathology data, with support from the pathology team when needed.
- Perform structured review of mammography, CEM, ultrasound and MRI using a predefined annotation form.
- Record modality-specific descriptors, including mass versus non-mass-like findings, enhancement patterns, diffusion visibility, lesion extent, multifocality/multicentricity and nodal findings.
- Compare imaging findings with pathology-based reference data, including tumour size, multifocality/multicentricity and staging.
- Participate in consensus sessions with a senior breast radiologist for ambiguous or discordant cases.
- Contribute to descriptive analysis, interpretation of radiology-pathology correlations, limitation assessment and preparation of the final report, abstract and/or manuscript draft.

APPLICANT'S BENEFITS

- Advanced exposure to multimodal imaging of ILC, including mammography, CEM, ultrasound and breast MRI.
- Training in structured imaging annotation and harmonisation of descriptors across modalities.
- Improved understanding of classic and non-classic ILC and their potential imaging correlates.
- Practical experience in imaging-pathology concordance, tumour extent assessment and staging discordance.
- Awareness of methodological issues in subgroup research, including sample size limitations and histological classification reproducibility.

- Interaction with radiologists, pathologists, oncologists, data managers and statisticians within an EIC Pathfinder-funded European ILC framework.
- Contribution to a clinically relevant research output with potential for congress presentation or manuscript submission.

PROJECT LEADER

Project Leader: Caroline MALHAIRE, MD, PhD, Department of Medical Imaging, Institut Curie, Research Center, Imaging, Innovative Radiotherapy, and Systems Medicine Laboratory (IRIS), INSERM, CNRS, U1353 / UMR 9029 Institut Curie; co-leader of the ELBCC Imaging Working Group]

Members: Senior breast radiologists, breast pathologist, data manager

SELECTED REFERENCES

1. Institut Curie Press Office. Curie en bref. Institutional key facts. Accessed 2026.
2. Van Baelen K, Sawyer E, Van Cauwenberge J, et al. Clinical challenges and proposed solutions for patients with invasive lobular breast cancer. *Ann Oncol.* 2025;36(11):1285-1298. doi:10.1016/j.annonc.2025.07.008.
3. Pereslucha AM, Wenger DM, Morris MF, Aydi ZB. Invasive lobular carcinoma: a review of imaging modalities with special focus on pathology concordance. *Healthcare (Basel).* 2023;11(5):746. doi:10.3390/healthcare11050746.
4. Cserni G, Floris G, Koufopoulos N, et al. Histological patterns and mammographic presentation of invasive lobular carcinoma show no obvious associations. *Cancers (Basel).* 2024;16(9):1640. doi:10.3390/cancers16091640.