European School of Molecular Medicine

2026 summer call PhD selections

AVAILABLE POSITIONS

Principal Investigator	SALVATORE PECE
Institute of Affiliation	Department of Experimental Oncology, European Institute of Oncology

PROJECT INFO	
Title of the proposed project:	Deconvolution of Intratumoral Heterogeneity in Bladder and Prostate Cancer: From Prognostic Biomarkers to Mechanism-Based Targeted Therapies
Short description of the project	This project focuses on the deconvolution of intratumoral heterogeneity in bladder and prostate cancer to better understand how diverse tumor cell populations, stromal components, immune cells, and other elements of the tumor ecosystem contribute to disease progression, prognosis, and therapeutic response. By characterizing the molecular, cellular, and microenvironmental complexity of these tumors, the project aims to identify novel prognostic biomarkers and uncover mechanisms that can guide the development of more effective, mechanism-based targeted therapies.
Main research area for the project	Focus on intratumoral heterogeneity, tumor evolution, and the tumor ecosystem in bladder and prostate cancer.
Second research area for the project	Identification of prognostic biomarkers and mechanism-based therapeutic targets to improve patient stratification and targeted treatment strategies.
3 key words for the project	Intratumoral heterogeneity; Tumor ecosystem; Precision oncology

LAB INFO	
Main topic/s of the lab	Stem cell biology, Translational oncology, cancer-specific mechanism, in vitro and in vivo models of breast, prostate and bladder cancer.
Short description of the lab activity	Central to the work of Pece's Lab is the need to resolve specific molecular workings underlying the heterogeneity and dynamics of cancer and harness this knowledge to identify novel therapeutically actionable vulnerabilities and predictive prognostic biomarkers to advance a framework for precision oncology. Current research lines concern mammary, prostate and bladder cancer, in a real effort to bridge the gap between fundamental science and clinical translation. Our special focus is on genes and signaling pathway components that are involved in the acquisition of plasticity through subversion of the normal tissue hierarchy, thereby instructing aberrant morphogenetic programs and evolutionary trajectories that underlie tumorigenesis, metastasis and therapy resistance, while introducing druggable vulnerabilities for targeted treatments. Our common scientific itinerary starts from explorative studies in densely clinico-pathologically phenotyped cohorts of real-life patients, available through the liaison with

	IEO clinical activities. These clinical studies are key to: i) identify unmet clinical needs and assess the actual relevance of specific molecular alterations to real-life human cancer patients; ii) generate testable hypotheses as to their pathogenetic involvement in tumorigenesis; iii) ignite in vitro and in vivo preclinical studies in physiopathologically relevant and experimentally tractable models, including mouse and human primary-derived organoids and patient-derived xenografts (PDX), integrated with multi-layered omics, single cell dynamics and high-end computational biology.
Recent bibliography	Li H, et al. SH3BP5L triggers the RAB11A-regulated integrin recycling network implicated in breast cancer metastasis. J Clin Invest. 2026 Feb 2;136(3):e192705. Sabbioni S, et al. The CRL7FBXW8 Complex Controls the Mammary Stem Cell Compartment through Regulation of NUMB Levels. Adv Sci (Weinh). 2025 Jul;12(25):e2405812. F.A. Tucci, et al. Loss of NUMB drives aggressive bladder cancer via a RHOA/ROCK/YAP signaling axis. *Nat Commun*., 2024 Dec 3;15(1):10378. doi: 10.1038/s41467-024-54246-6. Macandog ADG, et al. Longitudinal analysis of the gut microbiota during anti-PD-1 therapy reveals stable microbial features of response in melanoma patients. *Cell Host Microbe*. 2024. Tosi G, et al. Cancer cell stiffening via CoQ10 and UBIAD1 regulates ECM signaling and ferroptosis in breast cancer. *Nat Commun*. 2024 Sep 18;15(1):8214. Mulè P, et al. WNT Oncogenic Transcription Requires MYC Suppression of Lysosomal Activity and EPCAM Stabilization in Gastric Tumors. *Gastroenterology*. 2024. Salemme V, et al. p140Cap inhibits β-Catenin in the breast cancer stem cell compartment instructing a protective anti-tumor immune response.. *Nat Commun.,* 14(1):2350, 2023. Filippone MG, et al. Aberrant phosphorylation inactivates Numb in breast cancer causing expansion of the stem cell pool. *J Cell Biol*, 5, 221 (12), 2022. Filippone MG, et al. CDK12 promotes tumorigenesis but induces vulnerability to therapies inhibiting folate one-carbon metabolism in breast cancer. *Nat Commun*., 12;13(1):2642, 2022. Pece S, et al. Comparison of StemPrintER with Oncotype DX Recurrence Score for predicting risk of breast cancer distant recurrence after endocrine therapy. *Eur J Cancer*, 164:52-61, 2022.
Group composition	1 staff scientist, two senior post-docs, 3 PhD students, 2 research assistants
Institutional page link	https://www.research.ieo.it
Lab website link	https://www.research.ieo.it/salvatore-pece/ https://www.research.ieo.it/research-and-technology/principal-investigators/salvatore-pece/ https://www.research.ieo.it/research-and-technology/technological-units/molecular-and-digital-pathology-unit/