

AVAILABLE POSITIONS

Principal Investigator	Nicola Segata
Institute of Affiliation	University of Trento

PROJECT INFO	
Title of the proposed project:	Microbiome signatures of early on-set colorectal cancer
Short description of the project	<p>The research program is part of the project "PROSPECT " funded by Cancer Research UK, the National Cancer Institute, the Bowelbabe Fund for Cancer Research UK and Institut National Du Cancer through Cancer Grand Challenges. The overall aim of PROSPECT is to identify and understand the processes through which different biological and environmental factors cause early-onset cancers (EOCRC), and specifically the work packages led by prof. Nicola Segata are focusing on the role of the microbiome in such processes.</p> <p>The researcher will employ computational and statistical analyses, including machine-learning approaches, on both newly collected project samples and existing public study data. The primary goals are to: i) investigate the associations between the microbiome and EOCRC; ii) identify prospective microbial biomarkers for EOCRC and iii) assess the transmissibility of these identified biomarkers.</p>
Main research area for the project	Computational metagenomics and cancer
Second research area for the project	Biomolecular Science
3 key words for the project	microbiome, metagenomics, cancer

LAB INFO	
Main topic/s of the lab	Computational metagenomics, microbiome studies
Short description of the lab activity	<p>Next generation computational metagenomic tools. The potential of metagenomics is only partially expressed due to computational challenges. We are working on novel methods to profile microbiomes at increased resolution (e.g. strains) and perform large-scale comparative genomics on uncharacterized microbes.</p> <p>Integrative and machine learning meta'omic approaches. We develop new machine learning tools to cope with the variability and dimensionality of microbiome profiles and provide clinically relevant signatures by integrating complementary meta'omic approaches (e.g. metatranscriptomics or metaproteomics). Microbiome-pathogen interaction in human infections. The role of the microbiome in the acquisition and development of infections is largely unknown. By coupling longitudinal</p>

AVAILABLE POSITIONS

	<p>pathogen/microbiome sequencing we aim to understand how the microbiome can modulate the virulence profile and antibiotic resistance of human infections.</p> <p>Microbiome transmission. We study how microbes can be transmitted between different environments with specific focus on how members of the microbiome are vertically transmitted from mothers to infants at birth and horizontally between family members or individuals sharing the same environment.</p>
Recent bibliography	<ul style="list-style-type: none"> - Lee, K., Thomas, ... Segata, N. (2022). Cross-cohort gut microbiome associations with immune checkpoint inhibitor response in advanced melanoma. <i>Nature Medicine</i>, 28, 534–544. - Thomas, A.M., Fidelle, M., Routy, B. et al. Gut OncoMicrobiome Signatures (GOMS) as next-generation biomarkers for cancer immunotherapy. <i>Nat Rev Clin Oncol</i> 20, 583–603 (2023). https://doi.org/10.1038/s41571-023-00785-8 - Piccinno, G., Thompson, K,N, ..., Huttenhower, C., Naccarati, A., Budinska, E., Segata N. The gut microbiome in colorectal cancer: a cross-stage strain-level pooled analysis of 3,741 individuals from 18 cohorts. <i>Accepted Nature Medicine</i> - Ianiro, G., Punčochář, M., Karcher, N. et al. Variability of strain engraftment and predictability of microbiome composition after fecal microbiota transplantation across different diseases. <i>Nat Med</i> 28, 1913–1923 (2022).
Group composition	25 members: 12 PhD students, 10 postdocs, 2 pre-doc, 2 research assistants
Institutional page link	https://www.unitn.it/en
Lab website link	http://segatalab.cibio.unitn.it/index.html