The **Institute for Medical BioMathematics (IMBM)** is an independent non-for-profit scientific research institute, acting where the most advanced science can take traditional medicine a big step forward. We do this by implementing innovative mathematical, computational and artificial intelligence methodologies for optimizing the treatment of cancer and infectious diseases. https://www.imbm.org/

Goal and Vision

Since its foundation over twenty years ago, IMBM has been engaged in designing mathematical models and computational algorithms for optimizing and personalizing cancer therapy in several cancer indications, including lung cancer, prostate cancer, colon cancer, breast cancer, and melanoma, and under diverse onco-therapeutics (spanning from chemotherapeutics to targeted and immuno-therapies). The clinical decision-making algorithms that we develop rely on mathematical, statistical, and artificial intelligence (AI) methodologies, which integrate multiscale patient information, and combine an in-depth understanding of the underlying biological mechanisms and dynamic processes. We build these computational tools to offer optimal individualized predictions on patient responses to therapy, progression, survival, and other clinical outcomes. Our developed algorithms also aid in prioritizing guideline-compliant drug selection and treatment schedules out of the ever-expanding therapeutic options in oncology and immune-related disorders. Our software-based algorithms have a direct impact on the individual patient, as they assist physician's decision-making processes and help boost treatment efficacy, ultimately increasing the patient's survival and quality-of-life and saving valuable time for the treating oncologists. Our computational algorithms can navigate between the multiple available treatment options, identify optimal treatment regimens, and add new prognostic markers to the precision medicine arsenal.

Technology and Expertise

The clinical decision-making models and algorithms we develop build on three main expertise in IMBM: (i) processing large real-world datasets and complex multiscale patient information, collected from hospital registries, electronic health records, and clinical trial databases - e.g., genomic and proteomic factors, biomarkers, tumor biology and pathophysiology, radiological imaging, lab data, demographics, and other clinical metrics; (ii) advanced computation by cutting-edge methodologies, such as AI, machine learning, etc., intertwined with dynamic mechanistic modeling and statistics; (iii) integration of medical and biological scientific knowledge with the clinical realm for devising guideline-compliant decision support tools that are clinically suitable.

IMBM was founded by Prof. Zvia Agur, a renowned biomathematician and pioneer in the field of treatment optimization for cancer and infectious diseases. The multidisciplinary experts in IMBM come from various scientific backgrounds, spanning from biology, pharmacology, and medicine to mathematics, statistics, and computer sciences. IMBM has initiated several research endeavors in the realm of personalized treatment for solid cancers and has been actively involved in industry-based and pharma-oriented projects, under its associated startup company, Optimata Ltd. Our publications can be found here and here.

Collaborating

Our unique expertise in the field of cancer treatment optimization and personalization makes us ideal partners for a collaborative project under Topic 4 of IMI2-Call 23. To target this topic we wish to join forces with hospitals, medical societies, pharmaceutical companies, biotechnology companies, universities, and patient organizations. We hope to leverage the planned collaboration for developing clinically applicable disease-specific AI-based technologies for lung, breast, or prostate cancer, ultimately enriching precision medicine.