

Special Issue on Mathematical Modeling of Patient Care

Call for Papers

Mathematics has become an important tool in the study of biological structures and processes. Starting from problems in population dynamics, it has now found application in most areas of biology. In recent years, mathematicians and medical researchers have combined their individual expertise to study diseases of the human body that are amenable to mathematical analysis. Mathematical models have been proposed in many areas of medicine: immunology, pathology, oncology, infectious diseases, pharmacology, pulmonary and cardiac medicine, surgery and so forth. These models range from temporal-spatial models of tumor growth to the study of the estrogen metabolism pathway in women as a predictor of breast cancer, from mechanical analyses of surgical sutures to models of the human aortic valve and their implications for the design of annuloplasty rings, from models for the colonization of methicillin-resistant staphylococcus aureus strains to gene expression models for the identification of autoimmune digestive diseases. Indeed, mathematical modeling in medicine can exist at many scales from cellular and subcellular processes to the delivery of healthcare. We invite manuscripts that are likely to have a direct impact on patient care at different stages: prediction, diagnosis, treatment, and delivery. Potential topics include, but are not limited to:

- Time-spatial models of health care facilities (e.g., ICU or dialysis units) that can be used to minimize the spread of infections and the associated costs
- Computational models that use gene expression data to diagnose and treat diseases
- Mathematical models of physiological systems that are used to create online simulators to train and certify providers of health care
- Models to improve drug delivery for specific diseases
- Mathematical models to assist surgical procedures
- Models that focus on patient care outside of these areas

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