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Trachette Jackson*. *Turning cancer discoveries into effective treatments with the aid of mathematical modeling.*

It is an exciting time to work in the interdisciplinary field of Mathematical Oncology. Even TIME Magazine agrees that “A team-based, cross-disciplinary approach to cancer research is upending tradition and delivering results faster.” Mathematical and computational modeling approaches have been applied to every aspect of cancer biology from tumor initiation to malignant spread and treatment response. A substantial amount of research, aimed at improving therapeutic outcomes for cancers, is now focusing on the molecular biology of individual tumors in an attempt to target pathways involved in tumor progression selectively. Increased understanding of molecular mechanisms that mediate cancer pathogenesis is leading to the targeted manipulation of these pathways and the development of new cell-specific approaches to cancer therapy. This talk will highlight a suite of mathematical models designed to optimize the use of targeted drug treatment strategies, alone and in combination with traditional chemotherapy, to address the critical challenges associated with targeted cancer therapeutics. These mathematical models, combined with existing and newly generated experimental data, are poised to improve the ability to combine promising drugs for clinical trials. This type of interdisciplinary science can reduce the time and costs associated with transitioning novel therapeutics approaches from “equations to bench to bedside.”

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