Both clinicians and the public are bombarded with enthusiastic promises of how genomics technology will improve the diagnosis of disease, offer precision treatments and cures, and create healthy children through novel fertility treatments. Scientific and popular media characterize genetic testing, genome editing, and technologies such as mitochondrial replacement therapy (“three person IVF”) as efficient and revolutionary. This presentation will discuss three examples in the genomics revolution: (1) genetic tests used in precision oncology; (2) genome editing designed to cure monogenic disease; and (3) experimental mitochondrial replacement therapy to treat infertility. The presentation will briefly distill the medical rationale for each technology, the state of the scientific evidence pertaining to potential safety and efficacy, legal and regulatory status, and provide examples of how the genomics framework constitutes only one component when addressing human health and disease. This analysis offers insight to clinical discussions that are aligned with beneficence, non-maleficence, and that increase the transparency of clinician-patient communication. The content of this presentation will provide clinicians the information to become more discerning when evaluating genomics’ promises, enabling them to accurately communicate potential risks and benefits of emerging genomics technology both inter-professionally and to patients.