

Bioinformatics Challenges in Translational Research

(Invited Keynote Talk)

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The basic goal of translational research, from a bioinformatics perspective, is to relate data acquired from basic research to an outcome in a patient. The relation of data may be following the drug discovery process, where biochemical and protein structure data is linked all the way through to data collected during the clinical trial process and onward. The relation of data can also be associated with better patient care, through techniques like data mining, where data from the research environment is combined with data from the clinical environment and used for hypothesis generation, testing and potential outcomes are implemented. Translation research also requires collaboration between various clinical investigators, physicians, scientists and teams, creating a need for secure data sharing. Inherent to the nature of translational research is the integration of data from multiple systems. Data used for research resides in EMRs, LIMSs, CTMS, and other source systems. For example at the University of Miami, The Miller school and its affiliate Institutes (e.g., Jackson Hospital), have established a number of information systems to support various operational needs. These current systems include Velos (for clinical trials management) Cerner (the Jackson EMR), MetaDatach, (UMH) and IDX. The Miller School is also in the process of implementing a EPIC EMR system. We are developing a system to address the above outlined needs and challenges. It is an integration infrastructure to support translational research, but may also be applied to other data sharing and integration needs throughout UM. The system is currently referred to as UTRIX (UM Translational Research Information eXchange). More specifically, UTRIX features a utility data storage environment (FUSE), a service oriented architecture (SOA), an organization currently referred to as the "honest broker" (HB) to control access to data, and standard tools and educational programs to support data analysis. FUSE (Flexible Utility Storage Environment) is intended to meet the data storage needs described above. The SOA and HB together address the challenges posed by data access and authorization. FUSE, the SOA and HB together provide a context in which to make available tools and educational programs to enable the data analysis and advance data mining of research data.