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Ayush Prasad* (aprasad8@jhu.edu), **Nigar Karimli** and **Richard Schugart**. *Constructing an Optimal Design Method in a Mathematical Model for the Interactions of Matrix Metalloproteinases and Their Inhibitors in a Wound.*

Because the medical treatment of diabetic foot ulcers remains a challenge for clinicians, a quantitative approach using patient data and mathematical modeling can help researchers understand the physiology of the wounds. In this work, we estimate parameter values using individual patient data curve-fitted to a modified version of a mathematical model that describes the interactions among matrix metalloproteinases, their inhibitors, extracellular matrix, and fibroblasts at a wound site (Krishna et al., 2015). The model and parameter values were then analyzed using global and local sensitivity analyses, which were used to describe how sensitive each parameter value of the model was to changes in the system. However, these model parameters can be estimated more efficiently and accurately by implementing an optimal design method that calculates optimal observation times for collecting clinical data. We introduce an SE-optimal design (standard error optimal design) by using a Fisher Information Matrix (FIM) to determine the time evolution of sensitivity values. The goal of this work is to quantify and understand the differences between patients to predict future responses and individualize treatment for each patient. (Received September 20, 2018)