# BAYESIAN CALLIBRATION OF ELECTROPORATION, PSED Cluster 2018-2019


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Academic Disciplines:
**MECHANICAL ENGINEERING**


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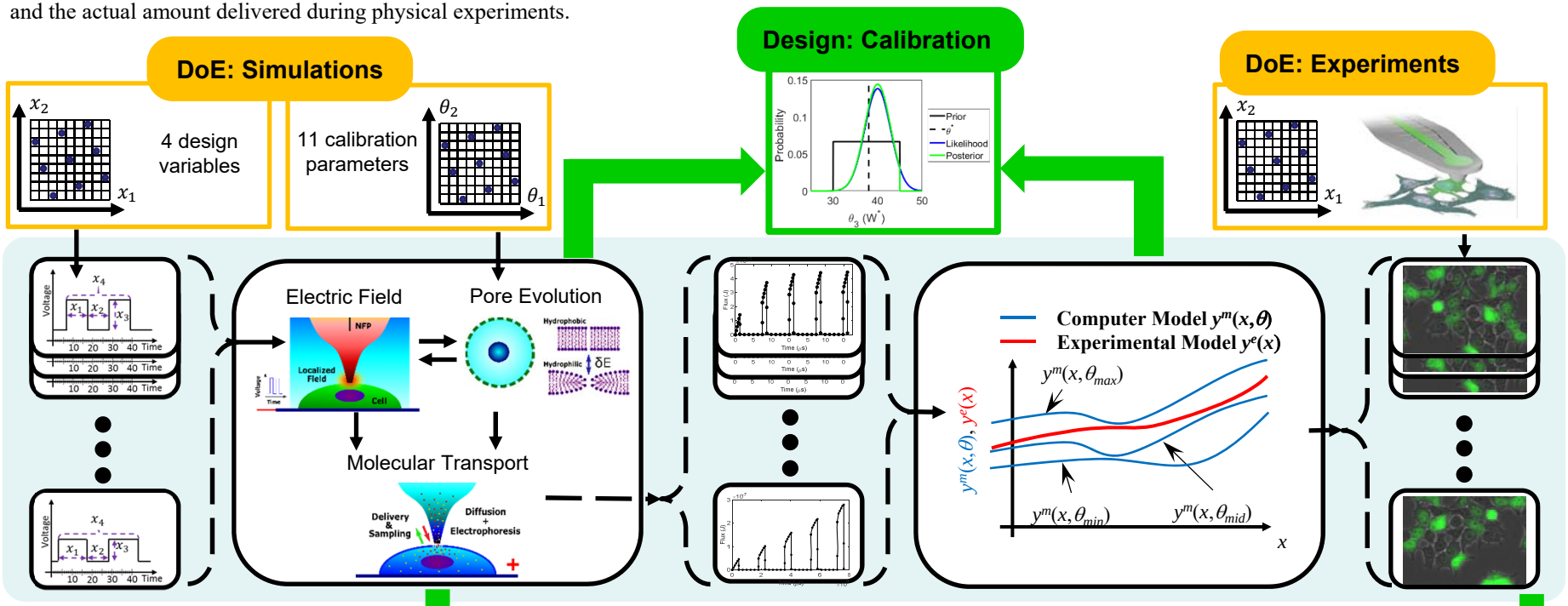
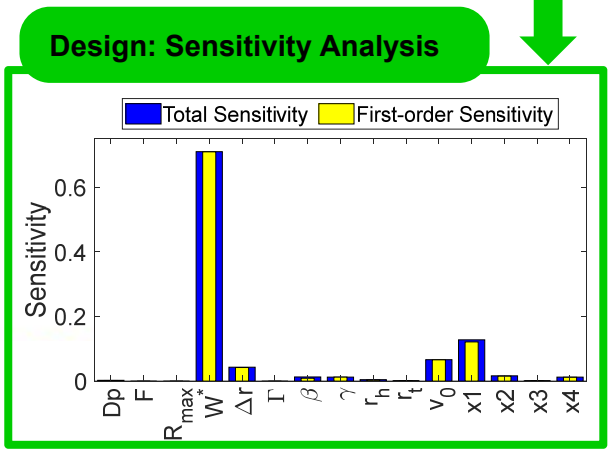
**Research Objective:** In this project, we have sought to develop a methodological approach for the design of electric pulses for electroporation. Conventionally design centers around minimizing an objective function, in our case this objective is to minimize the difference between the predicted amount of biomolecule delivered into a cell and the actual amount delivered during physical experiments.




**Achievements:** This work resulted in three major contributions:

(i) Improved simulation tractability through flexible data acquisition and linear extrapolation of saturated molecular transport flux.

(ii) Sensitivity analysis indicated that there are three influential calibration parameters, transition energy pore configuration $W^*$, pore destruction flux $\Delta r$, and frequency density $v_0$.

(iii) An emulator of the simulation model enabling a wide range of additional design applications, sensitivity analysis, design calibration, and design optimization.

**What is next:** Gather experimental data to identify the true calibration parameters and an emulator of the experimental response. The calibration parameters will provide fundamental physical insight into the electroporation process, and the experimental response will help the design of electric pulses.