

Title: Sim-U-Lab – A Simulation of Two Dimensional Gel Electrophoresis

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Two dimensional gel electrophoresis (2DE) is a technique used to determine levels of protein expression in studying whole organisms or tissues. In 2DE, proteins are separated in the first dimension by their isoelectric points (the pH at which their net charge is zero) and in the second dimension by their molecular weights.

This project poses many challenges for the computer scientist. First there is the need to learn enough biology and chemistry to understand what is happening in the living organisms and also the analytical technique (2DE) that is being applied to analyze an organism. A second challenge is to develop efficient algorithms for reading large datasets (often more than 6000 proteins from an organism), then performing a series of calculations on each member of the dataset. A third issue is more artistic in nature – how do we design a realistic user interface that reflects the technique as it is practiced.

This presentation will focus on addressing these three issues – translating biology into computer code, developing efficient algorithms, and designing and implementing the user interface.