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Vesicle Viewer – Data Analysis and Visualization Software

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Vesicle Viewer – Data Analysis and Visualization Software

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Introduction

As progress is made toward more detailed methods of experimentation, larger volumes of data are generated. Much the critical information inside that data is inaccessible to researchers, who have limited time to analyze results by hand.

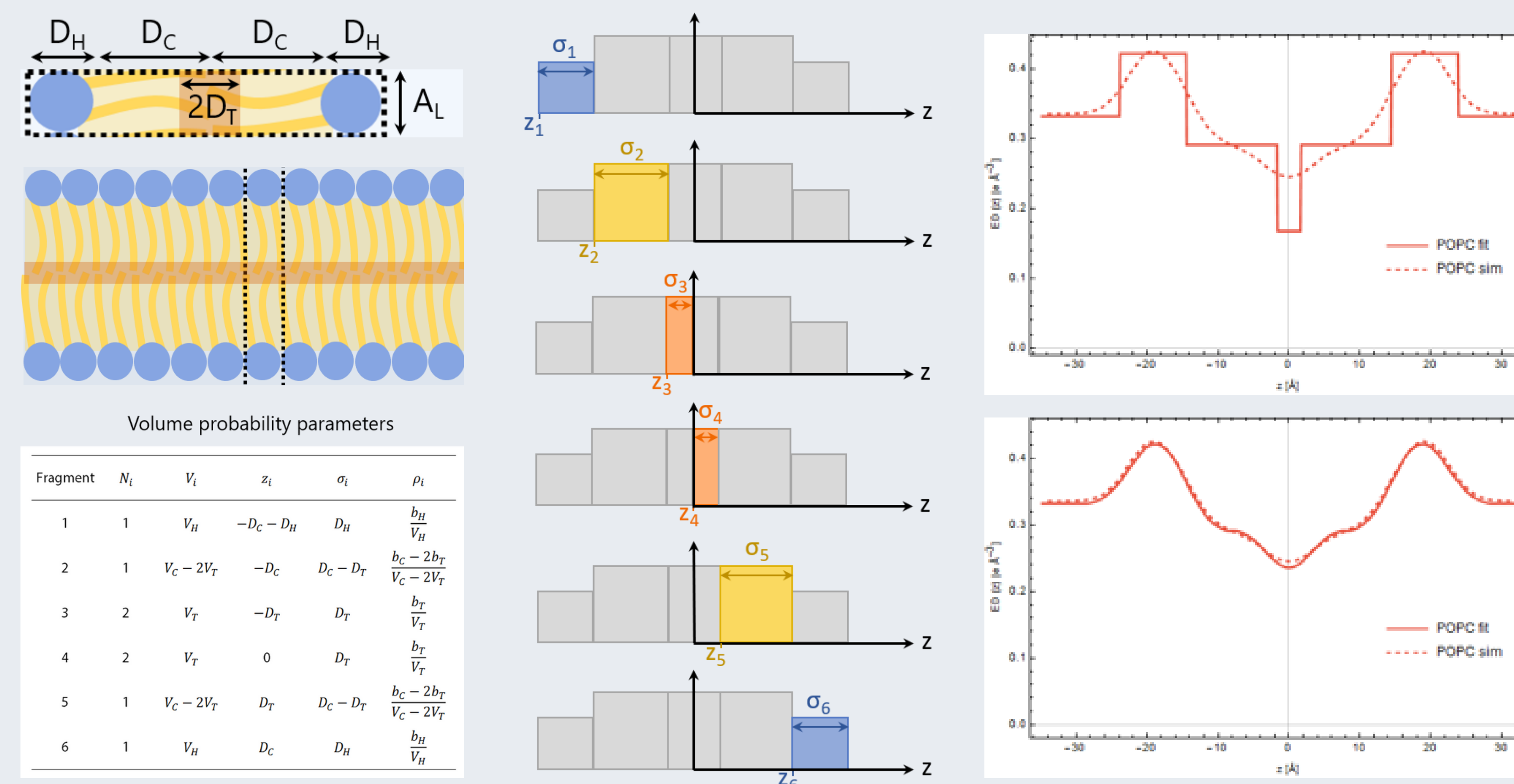
Easy to use data visualization software can allow them to take full advantage of valuable data and maximize the use of limited resources. In this project, a web application is being developed to visualize data generated in the study of lipid bilayers.

Use Case

Small-angle scattering data contain information about the structure of lipid membranes. When fitted to an appropriate model and visualized in various graphs, structural parameters including lipid areas and membrane thickness can be determined. These parameters enable biologists and biophysicists to make predictions about the behavior of cell membranes.

Model

Well established models exist for this use case. Lipids are divided into regions. Parameters for each of these regions are allowed to vary - this produces a result where a known curve can be fitted to experimental data.

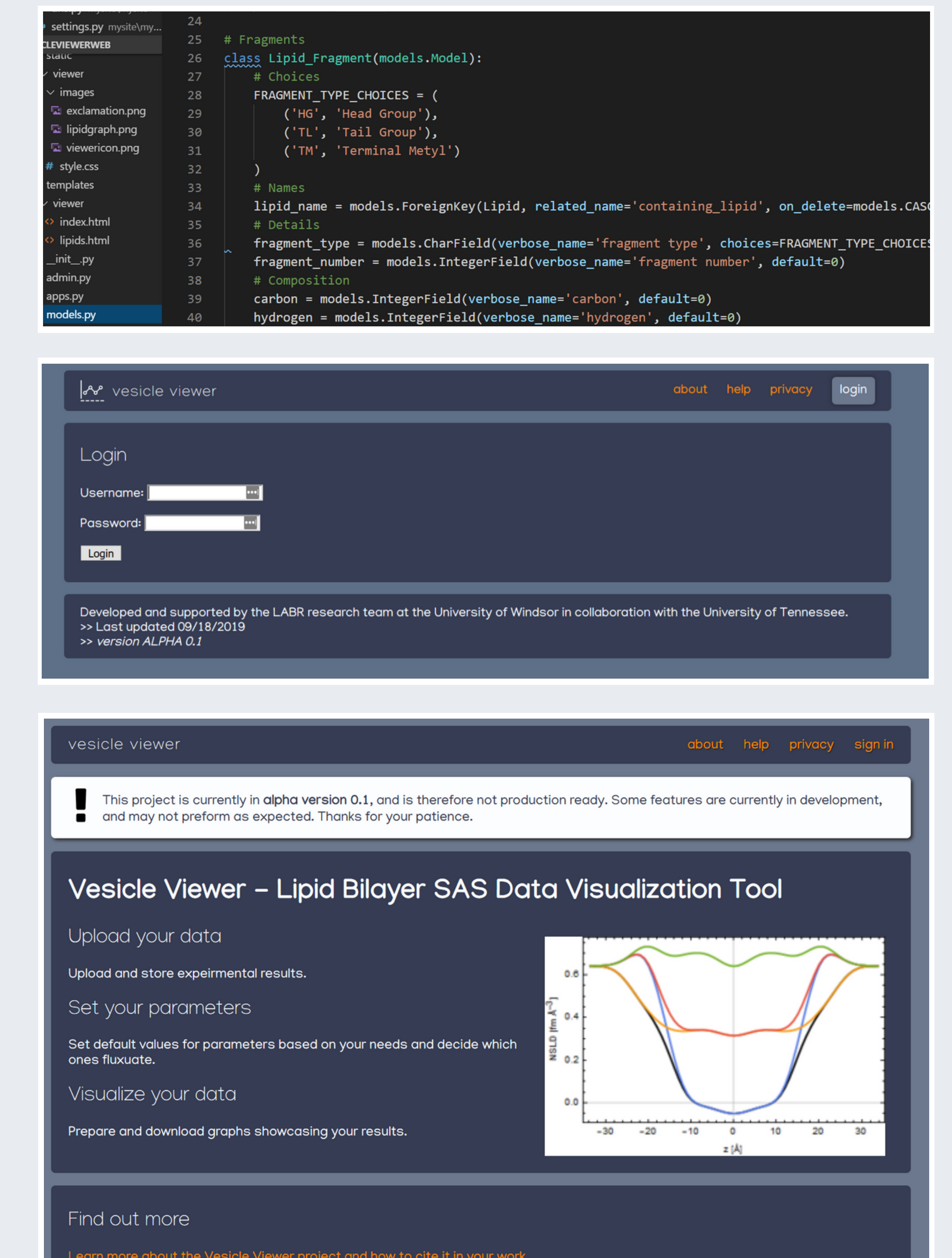


Technology

We are developing a web application to allow scientists all over the world to take advantage of this solution. By eliminating the barrier of downloading and installing software, users can take advantage of the application regardless of which operating system they use. This also allows for a shorter development cycle by eliminating the need to push updates or prepare multiple versions.

This application will primarily use Django, a python package specialized for the development of robust web applications. In addition, several other libraries are used to support the more technical aspects of the project - notable examples are Matplotlib (for graphs), NumPy (for calculations) and Pandas (for advanced data structures).

Interface



Future Work

Modules of the code developed for Vesicle Viewer can be used as a basis for other tools of a similar nature, allowing different mathematical models to be implemented and entirely new datasets to be processed.



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