

# Development of Teaching with Molecular Visualization: A BioMolViz Guide for Educators, an Open Educational Resource

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The initial aim of the BioMolViz project was to produce a repository of validated, visualization-based assessment questions that any instructor could use. However, as assessment-writing workshops began, it became clear that participants varied in their ability to create molecular visualizations. Some could easily generate precise custom images for new assessments using modeling programs, while others could not and wanted to be trained to do so. Through an NSF grant supplement, BioMolViz was able to incorporate two virtual modeling program training sessions for faculty. We developed a two-day online workshop that trained participants to navigate the Protein Data Bank, find resources for structures, and model a macromolecule of their choice. In breakout rooms, participants specialized in one of three popular molecular modeling programs (PyMOL, ChimeraX, or iCn3D). The wealth of training materials developed and used for the workshops remained in an online folder until members of the BioMolViz working group began designing formative assessments that utilized molecular modeling. Upon revisiting the materials, the working group noted there were enough resources to develop an online manual to help instructors take the first steps toward bringing molecular modeling into their classrooms. Group members organized activities into chapters and identified concepts that required elaboration to be translated from a workshop format to an open educational resource (OER). Here, we present the structure of the book Teaching with Molecular Visualization: A BioMolViz Guide for Educators. With chapters authored by over a dozen different members of the working group based on their specific expertise, the OER is a model for a network-wide collaboration for broad dissemination of educational material outside of the traditional publication avenue. This work showcases how a near-forgotten wealth of resources provided the basis for a creative work shaped by authors across numerous institutions and strengthened the BioMolViz community.