# Biological and Biophysics Simulation in Tissue Forge: Introduction and Guided Simulation Building

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Tissue Forge is open-source simulation software for interactive particle-based physics, chemistry and biology modeling and simulation. Tissue Forge allows users to create, simulate and explore models and virtual experiments based on soft condensed matter physics at multiple scales, from the molecular to the multicellular, using a simple interface. While Tissue Forge is designed to simplify solving problems in complex subcellular, cellular and tissue biophysics, it supports applications ranging from classic molecular dynamics to agent-based multicellular systems with dynamic populations. Tissue Forge users can build and interact with models and simulations in real-time and change simulation details during execution, or execute simulations off-screen and/or remotely in high-performance computing environments. Tissue Forge provides a growing library of built-in model components along with support for user-specified models during the development and application of custom, agent-based models. Tissue Forge includes an extensive Python API for model and simulation specification via Python scripts, an IPython console and a Jupyter Notebook, as well as C and C++ APIs for integrated applications with other software tools. Tissue Forge supports installations on Windows, Linux and MacOS systems and is available for local installation via conda. This workshop introduces the basic concepts, modeling and simulation features, and some relevant modeling applications of Tissue Forge through guided simulation scripting. Workshop concepts will introduce basic Tissue Forge modeling concepts and simulation features through the development of interactive simulations in Python. Attendees are encouraged, but not required, to code along as the workshop interactively develops and tests simulations in multicellular and biophysics modeling applications.