Capital College Visual Science
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Next Gen Planet Simulator

High Level Requirements

- Users can create and save a number of celestial bodies that they create or are created by randomizing the features the user can choose from. All simulations are part of a persistent state that can be reloaded between sessions.
- Users can create a celestial body and specify its physical properties. The physical properties are varied enough that the celestial body could be a brown dwarf, a gas giant, a terrestrial planet, an asteroid, a comet, or a dwarf planet.
- Users can reshape a celestial body by directly modifying a list of physical properties.
- Users can observe and investigate the properties of the celestial body and interact with the physically accurate simulations of the celestial body.
- Users can create and save a number of natural satellites for each celestial body.
- Users can specify physical properties of natural satellites in the same way as they specify properties for each celestial body, as well as additional properties describing the natural satellite's orbit and revolution around its parent.
- Users can choose different planetary system or stellar models for celestial bodies being simulated from a list of pre-made stellar objects like suns, black holes, and rogue systems. These choices affect both the lighting model and the thermodynamic input for the simulation including natural satellites and other celestial bodies.
- Users can choose an orbit around the stellar model and an orbital tilt, allowing for simulations of seasons and tidal drift.
- Users can zoom in on terrestrial regions of the celestial body to observe a more physically based simulation of collisions and geological simulations.
- Users can view graphs of physical properties like vector fields for wind and electromagnetism, and scalar fields for atmosphere and temperature.
- Users can view a cross-section of the celestial body for internal temperature and geological simulation.
- Users can hover over features of the simulation in inspection modes to view scientific descriptions and learning resources based on the feature they hover over. Inspection modes include modes to inspect climate, topography, geology, temperature, atmosphere, thermodynamics, orbits & kinematics, and electromagnetism.