**Target Audience:**This course is open to all USGS employees interested in advanced modeling of groundwater and surface-water systems. Cooperators may attend if sponsored by a local USGS office.

**Summary and Objectives:**This 5-day course class will cover the advanced capabilities available in MODFLOW 6 and PEST++. The class will focus on 1) advanced capabilities such as unstructured grids, local grid refinement, and XT3D; 2) use of the advanced stress packages; 3) solute transport, including variable-density groundwater flow and transport; 4) energy transport; 5) particle tracking; 6) use of the MODFLOW API to interactively control MODFLOW execution at runtime; 7) surface-water/groundwater interactions with pywatershed and MODFLOW; 8) surface-water flow; 9) running parallel MODFLOW 6 simulations; and 10) parameter estimation and uncertainty analysis using PEST++. The class will be taught using Python, FloPy, and Jupyter Notebooks. In addition to lectures on the advanced capabilities, most sessions will include in-class exercises to give attendees a better understanding of how to use the modeling tools.

**Prerequisites**: Completion of course GW2096 (Modeling Groundwater Flow with MODFLOW) or equivalent university courses on groundwater modeling is strongly recommended. ﻿

﻿﻿**Course Contact:**Joseph Hughes (312) 521-0740