NEA
NUCLEAR ENERGY AGENCY

OpenMC

# Class Title: OpenMC

3–7 April 2023

OECD Headquarters in Paris, France

Minimum enrollment required: 12

This 4.5-day class is intended to give students a thorough introduction to the usage and application of the OpenMC Monte Carlo code. The course will be interactive and students will work hand-in-hand with the instructors to develop models, run the code, and explore a wide variety of features. Time will also be allotted to discuss individual questions and work through student-motivated examples.

Topics to be covered include:

- **Geometry**: constructive solid geometry; surfaces, cells, universes, lattices, DAGMC
- **Sources**: statistical distributions, source options
- **Tallies**: filters, scores, and tallies; cell instances; meshes
- **Post-processing**: working with statepoint files; Pandas dataframes; tally arithmetic
- **Installation**: Compiling and installing; the Python API; optional dependencies
- **Nuclear data**: cross section configuration; introspection of data; automated data generation; cross section visualization
- **Depletion**: depletion operators; time integration methods; activation calculations
- **Multigroup cross section generation**: automated generation of MGXS over spatial domains; group structures; MGXS libraries
- **Visualization**: Geometry and tally visualization with the OpenMC plotter application
- **Coupling**: C/C++ API, multiphysics calculations

The class will be based on the latest version of OpenMC as of the start of the class. Students will need to bring a laptop to participate in the course. It is **not** required to have OpenMC installed on their laptop; however, students are welcome to install OpenMC in advance. Those who do not have OpenMC installed on their machine will be provided with a cloud-based Jupyter notebook interface accessible through an internet browser.

**Students are expected to have basic knowledge and familiarity with Python 3. Resources for learning basic Python will be provided in advance.**