

An Overview of the Morfeus Project: Object-oriented Multiphysics Framework Development in Fortran 2003

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No quicker path to looks of consternation exists than explaining the need for object-oriented Fortran. Researchers who write Fortran primarily write procedural code, while researchers who employ object-oriented programming (OOP) techniques primarily do so in languages other than Fortran. Nonetheless, active development of new Fortran codes remains the dominant practice in several research communities, e.g. the climate and combustion research communities. With the advent of compilers that fully support the OOP constructs of the Fortran 2003 standard, a need arises to articulate the best practices, or design patterns, in object-oriented design in Fortran. The goals of the Morfeus project include (1) publishing the first Fortran implementations of several classical patterns (Gamma et al., 1995), (2) articulating new patterns specific to the multiphysics modeling domain, and (3) releasing an open-source framework that encourages use of these patterns. This talk will present the project's results on the first two goals along with our progress toward the third goal, including our ongoing development of scalable solver components built atop the ForTrilinos package (Rouson et al. 2010).

Gamma, E., R. Helm, R. Johnson, and J. Vlissides (1995), *Design Patterns: Elements of Reusable Object-Oriented Software*. Addison Wesley.

Rouson, D. W. I., J. Xia, and X. Xu (2010), "Object construction and destruction design patterns in Fortran 2003," Intl. Conf. on Computational Science & Engineering, Amsterdam, Netherlands, May 31—June 2.