Computational Sciences Research Center

SDSU San Diego State University

MOLE: Mimetic Operators Library Enhanced

Stop at **the SDSU CSRC Booth in Hall 6, Booth #6527**

MOLE is a high-performance (C++ & MATLAB/Octave) library that implements high-order mimetic operators to solve partial differential equations. It provides discrete analogs of the most common vector calculus operators. The operators act on staggered grids (uniform, non-uniform, curvilinear) and satisfy local and global conservation laws.

NEWS: *New MOLE Open-source Software Ecosystem (OSE)*

The MOLE OSE organization is now established! The MOLE OSE was founded with a strong commitment to sustainability, reliability, high-performance computing software, and supported by the U.S. National Science Foundation Pathways for Open-source Software Ecosystems (POSE). To learn more about the MOLE OSE organization and mimetic discretization, visit us at:

SC'25 Hall 6, Booth #6527 and watch live demos of scientific applications that use MOLE, learn about mimetic discretizations, attend a short introduction to the MOLE API, and get all your questions about MOLE answered during the MOLE clinics. Also, check out: **mole-docs.readthedocs.io/**

DEMO: *Using MOLE to Enable High-Performance Coastal Ocean Modeling*

This demo showcases a classic ***lock exchange*** (also called ***lock release***) problem, where two fluids with different densities are initially separated by a wall that is later released. We are performing computational benchmarking of the General Curvilinear Coastal Ocean model (GCCOM), which employs MOLE mimetic operators for solving geophysical fluid dynamics problems. This experiment is run on the Argonne National Laboratory's Aurora exascale computer, which is equipped with Intel processors optimized for high-throughput scientific computing.

MOLE Clinics at SC'25

Members of the MOLE development team are available to answer your questions pertaining to the MOLE library, from the software installation, and becoming part of the MOLE community, to using MOLE, and learning about mimetic discretizations. Please check our schedule in the back and book an appointment. Walk-ins are also welcome!

SC25 St. Louis, MO | hpc ignites.

Exhibit Booth: Hall 6, Booth #6527
MOLE: Mimetic Operators Library Enhanced
Monday, Nov 17 to Thursday, Nov 20

TIMES	AGENDA
Monday, November 17	
6:00 - 7:00 PM	**MOLE Library Clinic** Opens. Prof. J. Castillo, SDSU CSRC director
7:00 - 8:00 PM	DEMO: ***Mimetic General Curvilinear Coastal Ocean Model (GCCOM) Computational Performance.*** Dr. J. Brzenski, SDSU and Scripps Institution of Oceanography
	MOLE Library Clinic. Prof. M. Dumett, SDSU
8:00 - 9:00 PM	**MOLE Library Clinic.** Prof. C. Paolini, SDSU
Tuesday, November 18	
10:00 AM - NOON	**MOLE Library Clinic.** Prof. C. Paolini, SDSU and Prof. M. Dumett, SDSU
NOON - 1:00 PM	***Solving Partial Differential Eqs using the MOLE Library.*** Dr. J. Brzenski, SDSU and Scripps Institution of Oceanography
	MOLE Library Clinic. Prof. M. Dumett, SDSU
1:00 - 2:00 PM	**MOLE Library Clinic.** Prof. C. Paolini, SDSU
2:00 - 3:00 PM	DEMO: ***Mimetic GCCOM Computational Performance.*** Dr. J. Brzenski, SDSU and Scripps Institution of Oceanography
	MOLE Library Clinic. Prof. C. Paolini, SDSU
3:00 - 4:00 PM	**MOLE Library Clinic.** Prof. M. Dumett, SDSU
4:00 - 5:00 PM	***Solving Partial Differential Equations using the MOLE Library.*** Prof. M. Dumett, SDSU
	MOLE Library Clinic. Prof. J. Castillo, SDSU CSRC director
5:00 - 6:00 PM	**MOLE Library Clinic.** Prof. C. Paolini, SDSU

TIMES	AGENDA
Wednesday, November 19	
10:00 - 11:00 AM	**MOLE Library Clinic.** Prof. C. Paolini, SDSU
11:00 AM - NOON	***Solving Partial Differential Equations using the MOLE Library.*** Prof. C. Paolini, SDSU
	MOLE Library Clinic. Prof. J. Castillo, SDSU CSRC director
1:00 - 2:00 PM	**MOLE Library Clinic.** Prof. C. Paolini, SDSU
2:00 - 3:00 PM	DEMO: ***Mimetic General Curvilinear Coastal Ocean Model (GCCOM) Computational Performance.*** Dr. J. Brzenski, SDSU and Scripps Institution of Oceanography
	MOLE Library Clinic. Prof. C. Paolini, SDSU
3:00 - 4:00 PM	**MOLE Library Clinic.** Dr. Brzenski, SDSU and Scripps Institute of Oceanography
4:00 - 6:00 PM	**MOLE Library Clinic**. Prof. J. Castillo, SDSU CSRC director
Thursday, November 20	
10:00 - 11:00 AM	**MOLE Library Clinic.** Dr. Brzenski, SDSU and Scripps Institute of Oceanography
11:00 - NOON	***Solving Partial Differential Equations using the MOLE Library.*** Dr. J. Brzenski, SDSU and Scripps Institution of Oceanography
	MOLE Library Clinic. Prof. J. Castillo, SDSU CSRC director
NOON - 1:00 PM	**MOLE Library Clinic**. Prof. J. Castillo, SDSU CSRC director
Booth Closes	