1154-65-643 **Thi-Thao-Phuong Hoang*** (tzh0059@auburn.edu), **Wei Leng**, **Lili Ju**, **Zhu Wang** and **Konstantin Pieper**. *Conservative Explicit Local Time-Stepping Schemes for the Shallow Water Equations.*

In this talk, we present explicit local time-stepping schemes of second and third order accuracy for the shallow water equations. The system is discretized in space by a C-grid staggering method, namely the TRiSK scheme adopted in MPAS-Ocean, a global ocean model with the capability of resolving multiple resolutions within a single simulation. The time integration is designed based on the strong stability preserving Runge-Kutta methods, but different time step sizes can be used in different regions of the domain through the coupling of coarse-fine time discretizations on the interface, and are only restricted by respective local CFL conditions. The proposed local time-stepping schemes preserve all important properties in the discrete sense, such as exact conservation of the mass and potential vorticity and conservation of the total energy within time-truncation errors. Moreover, they inherit the natural parallelism of the original explicit global time-stepping schemes. Extensive numerical tests are presented to illustrate the performance of the proposed algorithms. (Received September 09, 2019)