1171-76-88 **Pavel Lushnikov**, **Denis Silantyev** and **Michael Siegel*** (misieg@njit.edu), Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ 07102. *Finite-time singularity formation in the generalized Constantin- Lax-Majda equation.*

The question of finite-time singularity formation for solutions to the generalized Constantin-Lax-Majda (gCLM) equation is considered. This equation was first introduced by Constantin, Lax and Majda as a simplified model for singularity formation in the 3D incompressible Euler equations. It was later generalized by Okamoto, Sakajo and Wensch to include an advection term with parameter a, which allows different relative weights for advection and vortex stretching. There has been intense interest in the gCLM equation, but little is know about singularity formation over the full range of a. In this talk we provide such information via a combination of analysis and numerical computations. For solutions on the real line we find a new critical value $a_c = 0.689066\ldots$ below which there is finite time singularity formation that has a form of self-similar collapse, with the spatial extent of blow-up shrinking to zero. For $a_c < a \leq 1$, we observe a different singularity type in which the spatial extent of the blow-up region expands infinitely fast at the singularity time. For larger a we find that the solution exists globally in time. We also discuss the case of periodic boundary conditions. (Received August 08, 2021)