1126-49-177 **Harbir Antil*** (hantil@gmu.edu), Department of Mathematical Sciences, 4400 University Drive, MS: 3F2, Fairfax, VA 22030, and **Carlos Rautenberg** (carlos.rautenberg@wias-berlin.de), Weierstrass Institute, Mohrenstrasse 39, 10117 Berlin, Germany. *Fractional elliptic quasi-variational inequalities: theory and numerics.*

This talk introduces an elliptic quasi-variational inequality (QVI) problem class with fractional diffusion of order $s \in (0, 1)$, studies existence and uniqueness of solutions and develops a solution algorithm. As the fractional diffusion prohibits the use of standard tools to study the QVI, instead we realize it as a Dirichlet-to-Neumann map for a nonuniformly elliptic equation posed on a semi-infinite cylinder. We first study existence and uniqueness of solution for this extended QVI and then transfer the results to the fractional QVI. This introduces a new paradigm in the field of fractional QVIs. We truncate the semi-infinite cylinder and show that the solution to the truncated problem converges to the solution to the extended problem, under fairly mild assumptions, as truncation parameter $\tau \to \infty$. Since the constraint set changes with the solution, we develop an argument using Mosco convergence. We state an algorithm to solve the truncated problem and show its convergence in function spaces. Finally, we conclude with several illustrative numerical examples. (Received January 12, 2017)