Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

**Damage and fluctuations in optimal transport networks** ELENI KATIFORI, Rockefeller University, GERGELY SZOLLOSI, Eötvös University, Budapest, MARCELO MAGNASCO, Rockefeller University — Leaf venation is a pervasive example of a complex biological transport network that is necessary for the survival of land plants. Transport networks optimized for efficiency have been shown to be trees, i.e. loopless. However, dicotyledon leaf venation has a large number of functional closed loops. Inspired by leaf venation, we study two possible reasons for the existence of a high density of loops in biological transport networks: resilience to damage and fluctuations in load (transpiration rate across the leaf blade). We consider optimizing functionals that account for these two criteria, and examine the topology and transport properties of the resulting networks.

Eleni Katifori
Rockefeller University

Date submitted: 11 Nov 2009 Electronic form version 1.4