

Abstract Submitted
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Why hubs may not be the most efficient spreaders LAZAROS GALLOS, City College of New York, MAKSIM KITSACK, CAIDA, University of California-San Diego, SHLOMO HAVLIN, Bar-Ilan University, FREDRIK LILJEROS, Stockholm University, LEV MUCHNIK, New York University, H.E. STANLEY, Boston University, HERNAN MAKSE, City College of New York — The origin of a spreading process in a complex network can drastically influence the extent of the area that spreading can reach. In principle, the network hubs should be the most efficient spreaders. Here, we find that, in contrast to common belief, there are plausible circumstances where the best spreaders do not correspond to the best connected nodes or to the most central nodes (high betweenness centrality). Using the SIR model we find that: *(i)* The most efficient spreaders are those located within the core of the network as identified by the k -shell decomposition analysis. *(ii)* When multiple spreaders are considered simultaneously, the distance between them becomes the crucial parameter that determines the extent of the spreading. Similarly, we find that, in the SIS model, infections persist in the high k -shells of the network. Our analysis provides a plausible route for an optimal design of efficient dissemination strategies.

Hernan Makse
City College of New York

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