# A General Methodology for Inferring Failure Spreading Dynamics in Networks

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**Abstract:** Failure spreading widely exists in many systems, but methodologies devised to understand its dynamics so far are domain-constrained and demonstrate limited applicability across different systems. This paper tackles this issue from a reverse perspective of failure-spreading processes: It takes the spreading outcomes as inputs and seeks to infer the spreading process that gives rise to the outcomes, instead of the other way around as the prevalent approaches do. Because failure-spreading outcomes are commonly observed for different systems, we envision that this approach is generally applicable and provides a promising avenue to potentially unify research on spreading dynamics across disciplines. This research will facilitate understanding system dynamics and developing control techniques for them at different systems, scales, and dimensions.

**Bio:** Cynthia Chen is a professor in the department of civil and environmental engineering at the University of Washington, Seattle (UW). At UW, she directs the THINK (Transportation-Human Interaction-and- Network Knowledge) lab (https://sites.uw.edu/thinklab). The current research of THINK lab focuses on understanding data, modeling behaviors of individuals (mobility patterns) and networks (e.g., cascading processes), and designing interventions for modifying individual behaviors and network phenomena. Common to these threads is the development of innovative methodologies. Dr. Chen graduated from University of California, Davis with a PhD in civil and environmental engineering in 2001 and was an assistant professor with City College of New York between 2003 and 2009.