This NSF-sponsored RAPID grant study sought to understand the relationship between urban development patterns and the extent of physical damage caused by widespread tsunami run-up. The 11 March 2011 Tohoku, Japan earthquake caused significant damage all along the northeastern coast of Japan, with almost all of it resulting from tsunami waves that reached heights in excess of 20 meters. In order to understand how the built environment can affect the performance of communities in a tsunami, we studied twelve communities in the Miyagi/Chiba/Ibaraki Prefectures – areas ranging from minor to moderate damage to complete devastation. Our central research question was: Can the urban topology of a community mitigate the effects of a tsunami by isolating the more damaging surge effects to a few well-designed and well-placed buildings, thus limiting damage to “protected” buildings to just rising water effects?

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