

Grand Challenge: Bio-Inspired Adaptive Emergency Response

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The first several hours after a disaster are critical to rescue efforts and saving lives. Despite the wealth of sensor information that is currently available, no unifying system exists for emergency response that can enable command centers and associated rapid responders to be informed from the outset regarding locations and likely condition of survivors, as well as of the type and severity of ongoing hazards to victims and rescuers. What is needed is a system that can provide real time guidance allowing survivors to locate and assist other survivors and identify the most favorable routes to safety. The system should interface seamlessly with current and future disaster relief strategies at the community, state and national levels, providing critical input to those in charge as they seek to optimally deploy manpower and resources to assist the maximum number of victims in the shortest possible time. Additionally, the system should be adaptive, perhaps employing a self-organizing network of stationary and mobile sensors in a neuro-inspired framework that would emulate the neural human system where sensory-motor components are controlled by the spinal cord; when a high impact response needs to be taken, the brain is notified and takes control of the response. The ultimate goal is to fundamentally transform the sensing and communications infrastructure for emergency response management during major disasters in order to optimally deploy what are by definition limited resources to save lives.