LSU | College of Engineering
Department of
Mechanical & Industrial Engineering

The Robert W. Courter Seminar Series

3:00-4:00pm, Friday, February 8, 2019
1263 Patrick F Taylor Hall

Shock wave adventures: A look into using shock waves to focus energy

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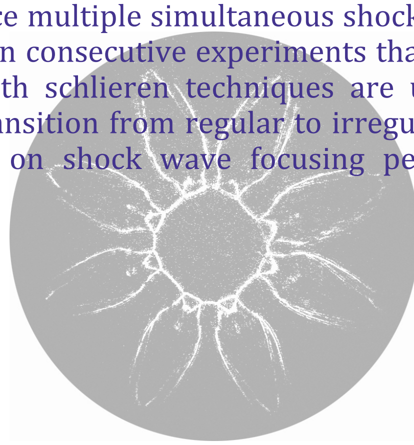
A shock wave is a thin discontinuous region over which fluid properties abruptly change from one state to another. Shock wave focusing occurs frequently both in nature and in a variety of man-made applications. It takes place when a shock wave propagates through a non-uniform or moving media, reflects from curved surfaces or through reflections with other shock waves. Extreme conditions created at the focal region – resulting in very high pressures and temperatures – can be either beneficial as in the case of shock wave lithotripsy or inertial confinement fusion or detrimental as in the case of superbooms (a type of sonic boom). As the shock wave emerges from the focal region, after the shock focusing event, the shape of the shock is often fundamentally altered. Therefore, a deeper understanding of the shock focusing process, and how to control it, is critical to fully understand its consequences and how to best enhance or mitigate it as needed depending on the application at hand. In this talk I will introduce our newest experimental setup that has the capability to produce multiple simultaneous shock waves in two or three dimensions with a turn around time between consecutive experiments that is under two minutes. Ultra high-speed photography coupled with schlieren techniques are used to probe the shock dynamic events, and in particular, the transition from regular to irregular reflections. I will also comment on our numerical simulations on shock wave focusing performed using geometrical shock dynamics.



* Dr. Veronica Eliasson received her Ph.D. in Mechanics at the Royal Institute of Technology, Stockholm, Sweden, in 2007. After a postdoctoral appointment at Graduate Aerospace Laboratories, California Institute of Technology, she became an faculty member at University of Southern California in 2009. In 2016 Dr Eliasson moved from USC to the Structural Engineering Department at University of California, San Diego. Dr Eliasson's research interests are in the area of experimental mechanics and include shock wave dynamics, high strain rate impacts and fracture mechanics.