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Abstract for an Invited Paper  
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### **From Nuclei to Neutron Stars**

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I will describe recent theoretical advances in nuclear structure and nuclear astrophysics that have been instrumental in unraveling the connections between nuclear physics and astrophysics. The role of nuclei, neutrino processes, and the states of matter at extreme density, in nucleosynthesis, supernova explosions and neutron star phenomena are not only known to be important, but we now understand specific correlations between the underlying nuclear physics and astrophysical observations. These developments are impacting and benefiting from both terrestrial nuclear experiments and astrophysical observations. I will discuss this interplay and explore how this synergy will help forge the path forward to develop a quantitative theory for dense systems, from nuclei to neutron stars. I highlight advances in describing strongly coupled many-body systems and discuss the emerging connections between nuclear structure, dense matter and cold-atom physics.