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Herbert P. Broida Prize Lecture: Probing chemical dynamics with negative ion photodetachment

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Photoelectron spectroscopy and its variants have been used in our laboratory to study diverse phenomena in chemical dynamics, including transition state spectroscopy, the electronic and vibrational spectroscopy of clusters, the photodissociation of reactive free radicals, hydrated electron dynamics in clusters and liquid jets, and the ultrafast dynamics of helium nanodroplets. This talk will focus on two examples of this type of work: slow electron velocity map imaging (SEVI) of trapped and cooled negative ions, and time-resolved photoelectron spectroscopy (TRPES) of negative ions. SEVI of cold ions represents a powerful means of performing high resolution photoelectron spectroscopy on complex species. Time-resolved radiation chemistry in nucleobases will be carried out with TRPES. In this work, starting with iodide-nucleobase complexes, we inject electrons into low-lying unoccupied orbitals of the nucleobase and follow the ensuing dynamics.