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Introductory Tribute to Stephen R. Leone

Steve Leone has dedicated his career toward illuminating the intricate details of chemical reactions. This use of the word "illuminating" has often been literally true, as he has been a pioneer in the application of ground-breaking laser techniques to the study of state-resolved energy transfer and reactive events in important chemical systems. Throughout the past 3.5 decades, he has constantly pushed in new directions with a keen eye for where breakthrough technologies provide opportunities to obtain new scientific insights. Along the way he has inspired colleagues, students, and postdocs with his trademark fusion of creativity and innovation with ruthless practicality and thorough preparation. His commitment to mentoring new scientists has spread his influence through the community as his protégés have moved into key positions throughout academics and industry.

Steve's remarkable scientific impact stems from a rigorous focus on key physical problems and from his exceptionally broad range of scientific interests. This breadth defies a simple summary, as glancing over his more than 400 publications will make clear. His scientific roots are in innovative state-selected laser investigations of gas-phase reactions and energy-transfer processes, areas that he helped to establish with trail-blazing applications of laser-initiated chemistry and infrared chemiluminescence detection. His work on photodissociation quantum yields, energy transfer and reactions involving spin−orbit excited halogen atoms has been highly influential in the development of chemical lasers and in the understanding of fundamental aspects of nonadiabatic interactions in the making and breaking of chemical bonds. Investigations of energy disposal in photolysis and chemical reactions, carried out in Steve's group by analyzing infrared emission, early on with circular variable filters and later with time-resolved Fourier-transform spectroscopy, provided important detailed insights into the underlying physical mechanisms of these processes.

These studies established the solid foundation from which Steve extended his scientific reach into areas such as ion chemistry, surface reactions, low-temperature chemical kinetics, nanoscience, coherent control, heterogeneous chemistry, and ultrafast physics, among others! He has always used his successes as opportunities to move forward to pose and answer new questions. For example, the work on gas-phase reactivity

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of excited atoms led to novel investigations of excited states in molecular-beam epitaxy, which in turn evolved toward new thrusts in laser microscopy and nanostructured surface dynamics. Since his move to Berkeley, he has continued to forge new paths, applying synchrotron radiation to obtain chemically specific information of unprecedented detail on systems from atmospheric aerosol reactions to water clusters to biomolecules. He has developed world-leading capabilities in attosecond physics, pushing the timescales of experimental investigation down toward the motion of electrons. The scope of his scientific achievements and influence is breathtaking.

The broad creativity and wide-ranging curiosity that has marked Steve's research is complemented by his sharp physical insight, thoroughness and legendary sense of organization. His leaps into new areas are bold, but never blind: his students and postdocs can attest to the detailed analysis Steve applies (and demands!) when considering prospective experiments. Even when he is setting out to do what has never been done, Steve usually knows what will be needed to make it work.

Coupled with his scientific leadership, Steve is generous with his service on many research workshops, advisory panels, and editorial boards. He also leads through his extraordinary commitment to training and guiding new scientists. Steve has a long history of sharing his insights on crafting a successful scientific career. From his seminars on successful grant writing, his detailed and timely editing of journal manuscripts, to the personal attention he devotes to each person's career path, Steve's genuine dedication to helping young scientists reach their goals is a hallmark of his character. His honesty, unwavering fairness and scrupulousness are exemplary. Those of us who have been fortunate enough to have Steve as a mentor have gained not only the technical knowledge and scientific savvy from his research, but also a trusted advisor who maintains a deep and continuing involvement with his students and postdocs throughout their careers.

On behalf of the many who have had the benefit of working with Steve, and the many more throughout the physical chemistry community who have gained so immensely from his contributions, we are pleased to dedicate this issue to our respected colleague and friend, Steve Leone. At 60, Steve is at the top of his game and will doubtless continue to lead chemical physics well into the future!

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