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Abstract for an Invited Paper
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Nonlinear Dynamics and Chaos generated by Optoelectronic Feedback Oscillators[1]

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Nonlinear differential equations describe the time evolution of a huge class of naturally occurring and practically relevant systems. Although explicit analytic solutions of any particular differential equation can be found only in rare cases, the mathematical tools of nonlinear dynamics provide significant insights into universal qualitative aspects of system behaviors that are often of greater interest, such as whether systems oscillate or not and how new solutions arise through bifurcations as parameters are changed. In this talk, I will introduce some of the relevant mathematical concepts and discuss how they can be used to investigate the dynamics of time-delay systems on the example of experiments utilizing optoelectronic feedback oscillators. A fascinating feature of these oscillators is that they are simple devices yet capable of generating a wide range of dynamic behaviors, from periodic oscillations to high-dimensional chaos. I will discuss these dynamic regimes and give examples of possible applications.

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