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Jonathan E Rubin* (jonrubin@pitt.edu), Department of Mathematics, University of Pittsburgh, 301 Thackeray Hall, Pittsburgh, PA 15260. *Inspired by breathing: mechanisms for mixed-mode oscillations and related dynamics.*

In mammals, respiration emerges from the dynamics of a central pattern generator (CPG) in the brainstem. Understanding the rhythmic dynamics of the respiratory CPG leads to a wide range of interesting mathematical problems involving topics such as multiple timescales, network interactions, and closed-loop control. In multi-timescale oscillatory systems with two or more slow variables, it is somewhat natural to expect mixed-mode oscillations (MMOs) involving alternations of small- and large-amplitude oscillations. In this talk, I will survey some of our recent results, inspired by respiratory modeling to differing degrees, about dynamics related to MMOs and about some non-standard MMO mechanisms. It is my hope that these ideas will be interesting and useful to audience members working on differential equation models for a range of complex biological systems. (Received July 17, 2017)