A greater appreciation for mathematical modeling by teachers will enable us to flip a familiar paradigm – guiding us away from telling students how important mathematics is in the world (“realizing mathematics”) towards allowing students to investigate intriguing contexts on their own (“mathematizing a reality”). In this session participants will explore a carefully crafted professional development course on modeling – this will include characterizing teachers’ understandings, making sense of conflicting notions of modeling, and studying the use of simulations, modeling tasks, and participants’ student work.