Stomata are epidermal pores essential for gas exchange in plants. Making and patterning the stomatal guard cells require processes fundamental to cell and developmental biology, such as specifying cell fate, creating cell polarity, and controlling stem cell activity in response to the environment. In my talk, I will first discuss my previous work on how a master transcription factor SPEECHLESS (SPCH) specifies the stomatal lineage by developing an improved ChIP technique. In the second part of my talk, I will discuss recent efforts in my current lab to address how environmental signals, particularly heat and light, modulate stomatal development through SPCH. Our work identifies molecular links connecting high temperature/light signaling and stomatal development, and reveals how the production of specific cell type can be coordinated with overall growth by broadly-expressed environmental factors.