What sets the size and form of living organisms is still, by large, an open question. During this talk, I will aim at a broad audience and illustrate how we are addressing this question by focusing on temporal and spatial fluctuations of growth, both experimentally and theoretically. First, I will show an analogy between plant tissues and liquid foams. Second, I will present predictions of fluctuations at multiple scales and experimental tests of these predictions, by developing a data analysis approach that is broadly relevant to geometrically disordered materials. Last, I will introduce how we are using microfluidics to investigate variability in morphogenesis between individual plants.