

Abstract Submitted  
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**Make a wish: coins falling in water** LIONEL VINCENT, LUKE HEISINGER, EVA KANSO, University of Southern California — Accurate prediction of the flight range and landing site of an object descending under the influence of gravitational and aerodynamic forces is relevant to many engineering and science applications. Examples range from forecasting the touchdown locations of re-entry space vehicles to understanding the settlement patterns of seeds. While the descent motion follows the laws of classical mechanics, the delicate interplay between the fluid medium and the physical properties of the descending object makes the exact landing site difficult to predict a priori and thus best treated probabilistically. Indeed, objects falling in a fluid medium rarely descend in a straight line. The descent motion is generally complex, even for regularly shaped objects such as coins and cards. For such objects, four types of descent regimes have been identified: steady, fluttering, chaotic, or tumbling. Here, we assess the dependence of landing sites on the type of descent motion through controlled experiments of coins falling in water where we quantify the spread in the landing sites and probability of landing heads up. Interestingly, we find that, in certain descent regimes, the fluid medium acts as a randomization device, while other regimes only cause small uncertainties in the landing sites.

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