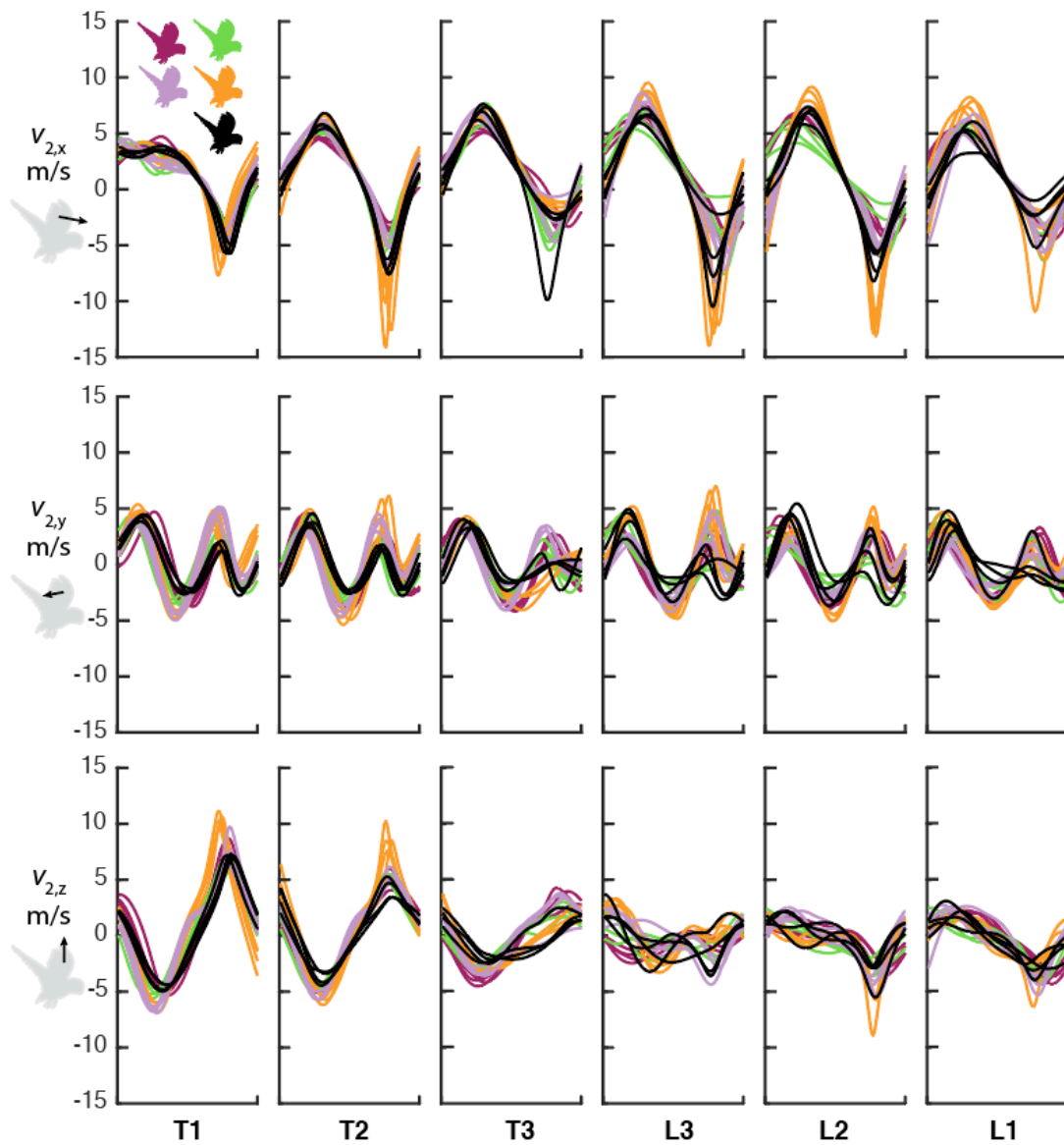


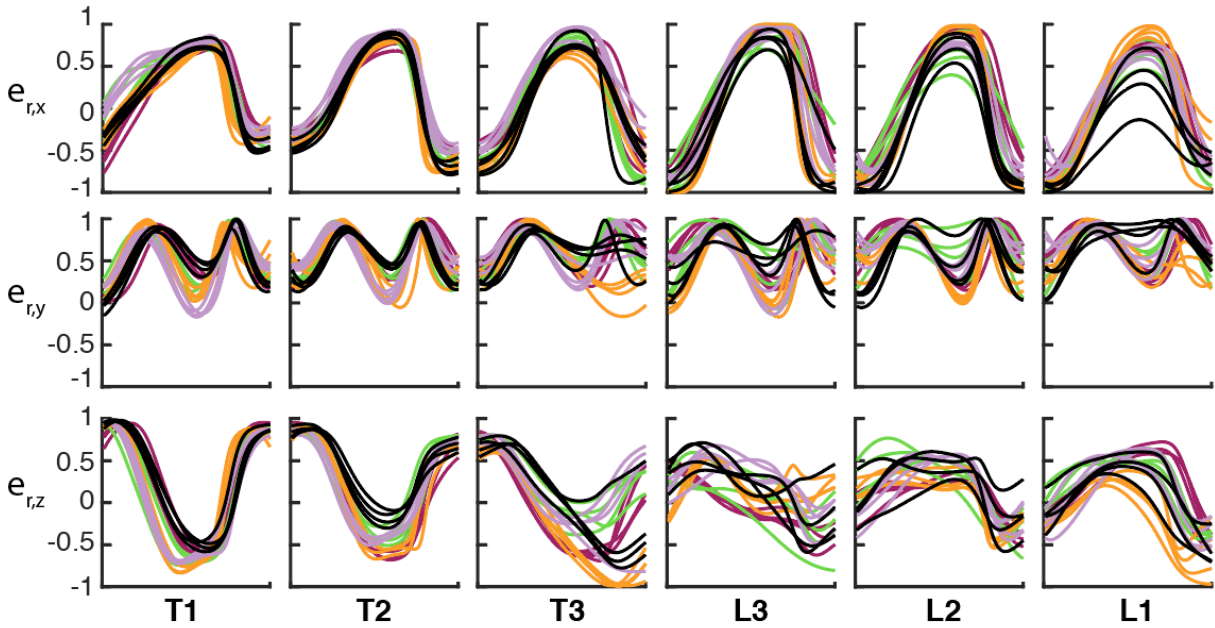
Supplementary Information

Birds repurpose the role of drag and lift to take off and land

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Supplementary Figure 1. Wing velocity components at the second moment of area r_2 . Time traces of the x , y , and z wing velocity components at r_2 during the first three takeoff wingbeats (T1, T2, T3) and the final three full landing wingbeats (L3, L2, L1) are shown for all recorded flights. Colors represent the 5 individual parrotlets (colored traces correspond to the 4 pale blue parrotlets, and the black trace corresponds to the darker blue parrotlet).



Supplementary Figure 2. Wing radius direction components during takeoff and landing wingbeats. Time traces of the parrotlets' wing radius direction ($\hat{\mathbf{r}} = \langle e_{r,x}, e_{r,y}, e_{r,z} \rangle$) during takeoff (T1, T2, T3) and landing (L3, L2, L1) are shown for all recorded flights. Colors represent the 5 individual parrotlets (colored traces correspond to the 4 pale blue parrotlets, and the black trace corresponds to the darker blue parrotlet).