**Data Source, Avian Pairs:** Cooney, C.R., Tobias, J.A., Weir, J.T., Botero, C.A. & Seddon, N. Sexual selection, speciation, and constraints on geographical range overlap in birds. *Ecol. Lett.* 20, 863-871 (2017).

**Goal:** Describe and implement systematic criteria for pair omission with sufficient detail and objectivity for written methods and publication. Must omit pairs where JMPH does not apply (re: where JMPH assumptions about speciation are inappropriate) without introducing bias or subjective scoring criteria.

**Proposed Methods:**

1. Start with ~1300 avian sister species pairs.
2. Mark for omission pairs for which the following criteria are **TRUE**\*:

* **Latitude overlap < *AA%.***
  + Omit pairs where sisters do not occur at similar latitudes.
* **Elevational overlap < *BB%.***
  + Omit pairs where sisters do not occur at similar elevations.
* **Thermal overlap < *CC%.***
  + Omit pairs where sisters do not have similar thermal niches.
* **Range overlap > *DD%.***
  + Omit pairs with extensive range overlap.
* **Phylogenetic Distance < *EE%* | Age Since Divergence < *FF%.***
  + Omit pairs that are not close relative | that have deep divergence times.
* **New world & Old world occurrence in species | pair.**
  + Omit pairs where data points for either species fall in both new world and old world.
  + Omit pairs where one species occurs in the new world and one species occurs in the old world.
* **River barriers > *GG* size present in line between centroids (in LCP?).**
  + Omit pairs where river capture is likely speciation mechanism.
* **LCP length > *HH*\*distance between sister centroids.**
  + Omit pairs where bad pathing occurs (e.g., paths trace coastline for 0-cost for long distance, creating an unrealistic path).
* **Distance between sister centroids > *JJ.***
  + Omit pairs that occur very far apart.
* **Water distance between sister centroids (in LCP?) > KK.**
  + Omit pairs that are separated by relatively large water barriers.

1. Ground truth all outcomes via comparison to sister pair range maps with plotted LCP data.

*\*A sensitivity analysis may be necessary for one or more of these parameters. Additionally, any of these parameters could be entered in the statistical models as a covariate.*

**Example cases that should be excluded with above criteria:**

* Instances of range shifts (not completely removed if both shifted in similar manner).
* Instances of anagenesis in elevational or thermal niche (not completely removed if both evolved in same direction).
* Instances of gradient speciation.
* Highly sympatric species where presence of a physiological barrier is not a reasonable assumption.
* Old speciation events that may have occurred prior to contemporary elevational | thermal state.
* Cosmopolitan and ring species.
* Instances of speciation across major oceans.
* Instances of speciation via river capture (e.g., in the amazon basin).
* Instances where the pathing algorithm found a 0-cost isocline and followed it for in inappropriate distance (e.g., all the way around south America clockwise rather than over land a short distance).
* Instances of long-distance speciation events.
* Instances of speciation in islands not likely driven by JMPH physiological mechanisms.