

# Gravity Model

- **BETWEEN** site features modulate movement
- **AT** site features influence allure

$$g_{ij} = k d_{ij}^{\alpha} m_j^{\beta} e_{ij}^{\gamma}$$

The diagram illustrates the Gravity Model equation  $g_{ij} = k d_{ij}^{\alpha} m_j^{\beta} e_{ij}^{\gamma}$  with four labeled components and their corresponding arrows:

- Genetic Dissimilarity** (green text) points to the  $d_{ij}^{\alpha}$  term.
- Euclidean Distance** (yellow text) points to the  $d_{ij}$  term.
- Site-Specific Features** (orange text) points to the  $m_j^{\beta}$  term.
- Ecological Separation** (red text) points to the  $e_{ij}^{\gamma}$  term.

# Pollination Example



Parameter	Code	Variable	Source	Description
<i>d</i>	<i>d</i>	Euclidean distance	UTM coordinates	Distance between sampling locations in metres
<i>m</i>	<i>dbh</i>	Diameter at breast height	Field measurements	Diameter of maternal tree trunk at breast height in centimetres
	<i>pctsky</i>	Canopy openness	Canopy photographs	Per cent of open sky above the maternal tree
	<i>clump</i>	Canopy clumping	Canopy photographs	Degree of clumping of canopy above maternal tree
	<i>flor</i>	Floral output	Field measurements	Total number of inflorescences per maternal tree
<i>e</i>	<i>open</i>	Open fields	Hyperspectral imagery	Variance of probability of open canopy occurrence due to fields along transect between maternal trees
	<i>decid</i>	Deciduous primary canopy	Hyperspectral imagery	Mean probability of mixed hardwood canopy occurrence in the forest overstory along transects between maternal trees
	<i>pine</i>	Pine primary canopy	Hyperspectral imagery	Variance of probability of conifer canopy occurrence in overstory along transects between maternal trees
	<i>roads</i>	Roads	LIDAR	Mean probability of open corridor occurrence due to roads along transects between maternal trees
	<i>cornus</i>	Cornus canopy	Field locations of dogwoods	Mean occurrence of <i>Cornus florida</i> canopy in understory along transects between maternal trees

Parameter: indicates whether the parameter in the gravity model (eqn 1) represents spatial distance between sites (*d*), at-site variables (*m*) or between-site ecological variables (*e*).