



Introduction

- Dr. Mathys
 - Ph.D. from Rutgers (Jan 2010)
 - Visiting Assistant Professor at Stockton College





My Interests:
Dissertation: Rapid Evolution of Birds Introduced to Islands
Birds, salamanders, mammals




Course Structure

- **Three Parts**
 - Lectures
 - Labs
 - Field Trips






Lecture

- Mostly from Textbook
- Powerpoints posted
 - <http://blakemathys.com/ornithology2011.html>
- Four Quizzes, Two Exams
 - Total of 70% of grade

Lab

- Bartlett Hall Room 012 (Basement)
- Learning to identify birds
 - Photographs and specimens
- Taxonomy
 - Order, Family, Common Name

Field Trips

- Meet in ENR parking lot at **7 a.m.**
- We will return by 12:15
- Wear **appropriate clothing**
- Bring binoculars if available
- Field Guide optional



Grading

Quizzes (4 x 5% each)	20%
Test	25%
Lab Practical	20%
Final Exam	25%
Participation	10%

Letter Grades

A = 90 – 100%	
B + = 88 – 90%	B = 80 – 88%
C + = 78 – 80%	C = 70 – 78%
D = 60-70%	
F = < 60%	

Academic Honesty

- Don't Cheat
- If you cheat, I'll turn you in

Attendance

- Not required for lecture, but recommended
 - Required for Field Trips
- Please be on time; if you're late, be courteous
- No make-up exams or quizzes
 - Except extraordinary circumstances
- Email me immediately if you must miss an exam or quiz

Electronic Devices

- Make every effort to avoid disruption to others
- If your use of a device is too distracting during lecture, I may ask you to put it away
- Must be turned off and put away during exams, quizzes, and while outside the vans on field trips

Communication

- <http://blakemathys.com/ornithology2011.html>
 - Announcements, lectures, pictures, ancillary material posted there
- Email: if you don't use your Rutgers address, email me at mathys@rci.rutgers.edu and let me know

Any Questions?



My lecture style

- Little text on slides, more talking
- Informal, feel free to ask questions
- Please participate, there is no such thing as a bad guess (yes there is)

What is a Bird?

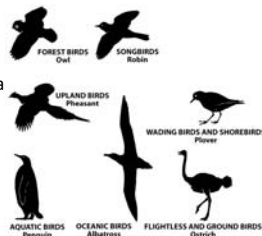


What is a Bird?

- Feathers
- Furcula (“wishbone”)
- Endothermic
- Bipedal
- Wings
(but not necessarily flight)
- Toothless
- 1 occipital condyle
- Bills
- Gizzard
- Hollow Bones
- Four-chambered Heart
- External Eggs
- Large Brain
- Syrinx
- Nucleated RBCs
- Heterogametic Female
- One-way Respiration

Species Diversity

- Domain Eukarya
- Kingdom Animalia
- Phylum Chordata
 - Subphylum Vertebrata
- Class **Aves**
- 30 Orders
- 193 Families
- 2,099 Extant Genera
- ~10,000 Extant Species
 - Around 300 billion individuals



Order Charadriiformes



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- Learn all 30 Order Names, and members – Simplified List

Size Diversity

- **Smallest:** Bee Hummingbird – weighs ~2 g, the same as a penny
- **Largest:** Ostrich – equal to 50,000 Bee Hummingbirds

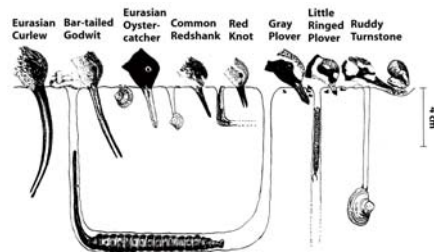


Geographic Diversity

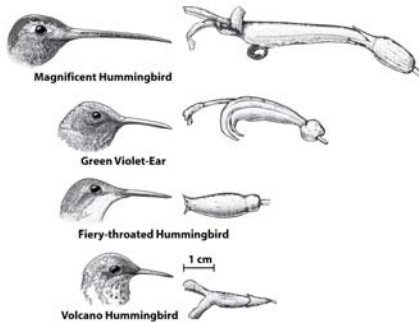
- Every continent
- Pervasive on land and water, including open ocean (but not nesting)
- Every latitude/altitude (a skua was seen crossing the South Pole, geese seen migrating over Mt. Everest)



Dietary Diversity

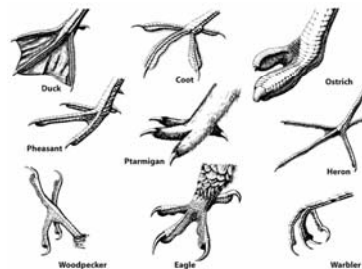


Dietary Diversity




Foot Diversity

- Ecology can be determined by morphology




Adaptive Radiation

- When a taxon diversifies into many ecological niches and phenotypes





Adaptive Radiation

- Order Passeriformes
 - 5,753 Species (next highest 429 species)
- Songbirds or Perching Birds





Life History Diversity

- Laysan Albatross
 - > 50 year lifespan, 1 egg at a time
- Vermilion Flycatcher
 - 5 years maximum, 3 eggs at a time

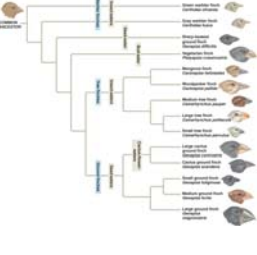
Diversity is due to Natural Selection

- Mechanism for adaptation that leads to speciation
- Proposed by Charles Darwin and Alfred Russell Wallace in mid-1800s

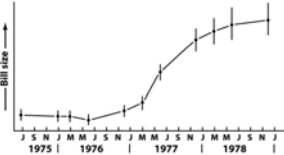




Diversity is due to Natural Selection

- “Descent with modification”
- Heritable traits are not all passed on equally



Diversity is due to Natural Selection





Medium Ground Finch


Photo by Philip Precey

Convergence

- Natural Selection for similar ecology/life history
- Unrelated taxa similar



Yellow-throated Longclaw Eastern Meadowlark

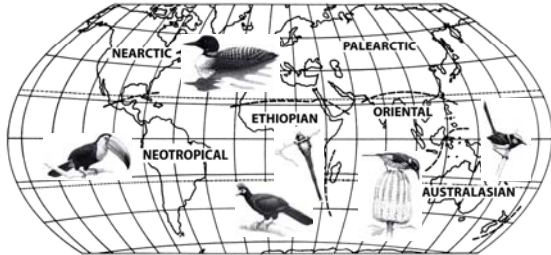


Peruvian Diving-Petrel
lochiffy

Razorbill
Jim "Jersey Birdie"

Biogeography

- The geography of life
 - Where organisms occur, and why



Biogeography

- The geography of life
 - Where organisms occur, and why
- Dispersal vs. Vicariance
 - Birds are good at dispersing