



Welcome to the 7th International Congress of Vertebrate Morphology, hosted by Florida Atlantic University in Boca Raton. I am pleased and proud to welcome delegates from across the globe to ICVM-7 and to Florida Atlantic University (FAU). It is an honor and a pleasure to host the premier meeting in the field of vertebrate morphology and to bring together such a distinguished group of delegates.

As vertebrate morphologists, we are lucky! We share a fascination with the study of vertebrate anatomy, which in some cases may have started as early as childhood. Perhaps our interests in morphology and evolution began as we marveled at fossil giants, or our ideas about development began as we peered into bottles of cleared and stained embryos, or perhaps the mechanics of anatomy took form as we gazed upon displays of skeletons. Whatever our path to this fascination with vertebrate morphology, we are now all part of a field with a rich tradition and a richer future.

Over the next six days, the ICVM-7 will explore exciting and dynamic aspects of vertebrate morphology through plenary lectures, symposia, workshops, and more than 300 contributed presentations and posters. The ICVM-7 plenary lectures demonstrate how morphologists work across disciplines, integrating ideas in topics that range from molecules to development of form, through biomechanics to evolutionary dynamics, and into a new understanding of fossil faunas that emerges through a synthesis of traditional approaches with the latest technologies. The 15 oral symposia, 4 poster symposia, and 4 workshops provide diverse perspectives on the field of vertebrate morphology today.

Vertebrate morphology is the science that gives us an understanding of the rich diversity and history of form and function. We are lucky to be in a field with such a rich tradition, at a time when it is one of the most dynamic and integrative fields of biology. Please enjoy your time with your colleagues at the ICVM-7, explore the beautiful campus of Florida Atlantic University, and don't forget to have fun pondering those exciting questions that drove us to become vertebrate morphologists!

Jeanette Wyneken
Florida Atlantic University
ICVM-7 Convener

Logistics. The University Center on the main campus of FAU serves as the venue for most of the ICVM-7 activities. The opening reception and closing banquet will be held at the Marriott.

Acknowledgments

The ICVM-7 is hosted at Florida Atlantic University by the Division of Research and Graduate Studies, the Charles E. Schmidt College of Science, the Environmentally Conscious Organization of Students (ECOS), the Department of Biological Sciences, and the Florida Atlantic University Foundation. We gratefully acknowledge logistical assistance from Peter Barker, Michael Coyne (iconferences.org), Sheree Figler, Gina Fourreau, Marie McLaughlin (Harvard University), Heidi Moomaw (University of Massachusetts), Lynn Sargent, Susan Sitahal, and Cathy Webb (UC). Nat Dean, Larry Lemanski, Gary Perry, Guri Roesijadi, Kevin Petrovsky, Michael Salmon, Wendy Stephens, and the Members of ECOS have been of immeasurable help.

The ICVM-7 thanks the National Science Foundation, Florida Atlantic University's Division of Research and Graduate Studies, the Charles E. Schmidt College of Science, and an anonymous donor for substantial financial support. We gratefully acknowledge our sponsors Ruden McClosky, Ward's Natural Science, Olympus, Fisher Scientific (Maggie Diaz) and Blackwell Publishing Ltd. (Alex Murray). We thank Jeffrey Laitman, editor for functional and evolutionary morphology at the *Anatomical Record* for support of the workshop *Finite Element Analysis of Vertebrate Skulls* and Continental AG of Hannover, Germany for its support of the symposium *Adhesion in Vertebrates – Mechanisms and Biomimetic Implications*.

We are grateful to Rick Harrison, editor of the *Journal of Morphology*, and Nancy Olsen along with the staff of John Wiley and Sons for their continuing support of the International Congress of Vertebrate Morphology. Their generosity, enthusiasm and guidance make it possible to publish the ICVM-7 abstracts in the *Journal of Morphology*.

The audiovisual equipment was supplied by the FAU Instructional Resources Management, H.O. Peitgen, G. Mayer, FAU- Department of Biological Sciences, and the Department of Herpetology, Museum of Comparative Zoology, Harvard University. Tom Moher and Olympus America, Inc. provided microscopes for our labs and our lanyards.

ICVM-7 SCHEDULE OF EVENTS

Tuesday, 27 July

1:00 - 8:00 PM	Congress Registration	Boca Raton Marriott Hotel
7:00 - 7:30 PM	Opening Ceremony	Grand Boca Ballroom Marriott Hotel
7:30 - 8:30 PM	Plenary Lecture, David Kingsley	Grand Boca Ballroom Marriott Hotel
8:30 - 10:00 PM	Reception	Boca Raton Marriott Hotel

Wednesday, 28 July

8:00 - 10:00 AM	Presenters put up posters for Poster Session 1 Numbered poster boards correspond with the number assigned to your title in the program.	University Center (UC) Grand Palm Room
8:50 - 10:10 AM	Concurrent Sessions, Contributed Papers	UC Live Oak and Majestic Palm Rooms
10:10 - 10:40 AM	Coffee Break	UC Grand Palm Room
10:40 AM - 12:00 PM	Concurrent Sessions, Contributed Papers	UC Live Oak and Majestic Palm Rooms
12:00 - 1:30 PM	Lunch Break Luncheon for Poster Symposium Participants (in poster area, Grand Palm Room)	
1:30 - 2:30 PM	Plenary Lecture, Susan Herring	Lifelong Learning Center
2:30 - 3:00 PM	Afternoon Break	UC Grand Palm Room
3:00 - 6:00 PM	Symposia: Adhesion in Vertebrates -- Mechanisms and Biomimetic Implications Organized by W.J.P. Barnes and sponsored by Continental AG of Hanover, Germany Inferring Function and Behavior in Extinct Vertebrates Organized by D.M. Henderson and E. Snively Linking Genes and Morphology Organized by F. Galis and J. Jernvall Mechanistic Approaches to Evolutionary Developmental Biology Organized by M.L. Zelditch	UC Live Oak Rooms
3:00 - 6:00 PM	Workshop: Finite-element Analysis of Vertebrate Skulls Organized by C. Ross and sponsored by <i>The Anatomical Record</i>	UC Majestic Palm Room
8:00 - 10:00 PM	Poster Session 1: Poster Symposia and Posters Associated with Oral Symposia and Workshops	UC Grand Palm Room

8:00 - 10:00 PM

Presenters, please stand next to your posters during this time

Poster Session 1 (continued)

UC Grand Palm Room

Poster Symposia:

Morphology and Life Habits of Past and Present Giant Vertebrates

Organized by R.A. Fariña and S.F. Vizcaíno

Mechanisms and Tradeoffs in Vertebrate Burrowing

Organized by B. Moon and J.C. O'Reilly

Venom Delivery in Snakes

Organized by B.A. Young and K.V. Kardong

Morphological Transformations During the Transition to Dry Land

Organized by Z. Rocek and J.A. Clack

Posters Associated with Oral Symposia and Workshops:

Integrating Approaches to the Study of Terrestrial Locomotion

The Ontogeny of Performance in Vertebrates

Integrated Mechanical Investigations of Fish Swimming

Molecular and Morphogenetic Evolution of Specific Organs

Inferring Function and Behavior in Extinct Vertebrates

Application of Advanced Imaging Technologies to Vertebrate Morphology

Thursday, 29 July

8:50 - 10:10 AM

Concurrent Sessions, Contributed Papers

UC Live Oak Rooms

10:10 - 10:40 AM

Coffee Break

UC Grand Palm Room

10:40 AM - 12:00 PM

Concurrent Sessions, Contributed Papers

UC Live Oak Rooms

12:00 - 1:30 PM

Lunch Break

ISVM Executive Committee Lunch Meeting (Queen Palm Room)

1:30 - 2:30 PM

Plenary Lecture, Frietson Galis

Lifelong Learning Center

2:30 - 3:00 PM

Afternoon Break

UC Grand Palm Room

3:00 - 6:00 PM

Symposia:

Integrating Approaches to the Study of Terrestrial Locomotion

Organized by S.M. Reilly & N. Stevens

Evolutionary Origin of Neural Crest and Placodes

Organized by G. Schlosser & C.V.H. Baker

Evolution of Developmental and Reproductive Patterns in Mammals

Organized by K.K. Smith & U. Zeller

Stem Groups and the Assembly of Vertebrate Body Plans

Organized by P.C.J. Donoghue & M.A. Purnell

3:00 - 6:00 PM	Workshop: Fish Teeth Wet Lab Organized by Howard Evans and Heiko Schoenfuß	UC Grand Palm Room
6:00 - 7:00 PM	Poster Presenters take down posters from Poster Session 1 (if you do not take down your poster during this time then it will be taken down for you and could be damaged or lost)	UC Grand Palm Room

Friday, 30 July

8:00 - 10:00 AM	Presenters put up posters for Poster Session 2 Numbered poster boards correspond with the number assigned to your title in the program.	UC Grand Palm Room
8:50 AM - 12:00 PM	Workshop: Teaching Comparative Anatomy Organized by Herb Rosenberg and Anthony Russell	UC Senate Chambers
8:50 AM - 12:00 PM	Concurrent Sessions, Contributed Papers	UC Live Oak and Majestic Palm Rooms
10:10 - 10:40 AM	Coffee Break	UC Grand Palm Room
10:40 AM - 12:00 PM	Concurrent Sessions, Contributed Papers	UC Live Oak and Majestic Palm Rooms
12:00 - 1:30 PM	Lunch Break	
1:30 - 2:30 PM	Plenary Lecture, Olivier Rieppel	Lifelong Learning Center
2:30 - 3:00 PM	Afternoon Break	UC Grand Palm Room
3:00 - 4:40 PM	Concurrent Sessions, Contributed Papers	UC Live Oak and Majestic Palm Rooms
5:00 - 6:00 PM	ISVM Business Meeting All ICVM participants are invited to attend	Lifelong Learning Center
8:00 - 10:00 PM Presenters please stand next to your posters during this time	Poster Session 2: Contributed Posters	UC Grand Palm Room

Saturday, 31 July

8:50 - 10:10 AM	Concurrent Sessions, Contributed Papers	UC Live Oak Rooms
10:10 - 10:40 AM	Coffee Break	UC Grand Palm Room
10:40 AM - 12:00 PM	Concurrent Sessions, Contributed Papers	UC Live Oak and Majestic Palm Rooms
12:00 - 1:30 PM	Lunch Break	
1:30 - 2:30 PM	Plenary Lecture, Peter Aerts	Lifelong Learning Center

2:30 - 3:00 PM	Afternoon Break	UC Grand Palm Room
3:00 - 6:00 PM	Symposia: The Ontogeny of Performance in Vertebrates Organized by A. Herrell & A.C. Gibb Morphology and Paleobiology of Mesozoic Birds Organized by A. Elzanowski and A. Chinsamy-Turan Making Headway -- Craniofacial Development in Model and Non-Model Vertebrates Organized by L.P. Hernández Integrated Mechanical Investigations of Fish Swimming Organized by R.G. Root and J.H. Long	UC Live Oak Rooms
3:00 - 6:00 PM	Workshop: Application of advanced imaging technologies to vertebrate morphology Organized by T.W. Cranford	UC Majestic Palm Room
6:00 - 7:00 PM	Poster Presenters take down posters from Poster Session 2 (if you do not take down your poster during this time then it will be taken down for you and could be damaged or lost)	UC Grand Palm Room
7:00 - 10:00 PM	ICVM Banquet and Congress Party	Boca Raton Marriott Hotel

Sunday, 1 August

9:00 - 10:30 AM	Symposia: Molecular and Morphogenetic Evolution of Specific Organs Organized by B. Fritsch and S. Kuratani Phylogenetic Approaches in Comparative Vertebrate Morphology Organized by T. Garland Respiration and Locomotion: Coupled Systems in Vertebrate Evolution Organized by S.F. Perry & D.R. Carrier	UC Live Oak Rooms
10:30 - 11:00 AM	Coffee Break	
11:00 AM - 12:30 PM	Symposia Continued	UC Live Oak Rooms
12:30 - 1:30 PM	Lunch Break	
1:30 - 2:30 PM	Plenary Lecture, Lawrence Witmer	Lifelong Learning Center
2:30 PM	Closing Ceremony	Lifelong Learning Center

Tuesday, 27 July 2004

1:00-8:00 PM	Congress Registration Boca Raton Marriott Hotel
7:00-7:30 PM	Opening Ceremony Grand Boca Ballroom, Boca Raton Marriott Hotel
7:30-8:30 PM	Plenary Lecture <i>How is Morphology Encoded in the Genome?</i> David Kingsley Stanford University, Palo Alto, California, USA
8:30-10:00 PM	Reception Royal Palm Ballroom and Courtyard, Boca Raton Marriott Hotel

Wednesday, 28 July 04

Contributed Papers	Live Oak A Chair: Matt Bonnan	Live Oak B Chair: Jon Mallatt	Live Oak C Chair: Mike Bennett	Live Oak D Chair: Jackie Webb	Majestic Palm Room Chair: Tonia Hsieh
8:50 - 9:10	Bone Surface Textures as Ontogenetic Indicators in Archosauria Tumarkin-Deratzian, AR		Maximum Bite Forces Among Three Sympatric <i>Hapalemur</i> Species at Ranomafana National Park, Madagascar Vinyard, CJ, N Yamashita and C Tan	Distinct Patterns of Neurogenesis in the Neurogenic Placodes Begbie, J and A Graham	Toe Pad Morphology and Adhesion in Tree Frogs Smith, JM
9:10 - 9:30	Phylogenetic and Functional Effects on Bone Vascularization in Sauropsids Cubo, J, F Ponton, E De Margerie and J Castanet	Speculations on the Origin of Vertebrates from the Perspective of the Excretory System Ditrich, H	Cranial Biomechanics of Sharks Utilizing Durophagous and Piscivorous Feeding Mechanisms Huber, DR and PJ Motta	Development of the Lateral Line System of the Paddlefish <i>Polyodon spathula</i> (Actinopterygii: Acipenseriformes) Bemis, WE and RG Northcutt	Amphibious Locomotion and Morphology of the Pacific Leaping Blenny, <i>Alticus arnoldorum</i> Hsieh, ST
9:30 - 9:50	Organization of Discrete Fibers in Dinosaur Bones Rensberger, JM, SM Collier, C Dauwalder, S Decker and C Richards	The Cambrian Fossil Animal, <i>Haikouella</i>, and the Origin of the Vertebrates Mallatt, J	<i>In Vivo</i> Loading Patterns in the Alligator Mandible Metzger, KA and CF Ross	Ear and Swim Bladder Morphology in Chaetodontid Fishes: Adaptations for Enhancement of Hearing? Webb, JF, TC Tricas, DR Ketten, RM Walsh, E Shearman and JL Herman	Waterfall Climbing By Hawaiian Gobies: Factors Affecting Climbing Performance Schoenfuss, HL, RW Blob and ML Julius
9:50 - 10:10	Inherit the Limbs: Did Near-isometric Growth in Sauropod Dinosaur Humeri and Femora Exapt Them for Gigantism? Bonnan, MF	Evolutionary Relationships Between Chordates, Hemichordates, and Echinoderms: New Implications from the Retro-engineering Approach Gudo, M	Mandibular Form and Masticatory Bone Strain in Alpacas Williams, SH, WL Hylander, CJ Vinyard and CE Wall	Is the Weberian Apparatus a Key Innovation? Bird, NC and LP Hernandez	Terrestrial and Aquatic Locomotion in the Mudskipper <i>Periophthalmus argentilineatus</i> Pace, CM
10:10 - 10:40	Coffee Break				

Wednesday, 28 July 2004

Contributed Papers	Live Oak A Chair: Matt Bonnan	Live Oak B Chair: Jon Mallatt	Live Oak C Chair: Mike Bennett	Live Oak D Chair: Jackie Webb	Majestic Palm Room Chair: Tonia Hsieh
10:40 - 11:00	<p>Engineering Meets Palaeontology: Finite Element Analysis of Extinct Light-Weight Vertebrates</p> <p>Fastnacht, M, N Hess-Mohr, E Frey and HP Weiser</p>	<p>Homology and Evolution of Jaw Muscles in Archosauria</p> <p>Holliday, CM</p>	<p>Arboreal Locomotion of the Chameleon (<i>Chamaeleo calyptratus</i>: Sauria)</p> <p>Lilje, KE and MS Fischer</p>	<p>The Evolution of Underwater Hearing in Whales</p> <p>Nummela, S, JGM Thewissen and S Bajpai</p>	<p>The Impact of Cranial Differences on Jaw Muscles in <i>Trichiurus lepturus</i> and <i>Aphanopus carbo</i> (Teleostei, Trichiuridae)</p> <p>De Schepper, N and D Adriaens</p>
11:00 - 11:20	<p>Recurring Morphological Patterns in the Evolution of Herbivory in Lizards</p> <p>Stayton, CT</p>	<p>Morphometric Exploration of the Macroevolutionary Disparity in the Skull of Archosaurs</p> <p>Marugán-Lobón, J and AD Buscalioni</p>	<p>The Biodynamics of Arboreal Versus Terrestrial Locomotion in Gray Short-tailed Opossums (<i>Monodelphis domestica</i>)</p> <p>Lammers, AR, KD Earls and AR Biknevicius</p>	<p>The Inner Ear of <i>Tachypteron franzeni</i>, the Earliest Emballonurid Bat from the Middle Eocene of Messel</p> <p>Habersetzer, J, G Storch and B Sigé</p>	<p>Abdominal Gut Appendage of Mesopelagic Fish Larvae</p> <p>Wourms, JP</p>
11:20 - 11:40	<p>Wood-cutting Functional Morphology and Behavior in an Extant and a Fossil Beaver</p> <p>Rybczynski, N</p>	<p>Forelimb Homologies Among Archosaurs: Reconstructing Anatomy Using the Extant Phylogenetic Bracket</p> <p>Meers, MB, DB Weishampel and P Dodson</p>	<p>Locomotion of Extinct Giant Kangaroos: Inferences from their Modern Relatives</p> <p>Bennett, MB</p>	<p>Activity Pattern and the Morphology of the Visual System in Birds and Lizards</p> <p>Hall, MI</p>	<p>Development of the Extraembryonic Membranes of Oviparous and Viviparous <i>Lacerta (=Zootoca) vivipara</i> (Squamata: Lacertilia)</p> <p>Stewart, JR and B Heulin</p>
11:40 - 12:00	<p>Dorsally Receding Premaxillae; Characteristic of Theria</p> <p>Landry, SO</p>	<p>Integration of Ontogenetic and Phylogenetic Data in <i>Tyrannosaurus rex</i> and its Kin</p> <p>Carr, TD</p>	<p>Perching and Ground Dwelling Behaviour in Extinct Bird Relatives: Inferences Made from Functional Morphology of Extant Bird Claws</p> <p>Glen, CL and MB Bennett</p>	<p>Neural Correlates of Orbit Orientation and Binocular Visual Field Overlap in Mammals</p> <p>Heesy, CP</p>	<p>Evolutionary Transformations of Yolk Sac Placentation in Rodentia with Special Respect to Hystricognathi</p> <p>Mess, A</p>
12:00 - 1:30	<p>Lunch Break Luncheon for Poster Symposium Participants in poster area, Grand Palm Room</p>				
1:30-2:30	<p>Plenary Lecture: Freidberg Lifelong Learning Center Auditorium <i>Mechanical Loading and the Mammalian Skull</i> Susan Herring University of Washington, Seattle, USA</p>				
2:30 - 3:00	<p>Afternoon Break</p>				

Wednesday, 28 July 2004

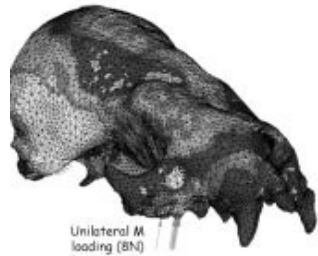
Symposia	ADHESION IN VERTEBRATES – MECHANISMS AND BIOMIMETIC IMPLICATIONS Live Oak A	INFERRING FUNCTION AND BEHAVIOR IN EXTINCT VERTEBRATES Live Oak B	LINKING GENES AND MORPHOLOGY Live Oak C	MECHANISTIC APPROACHES TO EVOLUTIONARY DEVELOPMENTAL BIOLOGY Live Oak D
3:00 - 3:30	Design Principles of Gecko Adhesive Nanostructures Autumn, K	Retro-Engineering: a Morphological-Analytical Method for Inferring Function and Evolution of Extinct Organisms Gudo, M and DG Homberger	A Working Hypothesis for the Origin of the Turtle Shell Gilbert, SF, JA Cebra-Thomas and F Tan	Ontogeny of Variance and Developmental Noise Hallgrímsson, B, D Curtis, J Chung, M Dymond and R German
3:30 - 4:00	Whole-Organism Studies of Adhesion in Lizards Irschick, DJ	Feeding Morphologies and Strategies in Carnivorous Synapsids van Valkenburgh, B	Tooth Cusp Patterning: from Genes To Evolution Salazar-Ciudad, I, JP Hunter and J Jernvall	Constraints on Asymmetric Variation in the Human Skull Deleon, VB
4:00 - 4:30	Wet Adhesion in Tree Frogs: Mechanisms and Biomimetic Implications Barnes, WJP and JM Smith	Ornithopod Jaw Mechanisms Norman, DB and JJ Thomason	Linking Genes to Novel Morphologies in Feathers Prum, R	Canalization, Developmental Stability and Integration of Rodent Skulls Marquez, E and M Zelditch
4:30 - 5:00	Wet Adhesion in the Feathertail Glider (<i>Acrobates pygmaeus</i>); a Mouse-sized Arboreal Marsupial Rosenberg, H and D Henderson	Biomechanical Modeling of Musculoskeletal Function in Extinct Taxa: Methods, Assumptions, and Challenges Hutchinson, JR	Fins, Limbs and Genitalia: From Evolutionary Origins to Congenital Malformations Cohn, MJ	Targeted Growth and the Regulation of Mammalian Body Size German, RZ, MC Bernstein, MC Lobe and SN Lobe
5:00 - 5:30	Surface Adhesion in Insects and Vertebrates: Functional Similarities and Convergent Design Federle, W	Innovations in the Locomotory Abilities of Pterosaurs and Their Evolutionary Implications Unwin, DM	Gene Duplication and Evolutionary Novelties, Studies on Plants and Vertebrates Svensson, ME	Integration and Inheritance of Adaptive Environmental Effects: An Example With Foraging Apparatus of Shrews Badyaev, AV and RL Young
5:30 - 6:00	Biological Attachment Systems as a Possible Source for Biomimetics: What Can We Learn from Evolution? Gorb, SN	Evolution of Swimming Mechanics in Cetaceans Fish, FE	Genetic Analysis of the Canid Skeleton: Quantitative Genetics of Skeletal Size and Shape Chase, K, LN Trut, AV Kharlamova, DR Carrier and KG Lark	Variability and Morphogenesis of Mammalian Teeth Polly, PD
Workshop 3:00-6:00	Workshop: FINITE-ELEMENT ANALYSIS OF VERTEBRATE SKULLS (see next page for details) Majestic Palm Room Organized by Callum Ross, University of Chicago, Chicago IL USA			

Wednesday, 28 July 2004

Workshop: Finite-Element Analysis of Vertebrate Skulls

Organizer: Callum F. Ross, The University of Chicago

Sponsors: ICVM, THE ANATOMICAL RECORD, & ORGANISMAL BIOLOGY
AND ANATOMY, THE UNIVERSITY OF CHICAGO



PROGRAM

- 15:00: C.F. Ross, **Opening remarks.**
- 15:05: U. Witzel, & H. Preuschoft. **Finite Element Model Construction for the Virtual Synthesis of the Skulls in Primates.**
- 15:20: H. Preuschoft & U. Witzel. **The Functional Shape of the Skull under Consideration of Ancestral Synapsids and Primates.**
- 15:35: D.S. Strait, P.C. Dechow, B.G. Richmond, C.F. Ross, M.A. Spencer. **Primate Masticatory Biomechanics Examined Using Finite Element Analysis.**
- 15:50: C.F. Ross, D.S. Strait, P.C. Dechow, B.G. Richmond, M.A. Spencer, B.A. Patel. **Modeling Muscle Function in Finite-Element Analysis: What Matters Most?**
- 16:05: R. Marinescu, D. Daegling, A. Rapoff. **Finite Element Modeling of the Anthropoid Mandible: The Effects of Altered Boundary Conditions.**
- 16:20: I.R. Grosse, E.R. Dumont. **Trials and Tribulations in Creating Finite Element Models of Vertebrate Morphology from CT Scans.**
- 16:35: E.R. Dumont, I.R. Grosse. **Bite Force and Bone Strain in the Facial Skeletons of Bats.**
- 16:50: C.R. McHenry, W.J.T. Daniel, P. Clausen. **Developing a Biomechanical Model of the Feeding Apparatus in Aquatic Tetrapods, Part 1: An Investigation of the Crocodylian Skull Using Finite Element Analysis.**
- 17:05: I. Jenkins-McIntyre. **Analogues, Near-Misses, Experimental Data and the Problems of Using Finite Element Analysis as Applied to Fossil Vertebrates.**
- 17:20: E.J. Rayfield. **Using Finite Element Analysis to Investigate Intracranial Mobility. A Case Study Using Large, Carnivorous Dinosaurs.**
- 17:35: G.A. Macho, D. Shimizu, I.R. Spears. **A Finite Element Approach to Studying the Functional Adaptations of Extinct Primate Enamel Microstructure.**
- 17:50: **Concluding Discussion**, chaired by C.F. Ross.



Wednesday, 28 July 2004

Poster Session 1 8:00 - 10:00 PM	POSTER SYMPOSIA Grand Palm Room				
<p>MECHANISMS AND TRADEOFFS IN VERTEBRATE BURROWING Organizers: Brad Moon, University of Louisiana, Lafayette, USA James C. O'Reilly, University of Miami, Coral Gables, Florida, USA</p>					
<p>1) Feeding Underground: Consequences of Burrowing on the Design and Use of the Cranial System in Lizards</p> <p>Herrel, A, NJ Kley and JJ Meyers</p>	<p>2) Behavior and Kinematics of Burrowing in <i>Ambystoma</i> Salamanders</p> <p>Ducey, PK and JA Wicknick</p>	<p>3) Is Sand Swimming in Reptiles True Swimming?</p> <p>Moon, BR</p>	<p>4) Burrowing in Snakes: Past Efforts and Future Directions</p> <p>Cundall, D, NJ Kley and JC O'Reilly</p>	<p>5) Adaptations for Fossoriality in Tadpoles</p> <p>Wassersug, R and I Rot-Nikcevic</p>	<p>6) Burrowing Strategies in Fishes: From Head to Tail</p> <p>De Schepper, N and D Adriaens</p>
<p>7) Adaptations for Digging in Living and Fossil Octodontidae (Rodentia: Caviomorpha)</p> <p>Lessa, EP, AI Vasallo and DH Verzi</p>	<p>8) Is There an Evolutionary Trade-Off Between Force and Speed in Limbless Burrowing?</p> <p>O'Reilly, JC and B Vanhooydonck</p>	<p>9) Small Mammal Burrowing: Multiple Evolutionary Pathways to Similar Results</p> <p>Gasc, J-P</p>			
<p>VENOM DELIVERY IN SNAKES Organizers: Bruce A. Young, Washington State University, Pullman, Washington, USA Kenneth Kardong, Washington State University, Pullman, Washington, USA</p>					
<p>11) The Comparative and Functional Morphology of Venom Ducts in Snakes</p> <p>Young, BA</p>	<p>12) Bioweapons Synthesis and Storage: the Venom Gland of Front-Fanged Snakes</p> <p>Mackessy, SP</p>	<p>13) From Molecular Sequences to Functional Morphology: What Can Phylogenetic Analysis of Snake toxin Families Tell Us About the Origin of the Venom Apparatus?</p> <p>Wuster, W and BG Fry</p>	<p>14) Tooth Structure in Snakes: Mechanical and Functional Significance</p> <p>Kardong, KV and BA Young</p>	<p>15) Influence of Envenomation on Ingestion Mechanics in Snakes</p> <p>Cundall, D and A Deufel</p>	<p>16) Functional Plasticity of the Venom Injection System in Snakes</p> <p>Deufel, A and D Cundall</p>
<p>17, 18) Evolution of the Tubular Venom-Conducting Fang: What Can Development Tell Us?</p> <p>Jackson, K</p>					

Wednesday, 28 July 2004

Poster Session 1 8:00-10:00 PM		POSTER SYMPOSIA Grand Palm Room			
MORPHOLOGICAL TRANSFORMATIONS DURING THE TRANSITION TO DRY LAND Organizers: Zbynek Rocek, Institute of Geology, Academy of Sciences and Charles University, Prague, Czech Republic Jennifer A. Clack, University Museum of Zoology, Cambridge, UK					
19) Introduction to the Symposium	20) <i>Ichthyostega</i> : Innovative But Not Intermediate Clack, JA, PE Ahlberg and H Blom	21, 22) Morphological Features in Anuran Development Reflecting Fish-Amphibian Transition Rocek, Z	23, 24) Development of the Skeleton in the Alpine Newt <i>Triturus alpestris</i> and its Bearing to Reconstruction of Larval Development in Early Tetrapods Vater, M and Z Rocek	25, 26) Transformations of Aortic Arches During Metamorphosis of the Spade-foot Toad <i>Pelobates fuscus</i> Majorová, H and Z Rocek	27, 28) Development of the Pelvic Girdle in Anurans: Contribution to Understanding the Origin of Pelvis in Early Tetrapods Rocková, H
29, 30) Structure of Parasphenoid of Reptiliomorph Tetrapods in Light of Fish-Tetrapod Transition Klembara, J	31, 32) Thermal Physiology and the Origin of Terrestriality in Vertebrates Carroll, RL, J Irwin and D Green	33) Evolutionary and Ontogenetic Transformations in Anuran Tadpoles Haas, A	34) Candidate Gene Approach to the Evolution and Development of Bone Formation in Metamorphosing and Direct-developing Frogs Kerney, R and J Hanken	35) Neural Crest Derivation of the Osteocranium in Recent Anurans Gross, J and J Hanken	36) Life History, Morphology, and the Transition to Dry Land Reiss, JO
37) Development of the Pectoral Girdle in <i>Discoglossus</i> (Anura: Discoglossidae) Havelková, P and Z Rocek	38) The Conquest of Land By Temnospondyls Steyer, JS				
MORPHOLOGY AND LIFE HABITS OF PAST AND PRESENT GIANT VERTEBRATES Organizers: Richard A. Fariña, Universidad de la Republica, Montevideo, Uruguay Sergio F. Vizcaíno, Museo de La Plata, La Plata, Argentina					
41) Giant Marine Vertebrates of the Past Motani, R	42) Mesozoic Terrestrial Giants Mazzetta, GV	43) Giant Flying Vertebrates Cunningham, JR and JC Cunningham	44) Eurasian Giant Mammals of the Cenozoic Period Christiansen, P	45) Cenozoic Giants of South America Bargo, MS	46) Cenozoic Giants of North America De Iuliis, GGB
47) African Ecology and the Evolution of Large Terrestrial Vertebrates During the Cenozoic Bobe, R	48) Some Questions About Locomotion in Living Aquatic Giants With Different Metabolic Rates Botella, H and C Martínez-Pérez	49) How to Be a Giant and Not Die Out at Trying Fariña, RA and SF Vizcaíno			

Wednesday, 28 July 2004

Poster Session 1 8:00-10:00 PM	POSTERS ASSOCIATED WITH SYMPOSIA AND WORKSHOPS Grand Palm Room				
INTEGRATING APPROACHES TO THE STUDY OF TERRESTRIAL LOCOMOTION					
51) Limb Kinematics of Quadrupedal Primates and Their Consequences for Functional Interpretations of Limb Proportions Schmidt, M	52) "Groucho Running" in Tinamous Hancock, JA, AR Biknevicius, KD Earls, NJ Stevens and SM Reilly	53) The Mechanics of Locomotion in Lizards McElroy, EM, AR Biknevicius and SM Reilly	54) Mass Sets for Interactive Computation of Body Segment Dimensions and Biomechanical Analysis of Animal Locomotion Ng-thow-hing, V, FC Anderson and JR Hutchinson	55) Surface-EMGs Arnold,D, MS Fischer, NP Schumann, FHW Biedermann and HCh Scholle	56) Intervertebral Movements During Locomotion in Small Mammals Schilling, N, R Hackert and MS Fischer
THE ONTOGENY OF PERFORMANCE IN VERTEBRATES					
57) Ontogenetic Development of Locomotion in Small Mammals Schilling, N	58) A Comparison of the Ontogeny of Prey Capture Kinematics and Feeding Morphology in Wild and Hatchery Florida Largemouth Bass, <i>Micropterus salmoides floridanus</i> Wintzer, AP and PJ Motta	59) Ontogenetic Relationship Between Morphology and Performance in Relation to Differential Mortalities in Two Closely Related Sceloporine Lizards Robbins, TR and JA Johnson	60) Scaling of Prey Capture Kinematics in the African Catfish <i>Clarias gariepinus</i> van Wassenbergh, S, A Herrel, D Adriaens and P Aerts		
INTEGRATED MECHANICAL INVESTIGATIONS OF FISH SWIMMING					
61) Experimental and Analytical Study About Schooling Motion of Fish Based On the Inter-Organisms Relationship Among School Individuals Inada, Y, K Kawachi and H Liu	62) Thunniform Swimmers with Internalized Red Muscles: Derived Features in the Musculotendinous System of Mako Sharks Konstantinidis, P, S Gemballa, JM Donley and RE Shadwick	63) Functions of Fish Myosepta: A Derived Design of Myosepta in Two Carangiform Swimmers Gemballa, S and T Hannich			

Wednesday, 28 July 2004

Poster Session 1 8:00-10:00 PM	POSTERS ASSOCIATED WITH SYMPOSIA AND WORKSHOPS Grand Palm Room				
MOLECULAR AND MORPHOGENETIC EVOLUTION OF SPECIFIC ORGANS					
<p>65) Developmental Regulation of Contactile Protein-Encoding Genes and Fates of Mesodermal Components in the Lamprey with Special Reference to Evolution of the Gnathostome Jaw</p> <p>Kusakabe, R, Y Murakami and S Kuratani</p>	<p>66) Molecular Developmental Studies of the Mammalian Middle Ear and Its Evolution</p> <p>Nakazawa, M, FM Rijli and S Kuratani</p>	<p>67) Development of the Pituitary Gland in the Lamprey: Evolution of Epigenetic Patterning Programs in Organogenesis</p> <p>Uchida K, Y Murakami, S Kuraku and S Kuratani</p>	<p>68) Hox Genes Expression Patterns in Japanese Lamprey (<i>Lethenteron japonicum</i>) During Development and Evolution of the Gnathostome Jaw</p> <p>Takio, Y, M Pasqualetti, FM Rijli and S Kuratani</p>	<p>69) Phylogenetic and Developmental Constraints on the Mammalian Vertebral Formula in Terms of Hox Code Evolution</p> <p>Narita, Y and S Kuratani</p>	<p>70) Development of Anterior-Posterior Pattern in the Lamprey Inner Ear</p> <p>Hammond, KL and TT Whitfield</p>
INFERRING FUNCTION AND BEHAVIOR IN EXTINCT VERTEBRATES					
<p>71) Soft-part Reconstructions and Biomechanics of the Axial Trunk Skeleton of Sauropods</p> <p>Schwarz, D</p>	<p>72) The Cranial Crests of Lambeosaurian Hadrosaurids: Function and Evolution of Nasal Passages</p> <p>Evans, DC</p>	<p>73) An Oviraptorid Neurocranium from Mongolia</p> <p>Kundrat, M, T Maryanska and H Osmolska</p>	<p>74) Anatomy and Evolution of the Bizarre "Battering Ram" of the Brontothere, <i>Embolotherium</i> (Mammalia, Perissodactyla)</p> <p>Mihlbachler, MC and N Solounias</p>		
WORKSHOP: APPLICATION OF ADVANCED IMAGING TECHNOLOGIES TO VERTEBRATE MORPHOLOGY					
<p>75) Virtual 3D Reconstruction of Embryonic Head Structures from Physical Sections</p> <p>Janacek, J and M Kundrat</p>	<p>76) Functional Microanatomy of Fossil Hominin Bone by Confocal Circularly Polarized Light Microscopy</p> <p>Bromage, TG and A Perez-Ochoa</p>	<p>77) Morphologynet: a Web-based, Interactive Library of 3D Visualizations of Animal Anatomy</p> <p>Maglia, AM and JL Leopold</p>	<p>78) Beyond Imaging: Using 3D Datasets in Comparative Morphology</p> <p>Ridgely, R and LM Witmer</p>	<p>79) The Skeletal System of Neonatal Caribbean Manatee (<i>Trichechus manatus latirostris</i>) Imaged by Computed Tomography (CT)</p> <p>Fritsch, G, M Faflbender, V Vasuthevan and TB Hildebrandt</p>	<p>80) The Highly Specialized Larynx of the Mongolian gazelle (<i>Procapra gutturosa</i> Pallas, 1777): Classical Morphological Methods and Computed Tomography Combined</p> <p>Frey, R, A Gebler and G. Fritsch</p>
<p>The <i>Fish Teeth Wet Lab Workshop</i> will be offered during both Poster Sessions in the Grand Palm Room and from 3-6 PM on Thursday, 29 July. Sign up at Registration Desk.</p>					

Thursday, 29 July 2004

Contributed papers	Live Oak A Chair: Alex Haas	Live Oak B Chair: Phil Motta	Live Oak C Chair: Rick Blob	Live Oak D Chair: Sue Rehorek
8:50 - 9:10				Homology of the Harderian Gland Rehorek, SJ and WJ Hillenius
9:10 - 9:30		Mechanics of Suction Generation in Bamboo Sharks Wilga, CAD and CP Sanford	Limb Muscle Activation Patterns During Locomotion in Loggerhead Sea Turtles Blob, RW, JS Willey and J Wyneken	Scent in a Sac: the Preorbital Apparatus of Deer Hillenius, WJ and SJ Rehorek
9:30 - 9:50	Early Development of Cranial Neural Crest Streams in Anurans Mitgutsch, C, A Haas and L Olsson	Functional Morphology, Suction Performance and the Enigma of Protrusion in the Nurse Shark <i>Ginglymostoma cirratum</i> Motta, PJ, RE Hueter, TC Tricas, AP Summers, D Lowry, MP Matott, LB Whitenack and AP Wintzer	Turning Performance of Freshwater Turtles During Swimming Rivera, G and RW Blob	Anatomy of the Circadian Clock in Avesuchian Archosaurs Sedlmayr, JC, SJ Rehorek, EJ Legenzoff and J Sanjur
9:50 - 10:10	Homology of the Trabecula in the Vertebrate Cranium Kuratani, S	How do Aquatic Frogs Generate Negative Buccal Pressure During Feeding? Carreno, CA and KC Nishikawa	Kinematics of the Righting Response in Inverted Turtles Rivera, ARV, G Rivera and RW Blob	Mechanical Implications of Nasal Fusion in Tyrannosaurid Dinosaurs Snively, E and DM Henderson
10:10 - 10:40	Coffee Break			

Thursday, 29 July 2004

Contributed papers	Live Oak A Chair: Alex Haas	Live Oak B Chair: Phil Motta	Live Oak C Chair: Rick Blob	Live Oak D Chair: Sue Rehorek
10:40 - 11:00	<p>Getting a Bite on the Developmental Origin of Jaws: New Interpretation of "Maxillary" and "Mandibular"</p> <p>Cerny, R, P Lwigale, R Ericsson, D Meulemans, H-H Epperlein and M Bronner-Fraser</p>	<p>Feeding Apparatus Specialization and Ecological Diversification in Angelfishes (Pisces: Pomacanthidae) - The Implications of a Novel Feeding Mode?</p> <p>Konow, N and DR Bellwood</p>	<p>Kinematics of Surface Descent and Horizontal Swimming of Thick-billed Murres (<i>Uria lomvia</i>)</p> <p>Hamilton, JL</p>	<p>To Bleed or Not To Bleed: Functional Significance of Nasal Foramina in Head-lift Diggers</p> <p>Gobet, KE</p>
11:00 - 11:20	<p>Dlx Gene Regulation of Pattern and Polarity in the Murine Jaw</p> <p>Depew, MJ</p>	<p>Myotomal Anatomy in Zebrafish: Mapping Three-Dimensional White Muscle Fiber Angles Using Cross-Correlation Image Analysis</p> <p>Tytell, E</p>	<p>Morphological Approach of the Aquatic Locomotion in Birds (Penguins, Spheniscidae)</p> <p>Courant, F, D Marchand, S Renous, C Berge and Y Le Maho</p>	<p>Structure and Function of the Sperm Whale Nose: Science, Art, and Folklore</p> <p>Cranford, TW</p>
11:20 - 11:40	<p>Genetic Architecture of the Human Craniofacial Complex With Paleontological Implications</p> <p>Sherwood, RJ, DL Duren, J Blangero, SA Czerwinski and B Towne</p>	<p>Asymmetries in Feeding and Respiration in the Hogchoker, <i>Trinectes maculatus</i></p> <p>O'Neill, MW and AC Gibb</p>	<p>Effect of Shape on the Aerodynamic Forces Generated by Flexible Wings</p> <p>Bishop, KL and K Breuer</p>	<p>Rules of Construction in Proboscis Building in Mammals</p> <p>Clifford, AB and LM Witmer</p>
11:40 - 12:00	<p>Hierarchical Levels of Variation in Ontogeny</p> <p>Jones, DC and RZ German</p>	<p>Evolution of Labroid Fishes: New Hope for a Key Innovation Poster Child</p> <p>Wainwright, PC, LA Ferry-Graham and TJ Near</p>	<p>Kinematic Correlates of Lift Production in Flying Bats</p> <p>Swartz, SM, S Tsao, KL Bishop and P Tan</p>	<p>The Cranial Morphology of <i>Corydoras aeneus</i></p> <p>Huysentruyt, F and D Adriaens</p>
12:00 - 1:30	<p>Lunch Break ISVM Executive Committee Lunch Meeting, Queen Palm Room</p>			
1:30 - 2:30	<p>Plenary Lecture: Freidberg Lifelong Learning Center Auditorium <i>The Conservation of Body Plans Through Internal Selection</i> Frietson Galis Leiden University, The Netherlands</p>			
2:30 - 3:00	<p>Afternoon Break</p>			

Thursday, 29 July 2004

Symposia	INTEGRATING APPROACHES TO THE STUDY OF TERRESTRIAL LOCOMOTION Live Oak A	EVOLUTIONARY ORIGIN OF NEURAL CREST AND PLACODES Live Oak B	EVOLUTION OF DEVELOPMENTAL AND REPRODUCTIVE PATTERNS IN MAMMALS Live Oak C	STEM GROUPS AND THE ASSEMBLY OF VERTEBRATE BODY PLANS Live Oak D
3:00 - 3:30	Patterns of Mechanical Energy Change in Tetrapod Gait: Pendula, Springs and Work Biewener, AA	The "New Head" Hypothesis Revisited Northcutt, RG	Stem Species Patterns of Mammalian Reproduction Zeller, U, C Freyer, K Szdzuy and J Schultz	Recognizing Stem Group Vertebrates and Their Importance in Understanding the Evolution of the Body Plan Purnell, MA
3:30 - 4:00	Powering Locomotion: Correlating Mechanics with Energetics Hoyt, DF and SJ Wickler	The Central Role of Gene Cooption During Neural Crest Evolution Meulemans, DK and M Bronner-Fraser	Marsupial Cleavage and Blastocyst Formation: Insights Into Evolution of the Mammalian Embryo Selwood, L	Assembly of the Gnathostome Bodyplan: 'Jawed Vertebrates' Without Jaws Donoghue, PCJ
4:00 - 4:30	Tetrapod Symmetrical Gaits and Their Relationship to Energy-saving Mechanics Biknevicius, AR	Amphioxus and the Evolution of Placodes and Neural Crest Holland, LZ, JK Yu and ND Holland	Marsupial Placentation Freyer, C, U Zeller and MB Renfree	The Origin of Tetrapods Coates, MI
4:30 - 5:00	Joint Kinematics, EMG, and Inverse Dynamics of Quadrupedal Locomotion Fischer, MS	Development of Putative Placode Homologs in <i>Ciona intestinalis</i> Shimeld, SM, F Mazet and A Graham	Sex, Soma, and Evolution: Insights From the Developing Marsupial Renfree, M, A Pask and G Shaw	The Origin of the Avian Body Plan Padian, K
5:00 - 5:30	Stability, Substrate Characteristics and Limb Coordination: the Ecological Relevance of Gait Stevens, NJ	Placodes in Ascidians Manni, L, NJ Lane, F Gasparini, S Tiozzo, F Caicci, G Zaniolo and P Burighel	Evolution of Diphyodont Dental Replacement and Determinate Skull Growth Through Cynodont-Mammal Transition Luo, Z-X	Convergent Cranial Evolution and Development in Mammals and Birds Rowe, T
5:30 - 6:00	Integrating Locomotor Energetics, Mechanics, and Gaits: Insights and Key Directions Reilly, SM	Development and Evolution of Placodes from a Common Precursor? Schlosser, G	Postcranial Development and the Marsupial-Placental Dichotomy Sánchez-Villagra, MR	The Origins and Adaptations of Early Hominids Strait, DS
Workshop 3:00-6:00	Workshop: FISH TEETH WET LAB (see next page for details) Organized by Howard Evans and Heiko Schoenfluss This workshop will also be offered during both poster sessions. Sign up at Registration Desk.			

Thursday, 29 July 2004

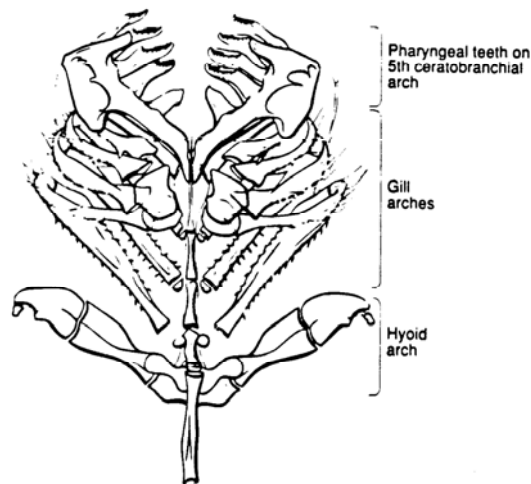
3:00-6:00

Workshop: **FISH TEETH WET LAB**

Organized by Howard Evans and Heiko Schoenfuss

Location: Grand Palm Room

- This workshop will also be offered during both evening poster sessions (28 and 30 July)
- Limited to 10 participants per session
- Sign-up at the registration desk to be certain that there will be a space available for you
- Walk-ins are also welcome if the workshop is not already filled



The pharyngeal skeleton of a golden shiner (*Notemigonus chrysoleucas*) in dorsal view.

Cyprinid fish (carps, minnows, and barbs) lack teeth on their jaws but have enamel covered pharyngeal teeth on the fifth gill arch (ceratobranchial). These teeth, which are constantly being replaced in a regular sequence, bite against a horny pad on the ventral surface of the basioccipital bone. By observing the developmental stage of replacement teeth it is possible to determine the sequence of replacement. Each participant will be given a cleared and stained cyprinid fish in glycerin or propylene glycol to dissect under a microscope with fine-pointed forceps. Microscopes, lamps, dishes, forceps and specimens will be provided. A brief discussion and a printed hand-out will illustrate the features to be observed. The unstained otoliths of the inner ear and the sound transmitting Weberian apparatus formed by vertebral elements can also be observed. Demonstration specimens of several species will be available for examination.



Pharyngeal teeth on the fifth ceratobranchials of a goldfish (*Carassius auratus*) in dorsal view with the rostral end at the bottom. There are four functional teeth on each side, and the tooth replacement sequence appears to alternate left and right sides. The median (first) tooth is always slightly ahead of the other three. In this illustration, the replacement teeth, on the right side of the fish, are young and stain darkly. On the left side, the replacement teeth are older and covered by nonstaining enamel. The pointed first tooth on the left arch has already moved into functional position, and the remaining three functional teeth will soon be shed and replaced by those behind them. This cycle continues throughout the fish's life.

Friday, 30 July 2004

Contributed Papers	Live Oak A Chair: Kristiaan D'Aout	Live Oak B Chair: Callum Ross	Live Oak C Chair: Dennis Bramble	Live Oak D Chair: Eric Hilton	Majestic Palm Room Chair: Moya Smith
8:50 - 9:10	Differences in Bipedal Locomotion Between Two Species of Kangaroo Mice in the Laboratory Hyde, ML	From Symmetrical to Asymmetrical Gaits, a New Way of Analyzing the Inter-limb Coordination in Quadrupeds Abourachid, A		Morphology and Ontogeny of Head Structures in <i>Ancistrus</i> (Pisces: Loricariidae): Tracking the Development of a Highly Specialized Feeding Apparatus Geerinckx, T and D Adriaens	Denticles and Teeth at the Origin of Jaws Johanson, Z and MM Smith
9:10 - 9:30	Differential Design for Hopping in Two Species of Wallabies McGowan, CP, RV Baudinette and AA Biewener	Bone Strain in the Cranial and Postcranial Skeletons of Tetrapods Ross, CF, B Demes and KA Metzger	Mechanics of the "Visceral Piston" in Galloping Dogs Bramble, DM and FA Jenkins Jr.	Did the First Developmental Studies Lead to the Concept of Evolution? Steyer, JS	Evolution and Developmental Conservation of the Vertebrate Dentition Fraser, GJ, IM McGonnell, A Graham and MM Smith
9:30 - 9:50	Locomotion of Extinct Giant Kangaroos: Inferences from Their Modern Relatives Bennett, MB	Diversity and Evolution of Terrestrial Loading Patterns in Tetrapod Limb Bones Espinoza, NR and RW Blob	Locomotion and Ventilation in Humans: Are They Really Mechanically Independent? Daley, MA, DM Bramble and DR Carrier	Ontogeny, Phylogeny, and Morphology in Anuran Larvae: A Morphometric Analysis of Cranial Development and Evolution in <i>Rana</i> Larvae (Anura: Ranidae) Larson, PM	Frog (<i>Rana pipiens</i>) Amelogenin Sequence and Enamel Biomineralization Xinping Wang, Xianghong Luan and TGH Diekwisch
9:50 - 10:10	Hindlimb Use During Bipedalism in Primates: a Comparative Study Wunderlich, RE, JC Schaum, PJ Kilkenny and MC Sinopoli	Adaptation of the Rat Femoral Neck to Bipedal Standing Exercise Matsumura, A, MS Fischer and M Okada	Gas Bladder Movement in Lionfishes: a Novel Mechanism for Control of Pitch Hornstra, HM, A Herrel and WL Montgomery	Ontogeny in Tertiary Frogs Rocek, Z	Skeletal and Dental Development of Therizinosauroid Embryos from China Kundrat, M, ARI Cruickshank, TW Manning, J Nudds, KA Joysey and Q Ji
Workshop 08:50-12:00	Workshop: <i>Teaching Comparative Anatomy</i> (see next page for details) Organized by Anthony Russell and Herb Rosenberg Location: Senate Chambers				
10:10 - 10:40	Coffee Break				

Friday, 30 July 2004

08:50 - 12:00

Workshop: Teaching Comparative Anatomy

Organized by Herb Rosenberg and Anthony Russell

Location: Senate Chambers

08:50 Introduction. Herb Rosenberg

Section A. *The Place and Role of Comparative Vertebrate Anatomy in the Undergraduate Biology Curriculum: An International Perspective.*

09:00 Anthony Russell (Canada / USA)

09:10 Mike Bennett (Australia)

09:20 Alex Fleming (South Africa)

09:30 Ian Jenkins-McIntyre (UK)

09:40 Steve Perry (Germany)

09:50 Open Discussion

10:10 - 10:20 Coffee Break

Section B. *Authoring Texts for Teaching Modern Comparative Vertebrate Anatomy.*

10:20 Robert Carr

10:30 Ted Goslow

10:40 Willy Bemis

10:50 Ken Kardong

11:00 Open Discussion

Section C. *Authoring Lab Manuals / Use of Electronic Media for Teaching Modern Comparative Vertebrate Anatomy.*

11:20 Dominique Homberger

11:30 Edward Zalisko

11:40 Bruce Young

11:50 Open Discussion

The Convenors recognize that this is a tight schedule and that more discussion may be required. If there is sufficient demand/desire, a continuation of the discussion of all three sections will be arranged for the evening of 30 July at a venue to be announced.

Friday, 30 July 2004

Contributed Papers	Live Oak A Chair: Kristiaan D'Aout	Live Oak B Chair: Callum Ross	Live Oak C Chair: Dennis Bramble	Live Oak D Chair: Eric Hilton	Majestic Palm Room Chair: Moya Smith
10:40 - 11:00	Morphometrics and Function of the Bonobo (<i>Pan paniscus</i>) Hind Limb D'août, K, R Payne, MM Günther, E Vereecke, K Schoonaert and P Aerts	An Ecomorphological Analysis of Small-Bodied Carnivorans Frischia, AR	Air Sac Diverticula as Passive Support Devices in Birds and Saurischian Dinosaurs: An Overlooked Biomechanical System Akersten, WA and CH Trost	Is Early Embryonic Development of Zebrafish, <i>Danio rerio</i> Accessible to Selection? A Quantitative Genetic Approach to Study Phenotypic Variation During Early Ontogeny Schmidt, KU and JM Starck	Scaling and Mechanics in the Long Bones of Caribbean Hutias (Rodentia, Capromyidae) Casinos, A, R Borroto, R Domene and I Ramos
11:00 - 11:20	The Functional Morphology of the Hominoid Foot-ankle Complex Vereecke, EE, K D'août, S van Sint Jan, R Payne, K Schoonaert and P Aerts	Evolution of Morphological Integration: Interspecific Patterns of Integration in the Shrew Mandible Young, RL and AV Badyaev	Distal Limb Pneumaticity in Extant Birds: Anatomical and Functional Correlates O'Connor, PM	Developmental, Descriptive, and Comparative Osteology of Sturgeons (Actinopterygii, Acipenseriformes, Acipenseridae) Hilton, EJ, L Grande and WE Bemis	Axial Stress As a Growth Constraint in the Vertebrae of Sauropod Dinosaurs Henderson, DM
11:20 - 11:40	Mechanics and Orientation of Transverse Processes of Lumbar Vertebrae in Simians Valverde, E, A Casinos, JD Rodriguez-Teijeiro and S Moyà-solà	Spatial and Functional Modelling of Carnivore and Insectivore Molariform Teeth Evans, AR and GD Sanson	The Kinematics of Crocodylian and Avian Lung Ventilation: Investigating the Evolution of Breathing in Extant and Extinct Archosauria Claessens, LPAM	In the Eye of the Beholder: A Geometric Morphometric Assessment of the Batagurine Process of Testudinoid Turtles Jamniczky, HA and AP Russell	An Original Lujanian Megatherioidea from Peru: Implications Concerning the Locomotion of Sloths Pujos, F, G De Iuliis, L Werdelin and C Argot
11:40 - 12:00	Shoulder Mobility of Quadruped Primates Related to Fiber Type Distribution of Intrinsic Shoulder Muscles Schmidt, M	Tooth Shape in Eretmodini (Teleostei, Cichlidae): An Ontogenetic and Multivariate Morphometric Analysis Wautier, K, E Vandervennet and A Huysseune	Comparative Anatomy of the Pulmonary Artery Sphincter in Marine Turtles: Gross and Microscopic Structural Adaptations Wyneken, J, AGJ Rhodin, A Garces and JAG Rhodin	Skull Asymmetry in Toothed Whales: Methods of Measurement, Interspecific Comparisons, and Evolutionary Trends Olson, JD and PJ Adam	The Pelvis as Functional Link Between Spine and Lower Limbs: Comparison Between Adult and Neonatal Pelvis in Humans Tardieu, C, J Hecquet, C Boulay, C Marty, G Duval-Beaupere
12:00 - 1:30	Lunch Break				
1:30-2:30	Plenary Lecture: Freidberg Lifelong Learning Center Auditorium <i>Breaking Organisms into Parts: Similarity, Stereotype, and Homology</i> Olivier Rieppel Field Museum of Natural History, Chicago, Illinois, USA				
2:30 - 3:00	Afternoon Break				

Friday, 30 July 2004

Contributed Papers	Live Oak A Chair: Lorenzo Alibardi	Live Oak B Chair: Margaret Rubega	Live Oak C Chair: Roland Frey	Live Oak D Chair: Hiran Dutta	Majestic Palm Room Chair: Lisa Ganser
3:00 - 3:20	A Comparative Study of Osteoderm Development in <i>Alligator mississippiensis</i> and <i>Dasyus novemcinctus</i> Vickaryous, MK and BK Hall	The Evolution of Constriction in Snakes Mehta, RS and BR Moon	The Role of Historical Constraint in Observing Patterns of Morphological Character Evolution Consistent With Rensch's Rule: Example from Family Mustelidae Berdnikovs, S	Glycosaminoglycans(GAG), Hyaluronan (HA) and Type-II and X Collagens in Rat Bone Repair after Perforation of the Tibia Effects of Training and Immobilization Hussar, Ü, P Hussar and T Haviko	The Meckel Anatomical Collection: Imaging Techniques and Ancient-DNA Analysis in Diagnosing Human and Animal Anomalous Collections Specimens Goebbel, L, R Klunker and R Schultka
3:20 - 3:40	Feather Development and Evolution: Only the Whole Story Will Suffice Maderson, PF and W Hillenius	How Snakes Eat Snakes (and Why) Jackson, K, EL Brainerd and NJ Kley	Sexual Dimorphism of the Larynx of the Mongolian Gazelle (<i>Procapra gutturosa</i> Pallas, 1777, Mammalia, Artiodactyla, Bovidae) Frey, R and T Riede	Phenotypic Flexibility in Response to Feeding and Fasting in Green Iguana (<i>Iguana iguana</i>) Moser, P and JM Starck	Studies on Myofibrillogenesis in Developing Hearts of Cardiac Mutant Axolotls Zhang C, X Huang, S Lemanski and L Lemanski
3:40 - 4:00	Expression of Beta-Keratin and its mRNA in Differentiating Lizard Epidermis Alibardi, L, M Toni, V Toffolo and L Dalla Valle	Dermal Characteristics, Scale Row Organization, and the Origin of Macrostomy in Snakes Savitzky, A, VR Townsend, Jr., DA Hutchinson and A Mori	The Ontogeny of Cranial Sexual Dimorphism in Hominoids: Implications for Hypotheses of Sexual Selection Weston, EM and F Schrenk	What Happens to the Kype of Male Atlantic Salmon (<i>Salmo salar</i>) That Survive Spawning? Witten, PE and BK Hall	A Possible Role for the Internal Vertebral Venous Plexus in Thermoregulation of the Spinal Cord Hoogland PV and W Vorster
4:00 - 4:20	Holotype skeletal morphology of <i>Gymnallabes nops</i> (Roberts & Stewart, 1976), using micro CT-scan Devaere, S, D Adriaens, GG Teugels, W Verraes, NM De Clerck and AA Postnov	Morphology and Function of a Hyobranchial Joint in the Ruddy Turnstone, a Scolopacid Shorebird Rubega, MA and K Schwenk	Sexual Dimorphism in Normal Craniofacial Growth Sudha, C and S Rajender	The Role of Phenotypic Flexibility for Vertebrate Morphology Starck, JM and U Bauchinger	Vasculature of the Parotoid Glands of Four Species of Toads (Bufonidae: <i>Bufo</i>) Hutchinson, DA and AH Savitzky
4:20 - 4:40	Rhinoceros Horn Attachment: Anatomy and Histology of a Dermally Influenced Bone Rugosity Hieronymus, TL and LM Witmer	Maintenance of Morphological Diversity in a Polymorphic Cichlid Fish Swanson, Brook O	Ecomorphological correlates of fighting ability in the lizard <i>Gallotia galloti</i> Huyghe, K, H Scheers and R Van Damme	In Utero and Lactational Effects of TCDD and PCDF on Sprague-dawley Rats: A Histological Analysis of Liver Dutta, HM and K Pinkerton	Comparative Anatomy of the Internal Vertebral Venous Plexus (IVVP) - Different Form Different Function Vorster, W, PVJM Hoogland, M Grobbelaar, BCJ Labuschagne and DF Du Toit
5:00 - 6:00	ISVM Business Meeting: Freidberg Lifelong Learning Center Auditorium				

Friday, 30 July 2004

Poster Session 2 8:00 - 10:00 PM	CONTRIBUTED POSTERS Grand Palm Room (page 1 of 3)				
1) Egg-shell Morphology and Calcium Logistics in Bird Karlsson, O, J Blom and C Lilja	2) Patterning of Embryonic Development in Birds Blom, J and C Lilja	3) Development of the Dogfish Spiracular Organ and Chick Paratympanic Organ: Placodal Origins and Evolutionary Implications O'Neill, P and CV Baker	4) Homologues of Vertebrate Placodes in <i>Ciona intestinalis</i> Mazet, F, J Millard, A Graham and SM Shimeld	5) Endotheliochorial Placental Arrangement in a Placentotrophic African Skink Flemming, A	6) Intraoviductal Feeding in Embryos of <i>Schistometopum thomense</i> (Amphibia: Gymnophiona: Caeciliidae) Müller, H. and JG Measey
7) Olfactory Metamorphosis in the Pacific Giant Salamander (<i>Dicamptodon tenebrosus</i>) Stuelpnagel, J and JO Reiss	8) Development of the Parachordal Chondrocranium in <i>Pelobates</i> and <i>Scaphiopus</i> (Anura: Pelobatidae) Zahradnicek, O	9) Consequences of Giantism in <i>Xenopus laevis</i> Tadpoles Rot-Nikcevic, I and R Wassersug	10) Mechanisms of Development of the Neural Crest-Derived Skeleton in <i>Hymenochirus boettgeri</i> Vincent, NA and BK Hall	11) Preliminary Analysis of Cranial Skeletal Development in <i>Nectophrynoides vivipara</i> Blackburn, D	12) Teratogenic Effects of 4-nonylphenol on Early Development of <i>Xenopus laevis</i> Maire, AG, EE Thornton and J Vaglia
13) Morphological Variations in a Tooth Family through Ontogeny in <i>Pleurodeles waltl</i> (Amphibia, Caudata) Davit-Béal, T and J-YE Sire	14) Tooth development in a scincid lizard, <i>Chalcides viridanus</i> (Squamata), with particular attention paid on enamel formation Delgado, S, T Davit-Béal, F Allizard and J-YE Sire	15) Breeding Teeth in Atlantic Salmon: Fact Or Fake? Witten, PE, BK Hall and A Huysseune	16) Abnormalities in Morphogenesis Associated with Early Exposure to Ground-Based Microgravity Conditions in <i>Rivulus marmoratus</i> (Teleostei) Cole, KS, A Sundareson and N Pellis	17) Facial Bone Modeling and Muscle Attachment in the Juvenile Pig (<i>Sus scrofa</i>) Wealthall, RJ	18) Morphological Integration in the Mammalian Skull: The Influences on Ontogeny, Phylogeny, and Function Goswami, A
19) Does the Nasal Septum Support the Cranioskeleton? Popowics, TE, R Wealthall and SW Herring	20) A Cladistic and Functional, Comparative Analysis of the Orbital Region of Mammalian Skulls Cox, PG	21) Somatic Growth and Growth of the Erupted Dentition in a Marsupial van Nievelt, AFH	22) Characterization of Two Novel Genes Specifically Involved in Fin Development in Zebrafish Padhi, BK, M Ekker and M Akimenko	23) Hand Development and Sequence of Ossification in the Forelimb of the European Shrew <i>Crocidura russula</i> and Comparisons Across Therian Mammals Prochel, J, MR Sanchez-Villagra and P Vogel	24) Comparative Analysis of Ossification in the Presence/Absence of Defined Growth Plate Reno, PL, DL Mcburney, CO Lovejoy and WE Horton Jr.

Friday, 30 July 2004

Poster Session 2 8:00 - 10:00 PM	CONTRIBUTED POSTERS Grand Palm Room (page 2 of 3)				
<p>25) Variation in Mammalian Proximal Femoral Ossification Patterns</p> <p>Serrat, MA, PL Reno, MA McCollum, RS Meindl and CO Lovejoy</p>	<p>26) Comparative Primate Bone Microstructure: Records of Life History and Mechanical Adaptation</p> <p>Warshaw, J</p>	<p>27) Bone Histology in Catarrhine Primates Relates to Aspects of Life History</p> <p>McFarlin, SC</p>	<p>28) Human Shoulder Development and Comparison with Bi- and Quadrupeds</p> <p>Vorster, W, CCJ Jaspars, DF du Toit, BJ Page, J Matthysen, JF de Beer and T Cresswell</p>	<p>29) Scapulocoracoid Homology Among Bony Fishes Based on Morphology and Development of the Queensland Lungfish <i>Neoceratodus forsteri</i> (Sarcopterygii)</p> <p>Johanson, Z, J Joss and M Sutija</p>	<p>30) Biometric Analysis of Populations of <i>Lebias fasciata</i> (Valenciennes) from Sicilian, Sardinian and Adriatic Coasts (Teleostei: Cyprinodontidae)</p> <p>Tigano, C, V Ferrito and AM Pappalardo</p>
<p>31) Periosteal Vasculature and Bone Organization</p> <p>Thompson, EN, P Ochareon and SW Herring</p>	<p>32) Vascular Immaturity Enables Plasticity of Adult Adipose Tissue</p> <p>Dickie, R</p>	<p>33) Pineal Gland and the Regulation of Cell Proliferation</p> <p>Sych, VF, IV Arav and SM Slesarev</p>	<p>34) The Hypoglossocervical Nerve Complex in a Bornean Orangutan (<i>Pongo pygmaeus pygmaeus</i>) and an Anubis Baboon (<i>Papio anubis</i>)</p> <p>Kawashima, T, M. Koizumi, K Kawai, S Honma, A Tokiyoshi, H Sasaki and K Kodama</p>	<p>35) Phylogeny of the Branching Pattern of the Nerve Bundles in the Shoulder Region of Tetrapods</p> <p>Koizumi, M and K Kodama</p>	<p>36) Neuromuscular Organization of the Rat Tongue: Is It Mammal Or Reptile?</p> <p>Sokoloff, AJ and O Ferrari</p>
<p>37) Mandibles of Rodents That Have Cheek Pouches Differ Morphometrically from Those of Rodents That Do Not</p> <p>Roth, VL and S Unsicker</p>	<p>38) Morphine Withdrawal Induced Abnormalities in the Spine Dendritic in Nucleus Accubens of Rat</p> <p>Saturnino, S, MC Puddu, M Diana, C Tigano and GP Serra</p>	<p>39) The Carnivore Spine - Does It Support Some Long Held Assumptions?</p> <p>Chang, K, A Camara and PJ Adam</p>	<p>40) Lumbar Vertebral Number in Hominids and Hominoids</p> <p>Rosenman, BA, KG Heiple and CO Lovejoy</p>	<p>41) The Skeleto-Muscular System of the Tongue of the Common Moorhen, <i>Gallinula chloropus meridionalis</i> (Aves, Gruiformes, Rallidae)</p> <p>Shawki, NA and IA Ismail</p>	<p>42) Evidence for Suction Feeding in the Desmostyliidae (Desmostylia, Mammalia)</p> <p>Beatty, BL</p>
<p>43) Behavioral and Morphological Specializations for Aerial Prey Capture in the Silver Arowana, <i>Osteoglossum bicirrhosum</i></p> <p>Whitenack, LB, D Lowry, AP Wintzer, MP Matott, DR Huber, MN Dean, AS Barker and PJ Motta</p>	<p>44) Striking Out</p> <p>Smith, TL, C Wallner and KV Kardong</p>	<p>45) Cranial Sutures in Fish - Using Suture Morphology to Infer Function in Fossil Taxa</p> <p>Markey, MJ and CR Marshall</p>	<p>46) Tooth Microwear Determinations of Trophic Niche in Three-Spined Sticklebacks</p> <p>Purnell, MA, DC Baines, PJB Hart and MA Bell</p>	<p>47) Connexin Distribution in Mammalian Esophagus Epithelium, with Reference to Feeding Habits</p> <p>Meyer, W, B Schoennagel and K Neurand</p>	<p>48) Sperm Ultrastructure in <i>Pseudocorynopoma doriae</i> (Pisces: Ostariophysi: Characiformes: Characidae)</p> <p>Burns, JR, MJ Hajjar-Nejad, SH Weitzman and LR Malabarba</p>

Friday, 30 July 2004

Poster Session 2 8:00-10:00 PM	CONTRIBUTED POSTERS Grand Palm Room (page 3 of 3)				
<p>49) The Biorhythmological Organization of Spermatogenesis</p> <p>Arav, VI , VF Sych and EV Zheleznyak</p>	<p>50) A Comparison of the Feline Claw and the Psittacine Upper Bill: A Natural Experiment</p> <p>Bragulla, HH and DG Homberger</p>	<p>51) Do Mustelid Carnivores Have Semi-Retractile Claws? A Comparative Morphometric Assessment</p> <p>Delannoy, SM, AM Gutierrez and AP Russell</p>	<p>52) A New Training Box for an Assessment of the Upright Posture in Operant Bipedal Rats</p> <p>Matsumura, A, N Schilling and MS Fischer</p>	<p>53) RoboCoq, from Avian Walk to a Bipedal Robot</p> <p>Abourachid, A, R Hacker, F Lambert, V Hugel, P Blazevic, H Gioanni and M Maurice</p>	<p>54) Ecomorphology of the Hindlimb Skeleton in Afro-Malagasy Tenrecoidea</p> <p>Salton, JA</p>
<p>55) Morphology and Function of the Postcrania of Selected Genera of Therocephalia (Amniota: Therapsida)</p> <p>Fourie, H</p>	<p>56) Functional Morphology of the Pes of Tardigrada</p> <p>Tito, G and G De Iuliis</p>	<p>57) Shock Absorbers and More: Design Principles of the Lower Hindlimb in African Elephants (<i>Loxodonta africana</i>)</p> <p>Weissengruber, GE and G Forstenpointner</p>	<p>58) Non-masticatory Functional Complexes and Their Effect on the Morphology of the Insectivoran Glenoid</p> <p>Gabriel, SN and PD Polly</p>	<p>59) Antler Stiffness in Reindeer: Testing Variation in Bone Material Properties Between Males and Females</p> <p>Shah, SR, JD Desjardins, AC Clark and RW Blob</p>	<p>60) Three Dimensional Kinematic Analysis of Powerstroking by Hatchling and Pelagic Stage Loggerhead Sea Turtles <i>Caretta caretta</i> L.</p> <p>Becking LE, R Blob and J Wyneken</p>
<p>61) UV Biased Colour Vision in Piscivorous Dip and Plunge Diving Birds</p> <p>Håstad, O, E Ernstdotter and A Ödeen</p>	<p>62) Morphological Traits and Molecules Involved in the Renal Concentrating Ability of South American Hystricognath Rodents</p> <p>Diaz, GB, MH Gallardo, RA Ojeda, S Brengio, M Dakar, J Sarmiento and G Kausel</p>	<p>63) Comparative Histological Study of Harderian Glands in Three Species of Squamate</p> <p>Gartner, G and LR Ganser</p>	<p>64) The Origin of the Parathyroid</p> <p>Okabe, M and A Graham</p>	<p>65) Origin of Ruminant Cranial Appendages: Biochronological and Biogeographical Aspects</p> <p>Nieto, M, J Morales, D Soria, B Azanza, L Ginsburg, P Plinio Peláez-Campomanes, M Pickford, V Quiralte and IM Sánchez</p>	<p>66) Evidence for Predominance of Orthal Masticatory Movements in Early Sloths</p> <p>Bargo, MS, SF Vizcaino and RF Kay</p>
<p>67) Common Patterns of Morphological Variation in the Skull of Vertebrates. Invariant Processes?</p> <p>Marugán-Lobón, J and M Bastir</p>	<p>68) The Shape of a Species: Morphometric Analysis of the Conodont Skeleton</p> <p>Jones, D, M Purnell, R Aldridge and P von Bitter</p>	<p>69) Pectoral Fin Evolution: Developing New Branches</p> <p>Metscher, BD</p>	<p>70) The Wrist and Manus of Archaeopterygians: Avian, Not Maniraptoran</p> <p>Campbell, KE</p>	<p>71) Two Morphotypes of the <i>Velociraptor</i> Neurocranium</p> <p>Kundrát, M</p>	<p>72) Morphology of the Uncinate Processes in Birds: Phylogenetic Approaches</p> <p>Codd, JR and SF Perry</p>
<p>The Fish Teeth Wet Lab Workshop will be offered during both Poster Sessions and from 3-6 PM on Thursday, 29 July. Sign up at Registration Desk</p>					

Saturday, 31 July 2004

Contributed papers	Live Oak A Chair: Ralph Turnigan	Live Oak B Chair: Andrea Ward	Live Oak C Chair: Miriam Ashley-Ross	Live Oak D Chair: Alan Sokoloff
8:50 - 9:10	How to Measure Ontogeny? Adriaens, D		Startle Response Motor Patterns and Mauthner Cell Morphology in Three Elongate Fish Species: <i>Anguilla rostrata</i> , <i>Mastacembelus armatus</i> , and <i>Protopterus annectens</i> Azizi, E, RP Levine, AB Ward and SJ Zottoli	The Neuromuscular Compartment: Fact Or Fiction? Sokoloff, AJ and GE Goslow
9:10 - 9:30	The Ontogeny of Feeding Performance in Divergent Stickleback Populations Travis, MP	Use of Principal Component Analysis in Modeling Growth of Segmental Structures Bergmann, PJ and AP Russell	Deployment of Dorsal Fins Is an Integral Part of the Escape Response in Largemouth Bass (<i>Micropterus salmoides</i>) Chadwell, BA, D Vichot, C Harris and MA Ashley-Ross	Neuromuscular Compartments in Locomotory Relevant Muscles Arnold, D, N Schilling, MS Fischer and H-C Scholle
9:30 - 9:50	Ontogenetic Changes in the Cranial Kinematics of a Larval Pleuronectiform Fish, <i>Paralichthys lethostigma</i> Francis, AW	Segmental and Regional Growth in the Rat Vertebral Column Russell, AP, PJ Bergmann and A Melin	Kinematics of the Transition Between Walking and Swimming in the California Newt (<i>Taricha torosa</i>) Ashley-Ross, MA and BF Bechtel	Modeling Ballistic Jaw Movements Using Equations of Motion for a Damped Mass-Spring System Nishikawa, KC, AK Lappin, JA Monroy, DJ Pierotti, JQ Pilarski and ED Zepnewski
9:50 - 10:10	Anatomical Features of Neotropical Glanapterygine Catfishes from the Interstitial Sand Environment of the Amazon-Orinoco System Baskin, JN, M De Pinna, F Provenzano and SA Schaefer	Intramuscular Architecture of Paravertebral Muscles in Small Mammals Schilling, N	Patterns of Propulsion by Lizards Accelerating on Sand Korff, WL	Modelling the Soft-body Mechanics of Snake Tongues, Larval Fish and Primitive Chordates van Leeuwen, JL, JH De Groot, JM Mallat, UM Mueller and JHG Van Den Boogaart
10:10 - 10:40	Coffee Break			

Saturday, 31 July 2004

Contributed papers	Live Oak A Chair: Ralph Turnigan	Live Oak B Chair: Andrea Ward	Live Oak C Chair: Miriam Ashley-Ross	Live Oak D Chair: Alan Sokoloff	Majestic Palm Room Chair: John Hutchinson
10:40 - 11:00	Ontogeny of Prey Capture Kinematics and Cranial Morphology in the Leopard Shark <i>Triakis semifasciata</i> Lowry, D and PJ Motta	Development of the Pectoral Fin Musculature in Zebrafish Ward, AB and MC Davis	Phylogeography of Cave Hyena and Cave Bear - Morphology Versus Genetics Nagel, D, N Rohland, G Rabeder and M Hofreiter	Isolation of Skate Elastin-like Genes from the Skate and Their Developmental Role in the Skeleton Miyake, T, JL Vaglia, D Tinnemore and CT Amemiya	Effects of Reproduction on Running Performance and Stability in <i>Iguana iguana</i> Butler, MA
11:00 - 11:20	Plasticity and Conservation of Functional Design in the Teleost Fish, <i>Archosargus probatocephalus</i> Turnigan, RG, JP Platt and MF Fougerolle	The Evolution of Pectoral Fin Development in Gnathostomes: Insights from Embryos and Fossils Davis, MC	Evolution in a Hominin Lineage: The Appearance of the 'Classic' Neanderthal Morphology Ferdinando, P and M Lynn	Sharks Exhibit All Skeletal Features Driven by the Genetic System Underlying Bone Formation Eames, BF, N Allen, J Young, RA Schneider and JA Helms	Bracing of the Trunk and Locomotion in Dyrosaurid Crocodylians Schwarz, D
11:20 - 11:40	The Relationships Between Head Morphology and Feeding Performance During Ontogeny in Two Snake Species (<i>Nerodia fasciata</i> & <i>Agkistrodon piscivorus</i>) Vincent, SE	Pelvic Shape in Reproductive, But Growing, Female Rats: Implications for Pregnancy in Adolescence Bernstein, M and S Berdnikovs	Cryptic Diversity and Evolution of Miniaturized Vertebrates: The Mexican Salamander Genus <i>Thorius</i> Hanken, J, G Parra-Olea, M Garcia-Paris and DB Wake	Early Bone Growth in King Penguin Chicks (<i>Aptenodytes patagonicus</i>) Castanet, J, E De Margerie, JP Robin, D Verrier, J Cubo and R Groscolas	The Biomechanics of Bounding Crocodiles Hutchinson, JR, JM Donelan, GM Erickson, KA Vliet, D Kledzik and R Kram
11:40 - 12:00	Size, Shape and Metamorphosis: Ontogeny of the Aquatic Escape Response of Spotted Salamanders, <i>Ambystoma maculatum</i> Landberg, T and E Azizi	Signed Assymetry of Vestigial Pelvic Phenotypes in Threespine Stickleback Bell, MA, V Khalef and MP Travis	Tongue projection in plethodontid salamanders: a high-power ballistic system Deban, SM, JC O'Reilly, U Dickie, and JL van Leeuwen	Application of Skeletochronology in Age Determination of Larvae of Salamanders of the Genera <i>Gyrinophilus</i> and <i>Pseudotriton</i> (Amphibia: Plethodontidae) Bruce, RC and J Castanet	Influence of Head-bobbing on the Dynamics of Quails' Locomotion Hackert, R and A Abourachid
12:00 - 1:30	Lunch Break				
1:30 - 2:30	Plenary Lecture: Freidberg Lifelong Learning Center Auditorium <i>The Promise of Basic Mechanics in Functional and Ecological Vertebrate Morphology</i> Peter Aerts University of Antwerp, Belgium				
2:30 - 3:00	Afternoon Break				

Saturday, 31 July 2004

Symposia	THE ONTOGENY OF PERFORMANCE IN VERTEBRATES Live Oak A	MORPHOLOGY AND PALEOBIOLOGY OF MESOZOIC BIRDS Live Oak B	MAKING HEADWAY – CRANIOFACIAL DEVELOPMENT IN MODEL AND NON-MODEL VERTEBRATES Live Oak C	INTEGRATED MECHANICAL INVESTIGATIONS OF FISH SWIMMING Live Oak D
3:00 - 3:30	Ontogeny of Escape Performance in Teleost Fishes Gibb, AC	Growth Patterns of Mesozoic Birds Chinsamy, A	Craniofacial Development: Facing the Future Francis-West, PH	Experimental Hydrodynamics of Median and Paired Fins in Fishes Lauder, GV
3:30 - 4:00	<i>In Vivo</i> Bone Strain Through Ontogeny: a Comparison of Two Vertebrate Taxa Main, RP and AA Biewener	Evolution and Structural Constraints of Avian Locomotion: What Use is Half a Wing? Dial, KP	Using Quail-duck Chimeras to Elucidate Mechanisms of Craniofacial Morphogenesis Schneider, RA	Simulation-Based Biological Fluid Dynamics in Fish Swimming Liu, H
4:00 - 4:30	Ontogeny of Contractile Performance and Physiological Capacity in Rattlesnake Shaker Muscle Moon, BR and A Tullis	Archosaur Shoulder Mechanics: Implications for Mesozoic Birds Baier, D	Neural Crest Cells: Development and Patterning of a Stem Cell Population in Craniofacial Development Trainor, PA	Is it a Drag to be Small? Why Fish Larvae Change Gait During Development Van Leeuwen, JL and UK Müller
4:30 - 5:00	Ontogeny of Bite Force and Diet in Lizards and Turtles Herrel A and JC O'Reilly	Reconstructing Leg Function from Osteology in Mesozoic Birds Middleton, KM and SM Gatesy	The Role of Endoderm in Pharyngeal Arch Development: Ugly Stepbrother to Neural Crest has its Day Hernández, LP	How Do Ontogenetic Changes in Morphology and Behavior Affect the Swimming Performance of Zebrafish? McHenry, MJ
5:00 - 5:30	The Effects of Ontogenetic Changes in Performance on Behaviour and Fitness (or, Why Size Matters) Lailvaux, S and DJ Irschick	Hindlimb Morphology and Function at the Non-avian - Avian Transition Christiansen, P	Patterns of Tooth Replacement in Osteichthyans: Variations on a Theme Huyseune, A, C Van Der Heyden and PE Witten	Heads or Tails? Anterior Thrust Generation in Numerically-Simulated Carangiform Fish Root, RG, T Psemeneke, R Cortez, P Watts and JH Long Jr.
5:30 - 6:00	Morphological Variation in Eurasian Perch (<i>Perca fluviatilis</i>): Linking Performance and Ecology Svanbäck, R	Biological Roles of Locomotor Modes in Basal Birds Elzanowski, A	Morphogenesis and Evolution of the Cranial Musculature and Skeleton in Lungfishes and Amphibians Olsson, L	From Lampreys to Salamanders: Neuromechanical Simulations of Gait Transition Between Swimming and Walking in the Salamander Ijspeert, AJ and J-M Cabelguen
3:00-6:00	Workshop: APPLICATION OF ADVANCED IMAGING TECHNOLOGIES TO VERTEBRATE MORPHOLOGY (see next page for details) Majestic Palm Room Organized by Ted Cranford			
7:00-10:00 PM	ICVM Banquet and Congress Party Boca Raton Marriott Hotel			

Saturday, 31 July 2004

Workshop: Application of Advanced Imaging Technologies to Vertebrate Morphology
Organized by Ted W. Cranford, San Diego State University USA and
Guido Fritsch, Institute for Zoo and Wildlife Research, Berlin, Germany

3:00 - 3:20

Humphries, Julian **Digimorph.Org: A Digital Library of Morphology Based On High-Resolution X-Ray Computed Tomography**

3:20 - 3:40

Ehman, Richard L. **Magnetic Resonance Elastography**

3:40 - 4:00

Starck, J. Matthias **Applications of Doppler Ultrasonography in Vertebrates**

4:00 - 4:20

Frey, Roland and Fritsch, Guido **The Highly Specialized Larynx of the Mongolian Gazelle (*Procapra gutturosa* Pallas, 1777). Classical Morphological Methods and Computed Tomography Combined**

4:20 - 4:40 Discussion

4:40 - 5:00

Solounias, Nikos, Muhlbachler, Matthew C., and Colbert, Matthew **The Meatal Diverticulum and Conchae of Tapirs**

5:00 - 5:20

McKenna, Megan F., Berta, Annalisa, and Cranford, Ted W. **CT Scans and 3D-Reconstructions: Tools Investigating Evolution and Function of Soft Tissue Structures**

5:20 - 5:40

Fritsch, Guido, Frey, Roland, Fassbender, Mirja, Giere, Peter, Vasuthevan, Vasu, and Hildebrandt, Thomas B.
Imaging of Whale Foetuses: Computed Tomography of Preserved Specimens of Different Cetacean Species

5:40 - 6:00

Cranford, Ted, W. **Industrial CT-Images of Large Whales as a Foundation for Sound Propagation Models**

Sunday, 1 August 2004

Symposia	MOLECULAR AND MORPHOGENETIC EVOLUTION OF SPECIFIC ORGANS Live Oak A	PHYLOGENETIC APPROACHES IN COMPARATIVE VERTEBRATE MORPHOLOGY Live Oak B	RESPIRATION AND LOCOMOTION: COUPLED SYSTEMS IN VERTEBRATE EVOLUTION Live Oak C
9:00 - 9:30	Molecular Bases for Evolutionary Novelty – Vertebrate Jaw and Turtle Shell Kuratani, S, Y Shigetani, H Nagashima and S Kuraku	Recent Developments in Phylogenetically Based Statistical Methods Garland, T	The Possible Neuroanatomical Basis for Central Control of Cardiorespiratory Interactions in Vertebrates Taylor, EW
9:30 - 10:00	Evolution of Developmental Mechanisms of the Vertebrate Ear Fritzschn, B	Phylogenetic Analyses of Adaptation and Constraint in Lacertid Lizards Vanhooydonck, B and R Van Damme	Dual Coupled Respiratory Oscillators in Amphibians and Mammals: Are They Homologous? Remmers, JE, R Wilson and K Vasilakos
10:00 - 10:30	How Labile Are Tooth Cusps? Kangas, AT, KD Kavanagh, I Salazar-Ciudad, T Mustonen, ML Mikkola, I Thesleff and J Jernvall	Evolution of Flight Morphology in Hummingbirds Altshuler, DL, FG Stiles, GR Graves and JA Mcguire	Cardiorespiratory Coupling During Terrestrial Locomotion in Reptiles: Consequences of Intra-abdominal Pressure and Respiratory Mechanics Munns, SL, LK Hartzler, AF Bennett and JW Hicks
10:30 - 11:00	Coffee Break		
11:00 - 11:30	Diversity of Position and Morphology of Vertebrate Limbs Tamura, K and S Yonei-Tamura	The Morphology of the Digestive Tract of Cetaceans and Ungulates, Maternal Investment and Phylogenetic Implications Langer, P	The Effect of Coelomic Septation on Lung Ventilation in Lizards Klein, W and T Owerkowicz
11:30 - 12:00	Molecular Evolution of the Endostyle Ogasawara, M	Integrating CT Scanning, 3D Morphometrics, and Phylogenetics to Reconstruct Hypothetical Ancestral Morphologies of Horned Lizards Hodges, WL	Functional Significance of the Uncinate Processes in Birds and Maniraptoran Dinosaurs Codd, JR and SF Perry
12:00 - 12:30	Development of the Lamprey Reticulospinal- and Branchiomotor-Neurons, with Special Reference to the Evolution of the Vertebrate Hindbrain Murakami, Y, M Pasqualetti, Y Takio, S Hirano, FM Rijli and S Kuratani	Phylogenetic Comparative Analysis of Multivariate Data As Exemplified by Comparative Quantitative Genetics and the Evolution of the G-Matrix Steppan, SJ	Tuning the Natural Frequencies of Locomotion and Breathing in Mammals and Running Birds Nassar, PN
12:30 - 1:30	Lunch Break		
1:30 - 2:30	Plenary Lecture: Freidberg Lifelong Learning Center Auditorium <i>Fleshing Out the Past: the Problem of Anatomical Novelty in the Fossil Record</i> Lawrence Witmer Ohio University, Athens, Ohio, USA		
2:30	Closing Ceremony: Freidberg Lifelong Learning Center Auditorium		