

7th International Congress of Vertebrate Morphology
27 July – 1 August 2004
Florida Atlantic University
Boca Raton Florida USA

Plenary Lectures

- *The promise of basic mechanics in functional and ecological vertebrate morphology*, Peter Aerts, University of Antwerp, Belgium
- *The conservation of body plans through internal selection*, Frietson Galis, Leiden University, The Netherlands
- *Mechanical loading and the mammalian skull*, Susan Herring, University of Washington, Seattle, USA
- *How is morphology encoded in the genome?* David Kingsley, Stanford University, Palo Alto, California, USA
- *Breaking organisms into parts: similarity, stereotype, and homology*, Olivier Rieppel, Field Museum of Natural History, Chicago, Illinois, USA
- *Fleshing out the past: the problem of anatomical novelty in the fossil record*, Lawrence Witmer, Ohio University, Athens, Ohio, USA

Symposia

1) ADHESION IN VERTEBRATES – MECHANISMS AND BIOMIMETIC IMPLICATIONS

Organizer: Jon Barnes, Glasgow University, Scotland, UK

- *Geckos: biological inspiration for smart adhesives and climbing robots*, Kellar Autumn, Lewis & Clark College, Portland, Oregon, USA
- *Whole-organism studies of clinging and locomotor ability in pad-bearing lizards*, Duncan J. Irschick, Tulane University, New Orleans, Louisiana, USA
- *Wet adhesion in tree frogs: mechanisms and biomimetic implications*, W. Jon. P. Barnes and Joanna M. Smith, Glasgow University, Scotland, UK
- *Adhesive pads of the feathertail glider, *Acrobates pygmaeus* (Marsupialia; Acrobatidae)*, Herb. Rosenberg, University of Calgary, Canada
- *Surface adhesion in insects and vertebrates: functional similarities and convergent design*, Walter Federle, University of Würzburg, Germany
- *Biological attachment systems as a possible source for biomimetics*, Stanislav N. Gorb, Max-Planck-Institut für Metallforschung, Stuttgart, Germany

2) EVOLUTION OF DEVELOPMENTAL AND REPRODUCTIVE PATTERNS IN MAMMALS

Organizers: Kathleen Smith, Duke University, Durham, North Carolina, USA

Ulrich Zeller, Museum of Zoology & Humboldt University, Berlin, Germany

- *The developing marsupial*, Marilyn Renfree, University of Melbourne, Australia
- *Marsupial placentation*, Claudia Freyer, University of Melbourne, Australia
- *Stem species patterns of mammalian reproduction*, Ulrich Zeller, Museum of Zoology & Humboldt University, Berlin, Germany
- *The dental replacement and its correlation to the skull growth patterns in early mammals*, Zhe-Xi Luo, Carnegie Museum, Pittsburgh, Pennsylvania, USA
- *Evolution and development of the postcranial skeleton in therians*, Marcelo Sanchez Villagra, University of Tübingen, Germany
- *The “embryonic area” of marsupial late unicellular blastocysts*, Jason Lillegraven, University of Wyoming, Station Laramie, Wyoming, USA

3) EVOLUTIONARY ORIGIN OF NEURAL CREST AND PLACODES

Organizers: Gerhard Schlosser, University of Bremen, Germany
Clare V. H. Baker, Cambridge University, UK

- *The New head hypothesis revisited*, R. Glenn Northcutt, University of California, San Diego, USA
- *The central role of genetic cooption during neural crest evolution*, Daniel Meulemans, California Institute of Technology, Pasadena, USA
- *Amphioxus and the evolution of neural crest and placodes*, Linda Z. Holland, Scripps Institution of Oceanography, University of California, San Diego, USA
- *Placodal structures in tunicates*, Lucia Manni, University of Padova, Italy
- *Development of putative placode homologs in *Ciona intestinalis**, Sebastian Shimeld, University of Reading, UK
- *Development and evolution of placodes from a common precursor?* Gerhard Schlosser, Brain Research Institute, University of Bremen, Germany

4) INFERRING FUNCTION AND BEHAVIOR IN EXTINCT VERTEBRATES

Organizers: Donald M. Henderson, University of Calgary, Canada
Eric Snively, University of Calgary, Canada

- *From muscles to mechanics*, John R Hutchinson, Biomechanical Engineering Division, Stanford University, Palo Alto, California, USA
- *Evolution of carnivory in synapsids*, Blaire Van Valkenburgh, University of California, Los Angeles, USA
- *Pterosaurs - winged, weird wonders*, David M. Unwin, Zentral Institut der Humboldt-Universitat, Berlin, Germany
- *Mechanics of herbivory in dinosaurs*, David B. Norman, Cambridge University, UK
- *From fishes to tetrapods: morphomechanical transitions*, Michael Gudo, Forschungsinstitut Senckenberg, Frankfurt, Germany
- *Evolution of swimming in whales*, Frank Fish, West Chester College, Pennsylvania, USA

5) INTEGRATED MECHANICAL INVESTIGATIONS OF FISH SWIMMING

Organizers: Robert G. Root, Lafayette College, Easton, Pennsylvania, USA
John H. Long, Vassar College, Poughkeepsie, New York, USA

- *From lampreys to salamanders: neuromechanical simulations of gait transition between swimming and walking in the salamander*, Auke Jan Ijspeert, Swiss Federal Institute of Technology, Lausanne, Switzerland
- *Experimental hydrodynamics of median and paired fins in fishes*, George V. Lauder, Harvard University, Cambridge, Massachusetts, USA
- *Simulation-based biological fluid dynamics in fish swimming*, Hao Liu, Chiba University, Japan
- *The ontogenetic scaling of morphology, behavior and swimming performance in zebrafish*, Matthew J. McHenry, Harvard University, Cambridge, Massachusetts, USA
- *Heads or tails? Anterior thrust generation in numerically-simulated carangiform fish*, Robert G. Root, Tiffany Psemeneke, Ricardo Cortez, Philip Watts, and John H. Long. Lafayette College, Easton, Pennsylvania, USA; Boston University, Massachusetts, USA; Tulane University, New Orleans, Louisiana, USA; Applied Fluid Dynamics, Vassar College, Poughkeepsie, New York, USA
- *Fast muscle function in the European eel (*Anguilla anguilla*, L.) during aquatic and terrestrial locomotion*, I.L.Y. Spierts, D. J. Ellerby and J. D. Altringham, Wageningen University, The Netherlands; University of Leeds, UK

6) INTEGRATING APPROACHES TO THE STUDY OF TERRESTRIAL LOCOMOTION

Organizers: Steve Reilly, Ohio University, Athens, Ohio, USA

Nancy Stevens, Ohio University, Athens, Ohio, USA

- *Patterns of mechanical energy fluctuations in tetrapods: pendula, springs and everything in between*, Andrew A. Biewener, Harvard University, Cambridge, Massachusetts, USA
- *Powering locomotion: correlating mechanics with energetics*, Donald F. Hoyt, California State Polytechnic University, Pomona, USA
- *Tetrapod symmetrical gaits and their relationship to energy saving mechanics*, Audrone Biknevičius, Ohio University, Athens, Ohio, USA
- *Joint kinematics, EMG, and inverse dynamics of quadrupedal locomotion*, Martin Fischer, Friedrich-Schiller-Universität, Jena, Germany
- *Stability, compliance, and limb shape: the ecological relevance of gait*, Nancy Stevens, Ohio University, Athens, Ohio, USA
- *Energetics, mechanics, and gaits: where are we going*, Steve Reilly, Ohio University, Athens, Ohio, USA

7) LINKING GENES AND MORPHOLOGY

Organizers: Fritson Galis, Leiden University, Netherlands

Jukka Jernvall, University of Helsinki, Finland

- *Molecular basis of limb and fin evolution*, Martin Cohn, University of Florida, Gainesville, USA
- *Feather development: from genes to evolution*, Rick Prum, University of Kansas, Lawrence, USA
- *Tooth cusp patterning: from genes to evolution*, Isaac Salazar-Ciudad, University of Helsinki, Finland
- *How the turtle should get its shell: preliminary developmental genetics of carapace and plastron formation*, Scott Gilbert, Swarthmore College, Pennsylvania, USA
- *Genetics of canid skeletal morphology*, Gordon Lark, University of Utah, Salt Lake City, USA
- *Linking molecular and morphological evolution, in eukaryotes in general, and the amphibian head in particular*, Mats Svensson, Friedrich-Schiller-Universität, Jena, Germany

8) MAKING HEADWAY – CRANIOFACIAL DEVELOPMENT IN MODEL AND NON-MODEL VERTEBRATES

Organizer: L. Patricia Hernández, George Washington University, Washington, DC, USA

- *Using model and non-model organisms in the study of tooth development*, Ann Huysseune, Ghent University, Belgium
- *Craniofacial development: facing the future*, Philippa Francis-West Reader, Guy's Hospital, London, UK
- *Using quail-duck chimeras to elucidate mechanisms of craniofacial morphogenesis*, Richard Schneider, University of California, San Francisco, California, USA
- *The role of endoderm in pharyngeal arch development: ugly stepbrother to neural crest has its day*, L. Patricia Hernández, George Washington University, Washington, DC, USA
- *Neural crest cells: patterning and development of an embryonic stem cell like population during craniofacial development*, Paul Trainor, Kansas University Medical Center, Kansas City, USA
- *Three-dimensional morphogenesis of cranial musculature in lungfishes, caecilians, salamanders and frogs*, Lennart Olsson, Friedrich-Schiller-Universität, Jena, Germany

9) MECHANISTIC APPROACHES TO EVOLUTIONARY DEVELOPMENTAL BIOLOGY

Organizer: Miriam Leah Zelditch, University of Michigan, Ann Arbor, Michigan, USA

- *Variability and morphogenesis of mammalian teeth in relation to short and long-term evolution*, David Polly, University of London, Queen Mary & Westfield Colleges, UK
- *Integration and inheritance of adaptive environmental effects: an example with foraging apparatus of shrews*, Alexander Badyaev, University of Arizona, Tucson, USA

- *Ontogeny of variance and developmental noise*, Benedikt Hallgrímsson, University of Calgary, Canada
- *Asymmetry and developmental instability of the human skull*, Valerie Burke DeLeon, Johns Hopkins School of Medicine, Baltimore, Maryland, USA
- *Differential growth and morphological integration of the rodent skull*, Eladio Marquez, University of Michigan, Ann Arbor, Michigan, USA
- *Targeted growth and the regulation of mammalian body size*, Rebecca Z. German, University of Cincinnati, Ohio, USA

10) MOLECULAR AND MORPHOGENETIC EVOLUTION OF SPECIFIC ORGANS

Organizers: Bernd Fritzsich, Creighton University, Omaha, Nebraska, USA

Shigeru Kuratani, Center for Developmental Biology, RIKEN, Kobe, Japan

- *Evolution of the ear and regulatory genes*, Bernd Fritzsich, Creighton University, Omaha, Nebraska, USA
- *Pax6 and evolution of the eye*, Claude Desplan, New York University, USA
- *Mammalian teeth evolution and genetic network*, Jukka Jernvall, Institute of Biotechnology, University of Helsinki, Finland
- *Development and evolution of the forebrain and pharyngeal arches*, Shigeru Kuratani, Center for Developmental Biology, RIKEN, Kobe Hyogo, Japan
- *Evolution in limb development*, Koji Tamura, Tohoku University, Sendai, Japan
- *Evolution of thyroid and endostyle and regulatory genes*, Michio Ogasawara, Chiba University, Japan

11) MORPHOLOGY AND PALEOBIOLOGY OF MESOZOIC BIRDS

Organizers: Andrzej Elzanowski, University of Wrocław, Poland

Anusuya Chinsamy-Turan, University of Cape Town, South Africa

- *Growth dynamics of Mesozoic birds*, Anusuya Chinsamy-Turan, University of Cape Town, South Africa
- *Aerodynamic constraints on the radiation of flight in Mesozoic birds*, Jeremy Rayner, University of Leeds, UK
- *Archosaur shoulder mechanics: implications for Mesozoic birds*, David Baier, Brown University, Providence, Rhode Island, USA
- *Reconstructing leg function from osteology in Mesozoic birds*, Stephen Gatesy and Kevin Middleton, Brown University, Providence, Rhode Island, USA
- *Hindlimb in non-avian and avian theropods: proportions, kinematics, and function*, Per Christiansen, University of Copenhagen, Denmark
- *Biological roles of locomotion in Mesozoic birds*, Andrzej Elzanowski, University of Wrocław, Poland

12) PHYLOGENETIC APPROACHES IN COMPARATIVE VERTEBRATE MORPHOLOGY

Organizer: Theodore Garland, University of California, Riverside, USA

- *Evolution of flight morphology in hummingbirds*, Douglas L. Altshuler, California Institute of Technology, Pasadena, USA
- *Recent developments in phylogenetically based statistical methods*, Theodore Garland, Jr., University of California, Riverside, USA
- *Integrating CT scanning, 3D morphometrics, and phylogenetics to reconstruct hypothetical ancestral morphologies*, Wendy L. Hodges, University of California, Riverside, USA
- *The morphology of the digestive tract of cetaceans and ungulates, maternal investment, and phylogenetic implications*, Peter Langer, Justus-Liebig-Universität, Giessen, Germany

- *Comparative quantitative genetics: evolution of the G matrix*, Scott J. Steppan, Florida State University, Tallahassee, Florida, USA
- *Phylogenetic analyses of adaptation and constraint in lacertid lizards*, Bieke Vanhooydonck, University of Antwerp, Netherlands

13) RESPIRATION AND LOCOMOTION: COUPLED SYSTEMS IN VERTEBRATE EVOLUTION

Organizers: Steven F. Perry, Universität Bonn, Germany
David R. Carrier, University of Utah, Salt Lake City, USA

- *Control of respiratory and cardiac function in fish*, Edward W. Taylor, University of Birmingham, UK
- *Comparative aspects of the control of aerial breathing in fish, amphibians and amniotes*, John E. Remmers, University of Calgary, Canada
- *Conflicting effects of abdominal pressures and the respiratory pump in exercising reptiles*, Susan Munns, University of California, Irvine, USA
- *The effect of coelomic septation on lung ventilation in lizard*, Tomasz Owerkowicz, University of Adelaide, Australia, Wilfried Klein, Universidade Federal de Bahia, Brazil
- *Coordination of locomotion and breathing in flying birds*, Dona Boggs, Eastern Washington University, Spokane, Washington, USA
- *Tuning the natural frequencies of locomotion and breathing in mammals and running birds*, Peter Nassar, Bryn Mawr College, Bryn Mawr, Pennsylvania, USA

14. STEM GROUPS AND THE ASSEMBLY OF VERTEBRATE BODY PLANS

Organizers: Philip Donoghue, University of Birmingham, UK
Mark Purnell, University of Leicester, UK

- *Recognizing stem vertebrates and hypotheses of vertebrate origins*, Mark Purnell, University of Leicester, UK
- *The establishment of the gnathostome bodyplan*, Philip Donoghue, University of Birmingham, UK
- *The origin of tetrapods and amniotes*, Mike Coates, University of Chicago, Illinois, USA
- *Dinosaurs and the origin of birds*, Kevin Padian, University of California, Berkeley, USA
- *Stem-group mammals and the assembly of the mammalian body plan*, Tim Rowe, University of Texas, Austin, USA
- *Stem group hominids and human origins*, David Strait, New York College of Osteopathic Medicine, Old Westbury, New York, USA

15) THE ONTOGENY OF PERFORMANCE IN VERTEBRATES

Organizers: Anthony Herrell, University of Antwerp, Belgium
Alice C. Gibb, Northern Arizona University, Flagstaff, USA

- *Ontogeny and performance of locomotion and feeding in fish*, Alice C. Gibb, Northern Arizona University, Flagstaff, Arizona, USA
- *The ontogeny of habitat use and performance in Caribbean anoles*, Duncan J. Irschick, Tulane University, New Orleans, Louisiana, USA
- *Ontogeny of bite force and diet in lizards and turtles*, James C. O'Reilly, University of Miami, Coral Gables, Florida, USA
- *Morphological variation in Eurasian perch (*Perca fluviatilis*): linking performance and ecology*, Richard Svanbäck, Evolutionary Biology Centre Norbyv, Uppsala, Sweden
- *Ontogeny of contractile performance and physiological capacity in rattlesnake shaker muscle*, Brad Moon, University of Louisiana, Lafayette, Louisiana, USA
- *In vivo bone strain through ontogeny: A comparison of diverse vertebrate taxa*, Russ Main, Concord Field Station, Museum of Comparative Zoology, Harvard University, Bedford, Massachusetts, USA

Poster Symposia

1) MORPHOLOGY AND LIFE HABITS OF PAST AND PRESENT GIANT VERTEBRATES

Organizers: R.A. Fariña, Universidad de la Republica, Montevideo, Uruguay
S.F. Vizcaíno, Museo de La Plata, La Plata, Argentina

- *Fossil aquatic giants*, Ryosuke Motani, University of Oregon, Eugene, USA
- *Mesozoic terrestrial giants*, Gerardo Mazzetta, University of Bristol, UK
- *Flying giants*, Jim Cunningham, Cunningham Engineering Assoc., USA
- *Cenozoic giants of Eurasia*, Per Christiansen, University of Copenhagen, Denmark
- *Cenozoic giants of South America*, Susana Bargo, Universidad Nacional de La Plata, Argentina
- *Cenozoic giants of North America*, Gerry de Iuliis, University of Toronto, Canada
- *Cenozoic giants of Australia*, Stephen Wroe, University of Sydney, Australia
- *Cenozoic giants of Africa and terrestrial living giants*, René Bobe, Smithsonian Institution, Washington, D.C., USA
- *Living aquatic giants*, Héctor Botella, Universitat de València, Spain
- *How to be a giant and not die out at trying*, Richard A Fariña and Sergio F. Vizcaíno, Universidad de la República, Uruguay, Universidad Nacional de La Plata, Argentina

2) 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

- *Burrowing in snakes: past efforts and future directions*, David Cundall, Nathan J. Kley and James C. O'Reilly, Lehigh University, Bethlehem, Pennsylvania, USA; Field Museum of Natural History, Chicago, Illinois, USA; University of Miami, Coral Gables, Florida, USA
- *Xenosaurus defensive behaviors in crevices: life between a rock and a hard place*, Edward DeGrauw, Portland Community College, Oregon, USA
- *Burrowing strategies in fishes: from head to tail*, Natalie De Schepper and Dominique Adriaens, Ghent University, Belgium
- *Behavior and kinematics of burrowing in Ambystoma salamanders*, Peter Ducey, State University of New York, Cortland, USA
- *Small mammal burrowing: multiple evolutionary pathways to similar results*, Jean-Pierre Gasc, Muséum National d'Histoire Naturelle, France
- *Feeding underground: consequences of burrowing on the design and use of the cranial system in lizards*, Anthony Herrel, University of Antwerp, Belgium
- *Adaptations for digging in living and fossil Octodontidae (Rodentia: Caviomorpha)*, Enrique Lessa, Aldo Vasallo and Diego Verzi, Universidad de la República, Uruguay, Universidad Nacional de Mar Del Plata, Argentina, Museo de La Plata, Argentina
- *Is sand swimming in reptiles true swimming?* Brad Moon, University of Louisiana, Lafayette, USA
- *Potential locomotor tradeoffs during the evolution of limbless burrowing*, James O'Reilly and Bieke Vanhooydonck, University of Miami, Coral Gables, Florida, USA, University of Antwerp, Belgium
- *Adaptations for fossoriality in tadpoles*, Richard Wassersug, Dalhousie University, Halifax, Canada

3) VENOM DELIVERY IN SNAKES

Organizers: Bruce A. Young, Lafayette College, Easton, Pennsylvania, USA
Kenneth Kardong, Washington State University, Pullman, Washington, USA

- *The functional role of snake fangs in fluid transport*, Kenneth Kardong and Bruce A. Young, Washington State University, Pullman, Washington, USA; Lafayette College, Easton, Pennsylvania, USA,
- *The developmental biology of snake fangs*, Kate Jackson, University of Toronto, Ontario, Canada

- *The comparative and functional morphology of venom ducts in snakes*, Bruce A. Young, Lafayette College, Easton, Pennsylvania, USA
- *Functional basis of venom secretion and regulation*, Steven Mackessy, University of Northern Colorado, Greeley, Colorado, USA
- *Influence of envenomation on ingestion mechanics*, David Cundall and Alexandra Dueffel, Lehigh University, Bethlehem, Pennsylvania, USA
- *Functional plasticity in the venom apparatus of snakes*, Alexandra Dueffel and David Cundall, Lehigh University, Bethlehem, Pennsylvania, USA

4) 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

- *Ichthyostega: innovative but not intermediate*, Henning Blom, University Museum of Zoology, Cambridge, UK (co-authored by Per Ahlberg and Jenny Clack)
- *Thermal physiology and the origin of terrestriality in vertebrates*, David Green, McGill University, Montreal, Canada (co-authored by Robert Carroll and Jason Irwin)
- *Neural crest derivation of the osteocranium in recent anurans*, Josh Gross, Harvard University, Cambridge, Massachusetts, USA (co-authored by James Hanken)
- *Evolutionary and ontogenetic transformations in anuran tadpoles*, Alexander Haas, Zoologisches Institut und Zoologisches Museum, Hamburg, Germany
- *Development of the pectoral girdle in Discoglossus (Anura: Discoglossidae) in context of fish-amphibian transition*, Pavla Havelková, South-Bohemian University, České Budějovice, Czech Republic (co-authored by Z. Rocek)
- *Candidate gene approach to the evolution and development of bone formation in metamorphosing and direct-developing frogs*, Ryan Kerney, Museum of Comparative Zoology, Cambridge, Massachusetts, USA (co-authored by James Hanken)
- *Structure of parasphenoid of Permian seymouriamorph tetrapods in light of fish-tetrapod transition*, Jozef Klembara, Comenius University, Bratislava, Slovak Republic
- *Structure and development of the ethmoidal part of the skull in Pipidae, and its possible ancestral pattern in Temnospondyli*, Karel Královec, University of Pardubice, Pardubice, Czech Republic (co-authored by Z. Rocek)
- *Transformations of the branchial arterial arches in metamorphosing toad Pelobates fuscus (Amphibia, Anura)*, Hana Majorová, Charles University, Prague, Czech Republic
- *Life history, morphology, and the transition to dry land*, John O. Reiss, Humboldt State University, Arcata, California, USA
- *Morphological features in anuran development reflecting fish-amphibian transition*, Zbynek Rocek, Institute of Geology, Academy of Sciences, Prague, Czech Republic and Charles University, Prague, Czech Republic
- *Development of the pelvic girdle in some anurans: contribution to understanding the origin of pelvis in early terrestrial tetrapods*, Hana Majorova, Charles University, Prague, Czech Republic
- *Evolution of urodele metamorphosis as guide to early vertebrate metamorphosis*, Sergei Smirnov, A.N. Severtsov Institute of Ecology and Evolution, Moscow, Russia
- *The conquest of land in temnospondyl amphibians*, Sébastien Steyer, Laboratoire de Paléontologie, Muséum National d'Histoire Naturelle, Paris, France, Laboratory of Palaeobiology, Institute of Geology, Academy of Sciences, Prague, Czech Republic
- *Developmental origin of the ear-ossicle in contemporary anurans*, Jan Trbuek, Palacky University, Olomouc, Czech Republic

Workshops

1) FINITE-ELEMENT ANALYSIS OF VERTEBRATE SKULLS

Organizer: Callum F. Ross, Stony Brook University, New York, USA

- *Bite force and bone strain in the facial skeletons of bats*, E.R. Dumont and I.R. Grosse, University of Massachusetts, Amherst, USA
- *Finite element modeling of the anthropoid mandible: In vitro experimental validation and the effects of altered boundary conditions*, Ruxandra Marinescu, David J Daegling, and Andrew J Rapoff, University of Florida, Gainesville, Florida, USA
- *Analogues, near-misses, experimental data and the problems of using FEA as applied to fossil vertebrates*, Ian Jenkins-McIntyre, University College London, London, UK
- *Developing a biomechanical model of the feeding apparatus in aquatic tetrapods, Part 1: an investigation of the crocodilian skull using Finite Element Analysis*, Colin McHenry, University of Newcastle, Callaghan, NSW, Australia
- *The biomechanics of the skulls in higher primates, in comparison to that in basal synapsids*, Holger Preuschoft, Ruhr-Universität Bochum, Germany
- *Modelling fossil skeletal material using FEA: assumptions, pitfalls and possibilities*, Emily Rayfield, University of Cambridge, Cambridge, UK
- *Modeling muscle function in Finite Element Analysis: what matters most?* Callum F. Ross, Stony Brook University, New York, USA
- *Finite element analysis applied to primate facial biomechanics*, David Strait, New York College of Osteopathic Medicine, Old Westbury, New York, USA
- *FE-Model construction for the virtual synthesis of the human skull*, Ulrich Witzel, Lehrstuhl für Maschinenelemente und Konstruktionslehre Universitätstraße, Bochum, Germany

2) APPLICATION OF ADVANCED IMAGING TECHNOLOGIES TO VERTEBRATE MORPHOLOGY

Organizers: Ted W. Cranford, San Diego State University

Guido Fritsch, Institute for Zoo and Wildlife Research, Berlin, Germany

- *The highly specialized larynx of the Mongolian gazelle (Procapra gutturosa) - classical morphological methods and computed tomography combined*, Roland Frey, Institute for Zoo and Wildlife Research, Berlin, Germany
- *Whale foetuses of the one hundred year old Kuekenenthal collection - reinvestigated by computed tomography*, Guido Fritsch, Institute for Zoo and Wildlife Research, Berlin, Germany
- *Imaging techniques for large whales as a foundation for building sound propagation models*, Ted W. Cranford, San Diego State University, California, USA
- *Geometric Morphometrics using CT and MR imaging in the odontocete nasal complex*, Megan McKenna, San Diego State University, California, USA
- *Digital visualization of cranial cavities; examples from fossil and recent mammals*, Matthew W. Colbert, The University of Texas, Austin, Texas, USA
- *Gut Morphology as illuminated by Ultrasound*, J. Matthias Starck, University of Munich, Munich, Germany
- *Magnetic Resonance Elastography: new techniques and new results*, Richard L. Ehman, Mayo Foundation, Rochester, Minnesota, USA
- *MRIs of extinct equids coupled with dissections and MRI of extant horses*, Nikos Solounias, New York Institute of Technology, New York, USA

3) TEACHING COMPARATIVE ANATOMY

Organizers: A.P. Russell
H.I. Rosenberg

Panelists:

Ian Jenkins-McIntyre

Steve Perry, Universität Bonn, Germany

Ken Kardong, Washington State University, Pullman, Washington, USA

Karel Liem, Harvard University, Cambridge Massachusetts USA

Ted Goslow, Brown University, Providence, RI USA

Robert Carr

Dominique Homberger

Edward Zalisko

Bruce Young, Lafayette College, Easton, Pennsylvania, USA

4) FISH TEETH WET LAB

Organizer: H. Evans