Export/sampling permits

Please note an export permit must be linked to an object or site that has to be created on SAHRIS! If the object/site you want to work on has not been created yet, you would need to do so. Thanks!

The proposal should include (you can fill these in below):

- a list of participants (name, affiliation, phone no, email addresses) and how they are involved;
- the name and address of the facility, including address, it is being scanned at;
- name and address of the museum/university department that currently hosts the object;
- names of the responsible person(s) during transport and while the fossil is at the facility;
- the period/time frame during which the fossil(s) will be outside the country;
- detailed information on the fossil(s), especially as it is a "unique" specimen;
- detailed information on the research project behind it & methodology including expected outcomes (i.e., the reason for export);
- the written confirmation of the institution that currently hosts the object that the object may be used as proposed and be returned in good condition;
- should there be any damage/destructive analysis (e.g., coating for higher resolution) undertaken, this needs to be stated in detail;
- Statement why this study cannot be done in South Africa.

Applicant (name and affiliation): this is usually the museum curator!
Dr Roger Smith – Curator (Iziko Museums of South Africa – 021 481 3879)

Applied for (principal researcher): Jordi Estefa Lopez

Participants with affiliations, email addresses, phone numbers (& their role):
1) Jordi Estefa Lopez; jordi.estefa@ebc.uu.se ; +46 (0)739366287
Role: Principal researcher
2) Anusuya Chinsamy-Turan; anusuya.chinsamy-turan@uct.ac.za ; 021 650 3604
Role: Collaborator
3) Sophie Sanchez; sophie.sanchez@ebc.uu.se ; +46 (0)18 471 2677
Role: Supervisor

The material will be **hand-carried** to the European Synchrotron Radiation Facility (ESRF) (facility/institution) in June 2016 (month, year) by Anusuya Chinsamy-Turan (name of person responsible for transport) and brought back by _____ (leave blank if same person as above). Anusuya Chinsamy-Turan (name) will be involved with the transport and scanning (e.g., transport/scanning) of objects and interpretation of the data (whatever else).

Institution incl. address that currently hosts the object:
25 Queen Victoria Street, Gardens, Cape Town

Facility incl. address at which the experiment will be done:
ESRF, 71 avenue des Martyrs, 38000 Grenoble, France

Table of objects or upload file:

Site including age at which object was found:
SAM-PK-000977 South Africa. Eastern Cape. Kraai Poort 7. Early Triassic.
SAM-PK-001332 South Africa. Eastern Cape. Kraai Poort 7. Early Triassic.
SAM-PK-004002 South Africa. Eastern Cape. Erf 1 Aliwal North. Early Triassic.
SAM-PK-00408 Lesotho. Likhoele. Early Jurassic.
SAM-PK-00412 South Africa. Eastern Cape. Kromspruit 9. Late Triassic.
SAM-PK-005877 South Africa. Eastern Cape. Erf 1 Aliwal North. Early Triassic.
SAM-PK-01119 South Africa. Free State. Harrismith Commonage. Early Triassic.
SAM-PK-01315 South Africa. Eastern Cape. Blikana 13. Early Jurassic.
SAM-PK-01388 South Africa. Eastern Cape. Schorpioen kraal 75. Early Triassic.
SAM-PK-06235 South Africa. Eastern Cape. Erf 1 Aliwal North. Early Triassic.
SAM-PK-07903 South Africa. Free State. Mequatling 459. Early Jurassic.
SAM-PK-07905 South Africa. Free State. Mequatling 459. Early Jurassic.
SAM-PK-10946 South Africa. Eastern Cape. Middelstuk 558. Early Triassic.
SAM-PK-11186 South Africa. Northern Cape. Matjesfontein 412. Late Permian.
SAM-PK-11747 Tanzania. Mkongoleko-Njalila. Middle Triassic.
SAM-PK-K01395 Unknown. Early Triassic.
SAM-PK-K10549 South Africa. Free State. Harrismith Commonage. Early Triassic.

Time frame:
Transport to the European Synchrotron Radiation Facility (ESRF) (facility): June 16th (date)
Return date: June 20th (date)

Aim/rationale: The appearance of the limb is one of the greatest steps in vertebrate evolution, one which permitted the adaptation of four-limbed animals (tetrapods) to land. Its bone histology has been commonly studied at mid-shaft, but the nature of its extremities, called epiphyses, remains mysterious although they play a major role during the locomotion of tetrapods. These epiphyses can be either cartilaginous or bony, and their nature is supposedly driven by one of the following processes within amniotes: 1) individual growth and reproductive strategies; or 2) biomechanical constraints. Apart from observations made on extant species, little is known about the epiphyses of fossil groups and their evolution over 300 million years.
The bony epiphyses of mammals have the most complex structures within amniotes. Our aim is to perform a complete study of living and fossil species differing in posture and growth-rate strategies in order to detect 1) when the epiphyses first ossified during the evolution of mammals and 2) which evolutionary pressures led to this process. We have performed propagation phase-contrast synchrotron-radiation microtomographies (PPC-SRμCT) of ontogenetic series of extant mammals. With the material from the Iziko South African Museum we will do the same for extinct species, which will allow us to compare between representatives of crown and stem mammals. The results will provide the first evidence for characterizing limb articulations in an evolutionary framework. Our understanding of their nature will be crucial for deciphering the epigenetic factors inducing mineralisation and their importance for organisms that have epiphyseal disorders.

Methodology (short): Perform propagation phase-contrast synchrotron-radiation microtomographies (PPC-SRμCT).

Confirmation/permit by museum: Attached

Damage/destructive analysis? (if yes, explain in detail) None.

Statement why this study cannot be done in South Africa: We plan to perform the experiment at the beamline ID19 at ESRF, France. We dispose of 9 shifts of beam time for the 3.5-6.5 μm imaging of the epiphysis. As the contrast is typically low in fossils, we need to use long propagation phase contrast at high energy (up to 10 m, 150 keV for the largest specimens), in polychromatic beam to ensure rapid scanning. Only ID19 can provide such combinations of parameters.