# Centre for Anatomy and Human Identification (CAHID)
# Greenhouse Research Studentships 2021/2022

The School of Science and Engineering are delighted to offer a 4 year fully funded (UK) PhD studentship based within the Centre for Anatomy and Human Identification (CAHID).

An essential part of the remit of the Greenhouse Research Studentship Programme is that successful applicants are required to teach in the dissecting room throughout semesters 1 and 2 and to assist with other classes as and when required.

The successful candidate will commence their studentship in January or May 2022. The 2021/2022 tax free stipend for the scholarship is £15,609 per annum.

**Eligibility:**

Candidates must be UK students and **MUST** have an undergraduate and/or Master's degree which includes experience of full body gross anatomical human dissection. Applicants who do not have such experience will not be considered for the scholarship.

**PhD Greenhouse projects**

Two research topics are offered to potential candidates who wish to apply for the Greenhouse scholarship award. Only one of these projects will be taken forward and so applicants are requested to indicate clearly which of the projects they wish to apply for.

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We invite applications from suitably qualified candidates.

Candidates are requested:

(i) to submit their full CV,
(ii) to indicate which of the two projects they wish to apply for,
(iii) to provide a one-page A4 summary of their suggestions for developing their research project choice.

Applications should reach Dr. Julieta G García-Donas (jgomezgarciadonas001@dundee.ac.uk) by midnight on the **19th November 2021**.

Shortlisted applicants will be notified about whether they will be invited for interview in the week commencing 22nd November 2021. Interviews are planned for 10th December, but date may be subject to change.

# Project 1

## Forensic Microscopy age estimation for an old cohort: a 2D and 3D study of cortical and trabecular bone

***Supervisors:*** Dr Julieta G. García-Donas (CAHID) and Dr Craig Cunningham (CAHID)

***Background:***

In disciplines such as Forensic Anthropology, osteological age is one of the key aspects in creating a biological profile from human remains. In the case of fragmentary remains, micro-anatomical features are employed to estimate age-at-death. In order to better understand bone age-related changes at the microscopic level, both cortical and trabecular bony structures need to be assessed to provide a complete aging multifactorial picture.

Previous studies have shown the relationship between age and cortical and trabecular bone for clinical purposes and cortical and trabecular assessment separately for aging methods. However, no study has tested both cortical and trabecular bone through 2D and 3D imaging methods for the development of forensic age estimation population-specific standards. Moreover, microscopic age estimation in old individuals have shown limitations for the old age cohort.

***Project aims:***

This study proposes a systematic examination of cortical and trabecular age-related changes to explore age-at-death throughout the later years of the human life. The development of an age estimation formula reporting error rates will clarify whether the observation of both cortical and trabecular bone increase the age estimates accuracy. The sample used for this project will consist of skeletal elements collected from the cadaveric sample in CAHID.

***Objectives:***

- An assessment of traditional 2D histology cortical bone microstructural features related to age.
- A 3D analysis of trabecular bone using micro-CT scans considering parameters related to age.
- The development of age estimation methods exploring the possibility of aging the elderly based on microscopic 2D and 3D approaches
- Consideration of other factors affecting the parameters under consideration.

# Project 2

## Visualising morphometric trends in facial growth, development and ageing

***Supervisors:*** Dr Tobias Houlton (CAHID) Dr Caroline Erolin (CAHID)

***Background:***
During life, the human craniofacial complex undergoes extensive growth, development and ageing. Globally, life expectancy is on the rise due to advancements in medical care and improved living conditions. As a consequence, a wider range of ages are being represented in clinical treatments (surgical, medical, dental) and forensic investigations (craniofacial reconstruction/superimposition, age estimation, etc.). Developments in robust reference data (metric and morphoscopic) are thus needed to understand the influence of age, with consideration to possible population and sex variation.

**Aim:**
Identify metric and morphoscopic trends in craniofacial ageing, for clinical and forensic application.

**Objectives:**

- Using a photogrammetric surface scanner and DSLR camera, build a collection of 3D scans and high resolution photographs of faces across various ages, to analyse the influence of facial growth, development and ageing.
- Determine if significant differences in facial growth, development and ageing exist between sex and population groups.
- Identify patterns in facial growth and ageing where significant changes in facial morphology tend to occur.
- Applying geometric morphometric techniques, generate a 3D reference model demonstrating common patterns in craniofacial growth, development and ageing.
- Detect and evaluate textural skin changes and facial crease patterns using photogrammetric image analysis.