

## ABSTRACTS

1) access to adequate lab space, equipment, and team members, 2) adherence to best practices, regulations, and ethical guidelines, 3) funding, and 4) oversight of the profession at the state and federal levels. In total we received 31 anonymous survey responses and conducted 2 virtual face-to-face interviews. Our results suggest three major places of concern including: 1) difficulty in acquiring suitable team members, 2) expectation for respondents to take on casework pro-bono, and 3) lack of state and federal oversight regarding accreditation/licensing for forensic anthropologist. While not exhaustive, these data provide some insight to common barriers impacting the field and makes recommendations on how the barriers can be diminished.

### 'Genetic architecture' differences between sexes can be confounded by gendered effects

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Increased availability of large human genome datasets has opened a new arena for researchers searching for essential sex differences: 'sex-specific genetic architecture'. Proponents of this framework posit that the gene-to-trait map differs between sexes in a consistent way, such that identical alleles can have unequal or even opposing effects depending on an individual's sex. Much of the evidence supporting these claims comes from comparing allele effect sizes estimated from sex-stratified genome scans and attributing any variation to fundamental biological differences between sexes. However, few of these studies consider gender as another potential causal factor for sex-correlated signals. In this talk, we will theorize how gendered experiences can create the appearance of sex-differentiated genetic architecture via gene-by-environment interactions and demonstrate how the statistical frameworks used for finding genomic sex differences, such as genetic correlation analyses, cannot differentiate between the effects of sex and gender.

### Artificial neural networks to reconstruct missing perikymata in worn teeth

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Dental studies are key to understanding the evolution of the growth and developmental processes of extinct hominins. Central to these studies is the intrinsic nature of dental tissues (enamel and dentin), as they record periodicity lines in their histological structure, enabling us to calculate very accurately their formation times. Approaches to assess periodicity often include sectioning or synchrotron scanning, both of which are destructive either at the macro or micro scale. In order to avoid damaging fossils, perikymata can also be assessed on the crown surface. However, this approach requires unworn teeth, which are scarce in the fossil record.

We address the need for a non-destructive method for assessing periodicity across a wider range of fossil specimens by overcoming the obstacle of wear. We developed a package in R, named as toothR, to reconstruct the obscured perikymata on slightly worn teeth. We then applied artificial neural network analysis (ANN) to estimate the number perikymata lost in the first deciles of the crown height. We employed 164 unworn modern human teeth where all perikymata were counted along their crown heights. The results indicate that ANN can estimate the number of perikymata in the first three deciles with less than 5% of error in all tooth types.

The user friendly software provides future studies with a higher level of accuracy, increased sample sizes, and more robust insight to the paleobiology of our ancestors.

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### Seasonality in the relationships between fluctuating asymmetry in deciduous teeth and environmental temperature during gestation

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External environmental variation during gestation impacts the physiology of human development *in utero*, affecting birth weight, disease risk, and longevity, but evidence for these impacts has not yet been explored in dentition. We examined the relationship between variation in gestational environmental temperature and fluctuating asymmetry (FA) in deciduous dentition. FA measures developmental instability by quantifying random deviation in body structures. Because deciduous teeth form during prenatal life, dental FA captures signals of stress during gestation. We measured

dental casts representing 159 child participants (ages 3-6 years) with health history records from the longitudinal Burlington Growth Study. FA was calculated from crown dimensions and inter-cusp distances. Temperature information was sourced from historical weather statistics based on the nine months preceding each participant's birth date, binned into trimesters. Individuals were grouped based on birth season (n=24-54) to control for seasonal temperature variation. Using multiple regression for each subgroup, we tested for the following effects on FA: high and low temperature extremes within each trimester; greatest variation within one month of each trimester; sex; and year and month of birth. Backwards selection indicates that the most predictive model for each subgroup differs in its selected temperature variables ( $p < 0.05$ ; adj.  $R^2 = 0.15-0.35$ ). However, extreme temperature lows during the first two trimesters have significant association with FA in Spring, Summer, and Fall subgroups. Winter births differ such that FA is not significantly impacted by any temperature stress. These results suggest the effect of temperature stress during gestation varies based on season and trimester of exposure.

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### Precolonial violence: Analysis of traumatic injuries from a communal burial site in South Africa

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Violent injury in children from the Holocene of southern Africa has rarely been reported. This study reports injuries observed in the skeletal remains of children recovered from a communal burial site at Ladismith, Western Cape, South Africa, with the aim of determining the circumstances surrounding their deaths. The burial site contained a minimum of ten individuals of varying ages and both sexes, dated to c.550 BP. The remains were exposed by animals and subsequently collected by members of the public. Most skeletons are incomplete, probably due to unsystematic recovery. Skeletal injuries were assessed macroscopically and using computed tomography for timing (antemortem, perimortem, postmortem), mechanism (blunt, sharp, perforating) and extent of injury. Trauma analyses revealed no perimortem injuries amongst adults, although adult crania were missing and could