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Project Summary:

For my project I created two digital creature maquettes, one male and one female, of an imaginary extraterrestrial creature to demonstrate the idea of sexual dimorphism and learn how to apply it to invented anatomies to improve my creature design work. The creature is called the common segran or *Bellua troglodytes*. The creature design was based heavily on real existing animals, mainly humans, gorillas, orangutans and dinosaurs, but also some birds and other primates. The dimorphism present in the sculptures was designed based on what is present in the human, orangutan and gorilla as well as some invented aspects based on how and why sexual dimorphism presents itself.

The first difference is body size. The male is larger than the female. This is mainly because of intrasexual selection. This is based on the gorilla who has large body size dimorphism because of male-male competition and also humans to some extent because they too have body size dimorphism [4][8][10]. The male segran must ward off other males to ensure there is no sperm competition. Due to the high amount of male-male competition and mate guarding, there is very little sperm competition and as a result the male segran has a small testes mass and penis length (relative to body mass) and also a low amount of copulations per birth [4]. This also results in a great deal of males who do not get the opportunity to mate and a polygynous mating system because "for sexual selection to promote differences between the sexes, certain social conditions must be met... Principally, there must be unequal opportunities of access to females by males (some individual males can potentially have more offspring than females) which is established by a dominance system, a polygynous mating system (which results in a number of individual males having few or no offspring)...[3]." The segran have very little intersexual selection or "female choice" due to the regularity of forced copulation. This is based on the orangutan [8].

Besides the overall body size and genital size, there are a great deal of other dimorphic features. These features have been based off of how they present themselves in humans, orangutans and gorillas. To summarize them, the male has, heavier bone structure, greater muscle mass, taller sagittal crest, a large throat pouch, larger hands and feet, square face, no nipples, a protruding snout, broader shoulders, and lower body fat percentage. The female has, enlargement of breasts, widening of the hips, smaller hands and feet, round face, smaller waist and more subcutaneous fat as well as a different distribution of fat deposits [9][2][7][3][8]. These differences imply that the female segran has internal gestation of offspring as well as lactation for feeding of offspring. The widened hips are for giving birth and the breasts are for lactation [7]. Parental care is usually the females responsibility due to the polygynous mating system. The male has an enlarged throat for the purpose of establishing dominance to other males through a loud roar. The male also has a taller sagittal crest like that of a male gorilla for larger jaw muscles [8]. The large protruding snout on the males is a sexually selected feature to show their dominance to other males. This is inspired by the large cheek flaps of a male orangutan [8].

Some additional information on segran is that they are omnivorous, hence the long claws and talons and well as strong jaw muscles and forward facing eyes. If the sculptures had been made with there mouths open, one would see that the segran have long sharp fangs in the

front for cutting and tearing as well as flat molars for chewing. They come from a planet with a similar atmosphere and geography to earth, which is why they have developed so many homologous structures to terrestrial creatures. They walk bipedally and evolved recently from arboreal knuckle walkers. They tend to live in warm climates and have a low risk of predation.

Bibliography:

1. Lande, Russell. "Sexual Dimorphism, Sexual Selection, and Adaptation in Polygenic Characters." *JSTOR*. Society for the Study of Evolution, Mar.-Apr. 1980. Web. 28 Nov. 2012. <http://www.jstor.org/discover/10.2307/2407393?uid=401224>.

2. Perrett, D. I., K. J. Lee, I. Penton-Voak, D. Rowland, S. Yoshikawa, D. M. Burt, S. P. Henzi, D. L. Castles, and S. Akamatsu. "Effects of Sexual Dimorphism on Facial Attractiveness." *Nature.com*. Nature Publishing Group, 10 July 1998. Web. 28 Nov. 2012. <http://www.nature.com/nature/journal/v394/n6696/abs/394884a0.html>.

3. Frayer, David W., and Milford H. Wolpff. "Sexual Dimorphism" *Annual Review of Anthropology* 14 (1985): n. pag. *Annual Review of Anthropology*. Annual Reviews Inc. Web. 28 Nov. 2012. <http://www.annualreviews.org/doi/abs/10.1146/annurev.an.14.100185.002241?prevSearch=searchText%253A%2528Sexual%2BDimorphism%2529>.

4. Ryan, Christopher, and Cacilda Jethá. *Sex at Dawn: The Prehistoric Origins of Modern Sexuality*. New York: Harper, 2010. Print.

5. Whitlatch, Terryl, and Gilbert Banducci. Animals Real and Imagined: The Fantasy of What Is and What Might Be. Culver City, CA: Design Studio, 2010. Print.

6. Lucchesi, Bruno, and Margit Malmstrom. Modeling the Figure in Clay.
New York: Watson-Guptill Publications, 1980. Print.

7. Jacob, Stanley W., Clarice Ashworth. Francone, and Walter J. Lossow. *Structure and Function in Man*. Philadelphia: W.B. Saunders, 1982. Print.

8. Jolly, Alison. *The Evolution of Primate Behavior.* New York: Macmillan, 1972. Print.

9. Peck, Stephen Rogers. *Atlas of Human Anatomy for the Artist*. Oxford: Oxford UP, 1982. Print.

10. Ogden et al (2004). Mean Body Weight, Height,and Body Mass Index, United States 1960–2002 *Advance Data from Vital and Health Statistics*, Number 347, October 27, 2004

Source one was used for an overall understanding of sexual dimorphism. Source two was used to understand intersexual selection and differences in the face of humans which was used to inform the face shapes of sculptures. Source three provided valuable information on the reasons for sexual dimorphism and what it means for the mating systems of an animal which informed decisions about the mating system of the segran and their look. Source four was used for its information on sexual dimorphism and mating systems as well as its comparisons between humans and non human primates. Source five was used for reference of comparative anatomy and methods of creature invention which influenced the look of the sculptures. Source six was used for reference of how human anatomy looks in the round. Source seven was used for medically accurate information on human anatomy. Source eight was used for information on primate mating systems and anatomy to be used for the invented creature. Source nine was used for its description on how sexual dimorphism in human looks visually. Source ten was used for modern record of human sexual dimorphism.