



Action Update

Bringing it all in-house

If you want a job done properly, do it yourself.

by [Athamanatha Kitsune](#) on Tuesday 16th February 2021

Renewing state charitable solicitation registrations and sending annual reports is part and parcel of having a valid 501(c)3 charity at all.

Until recently, we relied on an external contractor to conduct these bureaucratic acts for us. However, we found we were not receiving value for money. Frequently, our external provider was filing for extensions that only served to confuse matters, and not communicating with us about key information with regard to our condition of compliance. It is therefore quite a relief to take on these forms and duties, iron out the problems caused by long term miscommunications, and follow a straightforward calendar of activities to ensure smooth running in the future.

Just in this last week I have filed 3 renewals and an annual report, and I have another report to file soon. These are often sent into badly engineered state websites with redundant, bizarrely named and badly linked collections of similar-but-slightly-different systems to control their different legal and financial requirements.

The forms themselves are typically quite easy

to fill out, it's the methods of actually filing them that prove to be the challenge. Add to this that some states require figures from 1.5 years ago while others simultaneously are asking for figures from 6 months ago, and you can see why this can be a very involved job.

At the moment, we are only registered in some states. We may expand in the longer term to include more. Fortunately, when we do, we will be ready and organised thanks to the efforts being made now.

LaTeXing Like Pros

by [Athamanatha Kitsune](#) on Tuesday 16th February 2021

The screenshot shows a LaTeX Beamer presentation slide. The title is "A Review of the Integument of Selected Species of the Animal Kingdom". The slide contains a table of contents with sections on Feathers and Genetics of Feathers, and a list of specific genes. The slide is titled "A Review of the Integument of Selected Species of the Animal Kingdom".

- Scale orientation engineering (through cell polarity)
- Mechanical stresses and strains directing scale growth
- Physical processes of scale keratin growth (keratin deposit, directed growth), perspectives on engineering
- Visual properties (iridescence, smoothness) of scales, and possibilities of engineering these

6 Feathers

- Feather micro-anatomy
- Types and variations of feathers throughout the animal kingdom
- Developmental biology of feathers
- Feather size determination, does this occur through a biological clock as well?
- Feather orientation determination (likely linked to cell polarity)
- Feather microstructure development, how is a feather formed?
- Iridescent properties of feather microstructures, and possibilities of engineering these
- Feather coloration patterns

summary of who says what, some details but not much critical commentary, here's what we are going to do

In this section, we intend to describe the developmental processes involved in feather production in birds, draw parallels to hair in humans, and highlight conserved machinery (or lack thereof).

Feathers are of significant importance to many nonhuman identities, including avians, gryphons and angelic forms, among others.

6.1 Feather types

There are many types of feathers, and multiple sources seem to disagree on the nomenclature to adopt as a standard description framework for them. The most coherent modern source found by the authors of this paper to date, is Thompson's web page "Everything you need to know about feathers" from 2014. The most comprehensively descriptive source, as cited by the Wikipedia page on feathers, is Chandler's study of the structure of feathers, with reference to their taxonomic structure" from 1916. Briefly, here is Chandler's categorization of feathers, with Thompson's modern terminologies added in parentheses.

Plumules (Plumilaceous, Down):

- Unspecialised Plumules
- Powder-down
- Oil gland feathers
- Nesting feathers

6.2 Genetics of Feathers

We now proceed to review and comparatively analyse the genetic determinants of feather development in birds and the conservation (or lack thereof) of related genes and pseudogenes in humans. These were identified from a selection of papers:

Specific genes:

- ZFC1: scale to immature feather follicle invagination converter (Boroluzzi et al, 2020)
- PITX1: Decides the integumentary identity of limbs (Boroluzzi et al, 2020)
- TEX5: Forelimb identity and foot feathers development (Boroluzzi et al, 2020)
- EDA: Integument, nails, claws and teeth development driver (Ahn, 2015; Bayart and Branding-Bennett, 2018; Clarke, 2017; Grange, 2013; Guasch, 2017; Kirby, Daborn, and Behrens, 2013; Mina, 2015; Slepton and Kantaputra, 2019; Thiesfeld, 2015)
- Other genes are clearly involved, more will be added here in subsequent revisions.

Several of the genes in this list are genetic factors in the evolution of feathers as compared to fur and scales. When feathers evolved, it was in a series of stages of developmental complexity. Xu and Guo attempted to lay this out in their 2009 paper (Xu and Guo, 2009), but flaws were found in some of their research by Feih

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Our recent work on Project Integument Review has been augmented by online LaTeX format editing tools, which allow us to make scientific journals that look every bit like they were made by long-established formal publishers. The intention is to send the work in this format to scientific journal publishers, as some of them don't accept anything less.

Multiple LaTeX editors exist, the one we have been using is called Overleaf.

[CHECK OUT OVERLEAF](#)

New volunteer!

by [SiberDrac](#) on Tuesday 16th February 2021



Greetings from a science dook! I am SiberDrac “Siber” Terrian, AKA Will Towler, Ph.D. (he/him), and I’ve recently begun being active with the FFF, mostly in the context of Project 3D Anatomy. My fascination with both the furrydom and science all started from a conflux of sci-fi/fantasy literature as a teenager – we’re talking Animorphs, The Dragons of Pern, and sundry other influences.

My academic interests homed in on evo-devo – that is, the study of how evolutionary and developmental biology relate to one another and what can be learned from the multidisciplinary study of the two. Then, my

fascination landed on the skeletal system in particular, so I spent my Ph.D. studying it (particularly the toes, which I guess makes me a foot guy), and that made me a perfect fit to help out with Project 3D Anatomy.

P3DA is designing the interface that will allow users to personalize the forms they want to take and is using what’s known from evo-devo to create customizable base templates that reflect, as it stands, a skeletal plan – the squishy bits will come later. By connecting the desired structures to their biological bases, we will provide a modular framework of developmental signaling pathways that match the literal framework of our ultimate goal of morphological freedom.

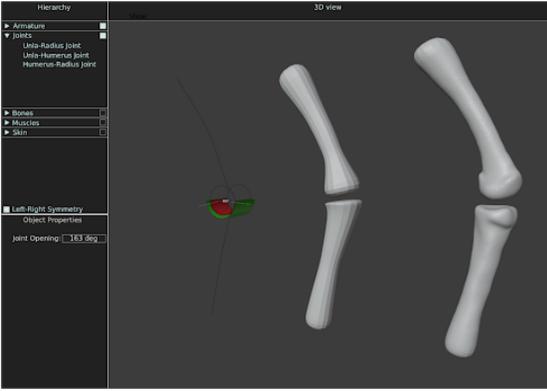
[Would you like to volunteer too?](#)
[Check out our open positions!](#)

Advancing Anatomical Modelling

By [Zennith](#) on Wednesday 24th February 2021

We’ve been making some great progress in our 3D anatomy project. With this project, we’re aiming to create a simultaneously *customizable* and *accurate* model of bones, muscles, tendons, and so forth. It’s a really intriguing mix of basic biology and app development.

I could talk your ears off about this, but suffice to say there are many interesting things we’re learning and implementing. The team’s amazing - Lathreas is taking the lead on mathematical modeling, SiberDrac’s covering biological mechanisms and signaling, Atha’s analyzing anatomical properties and diversity, and Gear’s getting the engine and interface up and running.



Coming up soon, we should have a pre-pre-pre-alpha build that starts to flesh out the framework we've been pulling together so far. We still need to brainstorm how the user will work with the graphical user interface a bit more, but we've settled on a GUI broadly similar to the attached image. After we get that and a few other things in order, we'll try to put together a deeper dive so those interested can find out more.

Eventually, we even see this as a way to let someone create an appearance of what they want to look like, in a physiologically accurate way. Relevant parameters could then be extracted, and used in any relevant modification or transformation process, ranging from surgical to bioprinting to genetic modifications.

[HERE'S PROJECT 3D ANATOMY ON GITHUB](#)

Boosting The Biomechatronics Lab!

by [Athamanatha Kitsune](#) on Thursday 25th February 2021

We have officially provided Hugh Herr's Biomechatronics Lab at MIT Media Lab a boost to their funding to the tune of \$4,000! We have stipulated that we should be kept up to date on what results from this funding and that it be used to further freedom of form. Your donations are directly helping research into the most advanced prosthetics on the planet.

[THESE ARE THE STAFF WE ARE SUPPORTING](#)

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This late edition of the newsletter was powered by bureaucratic nightmares being safely broken down by a kitsune using pocket dimensions and/or patience.

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