Putting dental calculus under the microscope

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Putting Dental Calculus Under the Microscope

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Jan Bartholdy

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Preface

This is not a traditional dissertation, which was a conscious choice on my part. First of all, it's not very common for a dissertation in my faculty to have a preface, which is why I have prefaced this preface with an explanation for why I need a preface. This mainly explains decisions regarding the format and style of my dissertation rather than the scientific content, which is why you won't see the phrase 'dental calculus' here. Oh, shoot...

Feel free to jump directly to Chapter 1 if you don't want to read this.

When I started my PhD research I had no intentions of shaking things up. I was going to put my head down and do my research, publish my articles in traditional journal venues, create a traditional article-based dissertation, and finish in the allotted four years. Six years later, and I accomplished... well, none of the above. Along the way I got a look behind the curtain of academic publishing. I didn't like what I saw. Not even a little bit. This was fueled by an introduction to Open Science. Science in the context of Open Science just made sense to me. This caused some delays as I dove head first into an Open Science rabbit hole. Also, covid. At first I vowed (to myself and those around me who would listen) never to publish any of my papers in Evilseer. Then, I took it a step further and vowed the same for more major publishers, including Springer and Wiley. Why do we pay publishers to take our copyright, publish our research, then pay extra so we're allowed read it? You may not be paying out of pocket, but your library is likely

covering those costs with expensive subscriptions. I'm sure they would much rather use that money on more useful stuff. All this to say, you won't find any of my PhD papers in the traditional journals. I wanted to try different platforms, like preprint servers and PCI_Archaeology.

Around the beginning of my PhD research I was also introduced to R statistical software. I can no longer remember how this came about, but after many months of rage-quitting and returning to SPSS, vowing never to open R again, I started to see the value of using scripting languages (and free, open-source software) for statistical analysis. It turns out when you have a document outlining every step you made in the analysis, it's easy to reproduce; both by yourself and others. Who knew? No need for the same 'point and click' all over again. I used R Markdown for most of my output, website, presentations, articles, etc. Then I took it a step further and started writing my dissertation in R Markdown (and eventually Quarto). My dissertation was now fully reproducible, and could be rendered in different formats with little change to the documents with the actual content. One of these formats was HTML. I could turn my dissertation into a website. That was pretty cool. I could have a dynamic, outward-facing dissertation easily modified when needed. This series of events led me to publishing my dissertation online, before it was completed, as a way to show the progress to the world. Of course most of the world didn't actually care, but a few people thought it was a pretty cool idea; and, more importantly, it made the writing part enjoyable. Or at least as enjoyable as something that's not very enjoyable in the first place. It definitely motivated me to make continuous progress. The (theoretically) wide availability of my dissertation made me start thinking about accessibility. This means increasing the readability and legibility of the dissertation, not only with the formatting, but with the language used. This doesn't necessarily mean that it can be easily picked up by someone with limited knowledge of the field. Writing 'academically' is not just exclusionary to members of the public, but also to those for whom English does not come naturally. Plus, I've found it to be a tedious read, even as a native English speaker. In my experience, writing more accessibly also requires a deeper understanding of the

subject matter.

Open Science is a priority in all of my work and will be reflected in this dissertation; sometimes directly, sometimes indirectly. Admittedly this is occasionally taken to an extreme: A fully reproducible dissertation, publishing everything before it's actually done, and avoiding traditional journals. Ultimately I was just fed up with the status quo. We as researchers need to do better. Contributing to knowledge requires more than having a paper accepted in a 'prestigious' journal. We need to ask ourselves why we are doing science, and for whom we are doing it.

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Acknowledgements

Where to begin? So many people helped shape this thesis, and therefore I do not take full responsibility for the quality (or lack thereof) of this work.

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Open Science Statement

All materials and data, including the source code for the dissertation itself, are made available to the best of my ability. All articles in association with the dissertation are/will be Open Access.

All outputs can be found, either directly or indirectly, on the Open Science Framework (DOI: 10.17605/OSF.IO/3YX8M).

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