UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMAXTEC INC. and
SMAXTEC ANIMAL CARE GMBH,
Petitioners

v.

ST REPRODUCTIVE TECHNOLOGIES, LLC,
Patent Owner

Case IPR2024-00885
Patent No. 8,823,515

DECLARATION OF MEREDITH KNOFF

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I. INTRODUCTION

1. My name is Meredith Knoff. I have been retained by ST Reproductive Technologies, LLC (the "Patent Owner" or "ST Repro") as an independent expert consultant in this proceeding before the United States Patent and Trademark Office.

2. As a Research and Engagement Librarian at Indiana University Bloomington, I was retained in this matter by ST Repro to provide my analysis, opinions, and observations regarding the public accessibility of one of Petitioner's primary references, Ex. 1005 ("Trevarthen"). I am being compensated at my usual rate of $225 per hour for my consulting services. My fee is not contingent on the outcome of this matter or on any of the positions I have taken, as discussed below. Although I am being compensated at my standard consulting rate for the time I spend on this matter, I have no personal financial interest in any of the entities involved in this proceeding, and my compensation does not depend in any way on my testimony, my conclusions, or the outcome of this proceeding.

3. For this declaration, I have been asked to review and respond to statements made in the Petition filed in IPR2024-00885, the opinions provided in the Declaration of Tami M. Brown-Brandl, Ph.D (Ex. 1003), the Declaration of June Munford (Ex. 1031), and the Declaration of Nathaniel E. Frank-White (Ex. 1030) filed in connection with the Petition, the statements made in the Preliminary

Reply in support of the Petition filed in IPR2024-00885, and the opinions provided in the Declarations of Timothy J. Bowser, Ph.D (Ex. 2001, 2005, and 2009). My opinions and the basis for those opinions are outlined below.

4. I reserve the right to revise or supplement my opinions if additional information makes either appropriate, or if Petitioners or the declarants revise or supplement their allegations or opinions.

5. A list of the documents and material I have considered in developing my opinion can be found in the Appendix below.

II. QUALIFICATIONS AND BACKGROUND

6. Attached as Exhibit 2012 is my curriculum vitae, incorporated by reference within this declaration. The following is a brief summary of my qualifications.

7. I received a Bachelor of Arts (B.A.) degree in English Literature from Lake Forest College in 2011. I then received a Master of Library and Information Science (M.L.I.S.) degree from the University of Illinois Urbana-Champaign in 2016. I have been employed as a university librarian professional since 2016.

8. In my career as a library professional, I have conducted countless hours of academic research at a university level, including research using the internet. For example, in my current work as a research and engagement librarian at Indiana University Bloomington—which is a member of the Big Ten Academic

Alliance, a well-known academic consortium dedicated to collaborative research efforts—I often assist and advise students on how to effectively conduct internet research, including how to utilize Google's advanced searching tools to locate hard-to-find resources and how to identify relevant literature from the search results. Through this experience, I have become deeply familiar with the different discovery tools available for conducting internet research across various different interdisciplinary resources. In addition, in my own academic research experience, I frequently utilize advanced internet searching or online repositories and databases (both open access and subscription based) to locate relevant literature.

III. MATERIALS CONSIDERED

9. My opinions are based on my years of education, research and experience, as well as my investigation and study of relevant materials. In forming my opinions, I have considered the materials I identify in this declaration and those listed in the Appendix below.

IV. LEGAL PRINCIPLES APPLIED

10. I understand that petitioners have the burden of establishing that a reference qualifies as a prior art "printed publication." I further understand that, for each reference they assert to be prior art, petitioners must identify evidence sufficient to establish by a preponderance of evidence that the reference was "publicly accessible" before the priority date of the challenged claims, and a

reference is considered publicly accessible if it was disseminated or made available to the extent that persons interested and ordinarily skilled in the subject matter or art ("POSA") exercising reasonable diligence can locate it. I further understand that assessing public accessibility involves a case-by-case assessment of the facts.

11. I have been informed that the priority date is September 15, 2009. I also note that Petitioners, Dr. Brown-Brandl, and Ms. Munford assessed public accessibility before the "critical date," which is one year earlier, i.e., September 15, 2008. I have focused my analysis on September 15, 2009, but all of my conclusion would apply to the earlier critical date as well. In other words, if a reference was not publicly accessible *before* September 16, 2009, it was also not publicly accessible before September 15, 2008.

12. I have been asked to assume that persons of ordinary skill in the art ("POSA") would routinely search for literature in library catalogs, online journals, and using internet search engines, such as Google, Google Scholar, and/or Yahoo, to identify relevant literature regarding sensor systems for livestock management.

V. PUBLIC ACCESSIBILITY OF TREVARTHEN

13. In my opinion, based on my understanding of the relevant standards, Petitioners, Dr. Brown-Brandl, Ms. Munford, Mr. Frank-White, and their cited evidence do not show that Trevarthen was publicly accessible at any time prior to

September 15, 2009, including before the critical date that they used in their analysis (September 15, 2008).

14. I understand that Petitioners allege that Trevarthen was publicly accessible prior art by virtue of its locatability on an internet search engine such as Google prior to September 15, 2008. Petitioners contend that Trevarthen was made available on the University of Wollongong's "Research Online" repository by at least October 22, 2006, and because digital copies Research Online references are "usually available on Google the following day," a POSA therefore would have been able to locate Trevarthen using keyword searches on Google. *See* Pet. at 7–8 (quoting Ex. 1031, "Munford Declaration" ¶19 (citing Ex. 1030, Ex. A)).

15. I further understand that, in addition to certain paragraphs from Dr. Brown-Brandl's declaration, Petitioners rely on three pieces of evidence:

- **Ex. 1031**: Declaration of June Munford, a librarian;
- **Ex. 1030**: Affidavit of Nathaniel E Frank-White relating to "Wayback Machine" archives; and
- **Exs. 1028–1029**: an International Search Report of the Australian Patent Office.

16. Based on my review of Petitioners' supporting exhibits, I have seen no evidence that Trevarthen itself was actually locatable on Google before September 15, 2009.

A. The Purpose of Research Online as an Institutional Repository

17. I understand that Petitioners allege that Trevarthen was uploaded to Research Online by at least October 21, 2006. I also understand that Petitioners rely on a 2009 article written that suggests the purpose of Research Online is to "promote[] the scholarly output of the University of Wollongong" and that digital references uploaded to Research Online can be "located through search engines such as Google and Yahoo." Ex. 1031 at 6-7 (citing Ex. 1027 at 149). Petitioners also rely on the University of Wollongong's statement that digital references uploaded to Research Online are "usually available on Google the following day." Ex. 1031 at 7 (citing App. IA01 at 6).

18. In my opinion, Trevarthen's presence on Research Online has no bearing on its availability on an internet search engine before September 2009. While Research Online is an online institutional repository that aims to provide open access to university research, online institutional repositories have historically fallen short of achieving this goal. Ex. 2013 at 98–123. Particularly during the relevant time period of 2008 and 2009, online institutional repositories were not an effective tool for disseminating research. *Id.* Even today, it is widely acknowledged that online institutional repositories still suffer from low usage. Ex. 2014 at 101–16. For example, the institutional repository available through my work at Indiana University Bloomington, IU Scholarworks, contains significantly

less scholarly output than what the university otherwise outputs because of the relative ineffectiveness of using an institutional repository to publish. Even in my own professional experience, I will utilize more traditional methods of publishing (such as a journal) and not our institutional repository when my intention is for my work to be published and reach a wider audience.

19. There is also no support for the University of Wollongong's claim that papers uploaded to Research Online are available on Google the following day. In my opinion, the suggestion that Research Online papers were available on Google the next day is unrealistic and inaccurate. Even today, in my experience working at a Big Ten Academic Alliance university known for producing collaborative scholarly research, papers uploaded to our institutional repository IU Scholarworks are generally not available on Google for a few days at best. For at least that reason, in my opinion, it would not have been possible for papers uploaded to Research Online to be available on Google the next day nearly twenty years ago. Institutional repositories generally provide a means for archiving or preserving research, but are simply not effective at facilitating distribution of such research. A more accurate summary of Research Online's capabilities would be that Research Online allows "open access" (*i.e.*, does not require a subscription or payment) to references on the internet. But as I will explain further below, there is

a fundamental difference between a reference existing on the internet and a reference that can be located through a search engine.

20. Specific to the Trevarthen thesis, there is also no support that Research Online's purpose was to "publish" undergraduate theses. Referring to the September 2007 Wayback Machine archive of the Research Online "Questions and Answers," the instructions for submitting a paper to Research Online are directed only to University of Wollongong staff and postgraduate research students, *not* undergraduate theses, and specifies that Research Online is "predominantly seeking journal articles and conference papers." Ex. 1030, Ex. A at 8. Thus, as a repository, Research Online does not acknowledge and is not intended to promote undergraduate research or theses.

21. I also understand that Petitioners rely on historical download counts of Trevarthen from Research Online as support that Trevarthen was available on Google. Ex. 1031 at 10-12. In my opinion, this conclusion is flawed for at least two reasons. First, download counts are notoriously unreliable. *See, e.g.*, Ex. 2015. For example, arXiv, a widely used open access platform, does not even report download statistics as they are unable to guarantee accuracy. Ex. 2016 (Q: "I'd like to know how many people have been downloading/reading my work. Are there any plans to add this facility?" A: "No, because we cannot guarantee the statistics we have are accurate, and we do not wish to publish potentially

misleading statistics.”). Libraries may attempt to rely on download counts to justify the value of institutional repositories, but in practice, download counts are untrustworthy, particularly in a world of internet bots and where the download count conflicts with the rate cited. Second, download counts do not provide any explanation as to how the downloader located the reference. In the context of academic research, including that done in an undergraduate setting, it is common to circulate a link to your research amongst friends, family, peers, faculty, prospective employers, and more. Any resulting views or downloads from that direct link thus would not have come from Google, yet download counts are unable to provide that distinction.

22. Accordingly, in my opinion, Petitioners cannot conclude that Trevarthen was available on Google simply because the reference was on Research Online.

B. Google’s Indexing Capabilities

23. I understand that Petitioners and Ms. Munford claim that Trevarthen “would have been located and indexed by Google and other search engines once it was made available” on Research Online. Pet., 8; Ex. 1031 at 8. This conclusion, however, oversimplifies what is required for a reference to be both “indexed” and “located” by Google.

24. As a search engine, Google uses crawlers to create its "index" or database. When a user conducts a Google search, they are using the discovery tool that searches the Google index for relevant results. Critically, this is not the same thing as searching the entire internet. A Google search *only* searches Google's index. Ex. 2017; Ex. 2018 at 1 ("[W]hen you search Google, you're not searching the live web. Instead you're searching Google's index of the web[.]").

25. In the 2008 and 2009 time frame, Google's indexing capabilities were limited and resulted in significant delays between when a webpage became available on the internet and when Google indexed the page to become available through its search results. It was not until June 2010, after the critical and priority dates, that Google introduced its new web indexing system "Caffeine, " which allowed the Google index to update continuously as content is added as opposed to on a convoluted layered basis that required analyzing the entire web to refresh an index layer. Ex. 2018. Before this update in mid-2010, it would not have been expected that Google had indexed everything on the internet, let alone with any efficiency or "the following day" after uploading a reference on the internet. This would be particularly true for Research Online. Like other institutional repositories, requesting indexing or granting Google permission to index does not guarantee when, if ever, that Google will actually index the site. Particularly for an uncited undergraduate thesis, it is my opinion that Trevarthen would not have been

indexed before the 2010 Caffeine update unless Google specifically sent a crawler to the Research Online web address of Trevarthen, which would have been extremely unlikely.

C. How Google Returns Search Results

26. I understand that Petitioners' position that Trevarthen is publicly accessible relies only on a POSA's ability to locate Trevarthen on a search engine like Google with reasonable diligence. This conclusion, however, relies on an inherently faulty assumption that just because something is available (*i.e.*, "indexed") on Google, that means it can be located. In my opinion, regardless of whether Google indexed Trevarthen before September 15, 2008, it is highly improbable that a Google search would have ranked it as relevant enough to find given its lack of larger web presence amongst other factors. Even if Trevarthen was returned in a search query, I believe it would be dramatically lower in relevance, relegating it far down in the results and near impossible to find.

27. Because a Google search only ever returns results from the Google index, whether a reference has been "indexed" by Google has limited correlation to whether that reference is *findable* on Google. In other words, a webpage must be indexed before it can be found on Google, but a webpage could be indexed and still not be findable. This is because Google's search results are based on its deeply protected relevance algorithm. In particular, Google displays search results that it

deems to be most relevant in response to the search query. For academic research, Google's determination of relevance would be based on factors like the reputation or recognition of the publishing entity (for example, like the well-known Journal of the American Medical Association (JAMA) or the PubMed database), how well-known the author is, how many times the research has been cited, or how many different internet locations or publication sites the reference exists. *See* Ex. 2019 at 2 ("PageRank works by counting the number and quality of links to a page to determine a rough estimate of how important the website is. The underlying assumption is that more important websites are likely to receive more links from other websites"). Specifically, the more places a reference exists on the internet, the more weight Google's relevance algorithm will give to that reference, and therefore the easier it would be to find the reference via a Google search.

28. Another factor in Google's relevance determination for academic research is whether the reference qualifies as "grey literature." Grey literature consists of research, articles, or other literature that is not produced through traditional publishing means, such as a peer reviewed journal. For example, as an undergraduate thesis only available on the University of Wollongong's institutional repository, Trevarthen classifies as grey literature. Because grey literature exists outside of the traditional publications, such literature is often not widely disseminated. *See, e.g.*, Ex. 2020 at 2 ("[F]inding and accessing grey literature is

significantly more difficult than finding and accessing research articles.”). Compounding that issue, Google’s relevance algorithm would deprioritize grey literature references, making them exceedingly difficult to locate. To that end, either in depth knowledge of internet discovery tools or independent knowledge of a reference’s existence would be required to locate grey literature with any amount of efficiency.

D. Reasonable Diligence in Internet Searching

29. Specific to locating Trevarthen before September 2008, I understand that Dr. Brown-Brandl’s opinion is that a POSA would have performed keyword searching on a search engine to locate relevant literature. Ex. 1003 at 33-34. I also understand that in Dr. Brown-Brandl’s opinion, a POSA would have located Trevarthen this way with reasonable diligence. Ex. 1003 at 33-34. I further understand that Ms. Munford also offers this conclusion, but does not provide any further information as to what a reasonably diligent search would look like in this context. Ex. 1031 at 14, 16, 18.

30. In my opinion, a POSA would not have located Trevarthen by reviewing Google search results with reasonable diligence prior to September 15, 2008. As I have explained above, to the extent that Trevarthen even existed in Google’s index before September 2009, the Google relevance algorithm would have deprioritized Trevarthen because of its status as an undergraduate thesis

("grey literature") and Trevarthen's existence on an institutional repository. In addition, as of September 2009, Trevarthen only existed on the Research Online platform and had zero citations. Both of these would further contribute to Trevarthen's lack of relevance according to Google's determination. Ex. 2019. Therefore, to the extent Google indexed Trevarthen and identified Trevarthen as responsive to a given search query, it would place Trevarthen deep in the universe of search results due to its deemphasized relevance.

31. Because Trevarthen would be deemphasized in Google's search results, this means a POSA would not be able to locate Trevarthen with reasonable diligence. There is overwhelming research supporting the concept of search persistence, namely that an individual conducting online research will not look beyond the first few pages of search results due to the information overload from the enormous amounts of information available online. Ex. 2021. In my own experience providing research assistance, I often advise students that the first 150 search results will be the most relevant. Thus, in my opinion, going beyond those first few pages of results to look for Trevarthen is not diligence that could reasonably be expected from someone performing research in this context.

E. Trevarthen Could Not Be Located by Keyword Searching an Internet Search Engine

32. I have also reviewed and understand that ST Repro's expert Dr. Bowser conducted various keyword searches on Google in an attempt to replicate

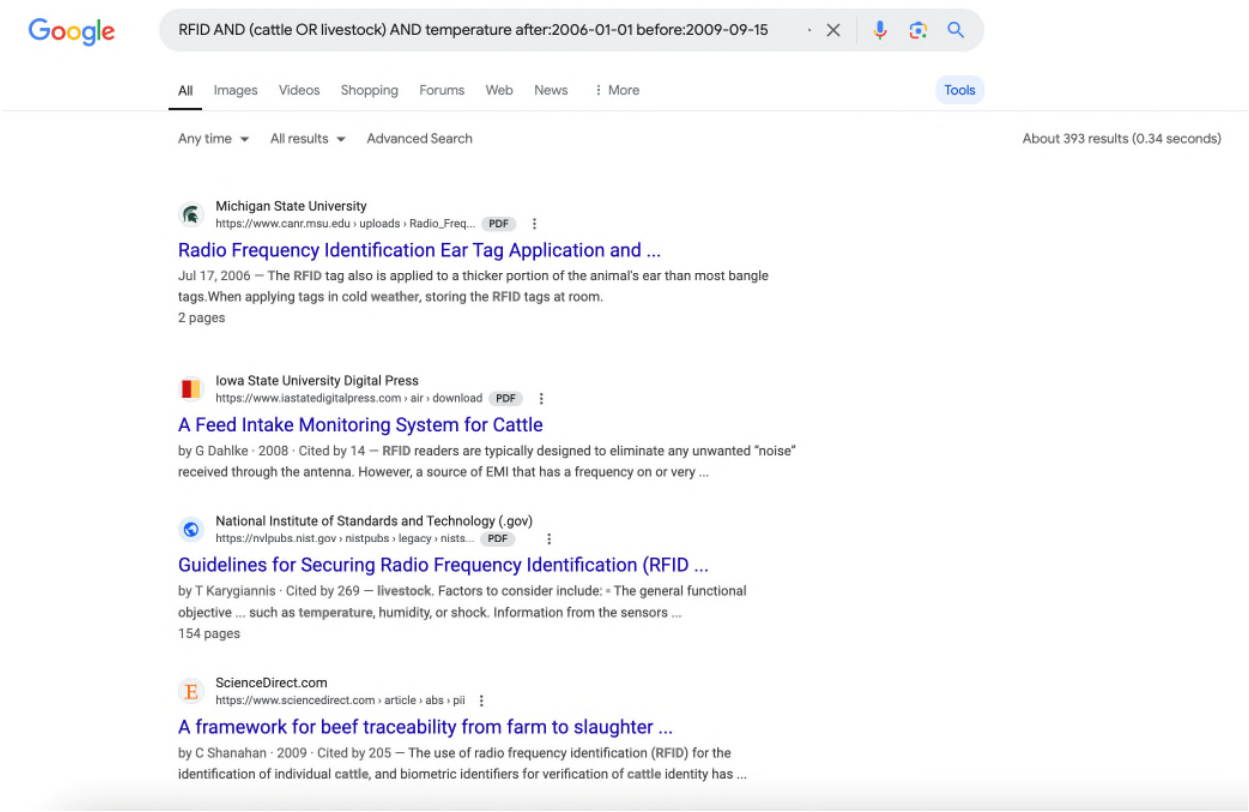
the search Petitioners allege would have successfully led a POSA to Trevarthen. Ex. 2001 at ¶¶60-79; Ex. 2009 at ¶¶90-105. I understand that Dr. Bowser qualifies as a POSA, and that in Dr. Bowser's opinion, a POSA would not have found Trevarthen via keyword searching on Google because depending on the specific combination of terms, Trevarthen either did not turn up at all or did not populate in the first 25 pages of search results.

33. In my opinion, Dr. Bowser's historical search experiment supports that Trevarthen would not have been locatable on a search engine prior to September 15, 2009. I understand that Dr. Brown-Brandl has stated in a deposition that Google's date-limited search function uses "the last date [that the] page was updated." Ex. 2010 at 100:2-5. But this is not entirely accurate. Specifically, Google offers various advanced search tools, including one that allows users to search by the last modified date within a specific time frame. But do the sheer volume of information in Google's index, this search is only available for time frames within in the last year. The date-limited search feature using the "custom date range" that Dr. Bowser used instead identifies search results that Google has identified as relevant to that specific time period. Another way of effectuating this exact same search is to include "before:" or "after:" limiters in the search string itself. Ultimately, this date-limiting search functionality on Google is a helpful proxy for gauging what search results Google were relevant—or not relevant—in a

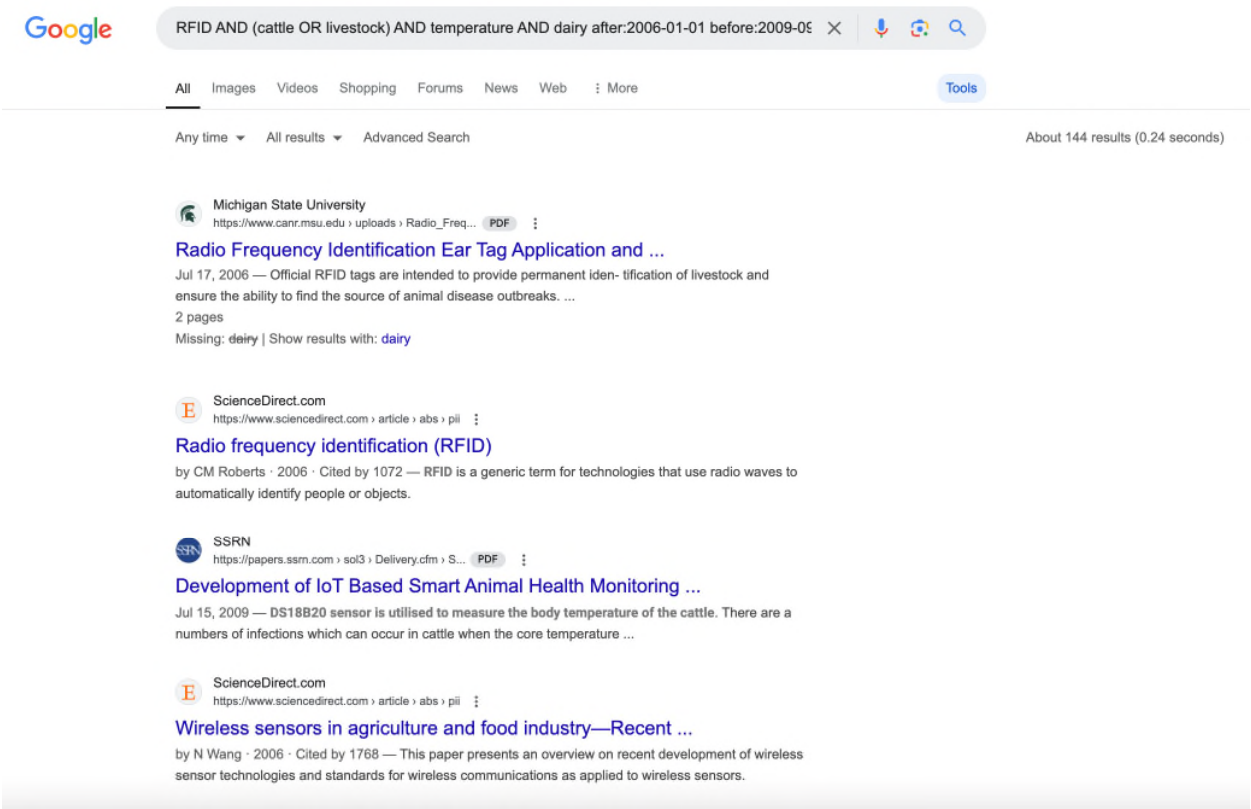
specific time period. In other words, a reference that populates as a search result in response to a date-limited search supports that the reference existed and was relevant (i.e., findable) during that time period, whereas a reference that does not populate as a search result supports that the reference either did not exist or was not relevant (i.e., not findable) during that time period.

34. I also performed keyword searches using Google's custom date range functionality and could not locate Trevarthen, which supports my opinion that Trevarthen would not have been findable on Google before September 15, 2009. In particular, I searched the key terms that Dr. Brown-Brandl suggested a POSA would search, including RFID, cattle, gate, temperature, livestock, dairy, and bolus, each of which appear in the Trevarthen thesis. I ran these searches on Google using a public workstation to minimize any effect that my search history would have on the results. In an effort to conduct a targeted search for Trevarthen, I set the custom date range to between January 1, 2006 and September 15, 2009. To the extent Trevarthen did not populate as a result before September 15, 2009, it also would not have populated as a result before September 15, 2008.

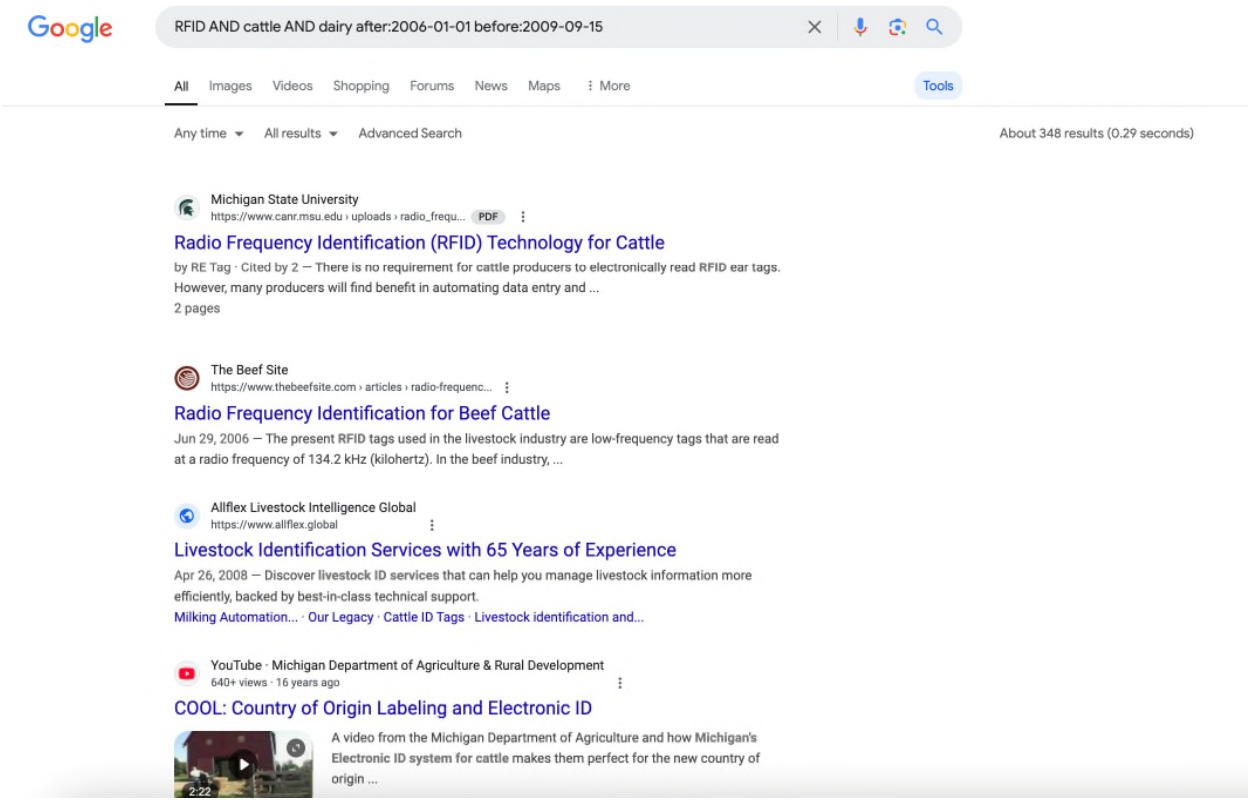
35. As shown below, the search string "RFID AND (cattle OR livestock) AND temperature" between January 1, 2006 and September 15, 2009 produced nearly 400 results. I reviewed all of these results, and neither Trevarthen nor the University of Wollongong's Research Online appeared.



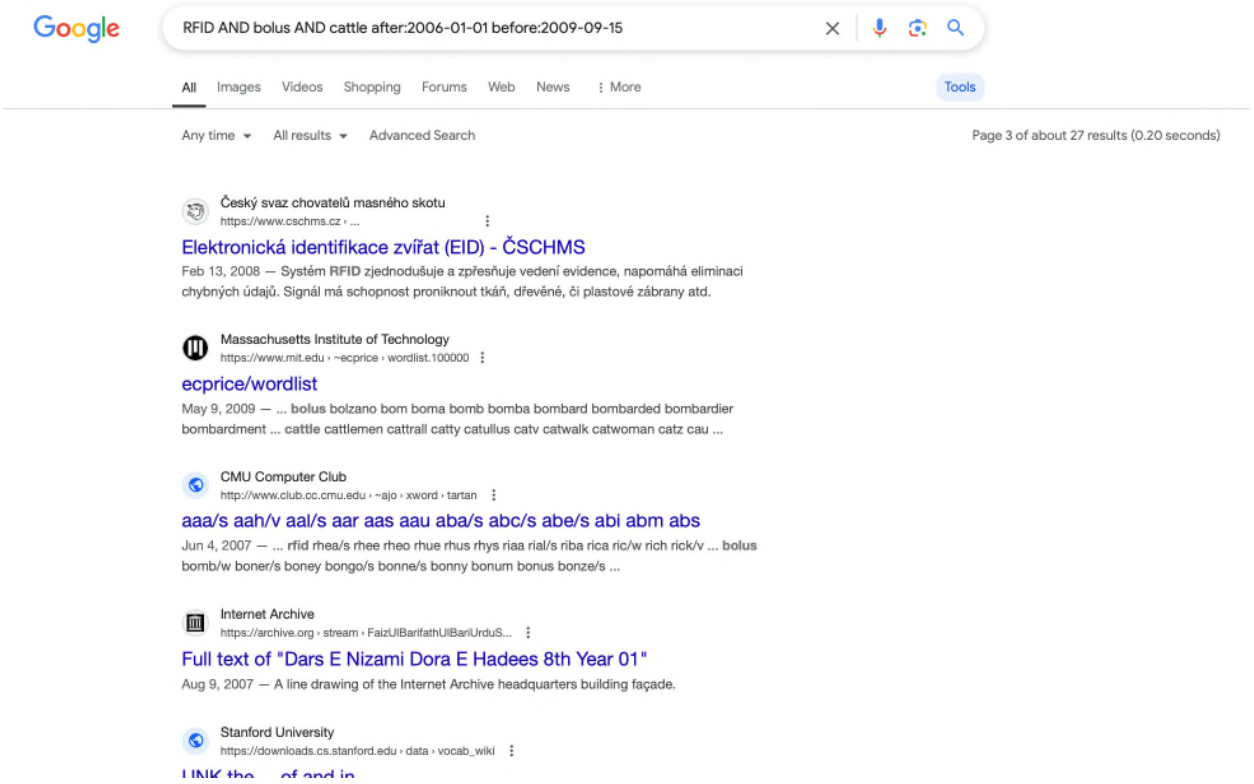
36. Next, as shown below, I ran an even more targeted search for Trevarthen using the search string "RFID AND (cattle OR livestock) AND temperature AND dairy" between January 1, 2006 and September 15, 2009 which returned 144 results. I reviewed all 144 of those results, and neither Trevarthen nor Research Online appeared.



37. Next, as shown below, I broadened the search string to "RFID AND cattle AND temperature" between January 1, 2006 and September 15, 2009 which returned 348 results. Again, I reviewed all 348 results and neither Trevarthen nor Research Online appeared.



38. Finally, as shown below, I ran a search using the string "RFID AND bolus AND cattle" between January 1, 2006 and September 15, 2009 which returned 27 results. Again, neither Trevarthen nor Research Online appeared in those 27 results.



39. As Dr. Bowser concluded, Trevarthen's absence from each of these searches supports that Trevarthen would not have been locatable through a Google search query before September 15, 2009 by a POSA using reasonable diligence. With respect to the broader searches that Dr. Bowser ran with only one search term that resulted in tens of thousands to tens of millions of results, looking for Trevarthen beyond the first few pages of those search results would require either extraordinary diligence or deep knowledge of advanced discovery tools.

VI. CONCLUSION

40. In summary, based on my review of Petitioners' evidence and my professional experience conducting research across various interdisciplinary

resources, I do not believe that a POSA would have found Trevarthen using an internet search engine with reasonable diligence prior to September 15, 2009.

Date: 2/14/25

By: _____
Meredith Knoff

APPENDIX – LIST OF MATERIALS

Exhibit No.	Description
1003	Declaration of Tami M. Brown-Brandl, Ph.D.
1005	Trevarthen, *The Importance of Utilising Electronic Identification for Total Farm Management: A Case Study of Dairy Farms on the South Coast of NSW* (Oct. 24, 2005) (Bachelor Thesis, University of Wollongong) ("Trevarthen")
1027	R. Daly & M. Organ, *Research Online: Digital Commons as a Publishing Platform at the University of Wollongong*, Australia, 35 Serials Review 149-53 (2009).
1028	International Application No. PCT/NZ2007/000286, International Search Report (March 18, 2008)
1029	International Application No. PCT/NZ2007/000286, Written Opinion of the International Search Authority (March 18, 2008)
1030	Affidavit of Nathaniel E Frank-White
1031	Declaration of June Munford in Support of *Inter Partes* Review of U.S. Patent No. 8,823, 515
2001	Declaration of Timothy J. Bowser, Ph.D.
2005	Declaration of Timothy J. Bowser, Ph.D. Pursuant to 37 C.F.R. 42.64(b)(2)
2006	DOUG BANIA, BUSINESS VALUATION RESOURCES, LLC, THE COMPREHENSIVE GUIDE TO ECONOMIC DAMAGES, VOL. 2, CH. 38 (Jimmy S. Pappas et al. eds., 7th ed. 2023), https://nevium.com/wp-content/uploads/2023/12/Bania-Chapter-38.-Using-Internet-Analytic-Tools-for-Valuation-and-Damages-Calculations-in-Internet-IP-Infringement-and-Defamation-Cases.pdf
2007	Emory University, Goizueta Business School, Become a Google Power User: Tips and Techniques,

	https://libraries.emory.edu/media/5321
2008	A.M. Bellon, Does animal charisma influence conservation funding for vertebrate species under the US Endangered Species Act?, Environmental Economics and Policy Studies (2019)
2009	Declaration of Dr. Timothy J. Bowser, Ph.D. in Support of Patent Owner Response
2010	Deposition Transcript of Tami M. Brown-Brandl, Ph.D. (January 29, 2025)
2013	Dorothea Salo, *Innkeeper at the Roach Motel*, 57 Libr. Trends 98 (2008), https://dx.doi.org/10.1353/lib.0.0031
2014	Kwame Kodua-Ntim, *University Academics' Usage of Open Access Institutional Repositories*, 30 J. Libr. Res. Sharing 101 (2021), https://doi.org/10.1080/1072303X.2022.2103227
2015	Alex Wood-Doughty et al., *Do Download Reports Reliably Measure Journal Usage? Trusting the Fox to Count Your Hens?*, 80 Coll. & Rsch. Librs. 694 (2019), https://doi.org/10.5860/crl.80.5.694
2016	*Frequently Asked Questions on Public Statistics*, Cornell Univ.: arXiv, https://info.arxiv.org/help/faq/statfaq.html
2017	*In-depth guide to how Google Search works*, Google Search Cent., https://developers.google.com/search/docs/fundamentals/how-search-works
2018	*Our new search index: Caffeine*, Google Search Cent., https://developers.google.com/search/blog/2010/06/our-new-search-index-caffeine (June 9, 2010)
2019	*Facts about Google and Competition: How Google Search Works*, Google, https://web.archive.org/web/20111104131332/https://www.google.com/competition/howgooglesearchworks.html (Mar. 19, 2016).

2020	*Grey Literature (in the Health Sciences)*, USC Librs.: Rsch. Guides, https://libguides.usc.edu/healthsciences/grey_literature
2021	Yazdan Mansourian & Nigel Ford, *Search persistence and failure on the web: a "bounded rationality" and "satisficing" analysis*, 63 J. Documentation 680 (2007), https://www.emerald.com/insight/content/doi/10.1108/00220410710827754/full/html.