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Paper No. 34
Date Filed:
June 27, 2025

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 IPR2024-00875
Patent No. 9,844,206

**ST REPRODUCTIVE TECHNOLOGIES, LLC'S
SUR-REPLY TO PETITIONERS' REPLY**

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. TREVARTHEN WAS NOT PUBLICLY ACCESSIBLE	2
A. Existence on “Research Online” Is Not Public Accessibility	2
B. Date-Limited Searches Show That Trevarthen Was Not Locatable	4
C. Present-Day Google Scholar Searches Fail to Show Public Accessibility in 2009	5
D. Australian ISR Is Not Evidence That POSAs Would Have Found Trevarthen Using a Search Engine.....	6
III. GROUND 1 – TREVARTHEN DOES NOT RENDER OBVIOUS CLAIMS 1-4 OR 6	7
A. Trevarthen Does Not Disclose or Render Obvious Combining “Milk Production” and “Sensed” Information	7
B. Trevarthen Does Not Disclose or Render Obvious All of the Claimed “Program Instructions”	11
C. Claim 4 Is Not Obvious in View of Trevarthen	12
1. Trevarthen Does Not Disclose or Render Obvious Using “Health Information” in a Logical Expression	12
2. Trevarthen Does Not Disclose or Render Obvious a “Logical Value” That “Indicates an Occurrence of an Illness”	14
D. Claim 6 Is Not Obvious in View of Trevarthen	15
1. Trevarthen Does Not Disclose or Render Obvious a System That Can Detect Illness for a Selected Period of Time	15
2. Trevarthen Does Not Render Obvious Calculating When a Threshold Number of Illnesses Has Been Exceeded	17
IV. GROUND 2 – TREVARTHEN AND BRUNE DO NOT RENDER OBVIOUS CLAIMS 17-20	17
V. GROUNDS 3 AND 4 – THE LAITINEN COMBINATIONS FAIL TO RENDER OBVIOUS CLAIMS 1-4, 6, OR 17-20	19
A. The Laitinen Combinations Do Not Disclose or Render Obvious Using “Milk Production” in a Logical Expression (Claims 1-4 and 6).....	19

B.	The Laitinen Combinations Do Not Disclose or Render Obvious an Implanted Temperature-Sensing RFID Device (Claims 2, 3, 6, and 17-20).....	22
C.	The Laitinen Combinations Do Not Disclose or Render Obvious All of the Claimed “Program Instructions” (All Claims)	25
D.	Claims 4 and 18 Are Not Obvious	26
VI.	CONCLUSION.....	26

EXHIBIT LIST

Exhibit	Description
EX2001	Declaration of Dr. Tim Bowser
EX2002	<i>Curriculum Vitae</i> of Dr. Tim Bowser
EX2003	Declaration of Thomas W. Landers, IV in Support of Motion to Appear <i>Pro Hac Vice</i>
EX2004	Declaration of Jonathan M. Hernandez in Support of Motion to Appear <i>Pro Hac Vice</i>
EX2005 (Not filed)	Declaration of Timothy J. Bowser, Ph.D. Pursuant to 37 C.F.R. 42.64(b)(2)
EX2006	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
EX2007	Emory University, Goizueta Business School, <i>Become a Google Power User: Tips and Techniques</i> , https://libraries.emory.edu/media/5321
EX2008	A.M. Bellon, <i>Does animal charisma influence conservation funding for vertebrate species under the US Endangered Species Act?</i> , Environmental Economics and Policy Studies (2019)
EX2009	Declaration of Dr. Timothy J. Bowser, Ph.D. in Support of Patent Owner Response
EX2010	Deposition Transcript of Tami M. Brown-Brandl, Ph.D. (January 29, 2025)
EX2011	Declaration of Meredith Knoff
EX2012	<i>Curriculum Vitae</i> of Meredith Knoff
EX2013	Dorothea Salo, <i>Innkeeper at the Roach Motel</i> , 57 Libr. Trends 98 (2008), https://dx.doi.org/10.1353/lib.0.0031

EX2014	Kwame Kodua-Ntim, <i>University Academics' Usage of Open Access Institutional Repositories</i> , 30 J. Libr. Res. Sharing 101 (2021), https://doi.org/10.1080/1072303X.2022.2103227
EX2015	Alex Wood-Doughty et al., <i>Do Download Reports Reliably Measure Journal Usage? Trusting the Fox to Count Your Hens?</i> , 80 Coll. & Rsch. Librs. 694 (2019), https://doi.org/10.5860/crl.80.5.694
EX2016	<i>Frequently Asked Questions on Public Statistics</i> , Cornell Univ.: arXiv, https://info.arxiv.org/help/faq/statfaq.html
EX2017	<i>In-depth guide to how Google Search works</i> , Google Search Cent., https://developers.google.com/search/docs/fundamentals/how-search-works
EX2018	<i>Our new search index: Caffeine</i> , Google Search Cent., https://developers.google.com/search/blog/2010/06/our-new-search-index-caffeine (June 9, 2010)
EX2019	<i>Facts about Google and Competition: How Google Search Works</i> , Google, https://web.archive.org/web/20111104131332/https://www.google.com/competition/howgooglesearchworks.html (Mar. 19, 2016)
EX2020	<i>Grey Literature (in the Health Sciences)</i> , USC Librs.: Rsch. Guides, https://libguides.usc.edu/healthsciences/grey_literature
EX2021	Yazdan Mansourian & Nigel Ford, <i>Search persistence and failure on the web: a "bounded rationality" and "satisficing" analysis</i> , 63 J. Documentation 680 (2007), https://www.emerald.com/insight/content/doi/10.1108/00220410710827754/full/html
EX2022 (Not filed)	Second Supplemental Declaration of Timothy J. Bowser, Ph.D. Pursuant to 37 C.F.R. 42.64(b)(2)
EX2023 (Not filed)	Supplemental Declaration of Meredith Knoff Pursuant to 37 C.F.R. 42.64(b)(2)
EX2024	Deposition Transcript of Tami M. Brown-Brandl, Ph.D. (June 19, 2025)

I. INTRODUCTION

The Reply confirms that the Petition failed to establish that any of the challenged claims are obvious in view of Petitioners' asserted references. Rather than stand on the arguments in the Petition, the Reply pivots to new obviousness theories and relies on expert testimony untethered from the prior art disclosures, in violation of 35 U.S.C. §311(b). For example, to address Trevvarthen's failure to combine milk production and temperature data, the Reply argues for the first time that the combination was "foundational knowledge" based on new evidence incorporated-by-reference in an expert declaration. But even a cursory review of the new evidence shows that it fails to support that new theory. Petitioners' departure from the Petition and the asserted art is particularly glaring in their treatment of claims 4 and 18, where the Reply fails to city *any* evidence, let alone evidence from patents and printed publications as required, for its new position that POSAs would have combined Trevvarthen's "treatment history" with temperature data to detect illness.

Notably, the Board need not even reach the merits of the Trevvarthen grounds because—after three attempts—Petitioners cannot establish that Trevvarthen was publicly accessible at the time of the invention. In fact, the new evidence in the Reply—including their expert's failed attempts to locate Trevvarthen in multiple

date-limited searches—confirms that Trevarthen was not locatable at the relevant time.

Petitioners’ Laitinen grounds fare no better. For instance, Petitioners’ argument for claim 1 requires integrating milk production data from a secondary reference, Liao, into Laitinen’s alleged logical expressions. But after recognizing that Liao’s milk information is incompatible with Laitinen, the Reply urges the Board to ignore the prior art and instead focus on a “new expression” created by Petitioners’ expert, which is prohibited by §311(b). Petitioners also abandon their position that an RFID device “implanted in animal” can include Laitinen’s external device and resort to misconstruing Laitinen’s disclosure of an internal device to include the claimed features—despite Laitinen’s express teachings to the contrary.

For the reasons discussed herein and in the Patent Owner Response, the Board should uphold the validity of the challenged claims.

II. TREVARTHEN WAS NOT PUBLICLY ACCESSIBLE

A. Existence on “Research Online” Is Not Public Accessibility

After three attempts to establish Trevarthen’s public accessibility, Petitioners have at best shown that the thesis existed electronically, but that does not meet their burden. Petitioners’ “public accessibility” argument hinges on hearsay statements about the University of Wollongong’s purported approach to search engine “availability” and certain Google functionality, both of which are entitled to

little or no weight. Pet., 8 (relying on hearsay in EX1030, Ex. A); Reply, 2-3 (relying on hearsay in EX1044). Patent Owner’s contention that Petitioners must do more to show that Trevarthen *itself* could have been located using Google is not an overly “rigid” application of the law, as Petitioners contend—it is the standard required to show public accessibility. *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 772-73 (Fed. Cir. 2018). And *Voter Verified, Inc. v. Premier Election Solutions, Inc.* does not suggest a less rigid standard, contrary to Petitioners’ assertion. Reply, 1-2. There, the petitioners established public accessibility by showing that POSAs were “independently aware” of an online forum where the reference was posted. 698 F.3d 1374, 1380 (Fed. Cir. 2012). Here, Petitioners do not argue that POSAs were “independently aware” of a website where Trevarthen existed, or provide evidence of such awareness. Instead, they argue only that Trevarthen was “available on Google,” requiring them to prove that it was locatable using a Google search at the time of the invention.

Petitioners further contend that “there is no dispute that Trevarthen was available for download” before 2009, but critically leave out that the alleged downloads were only available *from the Research Online platform*. Reply, 2. Without any evidence that the downloads resulted from interested persons who located Trevarthen via a search engine or any other search functionality, the unreliable download count from Research Online shows nothing more than

technical accessibility. *See MHL Custom, Inc. v. Waydoo USA, Inc.*, 2023 WL 5748755, at *4 (D. Del. Sept. 6, 2023). Petitioners attempt to avoid the holding of *MHL Custom* by pointing to its procedural posture, but conveniently ignore that the jury in that case nevertheless found that the reference was not prior art, which the Court upheld. Much like in *MHL Custom*, the unsubstantiated download counts are untethered from whether Trevarthen was locatable via a search engine.

B. Date-Limited Searches Show That Trevarthen Was Not Locatable

Petitioners’ explanation of why Trevarthen does not turn up in date-limited searches between 2006 and 2009 only reinforces their failure to show public accessibility. To “cast doubt on the accuracy” of Google’s date-limiting function, Petitioners point to searches conducted by their expert, Dr. Brown-Brandl (“Brown-Brandl”), that allegedly turned up “papers from 2015 and later.” Reply, 3. But Brown-Brandl admittedly is not an expert in search engine functionality—nor did she consult with any experts—and fails to offer any explanation for why her searches produced papers from after her date range. EX2010, 38:11-39:1; EX2024, 14:7-15:14, 17:4-11, 81:15-82:1, 82:18-22, 90:3-13 (“I’m not sure exactly how Google works.”). Brown-Brandl’s assumption that the inclusion of a post-2009 reference somehow indicates that a pre-2009 reference would have been omitted—conveniently, Trevarthen each time—has no support. *See* EX1055, ¶10; EX2024, 93:18-96:5.

Meredith Knoff (“Knoff”), who is an expert in Google’s search functionality, dispelled this issue at her deposition. As Knoff testified, even if “an article from 2015 showed up in a date limited search...from 2006 to 2009, that doesn’t change what still would have been available in that timeframe” because Google only *adds* web pages to its index, it does not remove content. Ex. 1038, 60:11-61:2, 65:8-21. The fact that Trevarthen did not turn up in a date-limited search in 2025—when additional documents may have “slipped into” the results—only shows that it was even less likely for Trevarthen to turn up in an actual search in 2009. *Id.*, 61:3-9. Moreover, Petitioners fail to reconcile that Brown-Brandl was equally unable to find Trevarthen in date-limited searches from the time of the invention, which confirms that it was not publicly accessible. EX1055, ¶¶8-10; EX2024, 84:21-85:8, 91:6-14, 94:17-95:4 (“I don’t know...why we didn’t find it.”).

C. Present-Day Google Scholar Searches Fail to Show Public Accessibility in 2009

After Brown-Brandl failed to locate Trevarthen in her Google searches, she pivoted to using present-day Google Scholar searches—which Petitioners admit cannot demonstrate public accessibility because “it is not possible to recreate what a search of Google Scholar would have revealed back in 2009.” Reply, 3. Indeed, Brown-Brandl’s Google Scholar searches only reinforce that Trevarthen was not publicly accessible *at the time of the invention* because the same keywords that returned Trevarthen on Google Scholar would have returned the reference in the

experts' date-limited searches from 2009 if it were locatable at that time. EX1055, ¶¶8-13. Moreover, Petitioners fail to cite any evidence showing that Trevarthen was even made available to Google Scholar before 2009. The hearsay statement that "discovery via Google and Google Scholar increases the[] visibility" of unspecified "research outputs that have never been digitized"—even if it were entitled to any weight—says nothing about Trevarthen or its availability on any search engine. EX1027, 150.

D. Australian ISR Is Not Evidence That POSAs Would Have Found Trevarthen Using a Search Engine

Trevarthen's public accessibility on a search engine is not "confirmed" by the Australian Patent Office ISR because there is no evidence showing how or where the examiner located Trevarthen or what level of effort was required to find it. Because the ISR itself fails to explain how Trevarthen was found, Petitioners rely on Brown-Brandl's speculation that "the examiner most likely located Trevarthen through internet searches." EX1055, ¶17. But this speculation is based solely on Brown-Brandl's "understanding" that the search tools listed on the ISR—other than "internet"—are "for patents or patent applications." *Id.* But other than referring to an unspecified "investigation," Brown-Brandl never explains why the other search tools could not be used to find Trevarthen. Moreover, even if the examiner did find Trevarthen on the "internet," it does not follow that he located the reference using a search engine, let alone with reasonable diligence.

Petitioners also argue, for the first time, that the ISR constitutes a “research aid” in locating Trevarthen. Reply, 5. Even if Petitioners could make new arguments at this stage (they cannot, *see Yita LLC v. MacNeil IP LLC*, 69 F.4th 1356, 1367 (Fed. Cir. 2023) (affirming PTAB’s rejection of new reply argument)), Petitioners provide no evidence as to how or why interested parties would have looked to the ISR as a “research aid” in the first instance. *MHL Custom*, 2023 WL 5748755, at *4 (finding no “roadmap” to asserted reference where petitioner did not establish how an interested party would have located alleged roadmap).

III. GROUND 1 – TREVARTHEN DOES NOT RENDER OBVIOUS CLAIMS 1-4 OR 6

A. Trevarthen Does Not Disclose or Render Obvious Combining “Milk Production” and “Sensed” Information

Petitioners never contend that Trevarthen expressly teaches that its separate disclosures of temperature and milk-related “alerts” are part of the same RFID-based system, and their reasons why POSAs would have combined the two disclosures have no merit. Petitioners argue that each of the two alert systems could be added to “existing farms” for the purpose of “detecting ‘illness.’” Reply, 7 (citing EX1005, 115, 121). At best, that could provide a reason to add *one* of the alerts to an existing farm, but not both, because they each “independently accomplish similar functions.” *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1369 (Fed. Cir. 2012). Moreover, there were reasons *not* to

incorporate Trevarthen's alleged temperature-sensing devices because, *e.g.*, they were not suitable for livestock or commercially available. POR, 28-31. In short, Trevarthen never discloses a system combining the two alert functions, and it fails to provide a reason to combine sensed temperature and milk production in the same system, let alone to generate a logical value using a logical expression as claimed.

Because Trevarthen itself fails to disclose or render obvious a system with both temperature and milk production, Petitioners rely on additional references outside of the cited grounds and alleged "foundational knowledge," but this additional material still fails to establish obviousness. For example, Petitioners assert that van den Berg "confirms it was known that multiple parameters ... generates a more reliable indication of illness." Reply, 9 (Petitioners' emphasis). But van den Berg confirms no such thing. It merely states that an indication of heat or illness is obtainable using "one or more" parameters from a list of parameters. EX1023, 4:13-17. That permissive language offers no suggestion that using multiple parameters improves illness detection, let alone that combining temperature and milk production specifically would yield any benefit. To the contrary, van den Berg draws *no* distinction between using "one" versus multiple parameters and instead suggests that a single parameter is sufficient.

Petitioners also cite a multipage paragraph in Brown-Brandl’s declaration—which itself includes a string-cite of new references—to incorrectly suggest that “it was foundational knowledge in the art that relying on multiple variables” necessarily “provided better predictions.” Reply, 9-10; EX1055, ¶20. This is a clear attempt by Petitioners to shoehorn new evidence and arguments into the reply, despite the word count limit and the requirement to make all arguments in the Petition itself. 37 C.F.R. §42.6(a)(3) (“Arguments must not be incorporated by reference...”); *Yita*, 69 F.4th at 1367.

Even if considered, the new references fail to show that using multiple variables was known to provide “better predictions,” let alone establish a reason to combine temperature and milk production specifically. Brown-Brandl admitted as much at her deposition when she clarified that “the art” she refers to in her declaration was merely directed to “statistics or model creation.” EX2024, 60:18-62:10. For example, Brown-Brandl quotes part of a sentence from Bagley—an article on “logistic regression”—stating that “introducing more variables will generally produce a model better fit to the data.” EX1055, ¶20. But in the same sentence, Bagley cautions against introducing more variables because it can “unduly influence the coefficients in the model, which is said to be ‘overfit.’” EX1039, 980. As Brown-Brandl admitted, “adding variables to a model can create overfitting,” which is “not something you would want.” EX2024, 65:1-21. The

additional cited references fare no better. Neter and Hair, for example, are single-page excerpts from math textbooks—cherry-picked by Petitioners’ lawyers (EX2024, 66:3-9, 73:18-74:8)—that say nothing about temperature or milk production and that potentially omit relevant information, such as the disadvantages of adding variables to a model. EX2024, 71:13-72:13 (agreeing that the omitted pages in Neter “could potentially list reasons why you would not want to add variables to a regression model”), 77:7-16 (testifying that the omitted pages in Hair would likely explain “whether a variable should be added or -- *or should not*”) (emphasis added).

Petitioners also fail to establish that POSAs would have had a reasonable expectation of success in combining milk production and temperature into a logical expression to generate a logical value. The Reply continues to rely on de Mol and attempts to downplay its admission that it generates too many “false positive alerts,” contending that they merely call for “further optimization.” Reply, 10. But de Mol was not a working system in need of “further optimization”—POSAs would have considered de Mol unusable in view of the false positive alerts. See EX2009, ¶¶147-49; EX2010, 145:11-13 (“[I]f a system puts out too many alerts, it becomes an obsolete system.”); *id.*, 146:6-12. At a minimum, de Mol’s admission provides an express reason *not* to modify Trevarthen’s temperature-based alert system to include milk production, or vice-versa.

B. Trevarthen Does Not Disclose or Render Obvious All of the Claimed “Program Instructions”

Claim 1 requires Petitioners to identify program instructions that specifically perform *each* of claimed functions, which they fail to do. The Reply identifies *some* instructions performed by Trevarthen’s “software,” but it fails to identify several claimed instructions, such as “retrieving,” “matching,” “entering said sensed animal information,” and “solving.” That is insufficient. *Garmin Int’l, Inc. v. Logantree, LP*, 825 F. App’x 894, 898-99 (Fed. Cir. 2020) (affirming that disclosure of “processor” that “controls the operation of the [] system” was insufficient to show that the processor specifically performs the claimed “comparing function”).

Although Petitioners originally contended that the “program instructions” were inherent in Trevarthen, the Reply pivots to an undeveloped obviousness argument based on testimony that “all the recited executable program instructions” were “well within a POSA’s knowledge and capability.” See Reply, 12-13. This reliance on expert testimony to supply claim limitations violates 35 U.S.C. §311(b), which limits the Petition to challenging claims “only on the basis of prior art consisting of patents or printed publications.” In other words, “[t]estimony cannot take the place of disclosure in a prior art reference.” *Samsung Electronics Co., Ltd. v. Power2B, Inc.*, IPR2022-00325, Paper 36 at 49-50 (P.T.A.B. June 26, 2023); Consolidated Trial Practice Guide (Nov. 2019) at 36 (explaining that expert

testimony “is not a substitute for disclosure in a prior art reference itself”).

Moreover, Petitioners’ new obviousness argument fails because the cited testimony is conclusory, and Petitioners fail to explain why Trevarthen would be configured to include *each* instruction, let alone with a reasonable expectation of success.

C. Claim 4 Is Not Obvious in View of Trevarthen

1. *Trevarthen Does Not Disclose or Render Obvious Using “Health Information” in a Logical Expression*

The only alleged “health information” identified in the Petition is Trevarthen’s reference to “historical treatments” administered to a cow. Pet., 25; Reply, 13-14. But Trevarthen never teaches or suggests using those treatments in a logical expression—let alone in combination with sensed physiological information to determine whether an animal is ill—as required by claim 4. To address that limitation, Petitioners contend, without citing any evidence, that “a POSA would have been motivated to use temperature *and treatment history* to determine illness.” Reply, 14 (emphasis added). Again, Petitioners skirt the requirement that IPR grounds may only be based on patents and printed publications.

In any event, Petitioners’ conclusory assertion that a POSA would have included treatments in a logical expression “[f]or the same reasons a POSA would have been motivated to use two variables (temperature and milk production) to determine illness” makes no sense. According to their expert, the reason to use

temperature and milk production in an expression is because “temperature fluctuations...and unexpectedly low milk production can both be signs of illness,” and thus both “could be input as logical variables in order to serve as an enhanced illness detection alert system.” EX1003, ¶113. But Brown-Brandl never contends that historical treatments are a sign of illness or could be used to enhance illness detection. To the contrary, she has no opinions on any correlation between treatments and illness because “treatment of animals is outside of [her] expertise.” EX2010, 81:6-15, 80:3-81:15. As Dr. Bowser testified, the “treatment” data in Trevarthen would not be compatible with its alleged logical expression. EX2009, ¶¶174-76; *see also* EX2010, 83:17-84:1.

Petitioners’ alternative argument that “milk production” is “health information” is a new argument that relies on a misinterpretation of dependent claim 4. Reply, 14. Claim 4 adds the restriction that the “animal information” of claim 1 “comprises health information.” And claim 1 already specifies that the “animal information” includes “milk production.” Thus, if “milk production” in claim 1 were to be interpreted to be “health information,” as Petitioners now contend, claim 4’s recitation that the stored animal information includes “health information” would be superfluous, rendering Petitioners’ new argument incorrect as a matter of claim construction. *See Digital-Vending Servs. Int’l, LLC v. Univ. of Phoenix, Inc.*, 672 F.3d 1270, 1275 (Fed. Cir. 2012) (explaining that claims should

be construed such that terms “are not rendered superfluous”). Moreover, as both experts have testified, milk production is an “economic metric” influenced by numerous factors—it does not directly relate to the animal’s health. *See* EX2009, 233 (“Milk production is an economic metric and not a direct indicator of a cow’s current health status.”); EX2010, 87:1-2 (“A deviation in milk production alone could be caused by a lot of factors.”); EX2024, 41:12-22 (testifying that peak milk yield is “an economic performance metric”).

2. *Trevarthen Does Not Disclose or Render Obvious a “Logical Value” That “Indicates an Occurrence of an Illness”*

Claim 4 further requires generating a “logical value” that “indicates an occurrence of an illness of said animal.” By Trevarthen’s own description, the alleged “alerts” that Petitioners rely on as “logical values” do not provide any indication that an illness has occurred. In two separate systems, Trevarthen simply purports to “alert” farmers when a cow’s temperature or milk production fluctuates so that the farmers can “investigate” the issue. EX1005, 115, 121-22. The farmers—not the alert systems—can then determine whether the cow is “falling ill,” “entering heat,” or experiencing some other issue. *Id.* Because Trevarthen’s alerts do not specifically indicate that an illness has occurred, Petitioners’ argument that “the claims do not require 100% accuracy in illness detection” is irrelevant. Reply, 15.

D. Claim 6 Is Not Obvious in View of Trevarthen

1. *Trevarthen Does Not Disclose or Render Obvious a System That Can Detect Illness for a Selected Period of Time*

For claim 6, Petitioners mix and match Trevarthen’s “basic” and “advanced” temperature measurement processes, but neither are configured to detect illness for a selected period of time. The “basic” system only measures temperature in the morning and afternoon, when a cow’s temperature is at its lowest and highest points and, therefore, is unable to detect “fluctuations” from the average of all measurements. *Id.* The Reply cites expert testimony to argue that the “average” temperature used for detecting fluctuations in Trevarthen is not “the average throughout the day” but instead is “the average of a time-series taken at the same time every day.” Reply, 16. Once again, Petitioners “fill in the gaps” of Trevarthen with evidence outside the purview of this proceeding because no patent or printed publication describes such a “time-series.” *Whatfix, Inc. v. WalkMe Ltd.*, IPR2024-0065, Paper 34 at 50-51 (P.T.A.B. Mar. 28, 2025) (“Petitioner improperly relies on Dr. Beigi to fill in the gaps in Allen’s disclosure”).

Moreover, Petitioners’ argument that an average of a time-series would be an average of measurements “taken at the same time every day” runs contrary to its own expert’s testimony. Reply, 16. According to Brown-Brandl, a “time-series” does not refer to measurements at a particular time of day but instead refers to measurements taken at “regular intervals” at *different* times of the day. EX2024,

45:21-46:18, 55:2-11 (testifying that temperature measurements could be “every 10 minutes, so at 10:00[], 10:10, 10:20, 10:30,” and “all of those measurements together would be a time series”). The “average of a time-series” is therefore not the average temperature at a particular time of day but instead is an average of *all* the measurements in the entire time-series. EX2024, 56:2-6, 57:2-14-57:22, 58:7-59:16. Thus, even if Trevarthen used an “average of a time-series,” that average would be based on temperatures taken in the morning and afternoon, not at the same time every day.

Trevarthen’s “advanced” system suffers from the same flaw as the basic system because some cows’ temperatures would only be measured in the morning and evening, rendering the system incapable of detecting fluctuations or illnesses for the plurality of animals as claimed. EX2009, ¶197. As Petitioners acknowledge, the advanced system suffers from an additional flaw in that the “temperatures of all cows in the herd cannot be taken at the same time.” Reply, 16-17. This is because the advanced system takes temperature measurements at unpredictable times of the day, depending on when (and if) the cow visits areas containing additional RFID readers, such as “hay feeders” or “a water trough.” EX1005, 112; EX2024, 28:14-17 (agreeing that “it would be impossible to predict a precise timing for when a dairy cow will visit a hay feeder or water trough”). Accordingly, it would be impossible to calculate temperature deviations based on a

“time-series of measurements,” which—according to Petitioners—requires temperatures to be “taken every day at the same times.” Reply, 16.

2. *Trevarthen Does Not Render Obvious Calculating When a Threshold Number of Illnesses Has Been Exceeded*

Petitioners do not dispute that Trevarthen fails to disclose a logical expression that solves for whether a “greater than selected number of said illness have occurred.” Instead, they cite Brown-Brandl’s conclusory expert testimony that an “operator could set a threshold value, which, when exceeded, would broadcast an alert.” EX1003, ¶143; Reply, 17. But again, Petitioners cannot rely on this testimony to “fill in the gaps” of Trevarthen. *Fidelity Info. Servs., LLC v. Groove Dig., Inc.*, IPR2019-00193, Paper 58 at 62 (P.T.AB. Apr. 30, 2020) (“Petitioner cannot fill in the gaps in the actual teachings of Wilson by relying on this conclusory, unpersuasive, testimony of its expert.”), *aff’d*, 850 F. App’x 793 (Fed. Cir. 2021) (*per curiam*).

IV. GROUND 2 – TREVARTHEN AND BRUNE DO NOT RENDER OBVIOUS CLAIMS 17-20

Because the Petition fails to provide any reason why POSAs would swap Trevarthen’s reader-based timestamp with Brune’s timestamp, the Reply adds a new argument that Trevarthen “requires a time-series of measurements where the date and time of each measurement is known,” which allegedly can be “facilitate[d]” by Brune. Reply, 18; *see also* EX2010, 149:17-152:14. That time-

series “requirement” appears nowhere in the prior art and thus cannot serve as a basis for challenging the claims. *See* §III.D.1.

To the extent a time-series of measurements is required, then the need to “synchronize” device-based systems to account for “drift” is a reason not to use device-based systems. According to Petitioners, Trevarthen’s “time-series” requires temperatures to be “taken every day at the same times.” Reply, 16. But if the calculated time drifts over time, then temperatures having the same time-stamp are not actually taken at the same time each day. *See* EX1037, 128:21-22 (testifying that “synchronization...is just keeping clocks on time”).

Petitioners further argue that a device-based time-stamp “would have at least been obvious to try,” but they fail to address the proper standard for that theory. Reply, 19. Establishing “obvious to try” requires first proving that “there is a design need or market pressure to solve a problem,” which they do not address. *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1338–1339 (Fed. Cir 2020).

Additionally, Ground 2 fails for similar reasons as Ground 1. *See* §III; POR, 45-47.

V. GROUNDS 3 AND 4 – THE LAITINEN COMBINATIONS FAIL TO RENDER OBVIOUS CLAIMS 1-4, 6, OR 17-20

A. The Laitinen Combinations Do Not Disclose or Render Obvious Using “Milk Production” in a Logical Expression (Claims 1-4 and 6)

Ground 3 turns on combining Liao’s “peak milk yield” with Laitinen’s “heat detection” system, but POSAs would have had no reason to make that combination because Liao’s “insemination decision” is concerned with identifying *which* animal to inseminate, not whether the animal is currently in heat. This is exemplified by Liao’s use of “peak milk yield in a latest lactation” as part of its “insemination decision.” EX1010, 5:18, 10:7-8; EX2009, ¶76. Unlike temperature and movement, peak milk yield is not a variable reflecting a cow’s current condition. Rather, it is a single number reflecting the maximum amount of milk produced by a cow in a single day during its latest lactation cycle. *See* EX2024, 35:13-21, 36:15-21, 37:20-39:6; EX2001, ¶150. Liao does not use that value to detect heat or when an animal is ready for insemination, but to determine whether a particular cow should be inseminated at all. *See* EX2010, 174:10-13, 181:18-182:14. As shown below, Liao’s system prioritizes inseminating a high-producing cow that is *not* in heat (55 peak yield) over a low-producing cow (20 peak yield) that *is* in heat:

D _{rand}							Dec _U
<u>DIM</u>	<u>Peak Yield</u>	<u>Av.# Ins./ conception.</u>	<u>Heat</u>	<u>Last Heat</u>	<u>Lactation</u>	<u>BCS</u>	<u>Insem.</u>
26	50	2,0	Yes	—	2	3,0	No
60	40	2,5	Yes	21	3	3,5	Yes
120	60	3,0	Yes	23	1	2,0	Yes
70	20	1,5	Yes	22	6	3,3	No
80	40	2,0	Yes	20	4	2,3	Yes
100	50	1,0	Yes	21	5	3,2	No
⋮							
200	55	4,4	No	23	3	3,1	Yes

EX1010, 10. In other words, Liao’s “insemination decision” is a breeding decision, not a heat detector. And Liao demonstrates how farmers select matings that produce offspring having high milk production and may not inseminate animals with low milk production. EX2024, 42:17-43:1 (agreeing that low peak yield can be a “data point in deciding not to artificially inseminate that animal”). Thus, peak yield may be informative for the breeding decision, but that is completely unrelated to heat detection. *Id.*, 39:7-42:5 (Brown-Brandl testifying that she “can’t think of other reasons” for a peak milk yield value and failing to mention heat detection).

Indeed, Liao’s “peak milk yield” value would serve no purpose in Laitinen’s heat detection system, which purports to use sensed temperature and movement measurements to trigger an alarm when a cow is currently in heat. EX1006, 8:5-15. Because peak milk yield is a single value reflecting the cow’s *highest* yield in a *prior* lactation cycle, it would not identify any drops in production and would provide no information on the cow’s current condition. Thus, Petitioners’ new evidence purportedly showing a correlation between decreased milk production and heat fails to provide any reason to use Liao’s peak yield to identify cows currently in heat. *See* Reply, 21; *see also* EX2010, 87:14-16.

Petitioners’ argument that Laitinen and Liao would be combined because “[h]eat and insemination decisions...are closely related” also has no merit. That two references involve “closely related subject matters” does not provide a motivation to combine them. *Microsoft Corp. v. Enfish, LLC*, 662 F. App’x 981, 990 (Fed. Cir. 2016) (affirming PTAB rejection of argument that two references would be combined because they “address[ed] the same technical issues and disclose[d] closely related subject matters”). Regardless of any relation between heat and insemination decisions, Petitioners still fail to explain why Liao’s particular peak yield value would be used in Laitinen.

Furthermore, milk production would not be used in Laitinen’s “inverse function” for determining effective medications for a cow. The Reply fails to

address Patent Owner’s arguments regarding the “inverse function,” including that milk production is not a factor in assessing the effectiveness of medication. *See* POR, 54-57. It merely contends that “the yield of [] discarded milk is still measured.” Reply, 22. Even if true, Petitioners fail to explain how or why such measurements would be used in Laitinen’s inverse function, such as to assess the effectiveness of a medication. *See* EX2009, ¶232.

Finally, the Board should not consider Petitioners’ argument that POSAs would have been motivated to “‘create a new’ expression”—as opposed to modifying Laitinen’s alleged expressions—because such argument is based on expert testimony, not a patent or printed publication. *See* §311(b); Reply, 23 (citing EX1055, ¶¶31–32). Indeed, Petitioners acknowledge that their Laitinen grounds are not based on prior art when they accuse Patent Owner of “miss[ing] the forest for the trees” by “focus[ing] on the specifics of Laitinen and Liao’s implementations.” Reply, 22-23.

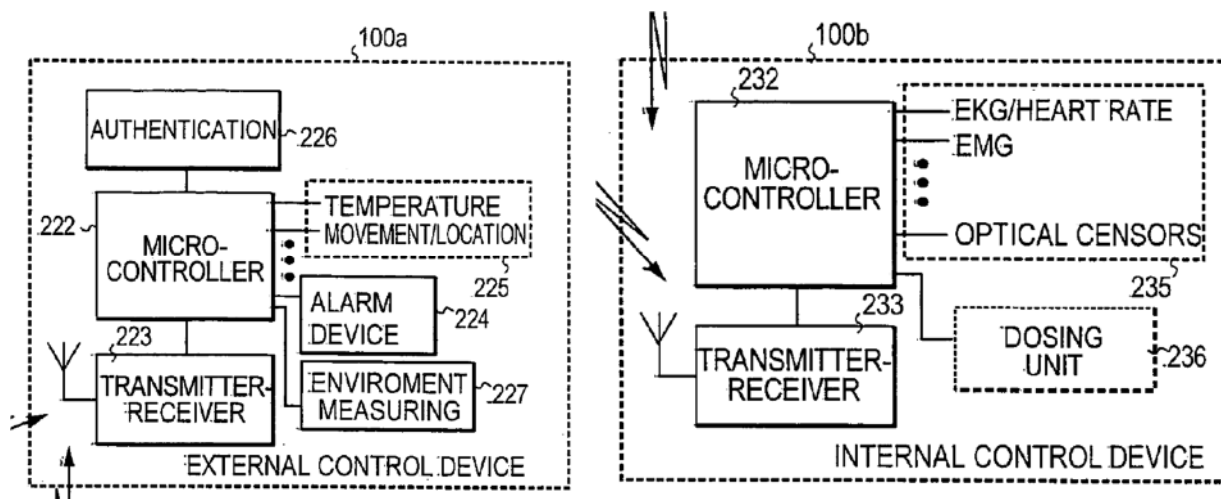
B. The Laitinen Combinations Do Not Disclose or Render Obvious an Implanted Temperature-Sensing RFID Device (Claims 2, 3, 6, and 17-20)

Petitioners’ expert has acknowledged Laitinen’s failure to disclose an internal RFID device that measures temperature, and the Reply fails to address that issue. Brown-Brandl testified that “[a]lthough Laitinen provides a specific external RFID device,” a “POSA would have been motivated to use an internal device.”

EX1003, ¶194. In other words, she made an obviousness argument and never contends that the disclosed internal pico level device—which only measures “heart rate,” “muscular tension,” “fatigue,” or “oxygen saturation”—measures temperature or movement. EX1006, 5:50-55, Fig. 2. And neither she nor Petitioners explain how the purported “motivation” to use an internal device would lead to the claimed invention, particularly where Laitinen itself provides a solution for the alleged “detachment” issue. EX1006, 3:58-62 (explaining that the system can include “detectors which alarm if the pico level device is detached from the animal”); see *Spectralytics, Inc. v. Cordis Corp.*, 649 F.3d 1336, 1343 (Fed. Cir. 2011) (affirming finding that prior art machines “taught away” from the invention because prior art used a different solution).

Instead of trying to explain why POSAs would have modified Laitinen’s internal RFID device to measure temperature or movement, Petitioners argue that Laitinen’s “[s]ensor unit” is an “RFID device” that measures temperature and movement and “can also be an implant inside the animal.” Reply, 23-24. But Laitinen explicitly says that the sensor unit is separate from an RFID device because the sensor unit is “read/transcribed *by the pico level equipment* using the so-called Radio Frequency Identification Technology.” EX1006, 3:53-57 (emphasis added).

Even if the sensor unit were an RFID device, Trevarthen's disclosure as a whole demonstrates that the sensor unit that measures temperature and movement is located external to the animal. As shown in Figure 2, sensor unit (225) measures "temperature" and "movement" and is part of "external control device" (100a), while the "internal control device" (100b) only includes "EKG/HEART RATE," "EMG," and "optical sensors":



EX1006, Fig. 2. That is consistent with Laitinen's clear distinction between an "external" device that measures temperature and movement and a separate "internal" device that measures other parameters. EX1006, 5:38-55. Accordingly, when Laitinen states that the "[s]ensor unit connected to the micro controller for the surveillance of the animal's body temperature, occlusion, muscular action, motion or metabolic level," he is referring to the sensor units in either type of control device. *Id.*, 3:51-53. But in the next sentence, Laitinen states that "[t]he sensor unit can *also* be an implant inside the animal, in which case *the data it*

provides can be...read/transcribed by the pico level equipment,” which refers to the implanted sensor in the internal control device that only provides heart rate, muscular tension, fatigue, or oxygen saturation data. *Id.*, 3:53-57. There is no teaching or suggestion that Laitinen’s implanted sensor unit is capable of providing temperature or movement data.

In an effort to expand Laitinen’s disclosure beyond what it teaches, Petitioners argue that three circles depicted in the “internal control device” of Figure 2 are “placeholders” that refer to unspecified “additional sensors.” Reply, 24. However, Laitinen never explains what the circles mean. Petitioners’ interpretation that the circles “invit[e]” additional sensors is nonsensical because it would mean that references can disclose infinite embodiments simply by including “placeholders.”

C. The Laitinen Combinations Do Not Disclose or Render Obvious All of the Claimed “Program Instructions” (All Claims)

Petitioners fail to identify each of the claimed “program instructions” in a patent or printed publication and instead rely on conclusory expert testimony to satisfy the claimed “retrieving, matching, entering, [and] solving” instructions.

Reply, 26 (citing EX1055, ¶¶171-72). That is prohibited under §311(b).

Moreover, Petitioners’ new obviousness theory fails because the cited testimony is conclusory and fails to explain where the missing instructions were disclosed or

why Laitinen would be configured to include such instructions, let alone with a reasonable expectation of success.

D. Claims 4 and 18 Are Not Obvious

Petitioners argue for the first time that Laitinen’s alleged “temperature” data, which is the alleged “sensed animal information” (Pet., 47), can satisfy the “health information” in claims 4 and 18, but that is incorrect. Reply, 26. The claims distinguish between “sensed animal information” and “animal information...stored in a database,” and require that *both* sets of information be used in a logical expression. Moreover, the claimed instruction to “match said sensed animal information” to “animal information of said animal stored in a database” would be nonsensical if sensed temperature can serve as both the “sensed” and “stored” information. Sensed temperature cannot “match” to itself. *Neville v. Found. Constructors, Inc.*, 972 F.3d 1350, 1357 (Fed. Cir. 2020) (rejecting “nonsensical” construction that would allow an “end plate” to protrude from an “end plate” because “an object cannot protrude from itself”).

VI. CONCLUSION

Accordingly, Patent Owner requests that the Board confirm the patentability of the challenged claims.

Dated: June 27, 2025

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing was served on counsel of record on June 27, 2025 by filing this document through the Patent Trial and Appeal Case Tracking System (P-TACTS), as well as delivering a copy via electronic mail to counsel of record for the Petitioners at the following addresses:

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CERTIFICATE OF COMPLIANCE PURSUANT TO 37 C.F.R. §42.24

This paper complies with the type-volume limitation of 37 C.F.R. §42.24. The paper contains 5,593 words, excluding the parts of the paper exempted by §42.24(a).

This paper also complies with the typeface requirements of 37 C.F.R. §42.6(a)(ii) and the type style requirements of §42.6(a)(iii)-(iv).

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