

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LULULEMON ATHLETICA CANADA INC. AND LULULEMON USA INC.
Petitioner,

v.

NIKE, INC.
Patent Owner.

Patent No. 8,620,413

Inter Partes Review No. IPR2023-00438

PETITIONER'S REPLY TO PATENT OWNER RESPONSE

TABLE OF CONTENTS

	Page
I. CLAIM CONSTRUCTION	1
II. GROUND 1: AMANO.....	4
A. Amano Teaches “wherein an exertion level is based on a level of physical fitness of a user” ([1C])	4
B. Amano Teaches “a plurality of heart rate zones based on first heart rate measurements . . . while the user exercises at the plurality of successive exertion levels” ([1D]).....	9
C. Amano’s First, Fourth, And Eighth Embodiments Are Not Distinct Embodiments	10
D. Nike Does Not Dispute That Amano Teaches Claims 5 And 7.....	11
III. GROUND 2: MATSUMOTO	11
A. Matsumoto Teaches “wherein an exertion level is based on a level of physical fitness of a user” ([1C])	11
B. Matsumoto Teaches “a plurality of heart rate zones based on first heart rate measurements . . . while the user exercises at the plurality of successive exertion levels” ([1D]).....	12
1. Matsumoto teaches a plurality of heart rate zones.....	13
2. Matsumoto teaches heart rate zones and heart rate measurements in the same embodiment	13
C. lululemon Did Not Map “first heart rate measurements” And “second heart rate measurements” To The Same Heart Rate Measurements ([1G])	15
D. Nike Does Not Dispute That Matsumoto Teaches Claims 5 And 7	16
IV. GROUND 3: LUBELL AND CECI.....	16
A. A POSITA Would Have Combined Lubell And Ceci	16
1. Nothing in Lubell teaches away from using a self-regulated protocol	18
2. A POSITA would have combined Lubell and Ceci with a reasonable expectation of success.....	19

TABLE OF CONTENTS
(continued)

	Page
B. Lubell And Ceci Teach “determin[ing] a plurality of heart rate zones based on first heart rate measurements . . . while the user exercises at the plurality of successive exertion levels” ([1D]).....	20
V. GROUNDS 6 AND 7: AMANO AND GORMAN/FLACH.....	21
A. The Dependent Claims Encompass Both Wired And Wireless Communications.....	21
B. A POSITA Would Have Combined Amano And Gorman/Flach.....	23
VI. GROUNDS 4, 5 (LUBELL-CECI AND GORMAN/FLACH) AND GROUNDS 8, 9 (MATSUMOTO AND GORMAN/FLACH)	24
VII. THE BOARD SHOULD REJECT NIKE’S ATTACKS ON DR. LYNCH AND INSTEAD EXCLUDE NIKE’S EXPERT.....	25
VIII. CONCLUSION.....	26

TABLE OF AUTHORITIES

Page(s)

Cases

<i>Kennametal, Inc. v. Ingersoll Cutting Tool Co.,</i> 780 F.3d 1376 (Fed. Cir. 2015)	14
<i>Net MoneyIN, Inc., v. Verisign, Inc.,</i> 545 F.3d 1359 (Fed. Cir. 2008)	11
<i>Unified Patents, Inc. v. Intellectual Ventures I LLC,</i> IPR2016-01643, 2018 WL 1511821 (PTAB Mar. 26, 2018).....	14

Petitioner’s Updated Exhibit List for
Inter Partes Review of U.S. Patent No. 8,620,413

Exhibit Description	Exhibit #
U.S. Patent No. 8,620,413 to Prstojevich <i>et al.</i>	1001
U.S. Patent No. 6,241,684 to Amano <i>et al.</i> (“Amano”)	1002
U.S. Patent No. 4,911,427 to Matsumoto <i>et al.</i> (“Matsumoto”)	1003
U.S. Patent No. 4,566,461 to Lubell <i>et al.</i> (“Lubell”)	1004
Ruggero Ceci & Peter Hassmén, <i>Self-monitored exercise at three different RPE intensities in treadmill vs field running</i> , 23 Medicine & Science in Sports & Exercise 732-738 (1991) (“Ceci”)	1005
Website for Medicine & Science in Sports & Exercise Volume 23, Issue 6 published in June 1991	1006
U.S. Patent No. 5,400,794 to Gorman (“Gorman”)	1007
U.S. Patent Application Publication No. US 2001/0023315 A1 (“Flach”)	1008
Declaration and <i>Curriculum Vitae</i> of Dr. Kevin Lynch	1009
June 22, 2012 Application No. 13/531,072 (Original Application)	1010
Feb. 14, 2013 Non-Final Rejection of Application No. 13/531,072	1011
May 2, 2013 Amendment to Application No. 13/531,072 and Request for Reconsideration	1012
June 13, 2013 Final Rejection of Application No. 13/531,072	1013
Aug. 13, 2013 Response After Final Action to Application No. 13/531,072	1014
Aug. 22, 2013 Notice of Allowance for Application No. 13/531,072	1015
Paper Depicting Formula (During Deposition of Dr. Bryan Bergeron)	1016

Transcript of December 21, 2023 Deposition of Dr. Bryan Bergeron	1017
Reply Declaration of Dr. Kevin Lynch	1018

**Petitioner's Exhibits 1001-1015 were previously filed and are listed again here based on 37 C.F.R. § 42.63.*

***Petitioner's Exhibit(s) 1016-1018 are newly filed.*

Petitioner submits that the challenged claims are unpatentable for the reasons set forth below.

I. CLAIM CONSTRUCTION

Nike's construction of "wherein an exertion level is based on a level of physical fitness of a user" is incorrect. (POR, 19-20.) The correct construction is "wherein an exertion level is adaptive to a user's physical fitness." (EX1018, ¶¶7-13.) The '413 patent specification describes an exertion level being based on a user's physical fitness, as indicated by physical attributes such as a user's sitting or resting heart rate. (EX1001, 15:54-56 ("As will be appreciated by those of ordinary skill in the art, an easy level of exercise is one that only slightly elevates the user's heart rate."); EX1017, 28:3-9 (Nike's expert) ("Q. And would sitting heart rate be an indicator of cardiorespiratory endurance? A. . . . It could be.")) Furthermore, during prosecution, Nike overcame Lubell by arguing that Lubell's test protocol is "predetermined" and not "adaptive to the physical fitness of a user." (EX1014, 8.)

lululemon's construction is also consistent with the extrinsic evidence upon which Nike relies. Caspersen describes physical fitness as a matter of degree: "No person has no fitness—all are active or fit to greater or lesser degrees." (EX2009, 130; EX1017, 49:4-50:20 (Nike's expert agreeing with Caspersen's statement).) Thus, an exertion level that is adaptive to a user's physical fitness would

necessarily be adaptive to the user's level of physical fitness. (EX1018, ¶11.)

That level is indicated by a set of physical attributes as Caspersen explains.

(EX2009, 129 (defining physical fitness as “[a] set of attributes that people have or achieve that relates to the ability to perform physical activity”); EX1017, 46:17-47:5 (Nike's expert agreeing with Caspersen's definition).) Nike's expert admitted that physical attributes, such as sitting heart rate, indicate a user's cardiorespiratory endurance, which reflects a level of physical fitness according to Nike. (EX1017, 28:3-9; POR, 25). And he admitted that other physical attributes such as weight and height as expressed through BMI can estimate body composition, which he acknowledged is another component of physical fitness. (EX1017, 52:9-13, 56:23-57:1.)

In its construction, Nike rewrites the entire limitation:

“wherein an exertion level takes into account ~~is based on an individual user's particular physical fitness condition~~ a level of physical fitness of a user, as assessed by fitness condition criteria such as cardiorespiratory endurance.”

(POR, 19-20.) Nike provides no explanation as to why it changed “based on” to “takes into account.” Its expert was confused whether the change was broadening or narrowing, and ultimately was not able to explain why he made the change. (EX1017, 71:3-20, 72:19-25.)

Nor could Nike's expert explain the wholesale revision of a “level of physical fitness of a user.” Nike has asserted that, in view of the prosecution

history, this claim limitation ties an exertion level to physical fitness level *of a user*. (POR, 24-25.) But Nike’s expert repeatedly stated the opposite—that he felt compelled to rewrite the limitation, because the limitation did *not* tie an exertion level to a physical fitness level of a user. (EX1017, 61:17-21, 74:1-8.) And he finally offered a construction that did not even use Nike’s phrase “an individual user’s particular physical fitness condition.” (*Id.*, 76:10-17.)

In any event, the intrinsic record does not support Nike’s rewrite of the claim limitation to focus on a user’s “physical fitness condition.” Nike apparently seeks to differentiate physical attributes—that its expert admits “influence” a person’s level of fitness—from a person’s “physical fitness condition.” (EX2008, ¶25.) The distinction between physical attributes and a “physical fitness condition” fails because a person’s physical attributes can also reflect his physical fitness condition. For example, a person’s high-risk obesity can indicate that he is not in a good physical fitness condition for running a marathon.

Nike makes the same error in its reliance on the ’413 specification passage that lists “condition” separately from “age.” (EX1001, 15:7-10; POR, 20.) The cited passage also lists an athlete’s “sitting heart rate.” Nike’s expert admitted that sitting heart rate is an indicator of cardiorespiratory endurance, and Nike contends that cardiorespiratory endurance reflects a person’s fitness condition. (EX1017, 28:3-9; POR, 25.) The passage does not suggest that physical attributes cannot be

indicators of a user's fitness "condition." (EX1018, ¶13.) Nike's "condition" construction is simply an attempt to arbitrarily exclude certain physical attributes from the scope of the claim. Nike's expert was correct to read out the user's "physical fitness condition" from the construction on cross-examination. (EX1017, 76:10-17; *see also* EX2012, 139:7-18 ("[T]here's no way to provide a definitive calculation of somebody's level of physical fitness. So what do we do? We look to indicators or aspects of that physical fitness and there are many, many.").)

Finally, Nike adds an entire phrase "as assessed by fitness condition criteria, such as cardiorespiratory endurance." These terms are not found in the intrinsic record and are instead imported from Nike's extrinsic evidence in attempt to overcome the instituted art. (POR, 25-27.)

II. GROUND 1: AMANO

A. Amano Teaches "wherein an exertion level is based on a level of physical fitness of a user" ([1C])

Nike and its expert agree that Amano discloses calculating an exercise intensity based on weight and stride length. (POR, 31; EX2001, ¶111; EX2008, ¶¶67-68; EX1002, 12:15-21.) Under either party's construction, Amano teaches [1C]. (EX1018, ¶¶20-24.) Amano's exercise intensity is adaptive to a user's physical fitness, as indicated by physical attributes such as the user's stride length and weight. (Decision on Institution ("DI") (Paper 11), 26 ("In our view, stride

length and weight are reasonably viewed as characteristics of a user's physical fitness.”.)

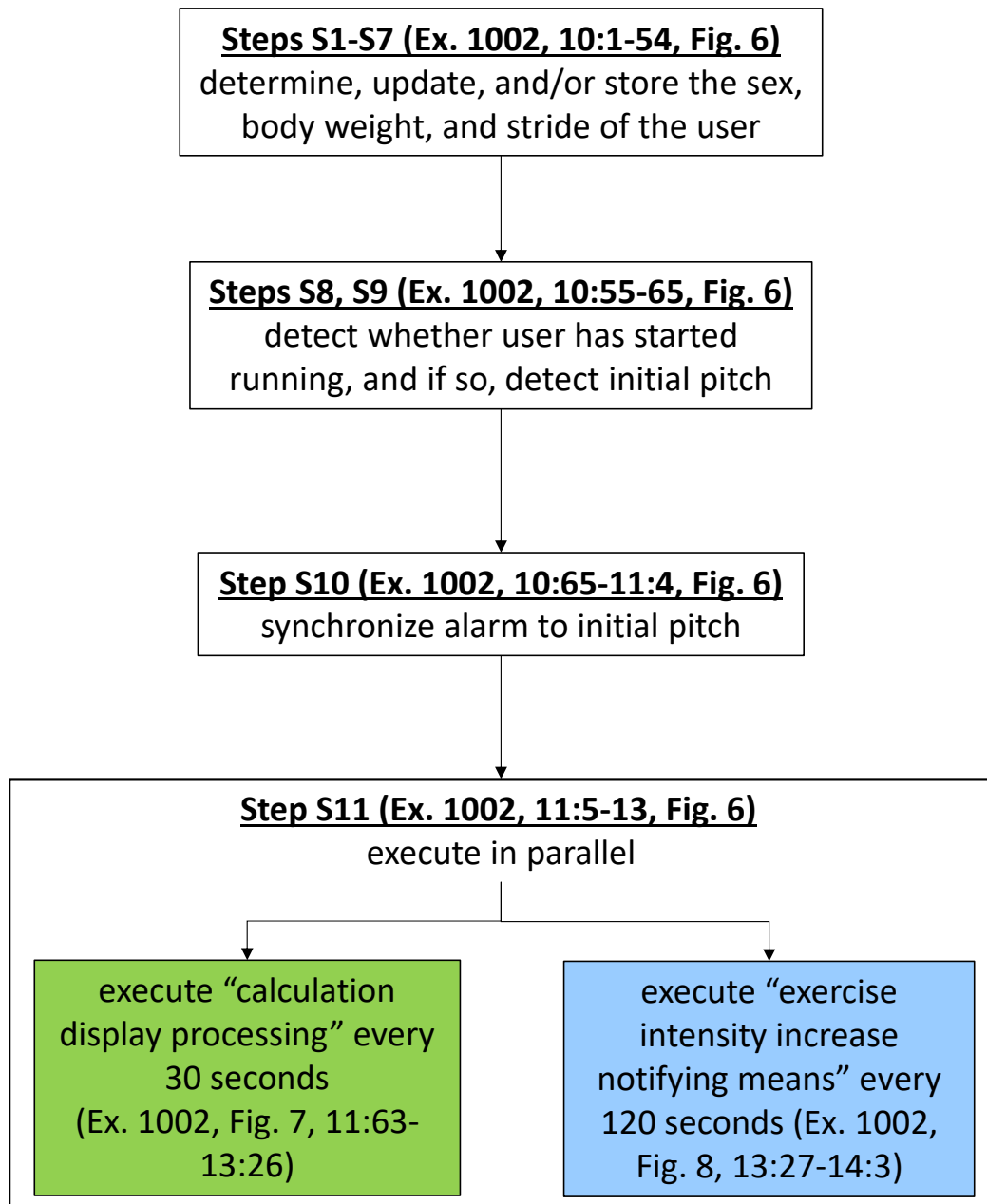
Even if Nike's construction were adopted, the result is the same. Nike's expert testified that [1C] means an exertion level that takes into account a fitness condition criteria “such as” a user's cardiorespiratory endurance. (EX1017, 76:10-17, 77:2-10.) He also admitted that body composition, like cardiorespiratory endurance, is a component of physical fitness and that BMI (reflecting weight and height) is an estimate of body composition. (EX1017, 52:9-13, 56:23-57:1.) By utilizing weight and stride length (associated with height) of a user, Amano's intensity level takes into account a fitness condition criteria, *i.e.*, the user's body composition. (EX1018, ¶¶22-24.)

Aside from claim construction, Nike resorts to a complicated, nonsensical theory that the meaning of “exercise intensity” in Amano somehow changes from one column to another. (POR, 29-32.) According to Nike, “exercise intensity” in column 12 of Amano refers to power, and “exercise intensity” in columns 13-15 refers to pitch. (POR, 31-32.) Nike mischaracterizes Amano to support its contorted argument.

As Dr. Lynch explains, column 12 discusses the “**calculation display processing**” process (figure below), which calculates an exercise intensity-beat pair every 30 seconds. (EX1002, 11:63-13:26; EX1018, ¶¶14-16, 18, 19.) The

latter part of column 13 discusses the “**exercise intensity increase notifying means**” process (figure below), which prompts the user to increase exercise intensity every 120 seconds to obtain a pair at a different exercise intensity. (EX1002, 13:27-14:3; EX1018, ¶¶14-17.)

Overview of Amano’s Operation



Amano detects the initial pitch of the user running in step S9 in Figure 6. (EX1002, 10:63-65, 12:1-14, 13:40-43; EX1018, ¶¶15, 16.) In the “**calculation display processing**” process of Figure 7, the exercise intensity (units in watts “[W]” (*i.e.*, power)) is calculated using the initial pitch detected in step Sa2 (same as step S9 in Fig. 6). (EX1002, 12:12-21; EX1018, ¶16.) In the “**exercise intensity increase notifying means**” process of Figure 8, the pitch increases by 10% using the initial pitch detected in step Sa2—*the same step from the calculation display processing*. (EX1002, 13:40-47; EX1018, ¶17.) It cannot be the case that “exercise intensity” for the two processes have different meanings as they both use the same initial pitch. (EX1018, ¶¶21-23; *see also* POR, 32 (Nike agreeing that pitch is used to determine exercise intensity).)

Nike mischaracterizes the passage at 13:57-62: “exercise intensity is not obtained during exercise intensity increase notifying means, but rather is obtained by measurements and calculations in step[] Sa2 . . . in the **calculation display processing**[.]”¹ (POR, 33.) This passage merely explains *which of the two processes* obtains the exercise intensity, not that “exercise intensity” has two different meanings. (EX1018, ¶19.)

¹ All emphasis is added, unless otherwise stated.

Nike's reading of column 13 is also belied by the relationship between pitch and exercise intensity. Its expert testified that exercise intensity is proportional to pitch. (EX1017, 128:2-11 (“Q. . . . would you agree that exercise intensity is proportional to pitch? . . . A. . . . intensity would also increase in proportion to [pitch] according to this equation, yes.”); EX1016.) As a result, 10% increases in pitch would necessarily equate to “increase[s in] exercise intensity by 10% each time.” (EX1002, 13:55; EX1018, ¶24.)

Furthermore, a 10% increase in pitch is not the same for all users. (POR, 29-30.) Amano detects the initial pitch, and then increases the pitch by **10% from the initial pitch**. (EX1002, 13:40-45; EX1018, ¶24.) As the Board already found, since the initial exercise intensity is based on a level of physical fitness of a user and varies for each user (including based on “his own preferences”), so do the pitches and corresponding prompts from the 10% increases. (DI, 26; EX1002, 13:67; EX1018, ¶24.)

Finally, Nike twists the record in making its arguments on [1C]. lululemon did not admit that Amano's protocol is “without regard to an **individual user's** particular physical fitness.” (POR, 29-30 (emphasis in original).) Nike improperly stretches its “column 13 argument” to columns 14-15. (*Id.*, 33.) (EX1002, 14:4-16:14 (*compare* column 13's “[e]xercise intensity increase notifying means”

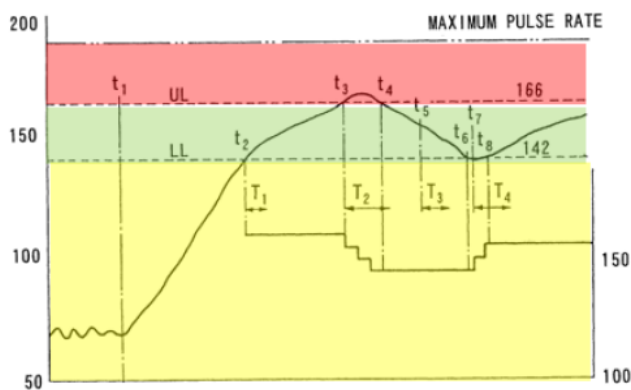
vs. columns 14-15's "[s]pecific operation"; EX1018, ¶18.) And the claims do not require measuring, thus Nike's measurement argument is a red herring. (POR, 30.)

B. Amano Teaches “a plurality of heart rate zones based on first heart rate measurements . . . while the user exercises at the plurality of successive exertion levels” ([1D])

Nike makes three arguments why Amano does not teach [1D]. It is wrong on every count.

First, Nike disputes whether Amano teaches “a plurality of heart rate zones.” (POR, 35.) The Board already rejected Nike's argument at institution and should do so again. (DI, 28-29.) Amano's upper and lower heart rate limits UL and LL correspond to three heart rate zones: (1) heart rate values that are less than lower limit LL (yellow, annotated Figure 27 (below)); (2) heart rate values between lower limit LL and upper limit UL (green); and (3) heart rate values greater than upper limit UL (red). (EX1002, 19:40-43, 20:14-28; Petition, 23-24; EX1018, ¶25.)

FIG. 27



Second, Nike argues that Amano’s upper and lower heart rate limits UL and LL are not determined based on a *plurality* of heart rate measurements. (POR, 35-36.) This is wrong. Amano determines VO_{2max} using its “calculation display processing . . . executed every 30 seconds, with the number of exercise intensity-beat rate pairs . . . increasing” (while the user exercises at the plurality of successive exertion levels). (EX1002, 11:66-12:3, 12:34-36; Petition, 23.) “[T]here are *three or more* exercise intensity-*beat rate* pairs.” (EX1002, 12:36-37; EX1018, ¶25.)

Third, Nike is wrong that Amano’s heart rate zones are not “based on [Amano’s] heart rate measurements.” (POR, 35-37.) Amano determines pulse rate *based on* the individual user’s VO_{2max} , and then determines heart rate zones (including upper and lower heart rate limits UL and LL) *based on* the user’s pulse rate. (EX1002, 19:40-43, 20:14-30; Petition, 23.) That Amano uses a table and user input for determining the pulse rate is irrelevant, as the table and user input are nevertheless based on heart rate measurements. (EX1018, ¶26.)

C. Amano’s First, Fourth, And Eighth Embodiments Are Not Distinct Embodiments

Nike also argues that Amano’s first, fourth, and eighth embodiments are distinct, insufficient for anticipation. (POR, 34-35, 37.) To the contrary, for Amano’s *fourth embodiment*, it states “[t]he user estimates his own VO_{2max} in advance using the methods explained in the *first . . . embodiment*[].” (EX1002,

19:49-50; EX2008, ¶43; EX1018, ¶27; EX2012, 166:5-17.) And for the *eighth embodiment*, it states “[t]he user[’]s VO_{2max} was obtained in the preceding *first . . . embodiment*[/].” (EX1002, 38:23-25; EX1018, ¶27.) Thus, Amano’s first, fourth, and eighth embodiments are all connected. And the Petition shows that the limitations are “arranged or combined in the same way as recited in the claim” by relying on, *e.g.*, a combination of the first and fourth embodiments for all the limitations of claim 1. *Net MoneyIN, Inc., v. Verisign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

D. Nike Does Not Dispute That Amano Teaches Claims 5 And 7

Apart from challenging claim 1, Nike does not dispute lululemon’s showing that Amano teaches claims 5 and 7. (POR, 38.) Because Nike’s arguments for claim 1 fail, the Board should cancel claims 5 and 7. (EX1018, ¶28.)

III. GROUND 2: MATSUMOTO

A. Matsumoto Teaches “wherein an exertion level is based on a level of physical fitness of a user” ([1C])

Nike disputes [1C] solely on the basis that Matsumoto does not teach “wherein an exertion level is based on a level of physical fitness of a user.” (POR, 46-47.) But, as it expressly discloses, Matsumoto’s exertion levels are adaptive to a level of physical fitness of a user. (EX1003, 4:33-35 (“suited to an individual user’s physical fitness”); *see also* DI, 32-33 (“[A]n exercise program that is

determined based on a user’s sex, age and weight, is reasonably understood” as meeting [1C]); EX1018, ¶35.)

Similar to its approach to Amano, Nike argues that Matsumoto’s express disclosure of “suited to an individual user’s physical fitness” should not be understood for what it plainly says. (POR, 46-48.) Nike asserts that this express disclosure is not tied to a particular user’s fitness condition. (*Id.*) But the claims do not require *unique* exercise programs for *each* user.

Even if Nike’s construction were adopted, the result is the same. By having an exercise program “suited to an individual user’s physical fitness,” Matsumoto “takes into account an individual user’s particular physical fitness condition.” (EX1018, ¶35.)

B. Matsumoto Teaches “a plurality of heart rate zones based on first heart rate measurements . . . while the user exercises at the plurality of successive exertion levels” ([1D])

Nike does not dispute that Matsumoto measures “first heart rate measurements . . . while the user exercises at the plurality of successive exertion levels.” (POR, 44.) Instead, Nike disputes whether Matsumoto determines a “plurality” of heart rate zones and whether these heart rate zones are “based on” the heart rate measurements. The Board should reject Nike’s arguments.

1. Matsumoto teaches a plurality of heart rate zones

Contrary to the POR at 44, Matsumoto discloses “an LED which can emit green, red or yellow light, to inform the user whether he is *above, below or within the target pulse zone (e.g. target pulse ± 5)*.” (EX1003, 7:48-51, *see also* 9:37-40; Petition, 32-33.) Thus, Matsumoto’s “target pulse ± 5 ” corresponds to three heart rate zones. One heart rate zone is the target pulse plus or minus 5 (green light). (*Id.*; EX1018, ¶36; EX1017, 87:5-88:12 (Nike’s expert testifying that “a zone would be some number, some percentage of that above -- above and below”).) Another heart rate zone includes heart rate values that are less than the target pulse zone (yellow light), and yet another heart rate zone includes heart rate values that are greater than the target pulse zone (red light). (EX1018, ¶36; EX1003, 7:48-51, 9:37-40.)

2. Matsumoto teaches heart rate zones and heart rate measurements in the same embodiment

For [1D], Nike accuses lululemon of combining different embodiments. (POR, 43-44.) Nike alleges that Table 2 and columns 5-6 (heart rate measurements) are the first embodiment, that the “target pulse ± 5 ” and columns 7-8 (heart rate zones) are the second embodiment, and that the two are distinct. (POR, 43-44.) Nike is wrong. (EX1018, ¶¶37-42.) As Dr. Lynch testified, the “concepts from [columns] 5, 6, 7, and 8 [are] all connect[ed] to each other.” (EX2012, 175:22-176:15.) For example, there are overlapping aspects (storing and

retrieving data in columns 6 and 8, prompting the user in columns 5 and 7) that connect the “embodiments.” (EX2012, 178:9-179:8, 183:11-19, 184:6-14.)

Additionally, under *Kennametal*, “a reference can anticipate a claim even if it ‘d[oes] not expressly spell out’ all the limitations arranged or combined as in the claim, if a [POSITA] reading the reference, would ‘at once envisage’ the claimed arrangement.” *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015) (citation omitted). In *Unified Patents*, the Board concluded that when there are a limited number of techniques described in a single reference to achieve an objective, a POSITA would “at once envisage” combining aspects of the techniques, particularly common aspects. *Unified Patents, Inc. v. Intellectual Ventures I LLC*, IPR2016-01643, 2018 WL 1511821, at *13 (PTAB Mar. 26, 2018). Here, Matsumoto discloses two techniques for prompting the user to train while exercising using a heart rate sensor. (EX1003, 5:39-61, 7:48-55, Figs. 3, 10; EX2012, 178:24-179:8; EX1018, ¶¶42.) And as both experts testified, it was known and common to use heart rate zones with heart rate sensors and exercise training programs. (EX1017, 138:8-24 (“Q. . . . would you agree that in 2003 it would be common to use heart rate zones? . . . A. . . . it’s still common today – to say, maintain your heart rate within that range, within that zone”); EX2001, ¶¶68-69; EX2002, EX2003, EX1002, EX1004 (prior art discussing heart rate zones).) Thus,

a POSITA would have at once envisaged target pulses in an exercise program as heart rate zones (target pulse ± 5) for training. (EX1018, ¶42.)

Finally, Nike is wrong that the two “embodiments” are separate machines that do not work together. (POR, 44-45.) Figures 3/5 and Figures 10/11 depict features of exercise machines for providing an exercise program suited to the individual user’s physical fitness, where the exercise machines have interfaces and components that are the same. (EX1018, ¶¶40-41; EX1003, 2:36-68, 7:57-8:14, Figs. 3-5, 10, 11; EX2012, 174:3-5, 179:10-181:7.)

C. lululemon Did Not Map “first heart rate measurements” And “second heart rate measurements” To The Same Heart Rate Measurements ([1G])

For [1G], Nike mischaracterizes the Petition. (POR, 45-46.) The Petition did not combine the target pulse from the “first embodiment” with target pulse zones from the “second embodiment.” And the Petition did not rely on the same heart rate measurements for both “first heart rate measurements” ([1D]) and “second heart rate measurements” ([1G]). Instead, the Petition mapped the heart rate measurements from the first exercise session to the “first heart rate measurements,” and heart rate measurements for future exercise programs to the “second heart rate measurements.” (Petition, 32, 36; EX1018, ¶43.)

D. Nike Does Not Dispute That Matsumoto Teaches Claims 5 And 7

Separate from its arguments for claim 1, Nike does not dispute lululemon's showing that Matsumoto teaches claims 5 and 7. (POR, 48; EX1018, ¶44.) Because Nike's arguments for claim 1 lack merit, the Board should cancel claims 5 and 7. (*Supra* §III.A-III.C.)

IV. GROUND 3: LUBELL AND CECI

A. A POSITA Would Have Combined Lubell And Ceci

As the Petition explained, a POSITA would have been motivated to combine Lubell and Ceci to employ a different exercise test protocol, as explicitly suggested by Lubell. (Petition, 42; EX1004, 5:13-15 (“a suitable submaximal exercise test protocol could be used”).) Lubell offers a specific predefined exercise test protocol as an example method for automatically calculating a fitness parameter, such as VO_{2max}. (EX1004, 2:45-51; EX1018, ¶48.) But Lubell's predefined protocol is a maximal test that requires the user to reach a maximal heart rate or point of exhaustion. (EX1004, 3:44-46; EX1018, ¶48.)

As Nike's expert concedes, a POSITA would have understood that using a submaximal test protocol would be beneficial because a maximal test may be dangerous for certain individuals, including for use when cycling, swimming, or other exercises. (EX1017, 35:19-36:6, 38:17-24.) Lubell's extremely intense protocol (running up to 10 mph, 12 mph, and then 14 mph each for three minutes) and explicit suggestion—“a suitable *submaximal* exercise test protocol could be

used, in *a controlled exercise environment*”—confirm the motivation to combine Lubell and Ceci. (EX1004, 3:60-63, 5:6-16; EX1018, ¶48.)

A submaximal test, such as Ceci’s self-regulated protocol, would allow certain users to avoid dangerously reaching a point of exhaustion. (EX2010, 34 (“In many cases, [maximal] tests require maximal or near-maximal effort by the participant and thus have not been used for older persons or those at increased risk for [cardiovascular disease].”); EX1017, 34:12-35:6, 42:25-43:19; EX1018, ¶48.)

And a POSITA would have recognized other benefits, as supported by Nike’s expert and evidence. (EX1017, 38:1-6; EX2010, 34 (“Any maximal test to assess cardiorespiratory fitness imposes a burden on both the participant and the examiner. To reduce this burden, several submaximal exercise testing protocols have been developed.”), *id.* (“The advantage [to submaximal tests] is that large numbers of participants can be tested rapidly at low cost.”); EX1018, ¶48.)

Nike’s counterarguments regarding motivation to combine have no merit. Nike is wrong that the passage at 5:6-16 refers *only* to a cycling or swimming version of its running protocol. (POR, 51-52.) After all, Lubell’s running protocol is a maximal test, and Lubell provides an explicit suggestion for a different type of test—“a suitable *submaximal* exercise test protocol could be used, in *a controlled exercise environment*.” (EX1004, 3:44-46, 5:6-16; EX1018, ¶48.)

Nike’s attempt to redefine Lubell’s express purpose is meritless. Lubell’s purpose is to “automatically calculate[] an appropriate fitness parameter” to “help[] the subject keep his exercise stress level within what is regarded as the fitness training range”—not strictly to determine VO_{2max} , as Nike argues. (EX1004, 1:27-29; EX2012, 256:18-257:2; EX1018, ¶49; POR, 52.) Nor does it make any difference whether Ceci’s protocol is suitable for animals or whether Ceci *itself* determines VO_{2max} , because the ground is based on a *combination* of Lubell and Ceci as presented in the Petition. (Petition, 40-46.)

1. Nothing in Lubell teaches away from using a self-regulated protocol

Nike is also wrong that Lubell’s passages at 2:1-25 and 2:35-51 teach away from using a self-regulated protocol. (POR, 53.) The first passage describes a “previously-proposed fitness monitoring system . . . [that] is not universally applicable” due to the “original data . . . [being] based only on the performance of . . . male U.S. Air Force recruits who were already in reasonably good shape.” (EX1004, 2:1-20; EX1018, ¶52.) The second passage describes “previously proposed fitness monitors . . . [where] there is no provision . . . to accommodate variability in stride length.” (EX1004, 2:35-51; EX1018, ¶52.) Far from disparaging or rejecting “self-regulated protocols,” what Lubell offers over prior devices is a training protocol that can account for different fitness levels (not just

for male U.S. Air Force recruits) and that can account for variability in stride length. (EX1018, ¶52.)

2. A POSITA would have combined Lubell and Ceci with a reasonable expectation of success

Nike's reasonable expectation of success argument fails. First, Lubell's purpose is not to determine VO_{2max} . (*Supra* §IV.A.)

Second, the evidence shows that a POSITA would have combined Lubell's device with Ceci's RPE protocol teachings with a reasonable expectation of success. Both references already disclose protocols that increase exercise intensity for determining a fitness parameter: Lubell for VO_{2max} , Ceci for heart rates. (EX1004, 2:48-50; EX1005, 734; EX2012, 274:15-275:5; EX1018, ¶53.) And both protocols are used to monitor and regulate exercise intensity. (EX1004, 1:27-29; EX1005, 737; EX1018, ¶53.) What Ceci provides to Lubell is a submaximal test protocol that avoids the user dangerously reaching a point of exhaustion. (EX1018, ¶53; EX1005, 734.) As Dr. Lynch testified, "Ceci discloses asking users to operate at different levels of perceived exertion, and there are methods known in the art for taking [] heart rates and exercise intensity and determining VO_2 max." (EX2012, 274:7-11.) Ceci teaches a relationship between VO_{2max} and heart rate, and Lubell provides a specific equation for the relationship. (EX1005, 733; EX1004, 4:39-52, 10:1-7; EX1018, ¶¶50, 54-55.) Given the overlap, including between their protocols, and known methods for combining

aspects from the two, a POSITA would have reasonably expected to succeed in modifying Lubell's device with Ceci's protocol. (EX1018, ¶55.)

Finally, Nike's argument that the combination would render Lubell inoperable for its intended purpose of determining VO_{2max} is unavailing. (POR, 53-54.) Again, the combination does not rely on Lubell's Van der Walt protocol. As the Petition explained, a POSITA would have combined Lubell and Ceci according to methods known in the art for determining VO_{2max} based on heart rates, including the non-Van der Walt equation that Lubell provides. (Petition, 42-44; EX1004, 4:39-52; EX1018, ¶51.)

B. Lubell And Ceci Teach “determin[ing] a plurality of heart rate zones based on first heart rate measurements . . . while the user exercises at the plurality of successive exertion levels” ([1D])

Nike specifically argues that Lubell determines VO_{2max} zones, not heart rate zones. (POR, 55.) As the Petition explained, Lubell calculates percentage VO_{2max} zones (e.g., 60 to 80 % VO_{2max}), and then provides an equation that relates percentage VO_{2max} zones to heart rate zones. (Petition, 44-45; EX2012, 279:23-280:10.) Lubell's equation uses heart rates while the user exercises (defined as exercise heart rate HR_E) to determine the heart rate zones. (EX1004, 10:15-24; EX1018, ¶54.) And Ceci continuously measures heart rates (plural) while the user exercises at a plurality of RPE levels. (EX1005, 733; EX1009, ¶92; EX1018, ¶54.) Further, Lubell “continuously calculat[es] . . . % VO_{2max} based on

the continuously measured . . . HR_E ,” and thus, its heart rate zones are based on heart rate measurements (plural). (EX1004, 12:16-24; EX1018, ¶54.)

Nike also argues that Dr. Lynch does not explain how Ceci’s mean heart rates for a group of subjects are used for determining VO_{2max} . (POR, 55-56.) But that was not lululemon’s argument. lululemon’s Petition relies on Ceci’s teachings of continuously measuring heart rates together with Lubell (including its resting heart rate and maximal heart rate) to determine % VO_{2max} zones. (Petition, 44-45; EX1018, ¶55.)

V. GROUNDS 6 AND 7: AMANO AND GORMAN/FLACH

Nike disputes whether Amano and Gorman/Flach render obvious the challenged dependent claims. Because none of Nike’s arguments has merit, the Board should cancel every challenged claim under these Grounds.

A. The Dependent Claims Encompass Both Wired And Wireless Communications

Nike asserts that the dependent claims relate only to wireless devices. (POR, 39.) This is false. Nothing in the claims or the specification limits the dependent claims to wireless. (EX1001, Claims 2 (“the first heart rate measurements and the second heart rate measurements are received in a plurality of encoded messages”), 3 (“decode the encoded messages using identification data of the sensor”), 4 (“the encoded messages comprise identification information of the sensor”), 9 (“determine that a message is from the sensor based upon a time at

which the message is received”), 13, 14, 18, 19 (similar); 5:30-32 (wired sensor interfaces), 7:16-36 (generally encoding messages); EX2012, 202:24-203:6.)

With respect to ’413 patent’s disclosure of encoding messages, Nike insists it is for wireless transmission only. (POR, 40.) But as Dr. Lynch testified, “whether the communication is wired or wireless, it needs to be encoded.” (EX2012, 213:21-24, 214:3-6, 251:14-252:3.) Dr. Bergeron testified the same. (EX1017, 92:22-93:19 (“Q. . . . Are there other components required in a wired communication system? . . . A. . . . If we’re talking, say, computer, you’d probably have maybe . . . some way to encode the original data so that you could make sure it reached the destination intact . . .”).) Similarly, just like wireless communications, wired communications include identification data in messages. (*Id.*, 221:18-222:8, 223:5-16, 226:19-227:6, 241:3-16.)

And Nike again twists the record in making its arguments for Grounds 6 and 7. Nike tries to cabin the combinations to wireless communication, but lululemon relies on Gorman/Flach teachings of encoding, time slots, and identification data—applicable to either wireless or wired communication. (POR, 39.) Even the ’413 patent is not limited to wireless communication. The passage at 5:27-32 describes wireless, and then “alternatively,” wired communications. (POR, 40.) Nothing in the specification suggests that encoded signals are for wireless transmission only.

(EX1018, ¶29.) Also, Nike's argument regarding improperly mixing/matching for *obviousness* Grounds 6 and 7 is without merit. (POR, 40-41, 42.)

B. A POSITA Would Have Combined Amano And Gorman/Flach

Nike accuses lululemon for not providing a rationale for combining Amano and Gorman/Flach. (POR, 39.) To the contrary, this rationale is in the Petition: a POSITA would have combined Amano and Gorman/Flach to improve Amano's communication system involving heart rate sensors. (Petition, 54-55; POR, 39.) The combination would have been obvious given that the teachings of Gorman and Flach: encoding, time slots (TDMA), and identification information, were all well known to a POSITA for both wired and wireless devices. (EX2012, 241:3-16; EX1017, 24:1-5, 92:22-93:19; EX1018, ¶¶30-31.)

Nike argues that Amano's wired devices would not face the problems that Gorman and Flach are designed to solve, specifically, distinguishing among signals from multiple transmitters, or correcting signal errors that may occur due to noise. (POR, 41-42.) Not so. A POSITA would have understood that when there are multiple transmitters (*e.g.*, sensors) and one communication channel (*e.g.*, a wire), the signals from the sensors would need to be combined in order to be communicated across one communication channel. (EX1018, ¶31.) There is a need to distinguish among (disentangle) the signals due to being combined. (*Id.*, EX2012, 222:10-21; EX1017, 102:1-103:1 ("Q. . . . In order to get all the signals .

. . . communicated . . . along one wire, would it be fair to say that multiplexing the signals help distinguish the source of the signals? . . . A. . . . So on the receiver end, you have to disentangle those.”).) Amano’s wired device is just that: multiple sensors (pulse wave sensor 301, body motion sensor 302) and one communication channel (cable from a finger belt). (EX1002, 20:42-44, Figs. 16, 19; EX1018, ¶31.) Further, as Dr. Bergeron admits, wired devices experience noise problems. (EX1017, 93:7-10 (“if there’s noise on the line – on the wire . . . you’d have to have some way to [] filter the noise out”); EX1018, ¶33.)

And Nike is wrong that the combination would require complete redesigns and new components, or that there would be no reasonable expectation of success. (POR, 42.) As Dr. Bergeron concedes, “some aspects . . . of communication are independent of whether it’s wired or wireless.” (EX2012, 218:7-9.) Nike cannot pretend that the components it names do not have equivalent counterparts for wired communications that were known by a POSITA. (EX1018, ¶¶32, 34.)

VI. GROUNDS 4, 5 (LUBELL-CECI AND GORMAN/FLACH) AND GROUNDS 8, 9 (MATSUMOTO AND GORMAN/FLACH)

For Grounds 4, 5, 8, and 9, Nike makes “largely the same” arguments from Grounds 6 and 7 (Amano and Gorman/Flach). (POR, 48-50, 56-59; EX1018, ¶45.) Like Amano, Matsumoto has multiple sensors (pulse sensor 15 and rotation sensors 12, 13) and one communication channel (*see* communication channel in Figures 5 and 11 from the sensors (external circuits)) communicating with a

controller 100. (EX1003, Figs. 5, 11; EX1018, ¶¶46-47.) Lubell also has multiple sensors (heart rate sensor 12 and bicycle sensor 65) communicating with a device 11. (EX1004, 5:48-53; EX1018, ¶56.) Thus, Nike’s arguments fail for the same reasons as before. (*Supra* §V.)

Nike’s other arguments fail. First, Nike’s rationale criticisms underscore that the art’s teachings were well known for both wired and wireless devices. (POR, 49-50; EX1018, ¶56.) Second, lululemon identified differences between the art, *e.g.*, “[t]he detailed communication method in Gorman can be used in place of the scantily described communication in Lubell.” (POR, 58; Petition, 49, 55.) Third, Nike is wrong that wired devices, like Lubell, do not use encoding or TDMA—its own expert testified to the contrary. (POR, 59; EX1017, 24:1-5, 92:22-93:19; EX1018, ¶57.) Finally, Nike’s vaguely accuses lululemon of “hindsight” reasoning, but lululemon’s rationale properly came from a POSITA’s knowledge and the art, not the ’413 patent. (POR, 59.)

VII. THE BOARD SHOULD REJECT NIKE’S ATTACKS ON DR. LYNCH AND INSTEAD EXCLUDE NIKE’S EXPERT

Nike spends over three pages attacking lululemon’s expert for not opining on anticipation, for not considering the claimed invention and the intrinsic record, and for not “fully” analyzing the references. (POR, 16-19.) Not so. On direct, Dr. Lynch testified how a POSITA would have understood the art and whether it would have been obvious to modify or combine the same. (*See* EX1009, *passim*.)

On cross (almost seven hours of testimony), he repeatedly explained how he considered the claimed invention and the intrinsic evidence (*see, e.g.*, EX2012, 23:7-24:3, 32:23-33:15, 54:4-9, 56:3-9, 76:11-16) and provided his analysis of the references (*see, e.g., id.*, 166:5-17, 175:22-176:15, 219:11-17). And on reply, Dr. Lynch explained why the prior art teaches the disputed limitations or would be combined in view of Nike's POR arguments. (*See* EX1018.)

Dr. Lynch is an engineering professor at Northwestern University with experience related to physiological sensors and human physiology. (EX1009, ¶¶4-12; EX2012, 41:3-23, 42:5-9, 44:20-45:24.) He readily qualifies as a POSITA under the parties' definition. (Petition, 18; POR, 16; EX2017, 66:22-67:6.) In contrast, Nike's expert does not. The definition requires "a bachelor's degree in engineering, computer science, industrial design, biomechanics, or a related field." (Petition, 18.) Dr. Bergeron admitted that he has a bachelor's degree in *psychology*—not engineering or computer science. (EX2017, 25:3-14.) Accordingly, his testimony as to what a POSITA would know or understand should be given no weight.

VIII. CONCLUSION

For the foregoing reasons, as well as those set forth in its Petition, Petitioner respectfully requests cancellation of the challenged claims.

IPR2023-00438

Dated: January 11, 2024

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Certification of Word Count (37 C.F.R. § 42.24)

I hereby certify that this PETITIONER’S REPLY TO PATENT OWNER RESPONSE has 5,561 words (as counted by the “Word Count” feature of the Microsoft Word™ word-processing system), exclusive of “a table of contents, a table of authorities, a listing of facts which are admitted, denied, or cannot be admitted or denied, a certificate of service or word count, or appendix of exhibits.”

Dated: January 11, 2024

By /Mehran Arjomand/

Certificate of Service (37 C.F.R. § 42.6(e)(4))

I hereby certify that the attached PETITIONER'S REPLY TO PATENT OWNER RESPONSE and supporting materials were served on the below date via e-mail (by consent) to the following counsel of record for the Patent Owner:

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