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

Case No.: IPR2023-00189
U.S. PATENT NO. 9,278,256

DECLARATION OF MEGAN TONEY-BOLGER, PH.D., IN SUPPORT OF PATENT OWNER NIKE, INC.'S PRELIMINARY RESPONSE

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I, Megan Toney-Bolger, Ph.D., declare as follows:

I. INTRODUCTION

1. I have been retained by Nike ("Patent Owner") as an independent expert in this *inter partes* review ("IPR") proceeding before the Patent Trial and Appeal Board ("PTAB"), which I understand involves U.S. Patent No. 9,278,256 ("the '256 Patent"). Exponent Engineering, P.C. ("Exponent P.C."), is being compensated for my time at my usual consulting rate of $350 per hour in 2023 for my work associated with this matter. No part of my compensation is dependent on the outcome of this proceeding, and I have no other interest in this proceeding.

2. I understand that this proceeding involves Claims 1-20 (the "Challenged Claims") of the '256 Patent. I further understand that Petitioner lululemon athletica canada inc. and lululemon usa inc. ("Petitioner") raises 5 grounds in the Petition for *Inter Partes* Review. I understand that the raised grounds relate to the following references:

U.S. Patent No. 8,162,804 ("Tagliabue")	Ex. 1004
U.S. Patent Publication No. 2007/0239479 ("Arrasvuori")	Ex. 1005
U.S. Patent No. 6,458,060 ("Watterson")	Ex. 1006
International Publication No. WO 2002/067449 ("Ellis")	Ex. 1007

3. I have been asked to provide my opinions in response to each of the grounds of invalidity asserted in the Petition. My opinions are set forth below.

II. BACKGROUND AND EXPERIENCE

4. My educational background includes a Ph.D. in Applied Physiology from the Georgia Institute of Technology and a Bachelor of Science in Engineering degree in Biomedical Engineering from Duke University. The Duke University degree programs in engineering are accredited by the Accreditation Board of Engineering and Technology (ABET), which is the primary governing body for engineering accreditation in the United States, and Duke University's biomedical engineering program is one of the oldest accredited biomedical engineering programs in the United States.

5. I am currently a Manager in Exponent Engineering's Biomechanics Practice. I am also a registered Professional Engineer in the State of Michigan (License No. 6201068198). Attaining a Professional Engineer (P.E.) license entails, among other things, passing a 6-hour Fundamentals of Engineering examination and an 8-hour Principles and Practices of Engineering examination within the engineering discipline of the examinee's choice. For my P.E. license, I took my Principles and Practices of Engineering examination in mechanical engineering.

6. In my graduate studies and in my work, I have done and continue to do extensive research in the field of biomechanics and physiology. My work is published in peer-reviewed journals and conference proceedings, and I have given invited talks at national and international conferences for my work in biomechanics and human motion numerous times over the last 13 years. My research has included, among other things, extensive study of human locomotion and evaluation of human motion and loading in response to various disturbances. I am intimately familiar with and regularly apply established methodology in my field of biomechanics and physiology.

7. I am a member of the American Society of Biomechanics (ASB) and the Society of Automotive Engineers, International (SAE). I have been a member of SAE since 2015 and ASB since 2010. I am an established and accepted member of the scientific community in the fields of biomechanics, physiology, and accident investigation. My research activities and professional experience have provided me with extensive experience in analyzing the mechanics of human locomotion, the physiological effects and motor control strategies associated with human locomotion, as well as the methodologies and analytical strategies utilized to measure and study the mechanics and neuromotor control of human movement. My education, training, and experience specifically involve quantitative analyses

of the mechanical forces and motions generated by the human body during movement, such as walking and running.

8. I have been employed by Exponent Engineering, P.C. as a biomechanical consultant for 8.5 years, and I have been studying biomechanics, including the mechanics of human movement for more than 15 years. My work experience has also involved evaluating how the human body responds to disruption, perturbations, and load application as well as the mechanical environments associated with causing injury. Throughout my professional experience, I have evaluated hundreds of scenarios involving kinematics and the result of various loading environments potentially resulting in injury. Events I have evaluated include motor vehicle accidents; falls resulting from slips and/or trips; use of industrial equipment like wood grinders, rock crushers, and forklifts; and use of recreational equipment like treadmills and elliptical machines, etc. My education, training, and experience specifically involves quantitative analyses of the effect of mechanical forces and motions on the human body. In my work, I have studied human motion, body loading, and motor control through the analysis and interpretation of data collected from human subject testing.

9. As part of my work measuring and evaluating human movement, I have and continue to employ methodologies and technologies for capturing and evaluating data related to human movement and physiology commonly used in the

fields of biomechanics, neuromechanics, neurophysiology, physiology, kinesiology, and exercise science, etc. These techniques include using technologies such as motion capture cameras, inertial measurement units (IMUs), accelerometers, gyroscopes, magnetometers, force plates, treadmills, high-speed cameras, electromyography (EMG) electrodes, calorimetry equipment, and pressure-sensitive films and insoles, among others. Through my work with these technologies, I have developed considerable expertise in wearable device selection and implementation that results in optimized signals and user experience, and I have deep knowledge related to processing, visualizing, and evaluating data acquired through these types of technologies to assess details of human movement (kinematics), loading (kinetics), motor control, metabolics, etc. My research activities and professional experience have provided me with extensive experience in applying established and novel methodologies and techniques to analyze data generated by these types of technologies to evaluate human motion movement, neuromotor control, and physiology. My dissertation work, in particular, was focused on evaluating the motion and loading of the human body during walking to gain insight into the motor control techniques underlying locomotor adaptation. In my work, I have used a wide array of wearable devices and lab-based technologies to evaluate how humans move while interacting with consumer products, experiencing virtual reality, and while exercising. I have compared the fidelity,

reliability, and validity of physiological data collected from wearable devices while human participants performed various types of exercise activity and movements both in a controlled, lab-based environment and in naturalistic settings.

10. As part of my declaration, I have relied upon my training and experience in the fields of biomechanics, applied physiology, and biomedical engineering; my knowledge of the principles of physics, mechanics, and physiology; my personal research and experimentation; books, publications, and treatises in these general fields; as well as testing performed by myself, Exponent, and others. My opinions and conclusions are supported by established and accepted principles and practices in the fields of engineering and biomechanics.

11. My Curriculum Vitae is attached as Exhibit 1.

III. COMPENSATION AND PRIOR TESTIMONY

12. I have been qualified as an expert and admitted to testify about biomechanics, occupant motion, and human injury mechanics in both state and federal courts. My testimony has included the topics of the biomechanics of traumatic injury, human injury tolerance, human kinematics and dynamics, and analysis of injury mechanics, including the mechanics associated with causing specific types of injuries. Attached as Exhibit 2 is a list of cases in which I have provided testimony in the last four years. To the best of my knowledge, no court

has ever excluded or prohibited me from providing trial testimony as an expert witness.

13. Although my employer, Exponent Engineering P.C., is being compensated for my time at a rate of $350 per hour in 2023 for my work in this matter, the opinions herein are my own and I have no stake in the outcome of this matter. My compensation does not depend in any way on the outcome of the matter or my opinions.

IV. MATERIALS CONSIDERED

14. All my opinions are based on my knowledge and professional judgment, and the following documents that I considered:

- Petitioner's Petition for *Inter Partes* Review of U.S. Patent No. 9,278,256;
- Exhibits 1001-1014; and
- Other materials discussed herein.

V. LEGAL STANDARDS

15. I am not an attorney. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my opinions. My understanding of the law is summarized below.

16. I understand that, in this *inter partes* review, Petitioner has the burden of proving that each challenged claim is unpatentable by a preponderance of the evidence.

17. I understand that a patent claim is unpatentable if, at the time of the invention, it would have been obvious to a POSITA to combine the teachings of the prior art to yield the patent claim. I also understand that it is not required (although it is acceptable) that each element/limitation of a patent claim be found in a single reference in order to find a patent claim obvious. Rather, for a patent claim to be found obvious, all the elements/limitations of the patent claim must be found in teachings of one or more references that would have been combined by a POSITA with a reasonable expectation of success. I understand that a proper analysis of whether an invention is unpatentable for obviousness includes a review of the scope and content of the prior art, the differences between the patent claims at issue and the prior art, the level of ordinary skill in the field of the invention at the time of the invention, and other objective considerations.

18. I understand that a showing of obviousness requires some articulated reasoning with a rational underpinning to support the combination of the references. I understand that in consideration of the issue of obviousness it is important to identify whether a reason existed at the time of the invention that would have led a POSITA to combine elements of the references in a way that yielded the claimed invention.

19. I understand that a claim may be considered unpatentable for obviousness for various reasons. I have been informed that the following exemplary rationales may support a finding of obviousness:

- combining prior art elements according to known methods to yield predictable results;
- simply substituting one known element for another to obtain predictable results;
- use of a known technique to improve similar devices in the same way;
- applying a known technique to a known device ready for improvement to yield predictable results;
- choosing from a finite number of identified, predictable solutions with a reasonable expectation of success;
- known work in a field that prompts variations in the work in the same or a different field that leads to predictable results; and
- some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify a prior art reference or combine multiple prior art references or teachings to arrive at the claimed invention.

VI. LEVEL OF ORDINARY SKILL IN THE ART

20. Petitioner claims that a POSITA relevant to the ’256 Patent would have had (1) a bachelor’s degree in engineering, computer science, industrial

design, biomechanics, or a related field, and (2) at least two years of experience researching, developing, designing, and/or testing fitness or physiological sensors, wearable devices, physiological or biomechanical devices, remotely-controlled systems or interfaces, and/or network-based applications and/or equipment, or the equivalent experience or education. (Petition at 23).

21. For purposes of this declaration, I am accepting Petitioner's description of a POSITA. My agreement with the above description of a POSITA does not imply agreement at all times moving forward. I reserve the right to supplement my opinion if the Board institutes review. I understand that Patent Owner reserves the right to further address Petitioner's formulation of a POSITA if trial is instituted.

22. In view of my experience and qualifications noted above, I am well positioned to opine as to what a POSITA at the time of the invention would have understood and done.

23. My opinions contained herein are from the perspective of a POSITA. My opinions reflect how a POSITA would have interpreted the claims, the prior art, and any available evidence.

24. My opinions are based on generally-accepted methodologies in the scientific and biomechanical communities.

VII. THE ’256 PATENT

A. Overview of the ’256 Patent

25. U.S. Patent 9,278,256 (the “’256 Patent”) to Nike, Inc., is entitled “Interactive Athletic Equipment System.” The ’256 Patent teaches “[s]ystems and techniques for the collection and display of athletic information” in which said athletic information “relating to a single person or group of people is collected at a central location” and then “displayed at a desired remote location so that the person or people can review and critique their performance” as well as so that the person “can compare his or her athletic activities to others.” (Ex. 1001 at Abstract). The ’256 Patent discloses an athletic information monitoring device 201 that includes an electronic interface device 205 and an athletic parameter measurement device 207. (Ex. 1001 at 7:55-67). The user wears athletic parameter measurement device 207 “while he or she is performing an athletic activity” and this device “measures one or more athletic parameters relating to the athletic performance being performed by the user.” (Ex. 1001 at 7:67-8:4). Athletic parameter measurement device 207 may include one or more sensors 301 for measuring an athletic parameter, such as an accelerometer or a “heart rate monitor, a blood oxygen monitor, a satellite positioning device, … an EKG monitor …, or any other device that measures one or more physical parameters of the user.” (Ex. 1001 at 8:11-28, 11:23-34).

26. The athletic parameter measurement device 207 transmits signals to various electronic interfaces, which display information to the user. (Ex. 1001 at 9:64-10:9, 10:25-36, 29:27-34). The '256 Patent discloses a configuration where "athletic equipment may query an athletic performance tracking site to obtain workout information. Once such information is obtained, the information can be displayed on the interface 1700 or on the portable device 203. Furthermore, . . . [c]onstant updates can be provided from the athletic performance tracking site to the athletic equipment and portable device 203." (Ex. 1001 at 31:32-46). The '256 Patent also discloses that in one embodiment, the interface includes a "message portion 1730 [that] may display messages for the user or athlete… If the user or athlete is participating in a challenge, competition or the like, the message portion 1730 may provide an indication as to the user or athlete's progress or comparison to the challenge or competition leader." (Ex. 1001 at 33:29-40).

27. A key feature of the invention of the '256 Patent is that the system "continuously generate[s] and simultaneously communicate[s] real-time to the first user at the first location and the second user at the second location, an interface indicating whether the challenge has been met." (Ex. 1001 at 40:64).

VIII. Claim Construction

28. I understand that neither the Petitioner nor Petitioner's expert Dr. Lynch have requested construction of any claim terms. (Petition at p. 22; Ex. 1003

at ¶ 45). I understand that Patent Owner agrees that all terms and phrases in the '256 Patent should be afforded their ordinary and customary meanings.

29. I have applied ordinary and customary meanings of claim terms throughout my analysis herein. Although I've not offered an opinion on claim construction, I reserve the right to do so in the future should the PTAB institute review.

IX. OVERVIEW OF THE PRIOR ART REFERENCES

A. Tagliabue

30. U.S. Patent 8,162,804 to Tagliabue (i.e., "Tagliabue"), filed February 14, 2008, is entitled "Collection and Display of Athletic Information." (Ex. 1004 at Cover). Tagliabue discloses an athletic information monitoring device 201 (Ex. 1004 at 7:18-20), shown below (Figure 1). The device includes an electronic interface device 205, a digital music player 203, and an athletic parameter measurement device 207. (Ex. 1004 at 7:20-24). Tagliabue teaches that athletic parameter measurement device 207 "is worn or otherwise carried by the user while he or she is performing an athletic activity, and measures one or more athletic parameters relating to the athletic performance being performed by the user." (Ex. 1004 at 7:28-32). Athletic parameter measurement device 207, which may be "located in the sole of a user's shoe," "transmits signals [that correspond to the measured athletic parameter] to the electronic interface device 205," which

"provides the received information to the digital music player 203." (Ex. 1004 at 7:47-52, 7:32-38).

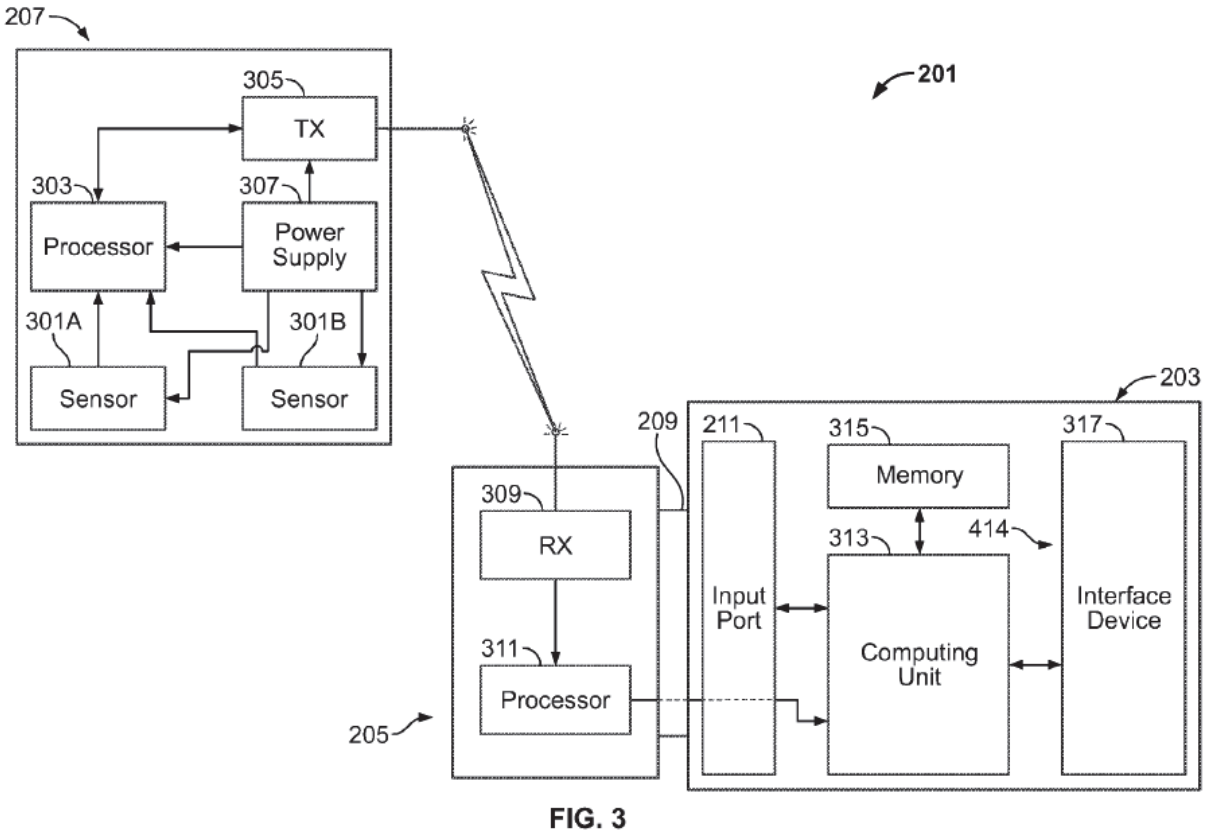

FIG. 3

Figure 1: Athletic information monitoring device (Ex. 1004 at Fig. 3).

31. Tagliabue teaches that "[v]arious examples of the invention may allow a user to 'challenge' one or more other users … to a competition regarding athletic activities" such as challenges described as "[d]istance race," "[m]ost miles," "[f]astest run," "[d]istance goal." (Ex. 1004 at 21:19-36). Tagliabue teaches that "[a]fter the athletic data display configuration device 601 has identified the participants in a challenge, it monitors the collected athletic data for each of the participants, and aggregates the relevant data values in the collected athletic data."

(Ex. 1004 at 22:31-34). For the example of a distance challenge, Tagliabue teaches that challenge winners are notified "[w]hen a participant has a sum of his or her total distance values that matches or exceeds the specified challenge distance (and is the first invitee to do so), then the athletic data display configuration device 601 will identify that participant as the winner of the challenge." (Ex. 1004 at 22:31-45). Tagliabue discloses that challenge updates are provided "by sending an electronic mail message" or "by displaying a special-purpose interface when each participant connects to the athletic data display configuration device 601." (Ex. 1004 at 22:53-65).

B. Arrasvuori

32. U.S. Patent Application 2007/0239479 to Arrasvuori (i.e., "Arrasvuori"), filed March 29, 2006, is entitled "System and Method for Gaming." (Ex. 1005 at Cover). Arrasvuori discloses a system "wherein one or more users are, in the context of a video game, presented with one or more real-world fitness tasks to be performed." (Ex. 1005 at Abstract). As shown in Figure 2, Arrasvuori teaches a computer 4000 that receives a signal from monitoring equipment that "might … be integrated into/or in communication with wireless nodes and/or other computers of users, and/or be attached to bodies of users." (Ex. 1005 at [0091], [0039]). For example, monitoring equipment might include GPS, altimeter, heart rate meter or pedometer. (Ex. 1005 at [0040]).

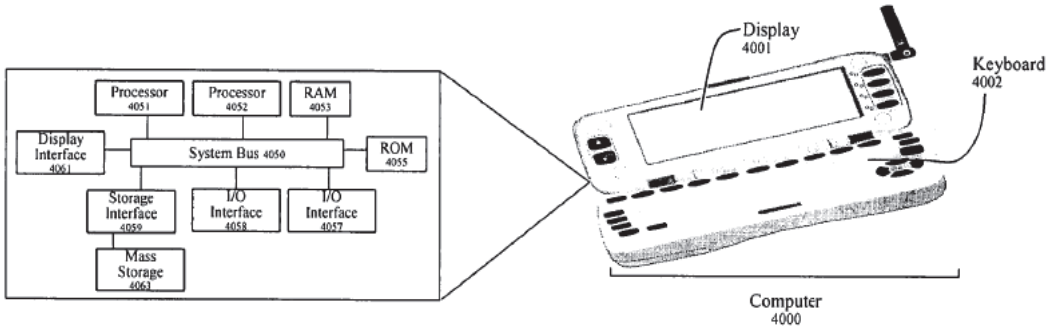

Fig. 4

Figure 2: Exemplary computer embodiment (Ex. 1005 at Fig. 4).

33. Arrasvuori teaches use of this system to "depict progress of a user performing a real-world fitness task relative to other users performing the real-world fitness task" that correspond to stages of a computer game requiring that a player reach a landmark, climb a mountain, cross a river, or defeat an enemy to progress to the next stage of the game. (Ex. 1005 at Abstract, [0026]-[0030], [0048]). Feedback regarding progress may be presented in real-time by way of "leaderboards available for direct viewing by users" (Ex. 1005 at [0049], [0050]).

34. The system might also perform compensatory operations such as taking "into account user fitness levels and/or environments in which real-world fitness tasks are performed." (Ex. 1005 at Abstract).

C. Watterson

35. U.S. Patent 6,458,060 to Watterson (i.e., "Watterson"), filed August 18, 2000, is entitled "Systems and Methods for Interaction with Exercise Device." (Ex. 1006 at Cover). Watterson discloses "[a]n exercise device configured to

enable a user to interact with a trainer in real-time communication." (Ex. 1006 at Abstract). As shown in Figure 3, system 10 consists of "one or more exercise mechanisms" such as treadmill 12a-12n, that "is in communication with one or more trainers at treadmill 20a-20n via a translator device 13 and a personal computer 14." (Ex. 1006 at 5:16-23). Watterson teaches that "system 10 enables exercise programming with control signals to be transmitted from a trainer at treadmill 20, or alternatively from communication system 18, to a user at treadmill 12." (Ex. 1006 at 7:5-8). In addition to exercise parameters from treadmill 12, communication system 18 may transmit signals related to user performance including "heart rate, blood pressure, and the like." (Ex. 1006 at 18:62-19:4).

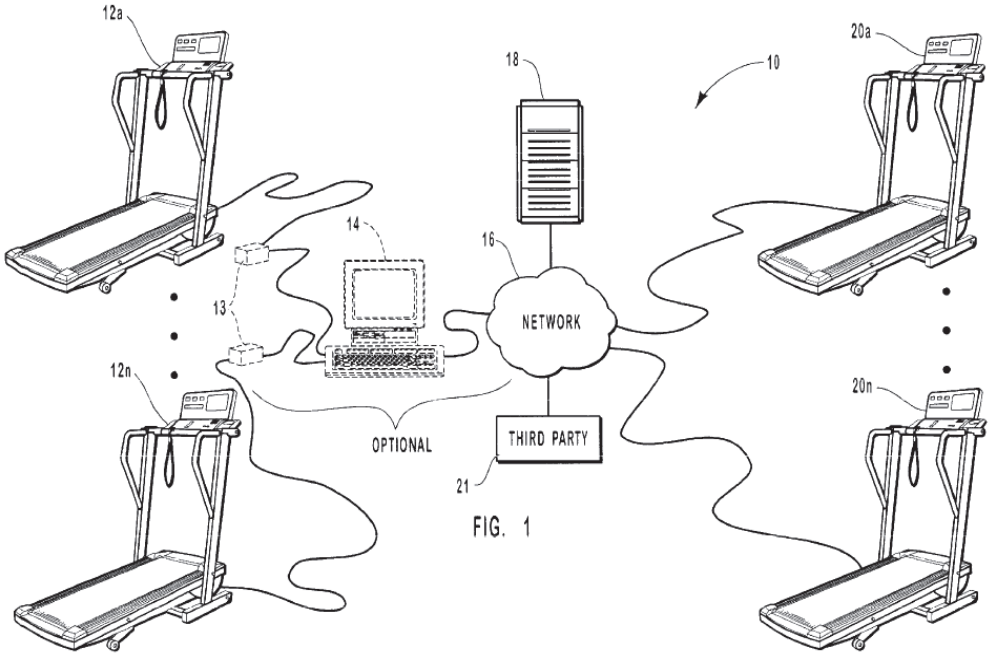

Figure 3: Representation of one system that may incorporate the features of Watterson (Ex. 1006 at Fig. 1).

36. Watterson teaches that the disclosed device allows for "competitive exercise programming" that "motivates the users to exercise on a more regular basis while also setting goals for the individual to reach. Competition module 314, therefore, provides various benefits to those seeking to exercise on a regular basis." (Ex. 1006 at 40:23-27). Watterson also discloses the ability for a trainer to tailor the exercise program available to different users based on "various criteria, such as participant's heart rates" by changing the operating parameters of the exercise devices. (Ex. 1006 at 48:66-49:11).

D. Ellis

37. International patent publication WO 02/067449 to Ellis (i.e., "Ellis"), published August 29, 2002, is entitled "Modular personal network systems and methods." (Ex. 1007 at Cover). Ellis discloses a "modular personal network that may be worn, carried, or used in close proximity to a user." (Ex. 1007 at Abstract). As shown in Figure 4, the modular personal network "may provide a variety of functions," including athletic functions. (Ex. 1007 at Abstract). Ellis teaches that "[a]thletic functions may include controlling a workout … and collecting results from a workout" and may also include a "coaching interface" or allow for competition between two athletes. (Ex. 1007 at 6:15-26). Ellis discloses collection of athletic data from exercise equipment or measurements of "distance, speed, heart rate, cadence, stride length" and contemplates monitoring an athlete's form

using an accelerometer (Ex. 1007 at 6:19-20, 15:26-30). Ellis teaches that "[d]ata may allow two or more users to engage in an athletic competition, for example, by transmitting performance data between athletes." (Ex. 1007 at 12:31-13:4).

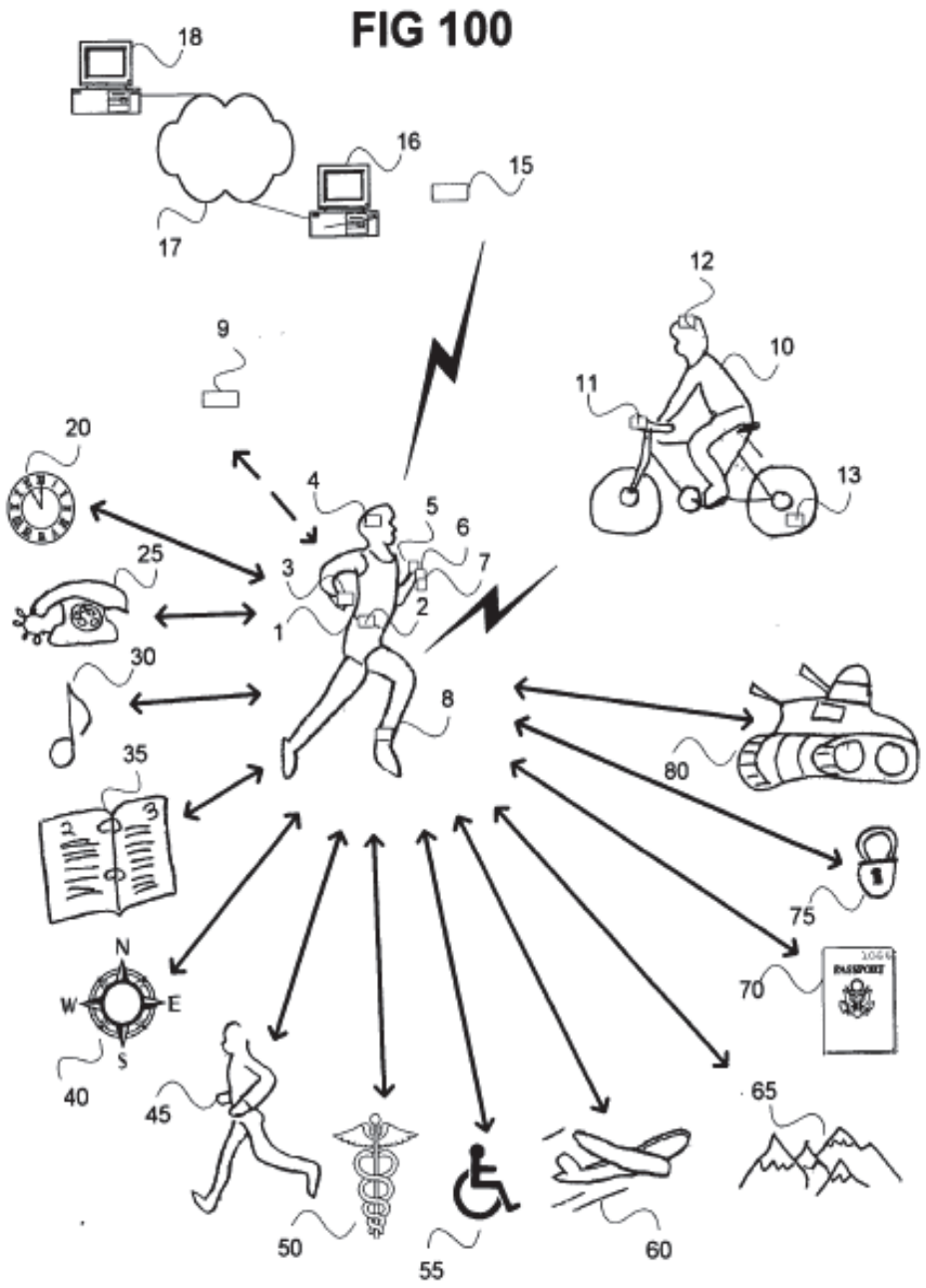

Figure 4: Illustrative overview of the modular personal network (Ex. 1007 at Fig. 100).

X. GROUND 1: TAGLIABUE DOES NOT DISCLOSE EACH AND EVERY LIMITATION OF CLAIMS 1-20

38. Petitioner argues that Tagliabue anticipates Claims 1-20 of the '256 Patent. (Petition at pp. 25-41). For at least the reasons detailed below, Tagliabue does not disclose each and every limitation of Claims 1-20. Omission of a particular claim, limitation, or topic from my discussion below should not be interpreted as agreement with arguments put forward by the Petitioner or Dr. Lynch unless I have explicitly stated this to be the case and I reserve the right to supplement my opinion if the Board institutes review.

A. Claim 1[G] & Claim 11[E]

1. continuously generate and simultaneously communicate in real-time to the first user at the first location and the second user at the second location, an interface indicating whether the challenge has been met

39. This limitation of Claims 1[G] and 11[E] contains two distinct elements. First, this limitation requires continuous generation of the interface indicating whether the challenge has been met. Under the ordinary and customary meaning, a POSITA would have understood this element to mean that the interface indicating whether the challenge has been met involves data generation without perceived interruption. Second, the limitation requires that the interface indicating whether the challenge has been met is simultaneously communicated in real-time to the two users. Under the ordinary and customary meaning of the terms, a POSITA would have understood this element to mean that the interface indicating

whether the challenge has been met is communicated to the two users at essentially the time that the athletic activities performed by the two users occurs. A POSITA would have understood that the '256 Patent's disclosed continuous generation and simultaneous, real-time communication of challenge progress involves data generation and display without interruption or perceived delay during an athletic activity.

40. I disagree with Petitioner's contention (Petition at p. 33) that Tagliabue discloses both of these elements of Claims 1[G] and 11[E]. It is readily apparent that Tagliabue does not disclose this limitation.

41. Tagliabue teaches that "**when** a participant has a sum of his or her total distance values that matches or exceeds the specified challenge distance … **then** the athletic data display configuration device 601 will identify that participant as the winner of the challenge" and that "**[i]n response**, the athletic data display configuration device 601 will notify each participant of the winner." (Ex. 1004 at 22:31-45, emphasis added). This notification of the winner of the challenge does not meet the first element requiring ***continuous*** generation of the interface indicating whether the challenge has been met. Tagliabue discloses that this notification of the winner only occurs at the end of the challenge when a participant has matched or exceeded the specified challenge distance. By contrast,

Claims 1[G] and 11[E] of the '256 Patent require continuous generation of the interface during the challenge itself.

42. Tagliabue also discloses the provision of updates to the user regarding challenge progress. (Petition at p. 33). However, Tagliabue discloses that these updates are provided in an intermittent fashion such as "by sending an electronic mail message" or "by displaying a special-purpose interface when each participant connects to the athletic data display configuration device 601." (Ex. 1004 at 22:53-65). A POSITA would have understood generation of feedback by "sending an electronic mail message" or "displaying a special-purpose interface when each participant connects to the athletic data display configuration device" to describe intermittent generation of challenge data. Thus, Tagliabue does not disclose the first element of the claim limitations requiring ***continuous*** generation of the interface indicating whether the challenge has been met.

43. In addition, Tagliabue's disclosure of providing updates via the special-purpose interface when each participant connects to the athletic data display configuration device 601 does not disclose the second element of the claim limitations requiring ***simultaneously*** communicating the interface in real-time. This is illustrated in the following hypothetical example. Participants A and B are competing to run 100 miles. On the first day of the challenge (January 1), Participant A runs 5 miles, and Participant B runs 7 miles. Pursuant to Tagliabue's

disclosures, a special-purpose interface displays the respective progress of Participants A and B when the users connect to the athletic data display configuration device the next day (January 2). As illustrated by this example, a POSITA would have understood that Tagliabue's interface providing updates to the participants is neither "continuously generated" nor "simultaneously communicated in real-time" as required by Claims 1[G] and 11[E].

44. Therefore, Petitioner has failed to establish that Tagliabue discloses each and every limitation of Claims 1 and 11 and the Challenged Claims dependent thereon.

XI. GROUNDS 2 AND 3: ARRASVUORI DOES NOT DISCLOSE, TEACH, OR SUGGEST EACH AND EVERY LIMITATION OF CLAIMS 1-4, 7, 8, AND 11-16

45. Petitioner argues that Claims 1-4, 7, 8 and 11-16 of the '256 Patent are anticipated or rendered obvious by Arrasvuori. (Petition at pp. 41-65). For at least the reasons detailed below, Arrasvuori does not disclose, teach, or suggest each and every limitation of Claims 1-4, 7, 8 and 11-16. Omission of a particular claim, limitation, or topic from my discussion below should not be interpreted as agreement with arguments put forward by the Petitioner or Dr. Lynch unless I have explicitly stated this to be the case and I reserve the right to supplement my opinion if the Board institutes review.

A. Claim 1[G] and Claim 11[E]

1. continuously generate and simultaneously communicate in real-time to the first user at the first location and the second user at the second location, an interface indicating whether the challenge has been met

46. Petitioner fails to show that Arrasvuori discloses the limitation requiring a system that can "continuously generate and simultaneously communicate in real-time to the first user at the first location and the second user at the second location, an interface indicating whether the challenge has been met." Specifically, Petitioner has not pointed to any teachings from Arrasvuori that disclose ***continuous*** generation of the interface indicating whether the challenge has been met. In fact, Petitioner omits the term "continuously" from its discussion of this limitation. Petitioner only contends that "[t]he server 'generate[s] and simultaneously communicate[s]' whether a challenge has been met to users during step 209 of monitoring and feedback operations." (Petition at p. 55).

47. Petitioner points to Arrasvuori's use of present tense in describing graphical performance indicators as indicative of continuous generation of challenge data:

> "As another example, Arrasvuori discloses that '***during performance*** of a real-world fitness task, display might be provided wherein graphical indicators corresponding to users that ***are performing*** … the real world fitness task are positioned relative to one another, a goal corresponding to the task ….' (*Id*., ¶ 52 (emphases added).) 'Such display might … be presented via [interfaces] provided by wireless nodes and/or other computers of users.' (*Id*.) A POSITA would have

> understood from these disclosures that the server communicates the interfaces to users as it generates them. (Ex. 1003, ¶ 72.)"

(Petition at pp. 57-58, emphases in original).

48. I disagree with Petitioner's suggestion that this passage discloses, teaches, or suggests ***continuously*** generating an interface to the users. A POSITA would have understood that the display with graphical indicators corresponding to users could be displayed during the performance of a real-world fitness task, but only at selective moments or designated checkpoints. Therefore, this display would not be continuously generated.

49. Arrasvuori's disclosure of leaderboards showing user performances fails for the same reason. That is, Arrasvuori only discloses that "[i]n various embodiments, with completion of and/or during performance of a real-world fitness task, one or more scores (e.g., taking into account quality of real-world fitness task performance) might be presented." (Ex. 1003 at [0051]). This description of a leaderboard does not disclose that the scores showing the relative progress of users is continuously generated throughout the performance of the real-world fitness task.

50. Arrasvuori discloses various embodiments that include "real-time feedback" (Ex. 1005 at [0049]) but makes no mention of continuous generation of an interface indicating challenge progress to various users. Arrasvuori discloses that "step 209" involves "[f]eedback regarding real-world fitness task

performance" that "might, in various embodiments, be provided to users." (Arrasvuori at [0048]). Hence, Arrasvuori teaches that generation of challenge data regarding real-world fitness tasks is optional. Further, Arrasvuori teaches that "users competing with and/or against one another might play at the same time and/or at different times." (Ex. 1005 at [0034]). Arrasvuori says nothing about whether the interface providing real-time feedback is continuously generated. In fact, Arrasvuori teaches that "a user might be informed (e.g., by a GUI and/or other interface of her wireless node and/or other computer) once she had reached a certain performance threshold in the real world (e.g., once she had traveled a certain distance)." (Ex. 1005 at [0067]). Thus, in my opinion, Arrasvuori teaches monitoring equipment that may optionally generate real-time feedback, but does not disclose continuous generation of said data. Therefore, Arrasvuori does not disclose each and every limitation of independent Claims 1 and 11.

51. Petitioner's obviousness arguments also fail to address whether Arrasvuori discloses continuous generation of the interface indicating whether the challenge has been met. Instead, Petitioner's obviousness arguments are focused on whether the server generates the interface. *See* Petition at p. 58 (arguing that "[a] POSITA would have understood from these disclosures that the server communicates the interfaces to users as it generates them"). Dr. Lynch also mistakenly focuses on whether the server generates the interface and fails to

address whether the interface is generated continuously. *See* Ex. 1003 at ¶ 72 (Dr. Lynch opining that "[a] POSITA would have understood from these disclosures that Arrasvuori's server can generate and communicate leaderboards and graphics to users depicting user progress towards goals in real time, i.e., as the server generates them.") As discussed above, Arrasvuori's disclosure of communicating the leaderboards and graphics to the users showing their progress in real-time is not the same as continuous generation.

52. Dr. Lynch also argues "[a] POSITA would have understood that providing real-time feedback based on monitoring requires real-time monitoring." (Ex. 1003 at ¶ 69). Again, this misses the point. While Arrasvuori may disclose continuous monitoring in order to provide the real-time feedback, this says nothing about whether there is continuous generation of the interface to provide real-time feedback. To the contrary, real-time feedback may be provided without the interface being continuously generated. For example, an interface could notify users of their progress relative to other competitors at every mile checkpoint. In this example, the interface provides real-time feedback at each mile checkpoint, but it is intermittently generated and does not provide continuous feedback between the mile checkpoints. Therefore, neither Petitioner nor its expert have shown that Arrasvuori discloses, teaches, or suggests continuously generating an

interface indicating whether the challenge has been met, as required by Claims 1 and 11.

XII. GROUND 4: ARRASVUORI AND ELLIS DO NOT TEACH OR SUGGEST CLAIM 13

53. Petitioner argues that Claim 13 of the ’256 Patent is rendered obvious by Arrasvuori in view of Ellis. (Petition at pp. 65-67). It is my opinion that Arrasvuori does not disclose, teach, or suggest each and every limitation of independent Claim 11, upon which Claim 13 depends. The disclosure of Ellis does not resolve the issues with Arrasvuori discussed above in Section XI. Omission of a particular claim, limitation, or topic from my discussion should not be interpreted as agreement with arguments put forward by Petitioner or Dr. Lynch unless I have explicitly stated this to be the case and I reserve the right to supplement my opinion if the Board institutes review.

XIII. GROUND 5: WATTERSON AND ARRASVUORI DO NOT TEACH OR SUGGEST CLAIMS 1, 7, 8, 11-13, 15, AND 16

54. Petitioner argues that Claims 1, 7, 8, 11-13, 15 and 16 of the ’256 Patent are rendered obvious by Watterson in view of Arrasvuori. (Petition at pp. 68-85). For at least the reasons detailed below, Watterson and Arrasvuori do not teach or suggest each and every limitation of Claims 1, 7, 8, 11-13, 15 and 16. Furthermore, a POSITA would not have been motivated to combine the teachings of Watterson and Arrasvuori to normalize a user’s performance by their fitness

level because Watterson already disclosed multiple mechanisms to tailor the intensity of the workout to a user's fitness level. Omission of a particular claim, limitation, or topic from my discussion below should not be interpreted as agreement with arguments put forward by Petitioner or Dr. Lynch unless I have explicitly stated this to be the case and I reserve the right to supplement my opinion if the Board institutes review.

A. Petitioner Has Not Met Its Burden of Showing that the Combination of Watterson and Arrasvuori Teaches or Suggests Each Limitation of the Challenged Claims

55. Petitioner fails to show that Watterson teaches or suggests each and every limitation of the Challenged Claims. Specifically, Petitioner has failed to show that Watterson teaches or suggests Claims 1[F] and 11[D], which recite that the challenge module is configured to "determine whether the challenge has been met by the first user based on a comparison of the first amount of athletic activity performed by the first user and a second amount of athletic activity performed by the second user."

56. Claims 1[F] and 11[D] must be read in the context of the entire claim. That is, Claim 1[A] recites that the "athletic performance module [is] configured to receive athletic activity data from a wirelessly-connected sensor worn on an appendage of a first user." Claim 1[D] recites that the challenge module is configured to "determine, from the received athletic activity data, a first amount of

athletic activity performed by the first user." Accordingly, the "received athletic activity data" in Claim 1[D] refers to the athletic activity data received from a wirelessly-connected sensor worn on the user's appendage in Claim 1[A]. Then, the "first amount of athletic activity performed by the first user" in Claim 1[F] refers to the athletic activity of the first user determined using the athletic activity data received from the wirelessly-connected sensor worn on an appendage.

57. Petitioner's argument that Watterson teaches or suggests Claims 1[F] and 11[D] is flawed. Petitioner identifies Watterson's "pulse watch" as the wirelessly-connected sensor recited in Claim 1[A]. (Petition at 70). The information received from Watterson's pulse watch is the user's heart rate. Heart rate data obtained from the "pulse watch" is not relied upon to determine the amount of athletic activity that is later compared to determine the winner of a challenge (i.e., distance traveled). Notably, the pulse watch does not obtain information about the user's actual velocity. (Ex. 1006 at 18:66-19:6).

58. To the extent that Petitioner relies on Watterson's disclosure that "[t]readmill 12 may includes [sic] other sensors that gather various other operating parameters, such as but not limited to, maximum pulse and heart rate, average pulse and heart rate, target heart rate, length of workout session, and the like" (Ex. 1006 at 25:17-20 (cited at Petition at 70)), a POSITA would have understood that

such sensors are included as a component of the treadmill 12 and not worn on the appendage of the user.

59. Petitioner argues with respect to Claim 1[F], that the determination of whether the challenge has been met is based on a comparison of distances travelled by the user. As noted above, the distance travelled by the user is not based on data from Watterson's pulse watch. A POSITA would have understood that the distance travelled by the user is calculated instead using data from the belt speed sensor 230 and incline sensor 232 that gather the operating parameters of treadmill 12. (Ex. 1006 at 25:10-17). Petitioner's claim that Watterson teaches Claims 1[F] and 11[D] ("determine whether the challenge has been met by the first user based on a comparison of the first amount of athletic activity performed by the first user and a second amount of athletic activity performed by the second user" from data collected via wirelessly-connected sensor worn on a user's appendage) is therefore inconsistent with its reliance on Watterson's pulse watch as the claimed sensor worn on the appendage of the first user.

60. Petitioner argues that the proposed combination of Watterson and Arrasvuori teaches or suggests Claims 1[F] and 11[D]. As explained further in Section XIII.B below, it is my opinion that a POSITA would not have been motivated to combine Watterson and Arrasvuori, contrary to Petitioner's assertion. Petitioner argues that "in the combination, Watterson's software normalizes

competing users' velocities by their heart rates." (Petition at pp. 74-75). Petitioner then concludes that "[c]ommunication module 254 computing apparent velocity as a function of heart rate and actual velocity is a determination of 'a first amount of athletic activity performed by the first user' based on the received heart rate data." (Petition at p. 75).

61. Petitioner's argument is flawed. Watterson does not determine "the amount of athletic activity performed by the first user" (distance travelled) based on data collected by the pulse watch. As described above, Watterson teaches that distance travelled by a user is determined using data from the belt speed sensor 230 and incline sensor 232 that gather the operating parameters of the treadmill 12 and is not determined from data acquired by a sensor worn on the appendage of the user. Petitioner attempts to argue that a user's travel velocity could be scaled using heart rate. Any such scaling of velocity still requires data collected by Watterson's treadmill as heart rate alone cannot independently determine a user's velocity.

62. Furthermore, Dr. Lynch makes an unsupported leap in logic, stating that "a POSITA could have tweaked Watterson's software to depict a user's progress along a racing track at an 'apparent' velocity" determined by multiplying the user's actual velocity by their heart rate and dividing by some constant." (Ex. 1003 at p. 61; Petition at pp. 76-77). Dr. Lynch does not define what the constant, hc, represents or how it is determined. Petitioner does not clarify how a POSITA

would have combined Arrasvuori with Watterson to change how Watterson's software determines user speed. Therefore, a POSITA would not have found the calculation suggested by Dr. Lynch to be useful for comparing physical performance, nor would a POSITA have found it an obvious calculation to make.

B. A POSITA Would Not Have Been Motivated to Combine Watterson and Arrasvuori to Render Obvious Claims 1[D] and 11[B]

63. Claim 1[D] recites: "determine, from the received athletic activity data, a first amount of athletic activity performed by the first user." Petitioner contends that "[t]his limitation is obvious over a combination of Watterson and Arrasvouri." (Petition at 74). Petitioner argues that "Watterson and Arrasvuori provide ample motivation for the combination … Watterson admits that some participants in a spin class, for example, cannot perform the same exercises as others" and therefore "Watterson's athletic competitions are unlikely to motivate users who lack others with whom to compete." (Petition at pp. 76-77; Ex. 1003 at ¶¶ 110-117). Petitioner concludes that "Arrasvuori solves this problem by normalizing each user's performance by their fitness level." (Petition at p. 77). Petitioner further argues that "[a] POSITA would have looked to Arrasvuori for this solution because it is closely related in subject matter to Watterson." (Petition at pp. 77-78). I disagree with this assertion. Neither Petitioner nor Dr. Lynch have shown that a POSITA would have been motivated to combine Watterson and Arrasvuori to arrive at the claimed invention.

64. First, Petitioner has misinterpreted the teachings of Watterson. Petitioner selectively quotes Watterson, ignoring the fact that Watterson discloses a solution to the admitted problem of participants who are unable to perform exercises in the same way as other users. Watterson teaches:

> "As mentioned, the presently described system, methods, and devices may be used in a master-slave system. In such a system, changes to the operating parameters of the master are translated to the operating parameters of the slave, thereby controlling the operation of the device or exercise device. … The master may selectively choose groups of participants based on various criteria, such as participant's heart rates, and change those participants exercise program, while maintaining other participants at the original or different exercise level."

(Ex. 1006 at 48:66-49:11).

65. Contrary to the argument advanced by Petitioner, a POSITA contemplating the disclosure of Watterson would not have been motivated to turn to Arrasvuori to find a solution to the problem of users with disparate fitness levels because, as described above, Watterson already discloses such a solution – namely, the ability to tailor the exercise program based on "criteria, such as participant's heart rates, and change those participants exercise program, while maintaining other participants at the original or different exercise level." Watterson conceives a solution by which the master adjusts operating parameters of the exercise device to make it easier for a less fit user to cover the same distance as a more fit user. For example, the master may reduce the resistance of an exercise bicycle for a less fit

user, allowing that first user to cover a similar cycling distance as a more fit user while exerting similar effort (e.g., resulting in similar heart rate). By making this adjustment to the operating parameters, Watterson does not require a post-hoc calculation of a user's "apparent velocity" as suggested by Dr. Lynch because the actual distance covered will directly reflect the users' effort while also accounting for their disparate fitness levels. Petitioner has provided no explanation as to why this solution provided by Watterson is somehow lacking or otherwise necessitates some modification or consideration of the disclosure of Arrasvuori.

66. Watterson also discloses a scaling control that allows users to scale the level of exertion to fit their individual abilities, independent of a master control signal:

> "A user may activate scaling control 86 and vary the intensity of an exercise program. The scaling control 86, therefore, enables a user to select a value representative of the proportional change to be made to the control signal received by the communicating mechanism of treadmill 12 from communication system 18. For example, if an exercise program requires a maximum speed of 6 miles per hour (mph) with a maximum incline of 15 degrees for a period of 30 minutes, an individual may activate scaling control 86 to require only 66% intensity of the exercise program; stated otherwise, reduce the intensity by one third. Therefore, the exercise program is varied to a maximum speed of 4 mph, with a maximum incline of 10 degrees, for a period of 20 minutes."

(Ex. 1006 at 11:17-30).

67. A POSITA would have understood that Watterson's scaling control enables users with different fitness levels to compete by performing the same exercise program, but at suitable intensity levels for each user. As described above, such an adjustment to the operating parameters would result in users of different fitness levels covering distances reflective of their individual capabilities, thus allowing direct comparisons of different users' performances without requiring any post-hoc adjustments.

68. Furthermore, Watterson discloses the option to race against the computer, which has different skill levels such as a beginner runner, intermediate runner, or advanced runner. (Ex. 1006 at 41:26-41; Figs. 17A & 17C). Thus, even if another individual with the same fitness level as the user is not available, the user could still compete against the computer set to an appropriate skill level to match the user's skill. Hence, a POSITA would have no reason to modify Watterson to solve the problem of motivating users who lack others with whom to compete.

69. Therefore, it is my opinion that a POSITA would not be motivated to turn to Arrasvuori for a solution that is already provided by Watterson.

XIV. CONCLUSION

70. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are

believed to be true; and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: February 16, 2023

Megan Toney-Bolger, Ph.D.

EXHIBIT 1

Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Toney-Bolger's areas of expertise include kinematics, dynamics, neuromechanics, motor control of human motion, and human injury mechanics. Dr. Toney-Bolger's work experience includes the analysis of a variety of injuries involving motor vehicles, recreational activities and equipment, pedestrians, occupational accidents, and slip-and-fall accidents as well as conducting sled tests and full-scale vehicle-to-vehicle crash tests. Her research has focused on occupant motion and loading in response to variety of crash modalities as well as the biomechanics of human walking and running, amputee locomotion, neural control of locomotion, gait rehabilitation technology, and motor learning responses in gait before and after injury or impairment.

Dr. Toney-Bolger also has technical knowledge and training in the areas of gait analysis techniques and use of the 3D Static Strength Prediction Program. She is a certified forklift operator and certified XL tribometrist. She has also completed training in traffic crash reconstruction through the Northwestern University Center for Public Safety.

Prior to joining Exponent, Dr. Toney-Bolger was a Graduate Research Assistant in the Comparative Neuromechanics Laboratory at Georgia Institute of Technology where she completed a National Institutes of Health Fellowship for Prosthetics and Orthotics Research Training. Her research evaluated the effect of amputation on a patient's control strategies, their ability to walk, and their adaptation to altered walking environments. Dr. Toney-Bolger has experience collecting and analyzing kinematic, kinetic, and electromyography (EMG) data using high-speed motion capture systems (VICON) and advanced computational software (Matlab and LabVIEW). Dr. Toney-Bolger also served as a Graduate Teaching Assistant at Georgia Tech for a graduate-level course in clinical gait analysis. In addition, Dr. Toney-Bolger conducted research in the Orthopaedic Biomechanics Laboratory at Duke University where she studied responses to air blast at both the cellular and organismal level.

Academic Credentials & Professional Honors

Ph.D., Applied Physiology, Georgia Institute of Technology (Georgia Tech), 2014

B.S.E., Biomedical Engineering, Duke University, 2009

NIH Fellow for Prosthetics and Orthotics Research Training, 2009-2012

Finalist for P.E.O. Scholar Award from Georgia Institute of Technology

Licenses and Certifications

Licensed Professional Engineer, Michigan, #6201068198

Professional Affiliations

American Society of Biomechanics

Society of Automotive Engineers

Publications

Toney-Bolger M, Isaacs JL, Rapp van Roden E, Croteau J, et al. Seat Belt Latch Plate Design and Pretensioner Deployment Strategies Have Limited Effect on In- and Out-of-Position Occupants in High-Severity Rear-End Collisions. SAE Technical Paper 2022-01-0849.

Croteau J, Toney-Bolger M, Isaacs JL, Shurtz B, et al. Seatback Strength and Its Effect on In-Position and Out-of-Position ATD Loading in High-Speed Rear Impact Sled Tests. SAE Technical Paper, 2022-01-0856.

Isaacs JL, Campbell IC, Watson H, Toney-Bolger M. Head and Neck Loading Trends in IIHS Side Impact Testing. Proceedings of the FISITA World Congress, Prague, 13-17 September 2021. Outstanding Paper Award

Toney-Bolger ME, Croteau J, Dibb A, Weber P, et al. The Role of Seat Belt Restraint System Components in Rear-End Collisions. SAE Technical Paper, 2021-01-0912.

Toney-Bolger ME, Sherman S, Isaacs J, Garman T, et al. An Evaluation of Near- and Far-side Occupant Responses to Low- to Moderate-Speed Side Impacts. SAE Technical Paper, 2020-01-1218.

Toney-Bolger ME, Campbell IC, Miller BD, Davis MS, et al. Evaluation of Occupant Loading in Low- to Moderate-Speed Frontal and Rear-End Motor Vehicle Collisions. SAE Technical Paper, 2019-01-1220.

Bruno A, Toney-Bolger M, George J, Koller J, et al. Evaluation of Occupant Kinematics in Low- to Moderate-Speed Frontal and Rear-End Motor Vehicle Collisions. SAE Technical Paper, 2019-01-1226.

Selgrade B, Toney ME, Chang YH. Two biomechanical strategies for locomotor adaptation to split-belt treadmill walking in subjects with and without transtibial amputation. Journal of Biomechanics 2017; 53(28):136-143.

Hashish R, Toney-Bolger ME, Sharpe SS, Lester BD, et al. Texting during stair negotiation and implications for fall risk. Gait & Posture 2017; 58:409-414.

Selgrade B, Thajchayapong M, Lee GE, Toney ME, et al. Changes in mechanical work during neural adaptation to asymmetric locomotion. Journal of Experimental Biology 2017; 220:2993-3000.

Toney M, Chang YH. The motor and the brake of the trailing leg in human walking: leg force control through ankle modulation and knee covariance. Experimental Brain Research 2016; 234(10):3011-3023.

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Invited Presentations

Isaacs JL, Toney Bolger ME, Campbell IC. Cervical Spine Loading During Asymmetrical Non-Injurious Physical Activities. Podium Presentation, XXVII Congress of the International Society of Biomechanics (ISB) /43rd Annual Meeting of the American Society of Biomechanics (ASB), Calgary, Canada, August 2019.

Thajchayapong M, Cho G, Toney M, Chang YH. Changes in total mechanical work explain why metabolic cost tracks locomotor adaptation during split-belt treadmill walking. Poster No. T272, 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.

Toney M, Chang YH. Consistent power production during walking is maintained by structuring joint torque variance to modulate trailing leg forces. Poster No. T267, 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.

Toney M, Chang YH. Amputees use less joint torque covariation than able-bodied subjects to generate leg force during walking. Podium Presentation, XXIV Congress of the International Society of Biomechanics, Natal, Rio Grande Do Norte, Brazil, August 4-9, 2013.

Toney M, Chang YH. Identifying implicit neuromechanical control targets in human gait. Poster No. 274.05/JJ3, 42nd Society for Neuroscience Annual Meeting, New Orleans, LA, October 13-17, 2012.

Toney M, Chang YH. Limb force variance is structured to stabilize the step-to-step transitions of dynamic walking. Abstract No. 285, 36th American Society of Biomechanics Annual Meeting. Gainesville, FL, August 15-18, 2012.

Norman T, Toney M, Chang YH. The Gait Deviation Index for analysis of amputee walking at different speeds. 38th American Academy of Orthotists and Prosthetists Annual Meeting and Scientific Symposium, Atlanta, GA, March 21-24, 2012.

Herrin K, Toney M, Chang YH. Use of neuromechanical redundancy for locomotor compensation in able-bodied and transtibial amputee subjects. Abstract No. 400, 34th American Society of Biomechanics Annual Meeting. Providence, RI, August 18-21, 2010.

EXHIBIT 2

Case Name	Venue	Date	Type
Juve v Premier Tech	United States District Court, District of Minnesota	July 15, 2019	Deposition
Maher v Michindoh Conference Center	State of Michigan, Circuit Court for the County of Hillsdale	October 31, 2019	Deposition
Borden v Wal-Mart	United States District Court for the Northern District of Alabama Middle Division	July 6, 2021	Deposition
Kalski v Ashley Capital	State of Michigan, Circuit Court for the County of Wayne	September 28, 2021	Deposition
Dennis "DJ" Nichols v. I-80/81 Storage Inc. v. Fairway Building Products, LLC	District Court of York County, Nebraska	March 14, 2022	Deposition
Nancy Kamposh v David Kilano	Circuit Court for the County of Oakland, Michigan	March 21, 2022	Deposition
Amy Neher v Geoffrey Wheeler and Erie Insurance Exchange	State of Indiana, Allen County Superior Court	April 1, 2022	Deposition
Aimee Lingo and Bobby Lingo v General Motors, L.L.C.	United States District Court, District of Colorado	April 14, 2022	Deposition
Nancy Kamposh v David Kilano	Circuit Court for the County of Oakland, Michigan	June 15, 2022	Trial
Amy Neher v Geoffrey Wheeler and Erie Insurance Exchange	State of Indiana, Allen County Superior Court	June 22, 2022	Trial
Misael Salas v Stephen Josephson and Groot Recycling & Waste Services, Inc.	Circuit Court of Cook County, Illinois	August 18, 2022	Deposition
Samantha Howard v Walt Disney Parks and Resorts U.S., Inc.	Circuit Court of the Ninth Judicial Circuit in and for Orange County, Florida	October 20, 2022	Deposition