

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LULULEMON USA INC.,

Petitioner,

v.

NIKE, INC.,

Patent Owner.

Case IPR2024-00460

Patent No. 8,266,749

**DECLARATION OF CHRISTOPHER M. PASTORE, PH.D., IN SUPPORT
OF NIKE, INC.'S PATENT OWNER'S RESPONSE**

lululemon v. NIKE, Inc. IPR2024-00460 Patent No. 8,266,749 Ex. 2003
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I, Christopher M. Pastore, 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. 8,266,749 (“the ’749 Patent”). I am being compensated for my time at my usual consulting rate of \$300 per hour 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 1–21 (the “Challenged Claims”) of the ’749 Patent. I further understand that Petitioner lululemon usa inc. (“lululemon”) raises six grounds in the Petition for *Inter Partes* Review. I understand that the raised grounds relate to the following references:

Reference	Exhibit
International Patent Publication No. WO 92/22223 to Nishida (“Nishida”)	Ex. 1005
U.S. Patent No. 2,047,724 to Zuckerman (“Zuckerman”)	Ex. 1008
U.S. Patent No. 2,675,631 to Doughty (“Doughty”)	Ex. 1017

3. For purposes of this declaration, I have been asked to provide my opinions in response to each of lululemon's invalidity grounds. My opinions for those grounds are set forth below.

II. BACKGROUND AND EXPERIENCE

4. My qualifications for forming the opinions set forth in this declaration are summarized in the following paragraphs and explained in more detail in my curriculum vitae which is attached Exhibit A to this report. Exhibit A also includes a list of my publications and research activities.

5. I am the Assistant Provost, Faculty Development in Classroom Pedagogy and Nexus Learning, and a Professor of Transdisciplinary Studies at Thomas Jefferson University in Philadelphia, Pennsylvania. I am also an Honorary Research Professor in the Department of Clothing and Textiles at Durban University of Technology in Durban, South Africa.

6. I have a Ph.D. in Materials Science from Drexel University, where I wrote my thesis: A Processing Science Model for Three Dimensional Braiding. I have written or had my writings included in nearly twenty books related to textiles. I have nearly fifty refereed publications related to textiles. I have produced nearly ninety presentations and non-refereed publications on textiles and fabrics. I have won numerous awards related to my writings in and experience with textiles.

7. I have worked in textile and materials engineering and textile engineering since 1984. I have a broad range of experience in warp and weft knitting, computer modelling of textile structures, defects in fabrics, mechanical properties of textiles, 4D textiles, structural and textile composites, and three-dimensional weaving.

III. COMPENSATION AND PRIOR TESTIMONY

8. I have previously been qualified as an expert and admitted to testify about textile design, engineering, and manufacturing. Attached as Exhibit B is a list of cases in which I have provided testimony in the last five years. To the best of my knowledge, no court has ever excluded or prohibited me from providing trial testimony as an expert witness.

9. Although I am being compensated for my time at a rate of \$300 per hour 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

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

- lululemon's Petition for *Inter Partes* Review of U.S. Patent No. 8,266,749;
- Exhibits 1001–1023; and

- all other materials discussed herein.

11. I reserve the right to amend or supplement the opinions provided in this declaration based on further arguments or evidence presented by lululemon in this proceeding.

V. LEGAL STANDARDS

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

13. I understand from counsel that in an *inter partes* review, claim terms should be construed “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b). I understand from counsel that the ordinary and customary meaning is determined primarily in view of the patent’s specification and prosecution history, but that extrinsic evidence such as dictionaries and treatises, as well as the opinions of persons of ordinary skill in the art (“POSITA”), may also be taken into account.

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

unpatentable over prior art under either an anticipation theory or an obviousness theory.

15. I understand from counsel that, to anticipate a claim, a single prior art reference must disclose each and every element of the claim. I further understand that the reference must not only disclose every element of the claim, but it must disclose those elements as arranged in the claim. I understand that even slight differences between a prior art reference and the claimed invention may make a showing of anticipation insufficient.

16. I understand from counsel that a patent claim is rendered obvious if it would have been obvious to a POSITA to combine the teachings of the prior art to yield the patent claim. I also understand from counsel that 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 have been informed by counsel 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.

17. I understand from counsel that a showing of obviousness requires some articulated reasoning with a rational underpinning to support the combination of the

references, i.e., a motivation to combine the references. I understand from counsel 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. I also understand from counsel that along with motivation to combine, petitioner must also show a POSITA would have reasonably expected to succeed in making the proposed prior art combination.

18. I understand from counsel that a claim may be considered unpatentable for obviousness for various reasons. Counsel informed me 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

19. I understand from counsel that lululemon asserts a POSITA in the relevant field of the '749 Patent would have had (1) at least a bachelor's degree in textile engineering, mechanical engineering, or similar technical degree, and (2) at least three years of experience working with knitted textiles for use in fabric-based articles. Petition, 14–15; Ex. 1003 at ¶37. For purposes of this declaration, I apply lululemon's definition of a POSITA.

20. 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.

21. 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.

22. My opinions are based on generally-accepted methodologies in the textile and knitting communities.

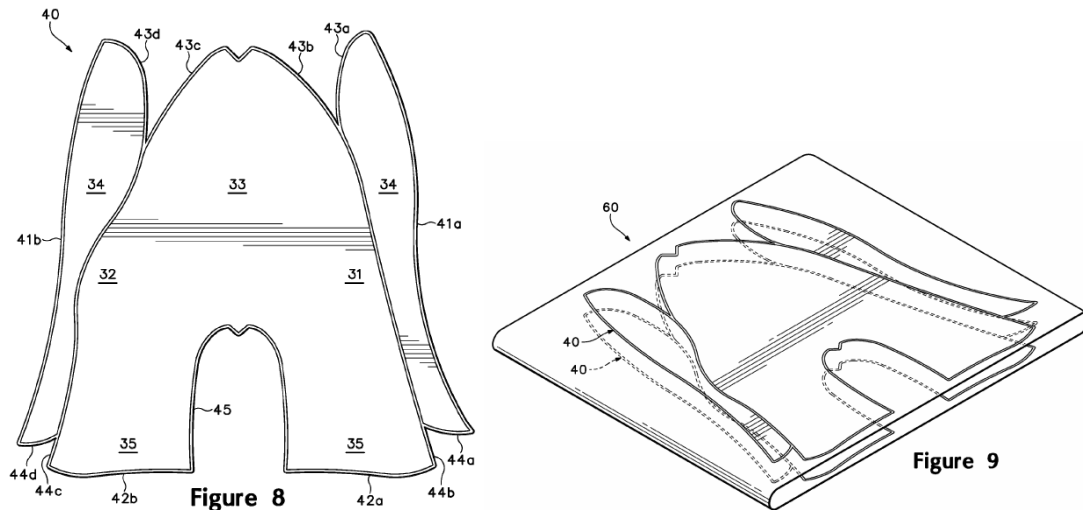
VII. THE '749 PATENT

23. The '749 patent relates to methods of manufacturing footwear. Independent claims 1 and 13 of the '749 patent recite methods of knitting textile elements at the same time as a surrounding textile structure. *E.g.*, Ex. 1001 at 11:43–14:5. The knitted textile elements have at least one texture that is different from the texture of the surrounding textile structure. *Id.* The knitted textile elements are then removed from the surrounding textile structure and incorporated into articles of footwear. *E.g.*, *id.* at Figure 9, 7:38–9:4, 11:43–14:5.

24. The '749 patent further discloses that the textile element(s) and surrounding textile structure can be produced using warp knitting machines and weft knitting machines, including circular knitting machines. *E.g.*, Ex. 1001. at 7:9–8:8. The textile elements can be removed from the surrounding textile structure using “die-cutting, laser-cutting, or other conventional cutting operation[s].” *E.g.*, *id.* at 8:4–8.

25. The claimed methods provide many benefits over conventional methods of manufacturing footwear. The claimed methods increase efficiency by limiting the required number of suppliers, machinery, or different assembly line techniques to cut or otherwise prepare the material for incorporation into the footwear. *E.g.*, Ex. 1001 at 3:4–25, 11:6–9. The claimed methods also reduce the

number of steps in the manufacturing process and reduce the number of seams in the final footwear product. *Id.*



Figures 8 and 9 of the '749 patent

26. Figure 8 shows an example of a textile element with the general shape and form of a footwear upper. Figure 9 shows an example of a tube-shaped cylindrical textile structure “formed with a wide-tube circular knitting machine.” Ex. 1001 at 7:38–39. Figure 9 also shows that “the types of stitches vary throughout textile structure 60 so that a pattern is formed with the outline of textile element 40 . . . [and] differences in the stitches within textile structure 60 form an outline with the shape and proportions of textile element 40.” *E.g., id.* at 7:38–45.

VIII. CLAIM CONSTRUCTION

27. As I explained in my declaration submitted with Nike’s Preliminary Response to New Balance’s Petition challenging the '749 patent (Ex. 2008), the

ordinary meaning of “article of footwear,” in the context of the ’749 patent, is a shoe having a sole and an upper.

28. I further understand that the parties agreed to constructions of two terms in the parallel district court litigation. I understand that the parties have agreed that “unitary construction” means “configuration wherein portions of a textile element are not joined together by seams or other connections.” Ex. 1015 at 11. I understand that the parties have agreed that “a first area and a second area with a [unitary construction]” means “a textile element having a [unitary construction] and having a first area and a second area.” *Id.* I have applied these constructions in my analysis.

29. I understand that all other terms and phrases in the ’749 patent claims have their ordinary and customary meanings and that no further construction is required. I reserve the right to offer opinions on any claim constructions that arise throughout this proceeding.

IX. OVERVIEW OF THE PRIOR ART REFERENCES

A. Nishida

30. Nishida is an English translation of International Publication No. 92/22223, titled “Method of Producing a Shaped Shoe Part From a Strip of Fabric, And a Shaped Shoe Part Produced by This Method.” Nishida was published on December 23, 1992. Nishida claims priority to Japanese patent application P4119911.1, which was filed on June 17, 1991. Nishida-US—the reference that the

Patent Office already considered multiple times—claims priority to the same Japanese patent application. The disclosure of Nishida and Nishida-US are virtually identical.

31. Nishida is directed to a method of manufacturing shoe components including a shoe upper and an associated sole part. *E.g.*, Ex. 1005 at 4, 9. Nishida discloses removing a patterned element of the desired shoe components from a “material web,” and then shaping and seaming the patterned element for incorporation into footwear. *E.g.*, *id.* at 9. As shown in Figure 2 (reproduced below), Nishida’s material web 1 has two primary components: “unwound web parts” 2 (i.e., the patterned pieces) and a “material web base” 4.

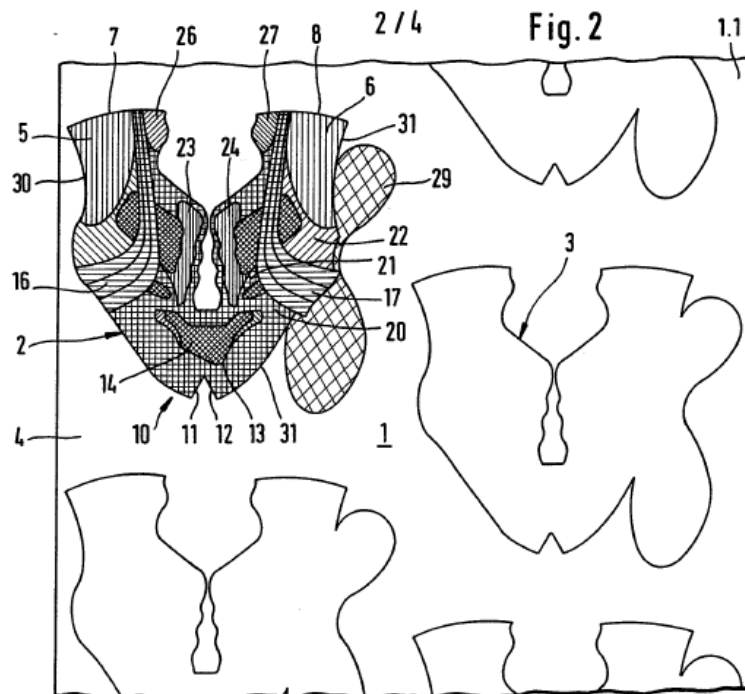


Figure 2 of Nishida

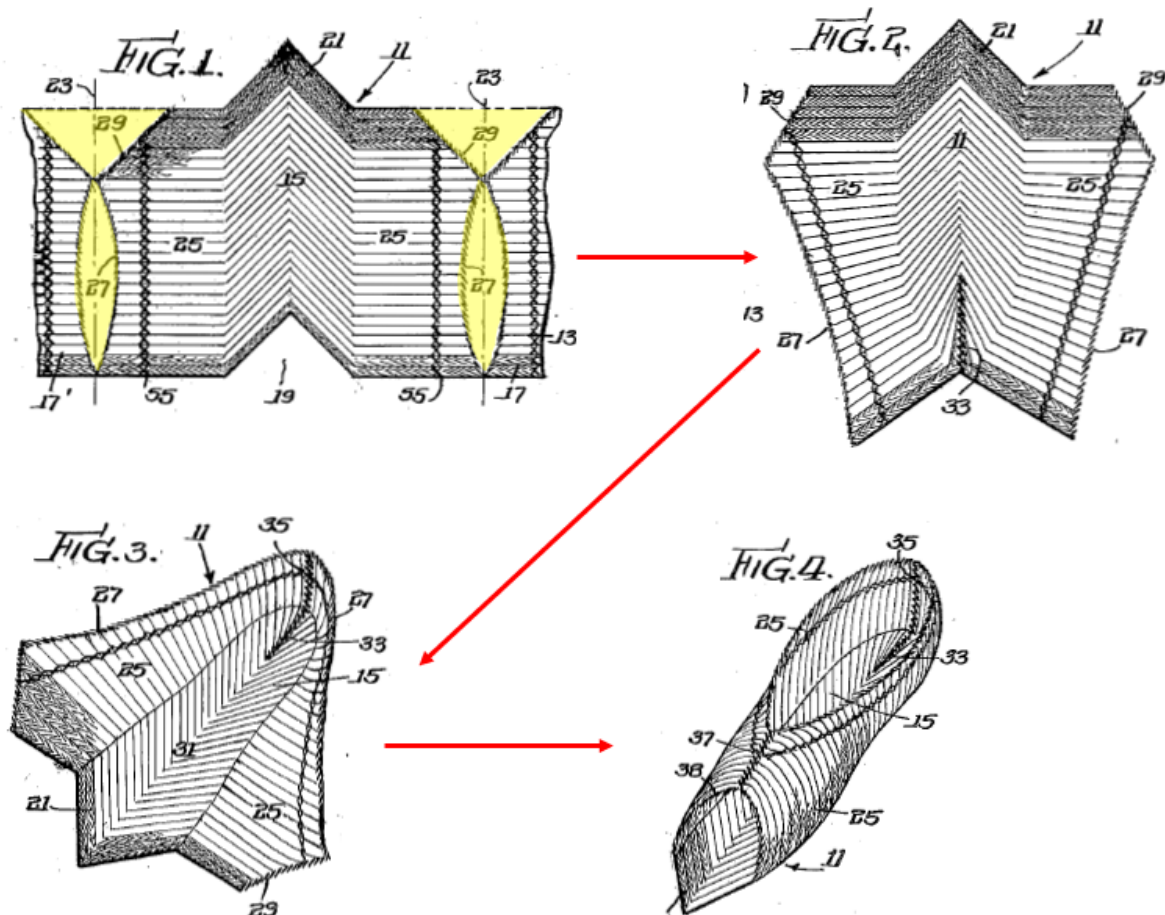
32. Unlike the '749 patent, Nishida does not disclose that unwound web parts 2 and material web base 4 are “simultaneously knit[ted],” i.e., knitted during a single knitting process. Nishida instead teaches a two-step process. In the first step, the material web base is formed as a separate, preexisting base. Ex. 1005 at 4–5. The preexisting material web base “may be a common woven or knitted fabric, e.g, consisting of warp and weft.” *Id.* at 5. In the second step, after the material web base is fully formed, the unwound web parts are printed (with a fabric printing process) or produced (with a textile production process) on top of or within that preexisting base. *Id.* at 4–5, 7–9 (claiming that “unwound web part (2)” and “sole part (29)” are “produced by a print process on the material web (1) and/or by a textile production method within the material web.”).

33. Surface areas 1.1 of the material web represent the areas free from unwound web parts. Ex. 1005 at Fig. 1. After the unwound web parts are produced on the material web base, they are cut from the material web and assembled into an article of footwear. *E.g., id.* at 5.

B. Zuckerman

34. U.S. Patent No. 2,047,724 (“Zuckerman”; Ex. 1008) is titled “Knitted Article and Method of Making Same” and issued on July 14, 1936. Zuckerman is directed to knitted footwear and methods for making the same. See, e.g., Ex. 1008 at 1(L):1–4. Zuckerman describes that an object of the invention is “to form a knitted

article, shaped to fit the foot, from a knitted blank of inexpensive form requiring a minimum of folding and stitching to provide the finished article.” *Id.* at 1(L):5–11. Zuckerman’s Figures 1–4 (reproduced below) depict a progression of turning a strip of knitted material into a finished shoe.



Figures 1–4 of Zuckerman

35. Figure 1 depicts a knitted strip 13 including blank 11 used to form the shoe. Within blank 11, element 15 becomes the sole of the shoe and elements 25 form the lateral and medial sides of the upper. Ex. 1008 at 1(L):27–32; 2(L):35–52. The highlighted portions of Figure 1 represent material that has been cut from knitted

C. Doughty

14

37. The knitted instep portion and sole portion may be attached “by any conventional method of stitching, sewing, or seaming” or by means of a “lacing thong or thread.” Ex. 1017 at 3:73–4:1, 4:16–20.

X. GROUND 1: NISHIDA FAILS TO DISCLOSE CLAIMS 1–8 AND 12–18

38. In my opinion, Nishida fails to disclose “simultaneously knitting a textile element with a surrounding textile structure,” as recited in independent claims 1 and 13. Nishida further fails to disclose that the “knitted textile element has a substantially planar configuration upon removal from the surrounding knitted textile structure,” as recited in dependent claims 5 and 15.

A. Nishida does not disclose “simultaneously knitting” a textile element with a surrounding textile structure as recited in Claims 1 and 13

39. In my opinion, Nishida fails to disclose “simultaneously knitting a textile element with a surrounding textile structure,” as recited in claim 1. Claim 13 similarly recites that a “first textile element” and a “second textile element” are simultaneously knitted with a “surrounding textile structure.” As I describe below, in my opinion, Nishida does not teach that a textile element that is *simultaneously knitted* with a surrounding textile structure.

40. lululemon and Dr. Brookstein rely on Nishida’s disclosure of producing “patterns (2)” “at the same time as” or “during the production of” “material web (1).” Petition at 25; Ex. 1003 at ¶75. As I describe above, Nishida’s material web 1 has two primary components—“unwound web parts 2” (i.e., “pattern elements”) and “material web base 4.” Nishida’s Figure 2 shows these components.

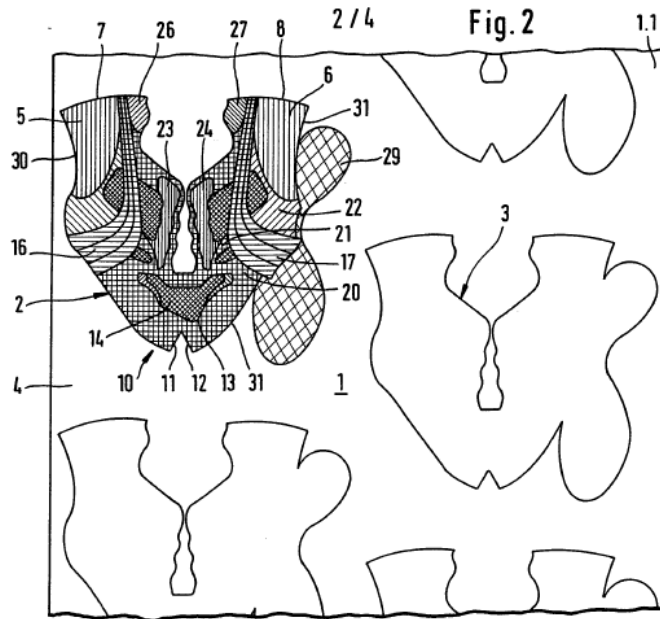


Figure 2 of Nishida

41. In my opinion, Nishida does not disclose that pattern elements 2 and material web base 4 are *simultaneously* knitted. Instead, Nishida first produces a material web base and then produces the pattern elements on the preexisting base. See Ex. 1005 at 4–5. Nishida describes the construction of material web base 4 independently of pattern elements 2. For example, Nishida says that the base “may be a common woven or knitted fabric, e.g., consisting of warp and weft.” *Id.* at 5.

Nishida then teaches printing or producing pattern elements 2 on the preexisting base. Specifically, the pattern elements 2 are printed using a fabric printing process or produced with a textile production process onto the preexisting base. *See id.* at 4–5, 7–9.

42. Nishida explains that “the shoe upper or the associated sole part are produced in the required quality, thickness, multilayered, or the like,” while the “remaining area of the material web,” i.e. “surface areas 1.1,” are made of “simple, lightweight or inexpensive fabric quality.” Ex. 1005 at 4, 7. In my opinion, the mentions of producing “multilayered” pattern elements and the differential in quality between surface areas and the pattern elements means that the pattern elements are formed in a separate process from the material web base 4, which may be formed from “gauze or with a low to very low number of warps and/or wefts.” *Id.* In my opinion, Nishida uses material web base 4 as a mechanism for building pattern elements 2 by stacking layers of material formed by a number of processes, e.g., print processes or textile production methods (weaving and/or knitting and/or embroidering).

43. I understand that Dr. Brookstein testified in deposition that Nishida’s pattern elements 2 and material web base 4 must have been knitted in the same knitting process because it is impossible to knit on top of an existing knit or woven fabric. Ex. 2004 at 82:14–24, 116:9–12. I disagree. Based on my own experience

with knitting and literature in the field, it is very much possible to knit on top of existing fabric. For example, U.S. Patent No. 4,540,311 to Leach (“Leach”) describes a composite fabric in which knit yarns are stitched through an existing fabric. *E.g.*, Ex. 2010 at Abstract, Figs. 7–8. And in an article that I co-authored in 1989, and which was published by the American Society of Mechanical Engineers, I describe and depict a process for knitting on top of an existing fabric. *Id.* at 2 (“Six layers of linear yarns can be assembled in various stacking sequences and stitched together by knitting needles piercing through the yarn layers.”), Fig. 8. Figure 8 is reproduced below.

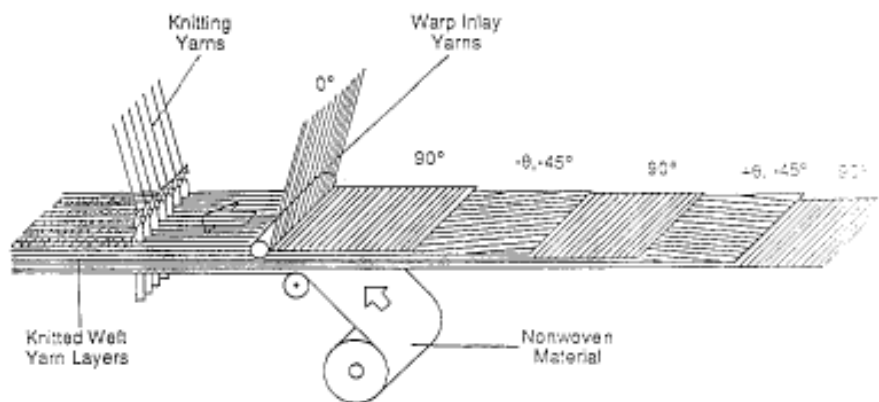


Figure 8. Process Schematic of Impaled MWK Fabric Production, Typical of LIBA or Hexcel Systems

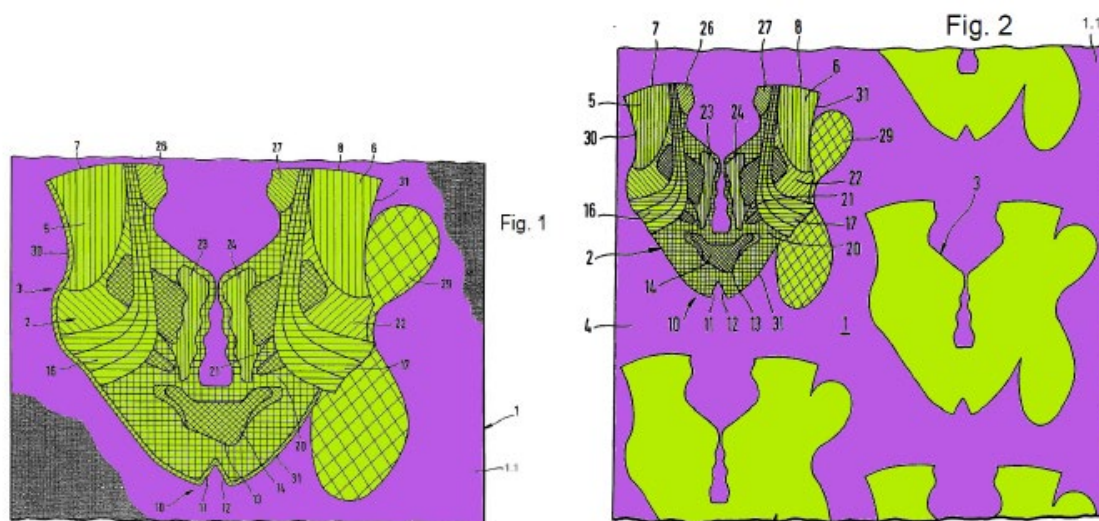
This article describes knitting through nonwoven fabric, but in my opinion and experience, it is just as possible to knit through woven or knitted fabrics.

44. For at least these reasons, it is my opinion that Nishida fails to disclose this limitation.

B. Nishida does not disclose that the knitted textile element has a “substantially planar configuration upon removal from the surrounding knitted textile structure” as recited in claims 5 and 15

45. In my opinion, lululemon fails to show Nishida discloses that the knitted textile element has a “substantially planar configuration” when removed from the surrounding knitted textile structure, as recited in dependent claims 5 and 15.

46. lululemon and Dr. Brookstein conclude that Nishida’s pattern elements 2 are “substantially planar” upon removal based on two things: (i) Figures 1 and 2 of Nishida (lululemon’s annotated versions reproduced below); and (ii) Nishida’s disclosure that part 29 is “folded out of the unwound web part 2 into the plane of the shoe sole.” Petition at 37–38; Ex. 1003 at ¶93. In my opinion, neither of these show that pattern elements 2 are substantially planar upon removal from Nishida’s material web.



Figures 1 and 2 of Nishida (annotated)

47. Nishida's Figures 1 and 2 show pattern elements 2 formed on material web base 4. Neither Figures 1 and 2, nor any other disclosure in Nishida, shows the pattern elements after removal from material web 1. In my opinion, the varying processes that Nishida describes for forming pattern elements 2 may impart a curl or three-dimensional structure to a removed pattern element such that it is not substantially planar. Further, in my opinion, Nishida's disclosure of folding sole portion 29 "into the plane of the shoe sole" has no bearing on whether the pattern element 2 is substantially planar upon removal from material web 1. Of course additional shaping processes could be performed on pattern element 2, but that does not impact the shape of the unwound web part after removal from the material web. Thus, Nishida does not disclose the additional limitations of claims 5 or 15.

48. For at least these reasons, it is my opinion that Nishida fails to disclose claims 5 and 15.

XI. GROUND 2: NISHIDA FAILS TO TEACH OR SUGGEST CLAIMS 9, 10, 19, AND 20

49. In my opinion, for at least the reasons I discuss above with respect to Ground 1, Nishida does not disclose independent claims 1 and 13. For at least the same reasons, it is my opinion that Nishida in view of a POSITA's general knowledge does not teach or suggest dependent claims 9, 10, 19, and 20.

XII. GROUND 3: ZUCKERMAN FAILS TO DISCLOSE CLAIMS 1–3, 5–8, 11, 13–17, AND 21

50. In my opinion, Zuckerman fails to disclose two limitations of independent claims 1 and 13. First, Zuckerman fails to disclose knitting a textile element with a “surrounding textile structure.” Second, Zuckerman’s shoe blank, i.e., textile element, is not “incorporated” into an “article of footwear.” In my opinion, Zuckerman also fails to disclose “knitting an outline” of the textile element, as recited in dependent claims 3 or 14, or that the knitted textile element has a “substantially planar configuration” when removed from the surrounding knitted textile structure, as recited in dependent claims 5 and 15.

A. Zuckerman does not disclose “simultaneously knitting” a “textile element” with a “surrounding textile structure” as recited in Claims 1 and 13

51. In my opinion, Zuckerman does not disclose “simultaneously knitting a textile element with a surrounding textile structure,” as recited in claim 1. Claim 13 similarly recites that a “first textile element” and a “second textile element” are simultaneously knitted with a “surrounding textile structure.” Because Zuckerman fails to disclose a textile element within a “*surrounding* textile structure,” this limitation is not met.

52. lululemon and Dr. Brookstein rely on Zuckerman’s knitted strip 13 from which blanks 11 (i.e., textile elements) are cut for this limitation. *See* Petition

at 57–59; Ex. 1003 at ¶¶138–139. Dr. Brookstein’s annotated version of Zuckerman’s Figure 1 showing strip 13 is reproduced below.

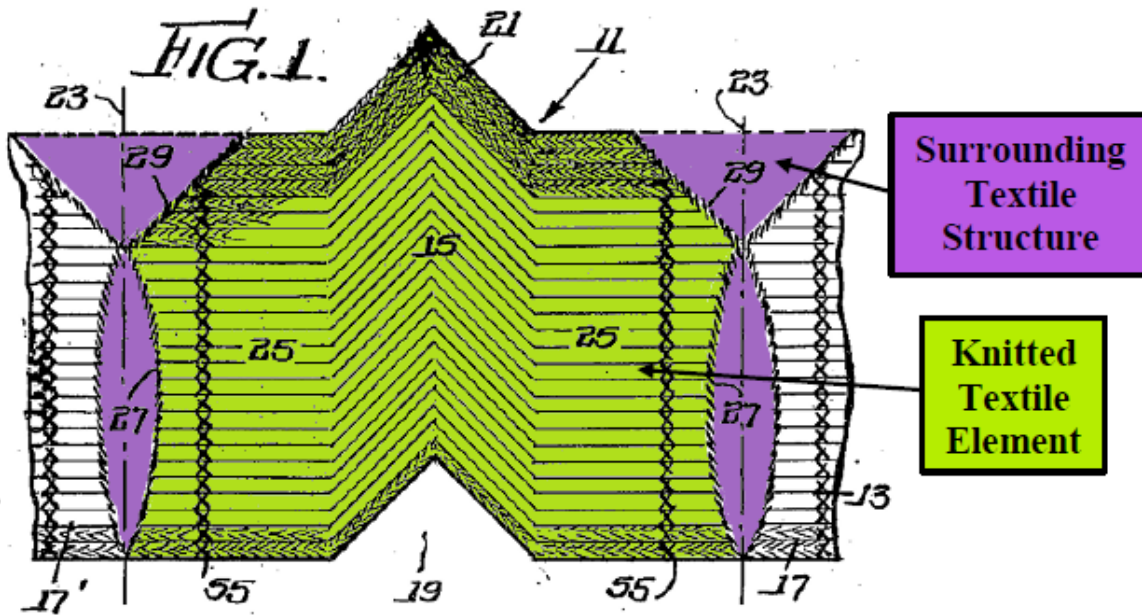


Figure 1 of Zuckerman (annotated)

53. Dr. Brookstein opines that the “portion of continuous strip 13 which surrounds blank 11” (shown in purple) is “a surrounding textile structure to the knitted textile element” (shown in green). I disagree. A POSITA at the relevant time would have understood that Zuckerman’s blank 11 is not knitted with a *surrounding* textile structure.

54. Zuckerman discloses two separate textile structures adjacent the blank—one on each side. And even if the two separate structures could be considered a single structure (which they cannot be), they abut only two sides of Zuckerman’s blank, with each structure abutting only about a quarter of the blank’s periphery. In

my opinion, a POSITA would not have understood these two separate structures, designated by purple in the figure above, to be a textile structure “surrounding” the blank. Thus, Zuckerman does not disclose this limitation.

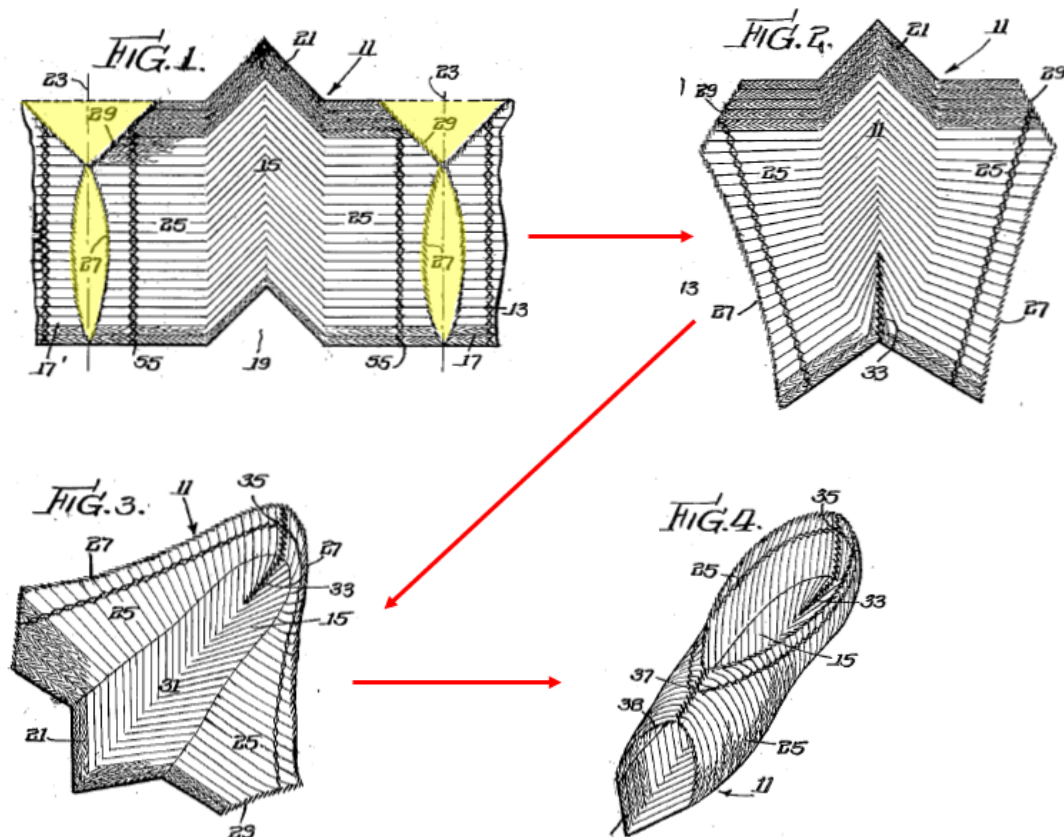
55. I understand that Dr. Brookstein testified in deposition that Zuckerman’s strip 13 would still surround blank 11 even if it only had abutting material from which it was removed on one side of blank 11. Ex. 2004 at 35:7–36:2. In other words, if blank 11 were only removed from the purple portion shown on the right-hand side of annotated Figure 2. *Id.* In my opinion, a POSITA would not have considered this to be “surrounding textile structure.” Instead, a POSITA would have understood that a “surrounding textile structure” extends around most or all of the periphery of the textile element.

56. For at least these reasons, it is my opinion that Zuckerman fails to disclose this limitation.

B. Zuckerman does not disclose “incorporating the knitted textile element into the article of footwear” as recited in Claims 1 and 13

57. In my opinion, Zuckerman does not disclose “incorporating the knitted textile element into the article of footwear,” as recited in claim 1. Zuckerman also fails to disclose a similar limitation in claim 13. Zuckerman’s blank 11 (“knitted textile element”) is not incorporated into an article of footwear—it is an “article of footwear,” as that term is properly construed. *See supra* § VIII.

58. Zuckerman describes that an object of the invention is “to form a knitted article, shaped to fit the foot, from a knitted blank of inexpensive form requiring a minimum of folding and stitching to provide the finished article.” Ex. 1008 at 1(L):5–11. Zuckerman’s Figures 1–4 shows the process by which a strip of knitted material is turned into a finished shoe, including: producing knitted strip 13 (Figure 1); removing blank 11 from strip 13 and joining seam 33 (Figure 2); stitching heel seam 35 (Figure 3); and adjoining edges 29 to form a slipper (Figure 4).



Figures 1-4 of Zuckerman (annotated)

59. As I discuss above, a POSITA at the relevant time would have understood that the upper and sole portions together form a shoe, i.e., an “article of footwear.” *See supra* § VIII. Zuckerman’s blank 11 includes the upper and sole of the finished slipper, i.e., the article of footwear. *See* Ex. 1008 at 1(L):27–32; 2(L):35–52.

60. Dr. Brookstein opines that, because other components—like a “toe covering portion”—may be added to Zuckerman’s slipper, the slipper is incorporated into the article of footwear. Ex. 1003 at ¶149 (citing Zuckerman at Fig. 7). I disagree. In my opinion, Zuckerman’s toe covering portion 47 or other adornments (e.g., edge 53 and pom-pom 51) shown in Figure 7 below are merely decorative finishings on Zuckerman’s shoe.

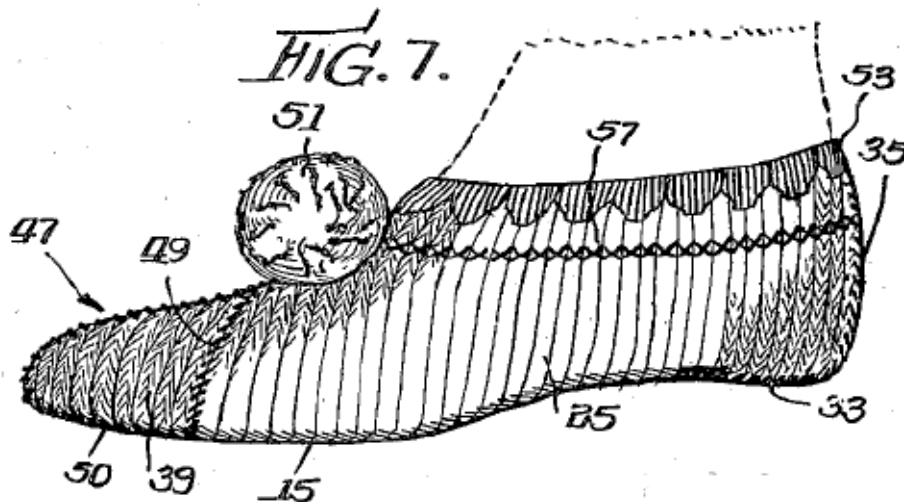


Figure 7 of Zuckerman

61. The addition of finishing materials and adornments to Zuckerman's slipper is far different from the way the claimed "textile element" of the '749 patent is incorporated into an article of footwear. *See, e.g.*, Ex. 1001 at 3:40–53. The '749 patent further describes a separate sole structure (*e.g.*, Fig. 12, item 120) to which the upper is attached. *Id.*, 10:8–31. Thus, it is my opinion that Zuckerman does not disclose this limitation.

62. For at least these reasons, it is my opinion that Zuckerman fails to disclose this limitation.

C. Zuckerman does not disclose "knitting an outline" of the "knitted textile element," as recited in claims 3 and 14

63. In my opinion, Zuckerman fails to disclose that the step of simultaneously knitting a textile element with a surrounding textile material includes "knitting an outline" of the knitted textile element, as recited in dependent claims 3 and 14. As I discuss above in Section XII.A, Zuckerman fails to disclose knitting a textile element with a surrounding textile structure. For at least this reason, Zuckerman also fails to knit an outline of the textile element within a surrounding textile structure.

64. Dr. Brookstein purports to show a knitted outline in Zuckerman's Figure 1 by drawing a red outline (red) around blank 11. Ex. 1003 at ¶153. In my opinion, this annotated figure demonstrates that the upper and lower edges of blank

11 are not surrounded by any textile material within which a knitted outline would appear.

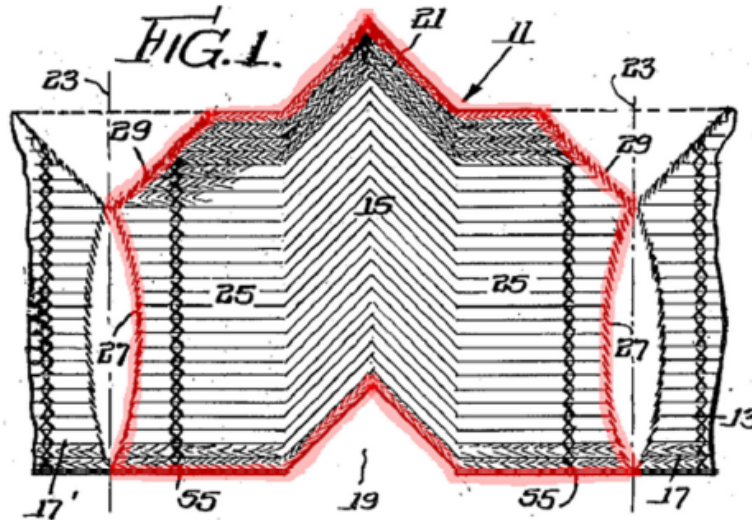


Figure 1 of Zuckerman (annotated)

65. Neither lululemon nor Dr. Brookstein point to anything aside from Figure 1 in Zuckerman as disclosing a knitted outline. Petition at 64; Ex. 1003 at ¶153. And Zuckerman never discloses that edges 27 and 29 are cut along a knitted outline. Zuckerman only describes edges 27 and 29 as cut edges or raw edges. E.g., Ex. 1008 at 2(L):22–34, 2(R):27–31, 2(R). In my opinion, this doesn't mean that there was a knitted outline where edges 27 and 29 were cut.

66. For at least these reasons, it is my opinion that Zuckerman fails to disclose dependent claims 3 or 14.

D. Zuckerman does not disclose the knitted textile element has a “substantially planar configuration” upon removal from the surrounding knitted textile structure, as recited in claims 5 and 15

67. In my opinion, Zuckerman fails to disclose that the knitted textile element has a “substantially planar configuration” when removed from the surrounding knitted textile structure, as recited in dependent claims 5 and 15. lululemon and Dr. Brookstein conclude that Zuckerman’s blank 11 is “substantially planar” upon removal based on three things, none of which is sufficient.

68. First, lululemon and Dr. Brookstein allege that Zuckerman’s blank must be substantially planar because it is cut from a “strip of fabric.” Petition at 64–65; Ex. 1003 at ¶155. Dr. Brookstein opines that the term “strip” mean “a long, narrow piece,” and the term “fabric” means “the piece has length and width but limited thickness,” which together forms a “flat piece of fabric and a plane.” Ex. 1003 at ¶155. Dr. Brookstein provides no citations in support of his proposed definition of “strip of fabric.” *Id.* I disagree with Dr. Brookstein’s definition of “fabric.” It is not clear what “limited thickness” means. To the extent Dr. Brookstein opines that the thickness of a fabric must be smaller than its length or width, I disagree. Nonetheless, in my opinion, Zuckerman’s disclosure of a “strip of fabric” has no particular significance as to whether Zuckerman’s blank 11 is substantially planar upon removal from the knitted strip 13.

69. Second, lululemon and Dr. Brookstein allege that Figure 1 shows a substantially planar knitted strip 13. Petition at 64–65; Ex. 1003 at ¶155. Figure 1 does not show blank 11 after removal from strip 13. Ex. 1008 at Fig. 1. And, in my opinion, it is unclear from Figure 1 that knitted strip 13 is substantially planar.

70. Third, lululemon and Dr. Brookstein allege that Zuckerman meets this limitation because it discloses joining edges of blank 11 “to form a rounded heel portion.” Petition at 65. Dr. Brookstein opines that the introduction of a “non-planar structure,” i.e, rounded heel portion, means that blank 11 has a substantially planar configuration upon removal from strip 13. Id.; Ex. 1003 at ¶156. In my opinion, stitching together seam 33 (see Zuckerman’s Figure 2 below) to “form a rounded heel portion” is entirely independent of the shape blank 11 takes upon removal from strip 13. Zuckerman never shows blank 11 after removal from strip 13, but before heel seam 33 is joined. Therefore, in my opinion, none of these disclosures establish that Zuckerman’s blank 11 is substantially planar upon removal from strip 13.

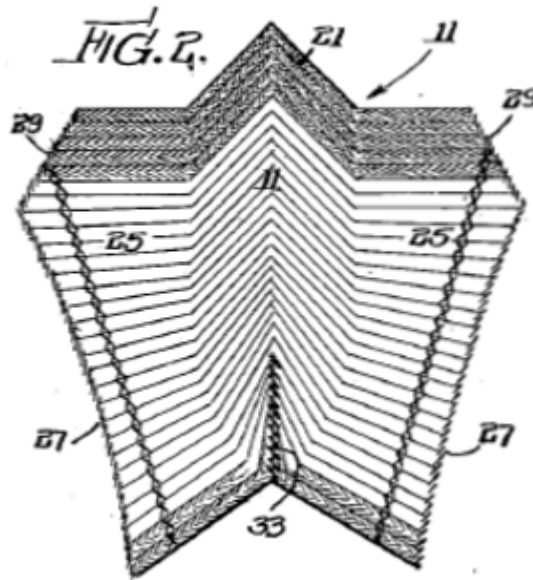


Figure 2 of Zuckerman

71. For at least these reasons, it is my opinion that Zuckerman fails to disclose claims 5 and 15.

XIII. GROUND 4: ZUCKERMAN FAILS TO TEACH OR SUGGEST CLAIMS 3, 9–10, 14, AND 19–20

72. In my opinion, for at least the reasons I discuss above for Ground 3, Zuckerman does not disclose independent claims 1 and 13. For at least the same reasons, Zuckerman in view of a POSITA's general knowledge does not teach or suggest dependent claims 3, 9–10, 14, and 19–20. Also in my opinion, a POSITA reading Zuckerman, would not have been motivated to knit an outline of blank 11 in knitted strip 13.

A. Zuckerman fails to teach “knitting an outline” of the “knitted textile element,” as recited in claims 3 and 14

73. As I discuss above in Section V, I understand from Counsel that, in order to establish obviousness, lululemon must show a motivation to modify Zuckerman with a knitted outline. In my opinion, a POSITA reading Zuckerman in 2004 would not have been motivated to knit an outline of blank 11 in knitted strip 13.

74. During the knitting process, Zuckerman’s knitted strip 13, shown in Figure 1 below, continues to the left and right (as indicated by red arrows) such that a series of identical textile elements, i.e., blanks 11, are knitted. *E.g.*, Ex. 1008 at 1(L):11–15 (“[A] still further object being to knit a continuous strip comprising several blanks and from which the blanks may be formed by cutting the strip into pieces of appropriate length.”).

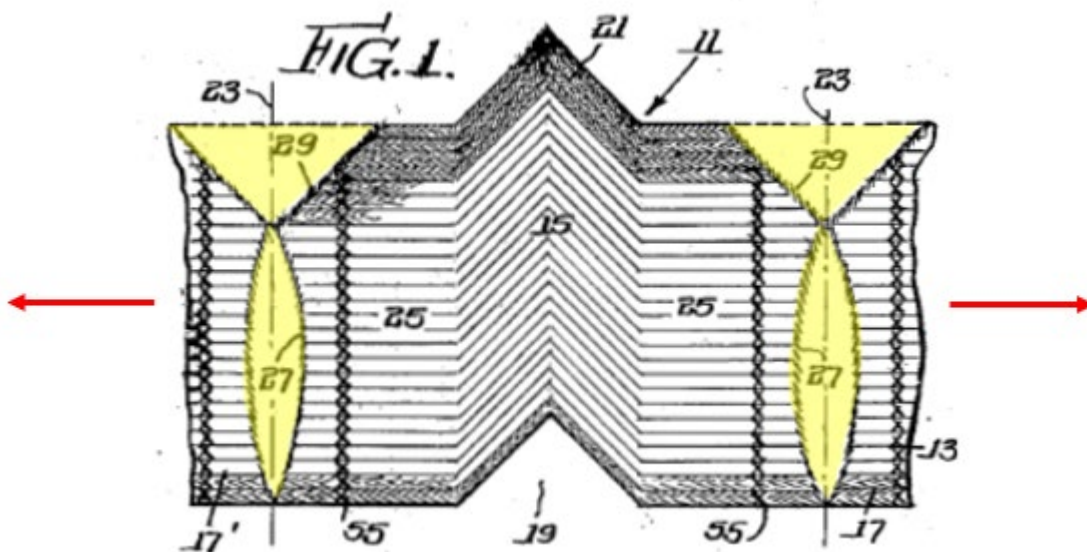


Figure 1 of Zuckerman (annotated)

Therefore, at regular intervals, knitted strip 13 will be provided with the triangular projection at the top of blank 11, and the triangular recess at the bottom of blank 11. *E.g.*, 1(R):45–50 (“The blanks are preferably formed by cutting the same from a strip of fabric 13, which may be made as a continuous strip on a knitting machine, if desired, and which comprises knitted portions 15 at equally spaced intervals in the strip.”). In my opinion, this projection and recess would have provided self-aligning features against which a POSITA could line up a fabric lay or a cutting die to remove blank 11 from knitted strip 13. And in my opinion, these methods of removal would have been far simpler than programming a knitting machine to change the stitching patterns within knitted strip 13 to form a knitted outline of blank 11.

75. lululemon and Dr. Brookstein also cite to several pages in Spencer (Ex. 1009) as supposedly showing that a POSITA would have knitted an outline in Zuckerman. But in my opinion, none of the cited portions of Spencer—pages 30, 90, 106, or 184—show that a POSITA would have knitted an outline of blank 11 in Zuckerman’s knitted strip 13. On page 30, Spencer refers to “scalloped shaping of net designs by cutting around the outline after finishing.” Ex. 1009 at 30. Spencer gives no indication that this mention of an “outline” even refers to a knitted outline. On page 90, Spencer refers to outlines of “marked lays” and “press cutter blades,” but these are items which are laid on top of a fabric, not knitted in the fabric. *Id.* at

90. On page 106, Spencer refers to a “welt.” *Id.* at 106. Based on my experience, a “welt” is not an outline demarcating a textile element from a surrounding textile structure, it is the edge of a fabric. A welt is a way to start the courses of a fabric so that the fabric doesn’t unravel. And finally, on page 184, Spencer discusses creating decorative lace on a raschel machine. *Id.* at 184. Thus, in my opinion, a POSITA in 2004 would not have considered knitting an outline of Zuckerman’s knitted blank based on any of these disclosures in Spencer.

XIV. GROUND 5: ZUCKERMAN IN VIEW OF DOUGHTY FAILS TO TEACH OR SUGGEST CLAIM 12

A. A POSITA would not have been motivated to combine Zuckerman with Doughty to “secur[e] the upper to a sole structure,” as recited in claim 12

76. As I discuss above in Section V, I understand from Counsel that, in order to establish obviousness, lululemon must show a motivation to modify Zuckerman with a knitted outline. In my opinion, a POSITA would not have motivated to combine Zuckerman with Doughty to reach claim 12.

77. Doughty discloses a sock and a “separately made foot bottom or sole portion” that can be “readily detached” from one another. Ex. 1017 at 1:22–29, 1:33–38. lululemon and Dr. Brookstein allege that it would have been obvious to secure Zuckerman’s upper to Doughty’s sole structure. Petition at 79–81; Ex. 1003 at ¶¶191–196. Specifically, Dr. Brookstein opines that a POSITA would have been

motivated to make this combination because it would “permit easy washing of and reduced wear on a knit upper” and would “reduce wear on a knit upper.” *Id.* at ¶194. For the reasons I discuss below, I disagree.

78. In my opinion, a POSITA in 2004 would not have been motivated to attach Doughty’s sole structure to Zuckerman’s slipper because it “permits easy washing.” Zuckerman’s slipper permits easier washing without having a sole structure attached. For example, the “stitching, sewing, or seaming” used to fasten Doughty’s sole structure to its sock would need to be undone before the sock could be washed. Ex. 1017 at 3:73–4:1.

79. In my opinion, a POSITA in 2004 would not have been motivated to attach Doughty’s sole structure to Zuckerman’s slipper because it would “reduce wear” on Zuckerman’s slipper. Zuckerman envisages and structurally accounts for the bottom of its slipper functioning as a sole structure. Zuckerman at 2(L):39–44. Specifically, Zuckerman describes that sole portion 15 of its slipper is “heavier” and “more durable than that used in the remaining portions of the blank” so that it may withstand “heavy wear.” *E.g.*, Ex. 1008 at Fig. 4, 1(L):27–32, 2(L):35–52. Thus, it would have been unnecessary to attach a sole structure to Zuckerman’s slipper to enhance durability of the sole.

80. In my opinion, a POSITA reading Zuckerman also would not have looked to combine Doughty’s sole structure because Zuckerman espouses the

benefits of its one-piece knitted slipper as being “inexpensive” and reducing processing steps. Ex. 1008 at 1(L):5–11. The introduction of Doughty’s sole structure would increase the expense and components of Zuckerman’s shoe, and would require additional processing steps.

XV. GROUND 6: NISHIDA IN VIEW OF ZUCKERMAN FAILS TO TEACH OR SUGGEST CLAIMS 11 OR 21

81. In my opinion, for at least the reasons I discuss above with respect to Ground 1, Nishida does not disclose independent claims 1 and 13. For at least the same reasons, Nishida in view of Zuckerman does not teach or suggest dependent claims 11 and 21.

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: October 30, 2024

A handwritten signature in blue ink, appearing to read "C. M. Pastore", with a long horizontal stroke extending to the right.

Christopher M. Pastore, Ph.D.

EXHIBIT A

Curriculum Vitae

Christopher M. Pastore

Professional Experience

- 2019-present *Assistant Provost, Faculty Development: Classroom Pedagogy and Nexus Learning*
Professor, Transdisciplinary Studies
Associate Director, Institute for Smart and Healthy Cities
Thomas Jefferson University, Philadelphia, PA
- 2012- 2019 *Professor, Transdisciplinary Studies*
Co-Director, Engineering and Design Institute
Nexus Learning Advocate
Kanbar College of Design, Engineering, & Commerce
Thomas Jefferson University/Philadelphia University, Philadelphia, PA
- 2018 - present *Associate Editor, Journal of Engineered Fibers and Fabrics*
- 2017-present *Honorary Research Professor, Department of Clothing and Textiles,*
Durban University of Technology, Durban, South Africa
- 2017 *Visiting Research Scientist, Institute of Technical Textiles, RWTH*
Aachen University, Aachen, Germany
- 2014 *Visiting Research Professor, Oak Ridge National Laboratory, Oak*
Ridge, TN
- 2003-2007 *Chief Science Officer, Novacomp, Inc., Willow Grove, PA*
- 2002–2012 *Professor, Engineering*
Co-Director, Engineering and Design Institute,
Program Director, Architectural Engineering
Secretary of the Faculty (2008-2009)
Chair of the Faculty (2009-2010)
Kanbar College of Design, Engineering, and Commerce
Philadelphia University, Philadelphia, PA
- 1995-2002 *Associate Professor (tenured 2001),*
Director of Research,
Program Director: Textile Engineering
Program Director: Fibrous Materials Science,
School of Textiles and Materials Technology,
Philadelphia University/Philadelphia College of Textiles and Sciences,
Philadelphia, PA

1995	<i>Visiting Research Professor</i> , Department of Textiles, University of Gent
1993-95	<i>Associate Professor</i> , (tenured, 1995) Department of Textile Engineering, Chemistry, and Science, North Carolina State University, Raleigh, NC.
1990-93	<i>Assistant Professor</i> , Department of Textile Engineering, Chemistry, and Science, North Carolina State University, Raleigh, NC.
1988-94	<i>Visiting Research Professor</i> , NASA Langley Research Center, Hampton, VA (Summers)
1988-90	<i>Assistant Professor</i> , Department of Materials Engineering, Drexel University, and <i>Associate Director</i> , Fibrous Materials Research Center, Drexel University, Philadelphia, PA.
1984-88	<i>Research Engineer</i> , Department of Materials Engineering, Drexel University, Philadelphia, PA.

Education

Ph.D.	Materials Science, Drexel University, Philadelphia, PA, March 1988; <i>A Processing Science Model for Three Dimensional Braiding</i>
M.S.	Mathematics, Drexel University, Philadelphia, PA, June 1986. Concentration: Computer Aided Geometric Design.
B.A.	Mathematics, LaSalle University, Philadelphia, PA, June 1982

Recognized Creative and Professional Achievement

Provost's Career Achievement Award, Thomas Jefferson University, 2024

Provost's Award for Applied Research, Thomas Jefferson University, 2022

Marion Roadhouse Nexus Learning Award, Thomas Jefferson University, 2021.

Member, Scientific Committee, *International Conference on Technics, Technology, and Education (ICTTE 2020)*, Yambol, Bulgaria, Nov 4-6, 2020.

National Academy of Inventors, member (Thomas Jefferson University Chapter), 2018

Honorary Research Professor, Faculty of Applied Sciences, Durban University of Technology, Durban, South Africa, 2017 - present

Journal of Engineered Fibers and Fabrics, Associate Editor, SAGE, 2017 - present

Fulbright Specialist, Textile Engineering, 2017-2020

Dr. Jackie Rehkopf Best Paper Award, "Light weighting Composites through Selective Fiber Placement", C. Pastore, 2015 SPE Automotive Composites Conference and Exhibition, Sept. 2015.

President's Award for Excellence, Philadelphia University, 2014.

Citation for Distinction, National Institute of Building Sciences, for the MS Sustainable Design, February 2012,

Best Practices in Communication – Honorable Mention, (for EcoMan and The Skeptic podcast), Council for the Advancement and Support of Education, December 2009.

Excellence in Education Award, (for MS in Sustainable Design Program) United States Green Building Council, 2009

Excellence in Sustainability Education, Delaware Valley Green Building Council, 2007

Philadelphia Sustainability Award, Pennsylvania Environmental Council, 2007

Leadership in Sustainable Building, Pennsylvania Resources Council, 2004

Director's Award, Systems Competency, National Textile Center, 2004

Best Presentation, National Textile Center, 2002, "Architectural Fabric Structures"

Distinguished Achievement in Basic or Applied Fiber Science, Fiber Society, 2000

Commendation from Philadelphia School District - Career to School program, advising high school students in engineering curricula, 1998

Outstanding Teacher of the Year, 1994, College of Textiles, North Carolina State University

Academy of Outstanding Teachers, North Carolina State University, 1994

Scholarly Activities

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"Learning from Covid-19: How the pandemic led to improved digital and remote learning in textile engineering", C. Pastore, *Co-Creating the future in education and the textile industry*, 4th T-CREPE Workshop, Tourcoing, France, March 15-16, 2023.

"Imagineering at Thomas Jefferson University", C. Pastore, *Alumni Day at Disney 100*, Franklin Institute, Philadelphia, March 11, 2023.

"How to Host an Inter-professional Academic Book Club", D. Verbit and C. Pastore, *Innovative Strategies to Advance Student Learning*, ITLC Lilly, Asheville, NC, Aug 8-10, 2022.

"Finding Joy in Game Design", C. Pastore and J. Suss, *Faculty Day 2022*, Thomas Jefferson University, June 2022.

"Talking Teaching", C. Pastore, *Faculty Day 2022*, Thomas Jefferson University, June 2022.

"Development of a 3D Braided Preform for Rotorcraft flex beams", C. Pastore, D. Nguyen, T. Chen, S. Ng, B. Ong, H. Lam, M. Grudza, D. Jann, R. Ciccarelli, and T. Liao, *Vertical Flight Society Forum 78*, Fort Worth, TX, May 10-12, 2022.

"Characterization of Residual Monomer in Acrylic Emulsion Medical Adhesives", M. Ugwuanyi, C. Pastore, & T. Twardowski Jr, Thomas Jefferson University College of Health Sciences Student Poster Session. Thomas Jefferson University. April, 2021.

"Introduction to 4D Textiles", C. Pastore, *AATCC Workshop*, online, March 5, 2021

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"Shape Memory Polymers for Recovery of 4D Textiles", C. Pastore, Keynote Speaker, *Aegean Textile Conference*, Mytilene, Greece, Sept 4-7, 2018.

"4D Textiles and Shape Memory Polymers", C. Pastore, D. Schmelzeisen, S. Shajoo, and J. Hairer, *Kármán Conference: Additive Fabrication of Interactive Material Systems*, Bergisch Gladbach, Germany, July 15-18, 2018.

"Game-Based Learning to Enhance Student Engagement", J. Suss, C. Pastore, R. Fleming & D. Orsetti, *Faculty Days*, Thomas Jefferson University, June 5, 2018, Philadelphia, PA.

"4D Textiles: Defined shape-change through 3D printed hybrid textiles", D. Schmelzeisen, C. Pastore, J. Haller, and T. Gries, *Fiber Society Annual Meeting 2017*, November, Athens, GA.

"Advances in Technical Textiles", *Dean's Lecture Series*, Durban University of Technology, Durban, South Africa, 20 September, 2017.

"Use of Elastomers and Bingham Plastics for Energy Absorption", *Plastics Institute of Southern Africa*, invited lecture, Durban, South Africa, 19 September, 2017.

"Implications of Industry 4.0 to the Textile Industry", C. Pastore, *Textile Industry Symposium*, US Consulate, Durban, South Africa, 12 September, 2017.

"Optimization of Textile Composites", C. Pastore, *4D Textile Workshop*, RWTH Aachen University, Institute of Textile Technology, Aachen, Germany, July 27, 2017.

"Tailored Materials Properties using Textile Composites", C. Pastore, *AUTEX 2017*, Corfu, Greece, 29 May, 2017.

"Reinforced Bingham plastics for energy dissipation", C. Pastore and T. Twardowski, *AATCC International Conference*, Williamsburg, VA, April 2016.

"The importance of game play in engaging students in serious gaming", C. Pastore and J. Suss, *3rd Annual Lilly Conference - Austin*, Austin, TX, January 2016.

"Lightweighting Composites through Selective Fiber Placement", C. Pastore, 2015 SPE Automotive Composites Conference and Exhibition, Detroit, MI, Sept. 2015.

"Integrating Building Automation into Academic Programs", R. Waligora & C. Pastore, *Honeywell Users Group*, Scottsdale, AZ, June, 2015.

"Transportation Applications of Textile Composites", session chair, C. Pastore, *TexComp 12*, Raleigh, NC, May 2015.

"Optimizing Price-Performance of Hybrid Short Fiber Composites", C. Pastore, R. Norris, C. Eberle, D. Hartman, and T. Sudbury, Keynote Presentation, *TexComp 12*, Raleigh, NC, May 2015.

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"High Tenacity Polyester Yarns: the New Generation of High Performance Biomaterial", M. King, C. Pastore, and R. Torgeson, *Pioneering the Future of Biomaterials*, Society for Biomaterials 2014 Annual Meeting, Denver, CO, April 2014.

"Noncontact Ultrasonic Characterization Techniques for Fibrous Materials Analysis", Periyaswamy, T., Balasubramanian, K., and Pastore, C. *Fiber Society 2012 Spring Conference*, St. Gallen, Switzerland, May 2012.

"The Sustainable Home: Today and Tomorrow", C. Pastore, *Eco-Expo 2012*, guest speaker, Ambler, PA, Jan 2012

"Future of Green Technologies", C. Pastore Panel Leader, *Green Building Product Summit*, Pittsburgh, PA, June 2011

"The Art and Science of Glass-making", C. Pastore, *Philadelphia Science Festival*, Philadelphia, PA, April 2011

"Green Plastics", C. Pastore, *SPE Plastic Magic*, Philadelphia, PA April 2011

"Sustainability and BioPolymers", C. Pastore, *ANTEC 2010*, keynote presentation, Orlando, FL, May 2010.

"Sustainability and Developments in Metallurgy", *Emerging Technologies Seminar*, Carpenter Technologies, April 2010.

"EcoMan and The Skeptic", *Earth Day Festival*, Cheltenham Township, April 2010.

"Here Comes the Sun", C. Pastore and R. Thompson, *Electrical and Computer Engineering Day*, Villanova University, November, 2009.

"Recent Advances in Green Materials", C. Pastore, session developer and chair, *Build Green 2009*, Philadelphia, PA, October 2009.

"Biobased Polymers for Structural Composites", C. Pastore and Y. Rane, *Society of Plastics Engineers Technical Symposium*, Newark, DE, October 2009.

"Rapidly Renewable Structural Composites", Y. Rane and C. Pastore, *International SAMPE Symposium and Exhibition (Proceedings)*, Baltimore, MD, May 2009.

"Green Materials for Brownfield Reclamation", C. Pastore, *Greening the Post-Industrial City: Innovative Reuse of Philadelphia's Idle Lands*, Philadelphia, PA April 2009.

"Commercialization of Green Products", C. Pastore, *Pa Green Growth Forum*, Hershey, PA September 2008

"Chitosan based renewable composites", Y. Rane and C. Pastore, *PA Green Growth Forum*, Hershey, PA September 2008.

"Trade Study of an Interface for a Removable/Replaceable Thermal Micrometeoroid Garment", Janet Ferl, Linda Hewes, Bobby Jones, Lindsay Aitchison, Ed Hodgson, Christopher Pastore, Bryce Beamer, and Frank Sneeringer, *International Conference on Environmental Systems*, June, 2008.

"Sustainable Textiles", C. Pastore, *Reading Public Museum*, Reading, PA, 2008.

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"Development of Interdisciplinary Research Centers", *AICUP Conference*, July, 2007, Harrisburg, PA.

"Green Composites", C. Pastore and C. Schauer, *Innovations in Nanotechnologies, Composites, and Sports/Military Materials Symposium*, AATCC, Atlanta, GA, April 2007.

"Creative Design of Urban Spaces", Panelist, *Global Creative Economy Convergence Summit*, Philadelphia, PA June 14, 2006

"Opportunities for Textiles and Sustainability", C. Pastore, *TechTextil North America*, Atlanta, GA, March 2006

"Direct measurement of punch force during two professional boxing matches ", Pierce, Jr., J.D., Reinbold, K.A., Goldman, R.J., Lyngard, B.C., and Pastore, C.M. (2004), May meeting of the American Psychological Society, Chicago, IL.

"Sustainability and Composites", C. Pastore, *TechTextil North America*, Atlanta, GA, March 2004.

"Structural Composites from Harvest Waste", C. Pastore, invited speaker, Cornell University, Ithaca, NY, October, 2003.

"Industrial Applications of 3D Textiles", C. Pastore, keynote speaker, *Textile Engineering at the dawn of a new millennium*, Bruges, Belgium, April 2002.

"Critiquing, Clarifying, Rewriting and Expanding Current Definitions of Sustainability to Include Aesthetics as a Core Value of Sustainable Design", R. Fleming and C. Pastore, *90th ACSA Annual Meeting*, New Orleans, April, 2002.

"Renewable Nonwoven Composites for a Sustainable Future", Matthew W. Dunn, Rob Fleming, and Christopher M. Pastore, *INTC 2001*, Baltimore, MD, Oct. 2001.

"Textile Composites for High Temperature Applications", C. Pastore, invited lecture, NASA Glenn Research Center, July, 2001.

"Textile Composites: Barriers to Commercial Acceptance", C. Pastore, keynote address,, *The Fiber Society Fall 2000 Annual Technical Conference*, Nov. 7-10, 2000, Pine Mountain, GA.

"The performance of hybrid braided composite rebar", C. Pastore, E. Armstrong-Carroll and F. Ko, *32nd International SAMPE Technical Conference*, Boston, MA, Nov 2000.

"Modelling the Tensile Response of Composite Rebar", E. Armstrong-Carroll, M. Dunn and C. Pastore, *International Mechanical Engineering Congress and Exposition*, ASME, Orlando, FL, Nov. 2000

"The Science of Art," C. Pastore and M. Dunn, special workshop for the *Franklin Institute Discovery Science Camp*, August 2000

"Opportunities and Challenges for Textile Composites", C. Pastore, invited keynote speaker, *MCM 2000 (11th International Conference on Mechanics of Composite Materials)*, June 11-15, 2000, Riga, Latvia.

"Virtual Manufacturing of Braided Composites", F. Ko and C. Pastore, *Composites Manufacturing and Tooling, 2000*, Long Beach, CA, February 23, 2000,

"3D Weaving Technologies", C. Pastore, *Carbon Fibers '99*, Nov, 1999, San Diego

"Dynamic Mechanical Response of Woven Fabrics", C. Pastore, Invited Seminar Speaker, *15th AIAA Aerodynamic Decelerator Systems Conference*, Toulouse, France, June 1999.

"Property-Driven Three-Dimensional Weave Design," M. Dunn and C. Pastore, *International Conference on Composites Engineering V*, Las Vegas, NV, July 1998.

3-D Weaving for Composites, C. Pastore, workshop for SME Composites '97, Anaheim, CA 1997.

"The Role of Fiber Architecture in the Air Flow Resistance and Permeability of Renitent Textile Composites," M. W. Dunn and C. Pastore, *Fall General Meeting of the Fiber Society*, Newport, RI, October, 1996.

"Nonlinear impact response of textile reinforced composites.", C. Pastore, *Joint Air Force/Army Workshop on Structural Mechanics*, 22-25 September, 1997, Myrtle Beach, SC.

"Renitent Composites from Commingled Yarns," M. W. Dunn and C. Pastore, 42nd International SAMPE Symposium and Exhibition, May 1997, Anaheim, CA.

"Elastic Properties of Three-Dimensionally Woven Composites," M. W. Dunn, C. Pastore, and A. Saeys, *Advances in Fibre and Textile Science and Technologies*, Fiber Society International Meeting, April 1997, Mulhouse, France.

"Property-Driven Three-Dimensional Weave Design," M. Dunn and C. Pastore, *ICCE-V*, July 1998, Las Vegas, NV.

Geometrical Modeling of Textiles for Composites, C. Pastore and Y. Gawayed, Fiber Society Fall Meeting, Nov. 11-13, 1995, Philadelphia, PA (International meeting)

Drapability Evaluation of Woven Glass Fabrics, P. Kiekens, C. Pastore, and L. Vangheluwe, Fiber Society Fall Meeting, Nov. 11-13, 1995, Philadelphia, PA (International meeting)

Applications of Textile Composites - Problems and Pitfalls, C. Pastore, University of Gent, "New Products, Processes, and Applications of Textiles", July 12, 1995, Gent, Belgium. (International meeting)

"Glass-Thermoplastic Composite Building Materials From Reclaimed Waste Fibers", P. Duke and C. Pastore, *Proceedings, Tech-Textil* 1994, Frankfurt.

"Composite Panels from Reclaimed Textile Waste", C. Pastore, A. Morales and E. Skott Greenhalgh, *Proceedings, TAPPI Conference, 1995, March, 1995, Petersburg, FL*.

"3-D Stress Analysis in Textile Composite Plates Using a Combination of ANSYS and Sub-Element/Deficient Approximation Function Analysis", C. M. Pastore, A. E. Bogdanovich, V. Kumar, M. German, 10th Annual ASM/ESD, Detroit, MI, Nov. 1994.

"Effects of Heterogeneity Hierarchy on the Mechanical Response of Three Dimensional Woven Composites", A. E. Bogdanovich, C. M. Pastore, V. Kumar and M. German, Winter Annual Meeting of the ASME, Chicago, IL, Nov, 1994.

"Application of the Meso-Volume Concept to the Prediction of Elastic Properties of Rigid Textile Structures", C. M. Pastore, Fall General Meeting of the Fiber Society, Atlanta, GA, Nov. 1994.

"3-D Stress Analysis in Composite Plates Using a Combination of ANSYS and Sub-Element Deficient Approximation Function Analysis", C. M. Pastore, A. E. Bogdanovich, V. Kumar, M. German, American Society for Composites Annual Meeting, Newark, DE, Sept. 20-22, 1994.

"Three Dimensional Static Analysis of Laminated Composite Cylinders", A. E. Bogdanovich and C. M. Pastore, Annual Meeting of the American Society for Composites, Newark, DE, Sept. 1994.

"Modelling of Textile Composites", E. Glaessgen, C. Pastore, H. Griffin, A. Birger, First Annual ICCE, New Orleans, LA, Aug 29-31, 1994.

"Material Characterization of Textile Composites", C. M. Pastore and A. E. Bogdanovich, First Annual ICCE, New Orleans, LA, Aug 29-31, 1994.

"Glass-Thermoplastic Composite Building Materials From Reclaimed Waste Fiber", P.W. Duke and C. M. Pastore, Tech Textil, Hamburg, Germany, July 1994.

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"Critical Review of Materials Property Modelling for Textile Composites", C. M. Pastore, TexComp-2, Leuven, Belgium, May 17-19, 1994.

"Effects of Fiber Architecture on the Performance of Textile Composites", C. M. Pastore, Gordon Conference on Composites, January 10-14, 1994, Ventura, CA

"Elastic Properties of Triaxially Braided Glass/Urethane Composites", J. Jaranson, C. Pastore, J. Singletary, T. Kniveton, and H. Rushing, *Proceedings of the 9th Annual the Advanced Composites Conference and Exposition: Technology Exchange and Partnerships*, November 8-11, 1993, Dearborn, MI.

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"Three-Dimensional Deformation and Failure Analysis of Textile Reinforced Composite Structures", A. E. Bogdanovich, C. M. Pastore and A. B. Birger, *Proceedings of the Ninth International Conference on Composite Materials (ICCM/9)*, Madrid, 12-16 July, 1993,

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"Analysis of Composite Shallow Shell Structures Reinforced with Textiles", A. Bogdanovich, C. Pastore, and A. Birger, *Textile Composites in Building Construction*, Lyon, France, June 1992.

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"Thermal and Thermo-mechanical Characterization of Three Dimensionally Reinforced Fibrous Composites", R. Gabel, A. Fahmy, and C. Pastore, *25th International SAMPE Technical Conference*, Tokyo, Japan, Nov. 1991.

"Modelling of Euclidean Braided Fiber Architectures to Optimize Composite Properties", E. Armstrong-Carroll, F. Ko, and C. Pastore, *Fiber-Tex 91*, Raleigh, NC Oct. 15-17, 1991, NASA CP-3176, pp. 153-157.

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"Effects of Processing on the Behavior of 3-D Braided SiC/SiC Composites", C. Pastore, P. Khandelwal, and F. Ko, *Proceedings, 13th Annual Conference on Composites and Advanced Ceramic Materials*, Cocoa Beach, FL, Jan. 1989.

"Fabric Geometry and Finite Cell Models for Three Dimensional Composites", F. Ko and C. Pastore, *1st US/USSR Conference on Composite Materials*, Riga, USSR, May 20-25, 1989.

"Modelling of Three Dimensional Braided Carbon/Carbon Composites", C. Lei, F. Ko, and C. Pastore, *Proceedings, High Temperature Composites*, Dayton, OH, 1989.

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"Structure and Properties of Cardable Glass Composites", F. Ko, M. Williams, C. Pastore, and J. Carey, *Proceedings, International Nonwovens Technical Conference, INDA Tec 87*, Hilton Head, SC, May 18-21, 1987.

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"The Effects of Fiber Architecture on SiC/SiC Composites", F. Ko, C. Burkland, C. Pastore, and M. Koczak, *Tenth Conference on Composites and Advanced Ceramic Materials*, Cocoa Beach, FL, Jan. 19-24, 1986.

"Control of Fiber Architecture for Tough, Net Shaped Structural Composites", F. Ko and C. Pastore, *Proceedings, Symposium on High Temperature Materials for the 1990's and Beyond*, Phila. PA, May 16, 1986.

"Cardable Glass Fibers for Composites", M. Williams, F. Ko, and C. Pastore, *Proceedings, IFAI Conference*, Boston MA, Oct. 1986.

"Tensile and Shear Properties of Composites by Various Reinforcement Concepts", A. Mayadas, C. Pastore and F. Ko, *Proceedings of the National SAMPE Technical Conference*, Anaheim, CA, 1985.

"Computer Aided Design of Nonwoven Fabrics", F. Ko and C. Pastore, *Proceedings of INDA Technical Symposium*, Boston MA, 1985.

"Design and Formation of 3-D Fabrics for Advanced Composites", Ko, F.K. and Pastore, C.M., *Composite Materials, NASA Publication CP-2420*, Annapolis, MD, November 1985

"Multilayer, Multidirectional Warp Knit for Industrial Applications", F. Ko, P. Fang, and C. Pastore, *Proceedings, IFAI Textile Technology Forum*, New Orleans, LA, Oct. 31, 1985.

"Nonlinear Viscoelasticity of Natural Polyamide Fibers", Ko, F.K. and Pastore, C.M., *Proceedings, 7th International Wool Textile Research Conference*, Tokyo. 1985.

Role of Processing in the Performance of Textile Reinforced Composite Materials, C. Pastore, NCSU COT Graduate Seminar Series, Sept. 1992.

Use of Textile Composites in the Aerospace Industry, C. Pastore, Society for Plastic Engineers, Southern Pines, NC, April, 1992.

Design and Analysis of Three Dimensional Preforms for Composites, C. Pastore, SAMPE Long Island Division, March 14, 1989.

Manufacture, Design and Analysis of Braided Fabrics and Composites, C. Pastore, *Proceedings, 4th Annual Textile Structural Composites Symposium*, Philadelphia, PA July 24-26, 1989.

Model for Silk-Like Spun Bonded Fabrics, F. Ko, P. Fang, C Pastore, INDA-TEC: The International Nonwovens Technical Conference, Philadelphia, PA, 1988.

Courses Taught

THOMAS JEFFERSON UNIVERSITY

Advanced Textile Composites
Analytical Methods^S
Architectural Engineering Senior Design
Behavior of Materials^A
Chemical Protective Clothing^C
Composite Materials: Design and Analysis
Design of Green Materials^A
Eco-Innovation and Sustainability^S
Engineering Dynamics
Engineering Senior Design I & II
Engineering Statics
Experimental Materials^A
Experimental Structures^A
Fabric Mechanics
Fabric Studies
Fibrous Composite Materials
Foundations: Fabric Studies
Integrative Design Process
Introduction to Computer Programming
Introduction to Structural Analysis
Introduction to Textile Materials^C
Introductory Materials Science
Mechanics of Materials
Mechanics of Textiles
Numerical Methods
Probability and Statistics
Processing of Polymers and Fibers
Research Methods
Structural Design of Compressive Systems
Structural Design of Tensile Systems

Structures I ^A
Structures II^A
Textile Engineering Senior Design I & II
Textile Materials
Textile Problem Solving
Yarn Mechanics

NORTH CAROLINA STATE UNIVERSITY

Design of a Composite Baja Vehicle
Introduction to Fiber Science
Introduction to Textiles
Mechanical Properties of Textiles
Physical Properties of Textile Fibers
Physical Properties of Textiles
Textile Composite Materials
Textile Composites
Textile Honors Seminar
Textile Materials Science Design I
Textile Materials Science Design II

DREXEL UNIVERSITY

Advanced Mechanical Behavior of Materials
Introduction to Materials Science
Numerical Methods for Materials Engineering
Senior Design Thesis

A: College of Architecture and the Built Environment

S: College of Science, Health and the Liberal Arts

C: School of Continuing and Professional Studies

Graduate Student Committees

CHAIR

T. Liao, *Three Braided Composites for Aerospace Applications*, PhD, Engineering, Thomas Jefferson University.

D. Forry, *Properties of knitted fabrics for garment modeling*, MS Textile Engineering, Thomas Jefferson University

C. Anderson, *Development of 3D Printed Gelatinous Composites*, PhD, Textile Engineering, May 2018, Thomas Jefferson University.

C. Huang, *Thermal Conductivity and Tensile Properties of Icelandic Horse Hair Fiber Reinforced Poly(Lactic Acid) Green Composites*, MS Textile Engineering, May 2012, Philadelphia University

J. Xu, *The Influence of Braid Angle and Yarn Twist Match on the Mechanical Properties and Knot Performance of Surgical Sutures*, MS Textile Engineering, May 2012, Philadelphia University

K. Fu, *Influence of Alkali Treatment on the Mechanical Properties of Aligned Jute Yarn/PLA Composites*, MS Textile Engineering, May 2011, Philadelphia University

X. Qiu, *Acoustic Qualities of Natural Fiber Reinforced Polylactic Acid Composites* MS Textile Engineering, May 2011, Philadelphia University

R. Wu, *Characterization and Development of Flax/PLA Composites for acoustic properties*, MS Textile Engineering, December 2010, Philadelphia University

Y. Rane, *Development of Triggered Degradation for Chitosan Composites*, Ph.D., August 2009, Textile Engineering, Philadelphia University

M. Owens, *Organic Material for Bone Replacement*, MS December 2009, Textile Engineering, Philadelphia University

T. Periyaswamy, *Ultrasonic Characterization of Flexible Textile Materials*, Ph.D., March 2009, Textile Engineering, Philadelphia University

K. Darrah, *Luminous Fabric Structures*, M.S. May 2010, Textile Engineering, Philadelphia University

H. Khurana, *Effect of Processing on Mechanical and Physical Properties of Chemical Protective Clothing*, M.S., May 2006, Textile Engineering, Philadelphia University

A. Naik, *Ultra-light weight cement products for built environments*, M.S., May 2005, Textile Engineering, Philadelphia, University

S. Ram, *Highly extensible knit fabrics for architectural applications*, M.S., May 2004, Textile Design, Philadelphia University

C. Wollner, *Non-linear anisotropic fabrics for architectural structures*, M. S., May 2002, Textile Engineering, Philadelphia University

K. Hristov, *Tensile Characteristics of Hybrid Braided Structures*, M. S., May 2002, Textile Engineering, Philadelphia University

D. Lee, *Moisture Diffusion in Kevlar®-Epoxy Composites*, M.S. May 2000, Textile Engineering, Philadelphia University.

L. DellaPutta, *Dynamic Response of 3D Woven Tapes Subject to Axial Tensile Load*, M.S., August 1998, Textile Engineering, PCT&S

J. N. Singletary *Analysis of Transverse Compressive Response of Anisotropic Single Fibers*, Ph.D., June 1998, Fiber and Polymer Science, NCSU.

T. Chen, *Effect of Glass Fiber Surface Treatments on the Bonding of Glass Fiber in Resin Matrix Composites*, M. S. , May 1998, Textile Engineering, PCT&S

M. W. Dunn, *Renitent Textile Composites: Formation and permeability analysis of porous media*, M.S., May 1997, Textile Engineering, PCT&S.

A. B. Birger, *Development of Curvilinear Spline Aided Techniques for Structural Analysis of Textile Composites*, Ph.D., June 1997, Fiber and Polymer Science, NCSU.

B. Deepak, *Application of Parametric Splines in Curvilinear Coordinate Systems for the Structural Analysis of Inhomogeneous Materials*, Ph.D., June 1997, Fiber and Polymer Science, NCSU.

G. Loughry, *Analysis of Shear Testing Methods for Braided Composite Cylinders and Plates*, M.S., Dec. 1995, Textile Engineering and Science, NCSU.

S. Khedekar, *Modelling of Braided Composites with Architectural Defects*, M.S. Sep. 1995, Mechanical and Aerospace Engineering, NCSU.

C. G. Green, *Cost-Effective Textile Reinforcements for Complex Shaped Automotive Components*, M.S., Dec. 1995, Textile Engineering and Science, NCSU.

P. W. Duke, *Commingled Thermoplastic-Glass Composites Formed from Recyclable Carded Webs*, M.S., Dec. 1995, Textile Engineering and Science, NCSU.

B. Deepak, *Application of Parametric Splines to the Displacement Solution of Textile Composites*, M.S. March. 1995, Textile Engineering and Science and Mechanical and Aerospace Engineering Co-major, NCSU.

E. C. Clyburn, *Application of Neutron Tomography to the Investigation of Textile Reinforcement Geometry in Composites*, M.S., Feb. 1995, Materials Engineering, NCSU.

E. S. Greenhalgh, *Development of Biomimetic Prosthetic Heart Valve Leaflets*, Ph.D., Dec. 1994, Fiber and Polymer Science, NCSU.

Y. Gawayed, *An Integrated Approach to the Mechanical and Geometrical Modelling of Textile Structural Composites*, Ph.D. March 1992, Fiber and Polymer Science, NCSU.

E.S. Greenhalgh, *Fabric Geometry Modelling Applied to Finite Element Methodology for the Prediction of Mechanical Behavior of Cylindrical Composite Structures*, M.S., March 1992 Fiber and Polymer Science, NCSU.

Funded Research Activities

3D Braided rotorcraft components, Phase 2, STTR	Naval Air Warfare Center	2021-2023
3D Braided rotorcraft components, Phase 1 Option, STTR	Naval Air Warfare Center, Patuxent River	2020-2021
3D Braided rotorcraft components, Phase 1 STTR	Naval Air Warfare Center, Patuxent River	2019-2020
Development of a Medical Adhesive with Thermal Release Properties	Saligman Family Surgery Pilot Grant	2018
Effect of Temperature on Strength of Biocompatible Adhesives	Faculty Research Grant	2018
Game Based Learning	Nexus Research Grant	2017
Multi-material preforming of structural automotive composites	Oak Ridge National Laboratory	2013
Development of warp knitted heater panels for helicopter rotors	Cox & Co.	2012-2016
Optimization of braided sutures	Ethicon	2011-2013
Evaluation of energy efficient classrooms	CertainTeed	2011-2012
Development of Cellulose/PLA composites as hardwood replacement	DCED/Comins Guitars	2011
Life Cycle Assessment and Environmental Impact of Textile Products	Federal Mogul	2010-11
Development of braided nerve conduits	Rutgers Univ.	2010-13

Design of Sustainable Classroom Components	CertainTeed	2010
Development of new building products	CS Group	2008
Design of ergonomic, comfortable carriage vests	KDH, Inc.	2007-2009
Effectiveness of stretch fabric for enhanced athletic performance	Lontex, Inc.	2007-2008
Design and Characterization of transparent exterior building insulation materials	Roofscapes, Inc.	2007-2008
Residential Complex Design Charette	Earth Rising, Inc.	2007
Development of wheat gluten polymers	Green Materials R&D	2008
Evaluation of through thickness reinforcement of Carbon/Carbon Composites	MR&D	2007
Pa Green Growth Partnership	PA DCED	2006-2011
Consortium for Sustainable Design and Research	PA DCED	2003-2006
Bioinductive Scaffolds	NIH	2004-2005
Sustainability as a Source of Competitive Advantage	NTC	2003-2005
Representations and Algorithms for Deformable Objects	NSF	2002-2005
Trans-Atlantic Textile Network	FIPSE	2002-2004
Spray-on Insulation System for Housing	State of PA	2002-2004
Engineering and Design Studio	State of PA	2000-2002
Haptic Simulation of Fabric Structures	NTC	2000-2002

Exploring Architectural Fabrics	NTC	2000-2002
Novel Textiles for Military Applications	DARPA	1999
Educating the Educators	NTC	2000-2002
Scale Sensitive Modelling of Braided Hybrid Composites	NTC	1998-2000
Development of self-sealing spacesuit materials	ILC Dover	1998
Materials Characterization of Elastomeric Nonwoven Fabrics	Kimberly Clark	1998
Conversion of natural fiber to textile products	Crane Paper	1998
Dynamic Response of Woven Arresting Tapes	Navy SAWC	1997-99
Apparel Research Network	DLA	1996-1999
Evaluation of Z Fiber Component in Needle Punched Nonwovens	Fiberite	1996-97
A Comparative Theoretical Study of Quasi-Static and Impact Response of Laminated and Textile Composite Structures	ARO	1996-1999
Testing and Analysis of Braided Composite Materials for Automotive Applications	Ford Motor	1994-96
Stress Analysis in Thick Walled Composite Cylinders	ONR	1995-97
Manufacturing and Analysis of Braided Composite Materials	Ford Motor	1993-94
Textile Composite Panels for Improved Indoor Air Quality	EPA	1992-95
Composite Materials for Energy Efficient Structures	Duke Power	1993-95
Prediction of Mechanical Properties of Textile Reinforced Composites	DoC	1992-95

Appearance Defects in Fabrics	DoC	1992-95
Development of Technical Glossary for Textile Composites Industry	NASA	1992
Modelling of Transverse Shear Deformation of Three Dimensionally Woven Composites	State of NC	1992-93
Geometric Modelling of Textile Reinforcements for Structural Analysis	NASA	1991-95

EXHIBIT B

Dr. Christopher M. Pastore Testimony List

- *Nike, Inc. v. lululemon usa inc.*, IPR2024-00159 (PTAB) (2024)
- *Rugged Cross Hunting Blinds, LLC v. Good Sportsman's Marketing, LLC et al.*, Case No. 4:23-cv-03243 (S.D. Tex) (2024)
- *Nike, Inc. v. lululemon usa inc.*, IPR2023-01460 (PTAB) (2024)
- *Nike, Inc. v. lululemon usa, inc.*, Case No. 1:23-cv-00771 (S.D.N.Y.) (2024)
- *Watterson Construction Co. v. International Door, Inc.*, Case no. 2:22-cv-11037 (E.D.M.I) (2023)
- *Nike, Inc. v. lululemon usa, inc.*, Case No. 1:23-cv-00771 (S.D.N.Y.) (2023)
- *In re Matter of Certain Knitted Footwear*, Inv. No. 337-TA-1289 (ITC) (2022)
- *Moore v. Hunter Safety Sys., Inc.*, Case No. 1931-MC-00688 (Missouri 31st Circuit) (2021)
- *Knauf Insulation, LLC v. Johns Manville Corp.*, Case No. 1:15-cv-00111 (S.D. Indiana) (2021)
- *Strategic Partners, Inc. v. Figs, Inc.*, Case No. 2:19-cv-02286 (C.D. Cal.) (2020)