UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SKECHERS U.S.A., INC.
Petitioner

v.

NIKE, INC.,
Patent Owner

Case IPR2025-00143

U.S. Patent No. 9,986,781

DECLARATION OF DR. CHRISTOPHER M. PASTORE ISO NIKE'S PATENT OWNER PRELIMINARY RESPONSE

Skechers U.S.A. v. Nike, Inc.
IPR2025-00143
Patent No. 9,986,781
Ex. 2001

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A. Herbert And Cusinato Do Not Disclose An "upper for an article of footwear" (Claim 1[preamble]) or an "article of footwear comprising: an upper" (Claim 12 [preamble]) 36

B. The Petition Does Not Provide A Sufficient Motivation For Combining Hlavacs With Herbert Or Cusinato To Reach Claims 1[preamble] and 12[preamble] 38

C. Herbert Does Not Disclose "a flat knit textile element having: (1) flat knit edges free of surrounding textile structure such that the flat knit edges are not surrounded by textile structure from which the textile element must be removed" (Claims 1[a1] and 12[a1]) 40

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E. The Petition Does Not Show That Herbert Or Spencer Discloses "a plurality of ribs integrally knitted into the flat knit textile element" (Claims 1[a2] and 12[a2]) 46

I, Christopher M. Pastore, Ph.D., declare as follows:

I. INTRODUCTION

1. I have been retained by the Patent Owner Nike, Inc. ("Nike") to provide certain opinions in the *inter partes* review ("IPR") proceeding regarding U.S. Patent No. 9,986,781 ("the '781 Patent"), the Petition for *Inter Partes* Review (the "Petition"), and the asserted references.

2. I understand that this proceeding involves Claims 1-20 (the "Challenged Claims") of the '781 Patent. I further understand that Petitioner Skechers U.S.A., Inc. ("Skechers" or "Petitioner") raises two grounds in the Petition for *Inter Partes* Review. I understand that the raised grounds relate to the following references:

Reference	Exhibit
European Patent Application EP 1,338,690 A1 ("Cusinato")	Ex. 1014
U.S. Patent No. 1,841,518 ("Bellak")	Ex. 1015
U.S. Patent No. 2,400,692 ("Herbert")	Ex. 1016
U.S. Patent No. 6,910,288 ("Dua")	Ex. 1017
U.S. Design Patent No. D461,951 ("Hlavacs")	Ex. 1018
David J. Spencer, *Knitting Technology: A Comprehensive Handbook and Practical Guide* (Woodhead Pub. Ltd. eds., 3d ed. 2001) ("Spencer")	Ex. 1050

II. QUALIFICATIONS

3. My *curriculum vitae*, attached as Exhibit A, includes my detailed education and employment background, professional experience, and a list of my technical publications and patents. A high-level summary of my relevant experience is provided below.

4. I am currently the Assistant Provost of 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.

5. I hold a Ph.D. in Materials Science from Drexel University, where I wrote my thesis: A Processing Science Model for Three Dimensional Braiding.

6. I have written or had my writings included in nearly twenty books relating to textiles. I have nearly fifty refereed publications related to textiles. I have produced 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, flat knitting and circular knitting, knitting machines, computer modelling of textile

structures, defects in fabrics, mechanical properties of textiles, 4D textiles, structural and textile composites, and three-dimensional weaving.

8. In forming my opinions, I have relied on my education and experience, as well as the materials described below, and those referenced in the Petition for *Inter Partes* Review.

III. COMPENSATION AND PRIOR TESTIMONY

9. 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.

10. I am being compensated at my standard rate of $300 per hour for my work in this matter. The opinions herein are my own, and I have no interest or stake in the outcome of this proceeding. My compensation does not depend in any way on the outcome of this proceeding or the content of my opinions.

IV. MATERIALS REVIEWED AND CONSIDERED

11. In performing my analysis and preparing this declaration, I reviewed the Petition, certain of the cited exhibits relevant to my analysis, the ’781 Patent and the portions of its prosecution history relating to the Patent Office’s examination of

the application, and certain of the references disclosed to and cited by the Patent Office during prosecution, including those listed as exhibits below:

- Petition Exhibits 1001-1002, 1005-1011, portions of Exhibit 1013 (the certified file history of the '781 Patent, in 15 volumes), 1014-1022, 1050, and 1053; and
- all other materials discussed herein.

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

V. RELEVANT LEGAL STANDARDS

13. I am not an attorney, but for the purposes of preparing this declaration, I have been informed about certain legal concepts that are relevant to forming my opinions. My understanding of those concepts is provided in this section.

14. I understand that in order for the Board to institute trial in this IPR, Petitioner must show a reasonable likelihood of prevailing as to the unpatentability of at least one Challenged Claim.

15. I also understand that a patent claim may be invalid if it would have been obvious to a POSITA at the time the application was filed. I understand this means that all the elements of the patent claim must be found in the teachings of one or more references, and that there must have been a rationale for a POSITA to

combine and/or modify the teachings of the references at the time of invention to arrive at the claimed invention, along with a reasonable expectation of success in doing so. I understand that a proper analysis of whether a patent claim is obvious includes consideration 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. I also understand that in considering obviousness, it is important not to rely on the benefit of hindsight derived from the patent being considered.

16. I understand that in evaluating whether a patent claim would have been obvious, it is appropriate to consider, among other factors:

- whether the teachings of the prior art references disclose known concepts that may be combined in familiar ways, and that when combined, would yield predictable results;
- whether substituting one known element for another would yield predictable results;
- whether applying a known technique would improve similar devices in the same way;

- whether the claimed elements represent one of a limited number of known design choices, which would have a reasonable expectation of success to a POSITA;
- whether known work in one field would prompt variations of the same work in others, leading to predictable results;
- whether there is some teaching, suggestion, or motivation in the prior art references that would have led a POSITA to combine or modify their teachings to arrive at the claimed invention.

17. I understand 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 that the ordinary and customary meaning is determined primarily in view of the claims, the patent's specification, and its prosecution history, and that the opinions of persons of ordinary skill in the art ("POSITA") as to the ordinary and customary meaning of terms may also be taken into account.

VI. OVERVIEW OF THE '781 PATENT

18. The '781 Patent generally relates to an article of footwear with an upper that includes a textile element. Independent Claim 1 of the '781 Patent recites an

upper for an article of footwear comprising a flat knit textile element with multiple flat knit edges free of surrounding textile structure, and integrally knit ribs extending longitudinally along the lateral and/or medial sides of the upper. Ex. 1001 at 12:8-20. Independent Claim 12 recites an article of footwear comprising an upper, comprising a flat knit textile element with multiple flat knit edges free of surrounding textile structure, and integrally knit ribs extending longitudinally along both the lateral and medial sides of the upper. Ex. 1001, at 12:49-64.

19. All 20 claims of the '781 Patent recite textile elements that are flat knit. *Id.* at 12:7-13:23. The '781 Patent further discloses that the textile element may be formed by warp knitting or weft knitting, using a variety of different knitting machines. *Id.* at 7:21-36.

20. The claimed upper and article of footwear may provide distinct benefits over conventional counterparts. For example, the upper in the '781 Patent can incorporate multiple different textured areas (*e.g.*, a smooth area and a textured area), into a "unitary element of textile," eliminating the need to stitch, sew, or otherwise join multiple textile elements together. *Id.* at 9:47-57. As another potential benefit, a unitary textile element may include few seams that contact the foot, which enhances comfort for the wearer. *Id.* at 11:14-21. The claimed upper and article of footwear also include ribs that are integrally knitted into the flat knit textile element,

which contrast with a texture in other areas of the textile element. *Id.* at 9:34-46, Fig. 10. The ribs provide benefits that include aesthetic decoration, and affecting the stretch properties of the upper, which can enhance the performance of the footwear. *Id.*

VII. LEVEL OF ORDINARY SKILL IN THE ART

21. I understand that Skechers asserts a POSITA in the relevant field of the '781 Patent would have had, by March 2004, "at least a few years of experience in knit materials and knitting methods and machines that can be used in making footwear, or a bachelor's degree in textile-related sciences, engineering, or industrial product design, or equivalent academic or work experience, including in the footwear industry." Petition, at 36; Ex. 1002, at ¶78. Skechers' definition also includes that such "person of ordinary skill would have at least a general understanding of general construction processes and materials used in the manufacturing process of fabric-based articles." *Id.* Finally, under Skechers' definition, a "lower educational level" could be counterbalanced by "working experience," and vice versa. *Id.* For purposes of this declaration, I apply Skechers' definition of a POSITA.

22. In view of my experience and qualifications noted above, I would qualify as a POSITA at the time of the invention of the '781 Patent, under Skechers' definition.

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

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

VIII. SUMMARY OF OPINIONS

25. Claim Construction: In my opinion, a POSITA reading the claims in light of the '781 Patent specification in 2004 would have understood the ordinary and customary meaning of an "article of footwear" to include both an upper and a sole structure, and to exclude hose, hosiery, stockings, socks, and the like. In other words, I agree with Nike's proposed construction.

26. Ground 1: In my opinion, (1) Cusinato and Bellak do not disclose the preambles of Claims 1 and 12, under the ordinary and customary meaning of "article of footwear"; (2) the Petition does not provide a sufficient motivation for combining Dua with Cusinato or Bellak to reach the preambles of Claims 1 and 12; and (3) the Petition does not show that Bellak, Dua, or Spencer discloses Claims 1[a2] and 12[a2], which recite "a plurality of ribs integrally knitted into the flat knit textile element," under the parties' agreed construction.

27. Ground 2: In my opinion, (1) Herbert and Cusinato do not disclose the preambles of Claims 1 and 12, under the ordinary and customary meaning of "article

of footwear"; (2) the Petition does not provide a sufficient motivation for combining Hlavacs with Herbert or Cusinato to reach the preambles of Claims 1 and 12; (3) Herbert does not disclose Claims 1[a1] and 12[a1], which require "a flat knit textile element having: (1) flat knit edges free of surrounding textile structure," under either party's construction; (4) a POSITA would not have been motivated to combine Cusinato with Herbert to reach Claims 1[a1] and 12[a1]; and (5) the Petition does not show that Herbert or Spencer discloses Claims 1[a2] and 12[a2], which recite "a plurality of ribs integrally knitted into the flat knit textile element," under the parties' agreed construction.

IX. CLAIM CONSTRUCTION

28. The Petition discusses the construction of four claim terms, and I understand that three of those constructions are currently disputed. Petition, at 36-41. I further understand from counsel that Nike's arguments in its patent owner preliminary response only implicate the disputed construction for the first claim term, "article of footwear." Thus, while I offer certain opinions below regarding a POSITA's understanding of the other three terms, my opinions primarily focus on the first term. I reserve the right to offer further analyses and opinions on these (and any other) claim terms, as these proceedings progress.

A. "article of footwear"

29. I have been asked to provide my opinion about the ordinary and customary meaning of "article of footwear," which is recited in Claims 1 and 12 of the '781 Patent.

30. I understand that Skechers proposes this term means "any foot covering in the form of shoes, boots, slippers, or hose (e.g., socks) used for utility and/or dress wear. Not necessarily synonymous with shoes, which are simply one category of footwear." Petition, at 37-38; Ex. 1006, at 5. To support its position, Skechers primarily relies on a dictionary definition of "footwear" from *The Complete Footwear Dictionary*. Petition, at 37; Ex. 1022, at 67. Skechers also argues that the '781 Patent "indicates a sole is optional" in footwear, including because, in Skechers' view, "none of claims 1-19 recite a sole," while Claim 20 recites a "sole structure," and because a sentence in the patent's abstract reads that the "footwear may include an upper and a sole structure." Petition, at 37; Ex. 1001, at Abstract (underlining added), and Claims 1-20.

31. I understand that Nike proposes this term should be construed according to its "ordinary and customary meaning," without necessarily requiring additional or different words. Ex. 1006, at 5. However, I understand that Nike has explained to the court in a related district court case that "[a] POSITA would readily ascertain that an 'article of footwear' as used in the ['781 Patent] does not include

'hose' or 'socks.'" Ex. 1007, at 6-7. I further understand that Nike has explained that the specification of the '781 Patent describes an "article of footwear" as including two primary elements: "an upper and a sole structure." *Id.*; Ex. 1001, at 1:39-40.

32. In my opinion, a POSITA reading the claims in light of the '781 Patent specification in 2004 would have understood the ordinary and customary meaning of an "article of footwear" to include both an upper and a sole structure, and to exclude hose, hosiery, stockings, socks, and the like. In other words, I agree with Nike's proposed construction. This is also consistent with my professional understanding of how "article of footwear" is used in the art.

33. First, the '781 Patent specification discusses that "[c]onventional articles of athletic footwear include two primary elements, an upper and a sole structure." Ex. 1001, at 1:39-40. The '781 Patent specification further discloses that "[t]he primary elements of footwear 10 are depicted in FIG. 1 as being a sole structure 20 and an upper 30." *Id.* at 4:62-63. Every figure of the '781 Patent depicts either a shoe that includes an upper and a sole structure (*e.g.*, Figs. 1, 12, 13, 14), or an upper (or a portion of an upper) that is designed to be, or is, incorporated into a shoe (*e.g.*, Figs. 2-11). In addition, the term "upper" takes its meaning from the context of being one of the primary elements of a shoe—that is, as the '781 Patent describes, an "upper provides a covering for the foot that securely receives and

positions the foot with respect to the sole structure." *Id.* at 1:40-42 (underlining added). The "upper and the sole structure operate cooperatively." *Id.* at 1:51-52. In other words, "upper" has a specialized meaning as a component of footwear, and derives that meaning in part from its relationship to the sole structure component.

34. There are also certain features that uppers generally have, which hose, hosiery, stockings, socks, and the like do not have, that contribute to the unique functionalities of shoes for "a wide variety of ambulatory activities, such as walking and running." *Id.* at 1:51-54. For example, an upper "securely receives and positions the foot with respect to the sole structure." *Id.* at 1:40-42. Uppers also tend to incorporate systems to "selectively increase the size of the ankle opening and permit the wearer to modify certain dimensions of the upper," such as a "lacing system." *Id.* at 1:62-66. Uppers also "may include a tongue," to "enhance the comfort of the footwear," and a "heel counter to limit movement of the heel." *Id.* at 1:66-2:2. Each of these features contributes to securing and placing the foot in a position inside the shoe upper, in relation to the sole structure, so that activities benefiting from the use of shoes may be performed. Because hose, hosiery, stockings, socks, and the like do not have a sole structure, they also do not require these features of uppers. I did not find any indication in the '781 Patent that hose, hosiery, stockings, socks, and the like are included within the meaning of an "upper" or "footwear."

35. Second, I do not agree with Skechers' reading of the '781 Patent's abstract and claims. From my perspective as a POSITA, the abstract does not indicate that a sole is "optional" for footwear, or provide a different definition of "footwear" compared to the meaning described throughout the specification, which as I explained above includes both an upper and a sole structure. Instead, my interpretation of "[t]he footwear may include an upper and a sole structure" is in the context of patent claiming, where I understand that an inventor need not include every element of an invention in a single claim, and may instead place certain elements in dependent claims. My reading is supported by the claims. For example, independent Claim 12 recites an "article of footwear comprising: an upper," but does not explicitly recite a sole. Ex. 1001, at 12:49-64. Dependent Claim 20, however, explicitly adds a "sole structure" element. *Id.* at 13:22-23. But this type of patent claiming does not change the meaning of "article of footwear" as understood by a POSITA, just as an independent claim reciting a "car with an engine," and a dependent claim adding "wheels," would not change the meaning of a "car" to make wheels optional.

36. Third, I note that Skechers' construction primarily relies on an extrinsic dictionary definition (*The Complete Footwear Dictionary*), and the description of a different claimed invention in an unrelated patent from the 1950s ("Doughty") that

was cited during prosecution of the '781 Patent. Petition, at 37; Ex. 1022, at 67, 88; Ex. 1053, at 4:55-58 (right column). Based on my understanding of the legal standards, I understand that the claims and specification are the most important sources for providing the meaning of claim terms. And I am not aware that *The Complete Footwear Dictionary* or Doughty are known in the art or accepted by POSITAs as providing definitions that apply to an "article of footwear," as it is claimed and described in the '781 Patent.

37. Finally I note that I reviewed Dr. Adanur's declaration, including his section addressing claim construction issues. Ex. 1002, at ¶¶97-98. In my reading, Dr. Adanur does not appear to offer an opinion or take a position as to the meaning of an "article of footwear" from the perspective of a POSITA. Instead, Dr. Adanur states what Skechers' proposed construction is, and explains that his "opinions in this declaration reflect" Skechers' construction. Should Dr. Adanur ever offer an opinion as to the meaning of this term during these proceedings, I reserve all rights to respond at the appropriate time.

38. Given the description provided by the '781 Patent and intrinsic record itself, and my professional experience, in my opinion a POSITA would have understood the meaning of an "article of footwear" to include both an upper and a

sole structure, and to exclude hose, hosiery, stockings, socks, and the like, consistent with Nike's proposed ordinary and customary meaning.

B. "a flat knit textile element having: (1) flat knit edges free of surrounding textile structure such that the flat knit edges are not surrounded by textile structure from which the textile element must be removed"

39. I understand that Skechers proposes the term means, in part, "a textile element that has only flat knit edges." Petition, at 38 (underlining added); Ex. 1006, at 6. I understand that Nike proposes the term should have its ordinary and customary meaning. Ex. 1006, at 6. I further understand that Nike has explained to the court in the related district court case, that there is no language in the claim term itself requiring "that the textile element have 'only' flat knit edges." Ex. 1007, at 9-10.

C. "wherein one or more ribs extend longitudinally…toward the heel region"

40. I understand that Skechers proposes the term means one or more ribs "extending in the direction of the heel region, not in a diagonal or vertical orientation up towards the ankle opening of the article of footwear." Petition, at 40. I understand that Nike proposes the term should have its ordinary and customary meaning. Ex. 1006, at 7. I further understand that Nike has explained to the court in the related district court case, that "the '781 patent does not exclude 'extending in a diagonal or vertical orientation,'" including because such construction "would read out Figure

10 of ’781 patent, which depicts ribs that would extend in a diagonal orientation when the heel edges are secured to each other.” Ex. 1007, at 12-13.

D. “ribs” and “ribs integrally knitted”

41. I understand that the parties agree that “ribs” means “ribs integrally knitted,” and that “ribs integrally knitted” means “a structure made of face wales and back wales wherein lengthwise ridges are formed on both sides of the fabric by pulling stitches first to the face and next to the back of the fabric in adjacent stitches or groups of stitches.” Ex. 1005, at 2; Petition, at 40-41.

X. OVERVIEW OF ASSERTED PRIOR ART REFERENCES

A. Cusinato

42. European Patent Application EP 1,338,690 A1 (“Cusinato”) is titled “Process for making a knitted fabric and its product,” and was published on August 27, 2003. Ex. 1014, cover page. Cusinato claims priority to IT VE20020009, which was filed on February 26, 2002. *Id.*

43. Cusinato is directed to making a knitted fabric, and using it to produce a “stocking”—which in this art has a similar meaning to a sock. *Id.* at [0013].

44. Cusinato discloses a piece of knitted fabric in which a left wave and right wave form a “V” shape. The shape is formed by varying the number of stitches in each row. *Id.* at [0014].

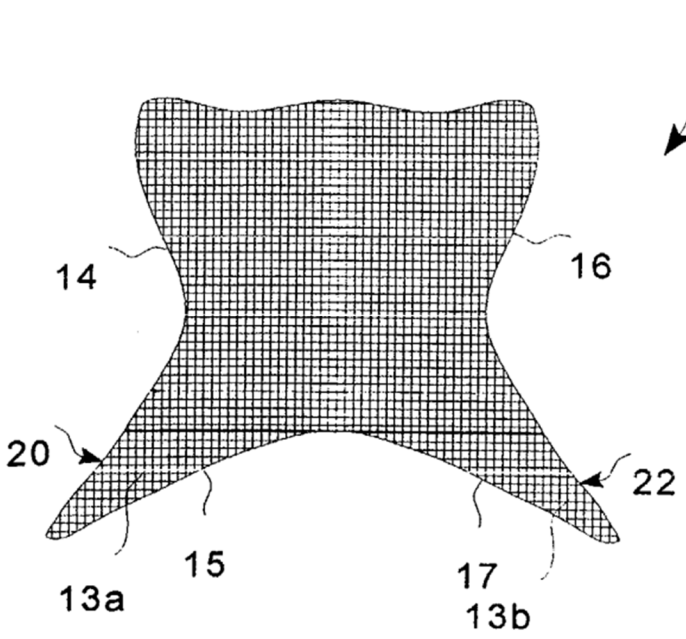


Fig. 3

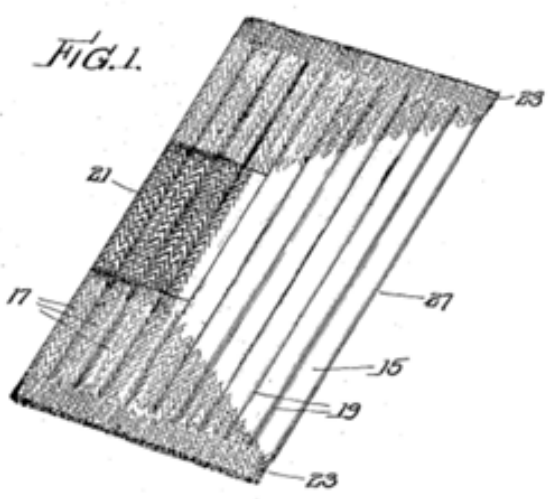
45. Cusinato discloses that its "aim is to obtain a fabric in one piece" in order to make a "stocking," such that once the fabric "has been folded, it directly forms the stocking." *Id.* at [0013].

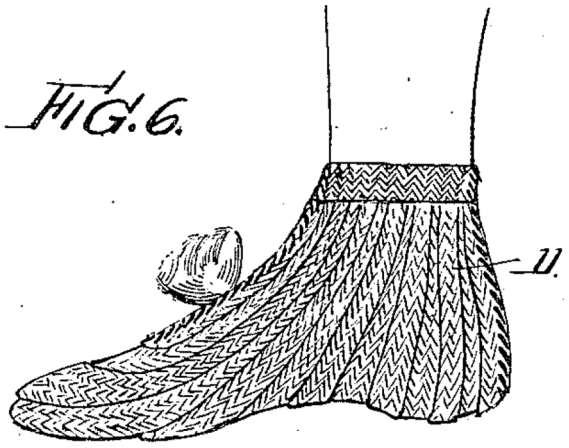
B. Bellak

46. U.S. Patent No. 1,841,518 ("Bellak") issued on January 19, 1932, and is titled "Knitted Article And Method Of Making Same." Ex. 1015, at 2.

47. Bellak is directed to making "knitted, crocheted or similarly woven article[s] adapted for use as a covering for the hands or feet." Ex. 1015, at 1:3-5. Specifically, Bellak describes that its "object is to make a rectangular bag-like knitted article for use as a slipper." *Id.* at 1:14-15.

48. As one example, Bellak describes producing a "rectangular fabric strip" with edges that are "seam[ed]" to form the "rectangular expansible bag adapted to form a hand or foot covering, such as a slipper, glove or the like." *Id.* at 1:18-25. The "strip can be easily and quickly made on simple machinery and without adjusting the machine to increase or decrease the number of stitches per row knitted in the final product." *Id.* at 2:89-93. Bellak depicts the "rectangular strip" in Figure 1, and a completed "slipper" in Figure 6. *Id.* at 1:33-51.





49. Bellak also discloses that its "fabric is preferably the so-called ribbed type comprising a plurality of projecting bands 17 and intermediate hollows 19." *Id.* at 2:71-75. This fabric is "extremely expansible" which allows it to cover the wearer's foot, when the end product is a sock. *Id.* at 2:69, 3:20-27.

C. Dua

50. U.S. Patent No. 6,910,288 ("Dua" or the "Dua '288 Patent") is titled "Footwear Incorporating a Textile With Fusible Filaments and Fibers," and issued on June 28, 2005. Ex. 1017. Dua shares a named inventor with the '781 Patent. *Id.*

51. Dua discloses "an upper for an article of footwear that includes a textile having fusible filaments or fibers," where "specific areas of the upper are heated such that the fusible filaments or fibers fuse with other filaments or fibers to form fused areas." *Id.* at Abstract.

52. One application of the fusion technique is for producing "fused" "strips" that may be placed along the "lateral side" of an upper. *Id.* at 5:64-6:10. The "strips" are made by including strands of "thermoplastic material" in the textile, and "melting [] individual thermoplastic strands" into a molten material which then "either surrounds unmolten strands or intermingles with molten material from other thermoplastic strands. The temperature is then reduced and the molten material solidifies, thereby forming fused areas." *Id.* at 5:5-15.

D. Spencer

53. "Spencer" is a knitting textbook authored by David J. Spencer titled "Knitting Technology: A Comprehensive Handbook And Practical Guide." Ex. 1050. This third edition was published in 2001. *Id.*

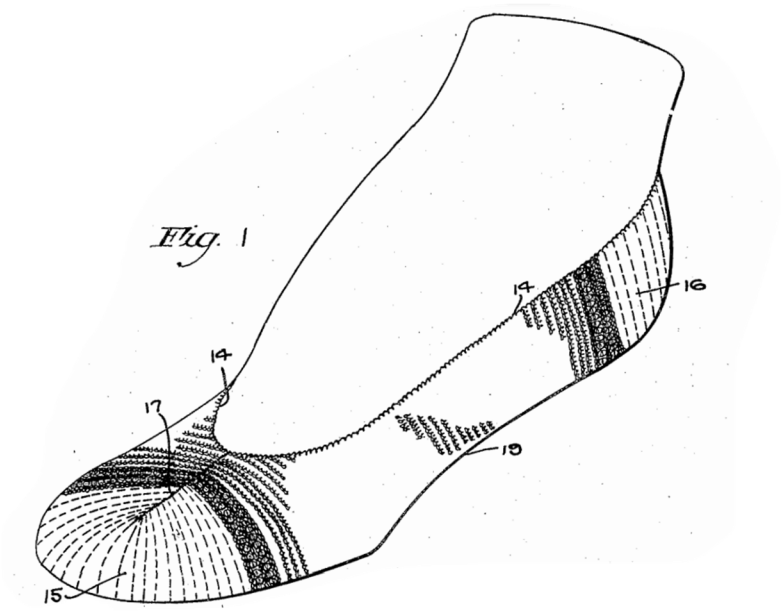
54. Spencer discusses the history of knitting, and general knitting concepts, including for knitting garments such as socks and sweaters, and the associated manufacturing processes for making those garments. *See id.* at 104, 222. Spencer is not directed to teaching knitting or manufacturing concepts for shoes or uppers.

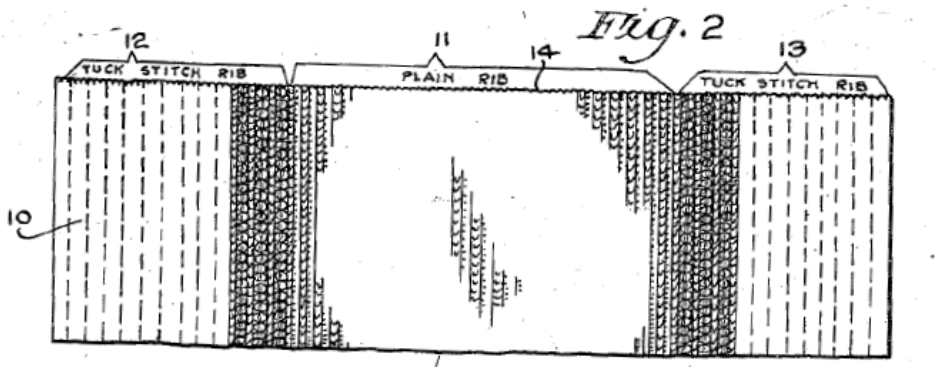
E. Herbert

55. U.S. Patent No. 2,400,692 ("Herbert") is titled "Foot Covering" and issued on May 21, 1946. Ex. 1016. Herbert is directed to a "slipper type of knitted foot covering adapted to be worn inside a low cut ladies' shoe or slipper," which in the context of Herbert's disclosure and this art, is similar to a sock. Ex. 1016, at 1:3-6 (left column).

56. Herbert explains that its "slipper" is of "such height as to be completely concealed from view when worn within an outer pump or other such low-cut shoe." *Id.* at 2:25-29 (right column). The fabric used to make the "slipper" is preferably knit as a "seamless tube," that is, "fabricated of circular knit seamless fabric." *Id.* at 1:11-15, 1:39-47 (both right column). Herbert explains that the "slipper" is produced from the circular knit fabric via "cutting" and "seam[ing]" steps. *Id.* at 2:9-21 (left column). Herbert mentions that it could be possible to produce the "slipper" from "cut and sewn flat rib knitted fabric," which also requires cutting steps, but Herbert does not disclose any details for a flat knit process. *Id.* at 1:5-11 (right column). The "slipper" is formed from an entirely "rib knitted fabric." *Id.* at 1:9 (left column).

Herbert explains that the ribbed fabric may include multiple types of rib stitches, including "plain rib" and "tucked rib" sections. *E.g.*, *id.* at 2:22-27 (left column). Herbert explains that the "tuck stitch" may be used in the "toe and heel portions," so that they "more snugly fit about the toe and heel of the wearer." *Id.* at 2:4-11 (right column). A depiction of the "slipper" on the foot of a wearer is shown in Figure 1, and a depiction of plain rib and tuck stitch rib sections in the circular knit fabric is shown in Figure 2:





F. Hlavacs

57. U.S. Design Patent No. D461,591 ("Hlavacs") is titled "Portion of a Shoe Upper," and issued on August 27, 2002.

58. Hlavacs is directed to "[t]he ornamental design for a portion of a shoe upper." Ex. 1018, at 1. Hlavacs is a design patent, and therefore does not include any written disclosure or technical details, but depicts its design in, *e.g.*, Figure 2:

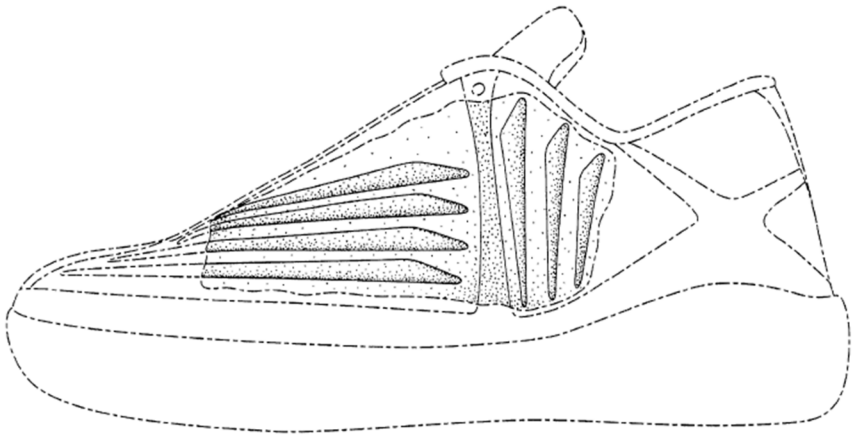


FIG. 2

XI. Ground 1: Skechers Fails To Show That Cusinato In View Of Bellak, Dua, And Spencer Renders Obvious The Challenged Claims

59. In my opinion, the Ground 1 combination fails to disclose the preambles of each independent Claim 1 and 12, which recite an "article of footwear," and the Petition fails to show that the combination discloses limitations 1[a2]/12[a2], which recite "a plurality of ribs integrally knitted into the flat knit textile element."

60. In addition, in my opinion Skechers and Dr. Adanur did not articulate a sufficient reason to explain why a POSITA would have been motivated to combine the sock-based references Cusinato and Bellak, with the shoe-based reference Dua, or the generic knitting reference Spencer.

61. Thus, it is my opinion that the Petition does not show that any claim of the '781 Patent is rendered obvious under Ground 1.

A. Cusinato And Bellak Do Not Disclose An "upper for an article of footwear" (Claim 1[preamble]) or an "article of footwear comprising: an upper" (Claim 12[preamble])

62. In my opinion, both Cusinato and Bellak do not disclose an "upper for an article of footwear" or an "article of footwear comprising: an upper," under the ordinary and customary meaning of "article of footwear." As discussed above, a POSITA would understand an "article of footwear" to mean both an upper and a sole structure (or in other words, a shoe), and to exclude hose, hosiery, stockings, socks, and the like.

63. Cusinato does not disclose an upper with a sole structure, or a shoe, or an upper. Instead, Cusinato only discloses a "stocking," which "is directly obtained by wrapping the fabric in a boot-like manner and carrying out a simple sewing in order to join the two side edges." Ex. 1014, at [0015]. In this art, a stocking is similar to a sock, and both articles are not within the ordinary and customary meaning of an "article of footwear." In the Petition, Skechers refers to the "boot-like shape" of

Cusinato's "stocking," and cites Cusinato's use of the word "footwear." Petition, at 53. Dr. Adanur cites the same language in Cusinato, although I note that he does not provide any opinions as to the meaning of that language, from the perspective of a POSITA. Ex. 1002, at ¶165. In my opinion, Cusinato's reference to a "boot-like shape" would be understood exactly as the plain words read—it refers to the shape that the "stocking" takes, as it is wrapped around the form of a foot, but does not disclose a "boot" (*i.e.*, a type of shoe). This is further evident from the fact that Cusinato does not mention a sole structure (which a "boot" has), or any other components that would be necessary to produce a "boot."

64. Similarly, in the context of Cusinato, it is evident that its references to "footwear" do not mean an "article of footwear" that includes an upper and a sole structure, as it is used in the '781 Patent. This is evident from the fact that Cusinato never refers to a sole or a sole structure, and exclusively refers to "stocking or footwear," in the context of a garment-like article (not a shoe). For example, Cusinato explains that its disclosed process also "may be used in order to manufacture other clothing articles," and "orthopaedic and medical-sanitary articles which cover different parts of the body, such as elbows and shoulders." Ex. 1014, at [0038]. The commonality between these other items is that they are knit items, none of which have sole structures. And in this list of other items, Cusinato does not

disclose that its "stocking or footwear" could be used for a shoe, or an upper with a sole structure, further indicating that Cusinato does not disclose an "article of footwear" from the perspective of a POSITA. Because Cusinato only discloses a stocking, in my opinion it fails to disclose the preamble of Claims 1 and 12.

65. Bellak also does not disclose an upper with a sole structure, or a shoe, or an upper. Instead, Bellak only discloses a "slipper," which is made using "an expansible rectangular fabric strip," where the edges are seamed "to form a rectangular expansible bag adapted to form" the "slipper." Ex. 1015, at 1:16-25. The only other item mentioned in Bellak as a potential application for its "fabric strip" is a "glove." *Id.* In the Petition, Skechers also refers to the "foot covering" language in Bellak. Petition, at 53. Dr. Adanur cites the same language from Bellak, although I note that he does not provide any opinions as to its meaning, from the perspective of a POSITA. Ex. 1002, at ¶166. In my opinion, Bellak's reference to a "foot covering" also does not disclose an "article of footwear," because the only example of a "foot covering" that Bellak mentions is a "slipper," and there is no indication anywhere in the reference that a "foot covering" is intended to refer to an upper with a sole structure, or a shoe. Because Bellak only discloses a slipper, in my opinion it fails to disclose the preamble of Claims 1 and 12.

B. The Petition Does Not Provide A Sufficient Motivation For Combining Dua With Cusinato Or Bellak To Reach Claims 1[preamble] and 12[preamble]

66. I understand that Skechers also asserts that if neither Cusinato nor Bellak discloses an "article of footwear," under Nike's construction where it includes a "sole" structure, then either reference could be combined with the "shoe" in Dua to meet the preamble limitations of Claims 1 and 12. Petition, at 53. Specifically, Skechers asserts that "a sole is disclosed in Dua, and a POSITA would consider it obvious to add a sole to Cusinato's 'boot-like' form or Bellak's 'slipper.'" *Id.*

67. I understand that in order to establish obviousness, Skechers must provide a rationale sufficient to explain why a POSITA would have combined Dua with Cusinato or Bellak, and/or would have modified the teachings of the references, in order to arrive at the claimed invention, and demonstrate that a POSITA would have had a reasonable expectation of success in doing so.

68. Skechers does not argue any alleged motivation in the Petition itself, but does cite to the opinions in Dr. Adanur's declaration. Petition at 53, citing Ex. 1002, at ¶¶164-70. In those cited paragraphs, Dr. Adanur only provides an opinion on an alleged motivation to combine in ¶169, where he opines that it "would be obvious to add a sole to Cusinato's flat knit textile element, which already has a

'boot-like' form, or to Bellak's 'slipper,' because adding a sole structure would provide, for example, cushioning, support, and traction. *See* EX1017, 4:17-37."

69. In my opinion, Dr. Adanur does not provide a sufficient motivation to combine from the perspective of a POSITA. On a fundamental level, Dr. Adanur does not explain why a POSITA would have looked to combine the sock-like references Cusinato and Bellak, with the Dua reference, which is in the distinct field of shoes. Shoes and socks have a very long history in the relevant arts, and each has features that are designed for unique purposes. In my experience, socks, stockings, and slippers are typically designed to be worn either alone (*e.g.*, for comfort indoors), or inside of a shoe. Shoes, on the other hand, are typically designed to provide a cushioning, supportive, and/or protective layer between the foot and the surface (*e.g.*, for activities such as walking on hard surfaces or outdoors, athletic activities, occasions where the wearer wishes to protect the foot from moisture and weather elements, etc.). For that reason, a shoe sole offers benefits that are unique to shoes—including cushioning, support, and traction, as Dr. Adanur points out from the Dua shoe reference. But if a person (or POSITA) desires those unique properties, then shoes are readily available. In my experience, a POSITA would not have any reason to attempt to transform a sock, stocking, or slipper into a shoe. In addition, Bellak specifically discloses that its knitted article is "adapted to form a hand or foot

covering, such as a slipper, glove or the like." *Id.* at 1:18-25 (underlining added). A sole structure is incompatible with a hand covering or glove, and therefore a POSITA would not be motivated to add such a structure to that type of knitted article. In other words, Bellak actually teaches away from combining its knitted article with a sole structure, because doing so would be contrary to the purpose of Bellak's disclosure—an article that can be adapted for use as a glove or a slipper.

70. Dr. Adanur's opinion is limited to the notion that a POSITA would supposedly be motivated to add a sole to a slipper or stocking, in order to provide the benefits of a shoe's sole—namely, cushioning, support, and traction. Here, Dr. Adanur only cites to a few lines of Dua, discussing benefits of a sole structure in the context of a shoe. Ex. 1002, at ¶169, citing Ex. 1017, at 4:17-37. I disagree that a POSITA would have had this motivation, because shoes are in different art than slippers and stockings, and each art has distinct approaches to addressing cushioning, support, and traction. If a POSITA desired to make a shoe with a sole structure to obtain the types of benefits offered by a shoe sole, then there are relevant references in the shoe arts. But there is also a separate art that includes different techniques for affecting the cushioning, support, and traction properties of slippers, stocking, and socks. While wide-ranging, these can include using different materials with desired properties, varying the thickness of the materials, incorporating elastic

or other supportive elements, and adding components to the bottom portion of the material to provide traction. In my opinion, Dr. Adanur does not provide a reason why a POSITA in possession of Cusinato and Bellak would have been motivated to look to Dua for shoe teachings, which does not address cushioning, support, and traction for slippers, stockings, or socks. Similarly, Dr. Adanur does not explain how Dua's teachings for a shoe sole could be combined with slippers or stockings. As I have discussed, an upper typically has unique properties that allow it to be joined to a sole structure, and slippers and stockings do not have those properties.

71. The references also show these distinctions between different arts. Bellak explains that there are distinct approaches to providing features like "cushioning" and "support" for a slipper/sock. For example, Bellak explains that its fabric may include a "central zone" with a "reenforced portion in which the weight of the yarn knitted into the product is substantially increased." Ex. 1015, at 1:94-100. Bellak also explains that the fabric can include "contacting bands" that "form an anklet . . . adapted to snugly fit the . . . ankle of the wearer and retain the finished product in place." *Id.* at 2:3-8. This "anklet" portion, in other words, provides support. Similarly, Cusinato explains that a purpose of its process is to produce a stocking that "is form-fitting to the foot or the leg of a person," which is another approach for providing support in sock art, which is distinct from the type of support

offered by a shoe sole. Ex. 1014, at [0018]. Each of these approaches is designed to work with slippers, stockings, or socks—not shoes. Dr. Adanur does not explain how the cushioning or support provided by a sole structure would be compatible with a slipper or stocking. Nor does he explain why a POSITA would seek to add the "traction" provided by a shoe sole, to a slipper or stocking. In fact, Dr. Adanur's declaration does not offer any opinion to show how a POSITA would have a reasonable likelihood of success in combining sock references with shoe teachings.

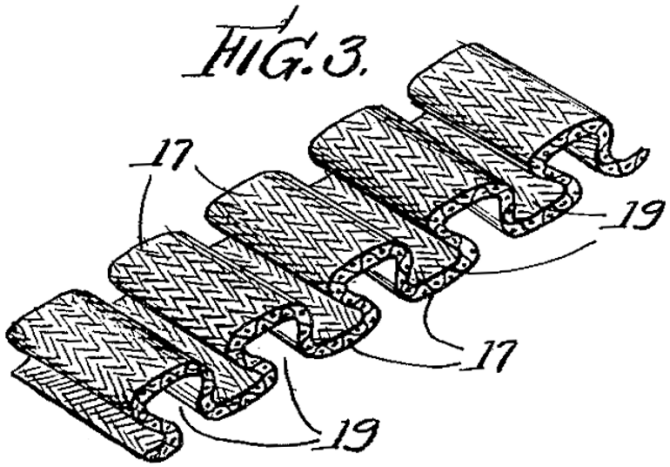
C. The Petition Does Not Show That Bellak, Dua, Or Spencer Discloses "a plurality of ribs integrally knitted into the flat knit textile element" (Claims 1[a2] and 12[a2])

72. In my opinion, the Petition does not show that Bellak, Dua, or Spencer discloses Claims 1[a2] and 12[a2], which recite "a plurality of ribs integrally knitted into the flat knit textile element," under the parties' agreed construction.

73. The parties' agreed construction for this term requires, among other details, "a structure made of face wales and back wales" that includes "lengthwise ridges" (*see* Section IX.D., above), and the claim language itself requires that the "ribs" be "integrally knitted into the flat knit textile element." Ex. 1001, Claims 1 and 12.

74. Skechers asserts that Bellak discloses this limitation because its slipper is made entirely from "fabric" of "the so-called ribbed type comprising a plurality

of projecting bands 17 and intermediate hollows 19," pointing to Figure 3 of the reference, shown below. Petition at 61, citing Ex. 1015, at 1:71-75.



75. In my opinion, the Petition only shows that Bellak discloses "ribbed" fabric, which has long been known in the art. That is different than this limitation, which requires a "structure" that includes "lengthwise ridges," that is "integrally knitted ***into*** the flat knit textile element." The Petition does not show such structures that are integrally knitted "into" a piece of flat knit textile, including because Bellak's fabric (as shown in Figure 3) is entirely ribbed.

76. The Petition also cites to Dr. Adanur's declaration regarding Bellak (Petition at 61, citing Ex. 1002, at ¶196), but Dr. Adanur does not add any opinions, and only repeats the descriptions of Bellak's "ribbed" fabric, pointing to Figure 3. Ex. 1002, at ¶¶196-97.

77. Next, the Petition asserts that "Bellak may be combined with Spencer, which discloses integrally knit ribs." Petition, at 61-62. But in the three pages of Spencer cited in the Petition, I do not see a disclosure of this limitation. The Petition asserts that page 68 of Spencer discloses "how integrally knit ribs have a cord-like appearance (*i.e.*, 'ridges')." *Id.* But on page 68, I only found a discussion of the knitting of a "1 x 1 rib" fabric, which (on the previous page) Spencer explains can be produced using a frame that was invented in the year 1755. Ex. 1050, 67-68. The Petition also refers to pages 60 and 218 of Spencer, regarding the stitching of "wales." Petition, at 62. But on page 60, I only found a short statement that defines "rib" fabric as including "wales," and on page 218 I only found a discussion of producing "cardigan" "sweaters" using fabric with "rib wales." Ex. 1050, at 60, 218. I did not find disclosure of "a plurality of ribs integrally knitted into the flat knit textile element" in the portions of Spencer cited in the Petition.

78. The Petition also cites to Dr. Adanur's declaration regarding Spencer. Petition at 62, citing Ex. 1002, at ¶197. In that paragraph, Dr. Adanur claims that "Spencer explains that integrally knit ribs have a cord-like appearance, which could also be described as ridge-like," citing page 68. *Id.* But again, I do not see that disclosure in Spencer, and page 68 only describes "[r]ib" fabric as having a "vertical cord appearance." Ex. 1050, at 68. I did not find disclosure of "ribs integrally knitted

into the flat knit textile element," under the parties' agreed construction. In any case, Spencer is a generic knitting reference, and it does not discuss the production of shoes, or uppers with a sole structure. Thus, it is not surprising to me that the Petition and Dr. Adanur do not identify any disclosure of this limitation in Spencer.

79. Finally, the Petition also seems to suggest that Dua discloses this limitation, because the examiner initially believed that Dua's fused strips disclosed this "rib" limitation. Petition, at 62-63. I disagree. In fact, I understand from the file history of the '781 Patent that the examiner retracted the position cited by Skechers, after the applicant explained that "fused" strips have a different meaning in the art, and are not integrally knitted into a textile element. Ex. 1013-1, at 91. In any case, Skechers acknowledges that Dua does not disclose this "rib" limitation, because the Petition goes on to assert that a "POSITA would look to Spencer for teachings regarding how to modify Cusinato to use integrally knit ribs rather than ***fused yarn***" strips, which is what Dua discloses. Petition, at 63. However, as I discussed above, I did not find a disclosure in Spencer for how to produce "ribs integrally knitted into the flat knit textile element," under the parties' agreed construction, in the context of the '781 Patent. And, Spencer is a generic knitting reference, and does not disclose techniques for producing shoes, or an upper with a sole structure.

80. The Petition also cites to Dr. Adanur's declaration regarding Dua. Petition, at 62-63, citing Ex. 1002, at ¶¶198-99. But I did not find any opinions there that show this limitation is disclosed. Dr. Adanur repeats the same reading of Dua, which he claims discloses "ribs," even though the examiner retracted that position. Ex. 1002, at ¶198. Next, Dr. Adanur claims that Spencer teaches "how to create integrally knit ribs (rather than Dua's fused yarn ribs)" (*id.*, ¶199), but I as explained above, I did not find such teaching in Spencer, for disclosing how to create "ribs integrally knitted into the flat knit textile element," under the parties' agreed construction.

81. For these reasons, it is my opinion that the Petition and Dr. Adanur did not show that Bellak, Dua, or Spencer discloses this limitation.

XII. Ground 2: Skechers Fails To Show That Herbert In View Of Cusinato, Hlavacs, And Spencer Renders Obvious The Challenged Claims

82. In my opinion, the Ground 2 combination fails to disclose the preambles of each independent Claim 1 and 12, which recite "an upper for an article of footwear" and "article of footwear comprising: an upper," respectively. The Petition also fails to show that this combination discloses limitation 1[a1]/12[a1], which recites "flat knit edges free of surrounding textile structure," and limitation 1[a2]/12[a2], which recites "a plurality of ribs integrally knitted into the flat knit textile element."

83. In addition, in my opinion Skechers and Dr. Adanur did not articulate a sufficient reason to explain why a POSITA would have been motivated to combine (1) the sock-based references Herbert and Cusinato, with the shoe design teachings of Hlavacs, or (2) the circular knitting reference Herbert, with the flat knitting teachings in Cusinato.

84. Thus, it is my opinion that the Petition does not show that any claim of the '781 Patent is rendered obvious under Ground 2.

A. Herbert And Cusinato Do Not Disclose An "upper for an article of footwear" (Claim 1[preamble]) or an "article of footwear comprising: an upper" (Claim 12 [preamble])

85. In my opinion, both Herbert and Cusinato do not disclose an "upper for an article of footwear" or an "article of footwear comprising: an upper," under the ordinary and customary meaning of "article of footwear." As discussed in Section IX.A. above, a POSITA would understand an "article of footwear" to mean both an upper and a sole structure, or in other words a shoe, and to exclude hose, hosiery, stockings, socks, and the like.

86. First, Herbert does not disclose an upper with a sole structure, a shoe, or an upper. Instead, Herbert discloses a "slipper," which in the context of the reference and this art is similar (or equivalent) to a sock, because Herbert explains that the "slipper" is "adapted to be worn inside" a " low cut ladies' shoe." Ex. 1016, at 1:4-7 (left column). Skechers and Dr. Adanur point to Herbert's description of a

"slipper foot covering" (Petition, at 93; Ex. 1002, at ¶283), but as I explained in Section IX.A. above, a POSITA would not consider a slipper to be an "article of footwear" under the term's ordinary and customary meaning.

87. Skechers and Dr. Adanur also point to Herbert's use of the word "sole" (Petition, at 93; Ex. 1002, at ¶283), but Herbert does not describe a sole ***structure***, and instead only uses the word "sole" in reference to the location of a portion of slipper's knitted fabric, along the "bottom" of the wearer's foot—*i.e.*, the sole of the foot. *E.g.*, Ex. 1016, at 2:12-18 (left column). Thus, the Petition takes Herbert's use of the word "sole" out of context. Rather than using it to describe a structure, Herbert, in every instance, refers to a "sole section" or "sole portion," which again, refers to the portion of the knitted slipper fabric that touches the sole of the wearer's foot. *E.g.*, *id.* at 1:11 (left column), 2:17 (left column). This is further shown by the fact that Herbert describes features of the slipper's "sole section" with respect to knitted fabric, not to a sole structure. For example, Herbert describes that the stitch type may provide "greater elasticity of the rib fabric of the lower sole portion which permits the foot to be fitted without binding discomfort." *Id.* at 2:4-14 (right column). Because Herbert only discloses a slipper, in my opinion it fails to disclose the preamble of Claims 1 and 12.

88. Second, Cusinato also does not disclose an upper with a sole structure, a shoe, or an upper, for the reasons that I discussed above. *See* Section XI.A. As I explained, Cusinato only discloses a "stocking," which in this art, is similar to a sock. *Id.* Because Cusinato only discloses a stocking, in my opinion it fails to disclose the preamble of Claims 1 and 12.

B. The Petition Does Not Provide A Sufficient Motivation For Combining Hlavacs With Herbert Or Cusinato To Reach Claims 1[preamble] and 12[preamble]

89. I understand that Skechers also asserts that if neither Herbert nor Cusinato discloses an "article of footwear," under Nike's construction where it includes a "sole" structure, then either reference could be combined with Hlavacs to meet the preambles of Claims 1 and 12. Petition, at 94. Specifically, Skechers asserts that "a POSITA would consider it obvious to add a discrete sole to the 'slipper' in Herbert or the 'boot-like' form in Cusinato." *Id.* The Petition also states that Hlavacs depicts a sole in its figures. *Id.*

90. As I explained in Section XI.B., I understand that in order to establish obviousness, Skechers must provide a rationale sufficient to explain why a POSITA would have combined Hlavacs with Herbert or Cusinato, and/or would have modified the teachings of the references, in order to arrive at the claimed invention, and demonstrate that a POSITA would have had a reasonable expectation of success in doing so.

91. For these combinations, the Petition states that "a POSITA would consider it obvious to add a discrete sole" to Herbert or Cusinato, but it does not provide any reasoning or explanation. Petition, at 94. Similarly, the Petition cites Dr. Adanur's declaration (*id.*, citing Ex. 1002, at ¶¶286-88), but Dr. Adanur only opines that "it would be obvious to add a discrete sole to Herbert's 'slipper' or Cusinato's 'boot-like' form," again without any reasoning or explanation. Ex. 1002, at ¶286.

92. Based on my review of the materials, neither the Petition nor Dr. Adanur provided any explanation why a POSITA would have been motivated to combine (or modify) Hlavacs with Herbert or Cusinato. Therefore, under my understanding of the legal standards, the Petition does not provide sufficient support to establish this obviousness ground.

93. Furthermore, the Petition and Dr. Adanur also did not address a reasonable expectation of success, which I understand is also required for obviousness. Here, it is my opinion that a POSITA would not have had a reasonable expectation of success in combining Herbert or Cusinato with Hlavacs (or modifying the references) to include a sole structure, because Hlavacs is only a design patent that discloses "[t]he ornamental design for a portion of a shoe upper." Ex. 1018, at 1. While Hlavacs' figures depict a shoe with a sole, those depictions are the extent of Hlavacs' disclosure, and they do not provide any description of how shoes or sole

structures are manufactured. Thus, even if a POSITA sought teachings on how to add a sole structure to an item (and I do not agree that the POSITA would have been motivated to consider adding a shoe sole to the slipper in Herbert, or the stocking in Cusinato, in the first place), in my opinion a POSITA would not have sought out Hlavacs for such purpose—because Hlavacs does not include any teachings at all. Therefore, because Hlavacs does not teach how to add a sole structure to any article, a POSITA would not have had a reasonable expectation of success.

94. For these reasons, it is my opinion that the Petition and Dr. Adanur do not show that a POSITA would have been motivated to combine Hlavacs with Herbert or Cusinato to reach the preambles of Claims 1 and 12, or would have had a reasonable expectation of success in making the combinations.

C. Herbert Does Not Disclose "a flat knit textile element having: (1) flat knit edges free of surrounding textile structure such that the flat knit edges are not surrounded by textile structure from which the textile element must be removed" (Claims 1[a1] and 12[a1])

95. In my opinion, Herbert does not disclose Claims 1[a1] and 12[a1], which require "a flat knit textile element having: (1) flat knit edges free of surrounding textile structure," under either Nike's or Skechers' proposed constructions, which I discussed above. *See* Section IX.B. That is because, whether multiple "flat knit edges" (under Nike's proposal) or "only" "flat knit edges" (under

Skechers' proposal) are required, Herbert does not disclose any "flat knit edges free of surrounding textile structure . . . from which the textile element must be removed."

96. As the Petition and Dr. Adanur explain, "[t]wo common machine-knitting techniques are circular knitting and flat knitting." Petition, at 18, citing Ex. 1002, at ¶¶51-55. "Circular knitting produces textiles in a continuous tube, while flat knitting produces textiles in sheets." Ex. 1002, at ¶¶51-55. Citing extrinsic references, the Petition and Dr. Adanur also explain that one type of "flat knitting" is "knitting to shape," whereby an article is directly knit into a desired shape such that "cutting steps can be avoided (which eliminates waste, avoids the need to finish cut edges, saves time, saves money, etc.)." Petition, at 18-19, citing Ex. 1050, at 379, and Ex. 1021, at 4:51-55.

97. I agree with these general statements distinguishing flat knitting from circular knitting, and describing flat knitting to shape. Another type of flat knitting is sometimes referred to as "cut-and-sew," whereby an article is formed by cutting a piece into the desired shape (or multiple pieces into multiple desired shapes), out of a rectangular sheet of flat knit fabric, and then joining edges and/or multiple pieces together using sewing or other techniques (for example, adhesives). This "cut-and-sew" process is briefly referenced in Herbert, which states that its slipper may be formed from "cut and sewn flat rib knitted fabric." Ex. 1016, at 1:7-9 (right column).

98. In view of the above background, it is my opinion that Herbert does not disclose Claims 1[a1] and 12[a1], under either proposed construction. At a minimum, under Nike's proposal, these limitations require a textile element with multiple "edges" that are (1) "flat knit," and that (2) did not have to be "removed" (i.e., cut) from "surrounding textile structure." Herbert does not disclose any such "flat knit" "edges." First, Herbert only discloses details for "circular knit seamless fabric," which is not flat knit and therefore cannot meet these limitations. *Id.* at 1:11-13 (right column). Second, while Herbert discloses no details for a flat knit process, it briefly references that "cut and sewn flat rib knitted fabric" could be used to make its slipper. *Id.* at 1:7-10 (right column). But "cut and sewn" flat knit fabric requires cutting, and Herbert does not disclose any "flat knit" "edges" that are "free of surrounding textile structure," such that they did not require cutting.

99. Neither Skechers nor Dr. Adanur explains how Herbert's brief reference to "cut and sewn flat rib knitted fabric" could disclose these limitations. Petition at 95, citing Ex. 1002, at ¶289.

100. For these reasons, it is my opinion that Herbert does not disclose limitations 1[a1] and 12[a1].

D. A POSITA Would Not Have Been Motivated To Combine Cusinato With Herbert To Reach Claims 1[a1] and 12[a1]

101. I understand that Skechers also asserts that if Herbert does not disclose "a flat knit textile element having: (1) flat knit edges free of surrounding textile structure," then Herbert could be combined with Cusinato to meet limitations 1[a1] and 12[a1]. Petition at 94-95. While the relevant section of the Petition addressing this proposed combination does not cite any supporting opinions from Dr. Adanur, elsewhere in his declaration Dr. Adanur appears to address the combination, so I will respond to his opinions as well. *E.g.*, Ex. 1002, at ¶¶158-159.

102. I understand that in order to establish obviousness, Skechers must provide a rationale sufficient to explain why a POSITA would have combined Cusinato with Herbert, and/or would have modified the teachings of the references, in order to arrive at the claimed invention, and demonstrate that a POSITA would have had a reasonable expectation of success in doing so.

103. First, I note that Skechers does not assert any alleged motivation in the Petition itself. Petition, at 94-95. Second, while Dr. Adanur does offer an opinion on combining Cusinato with Herbert, in my opinion it does not show a sufficient motivation to combine, including because his reasoning is contrary to the teachings of the references. Ex. 1002, at ¶¶158-159. Specifically, Dr. Adanur opines that both references "relate to the design and manufacture of footwear using flat knitting," and

that a POSITA would have been motivated to combine Herbert with Cusinato in light of "Cusinato's teaching of a shaped, flat knit textile element, which could be employed to reduce waste and simplify manufacturing by eliminating cutting steps." Ex. 1002, at ¶158. Dr. Adanur continues by opining that "Herbert teaches a similar goal, a 'method of making the finished product…simpler and less expensive.'" *Id.*, ¶159, citing Ex. 1016, at 2:14-15.

104. I disagree with Dr. Adanur on both counts. First, in my opinion neither Herbert nor Cusinato relates to "the design and manufacture of footwear," under the ordinary and customary meaning of "article of footwear," for the reasons I have already discussed. But in any case, I also disagree that Herbert "relate[s]" to flat knitting. As I discussed above, Herbert only discloses a process for making its "slipper"/sock using a "circular knit seamless fabric," not a flat knit process. Ex. 1016, at 1:5-15 (right column); *see* Section X.E. And while Herbert briefly mentions the possibility of "cut and sewn flat rib knitted fabric," such a process also requires cutting steps. Therefore, I disagree that Herbert would lead a POSITA to the flat knit teachings of Cusinato, because Herbert only discusses knitting processes that require cutting (whether circular knit or flat knit), and does not provide any reason for a POSITA to seek out knitting teachings that do not require cutting steps.

105. This leads to my second point of disagreement, which is that Herbert only describes the alleged benefits of its process with respect to its "preferred embodiment," which uses "circular knit seamless fabric," whereby Herbert claims that for "this type of fabric the method of making the finished product is simpler and less expensive." *Id.* at 1:11-15 (right column). In other words, Herbert again would not lead a POSITA to seek out the flat knit teachings of Cusinato, because Herbert only teaches a POSITA that the benefits of a "simpler and less expensive" process are available with circular knitting. In fact, Herbert teaches away from flat knitting in general, because Herbert tells a POSITA that circular knitting is "simpler and less expensive." Therefore, in my opinion a POSITA would not have been motivated to combine or modify Herbert with the flat knit teachings of Cusinato.

106. Finally, I also note that the Petition mentions Spencer for this combination, but it does not assert that Spencer discloses these limitations in combination with Herbert and Cusinato. Instead, Skechers asserts that Spencer teaches how to manufacture generic "flat rib knitted fabric" or "flat knit [(selvedged)] edges." Petition, at 95. While Spencer does discuss generic knitting concepts, Spencer is directed to garments, not footwear, and I did not find that the Petition or Dr. Adanur pointed to anything in Spencer that discloses these limitations.

107. Therefore, in my opinion a POSITA would not have been motivated to combine Cusinato with Herbert to reach Claims 1[a1] and 12[a1].

E. The Petition Does Not Show That Herbert Or Spencer Discloses "a plurality of ribs integrally knitted into the flat knit textile element" (Claims 1[a2] and 12[a2])

108. In my opinion, the Petition does not show that Herbert or Spencer discloses Claims 1[a2] and 12[a2], which recite "a plurality of ribs integrally knitted into the flat knit textile element," under the parties' agreed construction. As discussed above in Section IX.D., the parties' agreed construction for this term requires "a structure made of face wales and back wales" that includes "lengthwise ridges," and the claim language itself requires that the "ribs" be "integrally knitted into the flat knit textile element." Ex. 1001, Claims 1 and 12.

109. Skechers asserts that Herbert discloses this limitation because its "slipper" is made from "rib fabric." Petition, at 97, citing Ex. 1016, at 2:36-38 (left column). Dr. Adanur offers the same reasoning, by opining that "Figures 1 and 2 of Herbert show these ribs" for this limitation, pointing only to Herbert's use of "rib fabric." Ex. 1002, at ¶292. In other words, for this limitation, the Petition and Dr. Adanur only point to ribbed fabric, and do not identify any other items as constituting the claimed "ribs integrally knitted into the flat knit textile element."

110. In my opinion, the Petition and Dr. Adanur only show that Herbert discloses "ribbed" fabric, which has long been known in the art. But this limitation

requires a "structure" that includes "lengthwise ridges," that is "integrally knitted ***into*** the flat knit textile element." In my opinion, the Petition does not show any such structures that are integrally knitted "into" a piece of flat knit textile, including because Herbert's fabric is entirely ribbed. As Herbert explains, its "seamless tube" fabric can include different rib stitches, including "plain true rib sections" and "tuck stitch rib sections." Ex. 1016, at 1:39-45 (right column). While these are different types of rib stitches, Herbert's slipper is still made entirely of ribbed fabric. And, as I discussed above, Herbert only describes "circular knit" fabric, which cannot disclose this limitation's "flat knit textile element."

111. Next, the Petition asserts that Herbert "may be combined with Spencer, which discloses integrally knit ribs," citing its discussion of Spencer for this limitation in Ground 1. Petition, at 97, citing Section "VIII.F.3" (pp. 61-63), and citing Ex. 1002, at ¶¶294-95. But for the reasons I already discussed above, I do not see a disclosure of this limitation in the three pages of Spencer cited in the Petition. *See* Section XI.C. That includes under Dr. Adanur's opinions, where I note, for this limitation in Ground 2, Dr. Adanur also refers back to his Spencer opinions from Ground 1. Ex. 1002, at ¶294, citing Section VIII.A.3 (which includes ¶197).

112. For these reasons, it is my opinion that the Petition and Dr. Adanur did not show that Herbert or Spencer discloses this limitation.

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: March 21, 2025



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

Education

Ph.D.	Materials Science, Drexel University, Philadelphia, PA, March 1988; *A Processing Science Model for Three Dimensional Braiding*
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

Books or In Books

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Surface Characteristics of Fibers and Textiles, editor: C. Pastore & P. Kiekens, Marcel Dekker, Inc., NY, Dec. 2000

Technology Encyclopedia, editor of textile and apparel entries: C. Pastore, Brown Partworks, London, September, 2000

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"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

"Textile education during the 2020 pandemic: experiences in US, South Africa and Germany", Fassihi, A., Flax, B., Kyosev, Y., and Pastore, C., refereed proceedings of *International Conference on Technics, Technology and Education*, Yambol, Bulgaria, Nov 4-6, 2020.

"Assessment of Biodegradable Weed Control Fabrics Made of Flax and Polylactic Acid Fibers", W. Chanprapanon, B. George, & C. Pastore, *PaperCon 2019*, TAPPI, Indianapolis, IN, May 5-8, 2019.

"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.

Multi-material Preforming of Structural Composites, R. E. Norris, C. C. Eberle, C. Pastore, T. Z. Sudbury, F. Xiong, D. Hartman, ORNL/TM-2015/174, CRADA/NFE-14-04920, ORNL, Oak Ridge, TN, April 2015.

"Initial Lessons from Nexus Learning for Engineering Students Achieved Via Interdisciplinary Projects for Outside Clients," M. J. Traum, C. F. Anderson, C. M. Pastore, and M. J. Leonard, *Proceedings of the Spring 2015 Mid-Atlantic ASEE Conference*, Villanova, PA, April 10-11, 2015.

"Architectural and Transportation Applications of Fibrous Materials", session chair: C. Pastore, *Fiber Society Annual Meeting*, Philadelphia, PA, October 2014.

'Microtectonic Responsive Textile Systems", S. Frostén and C. Pastore, *Fiber Society 2014 Fall Meeting and Technical Conference: Fibers for the Future, Philadelphia, PA,* October 2014.

"Multimaterial Preforming of Structural Composites", Pastore, C., Sudbury, T., Norris, R., Eberle, C., Hartman, D. and Anderson, C., *Fiber Society 2014 Fall Meeting and Technical Conference: Fibers for the Future, Philadelphia, PA,* October 2014.

"Multimaterial Preforming of Structural Composites", T. Sudbury and C. Pastore, *National Conference on Undergraduate Research,* Lexington, KY, April 2014.

"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.

"Chitosan Composites", Y. Rane and C. Pastore, PaGGP Forum, Harrisburg, PA September, 2007

"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. Gowayed, 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.

"Generalized Analysis of Nonuniform Inhomogeneous Structure", A. E. Bogdanovich and Christopher M. Pastore, Army Workshop on Impact of Composites, August, 1994.

"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.

"Some Basic Concepts for the 3-D Analysis of Transverse and Interlaminar Stresses in Composite Structures", A. E. Bogdanovich and C. M. Pastore, *Proceedings of the 9th Annual the Advanced Composites Conference and Exposition*: Technology Exchange and Partnerships, November 8-11, 1993, Dearborn, MI.

"Role of Inhomogeneities in the Damage Resistance of Textile Composites", C. M. Pastore, *Proceedings of the 25th International SAMPE Technical Conference,* Oct. 26-28, 1993, Phila. PA.

"Analytical and Experimental Results for a Quasi-Unbalanced Composite Double Box Beam Spar", *Proceedings of the American Society for Composites 8th Technical Conference,* October 19-21, 1993, Cleveland, OH.

"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,

"Neural Network Modelling of the Mechanical Behavior of Textile Composites", W. J. Jasper and C. M. Pastore, *1992 Fall Meeting of the Materials Research Society,* Nov. 30 - Dec. 4, 1992, Boston, MA.

"Geometrical and Mechanical Modelling of Textile Reinforced Composites", Y. A. Gowayed and C. M. Pastore, *1992 Fall Meeting of the Materials Research Society*, Nov. 30 - Dec. 4, 1992, Boston, MA.

"Symmetry Conditions in Textile Structures", E. Armstrong-Carrol C. M. Pastore, and F. Ko, *1992 Fall Meeting of the Materials Research Society*, Nov. 30 - Dec. 4, 1992, Boston, MA.

"Quantification of Processing Artifacts in Textile Composites", C. Pastore, *Fiber-Tex 1992*,Philadelphia, PA, October 27-29, 1992, NASA Conference Publication 3211, 1993,

"Perception, Detection and Diagnosis of Appearance Defects in Fabrics", R. McGregor, D. H. Mershon, and C. M. Pastore, *113th Winter Annual Meeting*, Anaheim, CA, Nov. 1992.

"Manufacture of an Aeroelastic Smart Spar", M. Garfinkle, E. S. Greenhalgh, and C. M. Pastore, *Fiber-Tex 1992*,Philadelphia, PA, October 27-29, 1992, NASA Conference Publication 3211, 1993,

"Stochastic Damage Evolution in Textile Laminates", Y. A. Dzenis, A. E. Bogdanovich and C. M. Pastore, *Fiber-Tex 1992*, Philadelphia, PA, October 27-29, 1992, NASA Conference Publication 3211, 1993, pp. 235-248.

"On The Structural Analysis of Textile Composites", A. Bogdanovich, and C. Pastore, *ASME Summer Annual Meeting on Materials and Structures*, Tempe, AZ, April, 1992.

"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.

"Aeroelastic Continuous Fiber Smart Spar", E. S. Greenhalgh, C. M. Pastore, and M. Garfinkle, American Society for Composites, 7*th Technical Conference on Composite Materials*, Oct. 13-15, 1992, University Park, PA.

"Quantification of Processing Artifacts in Textile Composites", C. M. Pastore, *Fiber Tex '92*, Oct. 27-29, 1992, Phila., PA.

"The Effects of Specimen Width on Tensile Properties of Braided Laminates", C. M. Pastore, A. E. Bogdanovich, and J. E. Masters, *3rd Advanced Composites Technology Symposium*, Long Beach, CA, Jun 8-11, 1992.

"Applications of Structural Analysis to Textile Composites", C. Pastore, A. Bogdanovich, and Y.A. Gowayed, Proceedings, *5th Textile Structural Composites Symposium*, Phila., PA Dec. 2-5, 1991.

"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.

"Modelling Textile Composites: An Integrated Process, Property, Structure Approach", E. Greenhalgh, Y. Gowayed, and C. Pastore, *Fiber-Tex 91*, Raleigh, NC Oct. 15-17, 1991.

"Analytical Techniques for Textile Structural Composites: A Comparative Study of US-USSR Research", Y. Gowayed and C. Pastore, *FiberTex '90*, Aug. 14, 1990, Greenville SC

"Computer Aided Design of Three Dimensional Woven Fabrics for Composites", A. Morales, C. Pastore, *FiberTex '90*, Aug. 14, 1990, Greenville SC

"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.

"A Fabric Geometry Model for Brittle Matrix Composites", C. Pastore, E. Armstrong, and F. Ko, Proceedings, *Ceramic Matrix Composites*, Indianapolis, IN, April 24-26, 1989.

"Near Net Shape Manufacturing of Composite Engine Components by 3-D Architecture", C. Pastore and F. Ko, *Proceedings, Gas Turbine and Aeroengine Congress*, Toronto, Ontario, Canada, June 4-8, 1989.

"Evaluation of CVI Processing on SiC Yarns", C. Pastore, P. Khandelwal, and F. Ko, *Proceedings, 12th Annual Conference on Composites and Advanced Ceramic Materials*, Cocoa Beach, FL, Jan. 1988.

"CAD/CAM of Braided Preforms for Advanced Composites", G. Yang, C. Pastore, *Proceedings, 3rd Annual ASM/ESD Advanced Composites Conference*, Detroit, MI, Set 15-17, 1987.

"A Generalized Processing Science Model for Braided Structures", C. Pastore and F. Ko, *Fiber-Tex 1987*, NASA Publication

"Advanced Preforming Concepts for Structural Carbon/Carbon Composites", Proceedings, *12th Annual Conference on Composites and Advanced Ceramic Materials*, Cocoa Beach, FL, Jan. 1988.

"Structure and Properties of SiC/LAS III Ceramic Matrix Composites", F. Ko, P. Fang, and C . Pastore, *Proceedings, Whisker and Fiber Reinforced Ceramic Matrix Composites*, Oak Ridge National Laboratories, Oak Ridge, TN, May 1988.

"Analytical Techniques for Modelling Mechanical Properties of Multi-axial Textile Composites", C. Pastore, *Proceedings, 3rd Annual Textile Structural Composites Symposium*, Philadelphia, PA June 1-2, 1988.

"Structure and Properties of Hybrid SiC/LAS III Glass Ceramic Matrix Composites", C. Pastore, P. Fang, F. Ko and M. J. Koczak, *Proceedings, Fabricating Composites '88*, Philadelphia, PA, Sept. 1988.

"Structure and Properties of Hybrid SiC/Al-Li Composites", C. Lei, C. Pastore, and F. Ko, *Proceedings, Metal Matrix Composites, '88*, Philadelphia, PA, Sept. 1988.

"A Processing Science Model for Three Dimensional Braiding", C. Pastore and F. Ko, *Proceedings, Advanced Composites Conference,* 1988, Detroit, MI, Sept. 1988.

"An Integrated Design Methodology for Fabric Reinforced Composite Structural Components", T. M. Tan, C. Huang, C. Pastore and F. K. Ko, *Proceedings, ASME Winter Annual Meeting 1988*, Chicago, IL, Oct. 1988.

"Processing Science Model for Three Dimensional Braiding", C. Pastore and F. Ko, *Proceedings, ASME Winter Annual Meeting*, Chicago, IL, Oct. 1988.

"CAD of 3-D Composites", C. Pastore, Proceedings of the *2nd Textile Structural Composites Symposium,* Philadelphia, PA, Feb. 10-11, 1987.

"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.

"A Fabric Geometry Model for 3-D Braid Reinforced FP/Al-Li Composites", F. Ko, C. Pastore, C. Lei, and D. Whyte, *1987 International SAMPE Metals Conference: Competitive Advances in Metals/Metal Processing*, Cherry Hill, NJ, Aug. 18-21, 1987.

"Textiles: Product Design and Marketing", F. Ko and C. Pastore, *Proceedings, Annual World Conference of the Textile Institute*, Como Italy, May 5, 1987.

"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. Gowayed, *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.*, Case No. 1:23-cv-00771 (S.D.N.Y.) (2025)
- *Nike, Inc. v. lululemon usa inc.*, IPR2024-00460 (PTAB) (2025)
- *Good Sportsman Marketing, LLC v. Rugged Cross Hunting Blinds LLC*, 4:23-cv-3243 (S.D. Tex.) (2024)
- *Nike, Inc. v. lululemon usa inc.*, IPR2024-00159 (PTAB) (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)