UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

IMPERATIVE CARE, INC.,
Petitioner,

v.

INARI MEDICAL, INC.,
Patent Owner.

_____

Case No. IPR2025-01021
U.S. Patent No. 11,969,333

DECLARATION OF CHRISTOPHER S. MORRIS, M.D.

TABLE OF CONTENTS

I, **Christopher S. Morris,** declare as follows:

I. INTRODUCTION

1. My name is Christopher S. Morris. I have been retained by counsel for Patent Owner Inari Medical, Inc., ("Patent Owner" or "Inari") as an independent expert consultant in this *inter partes* review (IPR) proceeding, IPR2025-01021, concerning U.S. Patent 11,969,333 ("the '333 Patent"; EX1001), pending before the U.S. Patent and Trademark Office, Patent Trial and Appeal Board ("Board").

2. I understand that Imperative Care, Inc. ("Petitioner" or "Imperative") has filed a petition for *inter partes review* before the Board asserting:

> Ground 1A: Claims 1-10, 13-29, and 33-38 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent Application Publication No. 2017/0043066 (EX1012; "Laub") in combination with U.S. Patent Application Publication No. 2015/0173782 to Garrison et al. (EX1006; "Garrison");
>
> Ground 1B: Claims 6-8, 17, 25-27, and 36 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Laub in combination with Garrison and WIPO Patent Application Publication No. WO2006/124307 to Goff et al. (EX1007; "Goff");

Ground 1C: Claims 11-12 and 30-31 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Laub in combination with Garrison and U.S. Patent Application Publication No. 2003/0225379 to Schaffer et al. (EX1013; "Schaffer");

Ground 1D: Claims 11-12 and 30-31 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Laub in combination with Garrison, Schaffer, and U.S. Patent Application Publication No. 2003/0116731 to Hartley (EX1008; "Hartley");

Ground 2A: Claims 1-10, 13-29, and 32-38 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent No. 8,734,374 B2 to Aklog et al. (EX1005; "Aklog") in combination with Garrison;

Ground 2B: Claims 6-8, 17, 25-27, and 36 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Aklog in combination with Garrison and Goff;

Ground 2C: Claims 11-12 and 30-31 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Aklog in combination with Garrison and Schaffer;

Ground 2D: Claims 11-12 and 30-31 of the ’333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Aklog in combination with Garrison, Schaffer, and Hartley;

Ground 3A: Claims 1-10, 13-29, and 32-38 of the ’333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Garrison in combination with Laub;

Ground 3B: Claims 6-8, 17, 25-27, and 36 of the ’333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Garrison in combination with Laub and Goff;

Ground 3C: Claims 11-12 and 30-31 of the ’333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Garrison in combination with Laub and Schaffer;

Ground 3D: Claims 11-12 and 30-31 of the ’333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Garrison in combination with Laub, Schaffer, and Hartley;

Ground 4A: Claims 1-10, 13-29, and 32-38 of the ’333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Garrison in combination with Aklog;

> Ground 4B: Claims 6-8, 17, 25-27, and 36 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Garrison in combination with Aklog and Goff;
>
> Ground 4C: Claims 11-12 and 30-31 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Garrison in combination with Aklog and Schaffer; and
>
> Ground 3D: Claims 11-12 and 30-31 of the '333 Patent are unpatentable under 35 U.S.C. § 103 as obvious over Garrison in combination with Aklog, Schaffer, and Hartley.

Petition, pg.16.

3. I have been asked by counsel for Patent Owner to opine on issues that I am informed bear on the patentability of the challenged Claims of the '333 Patent.

4. Along with my years of education, research, and experience, my opinions are based on investigation and study of relevant materials. The materials that I evaluated in support of this Declaration include all exhibits cited in this Declaration and in the Petition.

5. I may rely upon these materials, my knowledge and experience, and/or additional materials to rebut arguments raised by Petitioner. Further, I may also

consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me.

6. My analysis of the materials produced in this matter is ongoing, and I will continue to review any new material as it is provided. This Declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

7. My work in this case is being billed at my normal hourly consulting rate, with reimbursement for actual expenses. My compensation is not related to the outcome of this proceeding. I have no personal interest in the outcome of the case.

II. BACKGROUND AND QUALIFICATIONS

8. I summarize my qualifications for forming the opinions set forth in this Declaration. My qualifications are further provided in my curriculum vitae, the first attachment to my Declaration.

9. I am currently a professor emeritus of radiology at the University of Vermont and an adjunct professor of radiology at the University of Utah. I have been performing thrombosis procedures, including mechanical thrombectomy and pharmacologic thrombolyis since the late 1980s and have extensive experience treating arterial, venous, and pulmonary embolism thrombosis

using a wide range of devices, including Inari Medical's catheter devices as well as products as/from Pronto, AngioJet, Trellis, Penumbra and EKOS. In my clinical practice, I frequently manage cases involving deep vein thrombosis and pulmonary embolism. I also have experience with peripheral vascular arterial and cerebral (stroke) thromboembolism treatments, including mechanical thrombectomy.

10. I earned my M.D. from Case Western Reserve University School of Medicine in 1985.

11. I previously earned a B.A. in Zoology and pre-Medicine from Ohio Wesleyan University in 1981 and an M.S. in Radiologic Sciences from Ohio State University in 1990.

12. Following medical school, I completed an Internship in Internal Medicine at Case Western Reserve University. Then, I was a clinical assistant at Ohio State University School of Medicine from 1986-1990, where I completed an accredited Diagnostic Radiology Residency.

13. I served as a clinical Assistant at Harvard Medical School from 1990-1991 and completed an accredited Fellowship in Vascular and Interventional Radiology at the Massachusetts General Hospital.

14. I have been on the medical staff at the University of Vermont since 1991 in various roles including Professor of Surgery (2016-2024), Professor of Ra-

diology (2006-2024), Associate Professor of Radiology (1999-2006), and Assistant Professor of Radiology (1991-1999) and have practiced full time Interventional Radiology for 33 years.

15. I am also currently an Adjunct Professor of Radiology at the University of Utah School of Medicine and have served in that role since 2023.

16. Throughout my career, in addition to teaching and research, I have practiced as a clinician treating venous thrombosis, including treating pulmonary embolisms and deep vein thromboses using a wide range of devices, techniques and procedures. During that time I performed and observed thousands of such procedures, including teaching how to perform such procedures.

17. I am Board Certified in both Diagnostic Radiology and Interventional Radiology by the American Board of Radiology.

18. I have coauthored more than 50 peer-reviewed publications in the field of Radiology and frequently present and speak on various topics in the field of Radiology to various industry and academic organizations both nationally and internationally.

III. BASES OF MY OPINION

A. Materials Considered

19. The opinions included in this Declaration are based on the documents I reviewed, my professional judgment, and my education and experience.

20. In forming the opinions expressed in this Declaration, I reviewed all the materials listed in the second attachment I have provided to my Declaration, and any other material I refer to in this Declaration in support of my opinions.

B. Relevant Legal Principles

21. I am not an attorney but, in preparing and forming my opinions, I have been informed of certain legal principles. I have applied my understanding of those principles and taken them into account when forming the opinions I describe. My understanding of the relevant legal principles is summarized below.

22. I understand that claim terms are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art at the time of the invention when read in the context of the specification and prosecution history, unless a patentee sets out a different definition or clearly disavows claim scope.

23. I further understand that extrinsic evidence such as expert and inventor testimony, dictionaries, and learned treatises can help understand the meaning of claim terms, although that evidence is less significant than the claims, specification, and prosecution history and cannot be used to contradict such evidence.

24. I have been informed that Petitioner bears the burden of proving unpatentability by a preponderance of evidence. I have been told that this means that Petitioner must prove that it is more likely than not that the Claims of the ’333 Patent are obvious over (grounds 1A-1D) Laub in combination with Garrison or in combination with Garrison and one or more of Goff, Schaffer, and Hartley, (grounds 2A-2D) Aklog in combination with Garrison or in combination with Garrison and one or more of Goff, Schaffer, and Hartley, (grounds 3A-3D) Garrison in combination with Laub or in combination with Laub and one or more of Goff, Schaffer, and Hartley, and (grounds 4A-4D) Garrison in combination with Aklog or in combination with Aklog and one or more of Goff, Schaffer, and Hartley.

25. I understand that my opinions regarding patentability are to be from the viewpoint of a person having ordinary skill in the field of the technology of the patent as of the time of the invention. For the purposes of this Declaration, I have assumed that date is the earliest priority date of the ’333 Patent, August 13, 2018. Petitioner also applied August 13, 2018, as the priority date for the ’333 Patent. Petition, pg.13.

26. I understand that if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person

having ordinary skill in the art to which the claimed invention pertains, the claimed invention is obvious.

27. I understand there are four fact-based inquiries involved in determining patent obviousness. These include: (1) the scope and content of the prior art; (2) the differences between the claimed invention and the prior art; (3) the level of ordinary skill in the art; and (4) objective indicia of non-obviousness. I have been informed that examples of objective indicia include unexpected results, commercial success of the invention, whether the invention satisfied a long felt need in the industry, failure of others to find a solution to the problem at hand, commercial acquiescence via licensing, professional approval, unexpected results, and copying and praise by infringers.

28. I understand that even if all limitations of a claimed invention are disclosed by the prior art combination, the patent challenger must demonstrate an apparent reason to combine the known elements in the fashion of the patent claim at issue and that a person of ordinary skill in the art would have reasonable expectation of success in pursuing that combination.

29. I understand that a prior art reference teaches away from a proposed modification when a person of ordinary skill in the art would be discouraged from following the path set out in the reference or would be led in a direction divergent from the path followed by and claimed in the patent.

IV. SUMMARY OF OPINIONS

30. For the reasons I discuss below, I believe that the Claims of the ’333 Patent are not rendered obvious by any combination of the prior art asserted in the Petition.

V. THE ’333 PATENT

A. Overview

31. Thrombi and emboli are blood clots that cause blockages (also called occlusions) of blood vessels or arteries. Blocking blood flow results in oxygen deprivation of tissues that results in tissue death. Clot blockages can cause many very serious health conditions if the clot is located in a critical blood vessel, including stroke (blocking blood flow to or from the brain), pulmonary embolism (blocking the flow of deoxygenated blood to the lungs, blocking blood flow out of the right side of the heart causing right heart strain and/or failure, and causing severe pulmonary artery hypertension), heart attacks (blocking blood flow to the coronary arteries supplying the heart), limb ischemia (blocking arterial blood flow to the extremities), bowel and kidney infarction (blocking arterial blood flow to abdominal organs), and other serious conditions.

32. Venous thromboembolism (“VTE”) is a disease caused by blood clot formation in the veins of the body. Pulmonary embolism (“PE”) and deep vein thrombosis (“DVT”) are common types of VTE.

33. Deep vein thrombosis ("DVT") is a type of blood clot (thrombus) that typically forms in the deep veins of a limb, such as the leg. EX1001, 1:46-51. DVTs can become a very large clot. Thromboembolism occurs when part or all of a thrombus breaks away from the blood vessel wall. This blood clot (now called an embolus) is then carried in the direction of blood flow. When the embolus travels from the vein towards the heart and then lungs, a pulmonary embolism ("PE") may result if such embolus lodges in an artery or branch thereof of the lungs. EX1001, 1:57-67. Because of their location and how they are formed, DVT and PE clots tend to be larger, variable in age, often older, more highly organized, and more fibrous than arterial clots, such as clots in the cerebral vasculature that cause strokes.

34. PE and DVT have traditionally been treated with drugs, e.g., anticoagulants (also called blood thinners) which stop new clots from forming, streptokinase (also called SK manufactured by pharmaceutical makers including GSK and BBT Biotech GmbH), urokinase (also called Abbokinase or Kinlytic, manufactured by companies including Abbott Laboratories), tissue plasminogen activator (TPA) or other drugs in a class of agents called "thrombolytics" (or just "lytics") that break down and dissolve the clot over hours or days, but do not physically remove the clot material from the body. EX1001, 2:26-32. Doctors can treat patients with lytics by introducing the

drugs through an IV line or, more preferably for many cases, applying the lytics at the site of the clot using a perfusion catheter placed at the clot.

35. Lytics can have many disadvantages. First, they can take many hours to work. EX1001, 2:28-29. Second, because the clots are not physically removed from the body, portions of the clot can break off and travel to a different location within the body rather than being eliminated entirely. Additionally, using lytics can cause complications such as hemorrhages and serious risks of death, necessitating ICU stays for treatments and monitoring. *Id*. at 2:30-32. Lytic treatments also are very expensive, as they require longer hospital stays, and they cannot be used for many patients because of conditions related to increased risk of bleeding (e.g., active bleeding, recent brain bleed/hemorrhage, recent brain or spine surgery, severe hypertension, severe kidney disease, etc.).

36. Anticoagulant drugs, which do not treat existing clots that have already formed, also have many disadvantages. The side effects include bleeding risk and loss of bone density. Anticoagulants also are not effective against existing clots, merely preventing clots from forming or continuing to form (to some degree).

37. Invasive surgical procedures have also been used to treat VTE. *Id*. at 2:10-12. But those procedures can involve exposing a patient to surgery which

can cause significant trauma and danger to the patient, particularly for patients that have already exhibited a tendency for dangerous clotting.

38. The ’333 Patent is directed to methods of treating PE and DVT that offer significant benefits over conventional treatments. EX1001, 4:17-19. For example, the ’333 Patent describes various aspiration systems that generate (pre-charge or store) negative (vacuum) pressure before applying the vacuum to an aspiration catheter positioned near clot material (e.g., PE or DVT) in a patient’s blood vessel to generate large suction forces (and corresponding fluid flow velocities) needed to effectively aspirate and remove the clot material from the patient. *Id*. at 4:34-50. The generated suction forces and corresponding fluid flow velocities are greater than conventional systems, allowing the aspiration system to more effectively remove the clot material, even when the clot material is strongly lodged or attached within the blood vessel in the instance of, for example, chronic PE or chronic DVT. *Id*. at 4:42-47 & 10:14-27.

39. I understand that Patent Owner has come to call their methodology of applying a pre-charged vacuum “whoosh,” so named based on the sound the catheter system makes when the pre-charged vacuum is applied to the catheter to aspirate blood and clot material. While I was not familiar with the term “whoosh” prior to my engagement in this matter, “whoosh” is consistent

with my observations of the operation of Inari's products that I have used in practice treating patients with PE or DVT. In effect, during operation of the Inari devices, one can often hear an audible "whoosh" due to the extremely rapid pressure equalization as the pre-charged vacuum is released. As I describe below, a POSA would not have expected such a rapid and strong "whoosh" using the claimed steps of pre-charging and subsequent release of a vacuum sufficient to treat PE or DVT.

40. The '333 Patent includes two independent claims that recite identical methods but for "treating a pulmonary embolism" (Claim 1) and "treating a deep vein thrombosis" (Claim 20). EX1001, claims 1 & 20. Each method includes "advancing an aspiration catheter at least partially through the vasculature of the patient such that a distal end portion of the aspiration catheter is positioned proximate to the" pulmonary embolism or deep vein thrombosis. *Id*. A "lumen of the aspiration catheter is fluidly coupled along a fluid path to a clot canister and an aspiration source proximal to the clot canister." *Id*. The claimed methods further include "generating vacuum pressure within the clot canister via the aspiration source while a valve positioned along the fluid path between the aspiration catheter and the clot canister is in a first position that inhibits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister" and "moving the valve from the first posi-

tion to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter such that at least a portion of the pulmonary embolism [or deep vein thrombosis] and blood are aspirated into the clot canister, wherein in the second position the valve permits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister, and wherein the clot canister includes a filter configured to filter the blood from the portion of the pulmonary embolism [or deep vein thrombosis]." *Id*.

41. Accordingly, the Claims of the '333 Patent recite methods including building up vacuum pressure in a clot canister with an aspiration source when a valve inhibits fluid flow from the aspiration catheter to the aspiration source, and then actuating the valve to apply that built-up vacuum pressure to the aspiration catheter to aspirate PE or DVT and blood therethrough. The clot canister includes a filter to filter the PE or DVT from the blood.

B. Person of Ordinary Skill in the Art (POSA)

42. My opinion on the level of ordinary skill in the art is based upon my personal knowledge and experience as well as my consideration of such things as the education and experience level of persons of skill working in the field.

43. The '333 patent recites that "[t]he present technology relates generally to systems, methods, and devices for the intravascular treatment of emboli and/or thrombi within a blood vessel of a human patient." EX1001, 1:23-25.

44. A POSA in the field of the ’333 patent would have been (1) a person with a Bachelor of Science degree in engineering or an equivalent field, with two to four years of academic or industry experience in the mechanical thrombectomy industry or comparable industry experience who would, where necessary or desired, work or consult with others including a physician to develop thrombectomy devices; or (2) an interventional radiologist or pulmonologist with at least three years of experience developing and/or using medical devices in thrombectomy procedures (including for smaller arteries), and who would, where necessary, work or consult with others including an engineer to develop such a medical device. A person with less education but more relevant practical experience, or more relevant education but less practical experience, may also meet this standard.

45. I disagree with Petitioner that a POSA would have had only “an undergraduate degree in mechanical engineering or a related engineering discipline and 2-4 years of catheter design experience and, where necessary, would have consulted with a physician regarding the methods of treatment.” Petition, p.13.

46. Specifically, a POSA would have experience in the mechanical thrombectomy industry or comparable industry experience. I was also at least a person of ordinary skill in the art as of the priority date of the ’333 Patent

according to both standards, and my opinions herein are the same under either standard.

VI. REFERENCES

A. Garrison

47. I have reviewed U.S. Patent Application Publication No. 2015/0173782 (EX1006, "Garrison"). Garrison generally relates to a system for treating acute ischemic stroke caused by cerebral clots in the cerebral arterial vasculature, which is quite different from treating large clots (e.g., PE and DVT) in the venous vasculature that is much larger in diameter than the cerebral vessels, as described in the '333 Patent. EX1006, ¶[0002].

48. Garrison discloses an embodiment of a syringe-based system in which "a locking syringe (for example a VacLok Syringe) is attached to the flow controller and the plunger is pulled back into a locked position by the user while the connection to the flow line is closed prior to the thrombectomy step of the procedure." *Id*. at ¶[0134]. Then, "[d]uring the procedure when the tip of the aspiration device … is near or at the face of the occlusion, the user may open the connection to the aspiration syringe … [t]his would enable the maximum level of aspiration in a rapid fashion with one user." *Id*. In this embodiment, the locking syringe is actuated with the connection to the flow line closed such that vacuum is generated in the syringe.

49. A POSA would have understood that Garrison's disclosure of "the maximum level of aspiration in a rapid fashion" is different from the methods of the current claims.

50. Specifically, a POSA would have recognized that Garrison's "maximum level of aspiration" is limited by the purpose of Garrison, "treatment of acute ischemic stroke" in the cerebral vasculature, and by the configuration of Garrison's systems including the flow of fluid through catheters sized to treat clots in the cerebral vasculature.

51. First, a POSA would have recognized that due to the size, location and purpose of the cerebral vasculature, it is highly sensitive to interventional techniques and thus very susceptible to various complications like vasospasm (e.g., the collapse and active constriction of the blood vessel when a sudden strong vacuum is applied over a short amount of time) or damage (vessel wall dis-section and/or rupture) to the vasculature itself. As such, a POSA would have understood that Garrison's disclosure of "the maximum level of aspiration in a rapid fashion" does not disclose the methods of the current claims for treating PE or DVT.

52. Garrison confirms that understanding in paragraphs [0127] to [0129], explaining that "the maximum level of aspiration in a rapid fashion" is limited by the size and length of the catheters for use in the cerebral vasculature.

53. Garrison recognizes that, first, the maximum rate of aspiration is limited in theory by Poiseuille's law ($Q=(\pi \times r^4 \times \Delta P)/(8 \times n \times L)$, where Q=flow rate, r=radius of the tube, P=pressure, n=viscosity, and L=length): "[a]ccording to Poiseuille's law for laminar flow in a tube … flow rate drops by increases in length and drops proportionally by decreases in radius to the fourth power." EX1006, ¶[0127]. Because the radius of the catheters disclosed in Garrison are small (less than 10 French), that maximum flow rate, and thus time to pressure equalization, is limited almost entirely by the small radius of Garrison's catheters, not the level and rapidity of the application of the vacuum, as might be the case with much larger 16F, 20F, or 24F catheters.

54. Garrison further discloses that, second, because of the small diameter catheters, the actual aspiration rates are "diminished somewhat as compared to the theoretical aspiration rates, especially at higher flow rates." EX1006, ¶[0129]. "This is reflective of the fact that at the higher flow rates, the flow is less and less laminar, and thus lower than the theoretical flow as predicted by Poiseuille's law." *Id*.

55. Garrison further confirms that the size and particular configuration of its systems set the limit for rate of aspiration, and thus time to pressure equalization that is commensurate with the low pressure used when treating clots in the cerebral vasculature, disclosing that "[t]he overall average extraction rate

was calculated based on the slope of the data points and was roughly linear over the 20 cc volume, indicating a constant vacuum level using this method." EX1006, ¶[0129]. Garrison also discloses disadvantages to various embodiments employing an external reservoir, such as a syringe:

> One disadvantage of current sources of aspiration is that the aspirated blood is received into an external reservoir or syringe. This blood is generally discarded at the end of the procedure, and as such represents blood loss from the patient. In addition, pumps such as centrifugal or peristaltic pumps are known to cause damage to blood cells. Although it is possible to return blood from the external reservoir to the patient, the blood has been exposed to air or has been static for a period of time, and there is risk of thrombus formation or damage to the blood cells. Usually, aspirated blood is not returned to the patient to avoid risk of thromboembolism.

Id. at ¶[0135].

56. Garrison discloses a different system employing continuous aspiration in Figure 36 "which is configured not to harm blood cells and which may be configured to return blood to the central venous system in real time during the procedure, so there is no reservoir in which the blood remains static." *Id*. at ¶[0136].

B. Laub

57. I have reviewed U.S. Patent Application Publication No. 2017/0043066 (EX1012, "Laub"). Laub discloses a "system for removing thrombi and other unwanted material from the body of a patient, particularly from the patient's vasculature" and, more particularly, a system "to remove clots from patients suffering from or at risk of pulmonary embolisms." EX1012, ¶[0005].

58. Because of the large and continuous flow rates enabled by a large catheter, Laub discloses the need for blood reinfusion: "Without returning the blood back to the patient, such high flow rates could quickly result in exsanguination of the patient." *Id*. at ¶[0045]. "By returning the aspirated blood back to the patient, embodiments of the present system 100 allows for aspiration while minimizing the blood loss of the patient." *Id*. Laub also discloses that "reinfusing the patient's blood continuously during aspiration allows for greater suction pressure and/or flow rates (e.g., 2-4 L/min) which can assist in dislodging and removing larger clots and/or tumors than would otherwise be possible." *Id*. A POSA would have understood that Laub's system is intended to be operated to continuously aspirate and return blood at a high flow rate so that large clots, such as PE and DVT, can be removed.

C. Aklog

59. I have reviewed U.S. Patent No. 8,734,374 B2 (EX1005, "Aklog"). A POSA would have understood Aklog's system is similar to Laub's system.

60. Aklog discloses that "[i]f the catheter is enlarged to accommodate the larger structure and material, such a catheter may aspirate an unacceptable volume of blood, resulting in excessive fluid loss and/or shock in the patient." *Id*. at 7:23-26. Aklog's system "simultaneously reinfuse[s] aspirated (i.e., removed) and filtered fluid, such as blood, back into the patient on a substantially continuous basis to minimize any occurrences of fluid loss and/or shock." *Id*. at 5:19-23. Aklog also discloses that the "suction and reinfusion of blood can occur, in an embodiment, continuously for a desired duration to minimize fluid loss in the patient." EX1005, 6:9-11. Like Laub, a POSA would have understood that Aklog's system is intended to be operated to continuously aspirate and return blood so that large clots, which include PE and DVT, can be removed.

VII. TURK DECLARATION (EX1022)

61. I have reviewed the declaration of Dr. Turk (EX1022) and make the following observations.

62. While there may be some similarities between the devices and procedures used for treating clots located in different portions of the vasculature, the

methods, techniques, and considerations are often quite different and involve different and unique considerations.

63. I understand that Garrison is directed to treating ischemic stroke in the cerebral vasculature. The following will focus on the reasons why a POSA would not have modified Garrison, Laub, or Aklog to arrive at the methods in the claims of the ’333 Patent, where claim 1 is directed to treating pulmonary embolisms and claim 20 is directed to treating deep vein thrombosis.

64. First, a POSA would not understand Garrison as disclosing the “whoosh,” in other words a stored pressure, a vacuum stored in a clot container, generated while a fluid control valve is closed and then opening the fluid control valve to apply the stored vacuum as described above.

65. A POSA would have understood that there are several relevant complications when treating clots in the cerebral vasculature because the cerebral vasculature is particularly susceptible to damage or complications that require special care.

66. As explained above, a POSA would have understood that Garrison’s disclosure of a “maximum level of aspiration” in its embodiment having a flow controller and a syringe and where the plunger is pulled back into a locked position by the user while the connection to the flow line is closed, does not disclose the “whoosh” concept because, as explained above, that “maximum

level of aspiration" is limited by the size of the catheters used in the cerebral vasculature and the complications that can arise in the cerebral vasculature if large bursts of vacuum are applied.

67. Garrison confirms that understanding at paragraphs [0127] to [0129]. In those paragraphs Garrison measures the flow rate through various catheters, referring to that flow rate as "aspiration rate." EX1006, ¶[0129]. Garrison explains—and a POSA would recognize—that the flow rate is limited according to Poiseuille's law, demonstrating that for laminar flow, the "flow rate drops by increases in length and drops proportionally by decreases in radius to the fourth power." *Id* at ¶[0127].

68. Garrison further explains that actual measured flow rates are lower than predicted flow rates because the flow through small catheters is not laminar: "When different catheter systems are tested for actual aspiration rates this benefit is diminished somewhat as compared to the theoretical aspiration rates, especially at higher flow rates. This is reflective of the fact that at the higher flow rates, the flow is less and less laminar, and thus lower than the theoretical flow as predicted by Poiseuille's law." EX1006, ¶[0129].

69. As such, a POSA would not have been motivated to combine Garrison with Aklog or Laub to form a system that includes "generating vacuum pressure … via the aspiration source while a valve positioned along the fluid path be-

tween the aspiration catheter and the clot canister is in a first position that inhibits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister" and "moving the valve from the first position to a second position thereby applying the vacuum pressure to the second lumen of the aspiration catheter such that at least a portion of the pulmonary embolism [or deep vein thrombosis] and blood are aspirated into the clot canister" to treat PE (as recited in claim 1 of the '333 Patent) and/or to treat DVT (as recited in claim 20 of the '333 Patent).

70. In relation to Dr. Turk's testimony regarding "the nature of the clots" in cerebral and DVT/PE conditions (EX1022, ¶38), I disagree.

71. First, a POSA designing a device to treat PE or DVT would design the device to treat the much larger and more adherent primary clots associated with either PE or DVT.

72. Regarding PE, the primary issue to be treated is the largest PEs in the largest vessels. Those PEs are the largest and most difficult to remove and a POSA would design any device to treat PE to address those clots. That a physician might discover during a procedure that a particular PE clot is easier to remove would not motivate a POSA to design a device that was only capable of removing that easier-to-remove clot. Instead, a POSA would design the device and methods to remove the primary clots encountered when treating

PE, which are often chronic, tortuous, large, and difficult to remove and pose the greatest risk to a patient.

73. That some peripheral pulmonary vessels are much smaller than the primary vessels treated in PE would not have changed that consideration for a POSA. A POSA would have understood that the threat to a patient having a small clot in a peripheral vessel in the lung that is similar in size to the largest cerebral vessels, would most likely not warrant treatment with mechanical aspiration. The benefit of removing such a clot with mechanical aspiration is minimal because of the redundancy in the vessels of the lungs. Conversely, the risk from such a procedure is great, particularly damage to the vessels, minimizing the need for a POSA to design a device to treat those issues. Instead, a POSA designing a treatment for PE would by necessity design the device to treat blockages in the largest and most central vessels which pose the greatest risk to a patient. Those same principles and considerations also generally apply to the treatment of DVT.

74. I note that Dr. Turk's reference to "very large, easily trackable, aspiration thrombectomy catheters that can now more easily and reliably navigate the cerebrovasculature" (in EX1027) refers to catheters having a French size of less than 10. EX1022, ¶28 (citing EX1027). The reference to "very large" catheters in cerebral applications is orders of magnitude smaller than the 16

French or greater (up to 24 French) catheters used to treat PE and DVT in the present claims.

75. In addition to not being motivated to combine and modify the references as claimed in claims 1 and 20, I also believe that a POSA would not have had a reasonable expectation of success when combining and modifying Garrison, Aklog and/or Laub to arrive at the claimed methods. First, a POSA would not have had a reasonable expectation that catheters of the size 16 French or greater could be used to treat PE using the claimed method. Specifically, a POSA would not have expected that such a catheter of sufficient size, strength, and maneuverability that could also perform the claimed methods could have reliably reached the locations necessary to treat PE, without unacceptable risk to harming the patient's vasculature. That same consideration applies to treating DVT.

76. Second, a POSA would not have any expectation that a catheter of smaller size could be used to aspirate PE or DVT due to the difficult nature of removing those clots with a small diameter catheter. More particularly, a POSA would have understood that a catheter of size 10 French or less, could not generate a sufficiently rapid pressure equalization or "whoosh" to treat a PE or DVT. As such a POSA would not have been motivated to include a

stop valve or similar to pre-charge the vacuum, particularly in view of the desire to include continuous blood return in Aklog and Laub.

VIII. UNEXPECTED RESULTS

77. I am familiar with, and have personally used, the Inari Flowtriever systems to treat pulmonary emboli, including both the Triever 16, Triever 20, and Triever 24.

78. I understand that Inari's Flowtriever systems include the ability "to generat[e] vacuum pressure" using an "aspiration source" where "a valve" is in a "first position that inhibits fluid flow along [a] fluid path from the lumen of the aspiration catheter" and "mov[e] the valve from the first position to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter" where "in the second position the valve permits fluid flow along the fluid path from the lumen of the aspiration catheter" as recited in claims 1 and 20 of the '333 Patent.

79. The following focuses on those features of the Flowtriever system that enable and provide surprising and unexpected results over the closest prior art when removing clots during the treatment of PE and DVT.

80. I further understand from the declaration of Brian Brown provided in conjunction with the related litigation that Inari's FlowTriever system falls within the scope of and practices claim 1 of the '910 patent. EX2017, ¶¶231-242.

81. I first note that, as I explain above, a POSA would not have combined Garrison, Aklog and/or Laub in the manner claimed in claims 1 and 20. I also note that the AngioVac system by Angiotech, now Angiodynamics, is similar to the Aklog reference (EX1005) relied upon in the Petition. I have personally used and witnessed the use of that AngioVac system.

82. I note two significant surprising and unexpected results demonstrated by the Inari Flowtriever systems having French sizes of 16 and greater over the expected results from Petitioner's proposed combination of Garrison, Aklog and/or Laub and the AngioVac system.

83. First is the ability of the Flowtriever to reach the location of the pulmonary embolism within the central pulmonary arteries safely and consistently. It is very difficult for catheters of 16 French or greater and that have sufficient properties to provide high levels of vacuum suction sufficient mechanically treat the clots associated with PE and DVT to reach the proper location to treat PE and DVT.

84. And, upon first use of the Flowtriever systems, I was personally surprised that the generation of a quick burst of vacuum and rapid pressure equalization could so effectively remove a clot when treating a PE or DVT, often times removing the clot intact. A POSA would not have expected such a result due to the difficulty in mechanically removing clot material when treat-

ing PE/DVT. And more specifically, a POSA would not have expected a quick burst of pre-charged vacuum as provided by the current claims could so effectively remove the clot material, particularly in view of the difficulty in mechanically removing clot material using other methods and systems, including the AngioVac system. In summary, a POSA would not have expected any meaningful improvement in clot removal for treating PE and DVT using a pre-charged vacuum as set forth the claims of the '333 patent compared with the expected result for the closest prior art.

85. To the extent a POSA would have expected any improvement using the claimed method by combining aspects of Garrison, Aklog and/or Laub (one would not have expected any improvement as explained above), the ability to remove a clot when treating PE or DVT (particularly with catheters of 16 French or greater) greatly exceeded any expectation of POSA at the time and thus was surprising and unexpected.

I, Christopher S. Morris, M.D., declare that all statements made herein of my 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.

Respectfully submitted,

Dated: March 12, 2026 By: Christopher S. Morris

Dr. Christopher S. Morris

ATTACHMENT 1

Updated 9/4/25

Christopher S. Morris, M.D.
Christopher.Morris@uvmhealth.org
Christopher.Morris@utah.edu

Business Address:

Department of Radiology
The University of Vermont Medical Center
111 Colchester Avenue
Burlington, VT 05401
(802) 847-3592

Current Position:

Attending Radiologist — Jul 1991 – Present
Section of Interventional Radiology
Department of Radiology
University of Vermont Medical Center
(Formerly Medical Center Hospital of Vermont)
(Formerly Fletcher Allen Health Care)

Attending Radiologist — Sep 2023 - Present
Section of Interventional Radiology
Department of Radiology
University of Utah School of Medicine

Academic Appointments:

Adjunct Professor of Radiology — Sep 2023 – Present
University of Utah School of Medicine

Professor Emeritus
Larner College of Medicine at the University of Vermont — July 2024 - Present

Professor of Surgery — Jul 2016 – Jun 2024
Larner College of Medicine at the University of Vermont

Professor of Radiology — Jul 2006 – Jun 2024
Larner College of Medicine at the University of Vermont

Associate Professor of Radiology — Jul 1999 – Jun 2006
Larner College of Medicine at the University of Vermont

Honorary Clinical Assistant in Radiology — Jan 1998 – Dec 1999

Guy's and St. Thomas' Hospital Trust, United Kingdom

Assistant Professor of Radiology — Jul 1991 – Jun 1999
Larner College of Medicine at the University of Vermont

Clinical Assistant — Jul 1990 – Jun 1991
Harvard Medical School

Clinical Assistant — Jul 1986 – Jun 1990
Ohio State University School of Medicine

Education:

Vascular and Interventional Radiology Fellowship — Jul 1990 – Jun 1991
Massachusetts General Hospital, Boston, Massachusetts

M.S. Ohio State University Graduate School — Dec 1990
Columbus, Ohio

Chief Resident, Diagnostic Radiology, Ohio State University Hospitals — Jul 1988 – Jun 1990
Columbus, Ohio

Resident, Diagnostic Radiology, Ohio State University Hospitals — Jul 1986 – Jun 1990
Columbus, Ohio

Intern in Medicine, Cleveland Metropolitan General Hospital — Jul 1985 – Jun 1986
Cleveland, Ohio

M.D. Case Western Reserve University School of Medicine — May 1985
Cleveland, Ohio

B.A. Ohio Wesleyan University — Jun 1981
Delaware, Ohio

Other Professional Positions and Employment:

Medical Staff — Sep 2023 – Present
University of Utah Hospitals
University of Utah School of Medicine

Medical Staff — Jul 1991 - Present
University of Vermont Medical Center
(Formerly Medical Center Hospital of Vermont)
(Formerly Fletcher Allen Health Care)

Medical Staff Champlain Valley Physicians Hospital University of Vermont Health Network	Jan 2020 - Present
Director, Division of Vascular and Interventional Radiology University of Vermont Medical Center (Formerly Fletcher Allen Health Care)	Jul 2006 – Jun 2010
Consultant Staff Gifford Memorial Hospital Randolph, VT	Jan 2007 – Dec 2010
Courtesy Staff Radiologist Rutland Regional Medical Center Rutland, VT	Jan 1995 – Dec 2004

Post Graduate Management/Leadership and Professional Training:

Horty Springer Leadership Training Course Las Vegas, Nevada	Apr 10 – 12, 2008

Certification and Licensure:

Advanced Cardiac Life Support (ACLS)	Aug 2023 – Present
Basic Life Support (BLS)	Aug 2023 – Present
Utah Medical License (Physician & Surgeon #13546003-1205) (Physician & Surgeon CS Schedule 2-5 #13546003-8905)	Aug 2023 – Jan 2026
Utah DEA (#******086) Schedules 2-5	Aug 2023 – Jan 2026
New York DEA (#******259	Dec 2024 – Jan 2025
American Board of Radiology – Interventional Radiology/ Diagnostic Radiology (#34386)	Oct 2017 – Present
Nevada Medical License (#13411 – Inactive)	2009
New York Medical License (#246680)	2007 – Present
New Hampshire State Board of Medicine (#13633 – Inactive)	2007

The Medical Board of California (#G87223)	2004 – Present
Certificate of Registration as a Visiting Overseas Doctor (Registration #4460912) General Medical Council, United Kingdom	1998
National Provider Identifier (NPI) (1528089166) Centers for Medicare and Medicaid Services	1996 – Present
American Board of Radiology - Certificate of Added Qualification In Vascular and Interventional Radiology (#34386)	1995 – 2018
State of Vermont Board of Medical Practice (#042-0008332)	1991 – Present
Vermont DEA (******885) Schedules 2-5	Dec 2023 – Jan 2027
American Board of Radiology - Diagnostic Radiology (#34386)	Jun 1990 – Sep 1995
Massachusetts Board of Registration in Medicine (#72682 – inactive)	1990
State Medical Board of Ohio (#53939 – inactive)	1985 – 1990

Professional Memberships & Activities (Active and Inactive):

American College of Radiology

Vermont Radiological Society

Radiological Society of North America

American Roentgen Ray Society

American Heart Association Council on Cardiovascular Radiology

Society of Interventional Radiology

International Society for Endovascular Surgery

New England Society of Cardiovascular and Interventional Radiology

Vermont Medical Society

International Society of Peritoneal Dialysis

Honors and Awards:

Division of the Year Interventional Radiology, Department of Radiology Larner College of Medicine at the University of Vermont	2016
"Master Teacher," Teaching Academy Larner College of Medicine at the University of Vermont	2016 - Present
Division of the Year Interventional Radiology, Department of Radiology Larner College of Medicine at the University of Vermont	2013
Certificate of Merit Award Educational Exhibit. Abstract # LL-VIE4507 97th Scientific Assembly and Annual Meeting of the Radiological Society of North America.	2012
Becoming One Team Award of the University of Vermont Medical Center for the IVC Filter Multidisciplinary Management Team	2010
Fellow, American College of Radiology	2005
Fellow, Society of Interventional Radiology	2001
Visiting Professor, Kuwait University Health Sciences Center and Faculty of Medicine, Department of Radiology	Feb 21 – 27, 1999
Visiting Professor, Ohio State University Department of Radiology	Nov 20, 1992
Slocum Award for the Sciences, Ohio Wesleyan University Delaware, Ohio	1981
Phi Beta Kappa, Ohio Wesleyan University Delaware, Ohio	1980

Sabbaticals:

Vascular and Interventional Radiology Guy's Hospital, Department of Radiology London, United Kingdom. Sponsor: Professor A. Adam MBBS (Hons) FRCP FRCR	Jan 1998 – Mar 1998
Vascular and Interventional Radiology University of California, San Diego Medical Center	Jan 2005 – Mar 2005

San Diego, California.
Sponsor: Ann Roberts, MD

University of Vermont and
Larner College of Medicine at the University of Vermont
(UVM COM) Committees and Administrative Service:

Clinical Devices and Instruments Course – BME3810 Department of Biomedical Engineering University of Vermont	2022 - 2023
Department of Radiology Chair Search Committee	2016 – 2017
UVM COM Curriculum Committee	2013 – 2016
UVM COM Specialty Panel	Nov 11, 2012
New Curriculum, Nephrology section	Nov 2004
Fellowship Program Director, Vascular and Interventional Radiology	1999 – 2004
Residency Program Director, Diagnostic Radiology	1992 – 1996

The University of Vermont Medical Center (UVMMC) and the
University of Vermont Medical Group (UVMMG)
Department/Hospital Committees
and Administrative Service:

Search Committee, Department of Pathology Cytopathology Staff Position	2023-2024
Compensation Plan Sub-committee - University of Vermont Medical Group	2018 - 2019
Search Committee, Division of Vascular Surgery Staff position	2018 - 2020
UVMMC Medical Staff Quality Committee	2017 - 2022
Search Committee, Division of Gastroenterology Staff position	2017 - 2022
Vice-Chair of Quality, Department of Radiology	2017 – 2022
Quality Committee, Department of Radiology	2017 – 2022
Promotion Committee, Department of Radiology	2016 - 2024

Finance Committee – University of Vermont Medical Group	2016 – 2022
Radiology Advancement Committee	2015 - 2024
Cardiovascular Services, Interventional Radiology Representative	2014 – 2024
Radiology Finance Committee	2018 - 2022
Radiology Visiting Professor Committee	2010 - 2020
Radiology Residency Core Curriculum Committee	2010 - 2016
Immediate Past President of the Medical Staff	2009 – 2010
President of the Medical Staff	2008 – 2009
Medical Staff Finance Committee – ex-officio member	2008 – 2009
Board of Trustees – ex-officio member	2008 – 2009
Patient Safety Committee – ex-officio member	2008 – 2009
Quality Assurance and Improvement Committee - ex-officio member	2008 – 2009
Bylaws Committee – ex-officio member	2008 – 2009
Vice President and President – Elect of the Medical Staff	2007 – 2008
Value Analysis Committee – Perioperative Services	2005 – 2010
Medical Staff Executive Committee	2004 – 2009
Credentials Committee	2003 – 2016
Graduate Medical Education Committee	1999 – 2004
Fellowship Program Director, Vascular and Interventional Radiology	1999 – 2004
Compliance Committee	1998 – 2000
Residency Program Director, Diagnostic Radiology	1992 – 1996
Graduate Medical Education Committee	1992 – 1996

Regional Committees and Administrative Service:

Vermont ALS Center, Sponsored by the National ALS Association	2006 – Present

Interventional Radiology Representative

Radiology Representative, Physician Policy Committee — 1999 – 2000
Vermont Medical Society

President, Vermont Radiological Society — 1998 – 2000
Vermont State Chapter of the American College of Radiology

Vice President / President Elect, Vermont Radiological Society — 1996 – 1998
Vermont State Chapter of the American College of Radiology

Secretary/Treasurer, Vermont Radiological Society — 1994 – 1996
Vermont State Chapter of the American College of Radiology

National Committees and Administrative Service:

Collaborative Committee (SIR) ACR-SIR Practice Parameter for the Performance of Angiography, Angioplasty, and Stenting for the Diagnosis and Treatment of Renal Artery Stenosis in Adults — 2019 - 2020
American College of Radiology and Society of Interventional Radiology

Standards of Practice Committee — 2013 – 2019
Guidelines and Statements Committee — 2020 - 2021
- Standards of Practice Steering Committee — 2019 - 2021
- Sub-committee on Procedure Complications — 2014 - 2016
- Standards Work Group on Cardiac Imaging, Women's Health And New Technologies — 2018 - 2021
- Standards Interventional Oncology Work Group — 2018 - 2021
- Standards Renal Work Group — 2018 - 2021

Society of Interventional Radiology

Society of Interventional Radiology Annual Scientific Meetings — Mar 24, 2012
SIR2012; San Francisco, CA
Faculty - CVC Insertion - Clinical Associates Hands-On Workshop

Research and Reports in Focused Ultrasound — 2012 – 2016
Editorial Board Member

The Scientific World Journal
Editorial Board Member — 2011 – 2017

Member, Data Monitoring and Safety Committee — 2008 – 2011
RETRIEVE I and RETRIEVE II Studies
Crux Biomedical, Inc.

Society of Interventional Radiology 29th, 30th, 31st Annual Scientific Meetings Faculty and Workshop Coordinator. — 2004 – 2006

Inferior Vena Cava Filtration Hands On Workshops.
Phoenix, AZ, New Orleans, LA, and Toronto, Canada

Society of Interventional Radiology 27th and 28th Annual Scientific Meetings Faculty. 2002 – 2003
Inferior Vena Cava Filtration Hands On Workshop
Baltimore, MD and Salt Lake City, UT

SUNY Downstate Medical Center – Brooklyn Endovascular Course Faculty. 1995-1996
Brooklyn, NY

American Association of Academic Chief Residents in Radiology 1988 – 1989
Steering Committee Member and Film Panel Moderator

Peer-Reviewed Publications:

Plante C, Nezami N, Pineda J, **Morris CS**, Bhave AD, Majdalany BS. Ruptured lymphocele leading to lymphorrhea and wound dehiscence: A treatment approach with drainage and lymphangiography. Radiology Case Reports. 2025 Jul; 20(7):3304-8. Available at: https://doi.org/10.1016/j.radcr.2025.03.080.

Wu R, Kokabi N, Adler JM, Bhave AD, **Morris CS**, Saad WE, Majdalany DS, Majdalany BS. Paradoxical Cerebral Embolization during Transjugular Intrahepatic Portosystemic Shunt Creation and Variceal Sclerotherapy. Semin Intervent Radiol. 2024 Jul 10;41(2):220-225. doi: 10.1055/s-0044-1786539. PMID: 38993595; PMCID: PMC11236452.

Zettler E, **Morris CS**, Bhave, AD, Scriver GM, Shields JT, Majdalany BS. Foamed sotradecol embolotherapy of vascular malformations: clinical outcomes in a single center. Works in progress.

Warfield A, **Morris CS**, Bhave, AD, Scriver GM, Shields JT, Majdalany BS. Post-CORAL renal artery stenting: retrospective analysis of a 20-year single center cohort. Works in progress.

Sung BR, Johnston G, **Morris CS**, Sutton DE, Scriver GM, Bhave AD, Shields JT, Chopra P, Majdalany BS. Infection control standards of central venous catheter placement: a 15-year study on infection rate improvement. Works in progress.

Scriver GM, **Morris CS**, Bhave, AD, Shields JT, Majdalany BS. Percutaneous extraction of tricuspid valve vegetations: clinical outcomes at a single center. Works in progress.

Majdalany BS, Scriver GM, **Morris CS**, Bhave, AD, Shields JT. Portal vein embolization prior to resection of liver tumors: clinical outcomes and retrospective analysis of a 20-year single center cohort. Works in progress.

Johnston G, Jin G, Majdalany BS, **Morris CS**. Percutaneous image-guided bone graft versus magnesium-based bone void filler administration as adjunctive sclerotherapy treatment of bone cysts. Works in progress.

Bent E, Bleau JI, Bhave AD, **Morris CS**, Scriver GM, Shields JT, Majdalany BS. The 100 X-iest IRs: a social media analysis of interventional radiologists. Submitted to JVIR 2024.

Clarke C, **Morris CS**. Aortocaval fistula. American College of Radiology Case in Point. ID: S13451 2024 Aug 16; Available at https://cortex.acr.org/CiP/Pages/CaseView?Info=6Lu5fy1UReHGUyZtStDqIWztFcWUtQfI5y4DfU1iYXo%3d.

Smith ZT, Haines J, Calkins E, Fox J, Scriver G, **Morris CS**. Transcatheter coil embolization of a complex pulmonary artery pseudoaneurysm with thyrocervical trunk-pulmonary arterial fistulization in a patient with cystic fibrosis and massive hemoptysis. Radiol Case Rep. 2022; 17:1836-42. https://doi.org/10.1016/j.radcr.2022.03.024. PMID: 35401900

Emelianova D, Prikis M, **Morris CS**, Gibson PC, Solomon R, Scriver G, Smith ZT, Bhave A, Shields J, DeSarno M, Kumar A. The evolution of performing a kidney biopsy: a single center experience comparing native and transplant kidney biopsies performed by interventional radiologists and nephrologists. BMC Nephrol. 2022 Jun 25;23(1):226. doi: 10.1186/s12882-022-02860-1. PMID: 35752759; PMCID: PMC9233823.

Johnston G, Jin G, **Morris CS**. Image-guided tunneled peritoneal dialysis catheter placement. Cardiovasc Diagn Ther. 2021; OnlineFirst https://dx.doi.org/10.21037/cdt-21-579; doi:10.21037/cdt-21-579.

Johnston G, Berg A, **Morris CS**. CT-guided percutaneous bilateral sacroiliac joint arthroplasty. Radiol Case Rep. 2021; 16:2266-73. PMID: 34178201

Michell H, Chopra P, Parkinson W, Bhave A, Ali N, Parkinson W, Shields J, Scriver G, **Morris CS**. Formation of spontaneous air cyst and ensuing hemopneumothorax during CT angiography in a patient with Ehlers-Danlos syndrome. BJR/Case Rep. 29 Jul 2020; OnlineFirst https://doi.org/10.1259/bjrcr.20200082 PMID: 33299598

Reis SP, Brejt SZ, Kaufman C, **Morris CS**, Redstone EA, Richard HM. ACR-SIR practice parameter for the performance of angiography, angioplasty, and stenting for the diagnosis and treatment of renal artery stenosis in adults. 2019; Available at https://www.acr.org/-/media/ACR/Files/Practice-Parameters/RenalArteryStenosis.pdf Accessed November 30, 2020.

Morris CS, Johnston GP, Desarno MJ, Badireddy AR: In vitro analysis and cadaver feasibility study of a peritoneal dialysis catheter tungsten weighted anchor. J Exp Nephrol. 2020; 1(1):25-37. Available at: https://www.probiologists.com/public/assets/articles/article-pdf-1735045752-492.pdf.

Michell H, Johnston G, Nezami N, Morris CS: Iatrogenic abdominal aortic pseudoaneurysm repaired by percutaneous image-guided translumbar embolization. Journal of Vascular Surgery Cases and Innovative Techniques. 2020 doi: https://doi.org/10.1016/j.jvscit.2020.11.002. PMID: 33665529

Michell H, Nezami N, **Morris CS**, Hong K: Dual-chambered venous access port as alternative access for extracorporeal apheresis therapy. Journal of Vascular Access. 15 Jun 2020; OnlineFirst. https://doi.org/10.1177/1129729820932425. PMID: 32538271

Michell H, Johnston GP, **Morris CS**: Uncomplicated percutaneous IVC filter removal following implantation time of 6033 days. Radiol Case Rep. 2020 May 21;15(7):1078-1082. doi: 10.1016/j.radcr.2020.05.008. eCollection 2020 Jul. PMID: 32461780.

Michell H, Nezami N, Dewald A, Bhave AD, **Morris CS**, Akselrod D: Median arcuate ligament syndrome with celiac artery aneurysm and dissection. Vascular and Endovascular Surgery. 2020; Online ahead of print. PMID: 32436479. DOI: 10.1177/1538574420927866.

Chopra P, Cleveland CH, Johnson M, Michell H, Holoch P, Irwin B, Scriver GM, **Morris CS**: Creation of a Neoinfundibulm and Serial Balloon Dilations for the Treatment of the Excluded Calyx: Two Cases Describing a Novel Technique. Radiol Case Rep. 2020 Jun 1;15(8):1121-1127. PMID: 32509047 doi: 10.1016/j.radcr.2020.04.038. eCollection 2020 Aug

Morris CS: Interventional radiology placement and management of tunneled peritoneal dialysis catheters: a pictorial review. Radiographics 40:1789-1806; 2020. **https://doi.org/10.1148/rg.2020200063** PMID: 33001792

Michell H, Johnston GP, Chopra P, Scriver GM, Bhave AD, Shields JT, **Morris CS:** Cholecystostomy as an exclusive access to remove cystic, common hepatic, and common bile duct stones. Am J Roentgenol 1-5: 10.2214/AJR.19.22469 OnlineFirst 08 Sep 2020, :1-5. DOI: 10.2214/ajr.19.22469 PMID: 32901566

Morris CS, Baerlocher MO, Dariushnia SR, McLoney E, Abi-Jaoudeh N, Nelson K, Cura M, Abdel-Aal AK, Mitchell JW, Madassery S, Partovi S, McClure TD, Tam AL, Patel S: Society of interventional radiology position statement on the role of percutaneous ablation in renal cell carcinoma. J Vasc Interv Radiol 31(2):189-94; 2020. PMID: 31917025. doi: 10.1016/j.jvir.2019.11.001. Epub 2020 Jan 6.

Hahn S, Perry M, **Morris CS,** Wshah S, Bertges DJ: Machine deep learning accurately detects endoleak after endovascular abdominal aortic aneurysm repair. J Vasc Surg: Vascular Science; https://doi.org/10.1016/j.jvssci.2019.12.003; 2020

Morris CS: Invited Commentary on "CT for Evaluation of Acute Gastrointestinal Bleeding." RG-18-0138.R1. Radiographics 38(4):1108-10; 2018.

Cisu T, Cleveland C, **Morris CS**, Plante M: Creation of a duplicated collecting system ureteric neoanastomosis in a transplanted cadaveric kidney with the use of a radiofrequency guide wire. Urol Case Rep 16:38-40; 2017.

Khalilzadeh O, Baerlocher MO, Shyn PB, Connolly BL, Devane AM, **Morris CS**, Cohen AM, Midia M, Thornton RH, Gross K, Caplin DM, Aeron G, Misra S, Patel NH, Walker TG, Martinez-Salazar G, Silberzweig JE, Nikolic B: Proposal of a New Adverse Event Classification by the Society of Interventional Radiology Standards of Practice Committee. J Vasc Interv Radiol 28:1432-7; 2017.

Vincent JK, Stark C, Bhave AD, Shields JT, **Morris CS**: Hepatic venous pressure gradient as a predictor of advanced hepatic fibrosis: A retrospective review. Abdom Radiol doi: 10.1007/s00261-017-1171-y. [Epub ahead of print]; 42(11):2609-2614; 2017.

Ford C, Lange B, **Morris CS**: Transcatheter Embolization of Abdominal Aortic Endograft Endoleaks Using Onyx and Coils: Experience at a Regional Tertiary Care Referral Center. Journal of Vascular Diagnostics and Interventions 5:15-9; 2017.

Winters J, **Morris CS**, Holmes C, et al.: A multidisciplinary quality improvement program increases inferior vena cava filter retrieval rates. Vasc Med. 22(1):51-6; 2017.

Stark C, Olsen D, **Morris CS**, Bertges D, Najarian K. Intravascular papillary endothelial hyperplasia (Masson's Tumor) of the radial artery: a case report. Cardiovas Intervent Radiol 2016; 39(11):1658-61.

Johnson J, Kiankhooy A, Bertges D, **Morris CS**: Image guided treatment of adventitial cystic disease of the femoral vein. Cardiovascular and Interventional Radiology 32:812-6; 2009.

Morris CS: Current status of renal arterial endovascular interventions. Invited Review. Current Hypertension Reviews 5:321-332; 2009.

Johnson J, Saemi A, **Morris CS**: Brief report: Transcatheter vasodilatation following thrombolytics for the treatment of frostbite. Cardiovascular and Interventional Radiology 32:1280-3; 2009.

Morris CS, Cushman M: Perforation of the inferior vena cava by a Greenfield filter. Journal of Thrombosis and Haemostasis 6:1835-1836; 2008.

Morris CS: Update on uterine artery embolization for symptomatic fibroid disease (uterine artery embolization). Abdominal Imaging. 33:104-11; 2008. Published online February 7, 2007.

Morris CS, Rogers FB, Najarian KE, Bhave AD, Shackford SR: Current trends in vena caval filtration with the introduction of a retrievable filter at a level I trauma center. J Trauma 57:32-36; 2004.

Schultze D, **Morris CS**, Bhave AD, Worgan BA, Najarian KE: Radiofrequency Ablation of Renal Transitional Cell Carcinoma with Protective Cold Saline Infusion. J Vasc Interv Radiol 14:489-492; 2003.

Morris CS: Role of vascular and interventional radiology in the diagnosis and management of acute trauma patients. J Intensive Care Med 17:112-126; 2002.

Morris CS: Vascular and solid organ trauma - Interventional Radiology. emedicine.com; accessible at http://www.emedicine.com/radio/topic881.htm; 2001.

Morris CS, Bonnevie G, Najarian KE: Nonsurgical treatment of acute iatrogenic renal artery injuries occurring after renal artery angioplasty and stenting. AJR. Am J Roentgenol 177:1-5; 2001.

Morris CS, Nelson EN, Najarian KE, D'Agostino R: Case report: Treatment of acute aortorenal bypass graft thrombosis using primary stenting and adjunctive thrombolysis. J Vasc Interv Radiol 9:961-963, 1998.

Morris CS, Najarian KE: Transjugular intrahepatic portosystemic shunt for bleeding stomal varices associated with chronic portal vein occlusion: long-term angiographic, hemodynamic,
and clinical follow-up. Am J Gastroenterol 95(10):2966-8, 2000.

Rogers FB, Strindberg G, Shackford SR, Osler TM, **Morris CS**, Ricci MA, Najarian KE, D'Agostino R, Pilcher DB: Five-year follow-up of prophylactic vena cava filters in high-risk trauma patients. Arch Surg 133:406-411, 1998.

Chapdelaine JP, Najarian KE, D'Agostino R, **Morris CS**: Stent placement in a carotid artery bypass graft in a patient with Takayasu arteritis. J Vasc Interv Radiol 9:846-848, 1998.

Najarian KE, **Morris CS**: Transcatheter arterial embolization in the chest (AVMs, bronchial artery embolization). Journal of Thoracic Imaging 13:93-104, 1998.

Ahmad A, Najarian KE, **Morris CS**: Case Report. Percutaneous treatment of a collapsed stent-graft. J Vasc Interv Radiol 8:637-639, 1997.

Rogers FB, Shackford SR, Wilson J, Ricci MA, **Morris CS**: Prophylactic vena cava filter insertion in severely injured trauma patients: Indications and preliminary results. J Trauma 35:637-641, 1993.

Morris CS: Master's Thesis: Microcomputer assisted tutorial in neuroradiology. The Ohio State University Press. Sept 1990.

Morris CS: Roentgenologic clinical pathologic case: Paget's disease with headache and disorientation. Investigative Radiology 25:1279-1284, Nov 1990.

Morris CS, Chirico PA: Case form A^3CR^2: Comatose young woman with respiratory distress and abdominal mass. Investigative Radiology 25:1159-1161, Oct 1990.

Morris CS, Lough LR, Weinberger E: Case from A^3CR^2: Infant with lethargy, failure to thrive, and abnormal blood smear. Investigative Radiology 25:1054-1057, Sept 1990.

Morris CS, Lloyd T: Case report: Traumatic scapulothoracic dissociation in a child. Skeletal Radiology 19:607-608, Sept 1990.

Morris CS, Beltran JL: Giant synovial cyst associated with a pseudarthrosis of a rib: MR appearance. AJR. Am J Roentgenol 155:337-338, Aug 1990.

Chandnani VP, Beltran J, **Morris CS**, et al.: Acute experimental osteomyelitis and abscesses: detection with MR imaging versus CT. Radiology 174:233-236, 1990.

McGhee RB, Bennett WF, **Morris CS**, Witanowski LS: Cost-effective development of a computer-assisted instruction system. AJR. Am J Roentgenol 153:877-879, Oct 1989.

Peer-Reviewed Collaborative Publications

Dariushnia SR(1), Haskal ZJ(2), Midia M(3), Martin LG(4), Walker TG(5), Kalva SP(6), Clark TW(7), Ganguli S(8), Krishnamurthy V(9), Saiter CK(10), NikolicB(11); Society of Interventional Radiology Standards of Practice Committee. Collaborators: Aeron G, Angle JF, Annamalai G, Arellano R, Athreya S, Baerlocher MO, Balter S, Baskin K, Brennan I, Brook O, Brown DB, Caplin D, Censullo M, Chamsuddin A, Chao C, Dagli MS, Davidson J, Devane A, Eyheremendy E, Fintelmann F, Gemmete J, Gendel V, Gould J, Graham T, Hancock J, Hogan M, Hohenwalter E, d'Othee BJ, Khan A, Kim HS, Kohi MP, Lee C, Mani NB, Martinez-Salazar G, McGraw JK, Meyers P, Miller DL, Mitchell JW, **Morris C**, Patel I, Pillai A, Pua U, Redstone E, Roberts AC, Sabharwal T, Sapoval M, Schiro BJ, Shah S, Shyn P, Padia SA, Siddiqi N, Silberzweig JE, Stokes L, Suri R, Swan T, Turba U, Venkatesan A, Weinstein JL, Wojak JC. "Quality Improvement Guidelines for Transjugular Intrahepatic Portosystemic Shunts." J Vasc Interv Radiol. 2016 Jan;27(1):1-7. doi: 10.1016/j.jvir.2015.09.018. Epub 2015 Nov 21.PMID: 26614596

Pabon-Ramos WM(1), Dariushnia SR(2), Walker TG(3), d'Othée BJ(4), Ganguli S(5), Midia M(6), Siddiqi N(7), Kalva SP(8), Nikolic B(9); Society of Interventional Radiology Standards of Practice Committee. Collaborators: Aeron G, Angle JF, Annamalai G, Arellano R, Athreya S, Baerlocher M, Balter S, Baskin K, Brennan I, Brook O, Brown D, Caplin D, Censullo M, Chamsuddin A, Chao C, Dagli MS, Davidson J, Devane A, Eyheremendy E, Fintelmann F, Gemmete J, Gendel V, Gould J, Graham T, Hancock J, Hogan M, Hohenwalter E, d'Othee BJ, Khan A, Kim HK, Kohi MP, Krishnamurthy V, Lee C, Mani NB, Martinez-Salazar G, McGraw JK, Meyers P, Miller D, Mitchell JW, **Morris C**, Patel I, Pillai A, Pua U, Redstone E, Roberts A, Sabharwal T, Sapoval M, Schiro BJ, Shah S, Shyn P, Siddharth P, Siddiqi N, Silberzweig JE, Stokes L, Suri R, Swan T, Turba U, Venkatesan A, Weinstein JL, Wojak J. "Quality Improvement Guidelines for Percutaneous Nephrostomy." 2016 Mar;27 (3):410-4. doi: 10.1016/j.jvir.2015.11.045. Epub 2016 Jan 21 J Vasc Interv Radiol. 2016 Mar;27(3):410-4. doi: 10.1016/j.jvir.2015.11.045. Epub 2016 Jan 21. PMID: 26803576

Invited Author for Book Chapter:

Morris CS and Rimmer JM: Diagnostic and therapeutic renal angiography. In: Schrier RW (ed.) *Diseases of the Kidney and Urinary Tract* 8th ed. Philadelphia: Lippincott, Williams, and Wilkins. 2006.

Morris CS and Rimmer JM: Diagnostic and therapeutic renal angiography. In: Schrier RW (ed.) *Diseases of the Kidney and Urinary Tract* 7th ed. Philadelphia: Lippincott, Williams, and Wilkins. 2001.

Morris CS and Rimmer JM: Diagnostic and therapeutic renal angiography. In: Schrier RW and Gottschalk CW (eds.) *Diseases of the Kidney* 6th ed. Boston: Little, Brown and Co. 1997

National/International Abstract Poster/Electronic Exhibit Presentations:

Zettler E, **Morris CS**, Majdalany B. Foamed sotradecol embolotherapy of venous malformations: clinical outcomes in a single center. Global Embolization Symposium and Technologies (GEST) 2025, May 15, 2025, New York City, NY.

Warfield A, **Morris C**, Bhave A, Scriver G, Shields J, Agrawal V, Solomon R, Majdalany B. Renal artery stenting for atherosclerotic renal artery stenosis: a retrospective analysis of a 20-year single-center cohort. Abstract No. 177. SIR 2025 Annual Scientific Meeting, March 31, 2025, Nashville, TN.

Franssen N, Park P, Bleau J, **Morris C**, Bhave A, Scriver G, Shields J, Pineda J, O'Neill C, Maithel S, Sarmiento J, Kiiby D, Lilly M, Jung J, Majdalany B. A dual-center, retrospective comparison of right portal vein embolization using foamed sodium tetradecyl sulfate compared with microsphere particle embolization. Abstract No. 42. SIR 2025 Annual Scientific Meeting, March 30, 2025, Nashville, TN.

Roh S, Sutton D, Bhave A, Scriver G, Shields J, McClellan B, **Morris C**, Majdalany B. A retrospective analysis of a single-institution, 20-year experience with infection control for chest port placement. Abstract No. 73. SIR 2025 Annual Scientific Meeting, March 30, 2025, Nashville, TN.

Calkins E, Bogart A, Dewald A, Khuong Y-L, Boyle J, Bhave A, Shields J, Scriver G, **Morris C**. Comparing patient satisfaction of telemedicine versus in-person interventional radiology clnic encounters: a single-site cross-sectional study. Presented as a scientific electronic poster (P-98) at the Cardiovascular and Interventional Radiology Society of Europe (CIRSE) Summit Annual Meeting Online; 2021 Sep; Vienna, Austria.

Pham S, Sutton DE, Chen J, Sutton H, Shields JT, **Morris CS**, Scriver GM, Bhave AD. Infection control standards of implanted chest ports. Presented as a scientific electronic poster at the International Symposium on Endovascular Therapy; 2019 Jan; Hollywood, FL.

Michell H, **Morris CS**, Hong K. To evaluate the use of a dual-chambered venous access port for extracorporeal apheresis therapy. Presented as a scientific electronic poster at the International Symposium on Endovascular Therapy; 2019 Jan; Hollywood, FL.

Michell H, Chopra P, Scriver G, Bhave A, Shields J, **Morris C**. Common Bile Duct and Cystic Stone Removal via a Cholecystoduodenostomy. Presented as a scientific electronic poster at the Yale School of Medicine 5th Annual Academic Interventional Radiology Symposium; 2018 Sep; New Haven, CT.

McGhee RB, Bennett WF, **Morris CS**, Witanowski LS. Cost-effective development of a computer-assisted instruction system. Presented as a scientific exhibit at the 37th Annual Meeting of the Association of University Radiologists; 1989 May; Seattle, WA.

McGhee RB, Bennett WF, **Morris CS**, Witanowski LS. Cost-effective development of a computer-assisted instruction system. Presented as a scientific exhibit at the 74th Scientific Assembly and Annual Meeting of the RSNA; 1988 Nov; Chicago, IL.

Chandnani VP, Beltran J, **Morris CS**, et al.: Acute experimental osteomyelitis and abscesses: detection with MR imaging versus CT. Presented as a scientific exhibit at the 74th Scientific Assembly and Annual Meeting of the RSNA; 1988 Nov; Chicago, IL.

Morris CS, LaRosa J, and VanAman ME. Technically difficult percutaneous Kimray-Greenfield filter insertions. Presented at the 48th annual meeting, Ohio State Radiological Society; 1988 May 13; Toledo, OH.

Regional Abstract
Oral Presentations:

Johnston G, Jin G, Majdalany BS, **Morris CS**. Percutaneous image-guided bone graft versus magnesium-based bone void filler administration as adjunctive sclerotherapy treatment of bone cysts. Submission number 1632899. Accepted for oral presentation at SIR 2024 Annual Scientific Meeting, March 24, 2024; Salt Lake City, UT.

Johnston G, Jin G, Berg A, Smith Z, **Morris CS**. Image guided percutaneous sclerotherapy and infusion of benign bone cysts with cadaveric bone chips and demineralized bone matrix. Accepted for Oral Presentation at the Society of Interventional Radiology 2022 Annual Scientific Meeting; June 15, 2022; Boston, MA.

Conor O'Neill, MD; Tess Aulet, MD; Sergey Kulikov, MD; Douglas Sutton, RN; **Christopher S. Morris, MD**; Joseph Shields, MD; Carlos Marroquin, MD, FACS; Anant Bhave, MD: Interventional Strategies for Management of Hepatocellular Carcinoma at UVMMC; Presented at the Vermont Chapter of the American College of Surgeons Annual Meeting, 26 May, 2016; South Burlington, VT.

Fernandez N, Stanley AC, Healey C, Osler T, Pilcher DB, Ricci MA, Steinthorsson G, **Morris CS**, Shackford SR: Clinical outcomes of percutaneous revascularization as an isolated procedure in treating patients with limb threatening ischemia. Presented at the New England Society for Vascular Surgery 30th Anniversary Meeting; 2003 Sept 19-21; Albany, NY.

Rogers FB, Shackford SR, Osler TM, **Morris CS**, Najarian KE, D'Agostino RM, Strindberg G, Ricci, MR: Five-year follow-up of prophylactic vena cava filters in high risk trauma patients:

complications and results. Presented at the New England Surgical Society Annual Meeting; 1997 Sept 20; Bolton Landing, NY.

Morris CS. Radiology of pulmonary embolism. Presented at the Edward F. Morris, M.D. Symposium, Barberton Citizens Hospital; 1988 June 18; Barberton, OH.

Regional Abstract
Poster/Electronic Exhibit
Presentations:

Zettler E, **Morris CS**, Bhave, AD, Scriver GM, Shields JT, Majdalany BS. Foamed sotradecol embolotherapy of vascular malformations: clinical outcomes in a single center. Larner College of Medicine at the University of Vermont Symposium for Summer Research; 2024 Sep 19; Burlington, VT.

Warfield A, **Morris CS**, Bhave, AD, Scriver GM, Shields JT, Majdalany BS. Post-CORAL renal artery stenting: retrospective analysis of a 20-year single center cohort. Larner College of Medicine at the University of Vermont Symposium for Summer Research; 2024 Sep 19; Burlington, VT.

Pham S, Sutton DE, Chen J, Sutton H, Shields JT, **Morris CS**, Scriver GM, Bhave AD. Infection control standards of central venous catheters. 16th Annual Quality Forum. Jeffords Institute for Quality. University of Vermont Health Network; 2019 May 15; Burlington, VT.

National/International
Abstract Oral or Poster Presentations

Bent E, Bleau JI, Bhave AD, **Morris CS**, Scriver GM, Shields JT, Majdalany BS. E5419. The 150 X-iest Radiologists: a social media analysis of radiology influencers. 2024 American Roentgen Ray Society (ARRS) Annual Meeting, 2024 May 5-9; Boston.

Hahn S, Wshah S, Perry M, **Morris CS**, Bertges DJ. Machine deep learning accurately detects endoleak after endovascular abdominal aortic aneurysm repair. Delivered as an oral presentation, abstract ID 606853, 2019 Vascular Annual Meeting, Society for Vascular Surgery, 2019 Jun 12-15; Washington D.C.

Hahn S, **Morris CS**, Bertges D, Wshah S. Deep learning for recognition of endoleak after endovascular abdominal aortic aneurysm repair. Delivered as an oral presentation/abstract. IEEE International Symposium on Biomedical Imaging (ISBI '19); 2019 Apr; Venice, Italy.

Khalilzadeh O, Baerlocher MO, Katsarelis D, Shyn P, Devane A, **Morris CS**, Cohen AM, Connolly B, Midia M, Thornton R, Gross K, Caplin D, Aeron G, Misra S, Patel N, Walker TG, Martinez-Salazar G, Silberzweig J, Nikolic B: Proposal of a New Adverse Event Classification by the SIR Standards of Practice Committee. Delivered as an oral presentation/abstract, 42nd Annual Meeting of the Society of Interventional Radiology; 2017 Mar 4 – 9; Washington D.C.

Love R, Scriver G, Shields JT, **Morris CS**, Bhave A. Effective implementation of fluoroscopic and angiographic dose reduction in image guided procedures. Abstract Presentation at the Annual Meeting of the Cardiovascular and Interventional Radiology Society of Europe; 2017 Sep 16-20; Copenhagen, Denmark.

Ali NS, Allison JB, **Morris CS**, D'Agostino RM: Clinical vignette: Spontaneous duodenal hematoma in an anticoagulated patient. Abstract presentation at the American Medical Association Research Symposium; 2016 Nov 11; Orlando, FL

Qian J, Shields JT, Allison JB, Bhave AD, **Morris CS**: Fluoroscopic Time Requirement as Predication of Successful IVC Filter Retrieval. Oral Presentation at the 102nd Scientific Assembly and Annual Meeting of the Radiological Society of North America, McCormick Place; 2016 Nov 27 – Dec 2; Chicago, IL.

Vincent JK, Stark C, **Morris CS**: Hepatic venous pressure gradient as a predictor of advanced hepatic fibrosis: A retrospective review. Scientific Poster Presentation at the American Roentgen Ray Society Annual Meeting; 2015 Apr 19 – 24; Toronto, Canada.

Winters J, **Morris CS**, Holmes C, et al.: A multidisciplinary quality improvement program increases inferior vena cava filter retrieval rates. Presented as a Scientific Poster (#162) at the Thrombosis and Hemostasis Summit of North America (THSNA); 2014 Apr 11; Chicago, IL.

Baumann CJ, **Morris CS**, Bhave AD, Najarian, KE: Compression of the anomalous median artery of the wrist. Abstract #358. Presented as a Scientific Poster at the 39th Annual Meeting of the Society of Interventional Radiology; 2014 Mar 22 – 27; San Diego, CA.

Lange B, **Morris CS**, Najarian KE: Transcatheter Embolization of Abdominal Aortic Endograft Endoleaks Using Onyx and Coils: Experience at a Regional Tertiary Care Referral Center. Oral Scientific Presentation of the 98th Scientific Assembly and Annual Meeting of the Radiological Society of North America, McCormick Place; 2012 Nov 24 – 30; Chicago, IL.

Lemos JA, Pace WA, Bhave AD, Scriver G, Shields JT, Najarian KE, **Morris CS**: Embolization and Obliteration of the Injured Biliary Ductal System Using Microcoils and N-Butyl Cyanoacrylate. Educational exhibit presentation at the 97th Scientific Assembly and Annual Meeting of the Radiological Society of North America. McCormick Place; 2011 Nov 27-Dec 2; Chicago, IL.

Lemos JA, Hampson CO, Najarian KE, Shields JT, **Morris CS**, Pace W, Bhave A. Management of hepatic malignancy with a minimally invasive approach: what every interventionalist trainee needs to know. Educational exhibit presentation at the 2010 Annual Meeting of the Cardiovascular and Interventional Radiological Society of Europe; 2010 Oct 2-6; Valencia, Spain.

Lemos JA, Hampson CO, **Morris CS**, Bhave AD, Shields JT, Najarian KE: Percutaneous Treatment of the Injured Biliary Tree. Educational exhibit presentation at the 95th Scientific Assembly and Annual Meeting of Radiology Society of North America (RSNA); 2009 Nov. 29 – Dec 04; Chicago, IL.

Lemos JA, Cushman M, Bhave AD, Najarian KE, Shields JT, **Morris CS**: Increased Inferior Vena Cava Filter Retrieval Rate With Improved Clinical Follow-Up. Scientific exhibit presentation at the

2009 Annual Meeting of the Cardiovascular and Interventional Radiological Society of Europe; 2009 Sept 19-23; Lisbon, Portugal.

Panko JE, **Morris CS**: Increased retrieval rates and dwell times for optional inferior vena cava filters at a level I trauma center: do improved patient follow-up and new inferior vena cava filter designs make a difference? Presented as a Scientific Poster at the Radiological Society of North America (RSNA) 92nd Scientific Assembly and Annual Meeting; 2006 Nov 26 – Dec 1; Chicago, IL.

Morris CS, Rogers FB, Najarian KE, Bhave AD, Shackford SR: Current trends in vena caval filtration with the introduction of a retrievable filter at a level I trauma center. Presented as a scientific poster at the 63rd Annual Meeting of the American Association for the Surgery of Trauma; 2003 Sept 9-11; Minneapolis, MN.

Ricci MA, **Morris CS**, Forgione MD, Callas PW, and the Wallgraft Occlusive Trial Investigators: Primary endovascular grafting of iliac occlusive disease is superior to stent alone - Initial results from a randomized, multicenter trial. Presented at the American Association for Vascular Surgery; 2001 June 12; Baltimore, MD.

Gemery JM, **Morris CS**, Najarian KE: Percutaneous transcatheter treatment of the failing lower extremity bypass graft. JVIR (suppl 2) 8:213, 1997. Presented at the Society of Interventional Radiology 22nd Annual Scientific Meeting; 1997 Mar 8-13; Washington D.C.

Rogers FB, Shackford SR, Wilson J, Kaups KL, Ricci MA, Wald S, **Morris CS**: Prophylactic vena cava filter insertion in severely injured trauma patients: Indications and preliminary results. E.A.S.T. 32:953, 1992. Hamilton, Bermuda.

McGhee RB, Bennett WF, **Morris CS**, Witanowski LS: Cost-effective development of a computer-assisted instruction system. 37th Annual Meeting of the Association of University Radiologists; 1989 May; Seattle, WA.

McGhee RB, Bennett WF, **Morris CS**, Witanowski LS: Cost-effective development of a computer-assisted instruction system. Scientific exhibit at the 74th Scientific Assembly and Annual Meeting of the RSNA; 1988 Nov; Chicago, IL.

Regional Invited
Speaking Engagements:

Interventional Radiology of GI Bleeding. GI Core Curriculum Conference. Department of Medicine. UVM College of Medicine; 2018 Jan 10; Burlington, VT.

UVM College of Medicine Surgery Readiness Course. 2016 Mar 7; Burlington, VT.

UVM College of Medicine Surgery Readiness Course. 2015 Mar 2; Burlington, VT.

UVM College of Medicine Surgery Readiness Course. 2014 Mar 4; Burlington, VT.

NMGI Mock Tumor Board. UVM College of Medicine; 2013 Mar 14; Burlington, VT.

Interventional Radiology of GI Bleeding. GI Core Curriculum Conference. Department of Medicine. UVM College of Medicine; 2013 Feb 26; Burlington, VT.

Interventional Radiology in the Abdomen. Surgery Resident Readiness Course. UVM College of Medicine; 2012 Mar 5; Burlington, VT.

Tumor Ablation. Pathology Research Forum. Department of Pathology. UVM College of Medicine; 2012 Feb 3; Burlington, VT.

Interventional Radiology Applications in the ICU. The 9th Annual Northern New England Critical Care Conference; 2011 Oct 21; Stowe, VT.

Interventional Radiology 2011. Grand Rounds. Department of Surgery. UVM College of Medicine; 2011 Apr 14; Burlington, VT.

Interventional Radiology for the Future Surgery Intern. Surgery Majors of UVM College of Medicine; 2011 Mar 16; Burlington, VT.

Interventional Radiology in Trauma: What is it, who are we, and what can it / we do for the trauma patient and trauma surgeon? The New England Regional Trauma Conference; 2008 Oct 2; Shrewsbury, MA.

Vascular Access Emergencies. Fletcher Allen Health Care Division of Nephrology Pathophysiology Conference; 2008 Mar 21; Burlington, VT.

Interventional Radiology of Image Guided Biopsy. Cytopathology Fall Seminar. Fletcher Allen Health Care. UVM College of Medicine. Department of Pathology. 2007 Oct 10; Burlington, VT.

Abdominal Aortic Aneurysms. Candidacy (anatomic issues), Devices, Domplications, and Follow-up of Endografts. Grand Rounds. Rutland Regional Medical Center; 2007 Jan 18; Rutland, VT.

Aortic Stent-Grafts and CTA. The 20th Annual Imaging Seminar. The University of Vermont College of Medicine; 2006 Oct 13; Stowe, VT.

Update on Inferior Vena Cava Filters. Vermont Vascular Medicine Conference; 2006 Oct 6; Burlington, VT.

Management of Abdominal Aortic Aneurysms. Grand Rounds. Porter Hospital; 2006 Sept 29; Middlebury, VT.

Aortic stent-grafts. Grand Rounds. Department of Radiology. University of Vermont College of Medicine; 2005 Dec 16; Burlington, VT.

Endoleaks associated with abdominal aortic stent-grafts: Past, present, and future. Grand Rounds. Department of Surgery. University of Vermont College of Medicine; 2005 Mar 31; Burlington, VT.

New topics in Interventional Radiology. The University of Vermont CME Regional Program. Copley Hospital Medical Staff; 2002 Feb 13; Morrisville, VT.

Update on uterine artery embolization for symptomatic uterine fibroid disease. Grand Rounds. Department of Obstetrics and Gynecology. University of Vermont College of Medicine; 2001 Nov 6; Burlington, VT.

What's new in vascular and interventional radiology. Grand Rounds. Department of Family Practice, University of Vermont College of Medicine; 2001 Mar 12; Burlington, VT.

Transjugular intrahepatic portosystemic shunt. Panel discussion. Stowe Conference on Digestive Diseases. University of Vermont College of Medicine; 2001 Mar 3; Stowe, VT.

Uterine artery embolization for symptomatic fibroid disease. The University of Vermont CME Regional Program. Springfield Hospital Medical Staff; 2001 Feb 15; Springfield, VT.

Angiography and interventional radiology in trauma. New England Roentgen Ray Society; 2000 Oct 13 Boston, MA.

Bronchial artery embolization and uterine artery embolization. 42nd Annual New England Conference of Radiologic Technologists; 2000 Sept 16; Burlington, VT.

MR Angiography. Vascular physics and technology review course. Department of Surgery, University of Vermont College of Medicine; 1999 Oct 25; Burlington, VT.

Radiologic management of the failing and thrombosed dialysis graft. Grand Rounds. Department of Surgery. University of Vermont College of Medicine; 1999 May 27; Burlington, VT.

Peripheral magnetic resonance angiography. Grand Rounds. Department of Radiology. University of Vermont College of Medicine; 1999 Jan 14; Burlington, VT.

Uterine artery embolization for the treatment of symptomatic uterine fibroids. Grand Rounds. Department of Obstetrics and Gynecology. University of Vermont College of Medicine; 1998 May 19; Burlington, VT.

Management of peripheral vascular disease. Vermont Academy of Family Physicians Annual Meeting; 1998 May 7; Killington, VT.

Bronchial artery transcatheter embolization in hemoptysis. Grand Rounds. Department of Radiology. University of Vermont College of Medicine; 1997 Apr 11; Burlington, VT.

Peripheral vascular disease. 38th Annual New England Conference of Radiologic Technologists; 1996 Sept 20; Burlington, VT.

Multidisciplinary approach to the management of portal hypertension. Grand Rounds. Department of Surgery. University of Vermont College of Medicine; 1996 Sept 12; Burlington, VT.

Current status of transjugular intrahepatic portosystemic shunts (TIPS). Fourth Annual Current Concepts and Controversies in Surgery. Department of Surgery, University of Vermont College of Medicine; 1995 Feb 9; Stowe, VT.

Angiography. Vascular physics and technology review course. Department of Surgery, University of Vermont College of Medicine; 1994 Sept 6; Burlington, VT.

Transjugular intrahepatic portosystemic shunts (TIPS) and other radiologic interventions. Clinical Problems in Gastroenterology X, UVM College of Medicine, Gastroenterology Unit; 1993 Feb 2; Stowe, VT.

Transjugular intrahepatic portosystemic shunt (TIPS). Grand Rounds, Department of Surgery, University of Vermont College of Medicine; 1993 Jan 28; Burlington, VT.

Transjugular intrahepatic portosystemic shunt (TIPS). Experience at MCHV. Grand Rounds, Department of Radiology, University of Vermont College of Medicine; 1992 Nov 10; Burlington, VT.

Transjugular intrahepatic portosystemic shunt. Presented at the Division of Gastroenterology, Department of Internal Medicine weekly conference, University of Vermont College of Medicine; 1992 June 25; Burlington, VT.

National/International Invited Speaking Engagements:

Central Venous Catheter Insertion. CVC Insertion. Clinical Associates Hands On Workshop. Society of Interventional Radiology Annual Scientific Meetings, SIR2012; 2012 Mar 24; San Francisco, CA.

The Cold Foot. The New England Roentgen Ray Society Program; 2008 Apr 4; Boston, MA.

Interventional Radiology for the Family Physician. New York State Academy of Family Physicians Winter Weekend and 59th Scientific Assembly; 2007 Jan 27; Lake Placid, NY.

Uterine Arterial Embolization. 26th Annual Comprehensive Review of Vascular and Interventional Radiology. Department of Radiology, University of California, San Diego; 2006 Oct 28; San Diego, CA.

Stent Grafts. 26th Annual Comprehensive Review of Vascular and Interventional Radiology. Department of Radiology, University of California, San Diego; 2006 Oct 28; San Diego, CA.

Update on renal arterial interventions. 26th Annual Comprehensive Review of Vascular and Interventional Radiology. Department of Radiology, University of California, San Diego; 2006 Oct 27; San Diego, CA.

Interventional Radiology of Biliary Disease. 1st Gulf Radiological Society Conference and 4th Kuwait International Conference of Radiology and Nuclear Medicine; 2006 Apr 20; Kuwait City, Kuwait.

Update on Inferior Vena Cava Filters. 1st Gulf Radiological Society Conference and 4th Kuwait International Conference of Radiology and Nuclear Medicine; 2006 Apr 19; Kuwait City, Kuwait.

Current status of inferior vena cava filtration. Inferior Vena Cava Filtration Hands On Workshop. Society of Interventional Radiology 31th Annual Scientific Meeting; 2006 Mar 31 and April 2; Toronto, CA.

Uterine artery embolization. University of California at San Diego Radiology Review Course: 25th Annual Comprehensive Review of Vascular and Interventional Radiology; 2005 Oct 22; San Diego, CA.

Stent-grafts in aortic diseases. University of California at San Diego Radiology Review Course: 25th Annual Comprehensive Review of Vascular and Interventional Radiology; 2005 Oct 22; San Diego, CA.

Current status of inferior vena cava filtration. Inferior Vena Cava Filtration Hands On Workshop. Society of Interventional Radiology 30th Annual Scientific Meeting; 2005 Apr 2& 4; New Orleans, LA.

Case Presentations. Radiology Residency Noon Conference. University of California, San Diego, VA Hospital; 2005 Mar 22; La Jolla, CA.

Interventional Radiology of biliary disease. Grand Rounds. Department of Radiology. UCSD Medical Center, Hillcrest Hospital; 2005 Mar 22; San Diego, CA.

Role of interventional radiology in trauma. Radiology Residency Noon Conference. University of California, San Diego, VA Hospital; 2005 Feb 15; La Jolla, CA.

Endoleaks associated with abdominal aortic stent grafts: Past, present, and future. San Diego Angio Club. Thornton Hospital; 2005 Jan 12; San Diego, CA.

Current status of inferior vena cava filtration. Culinary Institute; 2004 May 10; Poughkeepsie, NY.

Current status of inferior vena cava filtration. Syracuse Angio Club; 2004 Apr 14; Syracuse, NY.

Current status of inferior vena cava filtration. Inferior Vena Cava Filtration Hands On Workshop. Society of Interventional Radiology 29th Annual Scientific Meeting; 2004 Mar 26&29; Phoenix, AZ.

Current status of inferior vena cava filtration. Mercy Hospital; 2004 Feb 3; Portland, Maine.

Bronchial artery embolization. The Second International Conference of Radiology and Nuclear Medicine. Kuwait Radiology Society; 1999 Feb 22; Kuwait City, Kuwait.

Uterine artery embolization for symptomatic uterine fibroid disease. The Second International Conference of Radiology and Nuclear Medicine. Kuwait Radiology Society; 1999 Feb 22; Kuwait City, Kuwait.

Carbon dioxide angiography. The Second International Conference of Radiology and Nuclear Medicine. Kuwait Radiology Society; 1999 Feb 21; Kuwait City, Kuwait.

Current status of transjugular intrahepatic portosystemic shunt (TIPS). Grand Rounds. Department of Radiology, Ohio State University College of Medicine; 1992 Nov 20; Columbus, OH.

Invited Reviewer:

Reviewer, HPB Journal	2022 - 2023
Reviewer, Cardiovascular Diagnosis and Therapy	2021 - 2023
Reviewer, Journal of Vascular and Interventional Radiology	2011 – 2014
Senior Reviewer, Journal of Trauma	1996 – 2010
Reviewer, American Journal of Roentgenology	1997 – 2004

Grants:

University of Vermont Department of Surgery Internal Research Award — 2017 - 2019
Machine learning for detection of endoleak after endovascular abdominal aortic aneurysm repair
Sub-investigator
$25,000

University of Vermont Medical Center Foundation Grant — 2017 – 2019
Evaluation of a peritoneal dialysis catheter weighted anchor
Principal Investigator
$47,890

Active and Inactive Clinical Research:

Principal Investigator: CHRMS (Medical): STUDY00001696 — 2021 - Present
Sclerotherapy of cystic bone tumors.

Co-Principal Investigator: CHRMS (Medical): STUDY00001051 — 2020 - Present
A retrospective comparison of kidney biopsies performed by interventional radiologists and nephrologists.

Sub-Investigator: CHRMS 16-053 National Multicenter Trial. A phase 3, double-blind, randomized, long-term, placebo-controlled, multicenter study evaluating the safety and efficacy of obeticholic acid in subjects with non-alcoholic steatohepatitis (NASH). — 2019 - Present

Sub-Investigator: CHRMS Study #440 National Multicenter Trial. A phase 2, randomized, double-blind, placebo-controlled, multicenter, dose-finding study to evaluate the efficacy and safety of CC-90001 in subjects with non-alcoholic steatohepatitis (NASH) and stage 3 or stage 4 liver fibrosis. — 2019 - Present

Sub-Investigator: CHRMS 18-0636 National Multicenter Trial. A phase 2B randomized, double-blind, placebo-controlled study evaluating the safety and efficacy of BMS-986036 (PEG-FGF21) in adults with nonalcoholic steatohepatitis (NASH) and stage 3 liver fibrosis.	2019 – Present
Sub-Investigator: CHRMS 18-0634 National Multicenter Trial. A phase 2B randomized, double-blind, placebo-controlled study evaluating the safety and efficacy of BMS-986036 (PEG-FGF21) in adults with nonalcoholic steatohepatitis (NASH) and compensated liver cirrhosis.	2019
Sub-Investigator: CHRMS 18-0299 National Multicenter Trial. A phase 3, double-blind, randomized, long-term, placebo-controlled, multicenter study evaluating the safety and efficacy of obeticholic acid in subjects with compensated cirrhosis due to non-alcoholic steatohepatitis (NASH).	2019 - Present
Sub-Investigator: CHRMS Study #221 National Multicenter Trial. A phase 3, randomized, double-blind, placebo-controlled study evaluating the safety, tolerability, and efficacy of GS-9674 in non-cirrhotic subjects with primary sclerosing cholangitis.	2018 - Present
Sub-Investigator: CHRMS 18-0504 National Multicenter Trial. A Phase 2, Randomized, Double-Blind, Placebo-Controlled Study Evaluating the Safety and Efficacy of Selonsertib, GS-0976, GS-9674, and Combinations in Subjects with Bridging (F3) Fibrosis or Compensated Cirrhosis (F4) due to Nonalcoholic Steatohepatitis (NASH)	2018 - Present
Sub-Investigator: CHRMS Study #163 National Multicenter Trial. A post-Treatment follow-up study for liver disease subjects with or without liver Cirrhosis after receiving Emriscan or placebo.	2018 - 2019
Principal Investigator: CHRMS Study #413 Single Center Study. Percutaneous transcholecystic removal of biliary duct stones.	2018 - 2019
Sub-Investigator: National Multicenter Trial. National Cancer Institute (NCI) – Molecular Analysis for Therapy Choice (NCI-MATCH) Trial EAY131	2017 – Present
Sub-Investigator: CHRMS 17-0489 National Multicenter Trial – A phase 3, randomized, double-blind, placebo-controlled study evaluating the safety and efficacy of selonsertib in subjects with compensated cirrhosis due to non-alcoholic steatohepatitis (NASH).	2017 - 2019
Sub-Investigator: CHRMS 17-0488 National Multicenter Trial – A phase 3, randomized, double-blind, placebo-controlled study evaluating the safety and efficacy of Selonsertib in subjects with non-alcoholic steatohepatitis (NASH) and bridging (F3) fibrosis GS-US-384-1943.	2017 - 2019
Sub-Investigator: CHRMS 16-719 National Multicenter Trial - Conatus 12. Multicenter, randomized, double-blind, Placebo-controlled trial of Emricasan,	2017 - 2019

an oral caspase inhibitor, in (IDN-6556) in subjects with non-steatohepatitis (NASH) fibrosis.

Sub-Investigator: CHRMS 17-0334 Single Center Trial. Magnetic resonance-based determination of hepatic steatosis for optimization of outcomes following surgical resection of liver metastases. Sponsored by UVM Cancer Center / Lake Champlain Cancer Research Organization. 2017 - Present

Sub-Investigator: CHRMS 17-0192 National Multicenter Trial - Conatus 12. Multicenter randomized, double-blind, Placebo-controlled trial of Emricasan, an oral caspase inhibitor, in (IDN-6556) in subjects with non-steatohepatitis (NASH) fibrosis and severe portal hypertension. 2017 - Present

Sub-Investigator: CHRMS 16-472 Single Center Study – Fluoroscopic time requirement as prediction of successful IVC filter retrieval. 2016

Principal Investigator: Adjunctive cone-beam CT as a predictor of tunneled peritoneal dialysis catheter function.
University of Vermont Medical Center
Single Center Trial 2015 – 2018

Co-principal Investigator: National Multicenter Trial.
Best Endovascular vs. Best Surgical Therapy in Patients with Critical Limb Ischemia (BEST-CLI) 2014 – 2018

Co-investigator: National Multicenter Trial. ALLOCURE Phase 2 Clinical Trial in Acute Kidney Injury. Novel Cell Therapy AC607 2012 – 2014

Sub-Investigator: CHRMS 08-028 Single Center Study – Humanitarian device use of Therasphere for treatment of unresectable hepatocellular liver cancer. 2010 - Present

Co-investigator: National Multicenter Trial. ORION trial.
Boston Scientific Corporation. 2008 – 2010

Principal Investigator: Prospective evaluation of inferior vena cava filters.
University of Vermont Medical Center
Single Center Trial. Departments of Radiology, Medicine, and Surgery 2007 – 2012

Co-investigator: National Multicenter Post-market Trial.
CHOICE trial. Abbott Corporation. Jan 2007 – 2012

Principal Investigator: National Multicenter Trial.
Wallgraft Occlusive Trial. Boston Scientific Corporation. Feb 2006 – 2007

Principal Investigator: National Multicenter Trial.
EVEREST Recovery Filter Study.
BARD Peripheral Vascular, Inc. Dec 2005 – 2007

Co-investigator: National Multicenter Post-market Trial. Oct 2004 – Oct 2006
CAPTURE: Carotid ACCULINK/ACCUNET Post Approval
Trial to Uncover Rare Events. Guidant Corporation.

Principal Investigator: National Multicenter Trial. Dec 2001 – Dec 2002
A multicenter, phase 3 study to determine the safety
and efficacy of MS-325-enhanced MRA in patients
with suspected peripheral vascular disease.
Epix Medical, Inc. and Mallinkrodt.

Principal Investigator: Observational study of renal artery angioplasty May 2001 – May 2002
and stenting using carbon dioxide and iodinated contrast media.
Single Center Study. Department of Radiology.
University of Vermont College of Medicine.

Co-investigator: National Multicenter Trial. Feb 2001 – 2004
RESTORE: Renal stent for the treatment of renovascular hypertension.
IntraTherapeutics, Inc.

Co-investigator: National Multicenter Trial. Jan 2001 –Mar 2001
A randomized double blind study comparing the safety
and efficacy of enoxaparin 30 mg q 12 hours, enoxaparin 40 mg qd
with placebo and Na heparin 5000 u q12 hours as prophylaxis
against DVT and PE after trauma.
Aventis Pharmaceuticals, Inc.

Principal Investigator: National Multicenter Trial. Aug 2000 – Dec 2000
A phase 2, randomized, multicenter, comparative, dose-ranging,
placebo-controlled study to determine the safety and efficacy of MS-325
enhanced MRA for evaluation of aortoiliac occlusive disease in patients
with known or suspected peripheral vascular disease.
Epix Medical, Inc. and Mallinkrodt.

Co-investigator: National Multicenter Trial. Apr 1998 – 2007
Wallgraft endoprothesis iliac occlusive clinical trial.
Schneider (USA) Inc.

Principal Investigator: National Multicenter Trial. Nov 1997 – Dec 1997
A phase II study of the safety and preliminary efficacy of MS-325-
enhanced magnetic resonance angiography in carotid and peripheral arteries.
Epix Medical, Inc.

Collaborating Investigator: National Multicenter Trial. Feb 1997 – Feb 1998
A prospective, randomized comparison of percutaneous transluminal
angioplasty (PTA) with or without the Corvita Endoluminal graft (CEG)
used as immediate (primary) or late (suboptimal PTA)
adjunctive therapy for the treatment of iliac artery occlusive disease.
Corvita Corporation.

Collaborating Investigator: National Multicenter Trial. 1993 – 1995
Thrombolysis or peripheral arterial surgery (TOPAS).
Abbott Laboratories.

Other Creative Products

Webinar:

Oliver M, Quinn R, **Morris CS,** Jain A, Penner T. Patient discussion for PD catheter insertion. A discussion with expert operators. Organized by the North American PD Catheter Registry. Sponsored by the International Society of Peritoneal Dialysis. March 6, 2025. Available at https://youtu.be/a-fWy2lKvH4?si=OHQ9IJ8X7FFAG4Gn

Print/Online Media:

Morris CS. Cast the die for randomised evidence comparing percutaneous ablation with surgery and prepare for the flood of renal cell carcinoma patients. Interventional News Issue 83; page 15 – Sep, 2021. Available at https://interventionalnews.com/interventional-news-issue-83-september-2021-us-edition/

Electronic/Media:

Morris CS. Kawasaki Disease. Vascular and Interventional Radiology.
American College of Radiology and Society of Interventional Radiology CD-ROM Series.
Sep, 2003.

Morris CS. Chronic Mesenteric Ischemia. Vascular and Interventional Radiology.
American College of Radiology and Society of Interventional Radiology CD-ROM Series.
Sep, 2003.

Patents

Christopher S. Morris. "Peritoneal Dialysis (PD) Catheter Weighted Anchor," U.S. Provisional Patent Application (2017) No. 62/519,568 and Patent Cooperation Treaty (2018). U.S. Patent No. 12,048,792 B2 Issued 7/30/24.

Daniel J. Bertges, Safwan Wshah, **Christopher S. Morris**, and Sage Hahn. "Method and Apparatus for Analyzing Aoritc Aneurysms and Endoleaks in Computed Tomography Scans," U.S. Provisional Patent Application (2019) – patent pending. U.S. Application No. 17/602,164. U.S. Patent No. 12,205,278 B2 Issued 1/21/2025.

Participation in Corporate Agreements:

Philips HealthTech Agreements (as a radiologist in the department, I participate in research collaboration projects that allow us to maintain cutting edge technology for clinical service, teaching and research.)

1. Reference Site Agreement
I provide:

a. Radiologist peer to peer education during customer site visits to UVMMC
b. Product demonstrations during customer site visits to UVMMC
c. Contribution to Image Library for visiting customers
d. Follow-up discussions with peers

2. Master Research Agreement:
I provide:

a. Pre-production testing for Beta upgrades
b. Clinical observation and feedback on products
c. Test sequences and image acquisition
d. Software evaluation
e. Protocol development for products

McKesson Luminary Agreement (results in institutional discounts on technology and service)
I provide:

a. User feedback for the development of Beta products
b. Radiology informatics workflow development
c. Participation in product evaluation surveys, product development discussions and focus groups
d. Site visit participation that includes product demonstrations and peer to peer discussions with McKesson customers.

ATTACHMENT 2

MATERIALS CONSIDERED

EXHIBIT/PAPER NO.	DESCRIPTION
EX1001	U.S. Patent No. 11,974,910 ("the '910 patent")
EX1002	'910 Patent Prosecution History
EX1003	Expert Declaration of Troy Thornton
EX1004	Resume of Troy Thornton
EX1005	U.S. Patent No. 8,734,374 B2 to Aklog et al. ("Aklog")
EX1006	U.S. Patent Publication No. 2015/0173782 A1 to Garrison et al. ("Garrison")
EX1007	WIPO Publication No. WO 2006/124307 A2 to Goff et al. ("Goff")
EX1008	U.S. Patent Publication No. 2003/0116731 A1 to Hartley ("Hartley")
EX1009	U.S. Patent No. 6,776,770 B2 to Trerotola ("Trerotola")
EX1010	U.S. Patent Publication No. 2010/0042118 A1 to Garrison et al.
EX1011	U.S. Patent No. 8,535,283 B2 to Heaton et al. ("Heaton")
EX1012	U.S. Patent Publication No. 2017/0043066 A1 to Laub ("Laub")
EX1013	U.S. Patent Publication US 2003/0225379 A1 to Schaffer et al. ("Schaffer")
EX1014	U.S. Patent No. 5,938,645 to Gordon ("Gordon")
EX1015	U.S. Patent Publication No. 2014/0296868 A1 to Garrison et al.
EX1016	U.S. Patent No. 7,998,104 B2 to Chang ("Chang")
EX1017	U.S. Patent No. 8,157,760 B2 to Criado et al. ("Criado")
EX1018	U.S. Patent No. 6,481,439 B1 to Lewis et al.
EX1019	U.S. Patent No. 8,075,510 B2 to Aklog et al.

EXHIBIT/PAPER NO.	DESCRIPTION
EX1020	WIPO Publication No. WO 2018/019829 A1 to Brady et al. ("Brady")
EX1021	U.S. Patent Application No. 16/117,519 (the "519 application")
EX1022	Expert Declaration of Dr. Aquilla S. Turk, III, DO
EX1023	Resume of Dr. Aquilla Turk, III, D.O.
EX1024	Shani, Jacob M.D., et al., Mechanical Manipulation of Thrombus: Coronary Thrombectomy, Intracoronary Clot Displacement, and Transcatheter Aspiration, 72 Am. J. Cardiol. 116G-118G (1993)
EX1025	Bose, A et al., The Penumbra System: A Mechanical Device for the Treatment of Acute Stroke due to Thromboembolism, 29 Am. J. Neuroradiol. 1409-1413 (Aug. 2008)
EX1026	Turk, Aquilla S. et al., Initial clinical experience with the ADAPT technique: A direct aspiration first pass technique for stroke thrombectomy, 6 J. NeuroIntervent. Surg. 231-237 (2014)
EX1027	Turk, Aquilla S. et al., ADAPT FAST study: a direct aspiration first pass technique for acute stroke thrombectomy, 6 J. NeuroIntervent. Surg. 260-264 (2014)
EX1028	April 24, 2024 Letter from Inari to Imperative Care
EX1029	Turk, Aquilla S. et al., Aspiration thrombectomy versus stent retriever thrombectomy as first-line approach for large vessel occlusion (COMPASS): a multicentre, randomized, open label, blinded outcome, non-inferiority trial, 393 Lancet 998-1008 (March 2019)
EX1030	Save, Jeffrey L., Time is Brain – Quantified, American Heart Association Journals, available at http://www.stokeaha.org (2005).
EX1031	U.S. Patent No. 9,980,813 B1 to Eller ("Eller")
EX1032	US 2018/0064453 Al ("Garrison II")
EX1033	US 2005/0054995 Al ("Barzell")

EXHIBIT/PAPER NO.	DESCRIPTION
EX1034	Decision Granting Institution of *Inter Partes* Review for U.S. Patent No. 11,697,011 (Paper 7) in *Imperative Care, Inc. v. Inari Medical, Inc.,* IPR2024-01157 (P.T.A.B. Jan. 23, 2025)
EX1035	Decision Granting Institution of *Inter Partes* Review for U.S. Patent No. 11,697,012 (Paper 6) in *Imperative Care, Inc. v. Inari Medical, Inc.,* IPR2025-00156 (P.T.A.B. Apr. 22, 2025)
EX1036	U.S. Patent No. 12,109,384 B2 to Merritt et al.
EX1037	Patent Owner's Exhibit 2002 filed in *Imperative Care, Inc. v. Inari Medical, Inc.,* IPR2025-00289 (P.T.A.B.)
EX1038	Indigo Aspiration System-Penumbra Engine Pump and Canister, 510(k) No. K180105 (Mar. 8, 2018) ("Indigo Aspiration System")
EX1039	AXS Universal Aspiration Set Brochure (2017)
EX1040	VacLok Negative Pressure Syringe Brochure
EX1041	O. Nikoubashman et al., Under Pressure: Comparison of Aspiration Techniques for Endovascular Mechanical Thrombectomy, 39 Am. J. Neuroradiol. 905-909 (May 2018) ("Nikoubashman")
EX1042	Inari's Supplemental Infringement Contentions (without claim charts) from *Inari Medical, Inc. v. Imperative Care, Inc.,* No. 24- cv-3117 (N.D. Cal.) (served February 7, 2025)
EX1043	Inari's Notice of Motion and Motion for Leave to File Third Amended Complaint (Dkt. #88) in *Inari Medical, Inc. v. Imperative Care, Inc.,* 24-cv-03117-EKL (N.D. Cal.) (filed March 5, 2025)
EX1044	Case Management & Scheduling Order (Dkt. #54) in *Inari Medical, Inc. v. Imperative Care, Inc.,* 24-cv-03117-EKL (N.D. Cal.) (issued December 19, 2024)
EX1045	Decision Denying Institution of *Inter Partes* Review for U.S. Patent No. 11,744,691 (Paper 10) in *Imperative Care, Inc. v. Inari Medical, Inc.,* IPR2024-01257 (P.T.A.B. Feb. 7, 2025)
EX1046	U.S. Patent No. 7,984,730 B2 to Ziv et al.

EXHIBIT/PAPER NO.	DESCRIPTION
EX1047	Imperative Care's Opposition to Inari's Motion for Leave to File Third Amended Complaint (Dkt. #98) in *Inari Medical, Inc. v. Imperative Care, Inc.,* 24-cv-03117-EKL (N.D. Cal.) (filed March 26, 2025)
EX1048	Imperative Care's Notice of Motion and Motion to Stay Pending *Inter Partes* Review (Dkt. #100) in *Inari Medical, Inc. v. Imperative Care, Inc.,* 24-cv-03117-EKL (N.D. Cal.) (filed April 2, 2025)
EX1049	Ahmed Pasha et al., Successful Management of Acute Massive Pulmonary Embolism Using Angiovac Suction Catheter Technique in a Hemodynamically Unstable Patient, 15 Cardiovasc. Revasc. Med. 240-243 (2014)
EX1050	Certified File History of U.S. Patent Application 10/371,190 (Schaffer File History)
EX1051	Maureen Kohi, Catheter Directed Interventions for Acute Deep Vein Thrombosis, 6 Cardiovasc. Diagn. Ther. 599-611 (2016)
EX1053	Decision Referring the Petition to the Board (Paper 9) in *Imperative Care, Inc. v. Inari Medical, Inc.*, IPR2025-00728 (P.T.A.B. July 31, 2025)
EX1054	Decision Granting Institution of Inter Partes Review for U.S. Patent No. 11,554,005 (Paper 10) in *Imperative Care, Inc. v. Inari Medical, Inc.*, IPR2025-00289 (P.T.A.B. June 18, 2025)
EX1055	Order Denying Motion for Preliminary Injunction (Dkt. #136) in *Inari Medical, Inc. v. Imperative Care, Inc.*, 24-cv-03117-EKL (N.D. Cal.) (issued September 29, 2025)
EX1056	Joint Stipulation to Continue to Stay of Litigation Pending IPR Decisions and Vacate Upcoming Case Management Conference (Dkt. #139) in *Inari Medical, Inc. v. Imperative Care, Inc.*, 24-cv-03117-EKL (N.D. Cal.) (dated January 21, 2026)
EX1057	Order Granting Joint Stipulation to Continue the Stay of Litigation Pending IPR Decisions and Vacate Upcoming Case Management Conference (Dkt. #140) in Inari Medical, Inc. v. Imperative Care, Inc., 24-cv-03117-EKL (N.D. Cal.) (issued January 21, 2026)

EXHIBIT/PAPER NO.	DESCRIPTION
EX2001	U.S. Patent Application Publication No. 2017/0274180 to Garrison et al.
EX2002	U.S. Patent Application Publication No. 2013/0035628 to Garrison et al.
EX2003	U.S. Patent Application Publication No. 2018/0042623 to Batiste ("Batiste")
EX2004	U.S. Patent No. 6,059,745 to Gelbfish ("Gelbfish")
EX2006	Order Granting in Part Motion to Stay*, Inari Medical, Inc. v. Imperative Care, Inc.*, No. 5:24-cv-03117-EKL (N.D. Cal. Sept. 29, 2025), ECF No. 137
EX2007	Hearing Transcript, dated February 6, 2026
EX2009	Instructions for Use for Medtronic Bio-Bump™ BP-50, CBBP-50
EX2010	Instructions for Use for Maquet Getinge Group ROTAFLOW Centrifugal Pump
EX2011	40 Year Bio Pump Timeline
EX2012	OPERATING INSTRUCTIONS for the Pump Drive BVP-BP for centrifugal blood pump heads BP-50/BP-80 and SP-45
EX2013	Deposition Transcript of Troy L. Thornton (February 18, 2026)
EX2014	Deposition Transcript of Troy L. Thornton (February 19, 2026)
EX2015	Deposition Transcript of Aquilla S. Turk (February 25, 2026)
EX2016	Declaration of Dr. Christopher S. Morris
EX2017	Redacted version of Declaration of Brian Brown, *Inari Medical, Inc. v. Imperative Care, Inc.*, No. 5:24-cv-03117-EKL (N.D. Cal. July 24, 2024), ECF No. 24-2
Paper 1	Petition for *Inter Partes Review*
Paper 15	Decision Granting Institution of *Inter Partes Review*