Association of Vascular and Interventional Radiographers

INTERVENTIONAL INFORMER

Winter 2017

PRESIDENT'S MESSAGE

The man credited with the inception of Interventional Radiology, Dr. Charles Dotter, first introduced the concept on June 19th, 1963.

During a one hour lecture titled "Cardiac Catheterization and Angiographic Techniques of the Future", Dr. Dotter assured his colleagues that "the angiographic catheter can be more than a tool for passive means of diagnostic observation; used with imagination it can be a powerful surgical instrument."

The term "Interventional Radiologist" was coined by Alexander Margulis in an editorial in the March 1967 issue of the American Journal of Roentgenology. He suggested that the ability to care for patients before, during, and after the procedure, clinical knowledge, technical skills, close cooperation with surgeons, internists, and ancillary staff, high-quality radiologic imaging equipment, and special training would set Interventional Radiologists apart from Diagnostic Radiologists.

Since its inception, the Physicians, technologists, and nurses involved in the field of Interventional Radiology have identified and advocated for our autonomy.

Today, we are fortunate to live in a time where we are seeing the vision of the founders of IR come to fruition. Interventional Radiologists fill critical roles on aortic alert and pulmonary embolism response teams designed to provide emergency services to patients. Collaborative research across specialties is allowing for innovation in tumor embolization therapies, and radically reshaping cancer treatment. Additionally, as the field of IR continues to evolve, a designated residency training pathway for future Interventional Radiologists has emerged.

The new identity of IR as an individual specialty further reinforces the need for dedicated and highly trained technologists specialized in the field of IR.

The AVIR has long recognized the dynamic, patient centered nature of IR required personnel with proficient understanding of anatomy and pathology, technical aspect of tools employed in IR procedures, and patient care skills beyond that of radiographers. Our goal as an organization is to provide a network for those technologists who strive to embody the vision of the founders of IR; to provide comprehensive care for patients, to lead in this wonderful field of innovation, and "to see the angiographic catheter as a powerful surgical instrument."

Our membership has seen tremendous growth this year, fueled by IR technologists who identify their role as a requisite to ensuring the field of Interventional Radiology continues to evolve. Join us, and encourage others to join us, as we continue to change the way the world of medicine views IR.

Alisha Hawrylack RT(R)(VI)
President, AVIR

Inside Winter 2017 I David S. Douthett, RT(R)(CV), Editor

A LETTER FROM THE VICE PRESIDENT

Kristen L Welch, RT, R, VI
President-Elect

The AVIR and Education Committee have been working very hard to build on the educational benefits we offer our membership. First I'd like to welcome our newest addition to the AVIR Education Committee: Adam Rubin. Adam is the Technologist Supervisor in Interventional Radiology at Mayo Clinic in Jacksonville, Florida. There he plays a key role in their Interventional Radiology Technologist training internship.

The Education Committee has continued to build on our partnership with Medlantis. If you haven't had a chance to use one of your monthly CE coupon codes from Medlantis, you'll want to check it out! These CE courses are video and text based and cover a wide array of interventional topics. If you weren't able to make it to our 2017 Annual Meeting in Washington DC, most of the presentations from the meeting have been uploaded to Medlantis as well. We continue to update our online directed readings within our Educational Portal. We have several exciting workshops planned for our annual meeting in Los Angeles including our 3rd Annual Poster Presentations and also a workshop on writing a scientific abstract. This intimate workshop will be led by the Editor in Chief of the *Journal of Vascular and Interventional Radiology*, Dr. Ziv Haskal. There will be more details regarding these workshops as we get closer to the meeting date.

ARRT Continuing Education Update

I also had the opportunity recently to attend a CE Consensus meeting at the ARRT Headquarters in October. Leaders from other RCEEM organizations along with State Licensing Agencies were present to discuss upcoming changes to CE guidelines upheld by the ARRT. These modifications are being developed to ensure technologists are up to date within all modalities they hold credentialing with. These changes will affect all technologists with post primary certification in at least one or all of the following areas.

The AVIR continually strides to provide our members up to date education. We will stay up to date on these changes to ensure we are offering our members adequate education they can use to maintain their credentialing.

Structured Education CEs

This affects technologists sitting for post primary board examinations after **January 1, 2018**. In order to sit for your boards, you will be required to provide 16 structured education CEs. These credits are specific to your modality. For example technologists wanting to sit for their VI boards must have 16 VI Structured Ed CEs. These are VI in topic, and are approved as Structured VI education. The technologist must obtain all 16 credits within 24 months of taking their exam. If the CEs were obtained *before* January 1, 2018 they must be IR in topic, while CEs obtained *after* January 1, 2018 must be approved as structured education. It is the technologists responsibility to ensure that the credits they're obtaining are approved as Structured VI education. At least 1 credit must be obtained in the following three categories: Patient Care, Image Production, and Procedures. For more information on Structured Education, you may visit the ARRT's website here: www.arrt.org/arrt-reference-documents/structured-education-requirements. Technologists wishing to take post primary certification exams, please see article later in this issue.

Beginning January 1, 2018 the ARRT will no longer award 24 CE credits to technologists for passing their post primary certification exam.

CQR (Continuing Qualification Requirements)

This change affects technologists that obtained primary and/or post-primary certifications on or after January 1, 2011. These certifications are time limited to ten years. The ARRT has developed a self-assessment module. This is a learning tool that assesses your knowledge and skill set within each modality you are credentialed within. The content asked during the self assessment is from the ARRTs content outline. Each category will have 10 questions to be answered by the candidate. Once the self-assessment is completed, a report is generated by the ARRT identifying your areas of strength and weaknesses. You may be asked to obtain additional CE credits within your areas for opportune growth. The CQR process begins 7 years after your primary or post-primary certification examination. This gives you a 3 year period to complete any additional CEs needed. Technologists that obtained certification in 2011 will be receiving a notice to take their self assessment module from ARRT in 2018 during their birth month.

For more information, you may visit the ARRT's website here, www.arrt.org/CQR.

Discipline Specific CEs

In the future, all CE activities will be coded into different categories. The categories for each discipline are the same, but sub categories and content are different. This is important to understand because beginning January 1, 2020, biennial CE requirements are shifting to discipline specific CEs. Technologists that are credentialed in any post primary modalities will be required to obtain 16 of their 24 biennial CEs in their specialized modality. Within those 16 credits, specific topics will be mandated including: Ethics, Patient Care, and Safety. If technologists are credentialed in multiple disciplines, they will be required to obtain credits for their identified disciplines. The remaining 8 credits are free to use as the technologist wishes.

SUPPORT THE COMPANIES THAT SUPPORT YOU!

Dana Bridges-Kanfoush
Corporate Liaison

When people talk about our annual meeting, most people (except the board!) say "SIR" and they're not totally incorrect. AVIR does hold its educational conference in conjunction with the Society of Interventional Radiology's meeting but the groups operate independently. We are very fortunate to have a great deal of support from SIR's executive director and staff but when it comes to corporate funding, we are on our own. Just because companies spend marketing dollars with our physicians' organization DOES NOT mean they are supporting AVIR. And as you can imagine, garnering corporate support in this financially restrictive environment is not for the faint of heart. Imagine that this is your job description:

1) You must repeatedly explain who you are and why companies should support technologists.
2) You must face stiff competition from hundreds of other "worthy causes" for the ever-shrinking pile of sponsorship dollars.
3) You must deal with the following comments over and over: Although your request has a great deal of merit, we regret to inform you that our Grant Committee has declined your request for funding.
4) And finally, you must pick yourself up after hearing repeated "NO's!" and keep asking again and again and again.

Yes, that's right, folks. Don't sign up for this if you don't like to repeat yourself and repeat yourself and repeat yourself! Here's how you can help though … support the companies that support you. There are a handful of great companies that support us year after year. Cook Medical is almost always our first "yes" every single year! Bard has been one of our longest running vendor partners and I believe they've provided funding for our meeting almost every year for the past 30 years ago. W.L. Gore is another very loyal supporter as well as Boston Scientific.

We have a few companies that have supported us more recently but the loyalty is there and growing. Medcomp has provided funding for the last couple of years as have Penumbra and Barrier Technologies. Merit and Toshiba were new vendor partners this past year but we're hoping to continue to have a long-term relationship with them as well. Please make a note of who hasn't supported us. I can think of one particular dynamic company in the angio suite that hasn't provided any support for the last several years although they've been asked repeatedly. This one still shocks me given the amount of their products that are sold in IR departments.

Long story short, we could use your help and here's how: support the companies that support AVIR directly. If you read their names in this article or see their ads in our newsletter, let your local reps know that their corporate office provides funding for your professional educational association (and yes, you will probably have to explain who AVIR is but at least their executives know how important you are!). If you don't see a company on this list, let your local reps know that they SHOULD support AVIR, especially if you're a big customer of theirs. Every little bit helps!! The more you talk about AVIR and why it's important to support the people standing side by side with their physicians and opening up their products, the more likely they are to support us. Thank you for any help you can provide and for being loyal AVIR members!!

JOURNAL REVIEW: A TRIBUTE TO CHARLES DOTTER

Kristen L Welch, RT, R, VI
President-Elect

As a child, I despised history. I had a hard time focusing during class, and an even harder time with the reading assignments. I had no interest in learning about the past because there was so much going around me in the present. It's funny how as you grow up, your interests change… Now, I find myself reading textbooks for leisure. My friends like to tease me because I purchase vintage TIME magazines from antique stores to read articles from the 1950's and 60's. There's something about reading historical work that gives you insight into the processes and events of the past, and how they're interconnected to the present time. I don't think I'm alone when I say that I love learning about the history of Interventional Radiology. Subsequently, there's one name that comes to all of our minds with the subject; Charles Theodore Dotter, the Father of Interventional Radiology.

On the next page is one of my favorite articles I've read on Dotter. I've read it several times- it gives a very intimate insight into Dotter's contributions to our field, his non-conservative approach to medicine, and his personal life. Particularly what I enjoyed the most are the readings from interviews done with those who personally knew Dr. Dotter including: Bill Cook, Melvin Judkins, Josef Rosch, and Michael Baird. I hope you enjoy it as much as I have.

Historical Perspectives

Charles Theodore Dotter

The Father of Intervention

Misty M. Payne

The 1st percutaneous transluminal angioplasty marked a new era in the treatment of peripheral atherosclerotic lesions. The early techniques used in peripheral percutaneous transluminal angioplasty form the basis for subsequent percutaneous intervention both in the peripheral and coronary arteries and are largely the contribution of Charles Dotter. Dotter was the 1st to describe flow-directed balloon catheterization, the double-lumen balloon catheter, the safety guidewire, percutaneous arterial stenting, and more. This practical genius dedicated his considerable energy to the belief that there is always a better way to treat disease. His personal contributions to clinical medicine, research, and teaching have saved millions of limbs and lives all over the world. ***(Tex Heart Inst J 2001;28:28-38)***

> *Necessity is the mother of invention is a silly proverb. Necessity is the mother of futile dodges is much closer to the truth. The basis of growth of modern invention is science, and science is almost wholly the outgrowth of pleasurable intellectual curiosity.*
>
> —Alfred North Whitehead (1861-1947)

Charles Theodore Dotter (Fig. 1) is generally credited with developing a new medical specialty, interventional radiology. His contributions to vascular and interventional radiology are fundamental and broad in scope. He was a leading force in Machlett's development of an x-ray tube capable of obtaining millisecond exposures. He was the 1st to describe flow-directed balloon catheterization, the double-lumen balloon catheter, the safety guidewire, and the "J" tipped guidewire. Percutaneous transluminal angioplasty was his landmark contribution. He also introduced the concepts of percutaneous arterial stenting and stent grafting by placing the 1st percutaneous "coilspring graft" in the femoral artery of a dog. He pioneered the techniques of low-dose fibrinolysis with injection of streptokinase directly into an occluding thrombus. Dotter (along with Marcia K. Bilbao) invented the "loop-snare catheter" for retrieving intravascular foreign bodies. He developed tissue adhesives for vascular occlusion and organ ablation.[1]

The main theme of Dotter's work was the use of catheters for diagnosis and treatment in an attempt to replace the scalpel. He was 20 years ahead of his time, especially with percutaneous transluminal angioplasty. It would take that long for his peers in radiology and surgery to consider the idea seriously.* Even today at his home institution, Oregon Health Sciences University, Dotter remains largely unknown.

In the words of Dr. Michael Baird, a colleague at Oregon Health Sciences University, "he was something of a radical when it came to doing things and being willing to try things. I think it made a lot of people nervous, but it also led to an enormous amount of progress."** Dotter had a flamboyant personality when he spoke in person or presented scientific papers. European physicians, who were more open to unproven techniques, almost immediately embraced percutaneous transluminal angioplasty, recognizing a "medical breakthrough." His technique was even affectionately referred to as "Dottering an arterial stenosis."*

*Interview with Josef Rösch, MD, 6 June 2000, Oregon Health Sciences University. Conducted by Misty Payne.

**Interview with Michael Baird, MD, 6 February 1998, Oregon Health Sciences University Oral History Project. Conducted by Joan Ash.

Key words: *Angioplasty; cardiology/history; heart catheterization/instrumentation; heart catheterization/history; history of medicine, 20th century*

From: *Oregon Health Sciences University, Portland, Oregon 97201-3098*

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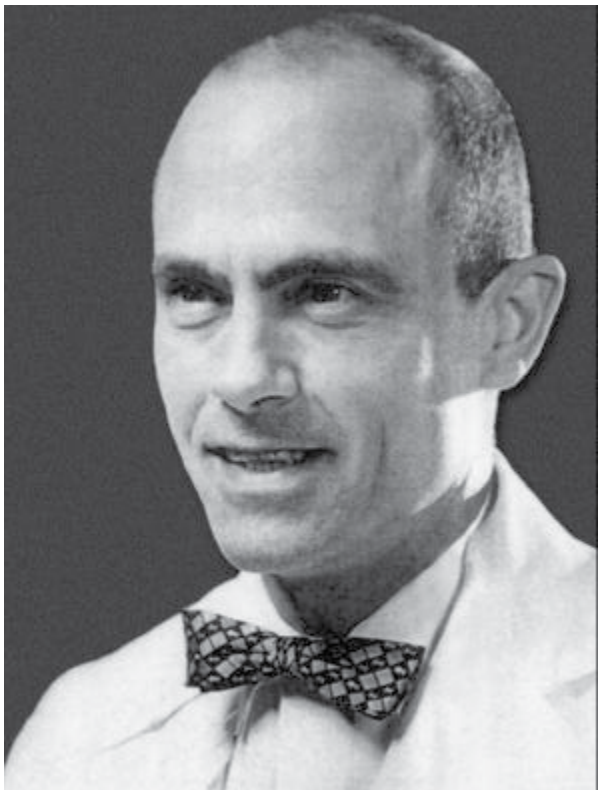

Fig. 1 *Charles Dotter (ca. 1960)*

(Courtesy of Oregon Health Sciences University)

The Early Years

Dotter was born in Boston on 14 June 1920. He attended grammar school and high school in Freeport, Long Island. An excellent student, he skipped a grade in grammar school. Dotter had boundless energy as a child, but he was small for his age and had little interest in team sports. Instead, he turned to mountaineering as an athletic outlet. He was inquisitive as a child and was interested in mechanical things from an early age.[2] He derived great satisfaction from working with tools and rarely encountered a machine he did not try to dismantle and attempt to find more uses for. In adulthood, Dotter designed his own "conceptual trademark" in the form of a crossed pipe and wrench (Fig. 2), both because he loved mechanical things and because this emblem meant "that if a plumber can do it to pipes, we can do it to blood vessels."[3]

Dotter received a bachelor of arts degree in 1941 from Duke University. He went to medical school at Cornell, where he met his future wife, Pamela Battie, a head nurse at New York Hospital. They were married in 1944. He completed his internship at the United States Naval Hospital in New York State, and his residency at New York Hospital.[2] Dotter was only 30 years old when he was offered a position as a full-time faculty member at Cornell Medical School. By the time he took his 1st staff position, he had already written a number of articles in the area of his major interest—angiocardiography. Two years later, he took the position of professor and chairman of the Department of Radiology at the University of Oregon Medical School. At 32 years of age, he was the youngest person ever to be named chairman of a radiology department in a major American medical school. He would remain in that position for an additional 32 years.[2] During those years, he developed an entirely new medical specialty, interventional radiology (Fig. 3). Along the way, he published more than 300 papers (of which he was 1st author on more than half), produced 3 scientific training films, and created nearly 20 scientific exhibits.[1-4]

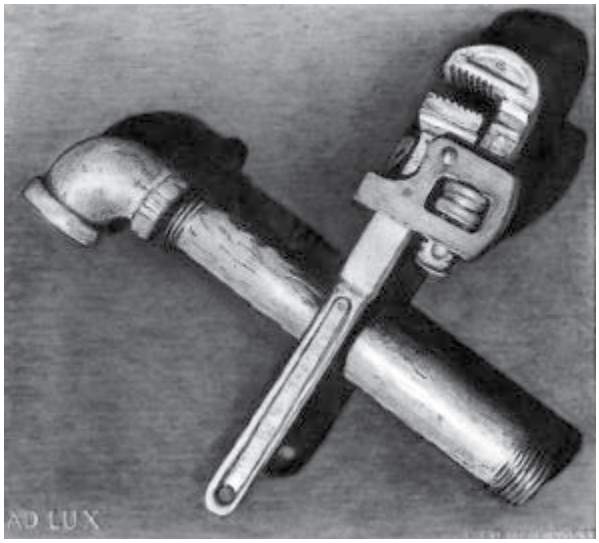

Fig. 2 *"My favorite conceptual trademark is a sketch that I did years ago of a crossed pipe and wrench. It's a gross oversimplification, of course, but what it means to me is that if a plumber can do it to pipes, we can do it to blood vessels."* [3]

(Courtesy of the Dotter Interventional Institute)

Fig. 3 *Dr. Dotter, hand-injecting contrast medium into his patients in the radiology suite.*

(Courtesy of Oregon Health Sciences University)

The X-Ray Roll-Film

Angiocardiography was a new area of interest when Dotter entered his residency; it had been only 15 years since the right heart was 1st cannulated. The ideal way to visualize blood flow in the coronary arteries is with real-time fluoroscopy, but in the 1940s the developing field of angiocardiography was severely impeded by a technical limitation: radiographic images still had to be made one at a time.[5] The x-ray technician manually changed cassettes for each new image, in an effort to obtain as many images as possible while the contrast agent was still in the coronary arteries. Even the quickest technicians had gaps of a few seconds between exposures, which severely limited imaging studies of the heart. "In 1949, single-plate angiograms were replaced by automatic film cassette changers that produced a rapid series of 'cut-films.' Within a year the image intensifier was introduced; this device permitted the development in the 1950s of cineangiograms on roll film."[6]

It was Dotter who, in 1950, developed an automatic X-Ray Roll-Film magazine capable of producing images at the rate of 2 per second.[7] Although he was not a mechanical engineer, he clearly had an extraordinary ability to solve mechanical problems. The X-Ray Roll machine still stands the test of time and was the prototype for the modern grid-controlled x-ray tube.[1]

Bill Cook and the Teflon Catheter

One of the biggest challenges to catheter therapy was the catheter itself. As Dotter envisioned new uses for catheters, he needed new catheters. Throughout his career, he invented his own interventional tools, often using unconventional materials: guitar strings, VW speedometer cables, and vinyl insulation stripped from a piece of intercom cable found lying in a wastebasket.[3] Technicians in his lab manufactured all the catheters he needed, but as time went on, he needed a corporate partner. A man named Bill Cook, who would become the chief executive officer and sole proprietor of the world's largest supplier of angiographic supplies, was to play a pivotal role in Dotter's success.

Bill Cook met Dotter at a Radiological Society of North America meeting in Chicago in 1963. By that time, Dotter had a "state of the art" angiography laboratory in Oregon. There, his technicians made wire guides and produced Teflon catheters. Dotter himself made some of the catheters with a blowtorch.[4] Still, the demand was greater than they could cope with. "Cook Incorporated" was so new that Bill Cook was the sole employee. Cook recalls his 1st encounter with Dotter:

> I was demonstrating to prospective customers how to pull tips on Teflon catheters when I noticed someone behind me sitting on a box. It was a short, muscular, bald man with darting eyes—I didn't know who he was, but he made me nervous. I turned and asked if I could be of help, and he said "no"—nothing more—and left. Just before we closed for the day he returned and asked if he could use my blowtorch and "borrow" some Teflon tubing. He said he wanted to practice making catheters in his hotel room. Thinking I had a real "space cadet" on my hands, I said, "Sure, may I have your name?" He answered, "Charles Dotter." The next morning he was waiting for me with 10 beautifully made Teflon catheters and my blowtorch. Remember, I had just started my business, and I admit that those 10 catheters were sold to someone else for $10.00 each later that day. He was my first production employee.[4]

On the last day of the conference, Dotter offered to fly Cook to Portland. It was during that 1st visit that Dotter gave him a sketch of 2 telescopic catheters. From those plans, the 1st dilation set, the "Dotter dilatation set," was soon produced.[4] This is the same kit that enabled Dotter to perform the 1st percutaneous transluminal angioplasty.[4]

Percutaneous Transluminal Angioplasty

Dotter's greatest contribution in radiology was the interventional catheter. Prior to "catheter therapy," all vascular procedures were done as open surgeries. These involved general anesthesia, several days in the hospital, and all the complications associated with a surgical wound. Understandably, Dotter was very excited about a procedure that gave patients the same benefits they would receive from vascular surgery without as much risk. Throughout his career, his goal remained the same: to treat the patient without the scalpel, lowering morbidity and mortality.* Although it would be many years before vascular surgeons would willingly refer their patients to radiologists for interventional procedures, vascular surgeons eventually accepted percutaneous transluminal angioplasty, calling it "endoluminal surgery."[1]

The First Patient

Dotter's 1st arterial recanalization was quite inadvertent: in 1963, he accidentally "recanalized an occluded right iliac artery by passing a percutaneously introduced catheter retrogradely through the occlu-

*Interview with Josef Rösch, MD, 6 June 2000, Oregon Health Sciences University. Conducted by Misty Payne.

sion to perform an abdominal aortogram in a patient with renal artery stenosis."[6] He reported this at the Czechoslovak Radiological Congress in June of that year[8] and immediately began to conceive of such improvements as balloon-mounted catheters and stents.[6]

On 16 January 1964, Dotter and his trainee, Melvin Judkins, 1st used the catheter for intentional percutaneous transluminal angioplasty. The 1st patient to benefit was Laura Shaw, an 82-year-old woman who was admitted to the University of Oregon Hospital with a painful left foot. The foot had a nonhealing ulcer and gangrenous toes. All of her physicians had recommended amputation, but she had refused. Dr. William Krippaehne, a general surgeon, handled the vascular cases. He had a good relationship with Dotter, and because Ms Shaw refused surgery, Krippaehne asked Dotter to see her. Dotter found out that Ms Shaw had short segmental stenosis of the superficial femoral artery, an ideal lesion upon which to test his percutaneous "dilating" catheters. The procedure went well and within minutes, the patient's foot was warm and hyperemic.[2] Her pain disappeared within a week and the ulcer soon healed (Fig. 4). Follow-up angiograms done 3 weeks and 6 months after Dotter's intervention showed the vessel to be patent (Fig. 5). Ms Shaw died of congestive heart failure almost 3 years later, "still walking on my own two feet."[9]

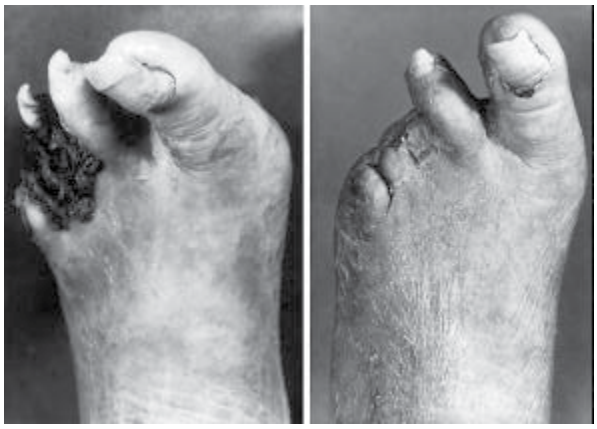

Fig. 4 *Laura Shaw's left foot 1 week and 5 months after the procedure.*

(From: Dotter CT, Judkins MP. Transluminal treatment of arteriosclerotic obstruction. Description of a new technic and a preliminary report of its application. Circulation 1964;30: 654-70. Reproduced by permission of the American Heart Association.)

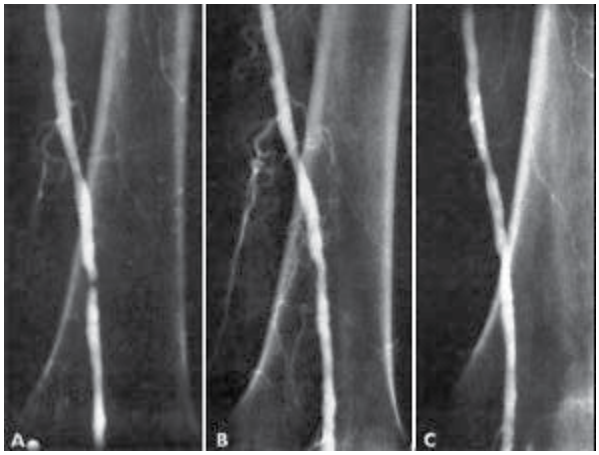

Fig. 5 *Angiograms of Dotter's 1st catheter patient, Laura Shaw: **A**) before transluminal dilation of the left superficial femoral artery, **B**) immediately after dilation, and **C**) 3 weeks after the procedure.*

(From: Dotter CT, Judkins MP. Transluminal treatment of arteriosclerotic obstruction. Description of a new technic and a preliminary report of its application. Circulation 1964;30: 654-70. Reproduced by permission of the American Heart Association.)

Becoming Accepted

In the beginning, the relationship between vascular surgeons and interventionalists was adversarial. A surgeon from the community sent Dotter a patient for an angiogram of the left superficial femoral artery. The surgeon asked for a left femoral angiogram and boldly wrote on the form "visualize but do not try to fix"[5] (Fig. 6). The diagnostic angiogram (Fig. 7A) showed that both the superficial and deep femoral arteries had areas of stenosis. Dotter dilated the deep femoral artery. The post-treatment angiogram (Fig. 7B) shows the superficial femoral artery to be stenotic and the deep femoral to be widely patent. Dotter delighted in telling the story of how he got around the surgeon's orders. On a training video, he points out that it "only took a moment" to dilate the stenosis.[7] Since Dotter performed meticulous follow-up on his patients, he was often able to demonstrate how his techniques saved their lives. In this patient, the planned open superior femoral arterioplasty procedure eventually failed, while the interventional dilation of the deep femoral remained open. Dotter delighted in pointing out how his dilatation of the deep stenosis, which remained patent for 5 years, saved the man's leg.[9] There is a remarkable photograph of Dotter and this patient on the summit of Mt. Hood (ca. 11,000 ft), taken about a year after the procedure (Fig. 8).

The attitudes toward percutaneous transluminal angioplasty in American surgical departments began to change in 1974 when a Zurich cardiologist, Andreas Grüntzig, developed a balloon catheter capable of dilating peripheral arteries. After Grüntzig described the first 5 cases of percutaneous transluminal coronary angioplasty in a letter to the editor of *Lancet* in February 1978,[10] physicians became more receptive to the idea of transluminal angioplasty. By 1981, Dotter was able to describe the relationship between the interventional radiologist and the vascular surgeon as "excellent."[3]

Grüntzig, who contributed so greatly to the changing attitude, had a different "style" from that of Dotter.* Melvin Judkins, who trained at Oregon Health Sciences University under Dr. Dotter and also knew Dr. Grüntzig, told it this way:

> Dr. Dotter frequently presents ideas in a nonconservative way. Now Dr. Grüntzig is just the opposite; he presents himself as supercautious, where Charlie presents himself as aggressive. And

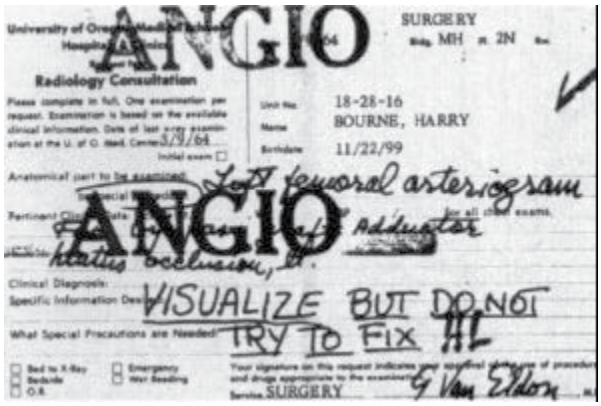

Fig. 6 *The consultation request that Dotter received in 1964.*

(Courtesy of Oregon Health Sciences University)

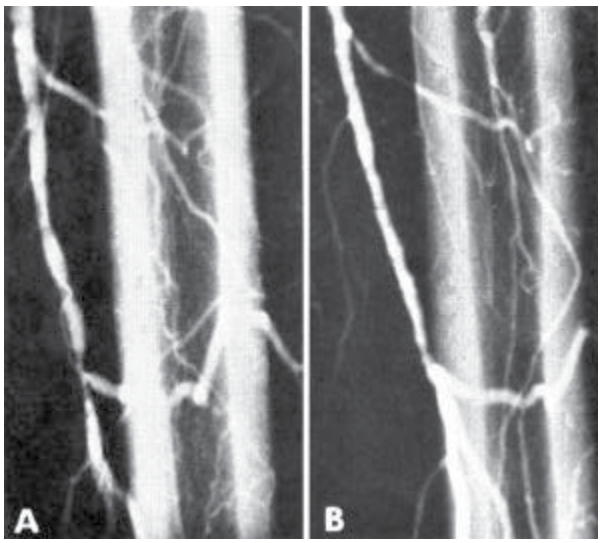

Fig. 7 *Angiograms of the "Do not fix" patient, showing atherosclerotic narrowing of the deep femoral artery* ***A****) before and* ***B****) after transluminal dilation.*

(From: Dotter CT, Judkins MP. Transluminal treatment of arteriosclerotic obstruction. Description of a new technic and a preliminary report of its application. Circulation 1964;30: 654-70. Reproduced by permission of the American Heart Association.)

*Interview with Josef Rösch, MD, 6 June 2000, Oregon Health Sciences University. Conducted by Misty Payne.

Fig. 8 *The "Do not fix" patient and Dotter (on right) after reaching the summit of Mt. Hood (ca. 1965). This image is taken from a VHS copy of the original 16-mm film.*

(From: Dr. Dotter's training video for percutaneous transluminal angioplasty. Courtesy of the Dotter Interventional Institute.)

> I think both individuals present themselves a little bit differently than they really are. I would describe Dr. Dotter as an individual who develops concepts, who is innovative, who likes to work on the frontiers of development. . . . Dr. Dotter has frequently been dubbed "Crazy Charlie" because of lack of understanding of his innovative and nonconventional ideas.[3]

Whereas Dotter openly ignored the social norms of the medical establishment, Grüntzig was careful to follow them. He took care to present himself in a conservative and scientific light. Grüntzig quickly gained fame for his technique and his persona. "Gruentzig's fame and acceptance helped Dotter because, knowing about 'Dottering' and realizing that everything he accomplished was based on Dotter's approaches, he openly gave credit to Dotter—something few cardiovascular surgeons were willing to do until the late 1970s."[5] With Grüntzig behind Dotter, others finally began to give him credit for something he had done nearly 15 years before—the 1st percutaneous transluminal angioplasty.[3]

Dotter hoped that his work would eventually translate into improved patient care and stimulate new ideas. In an interview, Dotter explained:

> Things have been both rewarding and at times frustrating. In the early days of transluminal angioplasty I had to accept a lot of unpleasant backbiting such as 'He's a nut, you can't trust his uncontrolled, poorly documented case experience,' and worse. I'm glad I was thick-skinned enough to stick with it and even more glad that there's so much still to be done and so many others to help do it.[3]

Percutaneous transluminal angioplasty, an idea 1st presented and later developed by Dotter, has surpassed all expectations. At the time of its development, Dotter was frustrated because people thought he was rushing in where he should not go.[5] Although his ideas were slow to be adopted, this pace was not unexpected. Even in his darkest times, Dotter knew that some of the greatest breakthroughs in medical history had met with the same reaction, but had proved their worth in time.

Coronary Angiography—"A Pressing Responsibility"

Another Dotter "project" was to develop a new method to reliably and safely visualize the coronary vessels. In July of 1958, he published an article in *Radiology* on the technique called "occlusion aortography," in which he described his canine experiments (Fig. 9).[11] Prior to this time, there had been no reliable way to visualize the coronary vessels. His method employed a soft, double-lumen balloon catheter. One lumen opened at the tip of the catheter and a 2nd, smaller lumen had a side opening in the catheter wall about 1 inch short of the tip. The latter lumen provided access to a sleeve-like, latex balloon secured to the shaft of the catheter above and below the side orifice. When distended, the balloon was large enough to occlude the human aorta. Under a light general anesthetic, the catheter was advanced from the radial artery to the aorta, where the balloon was inflated with nitrous oxide or carbon dioxide. After trial inflations to determine the correct location and amount of gas for occlusion, the examination proper was carried out. The balloon was quickly inflated, a small amount of contrast medium (4 mL) was injected through the distal lumen, and a series of x-ray exposures was made for 6 to 8 seconds. The balloon was then deflated and the catheter withdrawn.[11]

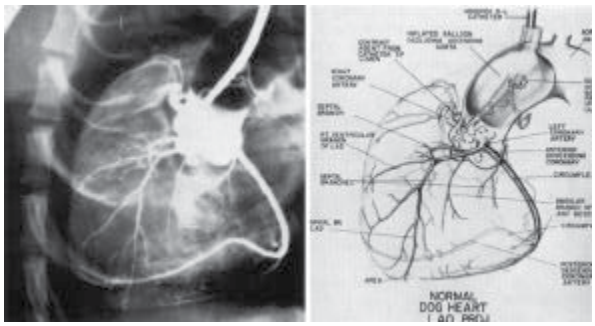

Fig. 9 *Selective coronary arteriogram in the normal dog by the technique of occlusion aortography.*

LAO = left anterior oblique

(From: Dotter CT, Frische LH. Visualization of the coronary circulation by occlusion aortography: a practical method. Radiology 1958;71:503-23. Reproduced by permission of the Radiological Society of North America.)

Earlier angiocardiographic techniques had depended on the injection of a large amount of contrast agent into a peripheral vein. Dotter believed that technique to be "worse than useless" for studying coronary artery occlusion.[11] His conclusion was based on a case series of 4,000 angiograms that had led to the diagnosis of only 1 intrinsic coronary artery lesion, a coronary arteriovenous fistula.[12] Cardiac ventriculography, the injection of contrast through a needle inserted through the chest wall, pleural space, pericardium, right ventricular myocardium, and interventricular septum, caused arrhythmias; and the opacified vessels were partially obscured by the opacified left ventricle.[13-15] The only other option, thoracic aortography, failed to produce recognizable opacification in 30% of the aortograms, and in better than half the cases only 1 coronary vessel was visualized.[11] This was the frustrating state of coronary angiography at the time that Dotter introduced controlled vascular occlusion as a way of visualizing the coronary vessels.

Occlusion aortography produced beautiful images of the coronary vasculature. In Dotter's 1958 *Radiology* article, he reported that all 78 dogs survived the procedure.[11] In addition, in this study, acetylcholine was used to cause transient cardiac arrest, which markedly improved the quality of the images.[16] Unfortunately, the risk of ventricular fibrillation was great and, in this era before closed-chest defibrillation and cardiopulmonary resuscitation, the technique never "caught on."[5] Dotter tried to allay fears about occlusion aortography when he stated: "the main risks of occlusion aortography without the acetylcholine are (1) operative technic or the hazards of aortic catheterization per se; (2) effects of aortic occlusion, in relation to physiologic consequences; (3) choice of contrast agent or the toxicology of coronary visualization."[11] Dotter asserted that all 3 factors added up to a small risk for the patient. The "risk of occlusion aortography can be reduced to a minimum defined by technical competence. . . . Complete circulatory arrest for a period of one or two minutes is without danger, particularly when coronary flow is maintained. To think otherwise would . . . cast aspersions on the honored sphygmomanometer cuff." In addition, "the alternatives to thorotrast [a contrast agent] are drugs which offer a considerably greater risk to the patient than the hazards associated with incompletely diagnosed coronary artery disease."[11]

At the time, surgeons, too, were having trouble with coronary artery disease. Because there was no good way to visualize the coronary vessels, they had no way to know where to operate. In his *Radiology* article, Dotter states, "The development of improved methods for radiographic demonstration of the coronary

vessels in man is one of radiology's most pressing responsibilities. Once this is achieved, there should result a significant acceleration toward what is hoped will be a successful surgical attack upon coronary vessels."[11] Boldly, Dotter makes his expectation clear. One wonders whether he yet had plans to use angiographic imaging to treat patients with his "catheter therapy"—which is, of course, what he and his colleagues in radiology eventually did. The foundation prepared by these early imaging studies, together with the better-known work of Mason Sones, formed the basis of modern angiography. It was in October of that same year (1958) that Sones accidentally intubated the ostium of a patient's right coronary artery and selectively opacified that vessel before he could remove the catheter. Selective opacification eclipsed Dotter's occlusion aortography as a method of imaging the coronary vasculature. Indeed, Dotter sent Melvin Judkins to Cleveland to learn Sones's technique for use in Portland—at the request of Albert Starr, who wanted to evaluate prosthetic-valve candidates over the age of 50.[6] Having learned coronary angiography from both Dotter and Sones, Judkins subsequently developed an improved set of catheters that would seek out the coronary ostia, regardless of aortic structure.[6]

Right Heart Catheterization

In 1950, Dotter turned his attention to the use of balloon-tipped catheters to study circulation. Dotter developed an ingenious balloon method that could produce a reversible increase in pulmonary resistance and completely obstruct a branch of the pulmonary artery.[17] A similar double-lumen, flow-guided catheter designed to measure right heart pressures was marketed by Swan and Ganz in 1970.[18] The Dotter catheter was made by mounting a rubber balloon near the tip of an 8.5-F catheter. His objective was to create a measure of right heart function that used the ability of the right ventricle to pump against a controlled resistance. In animal models, he recorded pressures in the femoral and right ventricular arteries before and after inflation of the balloon in the pulmonary artery.[17]

While Dotter was developing his balloon catheter, he also created a flow-guided catheter for the right heart and pulmonary artery.[19] At the time, this was quite an innovation because it was not easy to find a suitable material: radiopaque, sterile, and with an anticoagulant surface. Dotter experimented with many combinations of materials, including "specially dipped latex tubing and military surplus electronic insulation" before settling on Silastic, an inorganic silicone rubber.

The 1st flow-guided cardiac catheterization kit to be marketed was the one developed by Swan and Ganz. This same kit in a slightly modified form, the Swan-Ganz catheter, is now used routinely throughout the world. Although Dotter invented both a balloon catheter, and a balloon catheter capable of measuring right heart pressures, he was never able to put the 2 together.[5] Without the attached balloon, the catheter was prone to "tangle" in the vasculature, with the potential for serious complications.*

When he was developing his flow-guided catheter, therapeutic applications of the device were on Dotter's mind. Prior to the use of flexible tubing, passing a catheter into the pulmonary artery could require 10 to 30 minutes. The patient was made as comfortable as possible, placed in the left lateral recumbent position, and left there for half an hour, so the catheter would have time to work its way into the heart. Dotter believed that this was much too long. In a seminal article on Silastic "flow guided" cardiac catheterization,[19] he alludes to the brief "free phase" of pulmonary embolization. "During the time required to read this sentence, the reader's antecubital veins will be traversed by 3 or 4 billion red cells, virtually all of which will, within 2 to 4 seconds, reach the pulmonary artery. The free phase of pulmonary embolism is similarly brief. Why, then, does it require an average of 10 to 30 minutes to pass a cardiac catheter into the pulmonary arteries?"[19] The Silastic catheter solved this problem.

This advance inevitably led to the idea that pulmonary emboli could be treated by catheterization. In the same article,[19] Dotter shows the injection of contrast medium through a catheter into a mid-sized pulmonary artery. Similarly, Dotter pioneered the injection of streptokinase into the pulmonary vasculature as a treatment for pulmonary embolism.[20,21] Although the use of streptokinase was eventually abandoned in the United States due to a high incidence of lobar hemorrhage, it is still used in other countries as an important treatment for acute pulmonary embolism.[22,23]

One wonders why the Silastic catheter, like nearly all of Dotter's ideas, was not immediately embraced as an important innovation in both diagnosis and treatment. In an unpublished interview, Josef Rösch comments that at the time "he [Dotter] was interested in cardiac treatment, not diagnosis. . . . It seemed to him to be too traumatic. He was always thinking of how to do it easier, more effectively."* In a 1965 lecture, Dotter comments, "Since flow-guided right heart catheterization is neither difficult nor time-consuming, and, since vascular cut-down is not

*Interview with Josef Rösch, MD, 6 June 2000, Oregon Health Sciences University. Conducted by Misty Payne.

required, it is possible to study pulmonary blood pressures in hospital populations." He specifically mentions the development of an "economic, sterile, ready-for-use catheter pack," as well as a battery-operated, lightweight amplifier and transducer for use in the field.[20] But the combination of potential complications, Dotter's lack of controlled trials, and professional skepticism prevented the Silastic catheter from going very far.

Dotter the Person

Dotter was a risk taker. "He was a pilot and a flyer [in cars] and a mountain climber, and one of those people that just did things."* He was a Renaissance man. Rösch remembers, "Charles always found time for his wife Pamela, three children, and close friends, as well as classical music, painting, photography and outdoor living."[4] "Charlie was such a dramatic person. He was climbing mountains, painting pictures, doing things in x-ray, always on the move."* Dan Labby, who was chief resident in internal medicine at Cornell when Dotter rotated through as a student, remembers Dotter well. "He was very flamboyant. On top of that, he was extremely intelligent, had a very broad intelligence. Everything interested him. He was a mountain climber, he drew and painted beautifully, and so on. He was an amazing man."** Herbert Adams, a colleague and friend at Stanford, remembers Dotter for his "fertile mind, caustic comments, strong convictions and his understanding and belief that there were other ways to help sick people and that he had some of the answers."[4] Of his style in medicine, a colleague said, "Charles Dotter had thirty brilliant ideas a day. It took the rest of us to figure out which one was really worthwhile."***

Dotter was an accomplished mountaineer. He made it a goal to climb all 67 peaks over 14,000 feet in the continental United States, and it was a goal he accomplished. This was despite 2 bouts with Hodgkin's lymphoma and 2 open-heart surgeries for coronary artery stenosis. He tried never to let his medical problems slow him down. For example, he celebrated the favorable outcome of mantle radiation therapy for his 1st occurrence of Hodgkin's in 1970 by climbing the Matterhorn without a guide.[4] Stories of Dotter's adventures on mountains quickly spread throughout the staff of the new University Hospital. Nelson Niles remembers how it would go: "He'd decide he was going to do it [climb a mountain], and he'd pile his wife, maybe, and a friend or two who [were] going to go with him, and a couple of dogs, he always liked to take dogs, and they'd drive for a thousand miles, and he'd drive nonstop and then climb the mountain and then drive back." Many people vividly remember experiences they had in the wild with Dr. Dotter.

Bill Cook recalls more than 1 such occasion:

> During the 1960s and 1970s he would occasionally call and say, "Let's go out West." One time in Montana, Charles . . . [was] having [coffee] at a restaurant in Beaverhead National Forest. All of a sudden, Charles ran out the door with his camera. Some time later, we found him at the foot of a tree talking to a young bear and snapping pictures. We later learned that the treed bear was one of the rogues that had killed several young people in Yellowstone Park and had recently been relocated in Beaverhead.
>
> Charles also took me mountain climbing—once. There we were on Three Fingered Jack in a blizzard—never again! He also tried to talk me into flying under a bridge so he could take pictures for one of his films—I wouldn't do it. Next, he asked if I would fly him near several mountain peaks in Southern Oregon—I did, but he couldn't take pictures because of the turbulence and snow.[4]

Another mountaineering story involves Lou Frische (a colleague) and Mount St. Helen's:

> They had disappeared into the wilderness, and they didn't come back on time. The word was out that two doctors were lost on the mountain. Well, they didn't get lost. . . . There were reasons why they were slow and got kind of stuck, but they managed fine. When they got back to the university, there were signs everywhere in Radiology, "To Dr. Dotter and Dr. Frische: This way to the bathroom; this way to the cafeteria; this way to your office." Everywhere there were signs. I think they never quite lived that one down.*

Legends were also born on campus. One occurs in the setting of medical grand rounds at the University of Oregon Medical School around 1961. It is the one story most vividly remembered by people who worked with Dotter, because it is so characteristic of the things he loved to do.

> Charlie was doing grand rounds that morning at eight o'clock for the Department of Medicine,

*Interview with Michael Baird, MD, 6 February 1998, Oregon Health Sciences University Oral History Project. Conducted by Joan Ash.

**Interview with Daniel Labby, MD, 23 September 1998, Oregon Health Sciences University Oral History Project. Conducted by Linda Weimer, MLS, MPS.

***Interview with Herbert Griswold, MD, 21 July 1998, Oregon Health Sciences University Oral History Project. Conducted by Joan Ash.

and he was talking about what you could realize if you could get a catheter in the heart and what the graphs would look like. Well, he brought in a rather large—standing about six feet tall—cathode oscillograph, which is, you know, like a TV screen with these graphs on it. And he said, "I've been standing here and talking to you for about twenty minutes, and all this time I have had a catheter in my heart," whereupon he rolled up his sleeve, and there was the end of the catheter. And he said, "Now I'll show you what a normal heart reading looks like." So he went and he plugged himself into the machine, and we were all kind of gasping, you know. There's a man standing there with a catheter in his heart—and he moved it among the chambers of the heart as he stood there, and he explained what the graphs represented.*

It was an absolutely horrifying example, but it was the kind of thing he did, to say it is perfectly safe, it can be done, it isn't dangerous.**

He did these kinds of things precisely because he felt he had to. It was his way of building rapport with the medical staff, but conventional medicine being what it was, physicians were understandably taken aback by such demonstrations.

In a letter from Herbert Adams in the Department of Radiology at Stanford, some of Dotter's true personality outside of medicine is revealed.

One day in the 1950s, Charlie and his wife dropped by our home . . . with a small gift for our two children, aged 7 and 10. We lived on a hillside, among the redwood trees, with a large patio. . . . There, before the wide eyes of my kids, Charlie took the exhaust from a vacuum cleaner and proceeded to blow up a war surplus balloon until it was larger than the patio itself. As it reached the edge of the patio, a lovely rose bush with a nasty thorn punctured the balloon. . . . Charlie picked up my son, lifted him into the air and said: "Well, you win some and you lose some. That's life, sonny boy."

And that was Charlie's way. If someone ridiculed his latest thought or shrugged his shoulders in expressive skepticism, Charlie was never daunted. Not only did you "win some and lose some," but also "time would tell."[4]

*Interview with Daniel Labby, MD, 23 September 1998, Oregon Health Sciences University Oral History Project. Conducted by Linda Weimer, MLS, MPS.

**Interview with Michael Baird, MD, 6 February 1998, Oregon Health Sciences University Oral History Project. Conducted by Joan Ash.

This was Dotter, kind with children and surrounded by loving, supportive friends, but aggressive with other colleagues and often ridiculed by them. His personality and drive were very strong and tended to provoke equally strong, polar reactions. It was in this setting that Dotter made most of his consequential discoveries.

Contributions in Forensic Pathology and Life-Support Therapy

In 1961, while a consultant to the state crime laboratory, Dotter published "Murder by Suffocation," a case report in dental radiography and photography.[24] The subject appeared to have been beaten to death in a drunken altercation, but was the beating the only cause of death? Radiographs of the skull revealed a lower denture in normal position, but a complete upper denture was seen lying transversely in the posterior oral pharynx. In view of this finding, the tongue, pharynx, and denture were removed en bloc. A fragment of soft-drink bottle was found lodged in the denture. A final autopsy report of "death by suffocation" was made.[24]

The following year (1962), Dotter published an article on cardiac resuscitation and "last chance" therapy in *Electrical Engineering*.[25] In it, he presents ideas far ahead of their time. This article must have been submitted to a medical journal and rejected, then resubmitted to an electrical engineering journal. If so, rejection by medical reviewers is not surprising. The 1st line reads, "The stethoscope and electrocardiograph, time-honored tools of medicine, are instrumental equivalents of the ear trumpet and smoked drum recorder."[25] Dramatic and trying to make a point, Dotter ignores etiquette.

The content is shocking as well. He forcefully supports the 2-year-old technique of resuscitation by closed-chest compression, now known as CPR, and the slightly older defibrillation technique. Dotter goes so far as to disagree with the American Heart Association over who should learn CPR. He states, "I believe the technique should be used without delay whenever sudden collapse and unconsciousness are accompanied by the loss of pulse or audible heartbeat. In such circumstances there generally will be much to gain and nothing to lose." These techniques were quite revolutionary and were offered as alternatives to the then-standard open-chest massage that was used as a last resort in cardiac failure.

Probably a case he was involved with the year prior (1961) was behind this thought. The case is outlined in an article published that same year:[26]

Case I: A 38-year-old male was examined by contrast cardiovascular visualization prior to planned

surgery for aortic valvular stenosis. Two or three minutes following an injection of Hypaque into the proximal aorta, chest pain and the characteristic electrocardiographic changes of myocardial infarction heralded the onset of left heart failure and acute pulmonary edema. Ventricular tachycardia soon led to ventricular fibrillation.

Dotter describes how the patient was kept alive for 3 hours with closed chest compression and mechanical ventilation. During that time, the patient was able to say good-bye to his wife and undergo aortic valvulotomy. Unfortunately, the infarction was large and the left ventricle was not able to regain function.[25,26]

With this case as a reference point, Dotter pondered the definition of death and argued that new interventional techniques have a role in the treatment of end-stage heart disease.

> Unfortunately, it is difficult for physicians to alter the concept that death occurs when heartbeat and respiration cease. Not so, for death is an irreversible state. Thus, its clinical criteria cannot be rigidly stated if they are to be both useful and contemporary. Today it is possible to institute artificial circulation and respiration within a matter of seconds after the heart ceases to beat. . . . When means for its fabrication can be obtained, a special balloon catheter intermittently inflated within the heart shows great promise of providing a sophisticated means for emergency artificial circulation. Although resuscitative artificial circulation and respiration cannot be used indefinitely, they permit a new concept in medical treatment. . . . In this situation [the maintenance of the 38 year old for surgery] the most radical experimental technique can be regarded as risk-free and certainly offers the patient an infinitely greater chance than the customary alternative. . . . I believe this concept of planned "last chance" treatment warrants the serious and immediate consideration of my colleagues in medicine.[25]

The techniques to which Dr. Dotter referred would be taken seriously. His "special balloon catheter intermittently inflated within the heart" would evolve into the intra-aortic balloon pump, used today in cardiac surgery and cardiogenic shock;[26,27] and "planned last chance therapy," in the form of cardiopulmonary bypass, would become standard protocol for cardiac surgery.

Another idea that came out of the experience was the closed-chest compression machine, "the circulator."[26] Dotter understood the great amount of work required to perform closed-chest compression over prolonged periods of time and reasoned that "an anesthesia machine using room air is superior to chest compression for the purpose of artificial respiration. By analogy, even greater advantage should result from the development of a mechanical device for compressing the heart through forced sternal depression."[26] A machine to do just that was manufactured by Dotter out of an electric motor, cam, and thrust rod with a rubber shoe that would attach to the patient's sternum (Fig. 10). The impetus behind the machine was the idea that, "In providing a temporary substitute for the heart which has failed, artificial circulation affords an opportunity to treat the basic disease after it has 'killed' the patient."[26] The circulator never established itself in patient care, but Dotter's point remains valid. It is true that "the moment when irreversible cell death occurs in human myocardial infarction is not clear." Patients who have been maintained on left ventricular assist devices while awaiting transplantation are living proof that Dotter's basic vision was correct. Patients are kept alive in preparation for treatment of diseases that otherwise would have killed them long before.

The Future of Catheter Intervention

As Dotter hoped, his catheter therapy is more and more often replacing the scalpel. Internal medicine, cardiology, cardiothoracic surgery, radiology, gastroenterology, nephrology, neurology, neurosurgery, and gynecologic surgery all rely on interventional techniques to treat patients. The tenets presented in Dotter's 1964 article[28] that describes the 1st interventional case still hold true today. Indeed his summation is un-

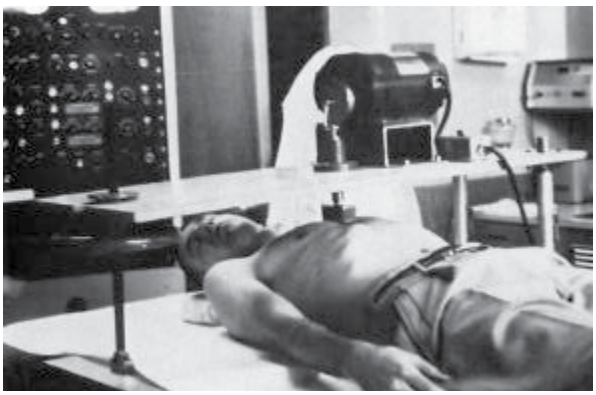

Fig. 10 *Simulated use of the circulator: electric motor, cam, and thrust rod with rubber shoe that contacts the patient's sternum. Patient lies between the motor board and the base of the external circulator.*

(From: Dotter CT, Straube KR, Strain DC. Circulatory arrest: manual and mechanical means for emergency management. Radiology 1961;77:426-33. Reproduced by permission of the Radiological Society of North America.)

derstatement: "It seems reasonable to expect that the transluminal technic for recanalization will extend the scope of treatment beyond the limits of present day surgery."

Acknowledgments

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References

1. Keller FS, Rosch J. A personal memoir of Charles Dotter [foreword]. In: The father of interventional radiology. Charles Dotter: highlights of his life and research. Toyko: Excerpta Medica Publishers; 1994. p. 7-9.
2. Friedman SG. Charles Dotter: Interventional radiologist. Radiology 1989;172(3 Pt 2):921-4.
3. Anonymous. Portraits in radiology: Charles T. Dotter, MD. Appl Radiol 1981;10(Jan-Feb):28,116.
4. Rosch J, Abrams HL, Cook W. Memorials: Charles Theodore Dotter, 1920–1985. AJR Am J Roentgenol 1985;144: 1321-3.
5. Geddes LA, Geddes LE. The catheter introducers. Chicago: Mobium Press, 1993.
6. Mueller RL, Sanborn TA. The history of interventional cardiology: cardiac catheterization, angioplasty, and related interventions. Am Heart J 1995;129:146-72.
7. Smith DC, Dotter CT. Automatic X-Ray Roll-Film Magazine for Angiocardiography: Technical Considerations. Read before convention of the ASXT at Columbus, Ohio, 29 May 1950.
8. Dotter CT. Cardiac catheterization and angiographic technics of the future. Background and current status of clinical catheter angiography. Cesk Radiol 1965;19:217-36. [Presented previously at the 1963 Czechoslovak Radiological Congress, Prague, 10 June 1963.]
9. Dotter CT. Percutaneous transluminal angioplasty [training video], ca. 1972.
10. Gruentzig A. Transluminal dilatation of coronary-artery stenosis [letter]. Lancet 1978;1:263.
11. Dotter CT, Frische LH. Visualization of the coronary circulation by occlusion aortography: a practical method. Radiology 1958;71:502-23.
12. Steinberg I, Baldwin JS, Dotter CT. Coronary arteriovenous fistula. Circulation 1958;17:372-90.
13. Nordenstrom B, Figley M, Sloan H. Controlled puncture and contrast injection into the left ventricle of the heart. Acta Radiol 1957;47:33-45.
14. Lehman JS, Musser BG, Lykens HD. Cardiac ventriculography. Direct transthoracic needle puncture opacification of the left (or right) ventricle. AJR Am J Roentgenol 1957;77:207-34.
15. Nordenstrom B, Stamer JP Jr, Figley M, Sloan H. Selective roentgenographic contrast examination and electrokymography of the left heart in experimental mitral insufficiency. Circulation 1957;15:682-8.
16. Dotter CT, Frische LH, Hoskinson WS, Kawashima E, Phillips RW. Coronary arteriography during induced cardiac arrest and aortic occlusion. Arch Int Med 1959;104:720-9.
17. Dotter CT, Lukas DS. Acute cor pulmonale. An experimental study utilizing a special cardiac catheter. Am J Physiol 1951;164:254-62.
18. Swan HJ, Ganz W, Forrester J, Marcus H, Diamond G, Chonette D. Catheterization of the heart in man with the use of a flow-directed balloon-tipped catheter. N Engl J Med 1970;283:447-51.
19. Dotter CT, Straube KR. Flow guided cardiac catheterization. AJR Am J Roentgenol 1962;88:27-30.
20. Dotter CT, Rosch J, Seaman AJ, Dennis D, Massey WH. Streptokinase treatment of thromboembolic disease. Radiology 1972;102:283-90.
21. Dotter CT, Rosch J, Seaman AJ. Selective clot lysis with low-dose streptokinase. Radiology 1974;111:31-7.
22. Brodmann M, Stark G, Pabst E, Lueger A, Pilger E. Pulmonary embolism and intracardiac thrombi—individual therapeutic procedures. Vasc Med 2000;5:27-31.
23. Lund O, Nielsen TT, Schifter S, Roenne K. Treatment of pulmonary embolism with full-dose heparin, streptokinase or embolectomy—results and indications. Thorac Cardiovasc Surg 1986;34:240-6.
24. Dotter CT. Case report: murder by suffocation. Med Radiogr Photogr 1961;37:34.
25. Dotter CT. Cardiac resuscitation and "last chance" therapy. Electrical Engineering July 1962.
26. Dotter CT, Straube KR, Strain DC. Circulatory arrest: manual and mechanical means for emergency management. Radiology 1961;77:426-33.
27. Jafarey AM, Amanullah M, Khan SA, Hasan SB. The use of intra aortic balloon pump in patients undergoing coronary artery bypass grafting at the Aga Khan University Hospital, Karachi. JPMA J Pak Med Assoc 2000;50:3-7.
28. Dotter CT, Judkins MP. Transluminal treatment of arteriosclerotic obstruction. Description of a new technic and a preliminary report of its application. Circulation 1964;30:654-70.

For Further Reading

1. Dotter CT, Steinberg I. The diagnosis of congenital aneurysm of the pulmonary artery. Report of two cases. N Engl J Med 1949;240:51-4.
2. Dotter CT, Steinberg I. Advances in angiocardiography. [New York: Symposium on Cardiovascular Diseases.] Med Clin North Am 1950;May:745-56.
3. Dotter CT. Catheter biopsy. Experimental technic for transvenous liver biopsy. Radiology 1964;82:312-4.
4. Dotter CT, Judkins MP. Exit catheterization. AJR Am J Roentgenol 1967;100:459-65.
5. Dotter CT, Buschmann RW, McKinney MK, Rosch J. Transluminal expandable nitinol coil stent grafting: preliminary report. Radiology 1983;147:259-60.
6. Dotter Interventional Institute. 1990-2000—The first decade. Portland: Dotter Interventional Institute, 2000.

WHAT AVIR MEANS TO ME

Dana Bridges-Kanfoush
Corporate Liaison

I've had a few conversations recently about AVIR and why I've been a part of the national board for as long as I have. For those of you who don't know me, I have been in a "one year" position as the associate rep then the corporate liaison for the last seven years. And I have to tell you … I'm not the rep with the longest tenure. That honor goes to Dave Douthett who has been our publications chair (and resident historian) on the national board for 22 years. He also serves on the Virginia AVIR board which holds one of our most consistent and largest regional meetings. Did I mention that he has a "day job" with W.L. Gore as well? We all have families, hobbies, friends, outside interests, jobs, the list goes on and on. Why would I take what precious little "free time" I have and volunteer to be a board member? In one simple word … inspiration.

Is it inspiring to think about hopping on a conference call at 8 pm after working all day and trying to carve out a little family time? No, it's not. Somehow though, every time I interact with my fellow board members, I find it inspiring. They truly embody the best of what interventional radiology is and should be. They are bright, passionate about their patients and their specialty, driven, creative, visionaries, problem solvers, positive in the face of adversity… I could continue for a while. These people are proud of IR and want to help carve out a better future for our members and specialty.

Alisha Hawrylack, our current president, is a perfect example of inspiration. I remember the first time I really got to spend time with her. We were sitting around Izzy's dining room table for our fall planning meeting (affectionately called "Izzyfest"). Rob Sheridan had asked all of us to prepare to discuss ideas to improve something about AVIR. When this "rookie" started talking, we were all completely impressed. Her well-thought out ideas proved to just be the beginning for the person who has grown into such an inspiring leader.

All of the fellow board members and past presidents that I've served with also continue to inspire long after their three-year tenure is up. People like Bill Greear, Anita Bell, Missy Post, Jeff Kins, Jaime Nodolf, Tony Walton, Karen Finnegan, Joni Schott, Rob Sheridan, Izzy Ramaswamy, David Nicholson, just to name a few, have all become part of a family that continues long after they've banged the gavel on the podium and handed it over to the incoming president. Their impact on AVIR and its future is felt for years and years. Their passion and dedication to our association and the field of interventional radiology is amazing.

The educational opportunities for technologists in IR are strong and growing on the shoulders of some of the most incredible people I have had the good fortune to volunteer with during my tenure with AVIR. Want to reignite your passion for your specialty and your career? Then join us on this journey and help build the future for our members and our specialty. Come find out how this adventure can be so inspiring and why it means so much to me!!!

EDITOR NOTE

Publication Chair
David S. Douthet, RT(R)(CV)

Welcome to the 2017 Winter Issue of the AVIR Interventional Informer. This issue brings a lot of history forward with the Dotter story and certainly with that, it always seem to bring out memories of past things that go along with our time in Interventional Medicine. We are also headed to LA for our annual meeting as pointed out in this issue and that is La La Land and we should all be prepared to reminisce a little with that story line. The topics this year are fantastic and we got a great line up of speakers. For all you Poster children this is going to be a good meeting as we have already gotten some great poster write ups coming in. The AVIR Chapters are rocking and Mike Kelly has really awaken some old time chapters and add in several new ones. The Virginia Chapter had a great meeting and was so proud to see 7 past presidents and the present president all in attendance. This surely was a record when outside of the annual meeting. The ISET meeting is celebrating its 30th year in existence and I remember going to the first few in Washington DC. Congratulations! Awards nominations are coming up and certainly if you know someone that goes above and beyond in your department, don't miss nominating them. They make a difference in your life at work and will make a difference in this organization and they should be pointed out and Awarded for it. Every year we support the RSNA consortium which is made up of all the different Radiology organization and it gives us a chance to represent the Interventional Radiographers in this very important high profile meeting. We wrap this issue up with an encouragement for each of you to think about getting involved. One way is to be a direct part of this organization. Whether you are just starting out in this field and want to be a committee member first or if you have been here a while and are willing to make a difference for this field, than take the step and put your name in the hat and Get Involved!

A MEETING LIKE NO OTHER.

AVIR MEMBERS:
Log into your account at **www.avir.org** to register at a discounted rate.

Experience 15+ Signature Live Cases

From the group that pioneered live cases for medical education in the United States, this year's program will again showcase the practical application of cutting-edge techniques and feature guidance from leading experts in endovascular therapy. Broadcast in real-time from Leipzig, Germany and Miami, Florida, ISET live cases— paired with insight from an expert moderator and a multidisciplinary panel— provide an elevated perspective you won't find anywhere else in the world.

CELEBRATING 30 yrs

ISET

February 3–7, 2018
The Diplomat
Hollywood, Florida USA

IN PARTNERSHIP WITH

SIR Endorsed Event | Miami Cardiac & Vascular Institute, Baptist Health South Florida

iset.org

INTERNATIONAL SYMPOSIUM ON ENDOVASCULAR THERAPY

ASSOCIATE REPRESENTATIVE CORNER

Lora Cheek RN, SCRN
Associate Director

Call for Poster Presentation Abstracts! Sharing is Caring!

Share your science with AVIR at our 2018 Annual Meeting in Los Angeles March 17-22!! "One of the lessons I have learned in the different stages of my career is that science is not done alone. It is through talking with others and sharing that progress is made." A favorite quote written by Carol W. Greider, evidences the impact you and your poster may have on your AVIR community. Have you encountered new science, an innovative procedure, evidence-based project, clinical initiative or best practice program that you are passionate about and would like to share with others? Have you considered the possibility of presenting a poster at our AVIR annual meeting? Poster presentations are a superior way to share information of meaning with your peers, offer an exceptional learning experience and are a tremendous opportunity to build onto your resume/CV. Your work may be exclusive to your workplace, cutting edge new science or a new professional practice model, and of great interest to your professional peers and your AVIR community. Nervous about presenting? Poster presentations can be likened to an "elevator speech", a brief two to five minute summary of your project that allows the host to interact one on one with the audience and immediately get feedback regarding the data presented. Sharing information about your work in an abstract is like telling a story in a short 250-400 word stroke of genius. A well-crafted story provides a solid introduction highlighting the goals and intentions of your project, why the subject matter is of interest to you, and why the work is important to others and to your field. From there, move into a concise overview of how you went about (or are going about) your work (data collection), and finish with either a summary of your results or the next steps you plan to take to move your project forward. Presentations flourish with collaboration so partner up with fellow Technologist, MD or RN coworkers, sharing the work is less demanding and garners significantly more insights to convey to your audience. AVIR is honored to support you in showcasing the amazing work you all do every day with your fellow technologists. Please consider submitting an abstract for our 2018 Annual Meeting in Los Angeles CA March 17-22. Submit your abstract by December 17, 2017 and be entered to win a FREE conference registration to our annual meeting!!! The technologists from the state with the most submissions will be entered TWICE!!!! Abstracts are being accepted NOW and the deadline for electronic submission is 5:00pm EST February 17, 2018

Don't know what subject to pursue? Topics of interest might include:

- Interventional Oncology
- Electronic Health Record (the Good, Bad and the Ugly)
- Devices in IR (Training, Mentorship, Rollouts)
- Clinical advancement for technologist in IR
- Multiple modality imaging
- Pediatric IR
- Hybrid IR/Cath lab/OR
- Clinical trials in IR
- Team Building
- Comprehensive Stroke center
- Anatomy of Interesting IR cases
- Safety in the IR lab
- Radiation Safety
- Contrast issues and management
- Quality measures (audits/PI projects)
- New Equipment available for IR
- New technologies/treatments in IR
- Staff orientation, education and competencies
- Call schedule and safe staff scheduling
- Throughput in the IR department (timely turn arounds)
- IR department management (who are your team members)
- Risk management in IR
- Safe communication of patient data for cases (texting info between team members)
- Social media and staff communication

Are you interested in taking your VI certification exam!?

The AVIR Now Offers an Online VI Review and Mock Registry Exam!

Available ONLY to AVIR members

http://edu.avir.org/education/

Our 4.0 CE review includes:

-Patient Care and Pharmacology Review
-An In-Depth Look at Vascular Anatomy and Pathology
-A Review of Inventory Vital to Our Field Including Diagnostic and Implantable Devices
-Review of Routine and Complex Interventional Procedures
-A 120-quesiton Mock Exam with Answers

ANNUAL MEETING UPDATE

Stefanie Rockwood RT(R)(VI)
Annual Meeting Chair

Who's excited for the annual meeting coming up? I know all of us on the board are, we have got an amazing line of topics and speakers for the annual meeting held in conjunction with the Society of Interventional Radiology in Los Angeles next March.

The city of angels invites you to experience the unparalleled gathering of experts in the field of IR. Located in the Los Angeles Convention Center you'll be at the center of it all. Here's the scoop on who should attend and what to expect!

Geared towards imaging professionals with a dedicated interest in Interventional Radiology. Continuing education is our main goal, this will give you the most comprehensive experience. Technologists, nurses, medical students, and clinical associates can all value from our program we have lined up. Below are just a few things you can expect from our meeting.

- An in depth up to date VI review course and mock registry exam for technologists wishing to partake in post primary certification
- Post abstracts from around the world detailing emerging IR therapies
- A vast array of networking opportunities offering notable perspective on our fast changing field
- Experts in minimally invasive procedures providing discussions on treatments, patient selection, and equipment

2018 Discussion Topics

Pediatric IR
Women's Health
Varicoceles
Service Excellence
Vascular Malformations
Neuro Intervention
Renal Insufficiency
Complex IVC Filter Retrieval
Endoleaks
A year in twitter: Case Files

Key Dates and Events

Sunday March 18, 2018
- Opening Day
- Combined ARIN and AVIR sessions
- Presentation of Shari Ulman Gold Medal Lecture Award

Monday March 19, 2018
- Breakfast with leadership
- AVIR educational sessions
- Vendor happy hour sip and social
- Hackathon to be held concurrent with AVIR sessions
- Local chapter Q and A with Mike Kelly
- Abstract poster presentations

Tuesday March 20, 2018
- VI board review and mock registry
- AVIR educational sessions
- AVIR business meeting and current ARRT guidelines
- Local chapter Q and A with Mike Kelly

More information on registration and hotel accommodations is located on our website under the annual meeting page.

As always any questions please reach out to me at stefavir@gmail.com

Meet some of our 2018 Speakers


Anuj Malhotra, MD


Anne Gill, MD


John Dalfino, MD


Anne Roberts, MD


Constantino Pena, MD

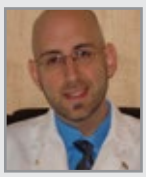

Janice Newsome, MD


Gary Siskin, MD


Michael Miller, MD


Ronald Winakur, MD


Laura Findeiss, MD


Mark Lessne, MD

TAMING THE MIND

Stefanie Rockwood RT(R)(VI)
Annual Meeting Chair

"Watch your thoughts, they become your words. Watch your words, they become your behaviour. Watch your behaviour, they become your habits. Watch your habits, they become your values. Watch your values, they become your character. Watch your character, it becomes your destiny." Mahatma Gandhi

We are minimally invasive. We work around the clock taking call, driving through hurricanes or snow storms to save peoples lives. Our work environment is fast paced, innovative, and exciting. There are the routine outpatients, trauma patients, and the patients no one else will touch but us. It can be easy to become overwhelmed at the knowledge needed in this field. This also means that having exceptional mental health is just as important. Having the contrast of negative and positive emotion in our life makes us realize when we are actually blissful and happy.

According to the World Health Organization mental health is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community. It goes on to say that if you're not mentally healthy, it can be challenging to live life to the fullest.

Everyone has emotional changes from day to day, we are human and that is ok. However, we can be aware of our emotional state and how we react to every situation. Nothing is truly a problem until we interpret it as one. Think about that for a minute, because I had a tough time believing this. What one person believes is a problem another may see it as an opportunity. In our daily life of interventional radiology there is one thing that is constant and that is change. A good case can turn into an emergency, someone used the last of the inventory without letting everyone know, the list can go on and on. Reacting to a situation in a negative or positive way and being aware of how it makes us feel will create an emotion in you. This takes some time to practice with, but the more we are aware of how we feel about something, the better we will be to find solutions.

The mind is a powerful tool, it's not easy to go outside the comfort zone. The brain wants to make decisions based on past experiences because it likes to be efficient with as little energy as possible. If you think about what your current emotion is and identify what it feels like, you can go back to knowing all emotions are created by thought. Deliberately think of how you want to feel and focus on the experience of it, describe it. What does it look like? If you believe a thought it will create an emotion which will create action leading to a result.

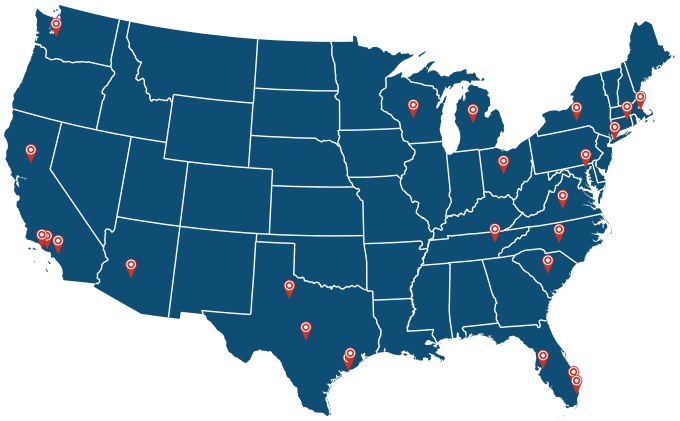
The National Institute of Mental Health an estimated 26.2% of Americans suffer from mental disorders and 68% of adults with mental disorders also have chronic medical conditions. Looking at these statistics its easy to see why mental health is so important.

Eighty-six percent of the nation's $2.7 trillion annual health care expenditures are for people with chronic and mental health conditions. These costs can be reduced, there are countless journals and articles written about the correlation of stress/burnout/mental health and disease.

Does this mean be happy in every moment of life? Certainly not, but we get the opportunity to choose how to think and determine how to feel. What about worrying? Does this offer us anything that is truly useful? Maybe we embrace the concept of not worrying and really believing we didn't have to. Then maybe over time we start to notice we feel better without anything external changing. But you may be thinking there are times I want to feel something other than just 24/7 happy and positive. Sad, fear, indifferent, disgust or anger; there are so many to choose from. We lose a patient, equipment may be malfunctioning, someone has criticized us, that guy at the coffee shop made our coffee wrong, etc. We can be aware of these emotions, really in tuned to it and use it to create the life we want. When you are and willing to feel any emotion without buffering there's nothing you're not willing to do.

2017 CHAPTER UPDATES - FALL

Mike Kelly, RT(R)(VI)RCIS
Director at Large



Austin, Texas (HCIR) Hill Country Interventional Radiographers

Contact: Derek Stearns
Email: avirhctx@gmail.com

This is a new chapter of the AVIR headed by Derek Stearns. Derek seems to have a great team working with him and they are gearing up for exciting things. They are looking to have some exciting things happening in the upcoming months. I look forward to seeing what this chapter has in store.

Arizona, Chapter

Contact: Alfredo Yanez
Email: ayanezavir@gmail.com

A newer AVIR Chapter is from Phoenix headed by Alfredo Yanez. They have a lot of interest and support from their local hospitals and staff. I have no doubt they will hit the ground running
with some great lectures and add to our membership growth.

Boston Chapter

Contact: Rob Sheridan
Email: robsheridanavir@gmail.com

Contact: Brian Oakes
Email: brianoakesavir@gmail.com

The Boston chapter is up and running and just recently held a 5 CE credit event on October 28th at Lahey Hospital. They had some great lectures given by Dr. Irani, Dr. McCarthy, Dr. Schainfeld, Dr. Thabet, and our very own Rob Sheridan. Some of the topics included Complex IR Cases, Radiation Safety, and ATTRACT DVT Trials. This event was just the first of many to come. Please follow @Boakesavir and @robsheridanavir on Twitter for future events.

Pictured: Brian Oakes and Rob Sheridan

Brazil Chapter (Rio de Janeiro)

Contact: Dr. Paulo Eduardo Ocke Reis
Email: vascular@pauloocke.com.br

Contact: Dr. Guilherme Abrao
Email: guiabrao@yahoo.combr

Both of these physicians have showed a lot of interest in getting involved with and starting the first ever AVIR chapter in Brazil. They feel it is an honor to represent the AVIR in their area and help create educational opportunities for their chapter. Really looking forward to the development of this chapter.

Buckeye State Chapter (Ohio)

Contact: Jamie Hiott RT (R) (CV)(M)(CT)(VI)
Email: jshiott@gmail.com

This Chapter is based out of Columbus, Ohio. Jamie is currently looking for interested professionals that are interested in helping get this chapter going once again. If you are interested in possibly being a part of this chapter please contact Jamie or Mike Kelly with the AVIR to discuss. There is huge potential for this chapter!!!

Chicago (Chicagoland) Chapter

Contact: Kevin Lynch, Amanda Karpierz, and Chelsea Lafayette
Email: AvirChicagochapter@gmail.com

Chicagoland held its 1st Annual Chicagoland AVIR Conference on October 14th, 2017 at Joe's Live @ MB Financial Park. This meeting was a great success and was very well attended. The team worked very hard to put this 7 CE credit event together. This chapter has put together a few events in just the short time of being active so be sure to keep up to date on what the Chicagoland Chapter has planned for future events.

Pictured: Kevin Lynch, Kristen Welch, Dr. Kumar Madassery

Connecticut Northeast Chapter of AVIR

Contact: Paul McCarthy RT(R) (VI)
Email: pmccarthy03@yahoo.com

Paul held three AVIR meetings in the Connecticut Chapter since last year's annual meeting.. He is continuing to strive with membership for the AVIR and we look forward to hearing from them soon on the other great things they have lined up.

Knoxville, Tennessee

Contact: Dan Bernard
Email: djbernard@me.com

The TN AVIR will host their 3rd Annual Conference in Nashville, TN towards the end of January 2018. They plan on having their conference itinerary posted by September 1, 2017 so please keep posted for that. For more information please call Dan Bernard at 1(865) 406-0514.

Be sure to follow them on their TN chapter Facebook page. They have been using their Facebook page for chapter communication and to post articles and cases of the month that are always open for discussion. Please join, like and share their page.

The TN Chapter's current board consist of:
Dan Bernard – Chapter President
Alan Buck – Chapter Vice President
Gary Anders – Chapter Secretary/Treasure
Brad Mitchell – Chapter Director at Large
Chris 0'Fallon – Corporate Liaison

South Florida-Miami Chapter

Contact: Roberto Telleria, RT R CV CT
Email: AVIR.MIAMI.RT@GMAIL.COM

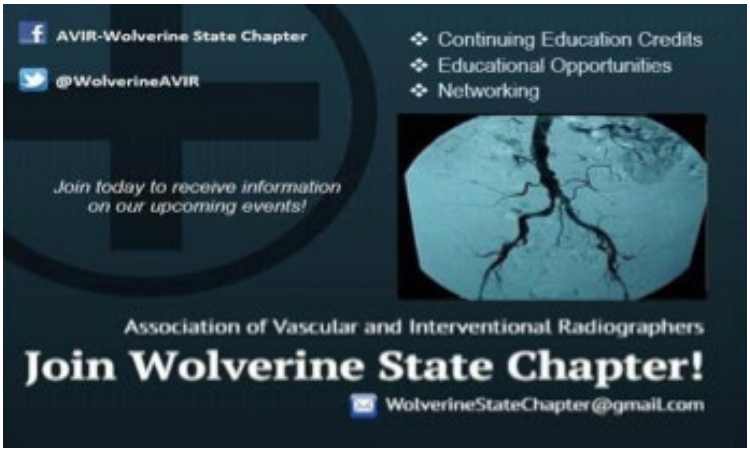
They are getting ready for ISET 2018 and have a great Tech/Nurse Symposium planned for this year. Last year they had over 150 registrants to this event and the symposium was very educational. As always, AVIR members get a special rate by registering through the AVIR website so be sure to take advantage of this and be sure to attend this event if able. This is a great opportunity to hear great speakers discuss topics that are important to our profession and have a chance to network with fellow professionals from across the country.

Wolverine State Chapter (Michigan)

Contact: Samantha Kobeissi
Email: Sskobeis@med.umich.edu

Contact: Andrea Reid
Email: Andreado@med.umich.edu

The Wolverine State Chapter is based out of Ann Arbor, MI. They are hitting the ground running and have already held a few events over the past few months. They plan on having their next following event on December 5th on the topic of Acute Ischemic Stroke and Neurointerventional Treatment. Please follow them on Twitter @ WolverineAVIR. If you are interested in getting involved please reach out to Samantha or Andrea.



New York City Chapter

Contact: Rennie Mohabir RT(R) (CV)
Email: mohabirh@mskcc.org

Rennie is really motivated to grow this chapter and I have no doubt that he will do just that. The NYC chapter has plans to put together some events in the near future, possibly this fall or beginning of the year. We will keep you updated.

Capital Region New York Chapter

Contact: James Black
Email: tdstechno.jb@gmail.com

Contact: Stefanie Rockwood
Email: stefavir@gmail.com

The Capital Region NY Chapter is up and running again!! They just held another event on the topic of "Complex Brain Aneurysms and New Therapy Options" with lecture given by Dr. Charles Matouk from Yale. James and Stefanie have plans to keep these educational events going so be sure to keep your eyes open for future events or reach out to them to find out when the next event will be. As you can see from pictures, it was very well attended and looks like great food to go along with a great lecture.

2017 CHAPTER UPDATES - FALL

Northern California Chapter
Contact: Darlene Crockett RT(CV)
Email: maildarlene@juno.com

North Carolina Chapter (NCAVIR)
Contact: Amy Scarborough
Email: Amy.Scarborough@carolinashealthcare.org

Contact: Marcia Stegall
Email: Marcia.Stegall@carolinashealthcare.org

NC AVIR is back up and running. Amy and Marcia are eager to start working on chapter events for North Carolina. This chapter is based around the Charlotte, NC area. Please reach out this team if you have interest in joining this chapter or finding out more about future events.

North Texas Chapter
Contact: Sven Phillips RT (R)VI
Email: sven427@yahoo.com

Sven and his colleagues are currently in the process of preparing educational opportunities for their area. Please reach out to him if you are interested in becoming involved.

Orange County California Chapter (OCAVIR)
Contact: Brett Thiebolt (R)
Email: brett.thiebolt@stjoe.org

The Orange County California Chapter has been involved with an Angio Club that meets quarterly for the last few years. They ask multiple facilities in the Orange County and LA area to provide case presentations. They usually ask for teaching cases or cases that have complications. The Angio Club is open to Physicians (IR Radiologists, Cardiologists and Vascular Surgeons), Fellows, Residents, RT's and Rn's.

Orlando, Florida Chapter
Contact: Jodie Reynolds
Email: jodieavir@gmail.com

Great news central Florida interventional technologists! The Orlando chapter of AVIR is up and running at Nemours Children's Hospital. They have an exciting year ahead of us and will be offering amazing new benefits. In conjunction with physicians and medical supply representatives, we will be hosting meetings to further educate our community on the history and future of AVIR.

Seattle Chapter
Contact: Cris Cassady RT(R)
Email: christina.cassady@providence.org

Contact: Leona Benson RT (R)(CV) FAVIR
Email: seattleavir@hotmail.com

Leona and Cris have gotten the Seattle chapter back up and running. These ladies currently are planning on a few events for the year so be sure to reach out to them to find out more information. Also, if you are interested in possibly helping with this chapter do not hesitate to reach out to them.

South Carolina (SCAVIR)
Contact: John Furtek RT (R)
Email: jfurtek52@gmail.com

The South Carolina Chapter is holding the 14th annual S.E.T. Symposium in Kiawah Island, South Carolina. It is scheduled for February 22nd -24th 2018. The Sanctuary of Endovascular Therapy (S.E.T.) has established itself as one of the premier endovascular meetings. The Symposium provides vascular surgeons, interventional radiologists, cardiologists, podiatrists and allied health professionals a unique interactive program with the most current information and treatment options for endovascular disease.

This three-day event featured presentations from world-renowned specialists with an emphasis on the latest advances, changing concepts and new techniques in endovascular treatments. Our faculty brings diverse specialty backgrounds that provide a unique perspective.

The program includes Interactive Panel Discussions, Pedal & Radial Access, Critical Limb Ischemia (CLI), Venous Sessions, CEU's for the entire team, and much more.

Tampa, Florida
Contact: Pete Stibbs
Email: pete.stibbs@argonmedical.com

Currently, this chapter is looking at the possibility of organizing a symposium and registry review to be held during the first part of 2018. If this is something you may be interested in attending or helping to organize it please reach out to Pete.

Texas Gulf Coast Chapter
Contact: Heather Cleveland
Email: hxclevel@texaschildrens.org
Phone: (214) 498-2962

Heather is dedicated to relaunching the Gulf Coast Chapter. Heather has some great ideas for this chapter. If you are interested in being a part of this chapter or possibly helping Heather with this task, please reach out to her. There is no doubt that this can be a great chapter.

Utah Chapter

Contact: Ivan Cutler
Email: cutler.ivan@gmail.com

This new chapter will be based in the Salt Lake City area. Please reach out to Ivan if you are interested in being a part of this chapter and the great things that I am sure will come from them.

Virginia Chapter VA AVIR

Contact: Hannah Smith
mhmkcsmith@verizon.net

The VA AVIR recently held their 15th annual symposium at the Great Wolf Lodge in Williamsburg, VA on Nov. 3rd & 4th. Once again, the meeting was a huge success with over 150 registrants which included students, IR/Vascular/Cardiac professionals, and vendors. We also had the privilege of having the National AVIR Board along with a few past AVIR presidents in attendance as well. Attendees had the opportunity to earn 12 A+ CE credits.

Over the two days of lectures, topics such as PAE, Vascular Gone Wild, Advanced Cardiac Procedures, Interventional Oncology, Dynamic Teamwork, Radiation Protection, Renal Denervation, and many more were discussed.

We have plans to start hosting smaller educational events throughout the year so make sure to follow the VA Chapter on their Facebook page (https://www.facebook.com/VAAVIR) and Twitter @VaAVIR

Wisconsin Southeast Chapter

Contact: Jen Eklund./ Kristen Welch / Deb Barnes
Email: daisymay1210@yahoo.com
Email: kristenavir@gmail.com
Email: Debra.Barnes@froedert.com

We were excited to kick off our educational offerings with Dr. Smit Vasaiwala and Dr. Curtis A. Given II talking about Multidisciplinary Approach to Managing Ischemic Stroke: From Acute Management to Transition of Care. This event was held in October and sponsored by Medtronic. We learned about managing stroke in the acute setting from the Neuro-interventional perspective of Dr. Given. Dr. Vasaiwala shared his electrophysiology expertise about caring for cryptogenic stroke population. Our November education will be showcasing the tools of Interventional Radiology presented by our very own Debra Barnes and Kristen Welch. Back to Basics, Getting to the “Point”, Needles, Wires, Sheaths, and Catheters will review properties and indications for these very important tools that get the job done. There will also be hands on time with product sponsored by Cook Medical. We hope to see you November 14th, 7:00pm at Fridays Miller Park Milwaukee, WI. Please stay tuned as we gear up for our annual Spring Symposium in April 2018!

SEW AVIR Chapter heads, Kristen Welch, Debbie Barnes, and Jennifer Eklund at our June CE event

15+ SIGNATURE LIVE CASES

400+ PRESENTATIONS

32.5 CME/CNE CREDITS

13 SAMS CREDITS*

CELEBRATING 30 yrs

ISET

February 3–7, 2018

The Diplomat

Hollywood, Florida USA

IN PARTNERSHIP WITH

SIR Endorsed Event

Miami Cardiac & Vascular Institute

BAPTIST HEALTH SOUTH FLORIDA

*Pending submission to the American Board of Radiology (ABR) for qualification in meeting the criteria for self-assessment toward the purpose of fulfilling the requirements in the ABR Maintenance of Certification Program.

iset.org

INTERNATIONAL SYMPOSIUM ON ENDOVASCULAR THERAPY

ISET CELEBRATES 30 YEARS!

Kristen L. Welch, RT, R, VI
President-Elect

The International Symposium on Endovascular Therapy (ISET) is quickly approaching! Did you know that as an AVIR member you can attend ISET for only $75?! ISET is held each winter in conjunction with the Symposium on Clinical Interventional Oncology (CIO) in Hollywood, Florida. The two conferences were developed and are led by the Miami Cardiac and Vascular Institute and attracts over 1,000 attendees each year. This year the organization is celebrating 30 years and has an exciting program lined up.. On Saturday February 3rd there is a Nurse and Technologist focused symposium.

30th Annual ISET Nurse and Technologist Focused Symposium: Innovations in Cardiac and Vascular Care Program

08:00	ISET at 30 Years
08:15	Non Invasive Vascular Laboratory: What do the Tests Tell Us?
08:45	Understanding IVUS and OCT
09:30	Clinical Exam in Acute Stroke
09:45	Cross Sectional Vascular Imaging: CTA vs MRA, When to Order What
11:05	Safe Imaging in Patients with Renal Disease
11:20	Understanding HD Access Options and Goals
11:45	Endovascular and Surgical Treatments of HD Access Failures
12:05	Preserving Vascular Access and Guidelines for Catheter Related Infection
01:30	The Dressing is Off: Management of Wounds
01:50	Cardiogenic Shock: Door to Support
02:10	Understanding Indication and Management of Short Term Mechanical Circulating Support Including Aortic Balloon Pump and Impella Device
02:30	Post Arterial Access Care: Compression, FemStop, Wristbands and Devices
02:50	My Patient is Receiving Thrombolytic Therapy: What to Know
03:10	Identifying and Managing Retroperitoneal Bleed / Hematoma
03:50 – 05:05	From the Front Line: Case Studies of Things That Can Go Wrong and How to Manage Them!

AVIR VP Kristen Welch, Dr. Barry Katzen, and Media Chair Izzy Ramaswamy at ISET in 2017

AVIR Past President Jeff Kins, VP Kristen Welch, and Media Chair Izzy Ramaswamy at ISET in 2017

CALL FOR POSTER ABSTRACTS

The Association of Vasuclar and Interventional Radiographers invites you to submit abstracts for posters to be presented at our Annual Meeting held in conjunction with the Society of Interventional Radiology. We are seeking scientific and educational abstracts that address clinical, education, procedures, quality improvement, and patient safety within Interventional Radiology.

EARLY BIRD PRIZE

Submit your abstract by December 17, 2017 and be entered to win a FREE conference registration to our annual meeting held in conjunction with SIR, March 17-22, 2018. The technologists from the state with the most submissions will be entered TWICE!

DEADLINE

Registration is open NOW, and the deadline for electronic submission is 5:00pm EST February 17, 2018. All authors will be notified of acceptance within two weeks of their submission. If your abstract is accepted, you are invited to create a poster that will be showcased at our annual meeting.

Visit Our Website for Abstract / Poster Guidelines: https://avir.site-ym.com/page/abstract

Authors of accepted abstracts are invited to present their posters during our poster session Monday March 19 in Los Angeles

Questions?
Lora Cheek, RN - loracheek@gmail.com
Kristen Welch, RT, R, VI – kristenavir@gmail.com

COMMITMENT TO GROWTH

If you're looking for an opportunity to network with other professionals and become involved with the AVIR on a deeper level consider pursuing appointment to the AVIR Education committee. The Education Committee, led by the Vice President, assists in the management of the Educational Content and all E-learning modules through our online and mobile platform and social media outlets. Often, those who join committees gain the experience to smoothly transition to an elected position on the AVIR Board of Directors.

If you're considering joining an AVIR committee, or have any questions or concerns, please contact us at info@avir.org.

Education Committee:
Nominating Committee:
Membership Committee:
Chapter Committee:
Annual Program Committee:
Publications Committee:
Associate Members Committee
Web Site Committee

ATTENTION ALL WRITERS

The Interventional Informer is offering $100 to the best article. This is awarded for each issue of the Informer. The article should be originals. No limit in size, but they must pertain to Interventional Medicine. Just submit your article with name and address for the AVIR Board of Directors to review.

Best of Luck!
Editors Award Winner
AVIR would like to acknowledge the following writer for their publication in the past issue.

With Gratitude in DC
By Debra Barnes, BS, RT, R, CV

Congratulations!

NEWSLETTER ADVERTISING RATES:

Type	Dimentions *Inches*	Ad Rate
Classified Ad	1 column inch	$ 125.00
1/8 page color ad	2¼ x 3¾	$ 525.00
1/4 page color ad	4½ x 3¾	$ 825.00
1/2 page color ad	4½ x 7½	$ 1,200.00
Full page color ad	8½ x 11 (+ ⅛ bleed)	$ 2,000.00

Mechanical Specifications
Dimensions:
Trim Size: 8.5"x11"
Live Area should be kept 1/4" from trim on all sides including gutter.
Bleed extends 1/8" beyond trim on all sides.

File Submission
Digital files should be provided in high resolution PDF format, including crop marks and bleed if applicable. Although not recommended, we will accept the following formats: .eps, .tiff, or Adobe InDesign native files with all support links and fonts. The following file formats are not accepted: Corel, Microsoft Word, Powerpoint or Publisher documents.

All images must be 300dpi and in CMYK or Grayscale color format. All fonts should be embedded or in outlines where applicable. Artwork should be submitted at 100% scale.

MEMBERSHIP CATEGORIES

AVIR memberships offer different options to meet your needs

Select the category below that closely fits your professional lifestyle and current needs.

All AVIR memberships offer:

- Newsletter
- Social Media
- Conference Discounts
- 1600 Member Network
- Free Webinars
- Directed Readings
- Mentor Partnerships
- Self-Study Podcast
- Clinical Observerships
- Career Center
- Anniversary Renewals

Student Membership	$45/year	Students who are currently in a certified program for Vascular and Interventional Radiographers	
Associate Membership	$65/year	Related healthcare professional working with or having a special interest in the field. Including but not limited to: Nursing staff, Medical/ Cardiovascular Technologist and or Commercial Company Representatives	• Additional ACE discounts
Active Membership	$75/year	Radiographers with a primary focus in Vascular and Interventional Radiology. Technologist must reside in the USA or Canada, be an active member of the ARRT or Canadian equivalent. Must be able to submit a current membership card.	• Additional ACE discounts • Access to the VI review for additional cost
International Membership	$85/year	Healthcare workings working in or having a special interest in Vascular and Interventional Radiology. Including but not limited to: Technologists, Nursing staff, Medical/Cardiovascular Technologist, and or Commercial Company Representatives residing outside of the USA and Canada.	

UPCOMING IR CONFERENCES

Meeting	Date	Location	Website
RSNA- Radiologic Society of North America Annual Scientific Assembly	November 26- December 1, 2017	Chicago, IL	www.rsna.org
6th Annual Miami Neuro Symposium	Nov 30- Dec 2, 2017	Carol Gables, FL	http://cme.baptisthealth.net/miami-neuro/pages/index.aspx
ISET- International Symposium on Endovascular Therapy	Feb 3-7, 2018	Hollywood, FL	www.iset.org
CIO- Symposium on Clinical Oncology	Feb 3-4, 2018	Hollywood, FL	www.iset.org
CARVE- Clinically Relevant Vascular & Endovascular Surgery	February 20-22, 2018	Vail, CO	www.carve-cme.com
43rd Annual SIR Meeting	Mar 17-22, 2018	Los Angeles, CA	www.sirmeeting.org
28th Annual AVIR Meeting	Mar 17-22, 2018	Los Angeles, CA	www.avir.org
GEST- Global Embolization Cancer Symposium Technologies	May 17-20, 2018	Miami Beach, FL	

CALL FOR AWARD NOMINATIONS AND AVIR FELLOWSHIP INDUCTEES

Kristen L. Welch, RT, R, VI
President-Elect

My favorite event at the AVIR Annual Meeting each year is the Business Meeting. You're probably wonder why, right?! Maybe I'm bias, but something I've always found very unique about our field is the level of passion generated from those within IR. This is clearly very apparent at our Awards Reception. I'm not embarrassed to admit this-I haven't made it through an award presentation without shedding a tear…. and I'd like to think I'm not alone in saying so. I love hearing the individual stories about our award recipients and their accolades within IR. These leaders are some of the most influential faces within our organization and field. Part of what makes this such a special event, is that all of the award recipients are nominated by their peers.

Do you know someone that deserves to be recognized for their hard work? Please consider nominating them for the AVIR Award of Excellence or the President's Award of Educational Excellence. The recipients of these awards will be honored at our Annual Meeting in Los Angeles and featured in our Annual Meeting Program. Additionally, their registration fee for the conference and accommodations will be waived. All applications will be reviewed by the AVIR Board of Directors. The recipients for these awards will be announced in February, and all submissions are due by January 1.

Please visit our website for application info: https://avir.site-ym.com/?AVIRHonors

AVIR AWARD OF EXCELLENCE

The AVIR recognizes the irreplaceable value of technologists who consistently go the extra mile. The AVIR Award of Excellence is presented each year at our Annual Meeting. This person represents the best of all we stand for as professionals, colleagues, and patient care advocates. If you know someone that stands out and should be recognized for going the extra mile each and every time please fill out the application on their behalf. The application does not have to be completed by an AVIR member, but by anyone who feels that the nominee goes above and beyond the call of duty and demonstrates a dedication to his or her job and profession. Do you know someone that embodies these characteristics?

Past Recipients

2017 Debra Barnes
2016 Rita Howard
2015 Mike Kelly
2014 Anne Kubasiak
2013 Roberto Telleria
2012 David Baires
2011 Stephen Haug
2010 Heidi Apfel
2009 Juan Mancera
2008 Rebecca Lassiter
2007 Patricia Crane
2006 Jamie Nodolf
2005 Viki Allenbach
2004 Sandra Dixon
2003 Leona Benson
2002 Sharon Misler
2001 Marie Shodle
2000 Gene Maziarski
1999 David Hall
1998 Gara Colelli
1997 Richard Cless
1996 Joyce Moses

PRESIDENT'S AWARD OF EDUCATIONAL EXCELLENCE

Last year in Washington DC we introduced a new award, the President's Award of Educational Excellence. This award honors a student who demonstrates a passion for Interventional Radiology through their commitment to patient care, research and innovation, and pursuit of continued learning.

To qualify for this award, students must actively be enrolled in a VI training program, either certificate, internship, or college based. Program Directors, Clinical Coordinators, Clinical Instructors, or technologists can nominate the student. All applications must include two letters of recommendation. Acceptable sources include the student's Program Director, a physician, clinical instructor, technologist within the division, or instructor within the program.

2017 Inaugural Recipient:
Melinda Mondrawickas

AVIR FELLOWSHIP

The AVIR Fellowship Award recognizes interventional radiographers who demonstrate a continuing pursuit of excellence in the IR profession. The commitment begins at the hospital level, moves onto their local AVIR chapter, and escalates to your commitment at the national level. The application employs a point system to evaluate the candidate in three areas: Personal qualifications, contributions to the AVIR, and to the profession. Once the minimum amount of points is reached, an application may be submitted to the Fellowship Committee for Review.

Past Inductees

2014 Robert Sheridan
2012 Izzy Ramaswamy
2010 John Mancera
2009 Diane Koenigshofer
2009 Melissa Post
2008 Viki Allenbach
2007 Darlene Crocket
2006 Joni Schott
2005 Deborah Sepinski
2005 Bill Greear
2004 Leona Benson
2003 Sharon Misler
2003 Anita Bell
2002 Betty Ashdown
2001 James Matthews
2001 Karen Finnegan
2000 Michael Tom 1999 Sue Smith
1997 Kathi Clark
1997 Joyce Moses
1997 Meredith Gaiter Brown
1996 Shari Ulman
1996 Sherry Stefina
1996 Mary Kay O'Brien
1996 Carol Mascioli
1996 Tom Burke
1996 Dennis Bair

Applications are being taken now and can be found at www.avir.org.

ATTEND THE RADIOLOGIC SOCIETY OF NORTH AMERICA'S 103RD SCIENTIFIC ASSEMBLY AND ANNUAL MEETING

By Kristen L Welch, RT, R, VI
President-Elect

Did you know that there are courses designed at RSNA specifically to meet the needs of radiologic technologists? The Associated Sciences Consortium is responsible for developing educational programs targeted to the members of the 11 associations that represent the various disciplines that represent Radiology. These associations include:

The Association for Medical Imaging Management (AHRA)

American Institute of Architects-Academy of Architecture for Health (AIA-AAH)

American Society of Radiology Technologists (ASRT)

Association of Educators in Imaging and Radiologic Sciences, Inc (AEIRS)

Association of Vascular and Interventional Radiographers (AVIR)

Canadian Association of Medical Radiation Technologists (CAMRT)

College of Radiographers (CoR)

International Society of Radiographers & Radiological Technologists (ISRRT)

Radiology Business Management Association (RBMA)

Section for Magnetic Resonance Technologists-International Society for Magnetic Resonance in Medicine (SMRT-ISMRM)

Society of Nuclear Medicine-Technologists Section (SNM-TS)

JOIN US AT RSNA 2017 FOR THE ASSOCIATED SCIENCES PROGRAM

McCormick Place, Chicago, IL

Monday November 27, 2017

MSAS21
8:30 AM – 10:00 AM
Room S105AB
CT Dose Tracking (An Interactive Session) (1.50 CE)
Nancy Macdonald, MS, Moderator
Christina Sammet, PhD

MSAS22
10:30 AM – 12:00 PM
Room S105AB
MACRA, MIPS, and Money (An Interactive Session) (1.50 CE)
Patricia Kroken, Moderator
Kendra Huber, RT, BS, Moderator
A: How Winners and Losers Will Be Decided and What You Can Do
Claudia Murray
Don Good

MSAS23
1:30 PM – 3:00 PM
Room S105AB
Emerging Imaging Trends in MRI Fusion Techniques (An Interactive Session) (1.50 CE)
Kenda Huber, RT, BS, Moderator
Kristen Welch, RT, R, VI, Moderator
A: PET / MRI Applications and Challenges
Behrang Amini, MD, PhD
B: MR Image-Guided Adaptive Radiation Therapy
Geoffrey S Ibbott, PhD

SPPH21
1:30 PM – 2:45 PM
Room S402AB
Basic Physics Lecture for the RT: Standardizing Image Quality in Digital Radiography (1.50 CE)
Scott J Emerson, MS, Moderator
Alisha Walz-Flannigan, PhD

MSAS24
3:30 PM – 5:00 PM
Room S105AB
Planning Effective and Efficient Imaging Services (An Interactive Session) (1.50 CE)
Morris A. Stein, BArch, Moderator
William A. Undie, PhD, RT, Moderator
A: Regulatory Updates on Clinical Support Systems and the Implication for Financial and Operational Considerations
Melody W. Muliak
B: Delivery of Imaging Master Planning and Design of Physical Space through Data, Modeling and Research
Carlos L. Amato

Tuesday November 28, 2017

MSAS31
8:30 AM – 10:00 AM
Room S105AB
The Developing Scope of Practice of the Radiographer / Radiological Technologist (an Interactive Session) (1.50 CE)
Charlotte Beadmore, MBA, Moderator
Dimitrios Katsifarakis, MSc, Moderator
A: Developing Scope of Practice of the Radiographer from the ISRRT
Donna Newman
B: The Developing Scope of Practice of the Radiographers / Radiological Technologist in Breast Imaging Services
Anne Marie Culpen, PhD

MSAS32
10:30 AM – 12:00 PM
Room S105AB
Patients are Expecting a Retail Experience: 5 Principles from Retail Healthcare (An Interactive Session) (1.50 CE)
Dana Aragon, RT, Moderator
Catherine Gunn, RT, Moderator
Matt Henry
Calvin Cheng

MSAS33
1:30 PM – 3:00 PM
Room S105AB
Cyber Crimes in Radiology (An Interactive Session)(1.50 CE)
Dana Aragon, RT, Moderator
A: Understanding the Elusive Enemy
Sam Khashman
B: Cyber Insurance: What It Does and Doesn't Cover
Adam Cottini

MSAS34
3:30 PM – 5:00 PM
Room S105AB
Better Together, Improving Outcomes with Family Centered Care Practices (An Interactive Session)(1.50CE)
Catherine Gunn, RT, Moderator
JoAnn Balderos-Mason, RT, Ed.D., Moderator
A: Parent Partnerships in the Patient Centered Care Environment
Catherine Gunn, RT
B: Coping Strategies in a Patient Centered Care Environment
JoAnn Balderos-Mason, RT, Ed.D.
C: Coping Strategies for Imaging Technologists
Elvira V. Lang, MD

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READY TO TAKE YOUR POST PRIMARY VI EXAMINATION? HERE'S WHAT YOU NEED TO KNOW

Kristen L Welch, RT, R, VI
President-Elect

Are you interested in sitting for your Vascular and Interventional post-primary exam!? Well, we've got all the info you need here to apply and prepare yourself for your examination. You can also view a comprehensive overview at www.arrt.org/handbooklinks

Still have questions?! Please feel free to reach out to the Education Committee Chairman at: kristenavir@gmail.com

Preparing to take the Exam

Beginning the Application Process

You can submit your application through your ARRT online account. Applications for certification and registration are subject to a processing fee of $200. Reapplication fees are $175. Once approved you must schedule your exam appointment in a 365-day window assigned by ARRT. For a list of locations to take your exam you can visit: www.pearsonvue.com/arrt

Ethics Requirement

You can view the ARRTs Standards of Ethics. This document articulates the types of behaviors they expect of RTs. Applicants are required to report any violations

Clinical Experience Requirement

Candidates for Vascular Interventional Radiology certification must document performance of a minimum of 200 procedures. These procedures are documented, verified, and submitted through an online tool through My ARRT Info in your ARRT online account.

The ARRT recognizes 61 different procedures in the following categories:

A. Neurologic

B. Thoracic

C. Abdominal and Pelvic

D. Genitoruinary and Gastrointestinal

E. Peripheral

F. Venous Access

G. Miscellaneous

for a complete list of procedures visit: www.arrt.org

Candidates must document a minimum of 200 procedures and follow these rules:

- The candidate does not need to select procedures from all 7 above categories
- Each selected procedure must be performed a minimum of 5 times in order to receive credit
- Each procedure may be counted a maximum of 20 times
- For any given patient per day, you may count only one diagnostic procedure, but multiple interventional procedures

Examples

Candidate A: This person identified 10 different procedures from the list and performed each of those procedures 20 times (10 x 20 = 200)

Candidate B: This person identified 25 different procedures from the list. The applicant performed 15 of those procedures 10 times (15 x 10 = 150), and the other 10 procedures five times (10 x 5 = 50)

Candidate C: This person identified 40 different procedures from the list and performed each of those procedures five times (40 x 5 = 200)

For the procedures to qualify for documentation the technologist must demonstrate active participation in a primary role with appropriate:

- Preparation of supplies and maintenance of equipment
- Evaluation of order and patient identification, patient preparation, and administration of medications as required
- Patient monitoring during procedure
- Post procedure patient care
- Image processing, including evaluation of images to ensure they demonstrate correct anatomy, radiographic technique, and identification / labeling

Continuing Education Requirement, Effective January 1, 2016

Technologists wishing to pursue post-primary certification in Vascular and Interventional Radiology must submit 16 CE credits specific to Vascular and Interventional Radiology before qualifying to sit for their examination.

Structured Education Requirement, Effective January 1, 2018

In order to sit for your boards, you will be required to provide 16 structured education CEs. What does this mean?! These credits are specific to your modality, but also have been approved by the ARRT as Structured Education. These credits will be "coded" into a category. The three required categories include: Patient Care, Image Production, and Procedures. Each applicant must have atleast 1 credit from each of the 3 categories.

How do you know which category your CEs fall into? After you complete your CE activities, long into your ARRT account and use their post-primary tool to directly submit your education to the ARRT. Your credits will be processed within 2 business days. Specific topics within each category are addressed in the content outline on www.arrt.org

Studying for Your VI Board Exam

AVIR Now Offers Online VI Review

The AVIR now offers a 4.0 CE video led online VI Review and Mock Registry Exam. The video content and mock registry are up-to-date and relevant to the current ARRT VI Examination.

Our review includes:

- Patient Care and Pharmacology Review
- An in-depth Look at Vascular Anatomy and Pathology
- A Review of Inventory Vital to Our Field Including Diagnostic and Implantable Devices
- Review of Routine and Complex Interventional Procedures
- A 120-question Mock Exam with Answers

Textbooks

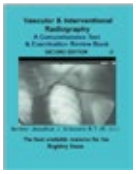
I've put together this list of textbooks that some of our members have found helpful in studying for their exam.

ARRT Examination in Cardiovascular Interventional Technology (Admission Test Series)

by Passbooks

ISBN 13: 978-0837358178

ISBN-10: 0837358175

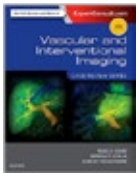


Vascular and Interventional Radiography: A Comprehensive Text & Examination Review 2nd Edition

by Jonathan J. Schwartz

ISBN 13: 978-1500443504

ISBN 10: 1500443506

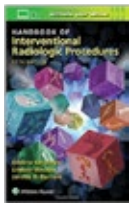


Vascular and Interventional Imaging: Case Review Series, 3rd Edition

by Wael Saad, Minhaj Khaja, and Suresh Vedantham

ISBN 13: 978-1455776306

ISBN 10: 1455776300



Handbook of Interventional Radiologic Procedures, 5th Edition

by Krishna Kandarpa, Lindsay Machan, and Janette Durham

ISBN-13: 978-1496302076

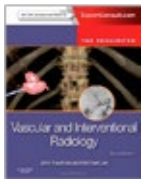
ISBN-10: 1496302079

Vascular and Interventional Radiology: Principles and Practice 1st Edition

by Curtis W. Bakal, James E. Swilberzweig, and Seymour Sprayregen

ISBN 13: 978-0865776784

ISBN 10: 0865776784



Vascular and Interventional Radiology: The Requisites, 2nd Editiion

by John A. Kauffman and Michael J, Lee

ISBN 13: 978-0323045841

ISBN-10: 0323045847

Todd's Cardiovsacular Review Book Vol 1: Invasive Basics (Cardiovascular Review Books) 5th Edition

by Wesley Todd

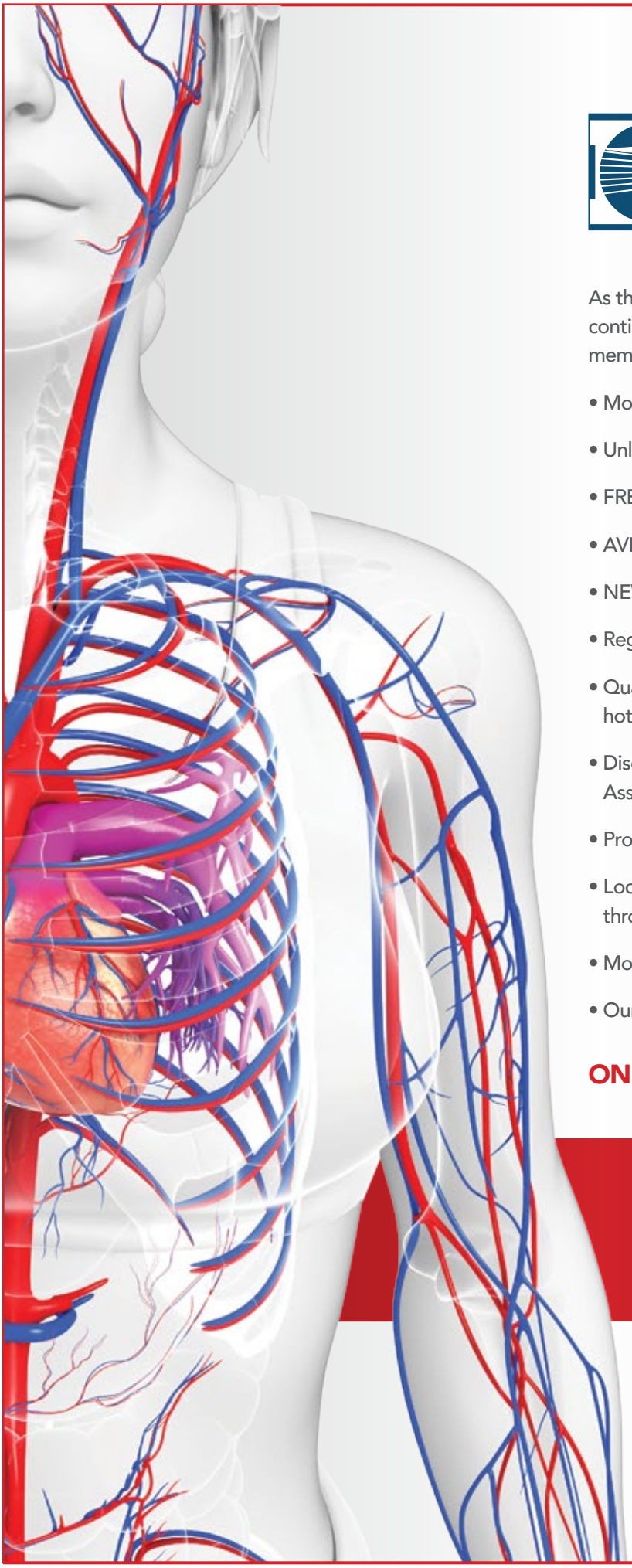
ISBN 13: 978-1490507323

ISBN 10: 1490507329

The Exam

The table below represents the major content categories and subcategories covered on the examination. The number of test questions in each category and subcategory are listed below. Specific topics within each of those categories are addressed in the content outline at www.arrt.org . The ARRT also includes 50 pilot questions. Pilot questions are un-scored questions. They use the data from pilot questions to evaluate new questions. These questions will appear on your exam like all the other questions and are unidentifiable.

Content Category:	**Number of Scored Questions**
Patient Care	30
Patient Interactions and Management (30)	
Image Production	25
Image Acquisition and Equipment (25)	
Procedures	105
Vascular Diagnostic Procedures (50)	
Vascular Interventional Procedures (35)	
Nonvascular Procedures (20)	
Pilot (un-scored questions)	50
Total	**210**



AVIR

As the continuing education guidelines for imaging technologists continue to evolve, the AVIR promises to provide **more** to our membership to meet these needs through:

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- FREE monthly CE credits through Medlantis
- AVIR Annual Meeting (30+ CE credits)
- NEW- Online VI Board Exam Review and Mock Registry
- Regional Meetings and VI Board Reviews
- Quarterly Newsletters with Interventional Radiology's hottest topics
- Discounted Conference Registration Through our Partner Associations Like: ISET and GEST
- Professional Networking
- Local Chapter Events - AVIR has several active State Chapters throughout the US!
- Monthly Educational and Annual Meeting Emails
- Our credits will meet the NEW coded ARRT CE guidelines

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BOARD OF DIRECTORS

Meet our AVIR Board of Directors
It has been my continued privilege to serve with the 2017-2018 AVIR Board of Directors. I am confident that our board possesses the individual skill sets, passion, and knowledge that will lead to the continued growth of the AVIR. They are working tirelessly to provide our members with access to world class education, networking opportunities, and resources that enable them further their own careers and effectively care for their patients.

Members of the 2017-2018 Board of Directors Include:

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a.hawrylack@gmail.com

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[1] In select sizes. LUTONIX® offered sizes as of June 2016: lengths of 40, 60, 80, 100, 120, 150 mm, diameters of 4-6 mm up to 150 mm, 7 mm up to 60 mm. LEVANT 2 clinical trial data on file. N=476. At 12 months, treatment with LUTONIX® 035 resulted in a primary patency rate of 73.5% versus 56.8% with PTA alone (p=0.001). Primary patency defined as absence of binary restenosis defined by DUS PSVR ≥2.5 and freedom from Target Lesion Revascularization (TLR). At 12 months, treatment with LUTONIX® 035 resulted in a freedom from primary safety event rate of 86.7% versus 81.5% with PTA along (p=0.185). Primary safety defined as composite of freedom from all-cause perioperative death and freedom at 1 year in the index limb from Amputation (ATK or BTK), Reintervention, and Index-limb related death. Numbers reported are Kaplan-Meier analyses, not pre-specified.

[2] Calculated based on dollar sales. MRG Moving Annual Total 2016 Data published May 2016 based on hospital sample. Includes third party vendor sales for LUTONIX®. © 2016 Millennium Research Group, Inc. All rights reserved. Reproduction, distribution, transmission or publication is prohibited. Reprinted with permission.

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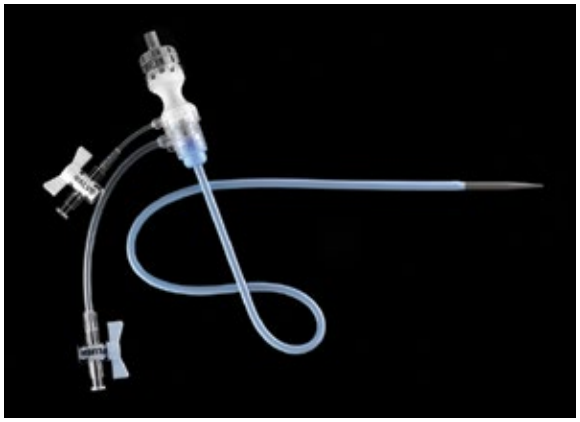

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SPOTLIGHT ON: THE INTERVENTIONAL INITIATIVE

Kristen L Welch, RT, R, VI
President-Elect

If you haven't heard of the Interventional Initiative via the internet or Social Media over the last six months, you may have been hiding under a rock… They've taken social media by storm! The Interventional Initiative is a Non-for-Profit organization with a mission to educate the public on Interventional Radiology and Minimally Invasive, Image-guided Procedures (MIIPs). Their mission is achieved through several public-centric outreach efforts, social media, their documentary, Without a Scalpel, and podcast series; Behind the Scrubs.

Their series have been released on several OnDemand platforms including: Amazon Prime, Vimeo, tubiTV, and Realez. The documentary episodes provide an in-depth look at the pathologies and procedures IR offers including peripheral vascular disease, Interventional Oncology procedures, and uterine fibroid embolization. The documentaries also offer the public a rare look inside the lives of the physicians and teams "behind the scenes" of Interventional Radiology. You can find more information on the documentary series at www.withoutascalpel.com.

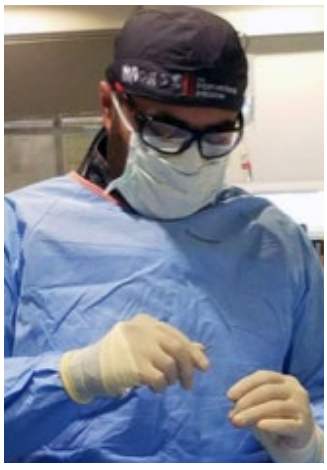
As we all know, MIIPs can treat a wide range of diseases including cancer, stroke, aneurysms, blocked blood vessels, infections, infertility and other women's health conditions, pediatric diseases, and trauma. Unfortunately, most of the general public has never heard of MIIPs. Within our community, even the majority of primary care providers have little familiarity with the vast scope of MIIPs options which limits their ability to inform patients. Though MIIPs offer cost savings, many hospital administrators and policy makers are unaware of their value and do not promote them at the institutional level. The Interventional Initiative was developed to empower patients with knowledge in regards to MIIPs.

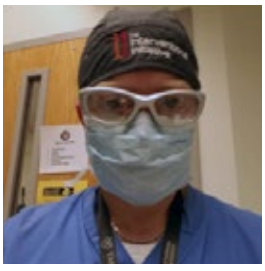
How Can You Help?

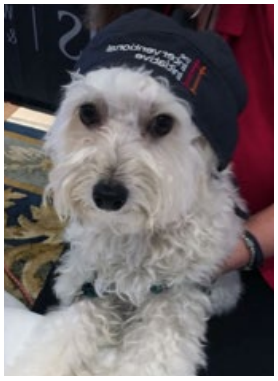
Donation – Everyone who donates $40 via the Interventional Initiative website receives a logo scrub hat. These scrub hats have been taking over the social media scene! You can find them by following the Interventional Initiative on Twitter @Interventional2 or searching #withoutascalpel

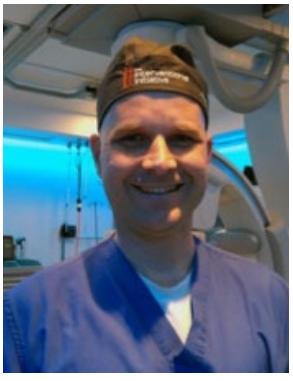
Promotion – Connect with the Interventional Initiative on Social Media through Twitter, Facebook, and LinkedIn. Tweet us your cases @Interventional2!

Volunteer – Are you interested in working with a passionate, energetic group of visionaries? The II has a lot of important and enjoyable work to do. They have seven committees compromised 100% by volunteers that include: Media Production, Business, Fundraising and Promotional, Website, Written Content, Social Media, and Patient Engagement. You can become involved by emailing: info@theii.org









AVIR NEEDS YOU TO BE OUR VOICE. ARE YOU UP FOR THE CHALLENGE? IT'S TIME FOR NOMINATIONS

by Alisha Hawrylack RT(R)(VI)
AVIR President

AVIR has to represent our profession from the inside. Over the past several decades, AVIR has brought legitimacy to our profession through networking and education. It is our mission to continue to do so but we cannot do it without you. We need you, not just our subscribers, but all interventional radiographers to take active roles in this endeavor. The process for getting involved has many facets including national and local level activity. At the local level you can form and/or attend a chapter and be engaged with your peers and colleagues. If you need assistance with that, please contact us and we will help you.

At the national level we need active board and committee members. Most board positions are one¬-year commitments, such as Secretary Treasurer, Director¬- at-Large, Associate Representative, and the three Board Appointments. This one-year appointment introduces new AVIR members to the responsibility of a Board position. While infusing the Board with new ideas, energy and resources, serving for one year also allows the new Board members the opportunity to see if they would like to run for the office of Vice President/President -Elect which is a three-year commitment which includes the third year served as Immediate Past President, a role which allows transition through guidance to the new team. By having one long-term position and the others only one year, the AVIR has the best of both worlds; continuity and new ideas. The current board of directors is working on renewing the charter and creating a new template for leadership best practices. We should have that ready for the new incoming team leaders.

Although serving in the capacity of these offices does take a certain amount of time and commitment, the rewards are worth the investment. Some of the rewards of serving as an officer in the AVIR include:

- Professional Self-satisfaction
- Team Building
- Grow your leadership skills
- Networking
- Time Management
- Business Acumen
- Marketability
- Personal and Professional growth

The **Vice President / President-Elect** uses the first year to learn the ropes so to speak. They chair the Education Committee, as well as the Fellows and the Award for Excellence Committees. Since the mission of the AVIR is to provide education, their Education Committee is vital to the functioning of the organization. The results of this committee, as well as the Chapters are the foundation of this organization and the product we give to our members, through annual, regional, and local meetings as well as other methods of continuing educational venues.

The President-Elect then transitions to the role of President and leads all the business meetings as well as the Board meetings. The President is also the Chair of the Ethics and Judicial Committee and is responsible for all the external representation of the orga¬nization. All the internal affairs of the organization are the responsibility of the President. During this year, the President promotes the Mission and Philosophy of the AVIR.

The third year of the commitment consists of serving as the Immediate Past President, acting as a senior advisor to the Board. **The Immediate Past President** is responsible for the nomination process for the organization, as well as being responsible for the Board appointed External Liaisons.

The **Director-at-Large** is one of the most vital positions on the Board, because this person is working at the grassroots level of the organization by being the intermediary between the Board and the Chapters. The chapters are fulfilling the AVIR's mission of education on a local level. The biggest responsibility of the director is to support the chapters and /or the liaisons to the chapters.

The office of **Secretary/Treasurer** really focuses on the Treasurer aspect of the position. We have an account executive whose role is to function as a secretary during board meetings, taking the minutes and then distrib¬uting them. However, the Treasurer's role also has the management company's assistance in the accounting functions. It is the duty of the Treasurer to review the quarterly financial statements and make recommendations accordingly. However, the Secretary/Treasurer is also responsible for communicating with the corporate sponsors, securing donations.

All Board members are responsible for writing articles for the newsletter, The International Informer, attending Board meetings, including the annual meeting and being available for conference calls. Probably the biggest responsibility for any Board member is to be a role model for the profession.

The qualifications for running for an office are that you are an active member in good standing, have served on a national level committee for a year and want to make a difference. If interested in running for an office for 2018-2019 year, please contact us at info@avir.org as this year we have a brandished our board of directors.

Elections commence starting in late October and concluded at the end of December.

Our officers this year are.

Alisha Hawrylack	President
Kristen Welch	Vice-President
Sandra Strycker	Secretary/Treasurer
Mike Kelly	Director at Large
David Nicholson	Immediate Past-President

The deadline for Board of Directors applications is December 2nd, 2017 5:00 EST. All eligible candidates will be included in a ballot to membership. The Ballots will close byDecember 20, 2017 and candidates will be notified of their new appointments shortly after.

BOARD OF DIRECTORS CANDIDATE APPLICATION

ASSOCIATION OF VASCULAR AND/OR INTERVENTIONAL RADIOGRAPHERS

2201 Cooperative Way | Suite 600 | Herndon, VA 20171 | 571.252.7174 | Fax: 571.858.7174 | Email: info@avir.org

Must be received on or before December 2nd, 2017

To be eligible to run for elected office, candidate must have served on an AVIR committee for at least one year and must have kept his/her membership current.

Candidates are sought for the following elected positions on the AVIR Board: (check one)

- ☐ President-Elect (1 year) to President (1 year) to Immediate Past President (1 year): 3-year term
- ☐ Secretary /Treasurer (1-year term)
- ☐ Director-at-Large (1-year term)
- ☐ Associate Representative (1-year term)

Name of Candidate:

Home Address:

Home Phone:

Place of Employment:

Work Address:

Work Phone: Email:

Education completed/Registration/Licensure/Advance Certification

☐RT(R) ☐RN ☐CV ☐CT ☐VI ☐FAVIR

☐Associate degree ☐Baccalaureate degree (BA, BS) ☐Master's degree (MA, MS)

☐Other (please list other credentials):

Employment/Experience

Present Position / Title:

Former positions held (include dates):

Number of years in CV/Interventional Radiology: Percentage of time spent in CV/IR: %

Continued on back >

BOARD OF DIRECTORS CANDIDATE APPLICATION

ASSOCIATION OF VASCULAR AND/OR INTERVENTIONAL RADIOGRAPHERS

2201 Cooperative Way I Suite 600 I Herndon, VA 20171 I 571.252.7174 I Fax: 571.858.7174 I Email: info@avir.org

Current professional activities/organizations

Chapter/Local:

State/Regional:

National:

Past professional activities/organizations:

Other activities/organizations/honors/offices held :

AVIR Committee Service

Name of Committee Year(s) of Service

Please explain, in 200 words or less, why you are interested and qualified for the office you are seeking. Give reasons for your candidacy. Also describe future goals and/or your vision for the AVIR.

CANDIDATE DECLARATION:

I am an Active member of the AVIR. If elected, I agree to serve the term of my office, fulfill the duties of the office in accordance with the AVIR Bylaws and Policies and Procedures, and attend all required meetings.

Signature Date

Please complete this form and email or mail with your professional resume/curriculum vitae to:

Info@avir.org

AVIR
2201 Cooperative Way
Suite 600
Herndon, VA 20171

Questions or concerns? Please contact the AVIR office:
Phone: 571.252.7174 Fax: 571.858.7174 Email: info@avir.org

MEMBERSHIP APPLICATION

ASSOCIATION OF VASCULAR AND/OR INTERVENTIONAL RADIOGRAPHERS

2201 Cooperative Way | Suite 600 | Herndon, VA 20171 | 571.252.7174 | Fax: 571.858.7174 | Email: info@avir.org

FULL PAYMENT MUST ACCOMPANY COMPLETED APPLICATION FORM

Membership Category — Select only one | Please print or type

❍ **Active** | $ 75/yr* ❍ **Clinical Associate** | $ 65/yr ❍ **Corporate Associate** | $ 65/yr

❍ **Student** | $ 45/yr ❍ **International** | $85/yr ***ACTIVE** – *Submit ARRT Certification or Canadian Equivalent*

❍Mr ❍ Mrs ❍Ms NAME / FIRST M.I. LAST GENERATION *(JR., SR., II, III)*

CREDENTIALS LICENSURE

DEGREE/S REGISTRATION/S

PREFERRED ADDRESS ❍ HOME ❍ WORK

HOME STREET

CITY STATE ZIP

PHONE FAX EMAIL *(for official AVIR business only)*

WORK INSTITUTION NAME DEPT.

STREET *(include department, room number, mail stop codes, etc., if appropriate)*

CITY STATE ZIP

PHONE FAXEMAIL *(for official AVIR business only)*

Length of Time as Tech Area of Expertise: _____

Size of Institution (*# of beds*): _____

____ ❍ Private____ ❍ Academic

Number of Exams Performed at this Institution:

_____ ❍ Vascular _____ ❍ Interventional

Are You a Member of: ARRT ❍ Yes ❍ No **ASRT** ❍ Yes ❍ No

(*If YES, please attach photocopy of membership card/s)*

Other Professional Organizations of Which You Are a Member:

_____

Related Interests (*CQI, Teaching, Publishing, etc.*):

_____

_____

Payment Information: ❍ Check Enclosed

OR Charge Credit Card: ❍ AmEx ❍ MasterCard ❍ Visa

ACCT NUMBEREXP DATE

NAME ON CARD

SIGNATURE

Student Members Only

DIRECTOR

PROGRAM ADDRESS

CITY STATEZIP

PHONE

WHAT IS AVIR?

The Association of Vascular and Interventional Radiographers (AVIR) is the national organization of healthcare professionals within Vascular and Interventional Radiology and involved in standard of care issues, continuing education and related concerns.

Who Can Become a Member of AVIR?

ACTIVE: Radiographers with a primary focus in Vascular and/or Interventional Radiology. Active members must be ARRT registered or have Canadian equivalent. Submit copy of certification with application.

Dues are $75 per year.

ASSOCIATE: Related healthcare professionals working with or having a special interest in Vascular and/or Interventional Radiology, including Nurses, Medical/Cardiovascular Technologies and Commercial Company Representatives.

Dues are $65 per year.

STUDENT: Students in certified programs for Vascular and/or Interventional Radiographers.

Dues are $45 per year.

INTERNATIONAL: Healthcare professionals working or having special interest in CIT and who reside outside of the United States and Canada. This category includes, but is not limited to, medical technologists, radiologic technologists, registered nurses, licensed practical nurses, Physicians and commercial company representatives.

Dues are $85 per year.

All Memberships are renewable annually each January.

Why Is Joining AVIR Important?

The AVIR is dedicated to you and is a powerful advocate for the special interest and concerns of healthcare professionals working in Vascular and Interventional Radiology. We acknowledge the importance of continuing education, establishing high standards of practice and care, certifying Vascular and/or Interventional Radiographers, and establishing a nationwide network for obtaining information and/or employment opportunities.

What Opportunities Does AVIR Offer?

- Professional growth
- Society of Interventional Radiographers (SIR) Annual Meeting
- Exchange of information and ideas
- AVIR Annual Meeting
- Continuing education opportunities
- Quarterly newsletter
- Local chapter involvement
- National membership directory

The Association of Vascular and Interventional Radiographers (AVIR)
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