



# SBINNEWS

The Member Newsletter of the Society of Breast Imaging



**INSIDE THIS ISSUE:**

**Highlights From the SBI/ACR Symposium: Las Vegas**  
**The SBI Goes to Egypt**



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Jennifer Saline, Vilert Loving, Ann Brown

# Editor's Note

The 2018 meeting of the SBI marks the beginning of my fourth rewarding year serving as chief editor of this newsletter. I admit that I was intimidated by the prospect of shepherding this important pillar of the SBI when Past President Murray Rebner, MD, FACR, FSBI, approached me. I couldn't imagine how I could follow in the footsteps of Gary Whitman, MD, FACR, FSBI, who had delivered an extraordinary newsletter for 4 years. Now, with 3 years of hindsight, I see that I shouldn't have been so worried. If I could go back and tell myself anything at the time, I would say, "This isn't a solo job. You will have a team. A great team! And they will want the same thing you want: to deliver an excellent newsletter to a devoted society of people that live to help others."



Peter R. Eby, MD, FACR, FSBI

**The newsletter committee is extraordinary.** Envisioning, producing, and recruiting content for 4 issues each year are constant tasks. We juggle all 3 incessantly and hope to keep them in the air and then put them on paper. Sacrifices have to be made. Some of our committee members have given up other opportunities or free time to bring our members a superlative newsletter. The annual meeting also marks the retirement of some members of our devoted team, so I would like to recognize and thank them.

Louis Miller, RT(R)(M), one of 2 technologist representatives, retires from our committee but not from her tireless efforts to improve the quality of mammograms around the United States and the world. She, along with Christine Puciato, RT(R)(M), has created articles for technologists and physicians about Enhancing Quality Using the Inspection Program, positioning, and patient interaction, to name a few articles that many of us share with our teams every quarter. Through these contributions, many breast imaging teams have improved and positively affected countless women through better screening. She will continue to educate through live workshops and video production at all levels. We will miss her dearly.

Mike Linver, MD, FACR, FSBI, retired from clinical practice last June and from our committee officially this April. His articles have covered every aspect of breast imaging over the years. Most recently he captained our "What I've Learned" column. This quarterly feature has given us special insight into the wisdom of our leaders for the benefit of all our members. Mike has been a member of this committee longer than I have, though to my eye he hasn't aged a day. We will have to make him the subject of his own column to learn his secret to happiness and longevity.

Ann Brown, MD, joined our committee as a member in training in 2014. She exceeded all expectations and has remained with us for an additional 2-year term. She has provided her unique perspective on the excitement and challenges of the landscape of the early career in a very connected age of social media. She has an exciting career ahead of her and we wish her the very best.

Annie Ko, MD, succeeded Dr Brown as the member-in-training representative of our committee in 2016. Her perspective on the process of applying for and securing a breast imaging fellowship through the newly instituted match program has been critical. This year we have recruited 2 new members in training to fill the gap left by Dr Ko. Leng Leng Young Lin, MD, joins us from New York University and Dorothy Lowell, MD, joins us from Duke University.

We have some additional new members to our committee and features that I am very excited about. Eric Rosen, MD, FSBI, from the University of Colorado, will team up with Nina Watson, MD, from Emory University School of Medicine, to produce a quarterly column about physician wellness. The first installment begins with this issue. Jennifer L. Saline, MD, hails from the University of New Mexico, where she is the chief of breast imaging. She is a longtime friend of Dr Linver and may assume control of our "What I've Learned" column. Dawn Derenburger, RT(R)(M), will be our new technologist representative, along with our veteran, Christine Puciato, RT(R)(M).

By now you've also noticed that our newsletter has a fresh new look and feel. We've partnered with Heather Kjar at Uneek Designs to produce an exciting and more colorful product. Please let us know if you love it or hate it or a little of both. At the SBI, our new coordinator is Natalie Ward. Laurie Anne Walden remains our outstanding copy editor.

Finally, I would like to note that Shadi Aminololama-Shakeri, MD, from the University of California, Davis, who has been on the newsletter committee for 4 years, will take on the newly created role of Assistant Editor for 2018-2019. She and I will work together to bring some additional new features to the newsletter and prepare her to become the chief editor in 2019 when I step aside.

Thank you all for continuing to support the SBI and, as always, I welcome your contributions, suggestions, and feedback.

# President's Column

## OUR SBI MISSION:

To save lives and minimize the impact of breast cancer

## OUR SBI VALUES:

Patient-centered and evidence-based care

Excellence in education

Scientific integrity

Collaboration and collegiality

Respect for diversity and inclusiveness



Wendy DeMartini,  
MD, FSBI,  
President of the SBI

It is with great gratitude that I write my final President's Column of the SBI Newsletter. I am so grateful to have had the honor to serve the SBI in this role. During my tenure as an SBI leader, I have found our society to be truly special in culture, people, purpose, impact, and consideration of the future of our field. I hope that your interactions with the SBI have cultivated similar sentiments.

Our SBI culture is commendable. We are dedicated to achieving our purpose, honoring our values, cultivating a connected community, and supporting diversity and inclusion. We continue to reinforce and expand this SBI culture in many ways, including through a newly established Connect Committee focused on member engagement and community.

Our SBI family is nothing short of tremendous. Our members, committee representatives, fellows, and board of directors are hardworking and passionate about our field of practice and the SBI. Our professional staff, led by Executive Director Yasmeen Fields, are extraordinarily dedicated to the SBI and its efforts. Together, our family makes the SBI a robust and productive society. We continue to welcome excellent and diverse people into our SBI community, including through our residents and fellows section and via our international education collaborations.

Our SBI purpose is important and inspiring. We seek to save lives and minimize the impact of breast cancer. In doing so, we can make a difference in the lives of our patients and their families and contribute to the greater good of society.

Our SBI impact is strong and is growing. We continue to expand the voice of SBI in promoting outstanding breast

imaging patient care, education, and research. Our SBI/ACR Symposium is the largest breast imaging meeting in the world. Importantly, attendees value the meeting not just for the educational content but also for the social and community experience. We partner with international societies to provide education worldwide. And we have taken steps to contribute to original science in breast imaging. We support opportunities for original research and researchers through the Symposium Scientific Program, and our Research and Education Fund will provide financial support for young researchers in the future. Further, we are investigating the launch of a breast imaging scientific journal. We are the only radiology subspecialty without a dedicated journal, and this would be a major forum for high-quality, peer-reviewed breast imaging and care research.

Our SBI dedication to the future of our field is powerful. We know we must lead the effort to improve the care and outcomes of our patients. With our colleagues in the ACR, we work to preserve access to screening mammography. We provide education on topics that are imperative to our continued success as a field. At the recent symposium, we highlighted improving quality and performance; providing value; addressing underserved populations; understanding new imaging technologies, including radiomics; and considering artificial intelligence as a promising adjunct in clinical care. In addition, we appreciate that our future depends on inclusiveness and collaboration, and at the symposium we welcomed colleagues from across disciplines and from around the world.

Thank you again for the opportunity to serve you and the SBI. And thank you for the hard work that you do every day in support of our patients and the purpose of the SBI. We will continue to face challenges in the practice of breast imaging, but our people, purpose, impact, and future make us strong and resilient. The SBI will be guided by the expert and enthusiastic leadership of our incoming president, Jay Baker, MD, FACR, FSBI. I look forward to working with Jay and you all in the years ahead!

*Wendy B. DeMartini M.D.*

Wendy DeMartini, MD, FSBI  
President, Society of Breast Imaging

# SBI Committee Updates

By Shadi A. Shakeri, MD; Yasmeen J. Fields, CAE

The 2018 annual SBI/ACR Breast Imaging Symposium in Las Vegas, Nevada, was an energizing conference like no other. With over 1100 attendees representing all 50 states, Puerto Rico, and 27 other countries, the vibrancy of the diverse audience was palpable. Over half of the attendees identified as female, and the majority were from private, community, or other nonacademic practices. At least half had previously attended an SBI/ACR Symposium. The attendees were a heterogeneous group of physicians, technologists, nurses, physicists, active duty military physicians, retired members, members in training, and the dedicated SBI staff.



Yasmeen J. Fields, CAE

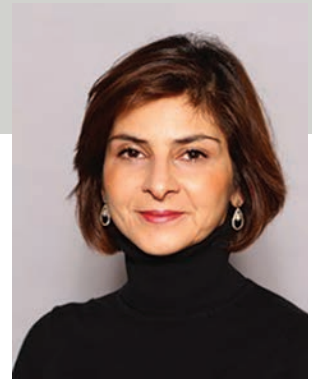
Many of the committees took the opportunity to meet at the Symposium. Here are some updates on the latest developments in our society's committees.

The **Patient Care and Delivery Task Force**, chaired by Stamatia Destounis, MD, FACR, FSBI, continues to collaborate with the ACR Commission on Patient- and Family-Centered Care on toolkits with informational resources to help radiologists, referring providers, and patients. They are also developing guidance for how to talk to your patients and more.

The **International Education Outreach Committee**, chaired by Elizabeth Morris, MD, FACR, FSBI, met with the chairs of the various outreach programs to discuss future strategy and partnerships. Since 2016, SBI has visited South Africa, India, Nepal, Indonesia, and Egypt. Later this year, Drs Linda Moy and Elizabeth Sutton will visit China as guest speakers on artificial intelligence and radiomics.

Rachel Brem, MD, FACR, FSBI, is the new Chair of the **Breast Imaging Fellowship Match Committee**. Gary Whitman, MD, FACR, FSBI, who bravely led the SBI through the first round of the match, has stepped down but remains on the committee as the liaison to the Society of Chairs of Academic Radiology Departments. The SBI is in its second round of sponsoring the match and is committed to improving the process for everyone. In development is a universal application for all programs and residents in the match. Fellowship programs can sign up now for the 2020-2021 match by contacting [info@sbi-online.org](mailto:info@sbi-online.org).

The **SBI Editorial Board**, led by Jennifer Harvey, MD, FACR, FSBI, met to continue its discussion of the possibility of a dedicated journal on breast imaging. No final decisions have been made, but the SBI board of directors is speaking with interested publishers to determine the feasibility.



Shadi A. Shakeri, MD

The **Newsletter Committee**, chaired by Peter Eby, MD, FACR, FSBI, thanked Ann Brown, MD; Annie Ko, MD; Mike Linver, MD, FACR, FSBI; and Louise Miller, RT(R)(M), FSBI, who conclude their tenure on this committee. The committee is grateful for their dedication to excellence and contributions to the growth of the SBI Newsletter. The committee is excited to have new members and expressed a hearty welcome to Dawn Derenburger, RT(R)(M); Dorothy "Dot" Lowell, MD (member in training); Eric Rosen, MD, FSBI; Jen Saline, MD; Nina Watson, MD; and Leng Leng Young Lin, MD (member in training). Shadi Shakeri, MD, was named the assistant editor for 2018-2019. The committee is also thrilled to introduce you to the new and improved look of the newsletter!



By Eric Rosen, MD, FSBI



The SBI is pleased to introduce the first installment of a regular column devoted to wellness. Careers in breast imaging, radiology, and medicine offer incredible privileges and fulfillment. However, we are also witnessing some dissatisfaction, burnout, and depression in our fields. This quarterly column, produced by Eric Rosen, MD, FSBI, and Nina Watson, MD, will address these topics for the benefit of all.

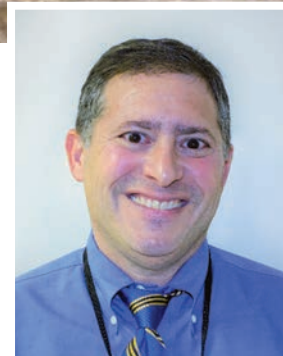
**Wellness:** noun | *well-ness* |: *The quality or state of being in good health especially as an actively sought goal*<sup>1</sup>

In this column I want to explore the concept of wellness. After all, that is the official title of this column, and if wellness exists, it is the antithesis of burnout. In Buddhism, wellness, or true happiness, can be attained only by developing the mind; it has nothing to do with external achievement, relationships, or material possessions. In fact, dependence on external forces, focusing on fleeting successes (you know, the ones we all achieved to become physicians), is in large part the root cause of suffering. Since this is not a course in Tibetan Buddhism, I'll just get to it. *Wellness is within all of us. It is a state of mind, and getting there is the journey of life, but as pointed out in the definition above, it must be an actively sought goal.*

**Mindfulness** is one way we can avoid becoming absorbed in negativity. Mindfulness focuses on being present, observing our thoughts and state of mind without judgment or reactivity. When we are mindful, we can observe thoughts and feelings without reacting to them, and this in turn allows us the space to place our experiences within a broader context. As Joseph Campbell wrote, *"The goal of life is to be a vehicle for something higher. Keep your eye up there between the pairs of opposites, watching your play in the world. Let the world be as it is and learn to rock with the waves. Remain 'radiant,' as Joyce put it, in the filth of the world."*<sup>2</sup>

The goal of this column is to provide tools that help promote wellness and resilience.

**Resilience** is "the ability of a substance or object to spring back into shape; elasticity"<sup>3</sup> or "the capability of a strained body to recover its size and shape after deformation caused especially by compressive stress."<sup>4</sup> Although medicine, radiology, and breast imaging afford us the opportunity to improve and actually save lives, the paths are cluttered with compressive stressors that can and will deform our experience if we allow.



Eric Rosen, MD, FSBI

One way to foster resilience is to practice what Dr Kristin Neff refers to as **self-compassion**. When we practice self-compassion, we offer ourselves the same kindness and forgiveness that we offer our friends. This is not self-pity, which in contrast occurs when we become over-identified with our own problems. Self-pity can result in feelings of isolation and personal suffering. Instead, self-compassion, like mindfulness, affords us the space required to put our personal struggles in perspective.

The goal of this column is to provide a resource that can help us acknowledge and confront suffering and the struggles we all face. This column will also provide evidence-based tools to combat the forces that lead to burnout, depression, substance abuse, and worse so that we can not only excel in breast imaging but also thrive in all aspects of life.

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# Breast Imaging in Argentina

By Flavia Sarquis, MD, and Daniel Lehrer, MD

Argentina is the eighth largest country in the world by area and the 31st largest in population (43 million). The distribution of the population is uneven, with one-third residing in the province of Buenos Aires. Life expectancy is approximately 75 years.

Breast cancer is the top female cancer in Argentina both in incidence and cancer-related mortality. In 2016, there were 19,386 new female breast cancers and 5979 breast cancer-related deaths (A. Di Sibio, written communication with data from the Instituto Nacional del Cáncer [INC], January 20, 2018).<sup>1</sup> The incidence of breast cancer (71.2 per 100,000 women) is below those of the United States, Canada, Nordic Europe, and many Western European countries. The incidence is higher in the provinces with the largest populations. The mortality rate (18.8 per 100,000 women) is higher than in most of the previously mentioned countries.

## Breast Screening in Argentina

Mammography screening is currently opportunistic. Prior attempts to organize screening at national and provincial levels failed. Consensus guidelines from the most important breast health-related scientific societies and institutions recommend annual mammography starting at age 40 years for average-risk women.<sup>2</sup> According to a survey by the National Ministry of Health, women 50 to 70 years of age had screening or diagnostic mammography within the last 2 years at the following rates: 46.1% (2005), 59% (2009), and 65.6% (2013), which is an encouraging trend.<sup>3</sup> Cancer mortality decreased 1.3% annually from 2001 to 2011 but increased 0.6% annually between 2011 and 2015 (written communication with data from the INC, A. Di Sibio, January 20, 2018).

## Health System Providers and Breast Imaging Resources

In Argentina the health care system is organized around 3 main provider types. Social plans such as Programa de Atención Médica Integral (which is similar to Medicaid) cover medical care and medicines for all workers of the formal economy and their families (48.3%). Private-sector coverage includes private insurance carriers and people who meet the total cost of their health expenses (15.7%). The public sector covers the remaining 36% and provides free clinical care for inpatients and outpatients not covered by the other 2 systems, mainly through public hospitals run by the national and local

governments.<sup>4</sup> Breast imaging services are performed by all 3 provider types.

Most of the mammography units in the country are computed radiography units, and there are still some analog units in small towns and rural areas. The best equipment and human resources generally belong to the private sector. A few breast imaging centers and most of the large institutions in the main cities use state-of-the-art equipment, such as full-field digital mammography; some digital breast tomosynthesis; handheld and automated 3-dimensional ultrasound; percutaneous biopsies with ultrasound, stereotactic, and digital breast tomosynthesis guidance; and breast magnetic resonance imaging (MRI) units of at least 1.5 Tesla with dedicated coils. At least 4 places in the country perform MRI biopsies.

## Physician Training

Medical training includes 6 years of university and 1 year of training in the 4 basic medical fields (internal medicine, pediatrics, gynecology, and trauma). Radiology residency programs are 3 or 4 years long and exist in both public and private institutions. Few radiologists pursue a 1-year fellowship. Gynecologists and surgeons undergo a 2-year training program to become “mastologists.” Radiologists complete the same first-year program but a different second-year curriculum for accreditation as breast imaging “specialists” but are not called mastologists.

There is a shortage of breast imagers, as in most places in the world. Support for breast imaging is scarce in the public sector, probably related to lack of investment in equipment and instructors (personal communication, Susana Blanco, MD, of the INC, January 2018). Private institutions have better equipment in all areas of diagnostic imaging and may have better residency programs than the public institutions. There

*Continued on page 8 >*



Flavia Sarquis, MD



Daniel Lehrer, MD

## Breast Imaging in Argentina (continued from page 7)

are male breast radiologists, but now medicine is dominated by women so most breast radiologists are female. Good radiologists in all fields are well considered and respected, but mastologists in general carry greater authority.

Quality control guidelines and voluntary accreditations for breast radiologists exist but are not required for daily practice. Nonetheless, many centers have good-quality images, especially in large cities. BI-RADS is widely used by radiologists dedicated to breast imaging, and BI-RADS categorization of reports is especially requested by referral physicians who are not breast specialists. Scientific societies like Sociedad Argentina de Mastología (Society of Mastology) and its branches in most provinces and the radiology societies (Sociedad Argentina de Radiología [SAR] and Federación Argentina de Asociaciones de Radiología, Diagnóstico por Imágenes y Terapia Radiante [FAARDIT]) are the primary educational sources for physicians and technologists.

The INC, founded in 2010, has led the critical job of collecting, analyzing, and disseminating data for physicians and the community. The INC is also a great source of education and training for physicians and technologists in the public sector to improve the quality of mammographic images.

### Screening Access and Awareness

The SAR, FAARDIT, and many nongovernmental agencies are the main sources of education and information for women throughout the year but especially in October, the Argentinian breast cancer awareness month. A national survey by the Society of Mastology<sup>5</sup> showed that women of lower socioeconomic status and lower educational levels were less likely to have had a mammogram, possibly because of a lack of information about prevention. Many women have knowledge about the disease but don't get a mammogram because "no one told them to do so." There is a direct relationship between clinical breast examinations and mammography referrals. When women older than 50 years, especially those of lower economic status and educational levels, switch from gynecologists to general practitioners for primary care, they may be less likely to receive clinical breast examinations in public hospitals and therefore may be less likely to receive mammography referral. The main message of awareness campaigns is to encourage women to have mammograms for early detection. These campaigns also educate women about the value of physical examinations.

The scientific literature is replete with data reporting variable access and rates of breast screening attendance because of many common barriers. If inequality according to socioeconomic status exists even with well-organized mass breast screenings where mammography is free,<sup>6</sup> it is worse in an opportunistic screening environment where the quantity and quality of the service varies across different sectors of the health care system.

**8** *To save lives and minimize the impact of breast cancer.*

## Breast Density Awareness and Supplemental Screening

Breast density awareness has been increasing. Although not officially mandated, most radiologists report breast density according to the BI-RADS lexicon. Personal doctors are responsible for advising patients on supplementary screening options and radiologists can do only what is requested by referring doctors. Education of referring doctors has increased requests for mammography and physician-performed ultrasound screening but there may be delays of 2 months for such combination examinations. Radiologists are well trained in the use of handheld breast ultrasonography devices, so this modality is considered cost-effective. Third-party payers usually cover supplemental ultrasound without complaint. Medical insurance covers the diagnostic study only if the referring physician requests it.

Supplemental screening with MRI is new and payers are variably cooperative. For MRI, the coverage depends on the detailed diagnostic justification and audit of the health system. High-risk patients may receive consultation at specialized centers with experts who evaluate and advise on surveillance strategies. There is a National Program of Familial and Hereditary Tumors, although it is not mandatory, so not all high-risk patients are evaluated by experts. All payers challenge referrals for MRI-guided biopsy.

### Challenges Ahead in Argentina

Access and quality remain our greatest challenges. Women of low socioeconomic status and educational backgrounds and those who live in rural areas are more difficult to engage in clinical consultation and mammography screening. Improving the quality and quantity of breast imaging equipment and support staff are especially needed to address underserved populations. Thank you for your interest in our vast, beautiful country of Argentina. Please come visit!

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# Contrast-Enhanced Ultrasound Imaging of the Breast: Background and Utility

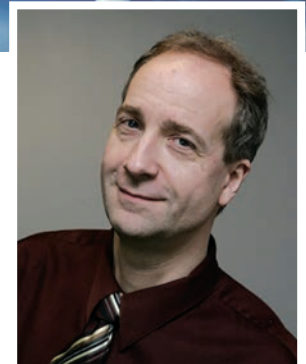
By Flemming Forsberg, PhD, FAIUM, FAIMBE

Characterizing breast lesions and diagnosing cancer on the basis of tumor neovascularity using conventional color Doppler modes have produced mixed results because of the overlap between flow measurements in benign and malignant masses. One problem may be the lack of sensitivity of ultrasound to depict flow in small tumor vessels.

Combining microbubble-based ultrasound contrast agents with nonlinear contrast-specific imaging techniques to produce contrast-enhanced ultrasound (CEUS) improves the sensitivity and specificity of ultrasound diagnosis. These agents consist of gas microbubbles (typically  $< 8 \mu\text{m}$  in diameter) encapsulated by an outer shell for stability. The microbubbles are filled with high-molecular-weight gases rather than air to slow diffusion back into the bloodstream. Following an intravenous injection, the microbubbles traverse the lung capillaries and circulate for 3 to 6 minutes. Three ultrasound contrast agents are currently approved by the US Food and Drug Administration (FDA) for cardiology and radiology applications: Optison (GE Healthcare), Definity (Lantheus Medical Imaging), and Lumason (marketed for more than a decade in Europe and elsewhere as SonoVue, Bracco Imaging). Optison and Definity are approved for cardiology only (left ventricular opacification and endocardial border definition), and Lumason is also approved for liver imaging in adult and pediatric patients. Very importantly, the safety profiles of these agents are well established. A retrospective study of FDA-approved ultrasound contrast agents used in echocardiography revealed a severe-reaction rate of 0.01% over 78,383 doses, making them the safest of all contrast media.

The compressibility of the microbubbles is 6 times greater than that of the surrounding blood. Hence, microbubble-based ultrasound contrast agents can enhance vascular ultrasound signals by up to 30 dB. This in turn enables imaging of signals from microbubbles flowing through breast tumor vessels 20 to 39  $\mu\text{m}$  in diameter. Multipulse imaging strategies, such as pulse inversion imaging or pulse amplitude modulation, can further improve the depiction of breast microvasculature compared with color Doppler imaging modes.

Ultrasound contrast agents not only enhance the backscattered ultrasound signals, but at sufficient acoustic pressures ( $> 0.5 \text{ MPa}$ ) they also act as nonlinear oscillators. These oscillations generate significant energy components in the received echo signals, which span the range of possible frequency emissions from subharmonics through ultraharmonic frequency components.



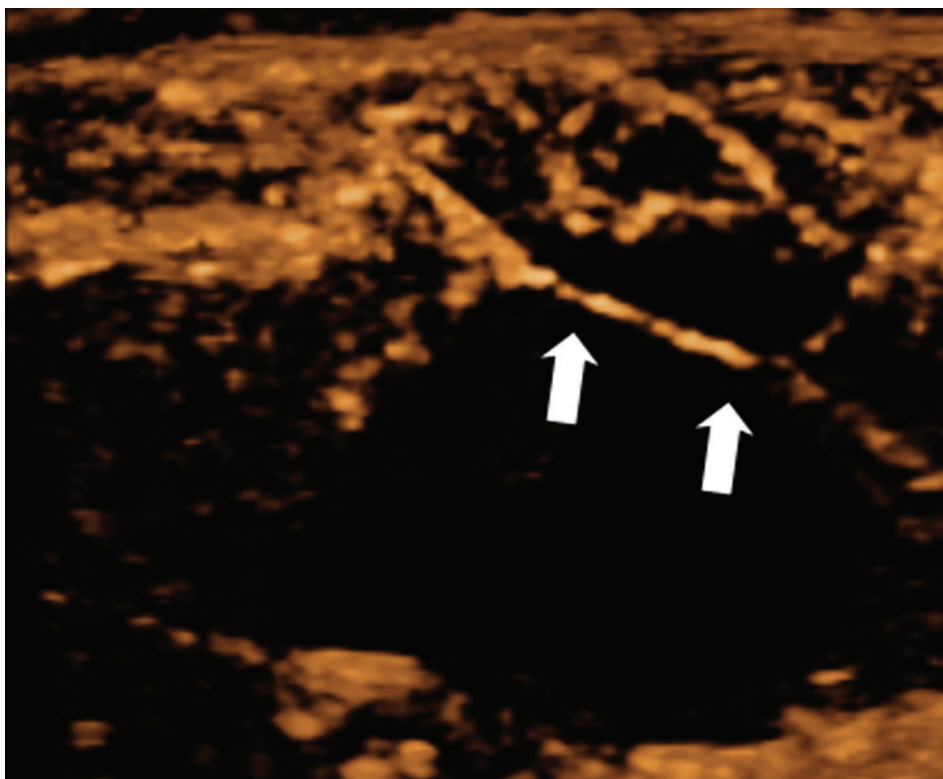
Flemming Forsberg,  
PhD, FAIUM, FAIMBE

Nonlinear bubble echoes can be separated from tissue echoes and used to create contrast-sensitive imaging modalities such as harmonic imaging (HI), which is commercially available on most state-of-the-art ultrasound systems. A recently published meta-analysis of contrast ultrasound examinations using commercial HI packages reviewed 16 studies (with 957 lesions) and found that overall sensitivity and specificity were 86% and 79%, respectively. This is a significant improvement over the specificity of mammography alone and may help reduce false-positive rates (reported to be as low as 65%). However, HI suffers from reduced blood-to-tissue contrast resulting from second harmonic generation and accumulation in tissue.

For this reason, subharmonic imaging (SHI), transmitting at the fundamental frequency ( $f_0$ ) and receiving at the subharmonic ( $f_0/2$ ), becomes an attractive alternative because of the weaker subharmonic generation in tissue and the significant subharmonic scattering produced by some new contrast agents. CEUS studies of 236 women with breast lesions demonstrated that SHI can detect the neovascularity associated with breast cancers with greater sensitivity than HI and can achieve a diagnostic accuracy of 90% through the optimal combination of quantitative flow parameters (Figure 1).

In addition to the characterization of breast lesions, cancer staging may become an important application for CEUS in the future. Subcutaneous injection of contrast microbubbles and CEUS of the drainage in the lymphatic system with pulse inversion HI has been investigated in various animal models and more recently in humans. This technique,

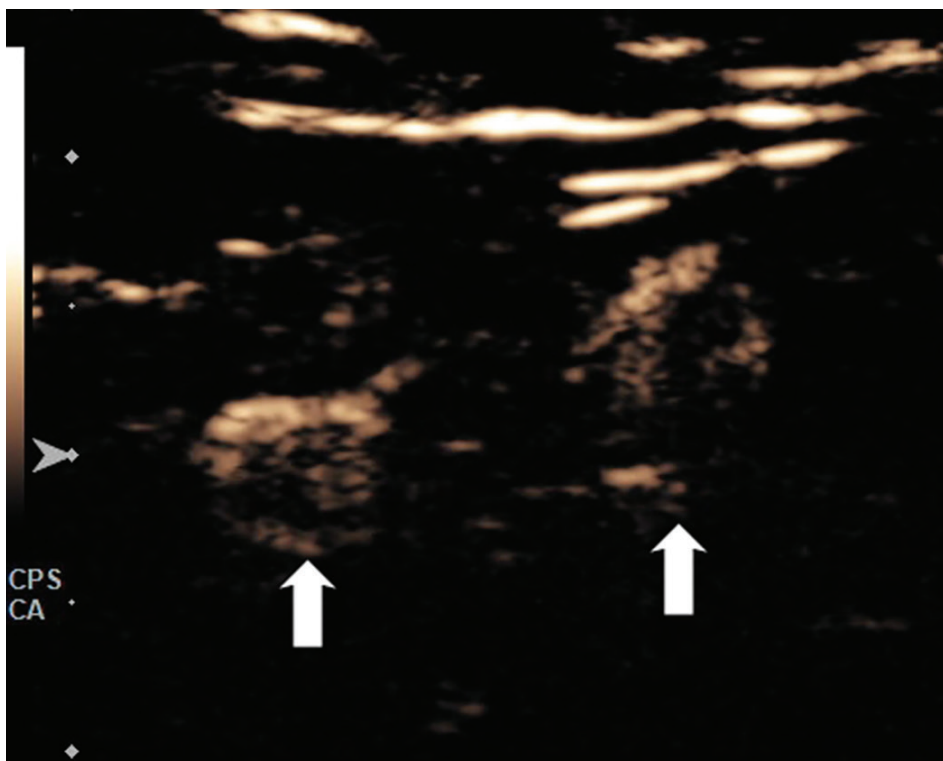
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**Figure 1.** Three-dimensional subharmonic ultrasound image shows microbubbles flowing through a vessel at the periphery of a cyst (arrows).

called lymphosonography, identifies sentinel lymph nodes with accuracy that matches or exceeds the accuracy of lymphoscintigraphy. Our group is currently involved in a phase 1 trial using intradermal breast injections of the ultrasound contrast agent Sonazoid (GE Healthcare) for lymph node detection. An example of this ongoing work is shown in Figure 2. We expect that this technique will aid intraoperative sentinel lymph node mapping and biopsy.

Finally, the role of CEUS is expected to expand with the advancement of molecularly targeted agents. In this approach, targeting ligands are conjugated to the microbubble shell, thereby increasing affinity of the microbubbles at a specific disease site. Recently an experimental agent targeted to vascular endothelial growth factors frequently expressed in tumors has been used in a phase 1 clinical trial and has shown promise for breast cancer characterization and detection.



**Figure 2.** Following injection of 1 ml of Sonazoid, contrast is observed in 2 lymph nodes (white arrows) in the left axilla.

The SBI Newsletter Committee is excited to provide interesting cases for our members. The print edition will include a brief introduction and key images of the case. We reserve the full discussion and bulk of images, in high-resolution glory, for the digital edition of the newsletter, which is available online to our members (<http://www.sbi-online.org/NEWS.aspx>). Our hope is that interesting cases will illustrate one or more valuable teaching points for a scenario or combination of findings that may emerge in any type of daily practice. We are happy to accept an interesting case from any individual or group. The description of a single extremely rare entity (case report) is discouraged unless there is an important aspect to the workup or imaging or clinical picture that merits discussion and can be more widely applied. Please contact Rob Gutierrez, MD, FSBI, for questions or submissions at [gutierrez.rl@ghc.org](mailto:gutierrez.rl@ghc.org).

## Interesting Case: Metastases to the Breast From Extramammary Malignancies

By Allison Aripoli, MD; Michelle Lee, MD; Diana Hook, MD

In 2012, a 52-year-old woman underwent hysterectomy, salpingo-oophorectomy, and omentectomy followed by intraperitoneal chemotherapy for treatment of high-grade serous ovarian carcinoma. A screening mammogram performed in 2012 was interpreted as normal (Figure 1). She presented for a screening mammogram in 2013 (Figure 2). How would you interpret this examination?



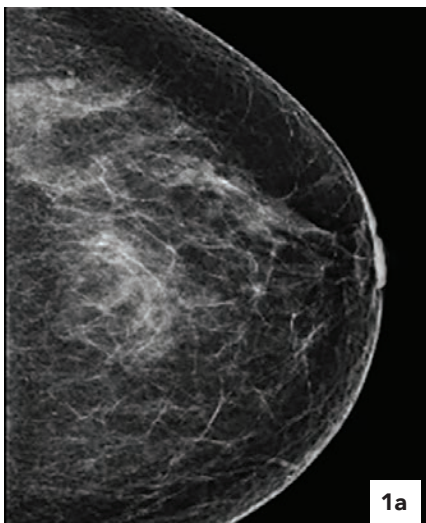
By Allison Aripoli, MD



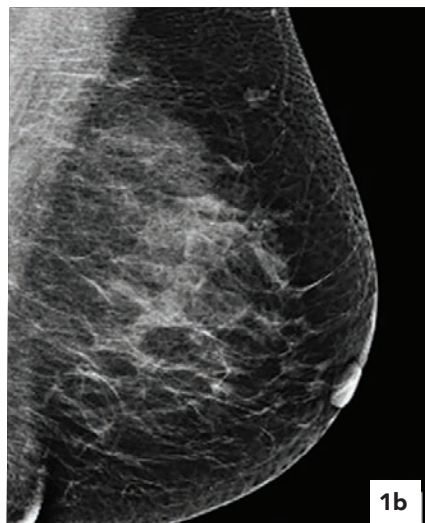
Michelle Lee, MD



Diana Hook, MD

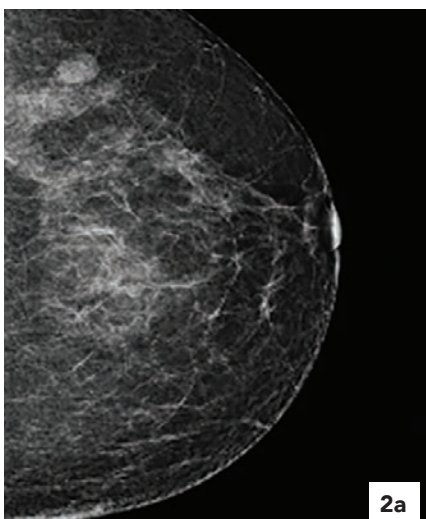


1a

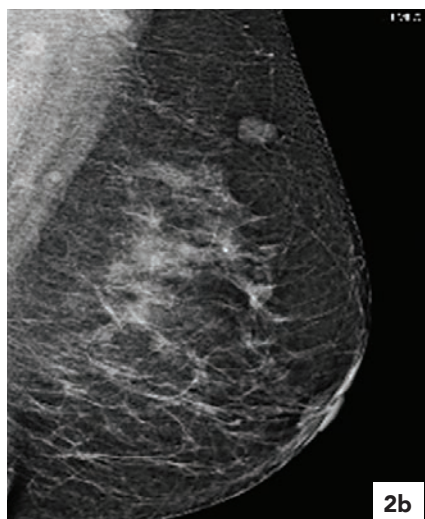


1b

◀ **Figure 1.** Left craniocaudal (CC) (a) and mediolateral oblique (MLO) (b) views from screening examination in 2012.



2a



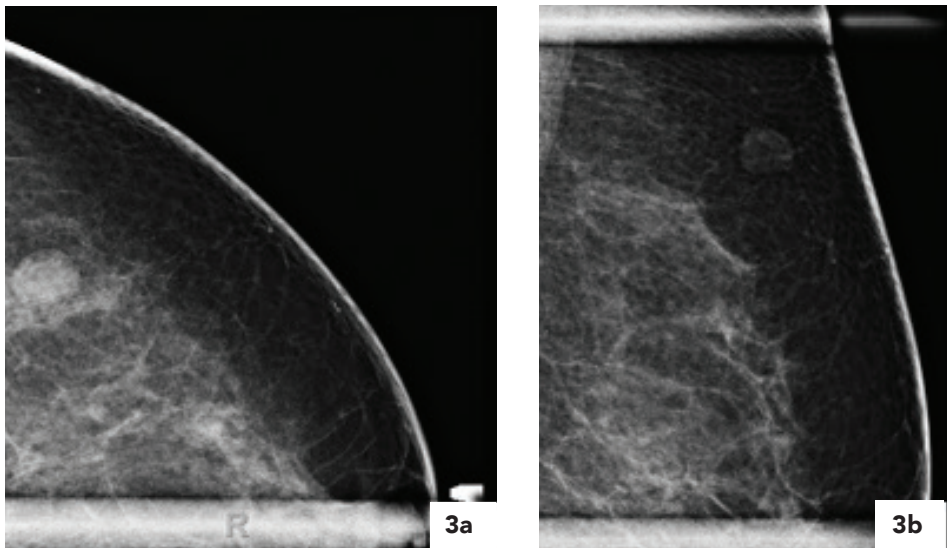
2b

◀ **Figure 2.** Left CC (a) and MLO (b) views from screening examination in 2013 show a new oval mass in the upper outer quadrant of the left breast.

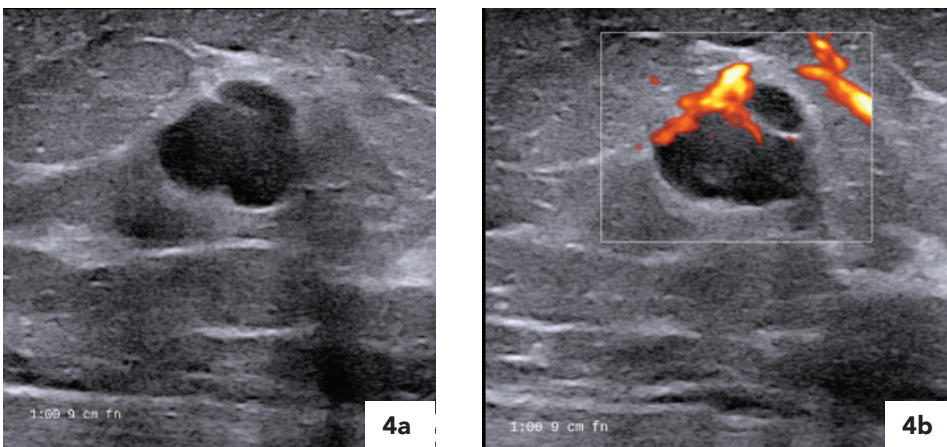
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**Interesting Case: Metastases to the Breast From Extramammary Malignancies (continued from page 11)**

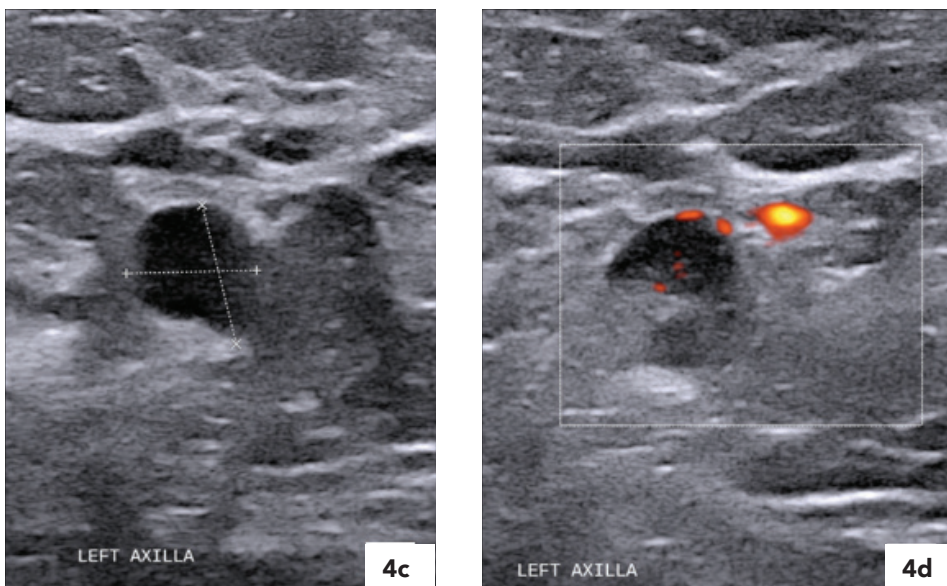
The 2013 screening mammogram was assessed as BI-RADS 0, and spot compression views and ultrasound were recommended for the mass in the upper outer quadrant. No abnormalities were found in the right breast. She returned for diagnostic examination, which demonstrated an equal-density oval mass with circumscribed margins measuring 13 mm (Figure 3). A directed sonogram demonstrated a morphologically abnormal lymph node with thickened cortex at the 1-o'clock position, 9 cm from the nipple (Figure 4), as well as a morphologically abnormal lymph node with a focal cortical bulge in the left axilla.



◀ **Figure 3.** CC (a) and MLO (b) spot compression views from the 2013 diagnostic examination demonstrate a circumscribed oval mass.



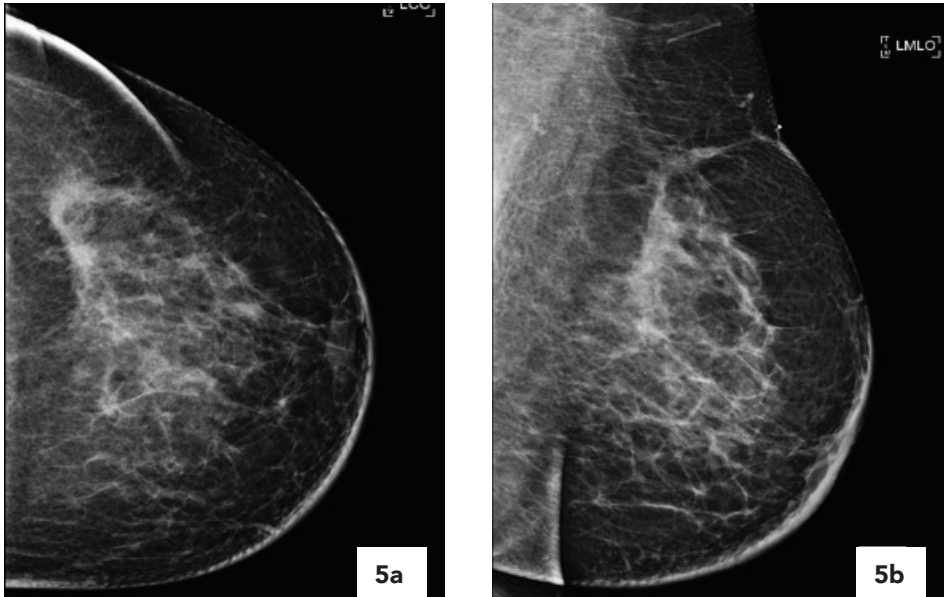
◀ **Figure 4.** Grayscale (a) and power Doppler (b) images from the 2013 diagnostic ultrasound show a morphologically abnormal lymph node at the 1-o'clock position, 9 cm from the nipple, corresponding to the breast mass. There is also a morphologically abnormal left axillary lymph node (c, d).



Subsequent ultrasound-guided biopsy confirmed metastatic ovarian serous carcinoma in the intramammary lymph node at the 1-o'clock position.

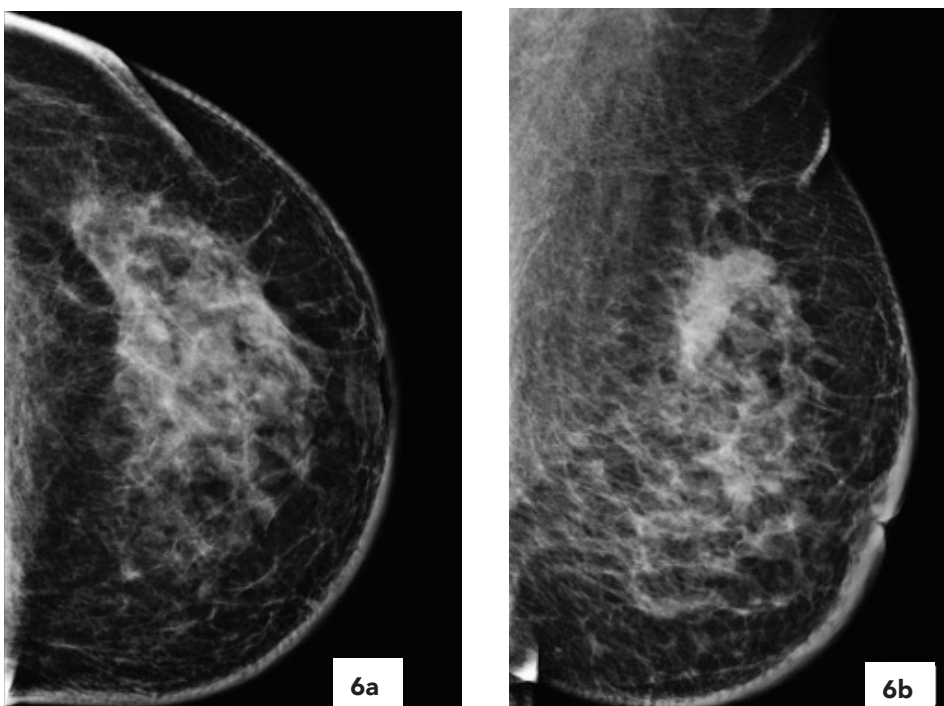
The patient underwent needle-localized excision of the biopsy-proven left breast upper outer quadrant metastatic lymph node as well as left axillary nodal dissection, which revealed metastatic serous carcinoma in 2 of 6 nodes. Staging computed tomography (CT) of the chest, abdomen, and pelvis demonstrated no additional sites of metastatic disease. She completed chemotherapy treatment in 2014. Routine staging CT of the chest in 2015 demonstrated progressively enlarging left axillary lymphadenopathy. Fine-needle aspiration again demonstrated metastatic ovarian serous carcinoma in the left axilla. She went on to receive additional chemotherapy and left axillary radiation therapy, followed by clinical and imaging remission, with whole-body positron emission tomography (PET) in 2016 showing no evidence of recurrent pelvic malignancy or distant metastatic disease.

However, in 2017 she presented with new left breast edema. Diagnostic mammography of the left breast showed increased trabecular and skin thickening consistent with breast edema related to prior axillary surgery and radiation therapy (Figure 5).



◀ **Figure 5.** Left CC (a) and MLO (b) views from the 2017 mammogram demonstrate diffuse increased left breast trabecular and skin thickening.

A routine staging CT examination performed 6 months later in 2017 demonstrated soft-tissue nodularity and enhancement within the left breast concerning for worsening disease. The examination also revealed increased size of bilateral axillary lymph nodes, prompting diagnostic examination of the left breast (Figure 6).

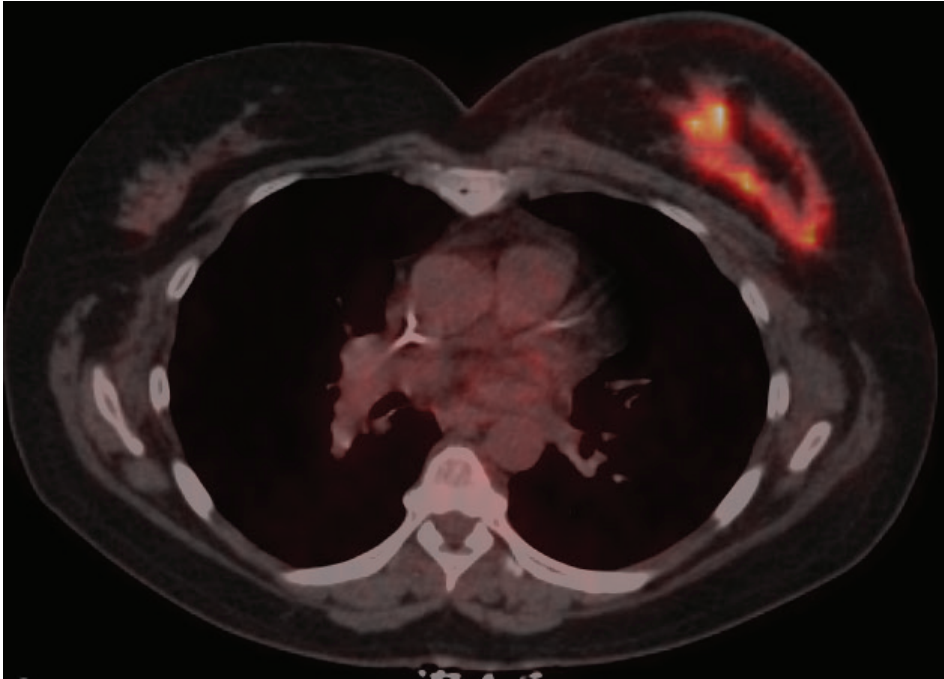


◀ **Figure 6.** Left CC (a) and MLO (b) views demonstrate a 4-cm irregular mass in the upper central left breast with circumscribed and obscured margins. Differential considerations include primary breast malignancy, metastatic ovarian cancer, and atypical appearance of lymphedema. The examination was assessed as BI-RADS 4C.

*Continued on page 14 >*

## Interesting Case: Metastases to the Breast From Extramammary Malignancies (continued from page 13)

Image-guided biopsy of the multilobulated mass in the left breast at the 12-o'clock position again demonstrated metastatic carcinoma, morphologically consistent with previously diagnosed high-grade ovarian serous carcinoma. Restaging PET/CT confirmed a hypermetabolic multifocal left breast mass (Figure 7). In addition, new hypermetabolic right supraclavicular and right axillary lymph nodes were identified.



◀ **Figure 7.** Hypermetabolic left breast mass consistent with biopsy-proven metastatic disease.

The patient underwent left mastectomy. Pathological analysis demonstrated metastatic high-grade serous carcinoma with widespread lymphovascular space invasion.

This case illustrates metastasis to the breast from an extramammary malignancy, initially presenting as a new abnormal intramammary lymph node followed 4 years later by lymphatic spread of disease in the breast. It is important to recognize the possible presence of metastatic disease as well as the presence of primary breast cancer in patients with a known extramammary malignancy.

Although the breast is a common site for primary malignancy in women, the reported clinically observed rate of breast metastases from extramammary malignancies ranges only from 0.5% to 1.3%.<sup>1</sup> The most common extramammary metastases to the breast are melanoma and lymphoma/leukemia. Breast metastases from primary ovarian cancer have been reported in only 0.03% to 0.6% of all breast cancers.<sup>2</sup> Breast metastases presenting as inflammatory breast cancer are particularly rare, with only 7 published cases.<sup>3</sup>

Clinical and imaging manifestations of extramammary malignancy metastatic to the breast are varied and depend on the form of dissemination.<sup>4</sup> Hematogenously disseminated metastases often develop as circumscribed masses, whereas

lymphatic dissemination often presents as diffuse breast edema and skin thickening.<sup>4,5</sup> However, the imaging features are not specific to metastatic disease.

It is difficult to differentiate metastatic lesions in the breast from primary breast cancers and benign lesions. Suspicion and confirmation of the diagnosis are essential for therapeutic planning in patients with metastatic disease to the breast. Although rare, in the appropriate clinical setting, metastatic malignant neoplasms should be considered in the differential diagnosis of breast lesions.

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# Patient Communication and Education

## From the Perspective of a Radiologic Technologist Breast Cancer Survivor

By Louise C. Miller, RT(R)(M), FSBI

I was diagnosed with breast cancer last September after a screening mammogram: stage 2, invasive ductal carcinoma, triple negative. It was a shock, to say the least. The following months were filled with many medical appointments, tests, decisions, and angst. As a mammography technologist working and teaching in the field for more than 30 years I thought I had a good idea about what the breast cancer experience entailed. Chemo, hair loss, surgery, and radiation. I soon found out I knew nothing about the real experience of dealing with and undergoing treatment for breast cancer. The goal of sharing my experience and this information is to help the technologist/radiologist understand the myriad experiences, side effects, and emotions the patient goes through and feels. Then, perhaps, we can develop better means of communication and increased compassion for breast cancer patients during their interactions with each of us as breast imaging specialists.

Patients who present with a clinical finding or return for a diagnostic workup will exhibit a higher level of anxiety than most screening patients. However, with that said, it is important to realize that screening patients are often very anxious also. Perhaps the group who is most distressed are patients who are being treated or have completed treatment for breast cancer. This includes patients having a localization prior to lumpectomy. They, most likely, have been through months of chemotherapy and may be weak and tired.



Louise C. Miller,  
RT(R)(M), FSBI

### EMOTIONAL ADVERSE EFFECTS OF BREAST CANCER DIAGNOSIS AND TREATMENT

- |  |  |
|--|--|
| Anger                                  | Anxiety  |
| Fear of the unknown                    | Depression   |
| Discomfort or shame                    | Embarrassment  |
| Emotional exhaustion                   | Fear of recurrence                                   |
| Concerns about chronic health problems | Frustration with physical changes or new limitations |
| Hopelessness                           | Sense of grief and loss                              |

### PHYSICAL ADVERSE EFFECTS OF BREAST CANCER TREATMENT

- |                         |                    |
|-------------------------|--------------------|
| Anxiety                 | Infection          |
| Bone loss               | Nausea/vomiting    |
| Diarrhea                | Sexual changes     |
| Hot flashes             | Urinary changes    |
| Mouth/throat/nose sores | Bleeding problems  |
| Pain                    | Constipation       |
| Swelling                | Hair loss/baldness |
| Appetite changes        | Memory changes     |
| Bruising                | Neuropathy         |
| Fatigue                 | Skin sensitivity   |
|                         | Anemia             |

*Continued on page 16>*

Special consideration should also be given to patients who are returning for mammograms following the completion of their treatment as they may be self-conscious about the results of their surgery and/or the effects of radiation therapy. Be aware also that those who have had a sentinel node biopsy and/or axillary node dissection may be especially sensitive and sore in the axilla. Special attention should be given to this when positioning for the mediolateral oblique view, and every effort should be made to ensure patient comfort while at the same time attempting to get the best image possible.

Perhaps not knowing what to say or how to say it is a challenge for many breast health professionals. Seeing a woman the age of your daughter, mother, sister, or close friend being diagnosed with breast cancer can invoke feelings of vulnerability in all of us. While we want to relate to each woman in a compassionate manner, it is important that we understand what she is going through and then use appropriate communication skills. I have included suggestions below.

#### **Communication skills for high-anxiety situations:**

- Acknowledge patients' feelings using broad terminology: "Most patients are somewhat anxious about having this examination or procedure."
- Ask the patient if there is anything you can do to make her more comfortable.
- Ask the patient if she has any questions before you start the examination or procedure: "Do you have any questions I can answer before we get started?" If the answer is outside your scope of practice, defer the question to the radiologist when he or she is present.
- Explain the examination or procedure using terminology the patient understands: "We are going to start with some top-to-bottom pictures of your breasts and then we will do some side views."
- Do not offer your opinion regarding her treatment even if she asks you. Respect her decisions. "Everyone has to decide their own course of treatment and usually those decisions are best made with the input of your doctors and family."
- Do not share your own breast cancer experience if you have had one. It may be tempting to say, "Oh, I know exactly how you feel, I have been there myself." However, the patient may then want to explore the course of treatment you had, which might include options that are unique to your circumstances.
- Speak from the heart: "I'm so sorry."

My hope is that by understanding the patient's feelings and history and subsequently employing appropriate and caring communication skills we can work to provide the best care possible on all levels.

#### **OTHER ISSUES RELATED TO BREAST CANCER TREATMENT**

Financial hardship

Limited or no support system

Other health problems



# Breast Imaging Radiologists Facebook Group

By Rebecca Seidel, MD

**Physician Mom's Group. Physician Side Gigs. Physician Women in Leadership. Physician Non-Clinical Career Hunters.** These are just a few of more than 500 physician groups on Facebook. Thousands of physicians use the "groups" feature of Facebook for sharing information, teaching, recruiting, and seeking advice from peers within virtual communities.

In 2015, one of my former fellows, Dr Stephanie Morgan, and I founded a Facebook group for breast imaging radiologists. At that time, I was a member of several local Facebook groups that I found useful for advice and referrals. We hoped that the Breast Imaging Radiologists (BIR) Facebook group would be a simple way to ask questions and receive timely feedback from colleagues. Over time, the group membership has steadily grown to 1218 radiologists from 49 countries. Most (84%) of the BIR members are female.<sup>1</sup>

Whether individual breast imagers practice tele mammography from home or work as faculty in a large academic institution, they can instantly connect with radiologists with shared interests through this forum. Members write posts about common issues they encounter in breast imaging, and colleagues around the globe respond with comments—often within minutes! Frequent topics of discussion include job opportunities, use of BI-RADS, management of difficult cases, accreditation, and imaging protocols. Most members are engaged, either by writing posts, making comments, or reacting to others' posts. Group rules are designed to foster an atmosphere of respect and professionalism and protect patient privacy.

Although the activity of physicians on Twitter has received much attention lately, I find Facebook groups to be an excellent platform to build a virtual community of colleagues. Because Facebook is the most popular social network in the world, many physicians already access it on a daily basis. Participation in a group integrates seamlessly into one's regular Facebook use and does not require a separate login or app. We were very sensitive to individual privacy in setting up our group and made sure that activity in the BIR group is completely separate from personal Facebook usage. That means BIR group members do not see content posted to

other members' personal profiles. This platform also allows users to share and archive documents, host events, and broadcast live interactive video.

I am frequently asked about privacy in groups on Facebook. The 3 privacy settings for groups are public, closed, and secret. With public and closed privacy settings, the name of the group and names of its members can be seen by anyone using Facebook. The BIR group uses the most restrictive privacy setting (ie, secret). This means that only members of the group can see *any* information about it, including the name, names of other members, and content of discussion. It *cannot* be found by searching. The easiest way to join is to be added by a Facebook "friend" who is already a member, so I would encourage you to network and get engaged that way.

It has been rewarding to watch the BIR group develop into a community where professionalism, collegiality, and imaging expertise all coalesce. Members generously share their knowledge and experience and support each other when facing challenges. With physician burnout at the forefront of medicine, any platform that allows us to forge connections and support colleagues is valuable. Please consider joining us. I hope to see you soon in the Breast Imaging Radiologists Facebook group!



Rebecca Seidel, MD

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The breast imaging community is diverse, and there is artistic talent that lives and breathes among us. We define art broadly to include all visual and literary forms such as drawings, paintings, photography, cartoons, and poetry. We welcome artistic submissions from all SBI members in any subject. We also invite SBI members to nominate nonmembers whose art pertains to our field of breast imaging.

Please contact Jiyon Lee, MD, at [Jiyon\\_L@hotmail.com](mailto:Jiyon_L@hotmail.com) with your submissions and nominations. Please provide a brief paragraph that addresses the following questions. Artist: why did you choose the subject and what does the art mean to you? SBI member: what does the piece of art mean to you and why do you want to share it with SBI Newsletter readers?

## Artistic Impressions: Valerie Jackson, MD, FACR, FSBI, and Her Photography

By Jiyon Lee, MD

**JL:** Dr Jackson, how did you choose your work and what does the art mean to you?

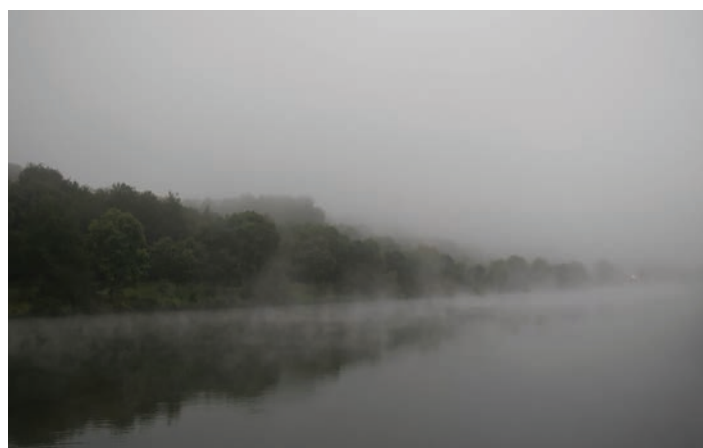
**VJ:** Photography is my creative outlet. It is a way to express myself because I have no talent for drawing or painting. I did a lot of photography during college but took a hiatus from the hobby while my son was growing up. He got me back into photography when he moved to Australia for graduate school. It continues to be a favorite shared activity for us. I have a wide range of photography interests, including travel, macro, and street photography.



Valerie Jackson, MD, FACR, FSBI, Germany, 2017



Rearview mirror, Germany, 2017



Fog, Germany, 2017

**SBI-N:** Dr Lee, what does Dr Jackson's work mean to you and why do you want to share it with SBI Newsletter readers?

**JL:** Our readers are radiologists, technologists, physicists, and everyone else in our breast radiology community. We are by definition interested and invested in imaging and its medical purpose. But photography is a different imaging medium. Photography serves so many purposes for so many people. It's funny—we're calling it her "work" but it's also play, isn't it? Her creative outlet in an otherwise very busy life. Creating, or rather supporting her travel memories, of what she saw and how she saw it. And those are being conveyed, relayed—all the verbs I can think of that mean we're experiencing in surrogacy. She is crafting what we see by how she's chosen to photograph. Deliberate and thoughtful intent with framing, lighting, perspective, big vistas to small details—all of that. But it's still an interactive experience, isn't it? What we bring to any art experience impacts what we

see, and how it becomes meaningful. And like Shakespeare and all good works—and arts—we can more deeply absorb and appreciate with each observant exposure.

I love her diverse photography. Nature-made and human-made subjects. The rearview mirror picture reminds us to occasionally look back—but don't trip in the present! The oblique perspective of the trees beyond the water, cloaked in fog. We see what we see but sometimes must have faith in what we trust is there even if we can't see it fully or as well.... That includes the landscape to the right of the frame. That also might include if we're shown the water's reflection instead of the actual trees. I also love the puffin in Alaska. That's us. Busy doing our thing. Breast imaging and procedures, caring for women and people, grateful to have lives of purpose. Thank you to Val and all photographers of the world.



Puffin, Alaska, 2017



Castle, Germany, 2017



Gaudi's Casa Batlló, Barcelona



White flower



Caterpillar and leaf, Germany, 2017

Much of what we know has been validated by scientific investigation and published in web-accessible journals for all to see. But there is so much more we learn through daily experience and interaction with our colleagues and patients. Where is that stored? How can we access it? If we are lucky, a talented veteran colleague will impart wisdom at opportune moments. Our series of articles called “What I’ve Learned” is designed to transmit the experience of our leaders far beyond the halls of their own breast centers to the many young dedicated custodians of the future of breast imaging.

## What I’ve Learned: Linda Warren, OBC, MD, FRCPC, FACR, FSBI

By Paula Gordon, OBC, MD, FRCPC, FSBI

Paula Gordon worked with Linda for almost 35 years and interviewed her for this feature in the SBI Newsletter. Paula describes Linda as a teacher, mentor, and loyal friend and says, “You’ll never meet anyone more positive, dignified, hardworking, and dedicated.”



Linda Warren, OBC, MD, FRCPC, FACR, FSBI (left) and Paula Gordon, OBC, MD, FRCPC, FSBI (right)

### PG: Was there a pivotal moment in your career?

**LW:** There are 2, actually. The first time was a totally fortuitous opportunity offered to me to do breast imaging as a subspecialty. I had just finished my residency and joined a community practice, which was comprised of 6 prestigious radiologists who worked both in the office and in the hospital. On the first day at the office, they came to me and said, “How wonderful that you are a woman. Why don’t you take over the breast imaging?” I was a little surprised, but I did not admit that I had seen 1 mammogram in my entire residency. So I said, “Fine. I’ll do it.” I then proceeded to learn as much as I could and do mini fellowships, one of which was with Dr Bob Egan, one of the fathers of breast imaging and our first gold medalist.

The second pivotal moment was after I had returned from a sabbatical in Europe where I had studied with radiologists who had established innovative screening programs there and returned home full of ideas and ambition. There was suddenly an opportunity to collaborate with British Columbia Cancer Agency colleagues to design and establish a mammography screening program which became the first in Canada. We gathered advice from world experts and determined that we had to start with built-in quality measures. We have seen concrete results, with reduction in breast cancer mortality of 40% since the early days of screening.

### What advice would you give to a brand new breast imaging fellow?

The very last phase of your radiology education is what drives and characterizes your career subsequently. So, I would encourage the fellow to embrace every opportunity to learn about how to conduct research, be critical in collecting and analyzing data, get as much hands-on experience in breast intervention and functional imaging as possible, and to embrace high-quality imaging and interpretation in diagnosis. Embrace and perfect knowledge of BI-RADS, the lexicon,

and assessment categories. Conclude every report with recommendations as to the next step, whether it is imaging or clinical follow-up. Also, very importantly in the age of machine learning, learn from all young fellows and residents.

### What is your guiding principle?

I think there really is more than 1 category here—as we are speaking about conducting ourselves in our work as well as in our lives. I think my guiding principle in my work is to do the very best job I can, to be thorough and accurate, whatever it takes. This embodies an aspiration for integrity and a compulsion to identify with others.

My other guiding principle is to allow compassion and empathy to guide every interpersonal encounter. Just as it is with putting yourself in your patient’s shoes, I try my very best to anticipate and avoid misunderstanding.

### What is the biggest influence on your life or your medical career?

My parents are definitely the biggest influence on my life. My father, who became a businessman involved in communication at a very young age, set a quiet example of how to use innate intellect to create, without having been trained.

My mother was born with creativity; she set her own potent example for me to embrace my interest in art, music, and fashion at the same time as she insisted that I focus on academic achievement.

My late husband, H. Joachim Burhenne, was the greatest influence on my medical career. He encouraged me to be proud of what I could accomplish in a small office practice, to publish, and ultimately pursue innovation in mammography screening.

### If you could do it all over again, would you change anything?

How you deal with what life “deals to you” is what really counts. The only thing that was not available at the time I completed my residency was a fellowship in breast imaging and had this been available, I think I would have chosen it. However, in retrospect, with the opportunity that I was given, I had a chance to do what was essentially a “self-fellowship.”

### What is the best advice you ever received?

I think the best advice was the great encouragement I received from my parents when, together, we made a very structured decision about my applying for medicine. They encouraged me and thought I would be good at it, with no reservations. Those were the years when there were a few women physicians: in my graduating class of 60, only 3 of us were women. What my parents understood was that there should be no impediment to my succeeding in medicine.

Another very good piece of advice came from my father, who often admonished us to “not buy anything you don’t need.” I simply forgot about that piece of advice for many years, but now I understand how good it was and how to follow it.

### What is your greatest source of strength?

I think the greatest source of personal strength is a combination of patience and perseverance. However, I gain my external support from my husband, who understands and cares infinitely. I also gain strength from the memory of my parents, who were true pioneers, both having been brought up in small towns with no educational opportunities and no resources, but with enormous determination to make the best of what they had.

### Who are your heroes?

I start again with my parents, who set an inspiring example for me during their lives and as I now pursue mine without them. My late husband was known internationally to be able to accomplish more in an academic workday than most others could in a week and at the same time leave weekends and holidays entirely free for skiing, mountaineering, and travel. My true living hero is my amazing husband, Dennis, whom I was able to find in dark times, who can conduct the most intricate piece of creative construction while conversing with erudition to anyone about anything.

### What is the most important part of your life outside medicine and why?

I spend as much time as possible outdoors and this has helped me to maintain vitality while working hard. I have pursued water sports including swimming, waterskiing, windsurfing and rowing, hiking, running. In the winter, I love to ski both downhill and cross-country. I have pursued modern dance and ballroom dancing and the piano. I try to do something cultural every week such as theater, ballet, or musical performances. Travel is also a great passion.

### What is the thing you are most proud of?

I think setting an example for living in how I conduct my work and how I try to help and relate to others.

### What have your friends taught you?

I have many true good friends dating from elementary school to university and medical school and residency. I have learned that friends are a lifelong treasure—it is simply soul-satisfying to meet, whether after months or years, and simply pick up where you left off with the comfort that you are accepted as you are. Such relationships are priceless.



Linda Warren lives in Vancouver, British Columbia, with her husband, Dennis Williams. She is clinical professor of radiology at the University of British Columbia, proprietor of her practice, the Vancouver Breast Centre, consulting staff at BC Women’s Hospital and BC Cancer, and the senior medical consultant at the Screening Mammography Program of British Columbia. She is the 2018 recipient of the Gold Medal of the Society of Breast Imaging. She enjoys the outdoors, especially water sports and double-diamond downhill skiing, and salsa dancing.

# The SBI Goes to Egypt

By Margaret Szabunio, MD, FACR, FAWWR

The first Middle East collaboration of the SBI was marked with our visit to Egypt on February 15 to 17, 2018. The SBI partnered with the Egyptian Society of Women's Health, a nonprofit organization that holds an annual women's educational symposium.



Margaret Szabunio, MD, FACR, FAWWR

It was my privilege to be the director of this 3-day conference, which included didactic lectures and workshops in the beautiful, ancient, and vibrant city of Cairo. It took many months of planning and preparation to organize the symposium with the support of Dr Norran H. Said, a dedicated breast radiologist who serves as the international coordinator for the Egyptian group and head of the local organizing committee.

Three hundred radiologists from Egypt and the neighboring countries of the United Arab Emirates, Saudi Arabia, Sudan, and Kuwait attended the Breast Imaging Symposium. Half of the attendees were Egyptian radiologists who traveled from other cities to Cairo. Four speakers from the SBI—Chris Comstock, MD, FSBI; Debra Ikeda, MD, FSBI; Jessica Leung, MD, FSBI; and John Lewin, MD, FSBI—joined our Egyptian speakers and me to cover various topics and lectures.

The national breast screening program, established in Egypt in 2007, targets women over the age of 40 years. Some areas of Egypt have state-of-the-art equipment and therefore the audience was highly interested in lectures about breast magnetic resonance imaging, digital breast tomosynthesis, and contrast-enhanced mammography. Egyptian breast imaging radiologists are predominantly women, and I was impressed with their excellent questions and enthusiasm. The participation and ongoing discussions continued through breaks and until the last minutes of the conference, which was appreciated by all in attendance.

One of the most popular training opportunities at the symposium was the screening self-assessment workshop. We provided 32 cases for the attendees to test their skills and receive sensitivity and specificity results from specially designed software. Eighty-five attendees took advantage of this workshop and provided excellent feedback discussions.

Dr Leung moderated a multidisciplinary panel discussion on regional nodal assessment and management of breast cancer patients. The interactive multimodality workshops, which used an audience response system, were another highlight of the conference. Additionally, the small-group, hands-on, phantom-based interventional ultrasound workshops on fine-needle

aspiration, core biopsy, and needle localization procedures were pivotal, beneficial, and popular among the participants.

Drs Dorria Salem and Ashraf Selim, the first 2 Egyptian breast imaging radiologists, were surprised with a special award as an expression of deep appreciation and gratitude from their students. I was honored to present a slide show highlighting their careers and milestones, followed by a heartwarming ceremony complete with an inscribed award.

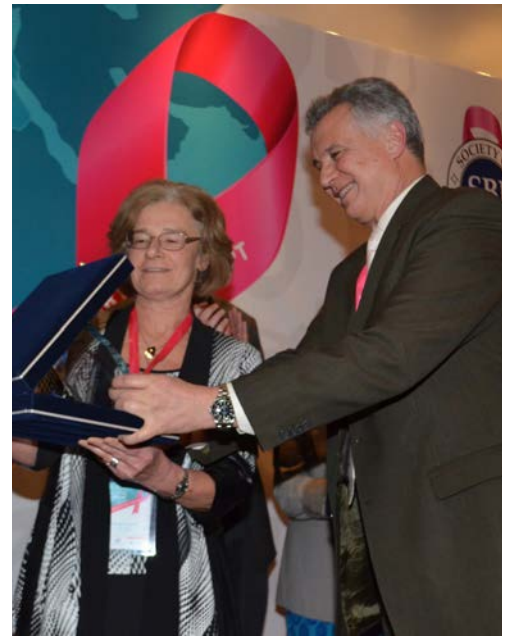
In addition to the scientific activities, we enjoyed some valuable sightseeing experiences before the symposium and even managed a camel ride beside the pyramids of Giza. Our hosts also ensured the evenings in Cairo were spectacular.

A visit to one of the old-town restaurants that offered delicious and different flavors of Egyptian food, including koshari, a mix of pasta, rice, and lentils with special spices, and the famous molokhia, or green soup, was a splendid and delectable treat to the palate. A traditional belly dancer show on a riverboat cruise along the banks of the energetic Nile was a highlight among many enjoyable and memorable moments.

Overall, the Egyptian collaboration was a successful experience and we were delighted to have had the opportunity to teach and learn about a different culture with an awe-inspiring history while making new lifelong friendships.







Be sure to visit the Egyptian Society of Women's Health Facebook page at <https://www.facebook.com/womenshealthegypt/> for more images of the SBI in Egypt.





# Three-Dimensional Printing in Medicine, Radiology, and Breast Cancer

By Elsa M. Arribas, MD; Lumarie Santiago, MD; Jessica Leung, MD, FACR, FSBI

The field of 3-dimensional (3D) printing has rapidly expanded in recent years. A combination of factors, such as reduced equipment costs and an increased array of novel printing materials, has made the technology increasingly accessible. The printing boom has not only impacted the manufacturing industry; it has also gained tremendous momentum in medicine, bringing it to the forefront of radiology. The 2017 Radiological Society of North America (RSNA) meeting provided over 3700 sq ft of exhibits, educational displays, and ample hands-on courses and didactic lectures regarding the various medical applications of 3D printing.



Elsa M. Arribas, MD



Lumarie Santiago, MD



Jessica Leung, MD, FACR, FSBI

## What Is 3D Printing?

Three-dimensional printing produces 3D physical objects by fusing or depositing materials in sequence from a digital file. The 3D-printed object is created by laying down successive layers of material until the object is formed. It is also known as rapid prototyping, additive manufacturing, stereolithography, and biomodeling. There are multiple 3D printing processes using various printer technologies, speeds, and resolutions. Plastic, metal, ceramic, powder, paper, and even living cells are some of the materials that can be used in the 3D printing process. Because of its ability to create complex objects, 3D printing can physically reproduce a tangible object, such as a spleen, from source DICOM information from a computed tomography scan of the abdomen, for example.

In medicine, 3D printing is currently being used as a teaching tool for individuals of various levels of experience and training. Trainees, including residents and fellows, use 3D-printed models to better visualize and understand a patient's anatomy and pathology, especially when complex. Surgical trainees and surgeons use 3D-printed models to aid surgical planning.<sup>1</sup> Customized surgical guides created from a patient's medical images are used to help guide surgeons during difficult or complex surgical procedures. By using these surgical guides, surgeons can complete challenging and complicated procedures in less time and with more accurate results, reducing intraoperative times.<sup>2</sup>

Some of the clinical areas where 3D printing is currently of documented clinical value include head and neck, cardiac, musculoskeletal, vascular, gastrointestinal, genitourinary, and dental disease processes. Personalized 3D-printed prosthetics and implantables, such as dental molds and

hearing aids, are becoming more common. Bioprinting, the process of producing 3D-printed living tissues such as bone and cartilage, is now a reality, having already been used for transplants. Even organ replication, previously possible only in science fiction, is becoming a reality.<sup>2</sup>

## Applications of 3D Printing in Breast Imaging

New clinical applications for 3D printing are continuously being investigated, including its use in breast imaging and breast cancer care (Figure). Can we use current imaging applications to create customized breast models? Can we use these models to aid patient care and surgical treatment options? Schulz-Wendtlandt et al explored the feasibility of generating 3D-printed breast tumor models and described the potential for reducing re-excision rates and perhaps intraoperative time.<sup>3</sup> At MD Anderson Cancer Center, we are currently investigating how 3D printing may help patients and physicians visualize imaging findings of breast tumors obtained through standard-of-care breast imaging studies for a better understanding of tumor size, extent of disease, and volume of the affected breast. This in turn can facilitate surgical planning among breast surgeons and plastic surgeons while enabling patients to better appreciate the 3D anatomy and make more informed choices. Three-dimensional printing can be used to educate patients before mastectomy or breast-conserving surgery and thereby improve patient-physician communication, patient understanding of breast disease, and ultimately posttreatment satisfaction.

Barriers to communication have been shown to negatively impact patient care. A study from Beth Israel Hospital in Boston showed that in 37.9% of cases, communication errors had a direct impact on patient care.<sup>4</sup> In a 2018 publication, it was

noted that patients are not well informed about imaging studies they are about to undergo.<sup>5</sup> It is reasonable to extrapolate that instruments that can bridge information gaps between radiologists' imaging reports and surgeons' understanding of these results, and between physicians and their patients, particularly when treatment decisions are being discussed, will reduce communication errors. At this particular time, when quality in medicine is being measured at least in part by patient perception and understanding, it is important to contemplate and probe new methods to improve communication.

Other applications in breast care, including the use of surgical guides, are being explored. A recent article from Dartmouth-Hitchcock Medical Center in New Hampshire described the use of a surgical guide to aid breast tumor localizations during breast-conserving surgery.<sup>6</sup> Another recent article described how a 3D model of relevant vasculature for deep inferior epigastric perforator (DIEP) flap breast reconstruction was useful to help plan and teach DIEP flap reconstructions. Preoperative planning (including volumetric analysis and perforator vascular anatomy) is broadly associated with improved aesthetic outcomes and reduced operative times in breast reconstruction.<sup>7</sup>

Because of the numerous current and future potential applications for 3D printing, the RSNA created a 3D printing special interest group, which is currently developing standards for medical 3D printing and striving for consistent, safe, and appropriate use of 3D printing from medical images. This group is also currently working alongside the Food and Drug Administration on the development of regulatory and safety guidelines for additive manufacturing (3D printing).

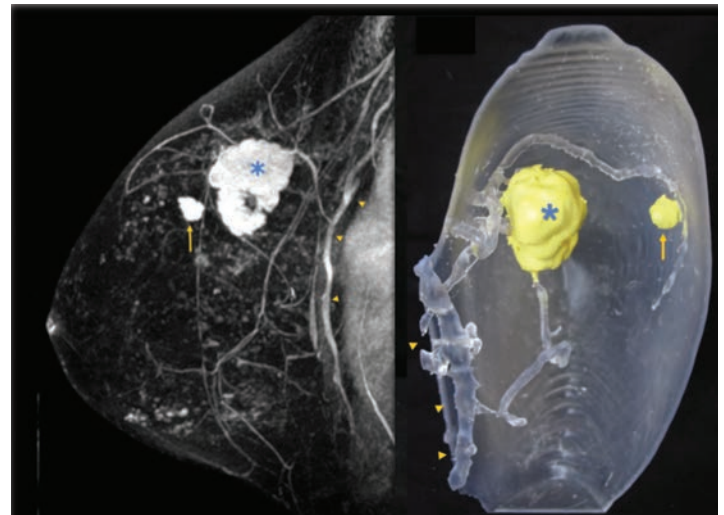
### Limitations of 3D Printing

The cost to print a 3D model is a major limiting factor. The cost of 3D printing in medicine includes not only the inherent expense of materials, printer, and software but also the physician or technologist time required to perform any necessary segmentation and image processing. As of now, there is no Current Procedural Terminology code for reimbursement of 3D models. Hospitals are therefore slow to adopt this technology and invest in a 3D printing laboratory. Therefore, 3D printing tends to be outsourced to third-party companies. This in turn elevates the cost of the model even more. The use of third-party companies also entails a longer production time of the model (being printed off-site) and brings about additional HIPAA (Health Insurance Portability and Accountability Act) privacy concerns.

Another limitation of 3D printing is the time required to select and segment or delineate the area of interest to be printed. The amount of time needed to produce the segmentation, in addition to the time needed to print the model, can make the process very lengthy and therefore not amenable to cases in which the model may be needed in less than 24

hours. Segmentation time is an important manual labor cost. Software companies seek to reduce the segmentation time by automating this part of the process whenever possible.

At present, we are experiencing staggering high-speed 3D printing technology advancements, which may render some of these limitations trivial. Ultimately, the advancements in 3D printing will allow this exciting technology to be a central and highly personalized element in the optimization of health care.



**Figure.** A maximum-intensity projection image of a breast (left) demonstrates a known malignancy in the upper inner quadrant (asterisk). A suspicious mass is seen in the upper outer quadrant of the same breast (arrow). Imaging also demonstrates the adjacent internal mammary blood vessels (arrowheads). A posterior view of the 3-dimensional printed model (right) demonstrates the known malignancy in the upper inner quadrant of the breast (asterisk), adjacent internal mammary blood vessels (arrowheads), and satellite mass in the upper outer quadrant (arrow).

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## SBI HIGHLIGHTS FROM THE SBI/ACR SYMPOSIUM

### THURSDAY

By Shadi A. Shakeri, MD

The theme of the first plenary session of the 2018 SBI/ACR Breast Imaging Symposium, Las Vegas, Nevada, was "Screening 2018." From guidance on improving screening performance to tips and updates on screening with a variety of imaging modalities (including tomosynthesis, ultrasound, and magnetic resonance imaging [MRI]), this informative session provided expansive coverage of screening-related topics. An inspiring talk on screening underserved populations rounded out the subject. The morning concluded with a dynamic question-and-answer speaker panel responding to audience members' questions.



Shadi A. Shakeri, MD

Opening the program was the ever-energetic and entertaining Brett T. Parkinson, MD, FSBI, imaging director at Intermountain Healthcare Breast Care Services, Murray, Utah, who debunked myths surrounding screening mammography by using the robust scientific evidence that supports the current guidelines from the ACR. Dr Parkinson reviewed scientific data to refute unsupported claims against screening mammography. He left us with the message that as imaging experts, we have the responsibility to educate our patients, colleagues, and the general public regarding why and how screening saves lives.

Following Dr Parkinson was one of the giants of our field: Edward A. Sickles, MD, FACR, FSBI, professor emeritus of radiology, University of California San Francisco School of Medicine, San Francisco, California. He provided sage advice and guiding principles for increasing our cancer detection rates and decreasing recall rates, thereby improving screening performance. He emphasized paying attention to the subtle signs of malignancy in addition to the patient's relevant clinical history, reading prior reports, comparing with the results of multiple prior imaging studies, and reading in batches without interruption and under proper viewing conditions. He inspired us to be wary of the 2 "SOS" conditions: satisfaction of search and the seduction of stability!

Sarah M. Friedewald, MD, FSBI, chief of breast and women's imaging, Northwestern Memorial Hospital, Chicago,

Illinois, reviewed tomosynthesis and how it can improve cancer detection and decrease recalls. She alerted us about the new accreditation process for tomosynthesis units. Dr Friedewald also informed the audience that the National Comprehensive Cancer Network guidelines now recommend considering tomosynthesis for screening average-risk women. She explained the principles of lesion localization on tomosynthesis and clarified why the scroll bar on tomosynthesis images may not appear accurate.

Regina Hooley, MD, FSBI, associate professor and vice chair for clinical affairs, Department of Radiology and Biomedical Imaging, Yale School of Medicine, New Haven, Connecticut, discussed screening ultrasound. She began by reviewing early performance studies of screening ultrasound and noted that the positive predictive value for biopsy has been low. Dr Hooley talked about using ultrasound as a supplemental tool for screening women with dense breasts particularly after the grassroots passage of density notification laws, which at this time are in effect in 34 states. Dr Hooley expanded on how to optimize screening ultrasound for our practices and patients. She went on to suggest ways to improve specificity while maintaining sensitivity and emphasized the importance of performing screening ultrasound practice audits. Dr Hooley concluded with an analysis of the effects of tomosynthesis on screening ultrasound utilization.

Next, Linda Moy, MD, FSBI, professor of radiology, New York University School of Medicine, New York, New York,



spoke about “Evolving Approaches to Abbreviated MRI Screening.” She presented an eloquent argument for why we need to consider adopting abbreviated breast MRI techniques. After introducing the concept, she presented the scientific evidence in support of using abbreviated breast MRI and explored a variety of potential protocols and sequences for clinical practice. Dr Moy finished by discussing fascinating new and emerging approaches, such as noncontrast examinations, state-of-the-art techniques, and even new MRI scanner designs.

The final speaker of the morning plenary session was Marc Hurlbert, PhD, chief mission officer, Breast Cancer Research Foundation, New York, New York, who delivered an outstanding talk on “Reaching the Underserved and the Underscreened.” He began by agreeing with the preceding speakers on the critical need to demystify false claims surrounding screening and to implement methods to improve cancer detection rates. Dr Hurlbert continued by issuing a call to action to breast imagers: “You need to get out of your reading room, get out of your institution, and work with your communities at all levels; otherwise you are not going to save lives.” He described community outreach programs in Atlanta, Georgia, and the amazing work in the Chicago, Illinois, area to address breast cancer mortality disparities. He expanded on evidence-based strategies to increase community outreach efforts. Dr Hurlbert gave us tools to engage and educate the community and ultimately increase access to screening programs. He highlighted 3 specific activities: client reminders (letters, postcards, phone calls, emails), small media (newsletters, pamphlets, brochures), and one-on-one education. Dr Hurlbert explained that most of the successful programs in community outreach efforts have employed methods to increase access. For example, dedicated hotlines may guide patients to access screening for uninsured people or those without primary care providers. Group education sessions and mass media such as television and radio advertisements, when linked to the other tools discussed earlier, along with client incentives like bus passes or gas cards, may improve screening rates. Dr Hurlbert made the

point that the biology and genetics of breast cancer do not fully explain the disparities that have increased over time and vary by geography. His take-away point was that the combination of aggressive tumor biology and genomics with lack of access to high-quality screening, care, and treatment is responsible for the disparities in mortality due to breast cancer. He reminded us that breast cancer mortality in black women is higher than in other groups and varies by geography, but system-level interventions can be effective by improving access. In his final remarks, Dr Hurlbert implored us to remove structural barriers and bring awareness to the disparities in breast cancer mortality reductions for African American women.

The information provided on the first day felt like a feast, yet it was only a taste of the varied and extensive menu of breast imaging topics offered through the symposium.



## **SBI HIGHLIGHTS FROM THE SBI/ACR SYMPOSIUM**

### **FRIDAY**

*By Kelly Fountain, MD*

The Friday morning program began with President Wendy DeMartini, MD, FSBI, leading the annual business meeting. Dr DeMartini reported on the status of the society in several key areas, highlighting the financial and educational successes of the society with special emphasis on international educational outreach initiatives. Dr DeMartini thanked multiple staff members, with special thanks to the chair of education, Jay Baker, MD, FSBI, for hosting the largest SBI/ACR Breast Imaging Symposium to date, with over 1100 attendees.



**Kelly Fountain, MD**

The next order of business was to thank outgoing board member Liz Morris, MD, FACR, FSBI, for her service to the board of directors from 2011 to 2018 and to welcome incoming board member John Lewin, MD, FSBI, as a new director at large. Dr DeMartini passed the gavel to the new president, Dr Jay Baker, who concluded the business meeting with the express goal of propelling the society forward as the spokespeople on the science of breast imaging.

True to the theme of Friday's plenary session, "Improving Outcomes by Doing Less," Timothy Jacobs, MD, pathologist from Virginia Mason Medical Center in Seattle, and Brandi Nicholson, MD, associate professor of radiology from the University of Virginia, discussed the management of high-risk lesions as a radiologist-pathologist team. The team stressed that many lesions we consider high risk are actually problematic because of lesion heterogeneity resulting in sampling errors. Atypical ductal hyperplasia (ADH) is one such lesion that often occurs in the company of ductal carcinoma in situ (DCIS). A diagnosis of ADH does not exclude the presence of DCIS in close proximity, and therefore the radiologist-pathologist duo recommend excision for all cases of ADH diagnosed with core-needle biopsy. Additional heterogeneous lesions for which Drs Jacobs and Nicholson recommend excision are papilloma and radial scar. However, they advise that excision may be avoided if the lesions are totally benign, incidental, and totally excised at the time of core-needle biopsy. Drs Jacobs and Nicholson

indicated that excision of lobular neoplasia may be avoided if the imaging finding is explained by a benign process and the lobular neoplasia is incidental. The lecture concluded with a reminder that teamwork between the radiologist and pathologist is crucial, particularly in determining the best course of action regarding high-risk lesions.

Albert Losken, MD, FACS, professor of plastic surgery at Emory University, Atlanta, followed with a discussion of oncoplastic surgery. The oncoplastic approach combines plastic surgery principles with conventional breast cancer surgery to achieve superior results, including improved patient satisfaction and quality of life, broadened indications for breast-conserving surgery, and improved margin control. Dr Losken emphasized that the best outcomes occur when a team including the plastic surgeon, breast surgeon, radiation oncologist, pathologist, and radiologist cooperates throughout all phases of a patient's care. Dr Losken discussed tissue rearrangement and tissue replacement techniques and possible postoperative radiologic pitfalls. The discussion concluded with a caution that as team members we impact each other for better or worse and that it is vital that all members understand the overall process.

Monica Morrow, MD, FACS, chief of the breast surgery service at Memorial Sloan Kettering Cancer Center, delivered the keynote lecture on how to do more with less. Dr Morrow reviewed several studies regarding

the surgical approach to the axilla and concluded that axillary lymph node dissection does not improve rates of locoregional recurrence, disease-free survival, or overall survival when compared with sentinel lymph node biopsy in patients with cT1-T2 cN0 tumors receiving radiation and adjuvant therapy, regardless of age and receptor status.<sup>1,2</sup> Dr Morrow further surmised that axillary lymph node dissection may be avoided in clinically node-positive patients with the use of neoadjuvant chemotherapy.<sup>3</sup>

Continuing the less-is-more discussion, Dr Morrow provided an update on margins by reviewing the Society of Surgical Oncology and American Society for Radiation Oncology (SSO-ASTRO) consensus guidelines, which state that tumor margins wide enough to be free of ink are optimal for local control of Stage I and II invasive carcinomas. The guidelines emphasize that no significant improvement in local control is found with wider margins.<sup>4</sup> SSO-ASTRO–American Society of Clinical Oncology guidelines for DCIS indicate that margins of at least 2 mm are associated with decreased risk of recurrence.<sup>5</sup>

Finally, Dr Morrow discussed the hot topic of overtreatment of DCIS. She stated that at this time it is unclear whether there is a benefit to observing DCIS when end points such as invasive recurrence treatment, cost, and quality of life are considered. In her concluding remarks, Dr Morrow encouraged us to continue to evaluate the necessity of

our treatments so our patients can reap the full benefits of multidisciplinary care with the lowest possible impact.

The morning session concluded with presentation of the Gold Medal award to Linda Warren, MD, FSBI, University of British Columbia, Vancouver, who proclaimed this award to be the pinnacle of her professional career for which she felt infinitely honored. Dr Warren led us through her impressive career, which she humbly described as a series of fortuitous opportunities. She thanked her mentors and warmly encouraged us to embrace change in our field, be image innovators, and be grateful for the chance to train and mentor upcoming radiologists and technologists.

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## SBI HIGHLIGHTS FROM THE SBI/ACR SYMPOSIUM

### SATURDAY

By Peter R. Eby, MD, FACR, FSBI

The themes of the Saturday plenary session were quality of patient care, engaging the patient, and providing optimal service during screening, diagnostic imaging, and image-guided procedures.

Geraldine McGinty, MD, MBA, FACR, chief strategy and contracting officer at Weill Cornell Medicine, began the session with “The Road to Value Is as Easy as 3.0.” She set the stage for the morning by describing Imaging 3.0, a vision and game plan created by the ACR for providing optimal imaging care (<https://acr.org/Practice-Management-Quality-Informatics/Imaging-3>). Dr McGinty summarized Imaging 3.0 with a quote from Bibb Allen, MD, FACR: “Our goal is to deliver all the imaging care that is beneficial and necessary and none that is not.” Dr McGinty challenged us to define our brand, which isn’t always positive. If you want to know what people think of radiologists, type “radiologists are” into Google and enjoy the auto-populated words that complete the phrase. *Parasites* is one of them.

She went on to explain how the Medicare Access and CHIP Reauthorization Act incentivizes value over volume and how, through the Merit-Based Incentive Payment System (MIPS), 9% of fee-for-service Medicare payments will be at risk in 2025. The losers will pay the winners. MIPS factors are weighted as follows: quality, 50%; advancing care information, 25%; improvement activities, 15%; and cost, 10%. We can approach improvements from any of these angles. In addition, participation in a registry offers bonus points, quicker feedback, and more measures of quality. The National Mammography Database qualifies as an appropriate registry to help fulfill MIPS. We look forward to a specialty that remains human, partners with patients, provides personalized screening with artificial intelligence, and improves with recurrent feedback from robust metrics that satisfy MIPS.

Jocelyn Rapelyea, MD, professor and residency program director at The George Washington University, followed Dr McGinty with “Expanding the Footprint of the Breast



Peter R. Eby, MD, FACR, FSBI

Radiologist.” Dr Rapelyea asked us to consider how patients perceive the role of the radiologist. Campaigns such as “#RadsHaveAFace” have improved the visibility of radiologists. What is still needed? Once patients understand our role, they want to interact with us more frequently. We breast imagers have many opportunities to satisfy these wishes of patients. If workflow prevents face-to-face interactions, we may choose to engage patients online. Surveys inform us that patients are very interested in mammography efficacy, screening guidelines, and report interpretation, which can be addressed through social media.<sup>1</sup> Patients may resort to social media to engage with individuals with similar concerns or express opinions and ask questions while remaining anonymous. If you engage in social media, search online for your own name first. Online activities, whether you control them or not, have intentional and unintentional consequences for your brand. Manage your online presence if you wish to establish trust with patients you have never met. Ultimately, online engagement can impact patient care at multiple levels: national (maintaining and promoting appropriate guidelines), local (providing information about access), and individual (answering specific patient questions). It can be rewarding for everyone involved when it is done right.

Stamatia Destounis, MD, FACR, FSBI, Elizabeth Wende Breast Care, clinical professor of radiology at the University of Rochester, addressed the practical implementation of Imaging 3.0 with “The Need for Speed – Is Faster Care Better Care?” She provided some specific suggestions from her experience and the literature. Patients like to have multiple examinations or appointments in a single visit and location, and self-scheduling can help them do





that. Same-day screening increases adherence to screening recommendations, and although patients want immediate results whenever possible, most do not want to pay extra for it. Patients also want to have results delivered face-to-face with the radiologist. But what are the downsides of rapid results? Batch reading improves screening performance, whereas immediate interpretations often increase recall rates without increasing cancer detection. The latest technology can be interpreted by patients as better care. When programs establish a risk assessment pathway, patients identified as “high risk” prefer a face-to-face discussion of the meaning and options. Radiologists who are supported by separation of tasks related to image interpretation versus noninterpretation perceive a better work environment. Hiring more support staff or appropriately delegating noninterpretive tasks to support staff improves the workplace experience.

Jessica W. T. Leung, MD, FACR, FSBI, professor of diagnostic radiology and section chief of breast imaging at MD Anderson Cancer Center, discussed some specific unexpected clinical scenarios requiring immediate treatment that benefits the patient but may derail a carefully orchestrated patient schedule in “Blood, Pus, and More – How to Treat Complications of Breast Interventions.” First, patients may not need to stop anticoagulant therapy prior to biopsy.<sup>2</sup> Preparing patients with a discussion of the small increased risk of bleeding associated with anticoagulants is recommended. An informal poll of the audience indicated that about 50% ask patients to stop anticoagulants and 50% do not. Second, if bleeding happens, it is important to remain calm and get the tissue. Patients will be extremely frustrated if they have a hematoma but no diagnosis. Use chest wrap and epinephrine routinely. Last resorts are surgical evacuation and ligation or interventional radiology absorbable gelatin sponge for persistent symptomatic bleeding. Pseudoaneurysm formation is possible and may be addressed by pressure or embolization. Third, infectious mastitis is usually caused by *Staphylococcus aureus* but needs to be differentiated from inflammatory breast cancer. Magnetic resonance imaging doesn’t help sort it out. Aspirate possible abscesses with an 18-gauge or larger needle through an oblique track to minimize fistula formation. Flush with sodium chloride solution too. Overall,

the complication rate of biopsy is less than 1%, but we should always discuss complications with patients in advance and remain prepared.

Mary Scott Soo, MD, FACR, FSBI, Duke University Medical Center, delivered a fantastic finish on the theme of the morning with “Breast Imaging From the Patient’s Perspective.” She reviewed the patient experience of image-guided biopsy before, during, and after the biopsy procedure. Prior to the procedure, patients may have an emotional response that we should accommodate, understand, and support through active listening, paraphrasing to show understanding, and validating emotions. Long wait times between recommendation and procedure can exacerbate the anxiety induced by an uncertain diagnosis. Be mindful of patients’ feelings when discussing the options of biopsy and follow-up. Different patients have different goals that we should acknowledge and incorporate into management plans. During the procedure, most patients report low-level discomfort that was less than expected. Music and loving-kindness meditation reduce anxiety and pain.<sup>3</sup> After the procedure, patients prefer to get results via the fastest method possible—the phone. Awaiting results causes a physiologic response that is similar to receiving a cancer diagnosis. When receiving results, patients want doctors to talk to them, connect with them, make them feel heard, and support them regardless of the outcome. Dr Soo emphasized partnering with patients and families and considering their needs and goals in all aspects of care. An adage helped crystallize the message: “People will forget what you said, people will forget what you did, but people will never forget how you made them feel.”

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# SBI HIGHLIGHTS FROM THE SBI/ACR SYMPOSIUM

## SUNDAY

By Ann L. Brown, MD

The planning committee of the 2018 SBI/ACR Symposium saved some of the best talks for Sunday in sessions devoted to enhancing skills and knowledge.

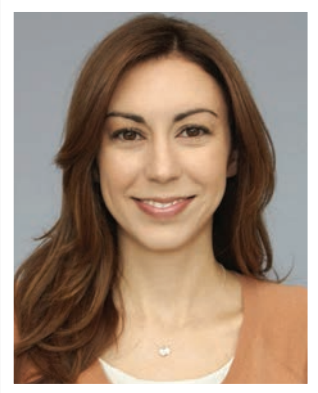
Mark Michalski, MD, kicked off the morning by igniting debate about the future of deep learning and artificial intelligence (AI) in health care and radiology. While AI won't replace breast imagers anytime soon, its potential to transform healthcare is great...and closer to reality than many of us expected.

However, as he astutely opined, "Radiology has always played the role of absorbing new technology, vetting it, and then making it its own. AI will be in the hands of radiologists and we will evolve to incorporate it into our workflows." Radiologists only stand to improve precision and efficiency when machine learning is incorporated into our practices.

SBI Past President Liz Morris, MD, FSBI, maintained the forward momentum with her discussion of the burgeoning field of radiogenomics and the important details of a breast cancer that could be hiding in plain sight. This new wave of research is revealing an increasing number of quantitative imaging features and tumor phenotypes that can further predict biology and prognosis in our era of precision medicine. Those in attendance left with a new appreciation for the data stored in our radiological studies. But she concluded by stressing that "early detection is key to pick up a cancer before a tumor has clonally diversified."

Maxine Jochelson, MD, FSBI, proved that contrast-enhanced mammography has practical and impactful applications with an accuracy for cancer detection that approaches that of breast magnetic resonance imaging (MRI). Moreover, contrast-enhanced mammography is the most accurate method of assessing tumor size and patients prefer it over breast MRI. It has taken off as a contrast-enhanced diagnostic imaging study and is currently being investigated as a screening tool with great potential.

During the scientific session, 2 outstanding and award-winning research studies were presented. Winner of the



Ann L. Brown, MD

Wendell Scott Award for best research by a fellow in training, Eugene Y. Kim, MD, of Memorial Sloan Kettering Cancer Center, showcased promising results for an interpretation algorithm to standardize and optimize cancer detection with abbreviated breast MRI. Winner of the Gerald D. Dodd Jr Award for best research by a medical student or resident, Emily Ambinder, MD, of Johns Hopkins School of Medicine, illustrated how academic breast imagers variably employ BI-RADS 3 and made a case for creating a national benchmark to help standardize usage of this category.

Those fortunate enough to attend the final session, "Complete Unknowns: Audience vs Faculty in a Battle of Wits," participated in an extremely informing and engaging case review presented by Peter Eby, MD, FSBI, with an expert panel including newly inducted SBI President Jay Baker, MD, FSBI; Tommy Pope, MD, FSBI; Rita Zuley, MD, FSBI; and a volunteer from the audience, Sharon Marshall, MD, MS, from Chester Springs, Pennsylvania, who at the conclusion of the session was awarded a complimentary registration for the 2019 SBI/ACR Symposium in Hollywood, Florida.

Thank you to SBI, the presidents coming and going, and the staff who put on a brilliant and entertaining show in Las Vegas!



## SBI 2018 NEW FELLOWS

By Vilert A. Loving, MD, MMM



At the SBI/ACR Breast Imaging Symposium, 6 breast radiologists were named SBI fellows. Fellowship recognizes their exceptional contributions to the SBI and our field as a whole. The new fellows are shown with the chair of the Fellows Committee, Dan Kopans, MD, FACR, FSBI, and immediate past president of the SBI, Wendy DeMartini, MD, FSBI. From left to right: Phoebe Freer, MD, FSBI (University of Utah); Sally Friedewald, MD, FSBI

(Northwestern Medicine); Yiming Gao, MD, FSBI (New York University); Colleen Neal, MD, FSBI (University of Michigan); Dr Kopans; Dr DeMartini; Kimberly Ray, MD, FSBI (University of California, San Francisco); and Beatriz Adrada, MD, FSBI (University of Texas MD Anderson Cancer Center). Congratulations to the new SBI fellows!



# SBI HIGHLIGHTS FROM THE SBI/ACR SYMPOSIUM

## SCIENTIFIC RESEARCH AWARD WINNERS

By Vilert A. Loving, MD, MMM

At the 2018 SBI/ACR Breast Imaging Symposium, Emily Ambinder, MD, from Johns Hopkins University, received the Gerald D Dodd Jr Award for research by a resident titled "Variability in BI-RADS 3 Use Among a Group of Academic Breast Imagers." The ACR BI-RADS Atlas lists specific imaging findings and conditions for which a BI-RADS 3 assessment may be confidently rendered to reduce the incidence of biopsy of benign breast lesions. Dr Ambinder's team sought to identify how BI-RADS 3 categorization was being applied in their practice and to determine if there were patterns of usage based on radiologists' performance and experience. Their study included 24,035 diagnostic exams, of which 3252 (13.5%) were ultimately assessed as BI-RADS 3. There was significant variability in BI-RADS 3 utilization rates among their 13 radiologists (range, 8.0%-19.6%). This utilization did not correlate with years of radiologist experience, tomosynthesis use, or outcomes measures such as cancer detection rate and positive predictive value. However, there was a positive correlation of BI-RADS 3 categorization rate with recall rate, suggesting that high use of BI-RADS 3 categorization may indicate a higher level of uncertainty among some radiologists. Dr Ambinder concluded that the ACR may consider a national benchmark to encourage standardization of BI-RADS category 3 utilization.

Eugene Kim, MD, from Memorial Sloan Kettering Cancer Center, received the Wendell Scott Award for research by

a fellow titled "Validating the Use of Interpretation Algorithms for Abbreviated Breast MRI." Because of the growing interest in abbreviated magnetic resonance imaging (MRI) as a potential screening modality, Dr Kim's team studied the performance of a standardized interpretation algorithm that was introduced with the ECOG-ACRIN EA1141 study. They retrospectively applied this algorithm to 381 baseline screening MRI exams performed at Memorial Sloan Kettering from 2010 to 2015 that were assessed as BI-RADS 3, 4, or 5. Study radiologists were blinded to the original MRI reports and pathology results. Of 397 lesions, 191 (48.1%) were given the same BI-RADS assessment as the original report. One hundred twenty lesions (30%) were downgraded from BI-RADS 3 to 2, and 75 lesions (19%) were downgraded from BI-RADS 4 to 3 or 2. None of these downgraded lesions were subsequently shown to be malignant. The new algorithm upgraded 11 lesions (2.8%) from BI-RADS 3 to 4, two of which were malignant, indicating that they would have been diagnosed earlier if the algorithm had been used. Although the study was small, Dr Kim's team concluded that the proposed abbreviated MRI interpretation algorithm should maintain the high sensitivity of MRI and improve its specificity.



Vilert A. Loving, MD, MMM



Rita Zuley, MD, FACR, FSBI, chair of the Scientific Program Committee, presents the Gerald D Dodd Jr Award to Emily Ambinder, MD.



Rita Zuley, MD, FACR, FSBI, chair of the Scientific Program Committee, presents the Wendell Scott Award to Eugene Kim, MD.



# SBI HIGHLIGHTS FROM THE SBI/ACR SYMPOSIUM

## GOLD MEDAL WINNER

By Vilert A. Loving, MD, MMM

The SBI Gold Medal recognizes individuals who have made outstanding contributions to the field of breast imaging and is awarded for distinguished and extraordinary service to the SBI and other medical societies and organizations.

At the SBI/ACR Breast Imaging Symposium, Linda Warren, MD, FRCPC, FACR, FSBI, of Vancouver, British Columbia, Canada, was named the 2018 Gold Medal winner. Dr Warren is currently a clinical professor in the Department of Radiology at the University of British Columbia. Her clinical research has included screening mammography, interpretive skills in breast imaging, and computer-aided detection.

Dr Warren has been a fellow of the SBI since 1991, and she was awarded fellowship in the ACR in 1994. Other awards include the College of Physicians and Surgeons of British Columbia Award of Excellence, the Doctors of BC (British Columbia Medical Association) Silver Medal of Service, and the Dr Don Rix Award for Physician Leadership. In 2009, she was awarded the Order of British Columbia, the province's highest honor for civilians who have contributed to the benefit of British Columbia's citizens.

Dr Warren's accomplishments have contributed significantly to the field of breast imaging. She established the first centralized breast cancer screening program in the North American continent. She constantly champions the importance of high-quality mammography, and this legacy of excellence continues through her numerous trainees. Directly and indirectly, Dr Warren has played a role in the training of most radiologists currently practicing in British Columbia.

As Dr Warren graciously accepted the Gold Medal award, she acknowledged the many challenges she overcame to reach this admirable point in her career. These challenges included learning breast imaging "on the job" and through a mini-fellowship with Dr Robert Egan at Emory, becoming the sole proprietor of her initial practice in British Columbia, and the multitude of barriers in creating a centralized screening program. Dr Warren is a proponent of embracing challenges and viewing them as unique growth opportunities. She thanked many of the colleagues, family, and friends who have supported her through her journey. As breast imaging colleagues, we are eternally grateful for Dr Warren's invaluable contributions to our field and our patients.



Vilert A. Loving, MD, MMM



Linda Warren, MD, FRCPC, FACR, FSBI (center), receives the 2018 SBI Gold Medal from new President Jay Baker, MD, FACR, FSBI, and immediate Past President, Wendy DeMartini, MD, FSBI.



# MARK YOUR CALENDAR

## Upcoming Events

**May 7-10, 2018**

Orlando, FL

Association of University Radiologists (AUR)  
66th Annual Meeting

**May 19-23, 2018**

Washington, DC

ACR 2018 Annual Meeting

**June 1-5, 2018**

Chicago, IL

American Society of Clinical Oncology (ASCO) Annual Meeting

**June 16-21, 2018**

Paris, France

International Society for Magnetic Resonance in Medicine –  
European Society for Magnetic Resonance in Medicine and  
Biology (ISMRM-ESMRMB) Joint Annual Meeting

**June 23-26, 2018**

Philadelphia, PA

Society of Nuclear Medicine and Molecular Imaging  
(SNMMI) Annual Meeting

**September 10-13, 2018**

Las Vegas, NV

ISMRM Workshop on Breast MRI: Advancing the State of the Art  
(In collaboration with Society of Breast Imaging and European  
Society of Breast Imaging)

**October 11-13, 2018**

Athens, Greece

European Society of Breast Imaging (EUSOBI)  
Annual Scientific Meeting

**November 8, 2018**

International Day of Radiology

**November 25-30, 2018**

Chicago, IL

Radiological Society of North America (RSNA) Annual Meeting