



The national and global impact of “Women in Thoracic Surgery”

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Abstract: Women in thoracic surgery in the United States are a diverse group with a variety of backgrounds and important expertise. Although the presence of women thoracic surgeons is growing, there remains a large gap, with women making up just under 4% of all board-certified thoracic surgeons in the United States. Currently, 22% of thoracic surgery residents are women, while 3% of Department of Surgery Chairs are women. Significant strides have been made in recent decades to recruit and promote women in thoracic surgery, but clearly there remains more work to be done. The Women in Thoracic Surgery (WTS) organization was created in 1986 for the purpose of facilitating the mutual support and professional advancement of women in the field, and its development and influence as a society has grown exponentially since then. The WTS mission statement includes enhancing the care and education provided to our patients as well as focusing on the development of women thoracic surgeons through mentoring and educational programs. In addition, the WTS creates opportunities to promote the visibility of women, and documents these accomplishments to shape our identity in the world’s view. Here, we review some of the landmark achievements of the society and its members as well as goals for the future.

Keywords: Thoracic surgery; United States; women in thoracic surgery

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Nearly six decades have passed since the first three women were certified by the American Board of Thoracic Surgery (ABTS) (1). Where are we now? In 2012, the Women in Thoracic Surgery (WTS) organization published an important report on the current status of US women in cardiothoracic surgery (2). In a survey sent to all ABTS-certified women (n=204 at the time), they found that the numbers of women in academic versus private practice were approximately equal, with high levels of job satisfaction in both working environments. The mean number of years spent in training after medical school was 9.1 years. Of those surveyed, 50% had entered the profession within ten years

of the survey, reflecting an exponential increase of women in the field in recent years (*Figure 1*). In fact, in 2020, there are a total of 353 women diplomats. Created in 1986 to provide mutual support and facilitate the advancement of women in thoracic surgery, WTS (formally Women in Cardiothoracic Surgery) has helped to shape the US experience of women in thoracic surgery by providing mentoring and continued education, creating impactful opportunities to promote women in our field, and, importantly, both celebrating and documenting our achievements. For the purposes of this paper, “women thoracic surgeons” is inclusive of thoracic, cardiac and congenital heart surgeons.



Figure 1 Largest gathering of women thoracic surgeons in 2002 compared to gathering of women thoracic surgeons at the WTS Reception at the 2018 STS meeting (Original pictures from *Oracle* Summer 2002 and *Oracle* Fall 2018).



Figure 2 WTS Scholarship awardees in 2016 (Original pictures from *Oracle* Spring 2016).

Education and mentoring of women in thoracic surgery

One of several opportunities for recruitment and retention of women thoracic surgeons is through mentoring programs. There are university thoracic training programs across the country that do not have women faculty, leaving a void of mentorship from woman thoracic surgeons, although excellent male thoracic surgeons have been willing mentors to both male and female trainees. There remains a lack of supply of thoracic women surgeons creating an

additional burden for the few that are available for this important work.

Born from a 2003 WTS strategic planning retreat, the WTS Scholarship Program was created. It was the first of its type for a professional surgical society of any size to financially underwrite attendance of interested students and residents to a national meeting and to pair the individual with a woman surgeon mentor. Since 2005, a total of 118 students and residents have received this award (*Figure 2*). With up to 60 applicants per cycle, it has become a fairly

Table 1 WTS scholarships

Award (year established)	Description
WTS Scholarship Program (2005)	To enhance the education of women thoracic surgeons, providing support to attend the STS annual meeting and be paired with a WTS mentor
TSF Carolyn E. Reed Traveling Fellowship (2013)	To allow a woman thoracic surgeon to travel to another institution for the purpose of learning a new technology, fostering collaboration between surgical investigators and providing a new innovation to her home institution
WTS Brigid Scanlan Traveling Mentorship Award (2013)	Provides support for medical students and general surgery residents to gain exposure to women cardiothoracic surgeon mentors by visiting a WTS member for an elective period of time at the mentor's institution
WTS Carpenter Scholarship (2016)	This award allows a woman in medical school or surgical training with an interest in cardiothoracic surgery the opportunity to attend the STSA Annual Meeting, and to be mentored throughout the meeting by a WTS/STSA member
WTS Intuitive Robotic Scholarship (2017)	To create a unique opportunity in advanced robotic training for a female thoracic surgeon to be trained by a female thoracic surgeon
WTS Thistlethwaite Scholarship (2019)	Conceived to allow women in medical school, surgical training and women postdoctoral candidates in a research or other gap year who have graduated medical school who are committed to cardiothoracic surgery the opportunity to attend the WTSA Annual Meeting, and to be mentored throughout the meeting by a WTS/WTSA member
WTS International Traveling Fellowship (2017)	Encourage international exchange of surgical information, enhance networking, mentorship and professional development for women in thoracic surgery

competitive scholarship, and we have expanded the scholarship opportunities from one to seven different annual awards in 2020 (*Table 1*). Through various scholarships, established women thoracic surgeons are nurturing the interest and mentoring of women medical students and general surgery residents. More recently scholarships have also been opened to support women who have already finished their training. The WTS Intuitive Robotic Fellowship, which has already been awarded to 16 women since its introduction in 2017, combines a didactic program as well as paid travel for mentoring/case observations with a female thoracic surgeon expert in robotic surgery (Dr. Lana Schumacher at Massachusetts General Hospital). The WTS has encouraged and supported underrepresented minorities in medicine and continues to develop ways to make opportunities available to all.

Every year at various annual national meetings, there are publications, talks, panel discussions and posters reflecting the incredible work being done by women surgeon scientists and clinical researchers. In fact, nearly a third of women thoracic surgeons with academic appointments have secured research funding (2). The Thoracic Surgery Foundation offers both a research award and research fellowship yearly to support female cardiac surgeons and trainees in their

research. Nina Starr Braunwald, MD was the first woman to be certified by the ABTS and the first woman to conduct open heart surgery. Two annual awards in her name provide operational support of original research efforts by women cardiac surgeons and trainees who are seeking initial support and recognition for their research program. WTS member Dr. Patricia Thistlethwaite, MD, PhD, who received the Braunwald Career Development Award in 1997, continues to run an active molecular biology laboratory at the University of California, San Diego. In addition to her contributions as an educator and clinician, she has achieved huge success in the research realm, including multiple NIH-funded projects studying the causes, prevention and treatment of pulmonary hypertension (*Figure 3*).

Continuing education opportunities exist through annual meetings, seminars, and other training mediums. In 2012, the WTS held its first Early-Riser Session at the Society of Thoracic Surgeon (STS) annual meeting and continues to hold educational sessions of interest to our members yearly. In 2018, The American Association for Thoracic Surgery (AATS) joined with the WTS to expand the highly successful AATS Leadership Academy program to a broader audience. The collaboration focused on developing future women leaders by introducing them to the administrative,

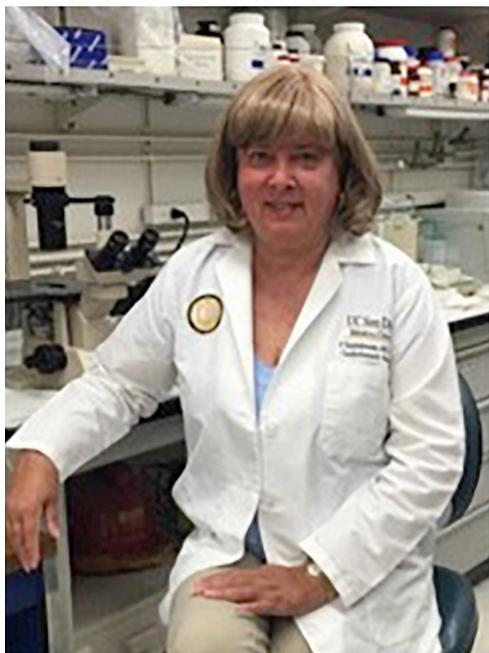


Figure 3 Dr. Patricia Thistlethwaite was awarded a Braunwald Career Development Award in 1997, and continues to run a hugely successful NIH-funded molecular biology laboratory studying pulmonary hypertension (Original picture courtesy of Dr. Thistlethwaite).

interpersonal, and mentoring skills necessary to serve in leadership positions in the field of cardiothoracic surgery. In 2019, the WTS Unconscious Bias Educational Session, from the STS 55th Annual Meeting in San Diego, featured presentations from Drs. Donington, Ceppa, Yanagawa and Higgins, and was well received and truly enlightening for all who attended. In 2020, in the era of the COVID pandemic, the WTS put together a very successful session for the 100th AATS Annual meeting held virtually, highlighting the important scientific work of women thoracic surgeons, from all three of the subspecialties of the field.

Promotion of women in thoracic surgery

Although major strides have been achieved in recent years, there remains an imbalance of male presenters, moderators, discussants and panel members, at these national annual meetings, compared to female surgeons. The disparity is worse within cardiac surgery than in thoracic surgery. While there has been a push to bring diversity and inclusion to the forefront of our society leaders minds, there remains

biases and challenges to reach balance at our national meetings. Through groups like the WTS, committees and departments are encouraged to strive for diversity and actively promote the visibility of women in thoracic surgery in all activities.

The WTS website (<https://wtsnet.org/>) itself is an important resource. A Featured Profile segment on the WTS website highlights the lives and accomplishments of women cardiothoracic surgeons, nominated by their colleagues. With the start of a resident's corner and medical student perspective on our website, we have given trainees interested in thoracic surgery a voice and place to learn from each other. The WTS website also features video blogs on a variety of topics which we feel are relevant to our membership, featuring our members. With impressive speed, women thoracic surgeons answered the call to provide up-to-date resources as the COVID-19 pandemic evolved, including a blog on "Coronavirus and Shifting Responsibilities for Women in Surgery," addressing issues that were specifically relevant for women in thoracic surgery (<https://wtsnet.org/blog-coronavirus-and-shifting-responsibilities-for-women-in-surgery/>).

With the general enthusiasm and acceptance of the use of social media by surgical organizations, WTS leader and social media maven, Dr. Mara Antonoff, established WTS Facebook, Twitter, and Instagram accounts. To date, WTS Facebook has 2,343 followers, while WTS Twitter has 4,436, and WTS Instagram has 920. This has facilitated a fluid and expansive connection with patients, researchers, advocacy groups, and academic organizations on an international level. In addition, Dr. Antonoff initiated the inspiring and camaraderie-building #HeforShe and #SheforShe hashtags. What started as a research project grew into a movement with support from our male and senior female colleagues and provided a bridge to other specialties on the #SoMe platform. An avenue for inspiring young women to pursue a male-dominated specialty was paved by those savvy with the evolving medium.

Women in private and academic practices across the United States have been and are excited about growing internationally to connect with and support women cardiothoracic surgeons across the globe. Women thoracic surgeons have reached outside our home borders through volunteerism. A few examples include work done by Dr. Kathleen Fenton serving and operating in Nicaragua and six other countries, Dr. Virginia Litle through Endoscopy training with the Solomon Island Living Memorial Project, Dr. Kathleen Casey as founding director of Operation



Figure 4 The WTS newsletter has grown from a single page document in 1991 to a biannual publication 27 pages long in 2019, addressing issues relevant to women in thoracic surgery (Original picture from WTS Photo Archives).

Giving Back, Dr. Emily Farkas’ humanitarian work (Nepal, Kenya, Tanzania, Uganda, Sri Lanka, Peru, Mongolia, and Nigeria, to name a few), and Dr. HelenMari Merritt’s volunteer work in Haiti after a devastating earthquake. As a strong supporter of international collaboration, the WTS offers an International Traveling Fellowship and is actively working to expand international membership. The WTS has also created an International Membership category aimed at better meeting the needs of our international colleagues around the world. Drs. Cecilia Pompili and Leah Backhus created and moderated the first Women in Thoracic Surgery International Session of the European Society of Thoracic Surgeons meeting in Dublin, Ireland June 2019, which was truly a historic event.

Creating a legacy of women in thoracic surgery

One of the most important roles of the WTS has been to help document and shape the identity of women in thoracic surgery. One way this has been accomplished is through our publications. In addition to the aforementioned WTS report, an important and comprehensive article celebrating the 30th year anniversary of the organization was published in *The Annals of Thoracic Surgery* in 2016 (3). Also, the WTS newsletter, *Oracle*, continues to be published biannually, featuring updates from the President, interviews, members’ perspectives, alerts to scholarship opportunities, and acknowledgements of the achievements of women in thoracic surgery (Figure 4). In addition, Dr. Shanda Blackmon in 2013, published a WTS History Book that compiled an extensive portfolio of images from Brigid Scanlan of Scanlan International Inc (an incredibly

dedicated long-time supporter of WTS) as well as WTS members.

One major way in which women leaders in thoracic surgery have been honored is through named scholarships. The WTS was deeply saddened by the loss of one of our own, Dr. Carolyn E. Reed. A thoracic surgeon, an educator, and a successful researcher, Dr. Reed died unexpectedly in November 2012, from complications of cancer treatment. She was an inspiration, a pioneer, a leader, and enormously respected among her peers. Dr. Reed was a leader in our field- the first woman Chair of the ABTS, the first female President of the Southern Thoracic Surgical Association (STSA), Treasurer of WTS, Treasurer of The Society of Thoracic Surgeons (STS), and she was posthumously elected to be the first woman President of STS. In 2013, to honor the memory of Dr. Reed, and to continue her commitment to the education of innovative thoracic surgeons, The Thoracic Surgery Foundation (TSF, then known as The Thoracic Surgery Foundation for Research and Education), in conjunction with WTS, established the Carolyn E. Reed Traveling Fellowship. The purpose of this fellowship is to allow a woman cardiothoracic surgeon to travel to another institution for the purpose of learning a new technology, fostering collaboration between surgical investigators and providing a new innovation to her home institution. Since 2013, WTS and TSF have awarded 14 Carolyn E. Reed Traveling Fellowships. Most recently, WTS initiated a unique fund-raiser where proceeds will go to continue support for future awards. Dedicated to the fact that she was a well-known proponent for preserving humanism in surgery, a “Carolyn Reed Box” will be designed to store letters from grateful patients and will be available on the WTS website.

Since the adoption of the Reed Award, honors offered have expanded to recognize the accomplishments of additional women leaders in cardiothoracic surgery. Dr. Andrea J. (Ajay) Carpenter, Professor of Surgery at University of Texas, Health Science Center at San Antonio, was the 5th President of the WTS and 63rd President of the STSA. To honor this achievement, the WTS established the WTS Carpenter Scholarship to fund a female medical student, general surgery resident, or cardiothoracic surgery resident to attend the annual meeting and be mentored at the event by a WTS and STSA member. Dr. Patricia Thistlethwaite, Professor of Surgery at University of California, San Diego, was the 43rd and first female President of the Western Thoracic Surgical Association (WTSA). The WTS Thistlethwaite Scholarship provides an

opportunity for students and residents to attend the WTSA annual meeting and to broaden the geographical mentoring experiences.

WTS past presidents as trailblazers

Past presidents of the WTS continue to inspire and achieve professional success. To name just a few of those who's impact is far beyond their home institutions: Dr. Yolonda Colson, Professor of Surgery and Chief, Division of Thoracic Surgery, will be the first female president of the American Association for Thoracic Surgery. Dr. Jennifer Lawton is Professor of Surgery and Chief, Division of Cardiac Surgery at Johns Hopkins, as well as the Director of the Cardiac Surgery Research Laboratory. Dr. Jessica Donington is Professor of Surgery and Chief, Division of Thoracic Surgery at the University of Chicago. Dr. Virginia Litle is Chief, Thoracic Surgery, Professor of Surgery, Boston University School of Medicine, Director, Center of Minimally Invasive Esophageal Therapies, Director, Barrett's Esophageal Program, and Director, Thoracic Surgery Clinical Research. Dr. Shanda Blackmon is Professor of Surgery who has served and serves as Secretary for the Thoracic Surgery Foundation and Southern Thoracic Surgical Association, Deputy Editor for The Annals of Thoracic Surgery, and Council Chair and Director of the STS. Dr. Ajay Carpenter is Professor of Cardiothoracic Surgery and has served as President of the Southern Thoracic Surgical Association and the WTS. Other female thoracic surgeons who have achieved landmark successes in surgery and served as role models for all in thoracic surgery, include Dr. Christine Lau, who is Professor and now Chair of the Department of Surgery, Surgeon-in-Chief of Surgery at the University of Maryland, and Dr. Valerie Rusch, who is Vice Chair for Clinical Research, Department of Surgery and Chair in Intrathoracic Cancers at Memorial Sloan Kettering Cancer Center, as well as President of the American College of Surgeons.

Conclusion

Looking towards the future, WTS is working on developing a women's leadership yearly retreat, specifically built to provide education, stimulate innovation and support wellness for women in all areas of thoracic surgery. The WTS is building a speaker bureau to facilitate sponsorship and advancement of women based on their areas of

professional interest and expertise. The WTS has been and is excited about growing internationally to connect with and support women cardiothoracic surgeons across the globe. Lastly, the impact and role in the response to the COVID-19 pandemic by thoracic surgeons in the US has been swift, innovative and critical to the minimization of damage it causes on people's lives, and is humbling. Many women thoracic surgeons have played a key role in educating our patients, colleagues, and the public.

Women thoracic surgeons in the United States are a diverse group of women with varied experiences and backgrounds. Together, however, our impact is significant. Our future, as women thoracic surgeons in the U.S., is full of promise, challenges, opportunity, resilience, and growth.

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Footnote

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