The Voice

Member Newsletter of the Voice Foundation

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Voice Foundation Newsletter Editors

Nadine Connor, PhD

Kim Steinhauer, PhD

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Voice Questions?
Submit your question to office@voicefoundation.org to be answered by one of our resident specialists in the next newsletter issue.

The Voice of the Editor

Nadine Connor, PhD

Welcome to the Spring edition of ***The Voice***. This is my first edition as editor and I am very pleased to serve on this wonderful publication. In this issue, we are responding to a reader's request for thematic content on "breathing." We encourage reader's ideas for newsletter themes. Please send the office an email with your ideas (office@voicefoundation.org) and we will put together something informative!

We have used a three-pronged approach for getting at the issue of breathing in this newsletter. First, Drs. Zhaoyan Zhang and David Berry, voice scientists at University of California—Los Angeles, provide a brief tutorial on how breathing and associated airflow contribute to the onset and maintenance of vocal fold vibration for phonation. Next, Dr. Michelle Troche, Speech-Language Pathologist and Clinical Assistant Professor at the University of Florida, describes a method of treating voice disorders by training expiratory muscle strength. Last, Aaron Johnson, Singing Voice Specialist and Pre-doctoral Fellow at the University of Wisconsin—Madison, addresses breathing and breath support for singing.

Breathing, Airflow and Mechanisms of Phonation Onset

Zhaoyan Zhang, PhD
Assistant Professor, UCLA Division of Head and Neck Surgery
David A. Berry, PhD
Professor, UCLA Division of Head and Neck Surgery

According to the classic myoelastic-aerodynamic theory of vocal fold vibration (Van den Berg, 1958), the vocal folds close due to the action of a negative Bernoulli pressure, which is followed by a buildup of subglottal pressure. When the subglottal pressure is sufficiently high, the vocal folds are pushed open and the intraglottal pressure is lowered. The cycle then repeats, which leads to sustained oscillation of the vocal folds.

While this description may seem to provide an adequate explanation for sustained vocal fold vibration during normal phonation, questions quickly arise for other voicing conditions. For example, for a breathy voice (in which complete glottal closure does not occur), would the negative Bernoulli pressure be sufficient to move the vocal folds inward? Or similarly, without complete glottal closure, would the build-up of subglottal pressure be sufficient to move the folds apart? Indeed, under some pathological conditions, phonation fails to occur and the vocal folds are simply blown apart—despite high subglottal pressures and high respiratory effort. Under such conditions, do alternate physical mechanisms exist to better explain the phenomenon of phonation onset?

The myoelastic-aerodynamic theory is correct in identifying the interaction between the vocal folds and the airflow as the underlying mechanism of self-sustained vocal fold vibration. However, as pointed out by Ishizaka (1981) and Titze (1994), the theory is inadequate in explaining how energy is transferred from the airflow to the vocal folds to sustain vibration. According to Bernoulli's equation, the airflow pressure would always be 90 degrees out of phase with the vocal fold surface velocity, resulting in no net energy transfer from the airflow to the vocal folds over one cycle of vibration. Thus, Bernoulli pressure alone does not provide a mechanism for energy transfer from the airflow to the vocal folds.

The key to a non-zero energy transfer lies in that the vocal folds are not rigid and therefore different portions of the vocal fold surface can vibrate in different phases, i.e., the upper and lower margins of the medial surface do not necessarily move inward and outward together. With a vertical phase difference between the upper and lower margins of the medial surface, the vocal fold often exhibits a wave-like motion, also called the mucosal wave, along the medial surface which propagates onto the superior surface. In his surface wave model of phonation, Titze (1988) showed that the presence of this wave motion caused the intraglottal pressure to be at least partially in phase with the vocal fold surface velocity, resulting in energy transfer from the airflow to the vocal folds, so that the vocal fold vibration could be sustained.

In Titze's surface wave model, such a wave-like motion was produced by artificially combining an in-phase vibration pattern (the entire medial surface moved inward and outward together) and an out-of-phase vibration pattern (upper and lower portions of the medial surface moved in opposite directions) and forcing these two motions (or modes) to oscillate at the same frequency. In reality, such synchronization of two vibration patterns (modes) to the same frequency is naturally induced by a cross-mode coupling of the glottal airflow, which causes the two modes to approach each other in frequency (Ishizaka, 1981; Zhang et al., 2007). At a threshold subglottal pressure or flow rate, the two modes are synchronized to the same frequency but often with a non-zero phase difference. Such a non-zero phases difference between the two synchronizing modes means that the different portions of the vocal fold surface now may move at different phase, i.e., the upper portion of the medial surface may move inwards as the lower portion of the medial surface moves outwards. Synchronization of two modes

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Breathing, Airflow and Mechanisms of Phonation Onset, cont.

at different phases causes the intraglottal pressure to have an in-phase component with the vocal fold surface velocity, thus allowing airflow to do work on the vocal folds and transfer energy into the vocal folds (Zhang et al., 2007). Note that this mechanism of mode synchronization does not require a complete glottal closure, with corresponding pressure build-up. A wide glottal opening (as for breathy voice) would reduce but not eliminate this mode synchronization effect.

Phonation onset occurs as two modes of the vocal folds are synchronized by the glottal flow. The resulting vocal fold vibration pattern depends criticially upon the characteristics of the two modes that are synchronized. This means that vocal fold vibration and therefore voice quality may be varied by changing the vibrational characteristics of the underlying modes which are synchronized. Changes in these modes are usually induced by changes in the geometry or stiffness of the layered vocal fold structure. For example, by changing the body-cover stiffness ratio, Zhang (2009) show that a series of vocal fold vibration patterns with different sound production efficiency could be produced.

In humans, different combinations of biomechanical properties of the multiple vocal fold layers can be achieved through neural stimulation of laryngeal muscles, through which we are able to produce many varieties of voice, minimize the respiratory effort required to initiate and sustain phonation, and thus optimize voice production efficiency.

Ishizaka, K. (1981). "Equivalent lumped-mass models of vocal fold vibration," in *Vocal Fold Physiology*, edited by K.N. Steven and M. Hirano (University of Tokyo, Tokyo), pp. 231-244.
Titze, I.R. (1988). "The physics of small-amplitude oscillation of the vocal folds," J. Acoust. Soc. Am. 83, 1536-1552.
Titze, I.R. (1994). *Principles of Voice Production* (Prentice-Hall, Englewood Cliffs, NJ).
Van Den Berg, J.W. (1958). "Myoelastic-aerodynamic theory of voice production," Journal of Speech and Hearing Research, 1, 227-244.
Zhang, Z. (2009). "Characteristics of phonation onset in a two-layer vocal fold model," J. Acoust. Soc. Am. 125, 1091-1102.
Zhang, Z., Neubauer, J, Berry, D.A. (2007). "Physical mechanisms of phonation onset: A linear stability analysis of an aeroelastic continuum model of phonation," J. Acoust. Soc. Am. 122, 2279-2295.

Expiratory Muscle Strength Training for the Treatment of Persons with Voice Disorders

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The respiratory system is often the primary therapeutic target in traditional rehabilitation of voice disorders given that appropriate respiratory drive, defined in large part by adequate subglottal pressure, is essential to phonation (e.g., Hixon, 1987). Often times the elastic recoil forces of the lung-thorax unit are not sufficient to complete the act of voicing, speaking, or singing; therefore, the development of appropriate subglottal pressures for these tasks requires work by the expiratory muscles. These driving pressures are necessary for the maintenance of good vocal quality, appropriate sound pressure levels (loudness), and increased sound durations (e.g., Isshiki, 1964, Scherer, 1995, Scherer, Vail, & Guo, 1995). The "breathing exercises" used in voice therapy often have as their goal an awareness of breathing, reductions in muscle tension, and improved "respiratory drive" for speech and voice. The latter can be difficult to achieve given that most respiratory or breathing exercises provide no "physiological load" to the muscles. In other words, the respiratory muscles are not forced to work more than their usual. Techniques such as breathing through pursed lips or maximum inhalations and exhalations are examples of this. Recently, strength training paradigms for respiratory muscles has garnered significant clinical and research interest. Our research group has been particularly interested in the effects of expiratory muscle strength training (EMST) on voice, speech, swallow, and cough function. The rationale for utilizing EMST for the treatment of voice disorders is based on two guiding principles: 1) overload and 2) transference.

The principle of overload suggests that in order to produce a peripheral or central change to the neuromuscular system, the system must work harder than it usually does. To achieve this end, we utilize an EMST device (Figure 1) which houses a calibrated, one-way, spring-loaded valve to mechanically overload the expiratory and submental muscles (Wheeler, Chiara, & Sapienza, 2007). The valve blocks the flow of air until sufficient expiratory pressure is produced. Once opened, air is allowed to flow through the device. The physiological load on the targeted muscles can be increased or decreased depending on the device setting. Traditionally we have set the device to 75% of a person's maximum expiratory pressure (MEP) largely mimicking the training protocols with limb muscles (Powers & Howley, 2004). The treatment paradigm lasts five weeks, with participants completing 25 breaths a day (5 sets of 5 repetitions) five days per week. We call this the "power of 5". During the five weeks the device is reset as changes in expiratory muscle strength take place.

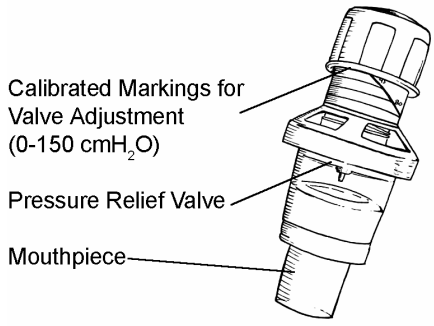

Figure 1. EMST device

Another guiding principle for the use of EMST is that of transference. This is the idea that changes can occur to systems which are not specifically targeted through training. Therefore, the effects of training with an EMST device should not only result in improvements to tasks similar to taking a breath through the EMST device. Instead, increased maximum expiratory pressures or MEPs secondary to training with the EMST device should result in higher-pressure support for voice resulting in improved sound quality, sound pressure level, and sound durations. In a healthy person, increased maximum expiratory pressures may not result in perceivable changes to voice, but in cases of laryngeal pathology or dysphonia increased expiratory pressures may help

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Expiratory Muscle Strength Training for the Treatment of Persons with Voice Disorders, cont.

compensate for the disease or disordered state, thus allowing for the development of necessary positive pressures for voice. Our research group has observed some of these changes in professional voice users.

Bari Hoffman-Ruddy, PhD and Christine Sapienza, PhD (2001) completed a study testing the effects of EMST on various voice parameters in a group of high-risk musical theater performers. These performers had several performances per day in conditions which were far from ideal (i.e., large heavy costumes, choreography while singing). Eleven performers were enrolled. Seven received EMST and four were placed in a control group. Those in the active treatment group received four weeks of training with the EMST device. Following the intervention phase, those who received EMST demonstrated a significant increase in MEP with an 84% average increase by the end of the treatment phase. Additionally, significant decreases in dyspnea or breathlessness rating, significantly longer phase durations for singing, and significantly decreased airflow open quotient were observed.

Judith Wingate, PhD, Christine Sapienza, PhD and colleagues (2006) studied 18 professional voice users with dysphonia, some of whom also had accompanying laryngeal lesions. Participants received 5 weeks of EMST and 6 weeks of traditional voice therapy. Half of the participants received EMST first and traditional voice therapy second, and this was reversed in the second group. Whereas robust change in voice parameters was not observed as a function of traditional voice therapy or EMST alone, the combined modality treatment accounted for significant improvements in MEP, voice handicap index (VHI) scores, subglottal pressure for loud phonatory tasks, and dynamic range.

The results of these two studies suggest that training with EMST can improve maximum expiratory pressures; therefore, improving the capacity to produce necessary subglottal pressures for voice while diminishing the perception of physiological work. In other words, it becomes easier and less taxing for the respiratory system to produce the necessary pressures for appropriate voice. But there are many more questions to be answered in regard to the effects of EMST on voice production and the treatment of voice disorders. We have begun to test the effects of EMST on speech and voice in multiple sclerosis and Parkinson's disease, but many populations remain unstudied. Additionally, questions about treatment dosage and further description of appropriate combined modality treatment paradigms have yet to be explored. The results to date suggest that EMST is a viable treatment paradigm with a strong rationale for rehabilitation of persons with voice disorders.

Hixon, T.J. (1987). Respiratory function in Speech and Song. Boston, MA: College Hill Press.
Hoffman-Ruddy, B., & Sapienza, C.M. (2001). Expiratory Pressure Threshold Training in High-Risk Performers. *Dissertation.*
Isshiki, N. (1964). Regulatory mechanism of voice intensity variation. *Journal of Speech Hearing Research, 128,* 17-29.
Powers, S.K., & Howley, E.T. (2004). Exercise Physiology: Theory and Application to Fitness and Performance. 5th ed. New York: McGraw Hill.
Sapienza, C.M., & Wheeler, K.M. (2006). Respiratory Muscle Strength Training: Functional Outcomes versus Plasticity. *Seminars in Speech and Language, 27,* 236-244.
Sapienza, C.M. (2008). Respiratory Muscle Strength Training Applications. *Current Opinion in Otolaryngology & Head and Neck Surgery, 16,* 216-220.
Scherer, R.C., Vail, V.J., & Guo, C.G. (1995). Required number of tokens to determine representative voice perturbation values. *Journal of Speech Hearing Research, 38,* 1260-1269.
Scherer, K.R. (1995). Expression of emotion in voice and music. *Journal of Voice, 9,* 235-248.
Wheeler, K.M., Chiara, T., & Sapienza, C.M. (2007). Surface electromyographic activity of the submental muscles during swallow and expiratory pressure threshold training tasks. *Dysphagia, 22,* 108-116.
Wingate, J.M., Brown, W.B., Shrivastav, R., Davenport, P., & Sapienza, C.M. (2007). Treatment Outcomes for Professional Voice Users. *Journal of Voice, 21,* 433-449.

Guilt-free Breathing for Singers

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Singers carry around a lot of guilt when it comes to breathing. This guilt has many causes, including the inherent difficulty of putting into words the inner mechanisms of breathing, the well-intentioned but inaccurate anatomic and physiologic vagaries that have crept into our collective language to describe breathing, and the sometimes imperious beliefs regarding the "right" way to breathe for singing. We can relieve this guilt, both from our students and ourselves, by clarifying and simplifying the process of breathing and allowing for individual exploration and discovery instead of using a dogmatic approach.

There are (at least) two levels of understanding when it comes to any physical activity: the knowledge of the mechanism and the understanding of the experience. It can be difficult to explain the mechanisms of breathing to a student in a concise, accurate way without a voice lesson turning into an anatomy lesson. Furthermore, a singer's knowledge about the mechanism of breathing is not nearly as important as the actual experience of breathing - the proprioceptive knowledge that comes from doing. These two types of understanding are not correlated. For example, reading a book about how to swing a golf club will not make you a better golfer, unless you apply that knowledge when you actually swing a club. Conversely, it is very possible (and common) to be a great golfer (or singer) and have very little idea about the actual underlying physiologic mechanisms. When teaching singing, we rely on both our knowledge of the mechanisms and, often more strongly, on our own proprioceptive memories of how we experience breathing. Explaining how breathing feels to us often results in the use of vague imagery that does not convey any true information and only serves to confuse our students (e.g. "feel the breath flowing out the top of your head").

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Guilt-free Breathing for Singers, cont.

This mixing of anatomic, physiologic, and proprioceptive knowledge has led to the existence of many vague catch phrases, such as "sing on the breath", "float the tone on the breath", and, my least-favorite, "sing from your _____." What was the missing word? It was, of course, "diaphragm." Almost every student I've ever taught has heard that phrase shouted out by a voice teacher or choir director, but nobody can tell me exactly what it means. The diaphragm is a muscle we can't touch, see, nor feel, and yet we have all been admonished to "sing from it" or been told we're "not using it" (is that even possible?). While I do not dispute the importance of the diaphragm, I do believe all this talk of this mysterious muscle contributes heavily to breath-related guilt. When faced with these phrases that have no specific meaning or directive, students think the lack of understanding is their fault and will try their best to "sing from their diaphragm," even if they have no idea how to do so.

The biggest cause of breath-related guilt is the moment when a student is told the way they breathe is "wrong" or that they "don't know how to breathe." As Luisa Tetrazzini wrote, "There is only one way to sing correctly, and that is to sing naturally, easily, comfortably... Some of the greatest teachers in the world reach this point apparently by diverging roads." Common sense and science both tell us there cannot be only one way to breathe for singing. Therefore, someone cannot breathe the "wrong" way. However, some ways of breathing are more efficient and effective for singing than others.

Guilt-free breathing for singing can be achieved by providing students with concrete, meaningful directions that set up the conditions for an efficient use of breath. The starting points for efficient breathing for singing are: 1) an upright, comfortable alignment and posture that allows for 2) an effortless, silent inhalation, which prepares the body to 3) maintain a steady supply of energy throughout the exhalation.

In my studio I refer to alignment and posture as the "structural support" for singing. Proper structural support will expand the rib cage and align the head, neck, and spine, while avoiding extraneous tension and locked joints throughout the body. With proper structural support, singers can easily inhale by simply releasing the abdominal muscles, allowing the air into the body instead of "taking" the breath through a forcible, muscular action. This type of inhalation releases tension from not only the abdomen but also from in and around the larynx, tongue, and jaw. A common complaint of young and/or beginning singers is that by the end of a song they "can't breathe." This is usually caused by an accumulation of tension throughout a song which progressively tightens the abdomen and neck muscles, making it nearly impossible to inhale. If every inhalation is seen as an opportunity to reset the system through a release instead of a gasp, this build-up of tension is avoided.

Exhalation during singing is an incredibly dynamic process that depends on factors such as vocal intensity, registration, fundamental frequency, and lung volume, all of which are constantly changing. "Singing on the gesture of inspiration," as Richard Miller said (paraphrasing Lamperti), is to resist the collapse of the structural support during exhalation while avoiding rigidity. Flexible antagonism between the muscles of exhalation and inhalation is what provides the energy in the breath and, consequently, the voice. During exhalation it is difficult to separate the sensations of breath from the vibrations and resonance of the voice, as the they are inextricably linked. When the breath is efficient, the tone is free and effortless, although a great deal of energy may be in use. The singer's own sensations must determine the language and imagery used to describe and train the exhalation.

Breath training (and all voice training, for that matter) should focus on developing a singer's toolbox of skills to enable them to independently explore and learn outside of the voice studio. Let us remove the mystery and guilt of "singing from the diaphragm" so we all can breathe guilt-free while singing.

News and Updates Submission

If you have an event or an update you would like to share in the quarterly newsletter, please email: office@voicefoundation.org.
Submission deadline for the Summer issue: March 15, 2009.

The Voice of our Local Chapters

Atlanta Chapter of the Voice Foundation (ACVF)

ACVF Chapter Officers

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Event Planner
Adam Klein, MD

The Atlanta Chapter of the Voice Foundation has a very interesting Spring 2010 planned. In January Dr. Karen Tedeschi of Tedeschi Wellness Center spoke to the group. Dr. Tedeschi is a Chiropractor with strong interests in the role that nutrition, allergies and emotional balance play in our lives. She has worked with many performers and discussed the importance of maintaining emotional balance through nutrition for performers. In celebration of World Voice Day, April 16, the chapter will be sponsoring a half day *Symposium: Rethinking Voice and Disability* together with the Emory Voice Center and the Emory Program of Health Science Humanities. Featured speakers will be Rosemarie Garland-Thomson, PhD and Ani Satz, PhD, JD, both leading scholars of disability studies and Nelson Roy, PhD CCC-SLP, whose research of voice handicap in teachers has lead the way for a serious look at voice disorders as disability. Highlights of the 2009 season were a Vocal Health Workshop together with Walter Huff and members of the Atlanta Opera Chorus as well as a very informative talk on working with R&B and Rock singers by Jan Smith, voice teacher and coach.

THE VOICE FOUNDATION
would like to thank our local chapters for their continued contributions and support of the voice care community.

If you are interested in starting a local chapter in your area, please contact the Voice Foundation at office@voicefoundation.org or (215) 735-7999.

Greater Milwaukee Chapter of the Voice Foundation (GMCVF)

The Greater Milwaukee Chapter continues to evolve and grow. This fall, the leadership made the executive decision to alter our meeting schedule to encourage consistent attendance, add accessibility, and promote active participation both within the chapter and in community outreach:

- Stagger the weeknight meeting schedule and decrease the number of weeknight meetings
- Plan a half-day seminar on a Saturday offering CEU/CME credits
- Encourage individual /small group projects

Our first meeting, held Monday October 26, 2009, was a round table format. Topics included performance anxiety and its effect on vocal health, the multidisciplinary approach to the evaluation and treatment of voice problems, when to seek medical help and why, and insurance reimbursement challenges. The meeting was held at the University of Wisconsin-Milwaukee (UWM) School of Fine Arts. It immediately followed a free master class with Emma Kirkby, soprano, sponsored by a cooperative effort between UWM and Early Music Now. For many of our members, this was an excellent opportunity to peek inside the singer's world.

On January 26, 2010, a networking and project planning meeting was held in the home of Linda Dindzans, MD. Members and their spouses were included. A Chapter President's challenge was issued to move this first local chapter from internal education and networking to community outreach. In honor of World Voice Day 2010, members were asked to brainstorm outreach projects that they could offer individually or jointly to schools, community theatres, choirs, etc. We look forward to further impacting the vocal health of our community.

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Theater Community Liaison
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Northwest Chapter of the Voice Foundation (NWCVF)

The Northwest Chapter, based in Seattle, is a wildly varied group of professionals and non-professionals in all voice related disciplines. With 50 or more people at each event, we heartily enjoy social time and networking as well as bi-monthly lectures. Topics presented in 2009 included "Transgender Voice Therapy," "Voicing in Fitzmaurice," "Challenges Facing a Professional Voice Over Artist" and "The Singer as a Surgical Patient." For 2010, we kicked-off the year with "Chest Mechanics for the Performer" and look forward to upcoming lectures covering "Demands on the Professional Opera Singer," "An Insider's Perspective of the Recording Industry," and "Acoustics for Performers and Listeners." The NWCVF meets on the 2nd Monday of odd numbered months at the University of Washington. For information about the NWCVF, please visit http://sites.google.com/site/vocalfxlab/ or contact Dr. Albert Merati amerati@uw.edu or Dr. Tanya Eadie teadie@uw.edu.

Important Dates, Upcoming Conferences & Events:

April 16, 2010
- World Voice Day

April 30, 2010
- Discount Symposium Registration Deadline (www.voicefoundation.org/registration)
- Dormitory Housing Deadline (Space fills quickly - Reserve early)

May 1, 2010
- Volunteer Deadline for the 39th Annual Symposium: Care of the Professional Voice
- Discount Symposium Hotel Reservation Deadline

June 1, 2010
- Gratis Presentation Coaching Deadline (As Available)

June 2-6, 2010
- The Voice Foundation's 39th Annual Symposium (Philadelphia, PA)

June 4, 2010
- *Voices of Summer* Gala and Benefit (Tickets available now!)

Please Welcome The Voice Foundation's Newest Co-Editor of The Voice: Nadine Connor, Ph.D.

Nadine P. Connor, PhD is Associate Professor of Communicative Disorders and Surgery at the University of Wisconsin - Madison. Dr. Connor teaches "Assessment and Management of Voice Disorders" at the UW-Madison and directs a research laboratory. Her research program encompasses the basic and clinical sciences and technology/innovation as related to disorders of voice, speech, and swallowing. The convergence of these levels of investigation allows her laboratory to explore potential mechanisms of diseases and disorders that affect these critical human functions, while also allowing this research to have clinical and health relevance.

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THE VOICE FOUNDATION

REGISTRATION IS NOW OPEN!

39th Annual Symposium: Care of the Professional Voice

The Westin Hotel – Philadelphia, PA
June 2–6, 2010

We are pleased to announce The Voice Foundation's *39th Annual Symposium: Care of the Professional Voice*. This Symposium attracts hundreds of medical and scientific experts, speech-language pathologists, performing artists and teachers from over 35 states and 30 countries.

The goal of the Symposium is to enhance knowledge and care of the human voice. The presenters' objectives at the Symposium are:

- to provide information regarding recent technological, scientific, and clinical advances in the study of the human voice;
- to provide information regarding diagnoses and treatment of voice disorders and implications of vocal fold surgery;
- to encourage understanding and practice of various therapies and teaching techniques, including examination/ evaluation of the voice, through workshops by recognized leaders in laryngology, speech pathology, speaking and singing;
- to foster dialogue and cooperation among otolaryngologists, speech-language pathologists, voice scientists, voice researchers, singing teachers, voice trainers, performers, nurses and others who are concerned with care of the professional voice.

Attendees of The Voice Foundation's Annual Symposium leave Philadelphia with the most up-to-date research findings, therapeutic techniques, and surgical methods in the field of voice medicine and science.

For more information about the *39th Annual Symposium: Care of the Professional Voice*, please visit our website at www.voicefoundation.org/registration. We look forward to seeing you in June!

www.voicefoundation.org/registration

Program Highlights

G. Paul Moore Lecture
Bonnie Raphael, PhD

Quintana Award Keynote Speech
Harm Schutte, MD, PhD

Master Class
Harolyn Blackwell

Workshop Sessions

Program Topics
Medical
Basic Science
Speech Language Pathology
Vocal Pedagogy

CME & CEU Credits Available