



# ***15<sup>th</sup> International Conference on Advances in Quantitative Laryngology, Voice and Speech Research***

March 30 – April 1, 2023

Mayo Clinic in Arizona

## **Thursday, March 30, 2023**

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Thursday workshops will be held at Mayo Clinic in Scottsdale, located at 13400 East Shea Boulevard. Shuttle transportation will be provided from two designated hotels. Alternatively, participants may drive directly to the Mayo Clinic Scottsdale campus.

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| 8:00 a.m.                 | Registration<br>Mayo Clinic in Scottsdale<br>(Shuttle transportation from hotel will be provided)   |
| 9:00 a.m. –<br>12:15 p.m. | Concurrent Workshops <ul style="list-style-type: none"><li>a) Dissection Lab in Mayo Clinic Center for Procedural Innovation<br/>David G. Lott, M.D.</li><li>b) Voice, AI, Data Collection, Analysis and Interpretation and Special Bonus<br/>Tour of Head and Neck Regenerative Medicine Lab<br/>Stacy L. Holyfield, M.S., CCC-SLP<br/>Maryam Naghibolhosseini, Ph.D.<br/>Cyril Varghese, M.D., M.S.<br/>Stephanie R.C. Zacharias, Ph.D., CCC-SLP</li></ul>                              |
| 12:15 p.m.                | Lunch (provided)  |
| 1:15 –<br>4:30 p.m.       | Concurrent Workshops (repeat of morning workshop) <ul style="list-style-type: none"><li>a) Dissection Lab in Mayo Clinic Center for Procedural Innovation<br/>David G. Lott, M.D.</li><li>b) Voice, AI, Data Collection, Analysis and Interpretation and Special Bonus<br/>Tour of Head and Neck Regenerative Medicine Lab<br/>Stacy L. Holyfield, M.S., CCC-SLP<br/>Maryam Naghibolhosseini, Ph.D.<br/>Cyril Varghese, M.D., M.S.<br/>Stephanie R.C. Zacharias, Ph.D., CCC-SLP</li></ul> |
| 4:30 p.m.                 | Workshops Adjourn<br>(Shuttle transportation to hotel will be provided)   |
| 6:30 – 8:00 p.m.          | Welcome Reception at Mayo Clinic in Phoenix   |

## Friday, March 31, 2023

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7:00 a.m.                      **Registration**

8:00 a.m.                      **Welcome and Introductions**  
David G. Lott, M.D.

8:10 a.m.                      **Translating Quantitative Laryngology Panel Discussion**  
Lana Shekim, Ph.D., Bonnie Martin-Harris, Ph.D.,  
Nathan Welham, Ph.D., CCC-SLP, and David G. Lott, M.D.

8:55 a.m.                      **Q & A**

### **Abstract Presentations – Session 1: Quantitative Imaging**

Moderator:

9:20 a.m.                      **Sources of Shape and Size Variation of the Human Larynx**  
Presenter: Tobias Riede, Ph.D.  
Co-Authors: Amy Stein, Karen Baab, and Joseph M. Hoxworth, M.D.

9:30 a.m.                      **Characterization of Vocal Motor Control Using Laryngeal Kinematics in Individuals with Hyperfunctional Voice Disorders**  
Presenter: Hasini R. Weerathunge, M.S., B.S.  
Co-Authors: Courtney J. Dunsmuir, Sarah J. Cocroft, Manuel Díaz-Cádiz, and Cara E. Stepp

9:40 a.m.                      **Cross-Sectional Area and Length Changes with a Semi-Occluded Vocal Tract: The Role of the Epilarynx in Human Phonation**  
Presenter: Amanda C. Stark, M.S., CCC-SLP  
Co-Authors: Robin Samlan, Ph.D., CCC-SLP, and Brad Story, Ph.D.

9:50 a.m.                      **The Effects of Voice Therapy Maneuvers on Vocal Fold Vibration in Older Adults**  
Presenter: Robin Samlan, Ph.D., CCC-SLP  
Co-Authors: Natalie Monahan, M.S., Takeshi Ikuma, Ph.D., Dori Smith, DMA, MS, Stephanie R.C. Zacharias, Ph.D., and Melda Kunduk, Ph.D.

10:00 a.m.                      **Vocal Fold Detective Edge Analysis in High-Speed Videoendoscopy During Running Speech in Adductor Spasmodic Dysphonia**  
Presenter: Ahmed M. Yousef, B.Sc., M.Sc.  
Co-Authors: Dimitar D. Deliyski, Mohsen Zayernouri, Stephanie R.C. Zacharias, Maryam Naghibolhosseini

10:10 a.m.                      **Characterization of SOVT Efficiency in an Excised Canine Larynx Model**  
Presenter: Charles Farbos de Luzan, Ph.D.  
Co-Authors: Jacob Michaud-Dorko, Liran Oren, Ph.D., Ephraim Gutmark, Ph.D., Sid Khosla, M.S., M.D.

10:20 a.m.                      **Q & A**

10:30 a.m.                      **Break**

## **Friday, March 31, 2023** *(continued)*

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### **Abstract Presentations – Session 2: Biomechanics**

Moderator:

- 10:45 a.m.                    **A Moment of Reflection: Sid Khosla, M.D.**  
Liran Oren, Ph.D.
- 10:55 a.m.                    **Glottal vs Infraglottal Medialization**  
Sid Khosla, M.D., presented by Liran Oren, Ph.D.
- 11:05 a.m.                    **Vocal Fold Biomechanics, Histology, and Gene Expression after Augmentation in a Recurrent Laryngeal Nerve Injury Model**  
Presenter: Gregory Dion, M.D.  
Co-Authors: Ronit Malka, M.D., Solaleh Miar, Ph.D., Gabriela Gonzales, M.D., Benjamin Walters, M.D., and Teja Guda, Ph.D.
- 11:15 a.m.                    **Experimental Investigation of Source-Filter Interaction in a Synthetic Larynx Model**  
Presenter: Christoph Näger, M.Sc.  
Co-Authors: Stefan Kniesburges and Stefan Becker
- 11:25 a.m.                    **Measurement of Canine Thyroarytenoid Muscle Tone**  
Presenter: Randal Paniello, M.D., Ph.D., F.A.C.S.
- 11:35 a.m.                    **MRI-Based Finite Element Modeling of Human Larynx with Active Intrinsic Muscles – Posturing and Vibration**  
Presenter: Qian Xue, Ph.D.  
Co-Authors: Biao Geng, Weili Jiang, and Xudong Zheng
- 11:45 a.m.                    **How Can Vocal Folds Oscillate with a Limited Mucosal Wave?**  
Presenter: Ingo R. Titze, Ph.D.
- 12:00 p.m.                    **Q & A**
- 12:10 p.m.                    **Lunch with Mentors** (lunch provided)
- 1:25 p.m.                    **Poster Session 1**
- 2:25 p.m.                    **Keynote Presentation: Vocal Fold Modeling**  
Michael H. Krane, Ph.D.
- 2:45 p.m.                    **Q & A**

## **Friday, March 31, 2023** *(continued)*

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### **Abstract Presentations – Session 3: Modeling**

Moderator:

- 2:55 p.m.                    **Evaluation of the One-Dimensional Glottal Flow Model in Predicting Voice Outcomes of Left-Right Asymmetric Vocal Fold Vibrations**  
Presenter: Tsukasa Yoshinaga, Ph.D.
- 3:05 p.m.                    **FSI Analysis of Aerodynamic and Elasticity Forces During Vocal Fold Vibration**  
Presenter: Liran Oren, Ph.D.  
Co-Authors: Elias Sundstrom, Charles Farbos de Luzan, Ephraim Gutmark and Sid Khosla, M.D.
- 3:15 p.m.                    **Representation of Non-Phonotraumatic Vocal Hyperfunction Through Numerical Modeling**  
Presenter: Carlos Calvache Mora, Ph.D.  
Co-Authors: Jesus Parra Peña, Leonardo Soláque, and Matías Zañartu
- 3:25 p.m.                    **Two Folds Triangular Body-Cover Model: Muscle Activation as an Imbalance Mechanism**  
Presenter: Carlos Calvache Mora, Ph.D.  
Co-Authors: Jesús Parra, Ph.D. Candidate, and Matías Zañartu
- 3:35 p.m.                    **PhonoSim: A Patient-Specific Computational Modeling Suite for Phono-Surgery**  
Presenter: Haoxiang Luo, Ph.D.  
Co-Authors: Zheng Li, Amit Avhad, Azure Wilson, Lea Sayce, and Bernard Rousseau
- 3:45 p.m.                    **Pressure-Flow Relationships in Self-Oscillating Poroelastic Vocal Fold Models**  
Presenter: Scott Thomson, Ph.D.  
Co-Author: Cooper Thacker
- 3:55 p.m.                    **Q & A**
- 4:05 p.m.                    **Break**

### **Abstract Presentations – Session 4: Machine Learning**

Moderator:

- 4:20 p.m.                    **Development of an AI Assisted Data Assimilation Framework for Voice Research**  
Presenter: Xudong Zheng, Ph.D.  
Co-Authors: Qian Xue, Jian-Xun Wang, Mohammadreza Movahhedi, Xin-Yang Liu, and Biao Geng

- 4:30 p.m.                    **Machine Learning Based Estimation of Hoarseness Severity Using Sustained Vowels Recorded During High-Speed Videoendoscopy**  
Presenter: Tobias Schraut, Dipl.-Ing.  
Co-Authors: Anne Schützenberger, Tomás Arias-Vergara, Melda Kunduk, Matthias Echternach, Michael Döllinger
- 4:40 p.m.                    **Giving Statistical Title Back to Machine Learning: Statistical Power Analysis and Statistical Model Confidence of Machine Learning**  
Presenter: Hamzeh Ghasemzadeh, Ph.D.  
Co-Authors: Robert E. Hillman and Daryush D. Mehta
- 4:50 p.m.                    **Prediction of Breathy Voice Quality by Frequency-Segmented Spectral Power Levels**  
Presenter: Takeshi Ikuma, Ph.D.  
Co-Authors: Andrew J. McWhorter, M.D. and Melda Kunduk, Ph.D.
- 5:00 p.m.                    **Simultaneous Segmentation and Sub-Pixel Localization in Structured Light High-Speed Video Endoscopy**  
Presenter: Jann-Ole Henningson, M.Sc.  
Co-Authors: Marion Semmler, Michael Döllinger, and Marc Stamminger
- 5:10 p.m.                    **Short-Term Prediction of Disease Symptoms Severity of Parkinson's Disease**  
Presenter: Daria Hemmerling, M.Sc.  
Co-Authors: Magdalena Wójcik-Pędziwiatr, Marek Wodziński, Mateusz Daniol, and Paweł Jemioło
- 5:20 p.m.                    **Q & A**
- 5:30 p.m.                    **Closing Comments, Town Hall and Discussion of Future AQL Conferences**
- 5:45 p.m.                    **Adjourn**

## Saturday, April 1, 2023

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7:00 a.m.                    **Registration**

8:00 a.m.                    **Announcements**  
Stephanie R.C. Zacharias, Ph.D., CCC-SLP

8:05 a.m.                    **Quantitative Laryngology: Don't Forget About the Swallow!**  
**Panel Discussion**  
Peter C. Belafsky, M.D., Ph.D., Ashli K. O'Rourke, M.D., and  
Jessica W. Gregor, M.S., CCC-SLP, BCS-S

8:50 a.m.                    **Q & A**

**Abstract Presentations – Session 5: Quantitative Swallow and Ambulatory Voice Monitoring**  
Moderator:

9:05 a.m.                    **Quantitative Analysis of Swallowing Using Time-Dependent Bolus Tracking**  
Presenter: Andreas Kist, Ph.D.  
Co-Authors: Luisa Neubig, Melda Kunduk, Deirdre Larsen, and Rebecca Leonard

9:15 a.m.                    **Applying Bioinformatic Methods to Temporality Quantification of Swallowing Kinematics in Ultrasonographic Examinations**  
Presenter: Wilson Yiu Shun Lam, M.S.  
Co-Authors: Elaine Kwong and Huberta Wai Tung Chan

9:25 a.m.                    **Effects of Semi-Occluded Vocal Tract Exercises (SOVTE) on Swallowing-Related Kinematics**  
Presenter: Adrián Castillo-Allendes, M.Sc., SLP  
Co-Authors: José Vergara, James A. Curtis, and Eric J. Hunter

9:35 a.m.                    **Quantifying Ambulatory Voicing-Resting Behaviors Reveals Subtypes in Patients with Phototraumatic Vocal Hyperfunction**  
Presenter: Hamzeh Ghasemzadeh, Ph.D.  
Co-Authors: Robert E. Hillman, Andrew J. Ortiz, Jarrad Van Stan, and Daryush D. Mehta

9:45 a.m.                    **Ambulatory Monitoring of Subglottal Pressure Estimated From Neck-Surface Vibration in Individuals With and Without Voice Disorders**  
Presenter: Daryush D. Mehta, Ph.D.  
Co-Authors: Juan P. Cortés, Jon Z. Lin, Katherine L. Marks, Victor M. Espinoza, and Emiro J. Ibarra

9:55 a.m.                    **Q & A**

10:05 a.m.                  **Break**

## **Saturday, April 1, 2023** *(continued)*

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### **Abstract Presentations – Session 6: Quantitative Imaging**

Moderator:

- 10:25 a.m.                    **Phonation Onset In An In-Vivo Canine Hemi Larynx Model: 3D Movement Patterns of the Medial Surface**  
Presenter: Patrick Schlegel, Ph.D.  
Co-Authors: Hye Rhyn Chung, Michael Döllinger, and Dinesh Chhetri
- 10:35 a.m.                    **Videostroboscopy vs High-Speed Laryngeal Imaging; Factors Influencing Ratings of Laryngeal Oscillation**  
Presenter: Robert Brinton Fujiki, Ph.D., CCC-SLP  
Co-Authors: Caitlin K. Croegaert-Koch, M.S., CCC-SLP, and Susan L. Thibeault, Ph.D., CCC-SLP
- 10:45 a.m.                    **A Novel Approach to High-Speed Transoral Fiberoptic Phonoscopy of the Glottis**  
Presenter: Michael H. Tyc, Ph.D.  
Co-Authors: Marcin Just, Anna Racino, Krzysztof Izdebski, and Monika Morawska-Kochman
- 10:55 a.m.                    **Experimental Comparison of Intraglottal Flow Fields Between Excised Canine Larynges and Multi-Layered Synthetic Vocal Folds**  
Presenter: Jacob Michaud, Ph.D.  
Co-Authors: Charles Farbos de Luzan, Liran Oren, Ephraim Gutmark, and Sid M. Khosla, M.D.
- 11:05 a.m.                    **Influence of the Vocal Fold Kinematic Parameters on the Kymographic Waveform**  
Presenter: Jan G. Svec, Ph.D.  
Co-Authors: S. Pravin Kumar, Ondrej Vencalek, R. Sandhanakrishnan, and Hugo Lehoux
- 11:15 a.m.                    **Voice Efficiency for Different Voice Qualities Combining Sound Signals and Numerical Modeling of 3D MRI Vocal Tract Models**  
Presenter: Louisa Traser, M.D.  
Co-Authors: Stefanie Rummel, Fiona Stritt, Johannes Fischer, Michael Bock, Matthias Echternach, Bernhard Richter, and Mario Fleischer
- 11:25 a.m.                    **Q & A**
- 11:35 a.m.                    **Lunch** (provided)
- 12:50 p.m.                    **Poster Session 2**
- 1:50 p.m.                    **Keynote Presentation: Regenerative Medicine / Tissue Engineering**  
Nathan Welham, Ph.D., CCC-SLP
- 2:10 p.m.                    **Q & A**

## **Saturday, April 1, 2023** *(continued)*

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### **Abstract Presentations – Session 7: Tissue Engineering / Regenerative Medicine**

Moderator:

- 2:20 p.m.                    **Contribution of Resident Commensal and Pathogenic Microbial Communities on Vocal Fold Mucosal Integrity and Function**  
Presenter: Vlasta Lungova, Ph.D.  
Co-Authors: Madhu Gouda and Susan L. Thibeault
- 2:30 p.m.                    **Piezo1-Expressing Vocal Fold Epithelia Modulate Remodeling Via Effects on Self-Renewal and Cytokeratin Differentiation**  
Presenter: Alexander Foote, Ph.D., CCC-SLP  
Co-Authors: Vlasta Lungova, Ph.D., and Susan Thibeault
- 2:40 p.m.                    **Development of Murine Larynx and Vocal Folds at Single-Cell Resolution**  
Presenter: Tadeas Lunga, MUDr.  
Co-Authors: Vlasta Lungova, Christina Kendzierski, and Susan Thibeault
- 2:50 p.m.                    **Microbial Gut-Larynx Axis and Laryngeal Immunity**  
Presenter: Ran An, Ph.D.  
Co-Authors: Christina Kendzierski, Federico E. Rey, and Susan L. Thibeault
- 3:00 p.m.                    **Shape Design and Functional Evaluation of Scaffold Shapes for Reconstruction of Partial Laryngectomy Defects**  
Presenter: Juergen Neubauer, Ph.D.  
Co-Authors: Michael J. McPhail, Ph.D., Stephanie R.C. Zacharias, Ph.D., CCC-SLP
- 3:10 p.m.                    **Fibrous Biomimetic Basement Membranes for Enhanced Wound Healing**  
Presenter: Dina M. Gadalla, Ph.D.  
Co-Authors: Maeve Kennedy, B.S., Jamie Ganem, B.S., Rachel Wells, C.V.T., and David G. Lott, M.D.
- 3:20 p.m.                    **Q & A**
- 3:30 p.m.                    **Break**
- 3:45 p.m.                    **Panel Discussion: Future of Quantitative Laryngology Science**  
Lana Shekim, Ph.D., Nathan Welham, Ph.D., CCC-SLP,  
Michael H. Krane, Ph.D., Peter C. Belafsky, M.D., M.P.H.,  
Ashli K. O'Rourke, M.D., Jessica W. Gregor, M.S., CCC-SLP, BCS-S
- 5:00 p.m.                    **Closing Comments, Student Awards and Adjourn**