Stanford



Elizabeth DiRenzo, PhD

Associate Professor of Otolaryngology - Head & Neck Surgery (OHNS) and, by courtesy, of Music

Otolaryngology (Head and Neck Surgery)

CONTACT INFORMATION

- **Administrative Contact**

  Helen Simon - Administrative Associate / Research Finance Administrator

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Bio

BIO

Dr. Elizabeth DiRenzo is a clinician scientist with a subspecialty interest in the behavioral assessment and treatment of laryngological disorders. She completed her undergraduate and clinical graduate degrees at Purdue University in West Lafayette, Indiana specializing in speech-language pathology. Following her clinical degrees, she remained at Purdue and earned a PhD in laryngeal physiology. She then completed postdoctoral training in the Department of Surgery, Division of Otolaryngology – Head & Neck Surgery at the University of Wisconsin-Madison studying vocal fold biology.

Clinically, Dr. DiRenzo is a practicing speech-language pathologist in the Stanford Voice and Swallowing Center. Her specific interests include the behavioral evaluation and treatment of patients with voice, resonance, upper airway, and swallowing disorders. In conjunction with her physician colleagues, Dr. DiRenzo has has implemented a team-based patient assessment approach between laryngologists and speech-language pathologists and standardized multidimensional evaluation procedures to characterize normal and pathological voices for clinical and research purposes.

Dr. DiRenzo's research goal is to advance patient care and improve treatment outcomes through study of both normal laryngeal function and the pathophysiology of voice disorders. To achieve this overarching objective, Dr. DiRenzo’s laboratory utilizes a highly collaborative, multifaceted approach consisting of basic science and clinical research techniques. Outside of work, she prioritizes spending time outdoors enjoying the beautiful California terrain with her husband Dan and their children Lucas and Clara.

ACADEMIC APPOINTMENTS

- Associate Prof-Univ Med Line, Otolaryngology (Head and Neck Surgery)
- Associate Prof-Univ Med Line (By courtesy), Music
- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)

HONORS AND AWARDS

- Distinguished Alumni Award, Purdue University College of Health and Human Sciences (2023)

- Investigator-initiated Research Project Grants (R01), NIH-NIDCD (2022-)
- Diversity, Equity, & Inclusion Grant, Stanford Department of Otolaryngology (2021-)
- New Century Scholars Research Grant, American-Speech-Language-Hearing Foundation (2018-2020)
- Early Career Research Award R21, NIH-NIDCD (2017-2020)
- New Investigator Research Grant, American-Speech-Language-Hearing Foundation (2015)
- The Fall Voice Conference Travel Grant, National Spasmodic Dysphonia Association (2015)
- National Institutes of Health Extramural Loan Repayment Award for Clinical Research, National Institutes of Health (2013-)
- Meritorious Poster Submission, American Speech-Language-Hearing Association (2012)
- Third Place Poster Award, American Laryngological Society (2012)
- Alumni and Friends Award, Department of Speech, Language, and Hearing Sciences, Purdue University (2010)
- New Century Scholars Doctoral Scholarship, American-Speech-Language-Hearing Foundation (2010)
- Wilson Travel Scholarship, Department of Speech, Language, and Hearing Sciences, Purdue University (2010)
- Student Research Travel Award, American Speech-Language-Hearing Association (2009)
- Frederick N. Andrews Fellowship, Purdue Graduate School (2008)
- Outstanding Student Clinician in Speech-Language Pathology, Indiana Speech-Language-Hearing Association (2008)
- Travel Grant, Purdue Graduate Student Government (2008)
- Outstanding Student Clinician in Speech-Language Pathology, Indiana Lion's Club (2007)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, American Speech-Language-Hearing Association (ASHA) (2010 - present)
- Member, ASHA, Special Interest Group - 19: Speech Science (2018 - present)
- Member, ASHA, Special Interest Group - 3: Voice and Voice Disorders (2010 - present)
- Member, ASHA, Special Interest Group - 13: Swallowing and Swallowing Disorders (2014 - present)

PROFESSIONAL EDUCATION

- Postdoctoral Fellowship, University of Wisconsin - Madison , Vocal Fold Biology (2014)
- Ph.D., Purdue University , Vocal Fold Physiology (2012)
- M.S., Purdue University , Speech Language Pathology (2008)
- B.S., Purdue University , Speech, Language, & Hearing Sciences (2006)

LINKS

- Stanford Voice and Swallowing Center: http://med.stanford.edu/ohns/voicecenter/
- DiRenzo Voice Research Lab: https://med.stanford.edu/ohns/research/labs/elizabeth-erickson-direnzo-lab.html
- Google Scholar: https://scholar.google.com/citations?user=TSrlpo0AAAAJ

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The larynx is uniquely located at the divergence of the upper and lower airways and gastrointestinal tract. The vocal folds are housed within the larynx and are the only tissues in the human body that routinely vibrate at frequencies ranging from ~100-1000 Hz, in order to generate voice.

Voice disorders affect millions of people every year and have a devastating impact on communication and quality of life. I am a researcher and clinician with training and expertise in laryngeal physiology. I aim to advance patient care and improve treatment outcomes through study of both normal laryngeal function and the pathophysiology of voice disorders. In order to achieve this overarching objective, my laboratory utilizes a highly collaborative, multifaceted approach consisting of basic science and clinical research techniques.

My general basic science research focus is on laryngeal mucosal biology. In normal physiology, epithelial and mucus cells protect the laryngeal mucosa from the ~25 million pollutant, viral, and bacterial insults inhaled each day. Using a combination of ex vivo, in vivo, and in vitro experimental approaches, I examine the role of laryngeal epithelial and mucus cells as modulators of mucosal remodeling in injury and disease and defensive barriers between the external environment and the underlying tissue. Currently, we utilize exposure to tobacco products as a clinically relevant model of laryngeal injury.

My general clinical science research focus is evaluating clinical and quality of life outcomes in patients with voice disorders undergoing surgical or behavioral interventions. A major thrust of my clinical research has focused on identification of novel therapeutic options for essential vocal tremor (EVT). Specifically, I have targeted formation of a line of research dedicated to the development and refinement of deep brain stimulation (DBS) of the thalamus, a common surgical intervention for essential tremor of the limbs, as a treatment for EVT.

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Akari Kimura

Publications

PUBLICATIONS

- **Establishing an air-liquid interface system for exposure of mouse laryngeal epithelial cells to cigarette smoke.** *Inhalation toxicology*
  Kimura, A., Golchin, A., Easwaran, M., Kiessling, P. T., Khan, M. I., Martinez, J. D., Erickson-DiRenzo, E.
  2026: 1-18
- **Chronic Electronic Cigarette Exposure Promotes Atherosclerosis and Chondrogenic Modulation of Smooth Muscle Cells**
  Damiani, I., Weldy, C., Zhao, Q., Hurtado Solberg, E., Qin, G., Easwaran, M., Basu, S., Gu, W., Worssam, M., Monteiro, J., Zheng, S., Kaur Bahia, G., Kundu, et al
  LIPPINCOTT WILLIAMS & WILKINS.2025
- **Laryngeal Basal Cell Response to Cigarette Smoke and E-Cigarette Aerosol Exposures.** *The Laryngoscope*
  Easwaran, M., Kimura, A., Liao, H. Y., Khan, M. I., Golchin, A., Kiessling, P., Erickson-DiRenzo, E.
  2025
- **Analysis of Pediatric Acute Upper Airway Pathology During Local Wildfires and Increased PM 2.5 Burden.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*
  Kiessling, P., Meister, K., Sidell, D., O'Bryan, M., Erickson-DiRenzo, E., Balakrishnan, K.
  2025
- **Establishing a Mouse Model of Surgical Vocal Fold Injury.** *The Laryngoscope*
  Kimura, A., Khan, M. I., Easwaran, M., Soo, J., Golchin, A., Erickson-DiRenzo, E.
  2024
- **Effects of Short-term Electronic(e)-Cigarette Aerosol Exposure in the Mouse Larynx.** *The Laryngoscope*
  Easwaran, M., Maria, C. S., Martinez, J. D., Hung, B., Yu, X., Soo, J., Kimura, A., Gross, E. R., Erickson-DiRenzo, E.
  2023
- **End-to-end deep learning classification of vocal pathology using stacked vowels** *LARYNGOSCOPE INVESTIGATIVE OTOLARYNGOLOGY*

Liu, G. S., Hodges, J. M., Yu, J., Sung, C., Erickson-DiRenzo, E., Doyle, P. C.
2023

- **Method for Collecting Single Epithelial Cells from the Mouse Larynx.** *The Laryngoscope*
  Khan, M. I., Easwaran, M., Martinez, J. D., Kimura, A., Erickson-DiRenzo, E.
  2023
- **Impact of Electronic Cigarettes on the Upper Aerodigestive Tract: A Comprehensive Review for Otolaryngology Providers** *OTO OPEN*
  Soo, J., Easwaran, M., Erickson-DiRenzo, E.
  2023; 7 (1)
- **Diagnosis and Management of Vocal Complications after Chondrolaryngoplasty.** *The Laryngoscope*
  Nuyen, B., Qian, Z. J., Rakkar, M., Thomas, J. P., Erickson-DiRenzo, E., Sung, C. K.
  2022
- **Social Perception of External Laryngeal Anatomy Related to Gender Expression in a Web-based Survey.** *The Laryngoscope*
  Kiessling, P., Balakrishnan, K., Fauer, A., Sanan, A., McDonald, D., Thomas, J., Erickson-Direnzo, E., Sung, C. K., Nuyen, B.
  2022
- **Effects of Electronic (E)-cigarette Vapor and Cigarette Smoke in Cultured Vocal Fold Fibroblasts.** *The Laryngoscope*
  Martinez, J. D., Easwaran, M., Ramirez, D., Erickson-DiRenzo, E.
  2022
- **Feminization Laryngoplasty: 17-Year Review on Long-Term Outcomes, Safety, and Technique.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*
  Nuyen, B. A., Qian, Z. J., Campbell, R. D., Erickson-DiRenzo, E., Thomas, J., Sung, C. K.
  2021: 1945998211036870
- **The Impact of COVID-19 on Speech-Language Pathologists Engaged in Clinical Practices With Elevated Coronavirus Transmission Risk** *AMERICAN JOURNAL OF SPEECH-LANGUAGE PATHOLOGY*
  Kearney, A., Searl, J., Erickson-DiRenzo, E., Doyle, P. C.
  2021; 30 (4): 1673-1685
- **Mainstream Cigarette Smoke Impacts the Mouse Vocal Fold Epithelium and Mucus Barrier.** *The Laryngoscope*
  Erickson-DiRenzo, E., Easwaran, M., Martinez, J. D., Dewan, K., Sung, C. K.
  2021
- **This Is the Voice (Book Review)** *SCIENCE*
  Book Review Authored by: DiRenzo, E.
  2021; 371 (6528): 471
- **Short-term whole body cigarette smoke exposure induces regional differences in cellular response in the mouse larynx.** *Toxicology reports*
  Easwaran, M., Martinez, J. D., Ramirez, D. J., Gall, P. A., Erickson-DiRenzo, E.
  2021; 8: 920-937
- **Vocal Hygiene in Collegiate Singers-Does Formal Training Relate to Practices?** *Journal of voice : official journal of the Voice Foundation*
  Santa Maria, C., Sung, C., Baird, B. J., Erickson-DiRenzo, E.
  2020
- **Intraoperative Evaluation of Essential Vocal Tremor in Deep Brain Stimulation Surgery.** *American journal of speech-language pathology*
  Erickson-DiRenzo, E., Sung, C. K., Ho, A. L., Halpern, C. H.
  2020: 1–13
- **Nasal Symptoms Following Laryngectomy: A Cross-sectional Analysis.** *American journal of rhinology & allergy*
  Ayoub, N., Kearney, A., Sayyid, Z. N., Erickson-DiRenzo, E., Jeffrey, C., Hwang, P. H.
  2020: 1945892420901631
- **Multiparametric laryngeal assessment of the effect of thalamic deep brain stimulation on essential vocal tremor.** *Parkinsonism & related disorders*
  Erickson-DiRenzo, E. n., Kuijper, F. M., Barbosa, D. A., Lim, E. A., Lin, P. T., Lising, M. A., Huang, Y. n., Sung, C. K., Halpern, C. H.
  2020; 81: 106–12

- **Increased expression of estrogen receptor beta in idiopathic progressive subglottic stenosis.** *The Laryngoscope*
  Damrose, E. J., Campbell, R. D., Darwish, S., Erickson-DiRenzo, E.
  2019
- **Methodology for the establishment of primary porcine vocal fold epithelial cell cultures** *LARYNGOSCOPE*
  Erickson-DiRenzo, E., Leydon, C., Thibeault, S. L.
  2019; 129 (10): E355-E364
- **Endoscopic Management of Postradiation Dysphagia in Head and Neck Cancer Patients: A Systematic Review.** *The Annals of otology, rhinology, and laryngology*
  Abu-Ghanem, S., Sung, C., Junlapan, A., Kearney, A., DiRenzo, E., Dewan, K., Damrose, E. J.
  2019: 3489419837565
- **A Preliminary Study of Vocal Health Among Collegiate A Cappella Singers.** *Journal of voice : official journal of the Voice Foundation*
  Baird, B. J., Mokhtari, T. E., Sung, C. K., Erickson-DiRenzo, E.
  2018
- **Biocompatibility of injectable resilin-based hydrogels.** *Journal of biomedical materials research. Part A*
  Li, L., Stiadle, J. M., Levendoski, E. E., Lau, H. K., Thibeault, S. L., Kiick, K. L.
  2018; 106 (8): 2229-2242
- **Phonomicrosurgery simulation: A low-cost teaching model using easily accessible materials.** *Laryngoscope*
  Zambricki, E. A., Bergeron, J. L., DiRenzo, E. E., Sung, C. K.
  2016; 126 (11): 2528-2533
- **Vocal Tremor: Novel Therapeutic Target for Deep Brain Stimulation.** *Brain sciences*
  Ravikumar, V. K., Ho, A. L., Parker, J. J., Erickson-DiRenzo, E., Halpern, C. H.
  2016; 6 (4)
- **Early Cellular Response to Radiation in Human Vocal Fold Fibroblasts.** *The Annals of otology, rhinology, and laryngology*
  Erickson-DiRenzo, E., Enos, G., Thibeault, S. L.
  2016; 125 (5): 425-432
- **Deep brain stimulation for vocal tremor: a comprehensive, multidisciplinary methodology** *NEUROSURGICAL FOCUS*
  Ho, A. L., Erickson-DiRenzo, E., Pendharkar, A. V., Sung, C., Halpern, C. H.
  2015; 38 (6)
- **Utility of cell viability assays for use with ex vivo vocal fold epithelial tissue.** *Laryngoscope*
  Erickson-DiRenzo, E., Sivasankar, M. P., Thibeault, S. L.
  2015; 125 (5): E180-5
- **Deep Brain Stimulation for Essential Vocal Tremor: A Technical Report.** *Cureus*
  Ho, A. L., Choudhri, O., Sung, C. K., DiRenzo, E. E., Halpern, C. H.
  2015; 7 (3)
- **A preliminary investigation of potential biases in phonation threshold pressure analysis.** *Journal of voice*
  Sundarrajan, A., Erickson-Levendoski, E., Sivasankar, M. P.
  2015; 29 (1): 22-25
- **Vocal fold epithelial barrier in health and injury: a research review.** *Journal of speech, language, and hearing research : JSLHR*
  Levendoski, E. E., Leydon, C., Thibeault, S. L.
  2014; 57 (5): 1679-91
- **Reducing the negative vocal effects of superficial laryngeal dehydration with humidification.** *The Annals of otology, rhinology, and laryngology*
  Levendoski, E. E., Sundarrajan, A., Sivasankar, M. P.
  2014; 123 (7): 475-81
- **Vocal Fold Ion Transport and Mucin Expression Following Acrolein Exposure** *JOURNAL OF MEMBRANE BIOLOGY*
  Levendoski, E. E., Sivasankar, M. P.
  2014; 247 (5): 441-450

- **Influence of Obligatory Mouth Breathing, During Realistic Activities, on Voice Measures** *JOURNAL OF VOICE*
  Sivasankar, M. P., Erickson-Levendoski, E.
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- **Role for Ion Transport in Porcine Vocal Fold Epithelial Defense to Acid Challenge** *OTOLARYNGOLOGY-HEAD AND NECK SURGERY*
  Erickson-Levendoski, E., Sivasankar, M. P.
  2012; 146 (2): 272-278
- **Acute Stress to Excised Vocal Fold Epithelium From Reactive Oxygen Species** *Combined Otolaryngology Spring Meeting (COSM)/132nd Annual Meeting of the American-Laryngological-Association/Annual Meeting of the American-Otological-Society*
  Alper, R., Fu, X., Erickson-Levendoski, E., Zheng, W., Sivasankar, M.
  WILEY-BLACKWELL.2011: 2180–84
- **Investigating the Effects of Caffeine on Phonation** *JOURNAL OF VOICE*
  Erickson-Levendoski, E., Sivasankar, M.
  2011; 25 (5): E215-E219
- **Simulated Reflux Decreases Vocal Fold Epithelial Barrier Resistance** *Annual Meeting of the American-Laryngological-Association*
  Erickson, E., Sivasankar, M.
  WILEY-BLACKWELL.2010: 1569–75
- **Evidence for Adverse Phonatory Change Following an Inhaled Combination Treatment** *JOURNAL OF SPEECH LANGUAGE AND HEARING RESEARCH*
  Erickson, E., Sivasankar, M.
  2010; 53 (1): 75-83
- **Hypertonic challenge to porcine vocal folds: Effects on epithelial barrier function** *OTOLARYNGOLOGY-HEAD AND NECK SURGERY*
  Sivasankar, M., Erickson, E., Rosenblatt, M., Branski, R. C.
  2010; 142 (1): 79-84
- **Short-Duration Accelerated Breathing Challenges Affect Phonation** *Annual Convention of the American-Speech-Language-Hearing-Association*
  Sivasankar, M., Erickson, E.
  JOHN WILEY & SONS INC.2009: 1658–63
- **Phonatory Effects of Airway Dehydration: Preliminary Evidence for Impaired Compensation to Oral Breathing in Individuals With a History of Vocal Fatigue** *JOURNAL OF SPEECH LANGUAGE AND HEARING RESEARCH*
  Sivasankar, M., Erickson, E., Schneider, S., Hawes, A.
  2008; 51 (6): 1494-1506