



Peter Luke Santa Maria

Assistant Professor of Otolaryngology-HNS (Otology and Neurotology) at the Stanford University Medical Center

Otolaryngology - Head & Neck Surgery Divisions

 NIH Biosketch available Online

CLINICAL OFFICES

- **Otolaryngology - Head and Neck Surgery**

801 Welch Rd 2nd FL

MC 5739

Stanford, CA 94305

Tel (650) 723-5281

Fax (650) 725-8502

Bio

BIO

Associate Director Stanford SPARK

Dr Peter Santa Maria is a surgeon scientist born and raised in Perth, Australia with a subspecialty interest in Otology, Neurotology and Skull Base Surgery. He attended medical school at The University of Western Australia before undertaking his residency in Otolaryngology, Head and Neck Surgery. He was the Neurotology and Skull Base Surgery fellow at Sir Charles Gairdner Hospital (2012), Western Australia before undertaking a three year instructorship at Stanford University in Otology, Neurotology and Skull Base Surgery (2015). He joined Stanford faculty again in 2017.

Clinically, Dr Santa Maria specializes in adult and pediatric surgery for hearing, balance and facial nerve disorders. He has a special interest in the management of cholesteatoma, chronic otitis media, ear drum perforations and hearing reconstruction, otosclerosis and stapes surgery, eustachian tube surgery, tumors of the ear and skull base including acoustic neuroma, schwannoma, meningioma, glomus tumors, cholesterol granuloma and squamous cell cancer of the ear as well as hearing implants, including cochlear implants, bone anchored hearing aids. Dr Santa Maria has authored book chapters and published papers and continues his clinical research in these areas, particularly with a focus on hearing preservation in cochlear implant surgery and outcomes of vestibular schwannoma management.

Scientifically, Dr Santa Maria completed his PhD in the molecular biology of wound healing of the tympanic membrane at The University of Western Australia (2012). His research includes a novel treatment for chronic ear drum perforations was accelerated through the SPARK program at Stanford, winning the "Excellence in Stanford SPARK 2014" award, and then taken into a pharmaceutical start-up, Auration Biotech, aimed at bringing treatments for hearing loss into the clinic. Auration Biotech recently partnered with a large pharmaceutical company, Astellas, to bring the non-surgical treatment for ear drum repair into human clinical trials. His research has now expanded to include novel treatments for biofilms in chronic suppurative otitis media and growth factor therapy for oral wound healing. He now is Associate Director of Stanford SPARK, assisting academic discoveries through translation to the clinic.

Dr Santa Maria also co-invented a medical device which won the "Robert Howard Next Step Award in Medical Technology Innovation 2014", as part of Stanford's Bidesign program, that could keep patients warm during surgery. His team built and tested the first prototype before he led, as the Principal Investigator, the first in

human clinical study where the device showed a three-fold benefit over the existing standard of care for preventing perioperative hypothermia. The device is now being further developed in another start-up, Flotherm, where he is working to bring the device to patients.

CLINICAL FOCUS

- Otolaryngology
- acoustic neuroma
- meningioma
- skull base
- facial nerve
- cochlear implant
- Eustachian tube
- cholesteatoma
- superior semicircular canal dehiscence
- cerebellopontine angle
- glomus tumor
- bone anchored hearing aid
- ear tumor
- otosclerosis
- neurofibromatosis type 2
- tympanoplasty
- mastoidectomy
- ear cancer
- Cerebrospinal fluid leak repair
- encephalocele repair

ACADEMIC APPOINTMENTS

- Assistant Professor - Med Center Line, Otolaryngology - Head & Neck Surgery Divisions
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Associate Director, Stanford SPARK, (2018- present)
- Director, SPARK Co-Lab (Perth), (2016- present)

HONORS AND AWARDS

- Robert Howard Next Step Award in Medical Technology Innovation, Stanford Biodesign (2018)
- 40 under 40 winner, Perth, Australia (2017)
- Robert Howard Next Step Award in Medical Technology Innovation, Stanford Biodesign (2015)
- William E. Eaglestein Award for Excellence in SPARK, Stanford SPARK (2014)
- Research Grants / Awards: Principal Surgeon Scientist Award, Garnett Passe and Rodney Williams Memorial Foundation (2012-present)
- Surgeon Scientist Award, Garnett Passe and Rodney Williams Memorial Foundation (2006-2008)
- William Allnutt & May G Saw Medical Research Scholarship, The University of Western Australia (2005)
- Simon Seow Memorial Prize in Public Health, The University of Western Australia (2000)
- Western Australian Medical Students Society Person of the Year, Western Australian Medical Students Society (1999)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Board Member, Lions Hearing Foundation Board, Perth (2016 - 2017)
- Chief of Scientific Advisory Board, Auration Biotech (2015 - present)
- Member, Ear Science Institute of Australia – Research Committee (2015 - 2017)
- Member, American Academy of Otolaryngology, Head and Neck Surgery Hearing Committee (2015 - 2016)
- Member, American Academy of Otolaryngology, Head and Neck Surgery Implantable Devices Committee (2015 - 2016)

- Chief of Scientific Advisory Board, Flo-Therm (2014 - present)
- Member, Journal of Laryngology and Otology (Australian Supplement) - Editorial board (2014 - 2017)
- Member, American Academy of Otolaryngology, Head and Neck Surgery Skull Base Surgery Committee (2014 - 2016)
- Councillor, Australian Medical Association of Western Australia (2000 - 2000)
- President, Western Australian Medical Students Society (2000 - 2000)

PROFESSIONAL EDUCATION

- Board Certification: Otolaryngology, Royal Australasian College of Surgeons
- Fellowship: Sir Charles Gairdner Hospital (2012) WA Australia
- Instructorship, Stanford University , Otology, Neurotology, Skull Base Surgery (2015)
- Residency: Royal Australasian College of Surgeons (2011) Australia
- Fellowship, Sir Charles Gairdner Hospital , Otology, Neurotology, Skull Base Surgery (2012)
- Residency: Sir Charles Gairdner Hospital (2005) WA Australia
- Internship: Sir Charles Gairdner Hospital (2002) WA Australia
- Residency / FRACS, The Royal Australian College of Surgeons , Otolaryngology, Head and Neck Surgery (2011)
- Medical Education: University of Western Australia (2002) WA Australia
- MBBS, The University of Western Australia , Medicine / Surgery (2001)
- PhD, The University of Western Australia (2012)

LINKS

- Get a Second Opinion: <https://stanfordhealthcare.org/second-opinion/overview.html>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Tympanic membrane regeneration

We developed a novel treatment for healing chronic tympanic membrane perforations which we have recently partnered with Astellas pharmaceuticals aiming for a clinical trial in the coming years. This treatment is delivered by hydrogel to heal the ear drum without surgery. We are also working on a therapy to prevent tympanic membrane wound healing that could be used as an alternative to pressure equalization tubes.

Biofilms in CSOM

We are collaborating to test new novel treatments that can treat pseudomonas and staphylococcus biofilms in chronic suppurative otitis media using a rodent model created in our lab.

Growth factor therapy for intra oral wound healing

Using rodent models for intra oral wound healing we are currently testing new growth factor therapy for healing in intra oral wounds with potential applications to prevent post tonsillectomy wound healing.

Medical devices

We have invented, prototyped and tested clinically a new medical device for maintaining perioperative normothermia with significant increased efficacy compared to the current standard of care

Clinical research

Evaluating outcomes of stereotactic radiation for vestibular schwannoma

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Laurent Adonis Bekale, Solange Massa

Publications

PUBLICATIONS

- **Single Administration of a Sustained-Release Formulation of KB-R7785 Inhibits Tympanic Membrane Regeneration in an Animal Model** *JOURNAL OF INTERNATIONAL ADVANCED OTOLOGY*
Maria, P. L., Maria, C. S., Kim, S., Yang, Y. P.
2016; 12 (3): 237-240
- **Heparin Binding Epidermal Growth Factor-Like Growth Factor Heals Chronic Tympanic Membrane Perforations With Advantage Over Fibroblast Growth Factor 2 and Epidermal Growth Factor in an Animal Model** *OTOLOGY & NEUROTOLOGY*
Maria, P. L., Weierich, K., Kim, S., Yang, Y. P.
2015; 36 (7): 1279-1283
- **A new theory on the pathogenesis of acquired cholesteatoma: Mucosal traction.** *Laryngoscope*
Jackler, R. K., Santa Maria, P. L., Varsak, Y. K., Nguyen, A., Blevins, N. H.
2015; 125: S1-S14
- **Heparin Binding-Epidermal Growth Factor-Like Growth Factor for the Regeneration of Chronic Tympanic Membrane Perforations in Mice** *TISSUE ENGINEERING PART A*
Maria, P. L., Kim, S., Varsak, Y. K., Yang, Y. P.
2015; 21 (9-10): 1483-1494
- **Hearing Preservation Surgery for Cochlear Implantation: A Meta-analysis** *OTOLOGY & NEUROTOLOGY*
Maria, P. L., Gluth, M. B., Yuan, Y., Atlas, M. D., Blevins, N. H.
2014; 35 (10): E256-E269
- **Hearing Preservation Surgery for Cochlear Implantation-Hearing and Quality of Life After 2 Years** *OTOLOGY & NEUROTOLOGY*
Maria, P. L., Domville-Lewis, C., Sucher, C. M., Chester-Browne, R., Atlas, M. D.
2013; 34 (3): 526-531
- **Sigmoid sinus dehiscence resurfacing as treatment for pulsatile tinnitus.** *The Journal of laryngology and otology*
Santa Maria, P. L.
2013: 1-3
- **Tympanic Membrane Wound Healing in Rats Assessed by Transcriptome Profiling** *LARYNGOSCOPE*
Santa Maria, P. L., Redmond, S. L., McInnes, R. L., Atlas, M. D., Ghassemifar, R.
2011; 121 (10): 2199-2213
- **Long-Term Hearing Outcomes Following Stereotactic Radiosurgery in Vestibular Schwannoma Patients-A Retrospective Cohort Study.** *Neurosurgery*
Santa Maria, P. L., Shi, Y., Gurgel, R. K., Corrales, C. E., Soltys, S. G., Santa Maria, C., Murray, K., Chang, S. D., Blevins, N. H., Gibbs, I. C., Jackler, R. K.
2018
- **Optical Coherence Tomography of the Tympanic Membrane and Middle Ear: A Review**
Tan, H., Maria, P., Wijesinghe, P., Kennedy, B., Allardyce, B., Eikelboom, R., Atlas, M., Dilley, R.
SAGE PUBLICATIONS LTD.2018: 424-38
- **Age-Related Hearing Loss: Innovations in Hearing Augmentation.** *Otolaryngologic clinics of North America*
Vaisbuch, Y., Santa Maria, P. L.

2018

- **In reference to Evidence against the mucosal traction theory in cholesteatoma.** *The Laryngoscope*
Jackler, R. K., Santa Maria, P. L., Blevins, N. H.
2018
- **Biomedical device innovation methodology: applications in biophotonics** *JOURNAL OF BIOMEDICAL OPTICS*
Beswick, D. M., Kaushik, A., Beinart, D., McGarry, S., Yew, M., Kennedy, B. F., Maria, P.
2018; 23 (2)
- **Epithelial separation theory for post-tonsillectomy secondary hemorrhage: evidence in a mouse model and potential heparin-binding epidermal growth factor-like growth factor therapy** *EUROPEAN ARCHIVES OF OTO-RHINO-LARYNGOLOGY*
Beswick, D. M., Santa Maria, C., Ayoub, N. F., Capasso, R., Santa Maria, P.
2018; 275 (2): 569–78
- **A novel thermal compression device for perioperative warming: a randomized trial for feasibility and efficacy** *BMC ANESTHESIOLOGY*
Maria, P., Maria, C., Eisenried, A., Velasquez, N., Kannard, B., Ramani, A., Kahn, D., Wheeler, A., Brock-Utne, J.
2017; 17: 102
- **Functional Outcomes of Heparin-Binding Epidermal Growth Factor-Like Growth Factor for Regeneration of Chronic Tympanic Membrane Perforations in Mice** *TISSUE ENGINEERING PART A*
Maria, P. L., Gottlieb, P., Maria, C. S., Kim, S., Puria, S., Yang, Y. P.
2017; 23 (9-10): 436-444
- **Functional Outcomes of Heparin Binding - Epidermal Growth Factor Like Growth Factor for Regeneration of Chronic Tympanic Membrane Perforations in Mice.** *Tissue engineering. Part A*
Santa Maria, P. L., Gottlieb, P., Santa Maria, C., Puria, S., Kim, S., Yang, Y. P.
2017
- **Predicting Sequential Cochlear Implantation Performance: A Systematic Review** *AUDIOLOGY AND NEURO-OTOLOGY*
Smulders, Y., Hendriks, T., Eikelboom, R., Stegeman, I., Santa Maria, P., Atlas, M., Friedland, P.
2017; 22 (6): 356–63
- **No systemic exposure of transtympanic heparin-binding epidermal growth factor like growth factor.** *Drug and chemical toxicology*
Santa Maria, P. L., Kim, S., Yang, Y. P.
2016; 39 (4): 451-454
- **Type I Tympanoplasty Meta-Analysis: A Single Variable Analysis** *OTOLOGY & NEUROTOLOGY*
Tan, H. E., Maria, P. L., Eikelboom, R. H., Anandacoomaraswamy, K. S., Atlas, M. D.
2016; 37 (7): 838-846
- **Ossicular calisthenics: Pneumomassage of the tympanic membrane** *LARYNGOSCOPE*
Mudry, A., Maria, P. S., Jackler, R. K.
2016; 126 (5): 1180-1186
- **Iatrogenic Phenol Injury Causing Facial Paralysis With Tympanic Membrane and Ossicular Necrosis** *OTOLOGY & NEUROTOLOGY*
Maria, P. L., Corrales, C. E., Sevy, A. B., Jackler, R. K.
2016; 37 (4): 385-387
- **In Response to the Letter to the Editor Regarding: Heparin Binding-Epidermal Growth Factor-Like Growth Factor for the Regeneration of Chronic Tympanic Membrane Perforations in Mice.** *Tissue engineering. Part A*
Santa Maria, P. L., Kim, S., Varsak, Y. K., Yang, Y. P.
2016; 22 (5-6): 570-571
- **Mouse model of experimental Eustachian tube occlusion: a surgical technique** *ACTA OTO-LARYNGOLOGICA*
Varsak, Y. K., Maria, P. L.
2016; 136 (1): 12-17
- **In reference to A new theory on the pathogenesis of acquired cholesteatoma: Mucosal traction.** *Laryngoscope*
Jackler, R. K., Santa Maria, P. L., Varsak, Y. K., Blevins, N. H., Nguyen, A.
2016; 126 (1): E50-?

- **Psychophysical Map Stability in Bilateral Sequential Cochlear Implantation: Comparing Current Audiology Methods to a New Statistical Definition** *EAR AND HEARING*
Domville-Lewis, C., Santa Maria, P. L., Upson, G., Chester-Browne, R., Atlas, M. D.
2015; 36 (5): 497-504
- **A new theory on the pathogenesis of acquired cholesteatoma: Mucosal traction** *LARYNGOSCOPE*
Jackler, R. K., Maria, P. L., Varsak, Y. K., Anh Nguyen, A., Blevins, N. H.
2015; 125: S1-S14
- **A case of stereotactic radiation in skull base solitary fibrous tumor: more harm than good?** *Journal of neurological surgery reports*
Santa Maria, P. L., Abuzeid, W. M., Nayak, J. V., Chang, S. D., Blevins, N. H.
2014; 75 (2): e214-6
- **When is the best timing for the second implant in pediatric bilateral cochlear implantation?** *Laryngoscope*
Santa Maria, P. L., Oghalai, J. S.
2014; 124 (7): 1511-1512
- **Is office-based myringoplasty a suitable alternative to surgical tympanoplasty?** *Laryngoscope*
Santa Maria, P. L., Oghalai, J. S.
2014; 124 (5): 1053-1054
- **In Response to: Regeneration of Chronic Tympanic Membrane Perforation Using an EGF-Releasing Chitosan Patch.** *Tissue engineering. Part A*
Santa Maria, P. L.
2013; 19 (19-20): 2109-2110
- **In Response to: Regeneration of Chronic Tympanic Membrane Perforation Using an EGF-Releasing Chitosan Patch.** *Tissue engineering. Part A*
Santa Maria, P. L.
2013; 19 (19-20): 2109-2110
- **Unique microbiology of chronically unstable canal wall down tympanomastoid cavities: considerations for surgical revision.** *journal of laryngology and otology*
Gluth, M. B., Tan, B. Y., Santa Maria, P. L., Atlas, M. D.
2013; 127 (5): 458-462
- **Pott's puffy tumour and intracranial complications of frontal sinusitis in pregnancy** *JOURNAL OF LARYNGOLOGY AND OTOTOLOGY*
Domville-Lewis, C., Friedland, P. L., Maria, P. L.
2013; 127: S35-S38
- **Keratinocyte growth factor 1, fibroblast growth factor 2 and 10 in the healing tympanic membrane following perforation in rats.** *Journal of molecular histology*
Santa Maria, P. L., Redmond, S. L., Atlas, M. D., Ghassemifar, R.
2011; 42 (1): 47-58
- **The role of epidermal growth factor in the healing tympanic membrane following perforation in rats.** *Journal of molecular histology*
Santa Maria, P. L., Redmond, S. L., Atlas, M. D., Ghassemifar, R.
2010; 41 (6): 309-314
- **Histology of the Healing Tympanic Membrane Following Perforation in Rats** *LARYNGOSCOPE*
Maria, P. L., Redmond, S. L., Atlas, M. D., Ghassemifar, R.
2010; 120 (10): 2061-2070
- **Chronic tympanic membrane perforation: a better animal model is needed** *WOUND REPAIR AND REGENERATION*
Maria, P. L., Atlas, M. D., Ghassemifar, R.
2007; 15 (4): 450-458
- **Neck dissection for squamous cell carcinoma of the head and neck.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*
Santa Maria, P. L., Sader, C., Preston, N. J., Fisher, P. H.
2007; 136 (4): S41-5

- **Cardiac surgery in Australian octogenarians: 1996-2001** *16th RACS Inter ASC Meeting*
Hewitt, T. D., Santa Maria, P. L., Alvarez, J. M.
WILEY-BLACKWELL PUBLISHING, INC.2003: 749–54