The Faculty of Medicine of Harvard University

Curriculum Vitae

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Education:

1998 - 2004	MD, with honors	Medicine	Dnipropetrovsk State Medical Academy (DSMA) Dnipropetrovsk, Ukraine
2004 - 2008	Kandidat Nauk (PhD)	Human Anatomy Vladimir Kozlov, Ph.D., DSc	DSMA Dnipropetrovsk, Ukraine
2005 - 2006	Master	Project Management	National Academy of Public Administration Dnipropetrovsk, Ukraine

Postdoctoral Training:

08/2004 - 11/2004	Medical Intern	Pathology	DSMA Dnipropetrovsk, Ukraine
11/2007 - 01/2009	Research Associate	Department of Human Anatomy Vladimir Kozlov, Ph.D., DSc	DSMA Dnipropetrovsk, Ukraine
02/2009 - 02/2012	Postdoctoral Scholar	Auditory Neuroscience / Physiology Gregory I. Frolenkov, Ph.D.	University of Kentucky College of Medicine Lexington, KY
02/2012 - 12/2018	Postdoctoral Fellow	Auditory Neuroscience / Neurobiology David P. Corey, Ph.D.	Harvard Medical School (HMS) Boston, MA

Faculty Academic Appointments:

12/2017 - Present	Assistant Professor	Department of Otolaryngology– Head and Neck Surgery (OHNS)	HMS
09/2019 - Present	Visiting Professor (non-voting)	Faculty of Medicine	Dnipro State Medical University, Ukraine

Appointments at Hospitals/Affiliated Institutions:

01/2018 - Present	Assistant Scientist	OHNS	Mass Eye and Ear (MEE)

Other Professional Positions:

2001 - 2003	Laboratory technician	Human Anatomy Department, DSMA, Ukraine	part-time, 50% effort

Committee Service:

Local

2002 - 2004	Head of Student Scientific Society	Human Anatomy Department, DSMA
2019	MEE Annual Joint Research Symposium.	MEE Organizing committee member and Moderator
2020 - 2021	Faculty Search Admissions Committee	MEE, HMS
2020 - 2026	Academic Advisor, Program in Speech and Hearing Bioscience and Technology	MEE, HMS
2021	MEE Technology Seminar series.	MEE Organizing committee member
2022 - 2023	EPL symposium: Inner Ear Biology	MEE Organizing committee member and Moderator
2022 - 2025	Institutional Animal Care and Use Committee	MEE Standing Committee Member
2022 - 2026	Admissions Committee, Program in Speech and Hearing Bioscience and Technology	HMS
2024 - 2025	Visiting Research Internship Program Selection Committee	Harvard University

2025 - Present	Peake Prize selection committee	Massachusetts Institute of Technology

Professional Societies

2004 - 2012	Society of Anatomists, Histologists and Embryologists; Ukraine	
2010 - Present	Association for Research in Otolaryngology (ARO)	
	2010 - 2018	Post Doc Member
	2018 - Present	Regular Member
	2019 - Present	SpARO mentor
	2021	ARO webinar session moderator
	2022	ARO podium session moderator
	2022 - Present	ARO Membership Committee
	2023 - Present	ARO Program Committee
2013 - 2019	The Physiological Society	
		Full Member
2015 - 2016	Society of General Physiologists	
2020 - 2022	American Society of Gene & Cell Therapy	
2022 - 2023	Biophysical Society	

Grant Review Activities:

2020	Translational Grant Review Committee	Action on Hearing Loss Foundation. London, UK
		Ad-hoc reviewer
2023	Emerging Research Grants Review Committee	Hearing Health Foundation. New York City, USA
		Ad-hoc reviewer
2023	Translational Grant Review Committee	Royal National Institute for Deaf People. London, UK
		Ad-hoc reviewer
2024	Emerging Research Grants Review Committee	Hearing Health Foundation. New York City, USA
		Ad-hoc reviewer
2024	Programmes Transversaux de Recherche Review Committee	Institut Pasteur. Paris, France.
		Ad-hoc reviewer

2024	Scientific Committee	La Fondation Pour l'Audition. Paris, France
		Ad-hoc reviewer
2025	Condensed matter physics review panel	French National Research Agency
2025	Emerging Research Grants Review Committee	Action on Hearing Loss Foundation. London, UK
2025	Emerging Research Grants Review Committee	Hearing Health Foundation. New York City, USA

Editorial Activities:

- **Ad hoc Reviewer**

Cell Reports
Frontiers in Aging Neuroscience
Frontiers in Cell and Developmental Biology
Frontiers in Cellular Neuroscience
Hearing Research
Heliyon
Human Molecular Genetics
Journal of Neuroscience
Journal of Otology
Journal of Physiology
Journal of Visualized Experiments
Molecular Therapy
Molecular and Cellular Neuroscience
Nature Communications
Neuron
Proceedings of the National Academy of Sciences
Scientific Reports
Yale Journal of Medicine and Biology
eNeuro

- **Other Editorial Roles**

2011 - 2015	Editorial Board Member	Sudovo-MedychnaExpertiza. [Ukraine]
2011 - Present	Editorial Board Member	Morphologiã, [Ukraine]
2022 - Present	Review Editor, Editorial Board Member	Frontiers in Cellular Neuroscience

2023 - Present	Review Editor, Editorial Board Member	Medicni Perspektivi [Ukraine]
2025 - Present	Review Editor, Editorial Board Member	Scientific Data, Nature Pubishing Group

Honors and Prizes:

1999	Second Prize, Human Anatomy Olympiad	Human Anatomy Department, DSMA
2000	Second best presentation	Physiology Department, DSMA
2001	Best presentation	Surgery Department, DSMA
2001 - 2004	State Council's Scholarship Award	Dnipropetrovsk State Government
2012 - Present	Travel award	Association for Research in Otolaryngology
2017	Jochen Schacht Invited Lecture Award	Kresge Hearing Research Institute, University of Michigan
2022	Excellence in Innovation	Mass General Brigham (MGB), Boston, MA
2024	Young Researcher Faculty of the Year Award	OHNS, MEE

Report of Funded and Unfunded Projects

Past

2005 - 2006	Mayor's Scholarship Award Dnipropetrovsk City Hall Role: Applicant (PI), PhD student ($4,800) Aim: To support the research program of my PhD project, fund reagents and my stipend.
2018 - 2019	"Development of AAV-mediated Mini-Gene Therapy for Usher Syndrome Type 1F, a Combined Deafness and Blindness" HMS Quadrangle Fund for Advancing and Seeding Translational Research (Q-FASTR) HMS Foundation grant Role: Co-PI (David Corey (PI), Harvard Medical School) ($109,950) Aim: To design and test shortened mini-PCDH15 molecules capable of rescuing the sensory function in the mouse inner ear.
2018 - 2021	"Gene Therapy for Deafness and Blindness in Usher Syndrome 1F"

	Bertarelli Collaborative Research Award from the Bertarelli Program in Translational Neuroscience and Neuroengineering at HMS. HMS Foundation grant Role: Co-PI (David Corey (PI), Harvard Medical School and Botond Roska (Co-PI), Institute of Molecular and Clinical Ophthalmology, Basel, Switzerland) ($150,000) Aim: To use three different strategies to develop methods to treat this devastating sensory disorder. We will collect pilot data testing the mini-gene, dual AAV and gene editing approaches to treat Usher Syndrome 1F.
2018 - 2024	"Molecular Basis of Hair Cell Stereocilia Bundle Morphology" NIH, NIDCD R01 DC017166 Role: Principal Investigator ($1,707,083) Aim: To understand the function of Polycystic Kidney and Hepatic Disease 1-Like 1 (PKHD1L1) in the mouse inner, as PKHD1L1-deficient mice develop hearing loss.
2019 - 2021	"Molecular basis of hair cell stereocilia bundle morphology" NIH, NIDCD Diversity supplement 3R01 DC017166-01S1 Role: Principal Investigator ($131,082) Aim: This diversity supplement is to support Dr. David Rosenberg and provide him with an adequate training environment to work on Aims 1 and 2 of the main proposal.
2021 - 2023	"Development of Mini-Gene Therapy for Usher Syndrome Type 1F" Blavatnik Therapeutics Challenge Awards (BTCA) HMS Foundation grant Role: Co-PI (David Corey (PI), HMS) ($321,996) Test best-performing mini-PCDH15 to rescue the visual deficit in Pcdh15-deficient mice and zebrafish.
2021 - 2023	"Cross-Modality Imaging Data Annotations for Deep-Learning-Based Analysis Solutions in the Auditory Field" NIH Office Of the Director Administrative Supplement to Support Collaborations to Improve the AI/ML-Readiness of NIH-Supported Data R01 DC017166-04S1 Role: Principal Investigator ($189,061) Aim: To annotate the wealth of imaging data produced in the main proposal to be readily used for the training of machine learning models.
2021 - 2024	"Molecular Basis of Hair Cell Stereocilia Bundle Morphology" NIH, NIDCD Diversity supplement R01 DC017166-04S2 Role: Principal Investigator ($57,446) Aim: This diversity supplement is to support Joseph Brower, an undergraduate student in the laboratory,and provide him with an adequate training environment to work on Aim 3 of the main proposal.
2022 - 2025	"Development of AAV-mediated Mini-Gene Therapy for Usher Syndrome Type 1F" Royal National Institute for Deaf People (RNID) Translational Grant Mechanism Role: Principal Investigator (with David Corey (Co-PI) and Marcos Sotomayor (Co-PI)) ($180,000) Aim: To develop and test human mini-PCDH15 constructs in human inner ear organoids. Note: This project was recommended for funding, and an award letter was issued

	to MEE. However, the funding was ultimately declined by the MGB Contracting team.
2023 - 2026	"Targeting mitochondrial calcium uptake to protect against noise-induced hearing loss" Royal National Institute for Deaf People (RNID) Discovery Project Grant Mechanism Role: Co-PI (Dr. Ruben Stepanyan (PI), Case Western Revere University (CWRU)) ($50,724) Aim: To investigate how changes in mitochondrial function affect the susceptibility of the auditory system to acquired hearing loss. Note: This project was recommended for funding, and an award letter was issued to MEE and CWRU. However, the funding was ultimately declined by the MGB Contracting team.

Current

2021 - 2024	"Structural evaluation of inner ear hair-cell proteins and rational protein engineering to develop therapies for deafness and blindness" Department of Energy Advanced Photon Source synchrotron beamtime access Role: Principal Investigator Aim: To understand the function of mini-PCDH15s and PKHD1L1 we will solve the structures of their artificially connected extracellular domains.
2022 - 2027	“Development of Gene Therapy for Hereditary Deafness using Rational Protein Engineering.” NIH, NIDCD R01 DC020190 Role: Principal Investigator (MPIs: David Corey, Harvard Medical School and Marcos Sotomayor, Ohio State University.) ($1,135,813) Aim: Test best-performing mini-PCDH15 to rescue the hearing and balance deficit in Pcdh15-deficient mice.
2023 - 2024 NCE	"Evaluation of human mini-PCDH15s in Human Inner Ear Organoids to treat Ush1F" MGB Gene and Cell Therapy Institute Role: Principal Investigator ($208,333) Aim: We will test human mini-PCDH15 in human inner ear organoid hair cell-like cells for proper localization and functional rescue.
2023 - 2024	"Structural evaluation of inner ear hair-cell proteins and rational protein engineering to develop therapies for deafness and blindness" Department of Energy Brookhaven National Laboratory synchrotron beamtime access Role: Principal Investigator Aim: To understand the function of mini-PCDH15s and PKHD1L1 we will solve the structures of their artificially connected extracellular domains.
2024	"Evaluation of human mini-PCDH15s in Sensory Cells" MGB Gene and Cell Therapy Institute Role: Principal Investigator ($42,000) Aim: Additional salary support for lab personnel involved in this study.
2024 - 2025	"Adoption of dAPEX2 reporter mice for 3D reconstruction of cholinergic synapses in the auditory midbrain"

	NEOMED Pilot seed funds Role: Collaborator (Brett R. Schofield, PhD and Ruben Stepanyan, PhD) ($11,064) Aim: To obtain pilot data through serial 3D electron microscopy and machine-learning-based synapse data analysis, supporting an NIH-level funding application
2024 - 2026	“Targeting mitochondrial calcium uptake to protect against noise-induced hearing loss” US Department of Defense Hearing Restoration Research Program; Focused Research Award RH230041 Role: Principal Investigator ($129,960) Aim: Perform an in silico, in vitro and in vivo screen of FDA-approved drugs for molecules that can block mitochondrial calcium uniporter (systemic delivery) in order to protect mice from noise-induced hearing loss.
2024 - 2029	"Calcium Regulation in Cochlear Cells" NIH, NIDCD R01 R01DC021795 Role: Principal Investigator (MPI) (Ruben Stepanyan (contact PI), Case Western University.) ($586,579) Aim: To evaluate the role of mitochondrial Ca overload on hearing function across various cochlear cell types
2025 - 2027	"In-silico screen and in-vivo evaluation of FDA-approved drugs to treat noise-induced hearing loss" NIH, NIDCD R21 DC022085 Role: Principal Investigator (Ruben Stepanyan, Case Western University) ($149,970) Aim: Perform an in silico, in vitro and in vivo screen of FDA-approved drugs for molecules that can block mitochondrial calcium uniporter (transtympanic delivery) in order to protect mice from noise-induced hearing loss.

Projects Submitted for Funding

Submitted	"Development of mini-USH2A gene therapy to rescue hearing loss in Usher syndrome type 2A" NIH, NIA R21 Role: Collaborator (subcontract) with Dr. Anil Chekuri (PI), Mass Eye and Ear ($87,558) Evaluate the efficacy of a selected USH2A minigene in rescuing auditory function for Usher syndrome type 2 (USH2) using the Ush2a-ko mouse model.
Submitted	"Machine Learning-Based Analysis of 3D Neural Tissue Microscopy Datasets" NIH, NIDCD R01 Role: Co-PI (MPI) with Dr. Uri Manor (PI), University of California, San Diego. ($1,240,000) Create user-friendly software to enhance the accuracy and efficiency of data analysis, democratizing access to powerful analysis tools for the broader scientific community. Review: September 2024.

Training Grants and Mentored Trainee Grants

2020 - Present	“Training for Speech and Hearing Sciences”

	5T32DC000038-29 Training grant Role: Mentor Aim: This proposal supports an interdisciplinary doctoral program begun in 1992 that prepares scientists for innovative research careers in the Speech and Hearing Sciences.
2022	“Identification of TMC1 ion channel modulators as a therapeutic alternative to treat deafness”, by Pedro De-la-Torre Subcontract with Conception University (Universidad de Concepción, Chile) Foundation grant Role: Mentor This is a collaborative project between MEE and leading institutions in Latin America, Conception University (Chile) and University of Talca (Chile), to perform an in silico screen of small molecules to identify novel blockers of TMC1.
2022	“Crystallization of Extracellular Cadherin Repeats of Synthetic PCDH15 Proteins”, by Joseph Brower. Harvard Program for Research in Science and Engineering (PRISE) Foundation grant Role: Mentor Aim: Funding support for Joseph Brower to perform his research in my lab
2023	“Rational protein engineering of gamma-Crystallin variants for therapeutic use”, by April Keyes. Harvard Program for Research in Science and Engineering (PRISE) Foundation grant Role: Mentor Aim: Funding support for April Keyes to perform her research in my lab
2023	“Characterization of PKHD1L1 IPT Domains 1-3 and Their Hearing Loss Causing Mutations” by Joseph Brower. Mary Gordon Roberts Mind Brain Behavior Interfaculty Initiative Summer Fellowship Foundation grant Role: Mentor Aim: Funding support for Joseph Brower to perform his research in my lab
2023	“Structural characterization of PKHD1L1 fragment” by Joseph Brower. The Herchel Smith-Harvard Undergraduate Research Program Foundation grant Role: Mentor Aim: Funding support for Joseph Brower to perform his research in my lab
2024	“Rational protein engineering of gamma-Crystallin variants for therapeutic use”, by April Keyes. Harvard College Research Program (HCRP) Foundation grant Role: Mentor Aim: Funding support for April Keyes to perform her research work in my lab for the summer of 2024
2024 - 2026	"Effects of the TECTB-C225Y Variant in the Inner Ear", by Evan Hale NIH, NIDCD F31DC021855 F31 Fellowship grant Role: Mentor Aim: To assess the phenotype of the Tectb-C225Y mouse model, determine if it

	recapitulates the phenotype observed in patients, and to investigate the effect of this point mutation on hearing.
2024 - 2027	"Investigating the role of tip link biophysics on MET function", by Frank Yeh NIH, NIDCD F32DC022491 F32 Fellowship grant Role: Mentor Aim: This project seeks to exploit this novel protein manipulation technique to study the biophysical properties of tip links and the influence of these properties on the MET channel function.

Unfunded Current Projects

2017 - Present	The role FREM2, linked to Frazer syndrome in humans, in mouse development. Role: Principal Investigator To investigate the role of FREM2, implicated in Fraser syndrome, using the Frem2-knockout (Frem2-ko) mouse model.
2019 - Present	Characterization of promoter activity in the inner ear hair cells for a set of short promoters. Role: Principal Investigator The goal of this project is to select and quantitatively characterize short, ubiquitous and cell-specific promoters for inner ear gene therapy.
2020 - Present	Development of machine-learning-based data analysis pipelines for light and electron microscopy datasets. Role: Principal Investigator Develop novel machine-learning-based tools to analyze serial imaging data.
2020 - Present	Assessment of Vestibular Hair Cell Survival in Usher Syndrome Type 1 Patients Role: Principal Investigator To quantify vestibular hair cell survival in temporal bones of Usher syndrome type 1 patients from MEE temporal bone bank registry.
2021 - Present	In-situ Cryo-EM tomography of hair cell stereocilia bundles. Role: Principal Investigator To perform high resolution Cryo-EM imaging of the hair cell mechanotransduction complex
2021 - Present	Development of endotoxin-induced neuroinflammation therapy using rational protein engineering of gamma-Crystallin variants. Role: Collaborator To design and evaluate high-affinity mutants of gamma-Crystallin for treatment of neuroinflammation in the retina
2022 - Present	Characterization of the hearing phenotype in a mouse model of human TECTB variant. Role: Principal Investigator To characterize the hearing loss phenotype in the mouse model carrying a TECTB variant, which segregates with hearing loss in patients.

Report of Local Teaching and Training

Teaching of Students in Courses:

11/2007 - 01/2009	Human Anatomy course Medical students	Dnipropetrovsk State Medical Academy. Dnipropetrovsk, Ukraine, Dnipropetrovsk, Ukraine part-time, ~50% effort
2020 - 2022	MED-SCI 300QC Responsible Conduct of Science PhD students	Harvard University, Boston, MA 10 hours/year
2021 - Present	SHBT 201, Biology of the Inner Ear PhD students	Harvard University, Boston, MA 4 hours/year

Research Supervisory and Training Responsibilities:

2017 - Present	Lab research mentoring Students and postdoctoral fellows	MEE 4 fellows, 4 hrs/week = 200 hrs/year. 2 students, 2hrs/week = 100 hrs/year.

Formally Mentored Harvard Students (Medical, Dental, Graduate, and Undergraduate):

2019 - 2024	Christopher Buswinka. Harvard Program in Speech and Hearing Bioscience and Technology; Mentoring role: PhD advisor Thesis "Applications of Computer Vision on the Biology of the Inner Ear". Accomplishments: three publications (2 peer-reviewed, one preprint).
2020 - 2022	Charles Tyler Morris. Harvard University; Mentoring role: Undergraduate thesis advisor Thesis "Structural Determinants of a Mutant-Containing Region in PKHD1L1, a Stereocilia Surface Coat Protein Required for Proper Hearing Function". Accomplishments: experimental work, one manuscript publication. Current position: Account Manager, Thermo Fisher Scientific
2020 - 2023	Joseph Brower. Harvard University; Mentoring role: Undergraduate thesis advisor Thesis: "Structural Characterization and Investigation of Mini-Protocadherin-15 Proteins for Usher Syndrome Type 1F Gene Therapy". Accomplishments: experimental work, two manuscript publications.
2021 - 2022	Ella Wesson, Harvard University. Mentoring role: Supervisor Career stage: Undergraduate student. Mentoring role: Supervisor. Accomplishments: lab research work, one manuscript publication.
2021 - Present	Evan B. Hale. Harvard Program in Speech and Hearing Bioscience and Technology; Mentoring role: PhD advisor
2022 - Present	April Keyes. Harvard University; Mentoring role: Undergraduate thesis advisor
2023	Jenny Jin. Harvard School of Public Health. Master's thesis committee member.
2023 - 2024	Matthew Mun. Harvard Program in Speech and Hearing Bioscience and Technology; Mentoring role: Preliminary Qualifying Exam Committee Chair Helped to navigate the PQE exam preparation process, chaired the examination committe and prepared the final report.
2024 - Present	Pranathi Ganti. Harvard University; Mentoring role: Supervisor
2024 - Present	Neil Sash. Harvard University; Mentoring role: Supervisor

Other Mentored Trainees and Faculty:

2016 - 2017	Hoor Al Jandal / Research Associate, Church Lab; Wyss Institute, HMS. Career stage: Undergraduate student. Northeastern University; Mentoring role: Advisor. Accomplishments: two manuscript publications.
2018	Dhun Chauhan / Medical school Career stage: Undergraduate student (Co-op). Mentoring role: Advisor. Accomplishments: training in laboratory research, experimental work.
2018 - 2019	Daniel Hathaway / Graduate student, HMS Career stage: Undergraduate student (Co-op). Mentoring role: Advisor. Accomplishments: three manuscript publications.
2018 - 2020	Chunjie Tian, MD, PhD / Assistant Professor, Medical School, China Career stage: Postdoctoral Fellow. Mentoring role: Advisor. Accomplishments: four manuscript publications.
2018 - 2022	Olga Strelkova, PhD / Postdoctoral fellow, University of Massachusetts Career stage: Postdoctoral Fellow. Mentoring role: Advisor. Accomplishments: five manuscript publications.
2019 - 2021	David Rosenberg, MBBS. / Research Associate, University of California San Diego Career stage: Postdoctoral fellow. Mentoring role: Advisor. Accomplishments: training in laboratory research, experimental work, two manuscript publications, one in preparation.
2019 - 2021	Xinyuan (Grace) Zhang, BS / Medical Student, University of Queensland Career stage: Research Assistant. Mentoring role: Advisor. Accomplishments: two manuscript publications.
2019 - 2024	Pedro De La Torre, PhD / Teaching Faculty Member, University of Baranquilla, Colombia Career stage: Postdoctoral fellow, Research Scientist. Mentoring role: Advisor. Accomplishments: five manuscript publications.
2020 - 2021	Jonathan Mo / Medical School Student, UC Davis Career stage: Undergraduate Student, matched through the ARO spARO Mentorship program. Mentoring role: Advisor. Accomplishments: accepted to medical school.
2021 - 2022	Federica M. Raciti Career stage: PhD Student, University of Florida, matched through the ARO spARO Mentorship program. Mentoring role: Advisor.
2021 - 2022	Rachel Gamburg / Analyst, Axtria Career stage: Undergraduate student (summer). Mentoring role: Advisor. Accomplishments: job in industry.
2021 - 2023	Emily Nguyen / Undergraduate student, Bunker Hill Community College Career stage: High School Student. Mentoring role: Advisor. Accomplishments: one manuscript publication.
2021 - Present	Richard Osgood, PhD Career stage: Postdoctoral Fellow. Mentoring role: Advisor. Accomplishments: four manuscript publications, one in preparation.

2022 - 2023	Sarah Visconti Career stage: Undergraduate student (Co-op). Mentoring role: Advisor. Accomplishments: experimental work.
2022 - 2023	Hidetomi Nitta / Research Assistant, Tufts University. Career stage: Undergraduate student, Northeastern University. (Co-op). Mentoring role: Advisor. Accomplishments: two manuscript publications.
2022 - 2023	Karina Martinez / Research Assistant, HMS Department of Cell Biology Career stage: Master student, Universidad Del Atlántico (Colombia). Mentoring role: Advisor. Accomplishments: one manuscript publication.
2022 - 2023	Auntara Nandi / PhD Student, Molecular and Cellular Biology at Stony Brook University Career stage: Masters student, Birla Institute of Technology & Science, Pilani University (India). Mentoring role: Advisor. Accomplishments: experimental work, accepted to a PhD Program.
2022 - 2023	Mona Jawad / PhD Student, Washington University St. Louis Career stage: Undergraduate student, University of Illinois at Urbana-Champaign. Mentoring role: Advisor. Accomplishments: manuscript in preparation.
2022 - Present	Sophia Wu / Undergraduate student, Wellesley College. High School Student. Mentoring role: Advisor. Accomplishments: manuscript in preparation.
2022 - Present	Rubina Simikyan / Research Assistant Career stage: Undergraduate student, Research Assistant. Mentoring role: Advisor. Accomplishments: three manuscript publications, one manuscript in preparation.
2022 - Present	Aaron Paul / Medical Student, Albany Medical College Career stage: Undergraduate student, Medical Student. Mentoring role: Advisor.
2023 - 2025	MyungHoon Yoo / Associate Professor, Department of Otorhinolaryngology-HNS, Kyungpook National University Hospital (Korea) Career stage: Visiting Associate Professor; Mentoring role: Advisor. Accomplishments: manuscript in preparation.
2024	Ethan Lawrence / Medical Student, Charles R. Drew University of Medicine and Science College of Medicine; Harvard Visiting Research Internship Scholar Career stage: Medical student (summer internship). Mentoring role: Advisor. Accomplishments: research work in the lab.

Local Invited Presentations:

☒ *No presentations below were sponsored by 3rd parties/outside entities*

☐ *Those presentations below sponsored by outside entities are so noted and the sponsor(s) is (are) identified.*

04/2021	"Making shorter tip-links to treat Usher Syndrome Type 1F using a mini-gene therapy approach". / Invited talk MEE Joint Research Symposium, Eaton-Peabody Laboratories, MEE, Boston, MA

01/2024	Fireside chat: "Current Trends and Future Directions in Regenerative Medicine in Hearing" / Invited panel member of a discussion group Eaton-Peabody Laboratories, MEE, Boston, MA
05/2024	"Harnessing AI for Enhanced Analysis of Cochlear Imaging Data" / Invited talk MEE Research Day, Boston, MA
12/2024	"Development of AAV-based gene therapies for Ush1F" / Invited talk "Sensory Rehabilitation and Restoration" symposium, MEE, Boston, MA
09/2025	"Harnessing AI for Enhanced Analysis of Light and Electron Microscopy Imaging Data" / Invited talk Schepens Eye Research Institute, Department of Ophthalmology, Boston, MA

Report of Regional, National and International Invited Teaching and Presentations

☒ *No presentations below were sponsored by 3rd parties/outside entities*

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Regional

09/2013	"Dynamic molecular composition of regenerating tip links in mammalian cochlear hair cells" / Invited talk MEE, Eaton Peabody Laboratory, Boston, MA
01/2017	"Mechanotransduction in hair cells and primary cilia: Integrating electrophysiology and advanced microscopy" / Invited talk MEE, Eaton Peabody Laboratory, Boston, MA

National

02/2012	"Dynamic molecular composition of regenerating tip links in mammalian cochlear hair cells" / Selected podium presentation ARO Annual Meeting, San Diego, CA
02/2014	"Genetically encoded calcium indicators enable MET channel localization in cochlear hair cells" / Invited Symposium Presentation ARO Annual Meeting, San Diego, CA
04/2016	"Kinocilia and other primary cilia are not calcium-responsive mechanosensors" / Invited Symposium Presentation Experimental Biology Conference Meeting, San Diego, CA
03/2017	"Mechanotransduction in hair cells and primary cilia: Integrating electrophysiology and advanced microscopy" / Invited Lecture, Jochen Schacht Annual Lectureship Kresge Hearing Research Institute, University of Michigan, Ann Arbor, MI
05/2019	"PKHD1L1, a novel coat protein of hair-cell stereocilia, is required for high-frequency hearing in mouse". / Invited talk Case Western Reserve University, Department of OHNS, Cleveland, OH

08/2019	Hair cell mechanotransduction laboratory course. / Invited laboratory course presentation The Biology of the Inner Ear Course, University of Chicago, Marine Biological Laboratory., Woods Hole, MA
09/2021	“A Machine Learning-Based Cochlear Hair Cell Analysis Toolbox” / Invited talk Department of Defense. Pharmaceutical Interventions for Hearing Loss (PIHL) working group (Ototoxicity), Hearing Center of Excellence., Baltimore, MD
01/2022	"Making shorter tip-links to treat Usher Syndrome Type 1F using a mini-gene therapy approach" / Selected podium presentation Ultimate Colorado Midwinter Meeting, Vail, CO
08/2022	Hair cell mechanotransduction laboratory course. / Invited laboratory course presentation The Biology of the Inner Ear Course, University of Chicago, Marine Biological Laboratory., Woods Hole, MA
01/2023	"The Hair Cell Analysis Toolbox: A machine learning-based whole cochlea analysis pipeline" / Selected podium presentation Ultimate Colorado Midwinter Meeting, Vail, CO
04/2023	"Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F" / Invited talk Case Western Reserve University, Department of OHNS, Cleveland, OH
01/2024	“AAV-based mini-gene therapy of Usher syndrome type 1F using structure-guided development of shorter tip links” / Invited talk Pharmacology Department, University of Florida, Jacksonville, FL
06/2024	"Use of machine learning and data science in the hearing field" / Invited talk, Keynote speaker Mechanics of Hearing Workshop, University of Michigan, Ann Arbor, MI
07/2025	"Edge Techniques and Models Applications in Hearing Research -Machine Learning Toolboxes for Hearing Research" / Invited talk Association for Research in Otolaryngology, Online event
11/2025	"The TECTB-C225Y Variant Causing Autosomal Dominant Deafness in a Nicaraguan Family Enhances Sensitivity to Noise-Induced Hearing Loss in Mice" / Invited talk, Keynote speaker Internetional Conference of the Genetic Society of Korea
11/2025	"Harnessing AI for Enhanced Analysis of Light and Electron Microscopy Imaging Data" / Invited talk Korea Brain Research Institute
03/2026	"Harnessing AI for Enhanced Analysis of Light and Electron Microscopy Imaging Data" / Invited talk Bellucci Translational Hearing Center, Creighton University, Omaha, NE

International

09/2019	“PKHD1L1, a novel coat protein of hair-cell stereocilia, is required for normal hearing in mouse” / Invited talk 5th Chinese Hearing Research Conference, Beijing, China

10/2019	“PKHD1L1, a novel stereocilia coat protein of hair-cell stereocilia, is required for normal hearing in mouse” / Invited talk, Keynote speaker 3rd International conference meeting “Theory and Practice of Current Morphology”, Dnipropetrovsk State Medical Academy, Ukraine
11/2020	"Dynamic molecular composition of regenerating tip links in mammalian cochlear hair cells" / Invited talk “Ear Summit Colombia”, Bogota, Colombia
06/2022	“Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F” / Invited talk 2nd Inner Ear Disorders Therapeutics Summit, Boston, MA.
11/2022	“Structure-guided development of AAV-Mediated Mini-Gene Therapy for of Usher Syndrome Type 1F” / Invited talk VII International Congress on Integral Health, Universidad del Magdalena., Magdalena, Colombia
03/2023	“AAV-based mini-gene therapy of Usher syndrome type 1F using structure-guided development of shorter tip links”. / Invited talk Department of Bioengineering, Imperial College London, London, UK
03/2023	“Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F” / Invited talk Wolfson Centre for Age-Related Diseases, Kings College London, London, UK
03/2023	“Engineering of Shorter Tip Links to Treat Usher Syndrome Type 1F” / Invited talk Hearing Institute. University College London, London, UK
05/2023	“Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F” / Invited talk Copenhagen Hearing and Balance Center and Hearing Systems Section, Department of Health Technology, Technical University of Denmark, Copenhagen, Denmark
05/2023	“The role of basic science in development of cutting-edge gene therapies”. / Invited talk Dendritic, a non-profit research organization founded by undergraduate and medical students from low-income families and minority groups attending various schools in the US and Canada, Ontario, Canada
05/2023	“Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F” / Invited talk Department of Physiology and Pharmacology, Karolinska Institute, Stockholm, Sweden
06/2023	“Structural Characterization of Engineered Mini-PCDH15 Proteins for Usher Syndrome Type 1F Gene Therapy” / Invited talk Max Delbrück Center for Molecular Medicine, Berlin, Germany
08/2023	“Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F” / Invited talk The Institute for Neurosciences of Montpellier, Montpellier, France
11/2023	“Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F” / Invited talk

	ENT department, Kyoto University, Kyoto, Japan
11/2023	"Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F" / Invited talk, Keynote speaker Department of Molecular Genetics, Kitasato University School of Medicine, Tokyo, Japan
11/2023	"Development of AAV-Mediated Mini-Gene Therapy for Usher Syndrome Type 1F" / Invited talk Department of Molecular and Cellular Pharmacology, Osaka University, Osaka, Japan
09/2024	"Harnessing AI for Enhanced Analysis of Cochlear Imaging Data" / Invited talk University Medical Center Göttingen, Göttingen, Germany
11/2025	"The TECTB-C225Y Variant Causing Autosomal Dominant Deafness in a Nicaraguan Family Enhances Sensitivity to Noise-Induced Hearing Loss in Mice" / Invited talk, Keynote speaker Genetics Society of Korea, Suwon, Korea

Report of Technological and Other Scientific Innovations

AAV vectors encoding mini-PCDH15 and uses thereof (2020)	Corey DP, **Indzhykulian AA**, Sotomayor M, Ivanchenko MV, Peters CWD (2020) *AAV vectors encoding mini-PCDH15 and uses thereof* (US Patent No. 2020/029968). U.S. Patent and Trademark Office. We developed miniaturized minigenes encoding mini-PCDH15 such that they could fit into a single AAV, while preserving their ability to mediate the hearing, balance and vision function in Pcdh15-deficient mice. These mini-PCDH15s can be used to treat deafness, blindness and balance deficit caused by Usher syndrome type 1F.

Report of Education of Patients and Service to the Community

☒No presentations below were sponsored by 3rd parties/outside entities.

☐Those presentations below sponsored by outside entities are so noted and the sponsor(s) is (are) identified.

Activities

2017	Countryside Elementary School, as part of a state-wide program "Understanding Our Differences" / Invited talk

Report of Scholarship

* denotes equal authorship contribution

** denotes mentored trainee.

Peer-Reviewed Scholarship in print or other media:

Research Investigations

1. [Kozlov V, Dovgal G, Zharikov M, **Indzhykulyan A.** Structure of papillary-trabecular apparatus and location variants of sinew filaments in heart of fetuses and children. Bukovinian Medical Bulletin, 2001. 5:59-60.] (*In Russian*)
2. [Abdul-Ogli L, **Indzhykulyan A.** Vascularisation and proliferation features of different regions of human's heart wall in ontogenesis. Bulletin of Biology and Medicine, 2005. 2:104-109]. (*In Russian*)
3. [Kozlov S, **Indzhykulyan A.** Constitutional features of mature age human heart. Bulletin of Biology and Medicine, 2005. 3:122-126]. (*In Russian*)
4. [**Indzhykulyan A.** Basic morphological characteristics of mature age men in correlation with the anthropometric indexes of the body. Medical Perspectives, 2006. 3:152-155]. (*In Russian*)
5. [**Indzhykulyan A,** Kozlov SV. Somatotypical features of some morphometric parameters of human heart. Medical Perspectives, 2007. 2:22-29]. (*In* Russian)
6. [**Indzhykulyan A.** Anthropometric and somatic type features of indexes of men in mature age. Morphologiã, 2007. 2:59-66]. (*In Russian*)
7. [**Indzhykulyan A.** Mathematical modeling of the morphometric parameters of mature age men's heart. Morphologiã, 2007. 3:27-31]. (*In Russian*)
8. [Savenkova S, Kozlov SV, **Indzhykulyan AA.** Structure of human heart's internal surface during the prenatal ontogenesis. Morphologiã, 2008. 2:44-46]. (*In Russian*)
9. [Kosharniy VV, **Indzhykulyan AA**, Abdul-Ogli LV. Morphogenetic transformations of rat embryos inner organs following exposure of EHF and UHF electromagnetic radiation. Bulletin of Biology and Medicine, 2011. 4:208-215]. (*In Russian*)
10. Stepanyan RS, **Indzhykulian AA,** Vélez-Ortega AC, Boger ET, Steyger PS, Friedman TB, Frolenkov GI. TRPA1-mediated accumulation of aminoglycosides in mouse cochlear outer hair cells. *J Assoc Res Otolaryngol*. 2011 Dec;12(6):729-40. doi: 10.1007/s10162-011-0288-x. Epub 2011 Aug 31. PMID: 21879401; PMCID: PMC3214240.
11. Riazuddin S, Belyantseva IA, Giese AP, Lee K, **Indzhykulian AA,** Nandamuri SP, Yousaf R, Sinha GP, Lee S, Terrell D, Hegde RS, Ali RA, Anwar S, Andrade-Elizondo PB, Sirmaci A, Parise LV, Basit S, Wali A, Ayub M, Ansar M, Ahmad W, Khan SN, Akram J, Tekin M, Riazuddin S, Cook T, Buschbeck EK, Frolenkov GI, Leal SM, Friedman TB, Ahmed ZM. Alterations of the CIB2 calcium- and integrin-binding protein cause Usher syndrome type 1J and nonsyndromic deafness DFNB48. *Nat Genet*. 2012 Nov;44(11):1265-71. doi: 10.1038/ng.2426. Epub 2012 Sep 30. PMID: 23023331; PMCID: PMC3501259.
    - Comment in HotSpots: Jan A. Mutations in CIB2 calcium and integrin-binding protein disrupt auditory hair cell calcium homeostasis in Usher syndrome type 1J and non-syndromic deafness DFNB48. Clin Genet. 2013 Apr;83(4):317-8.
12. **Indzhykulian AA,**Stepanyan R, Nelina A, Spinelli KJ, Ahmed ZM, Belyantseva IA, Friedman TB, Gillespie PG, Frolenkov GI. Molecular remodeling of tip links underlies mechanosensory regeneration in auditory hair cells.*PLoS Biol*. 2013;11(6):e1001583. doi: 10.1371/journal.pbio.1001583. Epub 2013 Jun 11. PMID: 23776407; PMCID: PMC3679001.
    - Featured in Leading Edge Select: "Making or breaking the inner ear" Cell, 2013 154,945-947.

- Preview. Robinson R. A close look at hearing repair, one protein at a time. PLoS Biol. 2013;11(6)
- Referenced as "study of outstanding interest". Zhao B, Muller U, The elusive mechanotransduction machinery of hair cells. Curr Opin Neurobiol. 2015 Oct;34:172-9.
- Selected as "New Finding" and "Technical Advance" by the Faculty of 1000.
- Cover paper.

13. Scheffer DI, Zhang DS, Shen J, **Indzhykulian A**, Karavitaki KD, Xu YJ, Wang Q, Lin JJ, Chen ZY, Corey DP. XIRP2, an Actin-Binding Protein Essential for Inner Ear Hair-Cell Stereocilia. *Cell Rep.* 2015 Mar 24; 10(11) 1811-8. PMID: 25772365.
14. Fang Q, **Indzhykulian AA**, Mustapha M, Riordan GP, Dolan DF, Friedman TB, Belyantseva IA, Frolenkov GI, Camper SA, Bird JE. The 133-kDa N-terminal domain enables myosin 15 to maintain mechanotransducing stereocilia and is essential for hearing. *Elife.* 2015 Aug 24;4. PMID: 26302205.
    - Preview. Nicolson T. Hearing: It takes two. Elife. 2015 Oct 6;4.
15. Delling M*, **Indzhykulian AA***, Liu X, Li Y, Xie T, Corey DP, Clapham DE. Primary Cilia Are Not Calcium-Responsive Mechanosensors. *Nature.*2016 Mar 31;531(7596):656-60. PMID: 27007841, PMC4851444. (*Equally contributing, co-first author*)
    - News & Views. Norris DP, Jackson PK. Cell biology: Calcium contradictions in cilia, Nature. 2016 Mar 31;531(7596):582-3.
    - Selected as "Controversial", "Negative/Null Results", "New Finding", "Refutation" and "Technical Advance" by the Faculty of 1000.
16. Wu X*, **Indzhykulian AA***, Niksch PD, Webber RM, Garcia-Gonzalez M, Watnick T, Zhou J, Vollrath MA, Corey DP. Hair-Cell Mechanotransduction Persists in TRP Channel Knockout Mice. *PLoS One.* 2016 May 19;11(5):e0155577. doi: 10.1371/journal.pone.0155577. PMID: 27196058; PMCID: PMC4873267.
17. Panou I*, Yamanbaeva G*, Vogl C*, Wichmann C*, Mangosing S*, Vilardi F*, **Indzhykulian AA***, Pangršic T*, Wu X, Wojcik SM, Kwan KY, Schwappach B, Strenzke N, Corey DP, Lin S-Y, Moser T. Tryptophan-rich basic protein (WRB) mediates insertion of the tail-anchored protein otoferlin and is required for hair cell exocytosis and hearing. *EMBO J.* 2016 Dec 1;35(23):2536-2552. PMID: 27458190, PMCID: PMC5283584. (*Equally contributing, co-first author*)
    - News & Views. Avraham KB. What's hot about Otoferlin. EMBO J. 2016 Dec 1;35(23):2502-2504.
18. György B, Sage C, **Indzhykulian AA,** Scheffer DI, Brisson AR, Tan S, Wu X, Volak A, Mu D, Tamvakologos PI, Li Y, Fitzpatrick Z, Ericsson M, Breakefield XO, Corey DP, Maguire CA. Rescue of Hearing by Gene Delivery to Inner-Ear Hair Cells Using Exosome-Associated AAV. *Mol Ther*. 2017 Feb 1;25(2):379-391. doi: 10.1016/j.ymthe.2016.12.010. Epub 2017 Jan 9. PMID: 28082074; PMCID: PMC5368844.
    - News & Views. Martin DM, Raphael Y. It's All in the Delivery: Improving AAV Transfection Efficiency with Exosomes. Mol Ther. 2017 Feb 1;25(2):309-311.
19. Vélez-Ortega AC, Freeman MJ, **Indzhykulian AA**, Grossheim JM, Frolenkov GI. Mechanotransduction current is essential for stability of the transducing stereocilia in mammalian

auditory hair cells. *Elife*. 2017 Mar 28;6:e24661. doi: 10.7554/eLife.24661. PMID: 28350294; PMCID: PMC5407859.

20. Pan B, Askew C, Galvin A, Heman-Ackah S, Asai Y, **Indzhykulian AA,** Jodelka FM, Hastings ML, Lentz JJ, Vandenberghe LH, Holt JR, Géléoc GS. Gene therapy restores auditory and vestibular function in a mouse model of Usher syndrome type 1c. *Nat Biotechnol*. 2017 Mar;35(3):264-272. doi: 10.1038/nbt.3801. Epub 2017 Feb 6. PMID: 28165476; PMCID: PMC5340578.
    - News & Views. Brigande JV. Hearing in the mouse of Usher. Nat Biotechnol. 2017 Mar 7;35(3):216-218.
    - Selected as "New Finding" and "Technical Advance" by the Faculty of 1000.
21. György B, Meijer EJ, Ivanchenko MV, Tenneson K, Emond F, Hanlon KS, **Indzhykulian AA**, Volak A, Karavitaki KD, Tamvakologos PI, Vezina M, Berezovskii VK, Born RT, O'Brien M, Lafond JF, Arsenijevic Y, Kenna MA, Maguire CA, Corey DP. Gene Transfer with AAV9-PHP.B Rescues Hearing in a Mouse Model of Usher Syndrome 3A and Transduces Hair Cells in a Non-human Primate. *Mol Ther Methods Clin Dev.* 2018 Nov 20;13:1-13. PMCID: PMC6297893.
22. Wu X, Ivanchenko MV, Al Jandal H, Cicconet M, **Indzhykulian AA*,** Corey DP*. PKHD1L1 is a coat protein of hair-cell stereocilia and is required for normal hearing. *Nat Commun.* 2019 Aug 23;10(1):3801. doi: 10.1038/s41467-019-11712-w. PMCID: PMC6707252. (*Co-corresponding author*).
23. Shu Y, Li W, Huang M, Quan YZ, Scheffer D, Tian C**, Tao Y, Liu X, Hochedlinger K, **Indzhykulian AA**, Wang Z, Li H, Chen ZY. Renewed proliferation in adult mouse cochlea and regeneration of hair cells. *Nat Commun.* 2019 Dec 4;10(1):5530. doi:10.1038/s41467-019-13157-7. PMCID: PMC6892913.
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25. Hayashi Y, Chiang H, Tian C**, **Indzhykulian AA,** Edge ASB. Norrie disease protein is essential for cochlear hair cell maturation. *Proc Natl Acad Sci U S A.* 2021 Sep 28;118(39):e2106369118. doi: 10.1073/pnas.2106369118. PMID: 34544869; PMCID: PMC8488680.
26. Ivanchenko MV, **Indzhykulian AA,** Corey DP. Electron Microscopy Techniques for Investigating Structure and Composition of Hair-Cell Stereociliary Bundles. *Front Cell Dev Biol.* 2021 Oct 22;9:744248. doi: 10.3389/fcell.2021.744248. PMID: 34746139; PMCID: PMC8569945.
27. Holmgren M, Ravicz ME, Hancock KE, Strelkova O**, Kallogjeri D, **Indzhykulian AA,**Warchol ME, Sheets L. Mechanical overstimulation causes acute injury and synapse loss followed by fast recovery in lateral-line neuromasts of larval zebrafish. *Elife.* 2021 Oct 19;10:e69264. doi: 10.7554/eLife.69264. PMID: 34665127; PMCID: PMC8555980.
28. Buswinka CJ**, Osgood RT**, Simikyan RG**, Rosenberg DB**, **Indzhykulian AA.** The hair cell analysis toolbox is a precise and fully automated pipeline for whole cochlea hair cell quantification. *PLoS Biol.* 2023 Mar 22;21(3):e3002041. doi: 10.1371/journal.pbio.3002041. PMID: 36947567; PMCID: PMC10069775. *(Corresponding author).*

29. Ivanchenko MV, Hathaway DM**, Klein AJ, Pan B, Strelkova O**, De-la-Torre P**, Wu X, Peters CW, Mulhall EM, Booth KT, Goldstein C, Brower J**, Sotomayor M, **Indzhykulian AA**, Corey DP. Mini-PCDH15 gene therapy rescues hearing in a mouse model of Usher syndrome type 1F. *Nat Commun*. 2023 Apr 26;14(1):2400. doi: 10.1038/s41467-023-38038-y. PMID: 37100771; PMCID: PMC10133396.

30. Quan YZ, Wei W, Ergin V, Rameshbabu AP, Huang M, Tian C**, Saladi SV, **Indzhykulian AA**, Chen ZY. Reprogramming by drug-like molecules leads to regeneration of cochlear hair cell-like cells in adult mice. *Proc Natl Acad Sci* U S A. 2023 Apr 25;120(17):e2215253120. doi: 10.1073/pnas.2215253120. Epub 2023 Apr 17. PMID: 37068229, PMCID: PMC10151514.

31. Peters CW, Hanlon KS, Ivanchenko MV, Zinn E, Linarte EF, Li Y, Levy JM, Liu DR, Kleinstiver BP, **Indzhykulian AA**, Corey DP. Rescue of hearing by adenine base editing in a humanized mouse model of Usher syndrome type 1F. *Mol Ther.* 2023 Aug 2;31(8):2439-2453. doi: 10.1016/j.ymthe.2023.06.007. Epub 2023 Jun 12. PMID: 37312453; PMCID: PMC10421997.

32. Redfield SE*, De-la-Torre P*, **, Zamani M, Wang H, Khan H, Morris T**, Shariati G, Karimi M, Kenna MA, Seo GH, Xu H, Lu W, Naz S, Galehdari H, **Indzhykulian AA**, Shearer AE, Vona B. PKHD1L1, a gene involved in the stereocilia coat, causes autosomal recessive nonsyndromic hearing loss. *Hum Genet*. 2024 Mar;143(3):311-329. doi: 10.1007/s00439-024-02649-2. Epub 2024 Mar 9. PMID: 38459354; PMCID: PMC11043200. *(Co-corresponding author with equal contribution).*

33. Buswinka CJ**, Rosenberg DB**, Simikyan RG**, Osgood RT**, Fernandez K, Nitta H, Hayashi Y, Liberman LW, Nguyen E**, Yildiz E, Kim J, Jarysta A, Renauld J, Wesson E**, Wang H, Thapa P, Bordiga P, McMurtry N, Llamas J, Kitcher SR, López-Porras AI, Cui R, Behnammanesh G, Bird JE, Ballesteros A, Vélez-Ortega AC, Edge ASB, Deans MR, Gnedeva K, Shrestha BR, Manor U, Zhao B, Ricci AJ, Tarchini B, Basch ML, Stepanyan R, Landegger LD, Rutherford MA, Liberman MC, Walters BJ, Kros CJ, Richardson GP, Cunningham LL, **Indzhykulian AA**. Large-scale annotated dataset for cochlear hair cell detection and classification. *Sci Data*. 2024 Apr 23;11(1):416. doi: 10.1038/s41597-024-03218-y. PMID: 38653806; PMCID: PMC11039649. (*Corresponding author)*.

34. Castro JP*, Shindyapina AV*, Barbieri A, Ying K, Strelkova OS**, Paulo JA, Tyshkovskiy A, Meinl R, Kerepesi C, Petrashen AP, Mariotti M, Meer MV, Hu Y, Karamyshev A, Losyev G, Galhardo M, Logarinho E, **Indzhykulian AA**, Gygi SP, Sedivy JM, Manis JP, Gladyshev VN. Age-associated clonal B cells drive B cell lymphoma in mice. Nat Aging. 2024 Aug 08. PMID: 39117982

35. Strelkova OS**, Osgood RT**, Tian C**, Zhang X**, Hale E**, De-la-Torre P**, Hathaway DM**, **Indzhykulian AA.** PKHD1L1 is required for stereocilia bundle maintenance, durable hearing function and resilience to noise exposure. *Commun Biol.* 2024 Nov 1;7(1):1423. doi: 10.1038/s42003-024-07121-5. PMID: 39482437; PMCID: PMC11527881. (*Corresponding author)*.

36. De-la-Torre P, Martínez-García C, Gratias P, Mun M, Santana P, Akyuz N, González W, **Indzhykulian AA**, Ramírez D. Identification of druggable binding sites and small molecules as modulators of TMC1. Commun Biol. 2025 May 13;8(1):742. doi: 10.1038/s42003-025-07943-x. PMID: 40360848; PMCID: PMC12075566.

37. Wei W, Zhu W, Silver S, Armstrong AM, Robbins FS, Rameshbabu AP, Walz K, Quan Y, Du W, Kim Y, I**ndzhykulian AA**, Shu Y, Liu XZ, Chen ZY. Single-dose genome editing therapy rescues auditory and vestibular functions in adult mice with DFNA41 deafness. J Clin Invest. 2025 Aug 14;135(20):e187872. doi: 10.1172/JCI187872. PMID: 41090360.

38. Simikyan RG, Zhang X, Strelkova O, Li N, Zhu M, Eckhard A, Baranov PY, Wu X, Richey L, **Indzhykulian AA**. Frem2 knockout mice exhibit Fraser syndrome phenotypes and neonatal lethality due to bilateral renal agenesis. Sci Rep. 2025 Sep 26;15(1):32956. doi: 10.1038/s41598-025-14737-y. PMID: 41006360; PMCID: PMC12475133.

Non-peer reviewed scholarship in print or other media:

Reviews, chapters, and editorials

1. **Indzhykulian AA,** Corey DP. In the Right Place at the Right Time: Is TMC1/2 the Transduction Channel for Hearing? *Cell Rep*. 2015 Sep 8;12(10):1531-2. doi: 10.1016/j.celrep.2015.08.064. PMID: 26352665.
2. **Indzhykulian A.A.**, Johnson S.L., Géléoc G.S.G. (2022) Electrophysiological Recordings of Voltage-Dependent and Mechanosensitive Currents in Sensory Hair Cells of the Auditory and Vestibular Organs of the Mouse. *Book Chapter In*: Groves A.K. Developmental, Physiological, and Functional Neurobiology of the Inner Ear. Neuromethods, vol 176. Humana, New York, NY. https://doi.org/10.1007/978-1-0716-2022-9_10

Other non-peer reviewed scholarship

1. Jawad M, Buswinka CJ, Nguyen E, Wu S, **Indzhykulian AA.** Machine-Learning-Based-Segmentation of Inner Ear Hair Cell Stereocilia on Scanning Electron Micrographs. *In preparation.*
2. Osgood RT, Chari DA, O'Malley JT, Zhu MY, Chien W, Cremers C, Nadol Jr JB, Liberman MC, Quesnel AM, **Indzhykulian AA.** Vestibular Hair Cell Survival in Usher Syndrome Type 1 Patients. *In preparation.*
3. Rosenberg RB, Strelkova OS,Buswinka CJ,**Indzhykulian AA.**The Quantitative Evaluation of Short, 'Minimal' CMV Promoters as a tool for AAV-based Inner Ear Gene Therapy. *In preparation.*

Thesis:

1. **Indzhykulyan AA.** (2007) Anthropometric and somatotypical features of morphological indexes of mature age men's heart. Dnipropetrovsk State Medical Academy.

Manuscripts Submitted to Preprint Servers

1. Buswinka CJ, Osgood RT, Nitta H, **Indzhykulian AA.** SKOOTS: Skeleton-oriented object segmentation for mitochondria. bioRxiv [Preprint]. 2025 Aug 13:2023.05.05.539611. doi: 10.1101/2023.05.05.539611. PMID: 37214838; PMCID: PMC10197543.
2. De-la-Torre P, Wen H, Brower J, Martinez-Perez K, Narui Y, Yeh F, Hale E, Ivanchenko MV, Corey DP, Sotomayor M, **Indzhykulian AA.** Elasticity and Thermal Stability are Key Determinants of Hearing Rescue by Mini-Protocadherin-15 Proteins *bioRxiv***[Preprint]**. 2024 Jun 16:2024.06.599132. PMID: 38948700; PMCID: PMC11212938.(Co-corresponding author). Under revision for *PNAS*
3. Hale EB, Vona B, Goodyear RJ, Osgood RT, Amr SS, Mojica K, Vera-Monroy R, Callahan K, Gudlewski KL, Quadros R, Ohtsuka M, McGee J, Walsh EJ, Morton CC, Gurumurthy C, Saunders JE, Richardson GP, **Indzhykulian AA.** The *TECTB-C225Y* Variant Causing

Autosomal Dominant Deafness in a Nicaraguan Family Enhances Sensitivity to Noise-Induced Hearing Loss in Mice. medRxiv [Preprint]. 2025 Aug 14:2025.08.13.25333146. doi: 10.1101/2025.08.13.25333146. PMID: 40832383; PMCID: PMC12363751.

4. Kassim YM, Rosenberg DB, Das S, Huang Z, Rahman S, Al Shammaa I, Salim S, Huang K, Renero A, Miller C, Ninoyu Y, Friedman RA, **Indzhykulian A**, Manor U. VASCilia (Vision Analysis StereoCilia): A Napari Plugin for Deep Learning-Based 3D Analysis of Cochlear Hair Cell Stereocilia Bundles. bioRxiv [Preprint]. 2025 Sep 23:2024.06.17.599381. doi: 10.1101/2024.06.17.599381. PMID: 38948743; PMCID: PMC11212889.

Abstracts, Poster Presentations, and Exhibits Presented at Professional Meetings:

1. Osgood RT, Chari DA, O'Malley JT, Zhu MY, Chien W, Cremers C, Nadol Jr JB, Liberman MC, Quesnel AM, **Indzhykulian AA.** Vestibular Hair Cell Survival and Stereocilia Bundle Morphology in Usher Syndrome Type 1 Patients. Midwinter Meeting of Association for Research in Otolaryngology, Virtual Conference, 2022.
2. Osgood RT, Chari DA, O'Malley JT, Zhu MY, Chien W, Cremers C, Nadol Jr JB, Liberman MC, Quesnel AM, **Indzhykulian AA.** Vestibular Hair Cell Survival in Usher Syndrome Type 1 Patients. Midwinter Meeting of Association for Research in Otolaryngology, Orlando, FL, 2023.
3. De-la-Torre P, Brower JB, Narui Y, Wen H, Ivanchenko MV, Corey DP, Sotomayor M, **Indzhykulian AA**. Structural characterization of mini-PCDH15 proteins for Usher syndrome type 1F therapy. Biophysical society, San Diego, CA 2023
4. Buswinka CJ, Osgood RT, Nitta H, **Indzhykulian AA.** Instance Segmentation of Hair Cell Mitochondria in FIB-SEM Datasets for Morphological Analysis. Midwinter Meeting of Association for Research in Otolaryngology, Orlando, FL, 2023.
5. De-la-Torre P, Brower JB, Narui Y, Wen H, Ivanchenko MV, Corey DP, Sotomayor M, **Indzhykulian AA**. Structural Characterization Of Mini-PCDH15 Engineered Proteins For Usher Syndrome Type 1F Therapy. Midwinter Meeting of Association for Research in Otolaryngology, Orlando, FL, 2023.
6. Hartig E, Moreland Z, Heidings J, Krupp L, **Indzhykulian AA**, Bird J, Tarchini B. MYO15A Function in Stereocilia Requires Light-Chain Binding via the IQ3 Domain. Midwinter Meeting of Association for Research in Otolaryngology, Orlando, FL, 2023.
7. Jawad M, Buswinka CJ, Nguyen E, **Indzhykulian AA.** A Machine Learning Based Segmentation of Inner Ear Hair Cell Stereocilia on Scanning Electron Micrographs Midwinter Meeting of Association for Research in Otolaryngology, Orlando, FL, 2023.
8. Buswinka CJ, **Indzhykulian AA.** Harnessing AI for Enhanced Analysis of Cochlear Imaging Data. Inner Ear Biology 2024 Meeting. Warsaw, Poland.

Narrative Report