BÜŞRA KÖSE-ÖZKAN, PhD

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RESEARCH INTEREST

I am interested in the mechanisms underlying hearing loss-related pathologies, integrating electrophysiological, behavioral, and molecular methods to investigate how auditory system dysfunction affects cognitive and emotional processes.

RESEARCH AND CLINICAL EXPERIENCE

Postdoctoral Researcher **Feb 2026 – present**
NEAF Lab, Biomedical Reseach Institute of New Jersey, United States
- Implementing a social isolation-based prenatal stress model and analyzing behavioral, auditory (two-tone discrimination, AMRD, tone memory, ABR), molecular and hormonal measures in dams and offspring to identify stress-related alterations in auditory processing and neurodevelopment
- Analyzing longitudinal and cross-sectional ABR/FFR recordings in preterm and term infants to identify early neural markers of auditory development and help establish a milestone atlas for early auditory processing

Visiting Researcher **May 2025 – Jan 2026**
Department of Anatomy, Koç University, Türkiye
- Contributed to grant proposal writing, including project design, literature review, data analysis, and preliminary data presentation
- Investigated neuroanatomical connectivity of the auditory cortex with cognitive and emotional processing regions using tract-tracing and diffusion tensor imaging

Visiting Researcher **Jan 2025 – Apr 2025**
Department of Medical Genetics, Koç University, Türkiye
- Conducted PCR-based genotyping, RT-qPCR for gene expression, and immunofluorescence staining to characterize molecular phenotypes in zebrafish embryos
- Observed microinjection procedures for establishing a zebrafish model of muscular dystrophy caused by SNUPN gene mutations using CRISPR/Cas9

Doctoral Researcher **Sept 2019 – Jul 2024**
Koç University Research Center for Translational Medicine, Türkiye
- Investigated connectivity of the pedunculopontine nucleus and supplementary motor area using tract-tracing in rodents and diffusion tensor imaging in humans; performed stereotaxic surgeries, fluorescence/confocal microscopy, and neuroanatomical mapping to define pathways
- Examined developmental changes and regional differences in astrocyte gap junction proteins and astrocyte density in rat models of genetic absence epilepsy; performed molecular assays (immunohistochemistry, Western blotting, RT-qPCR), analyzed data using ImageJ and MATLAB, and prepared figures with GraphPad and Adobe Illustrator

Visiting Researcher **Jan 2023 – Jan 2024**
Auditory Neuroscience Laboratory of Dr. Shaowen Bao, University of Arizona, United States

- Investigated the role of TNF-α signaling in PV neurons of auditory cortex and hippocampus using transgenic mouse model; conducted noise exposure experiments, behavioral assessments (prepulse inhibition, gap detection, anxiety-related behaviours), and auditory brainstem response (ABR) recordings
- Performed whole-cell patch clamp recordings to assess synaptic transmission; conducted stereotaxic surgeries and confocal imaging to examine molecular and cellular changes in the auditory cortex and hippocampus related to noise-induced tinnitus and anxiety

Research Assistant **Sept 2017 – Jun 2019**
Department of Audiology, Marmara University Training and Research Hospital, Türkiye

- Performed clinical audiological and vestibular assessments and interpreted diagnostic results in clinical routine; evaluated hearing aid/cochlear implant candidates and monitored patient outcomes
- Explored how cognitive and auditory skills influence cochlear implant outcomes in children; analyzed working memory, short-term memory, spectral resolution, and speech-in-noise perception to identify predictors of auditory performance
- Developed the Turkish version of the MUSHRA test and evaluated perceived sound quality in adult cochlear implant users

EDUCATION

PhD in Neuroscience (GPA: 3.86/4.00) **Jul 2024**
Institute of Health Sciences, Koç University, Istanbul, Türkiye (4-year full scholarship**)**
Dissertation Title: "Noise trauma-induced auditory processing deficits and anxiety"
Advisor: Prof. Safiye Çavdar

MSc in Audiology and Speech Disorders (GPA: 3.79/4.00 & high honor student) **Aug 2019**
Institute of Health Sciences, Marmara University, Istanbul, Türkiye
Dissertation Title: "Effects of working memory and short-term memory on academic achievement in children with cochlear implants"
Advisor: Prof. Ayça Çiprut

BSc in Audiology (GPA: 3.74/4.00 & high honor student) **June 2017**
Faculty of Health Sciences, Aydın University, Istanbul, Türkiye (4-year full scholarship)

GRANTS

International Research Fellowship for PhD Students, 2023 – 2024. Funded by Scientific and Technological Research Council of Türkiye (TUBITAK), Grant Number: 1059B142200098 ($22,800)

Researcher, 2018 – 2019. Funded by Higher Education Council, Grant Number: SAG-A-110618-0289 (10.200,00 TL - $2,600)

TEACHING EXPERIENCE

Lecturer (PhD) | University of Health Sciences **Sept 2025 – Jan 2026**
NRBL03000000 Neuroscience

Lecturer (PhD) | Department of Audiology, Near East University **Sept 2024 – Jan 2025**
AUD213/SBF213 Auditory Perception Processes (English & Turkish sections)

Teaching Assistant | School of Medicine, Koç University **Sept 2019 – Jun 2021**
Department of Anatomy

Teaching Assistant | Faculty of Health Sciences, Gelişim University **Sept 2017 – Aug 2019**
Department of Audiology

PUBLICATIONS

Köse-Özkan B., Özkan M., Güneş Y. C., Algın O., & Çavdar S. (2026). Primary and nonprimary auditory cortex connectivity with brain regions involved in cognitive and emotional processing: in mouse and human. Hearing Research, 109538.

Köse B., Karaman-Demirel A., & Çiprut A. (2022). Psychoacoustic abilities in pediatric cochlear implant recipients: The relation with short-term memory and working memory capacity. *International Journal of Pediatric Otorhinolaryngology*, 162, 111307.

Köse B., Özkan M., Sur-Erdem İ., & Çavdar S. (2022). Does astrocyte gap junction protein expression differ during development in absence epileptic rats? *Synapse*, e22225.

Çavdar S., **Köse B.**, Altınöz D., Söyler G., Cingöz A., Gürses İ.A., ... & Çakır H. (2023). Lymphatic vessels accompanying dorsal and basal dural sinuses in the human. *Journal of Chemical Neuroanatomy*, 134, 102357.

Çavdar S., **Köse B.**, Altınöz D., Özkan M., Güneş Y.C. & Algın O. (2023). The brainstem connections of the supplementary motor area and its relations to the corticospinal tract: Experimental rat and human 3-tesla tractography study. *Neuroscience Letters*, 798, 137099.

Çavdar S., **Köse B.**, Özkan M. & Sur-Erdem İ. (2022). Comparison of astrocytes and gap junction proteins in the white matter of genetic absence epileptic and control rats: an experimental study. *Neurological Research*, 1-11.

Çavdar S., Sürücü S., Özkan M., **Köse B.**, Malik A.N., Aydoğmuş E., Tanış Ö. & Lazoğlu İ. (2022). Comparison of the morphological and mechanical features of human cranial dura and other graft materials used for duraplasty. *World Neurosurgery*, 159, e199-e207.

Özkan M., **Köse B.**, Algın O., Oğuz S., Erden M.E. & Çavdar S. (2021). Non-motor connections of the pedunculopontine nucleus of the rat and human brain. *Neuroscience Letters*, 136308.

Arslan N.Ö., Akbulut A.A., **Köse B.**, Demirel-Karaman A. & Derinsu U. (2021). Sound quality perception of cochlear implant recipients: low-frequency information and foreign language effect. *International Journal of Audiology*, 1-9.

INVITED TALKS AND CONFERENCE PROCEEDINGS

Özkan M., **Köse-Özkan B.,** Altınöz D., Güneş Y.C., Algın O. & Çavdar S. Integrative cortical–subcortical connectivity underlying cognitive and emotional processing: evidence from experimental tracing and human diffusion imaging, FENS Forum, Barcelona, Spain, 9th July 2026 **(poster)**.

Köse-Özkan B. (invited talk), Experimental animal models in otolaryngology, 46th Turkish National Congress of Otorhinolaryngology and Head & Neck Surgery, Bafra, Cyprus, 8th November 2025.

Köse-Özkan B. (invited talk), The role of neuroinflammation in tinnitus pathophysiology, 4th International Congress of the Mirko Tos Hearing Research Center, Ankara, Türkiye, 24th October 2025.

Köse-Özkan B., Wang W., Bao S. Differential activation of TNFR1 and TNFR2 in cortical parvalbumin-positive neurons following noise trauma, 8th International Conference on Auditory Cortex, Maastricht, Netherlands, 16th September 2025 **(poster)**.

Köse-Özkan B. (invited talk), Translational studies in hearing research, University of Health Sciences, İstanbul, Türkiye, 7th April 2025.

Köse B., Akbulut A.A., Karaman A., Derinsu U., & Çiprut A.A. Assessment of sound quality perception in native-Turkish speaking cochlear implant users using TR-MUSHRA, 14th European Symposium on Pediatric Cochlear Implantation, Bucharest, Romania, 2019 **(poster)**.

Köse B., Karaman A., Çiprut A,A. Evaluation of psychoacoustic and cognitive skills in children with cochlear implants, 7th National Congress of Otology and Neurotology, Antalya, Türkiye, 2019 **(oral presentation)**.

ADDITIONAL ACTIVITIES

- Team member at **İşitme Atölyesi**, a platform dedicated to sharing information, reviews, news and professional experiences in the field of Audiology

REFERENCES

Safiye Çavdar, PhD
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