

Rafay Ali Khan

Doctoral Candidate
Neuroscience Program
University of Illinois at Urbana-Champaign
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Education and work experience

The University of Illinois at Urbana-Champaign, Champaign, IL, USA

August 2017 – present

PhD in Neuroscience

University of Nebraska-Lincoln, Lincoln, NE, USA

September 2015 – July 2017

Lab Manager

The University of Nottingham, Nottingham, United Kingdom

September 2011 – June 2014

BSc. (Hons) in Psychology and Cognitive Neuroscience

Honors thesis: “An investigation into the role of the right inferior frontal gyrus in backward inhibition”

Funding and Grants

Husain, F.T., **Khan, R.**, Tai, Y. *Neuroimaging brain changes following tinnitus treatment*. Lemann Institute (UIUC)-FAPESP (Brazil) Collaborative Research Grant, (total cost) \$20,000, June 1, 2018 – May 31, 2020

Publications

Husain, F.T., **Khan, R.A.**, Tai, Y., Shahsavarani, S. (*Under review*). Evaluating Resound Relief App for smartphones using behavioral and brain imaging measures.

Khan, R.A., Sutton, B.P., Tai, Y., Schmidt, S.A., Shahsavarani, S., Husain, F.T. (2021). A large-scale diffusion imaging study of tinnitus and hearing loss. *Scientific Reports*, 11, 23395. <https://doi.org/10.1038/s41598-021-02908-6>.

Simonetti, P., Ono, C.R., Carneiro, C.D., **Khan, R.A.**, Shahsavarani, S., Husain, F.T., Oiticica, J. (2021). Evaluating the efficacy of hearing aids for tinnitus therapy - A Positron Emission Tomography study. *Brain Research*, 147728. <https://doi.org/10.1016/j.brainres.2021.147728>.

Zimmerman, B., Schmidt, S.A., **Khan, R.A.**, Tai, Y., Shahsavarani, S., Husain, F.T. (2021). Decreased resting perfusion in precuneus and posterior cingulate cortex predicts tinnitus severity. *Current Research in Neurobiology*, 2, 100010. <https://doi.org/10.1016/j.crneur.2021.100010>.

Shahsavarani, S., Schmidt, S.A., **Khan, R.A.**, Tai, Y., Husain, F.T. (2021). Salience, emotion, and attention: the neural networks underlying tinnitus distress revealed using music and rest. *Brain Research*, 147277. <https://doi.org/10.1016/j.brainres.2021.147277>.

Khan, R.A., Husain, F.T. (2020). Tinnitus and cognition: Can load theory help us refine our understanding? *Laryngoscope Investigative Otolaryngology*, 5(6), 1197-1204. <https://doi.org/10.1002/lio2.501>.

Shahsavarani, S., **Khan, R.A.**, Husain, F.T. (2019). Tinnitus and the Brain: A Review of Functional and Anatomical Magnetic Resonance Imaging Studies. *Perspectives SIG6, Hearing and Hearing Disorders: Research and Diagnosis*, 4(5), 896-909. https://doi.org/10.1044/2019_PERS-SIG6-2019-0001.

Oral Presentations

Tracking the noise – white matter plasticity associated with tinnitus and hearing loss. (2021, November). *Invited presentation given at the 77th Chilean Congress of Otolaryngology.*

Tinnitus and the Brain. (2021, October). *Presentation given to the general Illinois community as part of the Illinois Extension/Interdisciplinary Health Sciences Institute Fall Seminar Series.*

Can DTI be Used to Differentiate between Tinnitus Subgroups? (2020, November). *Virtual presentation at the Brain Imaging and Tinnitus International Interdisciplinary Conference.*

How white matter plasticity correlates with measures of tinnitus and hearing loss. (2019, November). *Invited talk given at Ribeirão Preto Medical School, University of São Paulo, Ribeirão Preto, Brazil.*

How white matter plasticity correlates with measures of tinnitus and hearing loss. (2019, June). *Oral presentation at the UIUC/Sao Paulo School of Medicine mini workshop on tinnitus, Urbana, IL.*

What the brain's white matter can tell us about the relationship between hearing loss and tinnitus. (2019, April). *Oral presentation at the University of Illinois at Urbana-Champaign Speech and Hearing Science department proseminar, Urbana, IL.*

Investigating the plasticity of white matter as it relates to tinnitus and hearing loss. (2019, February). *Oral presentation at the University of Illinois at Urbana-Champaign Neuroscience Program seminar, Urbana, IL.*

Poster Presentations

Khan, R.A., Wang, Z., Lam, F., Husain, F. (2022, February). *An Investigation Into Changes in Neurotransmitter Concentrations Associated With Tinnitus and Hearing Loss. Virtual poster presentation at Association for Research in Otolaryngology, Midwinter Meeting, 2022.*

Khan, R.A., Sutton B.P., Tai, Y., Schmidt, S.A., Shahsavarani, S., Husain, F.T. (2021, November). *Unraveling the relationship between tinnitus and hearing loss through anatomical connectivity analysis. Virtual poster presentation at Advances and Perspectives in Auditory Neuroscience annual conference, 2021.*

Khan, R.A., Sutton, B., Schmidt, S.A., Shahsavarani, S., Tai, Y., Husain, F.T. (2021, February). *Anatomical Connectivity Correlates of Tinnitus and Hearing Loss. Virtual poster presentation at the Association for Research in Otolaryngology, Midwinter Meeting, 2021.*

Khan, R.A., Tai, Y., Husain, F. (2020, May, *accepted*). *White matter correlates of tinnitus and hearing loss. Poster presentation at Tinnitus Research Initiatives, Vancouver, Canada. (Conference canceled due to COVID-19 pandemic)*

Khan, R.A., Schmidt, S.A., Tai, Y., Shahsavarani, S., Husain, F.T. (2019, October). *What white matter plasticity can tell us about the associations between tinnitus and hearing loss. Poster presentation at Society for Neuroscience, Chicago, IL.*

Khan, R.A., Schmidt, S.A., Tai, Y., Shahsavarani, S., Husain, F.T. (2019, October). *What white matter plasticity can tell us about the associations between tinnitus and hearing loss. Poster presentation at Advances and Perspectives in Auditory Neuroscience, Chicago, IL.*

Shahsavarani, S., Tai, Y., Schmidt, S., **Khan, R.,** & Husain, F. (2019). *Passive music listening: A modulation of resting-state functional connectivity to better dissociate tinnitus. Poster presentation: The Journal of the Acoustical Society of America, 145(3), 1716-1716.*

Husain, F., Tai, Y., **Khan, R.**, Woods, J., Dang, M. (2019, August). Evaluating Resound Relief using task- and rest-based fMRI. *Poster presentation at International Symposium on Auditory and Audiological Research, Nyborg, Denmark.*

Khan, R.A., Schmidt, S., Tai, Y., Shahsavarani, S., Husain, F. (2019, July). Correlations between white matter integrity and measures of tinnitus and hearing loss. *Poster presentation at the Midwest Auditory Research Conference, Springfield, IL.*

Tai, Y., Shahsavarani, S., **Khan, R.**, Schmidt, S., Husain, F. (2019, May). Are gray matter volume changes in frontal brain regions associated with speech-in-noise performance in tinnitus patients? *Poster presentation at the Tinnitus Research Initiatives conference, Taipei, Taiwan.*

Johnson, M.R., Williams, J.M., **Khan, R.A.**, Kuntzelman, K. (2019, March). Deep learning classifiers of visual cortex activity can identify which moment of a video is represented by a single fMRI volume during naturalistic movie viewing. *Poster presentation at the Cognitive Neuroscience Society Annual Meeting, San Francisco, CA.*

Khan, R.A., Schmidt, S.A., Shahsavarani, S., Tai, Y., Husain, F.T. (2019, February). An investigation into the white matter deficits associated with tinnitus and hearing loss. *Poster presentation at the Association for Research in Otolaryngology, Midwinter Meeting 2019, Baltimore, MD.*

Schmidt, S.A., Husain, F.T., Zimmerman, B., **Khan, R.**, Tai, Y., Esquivel, C., Levy, C., Ramos, P., Camou, E., Sherman, P. (2018, March). Replicability of resting state networks in tinnitus patients. *Poster presentation at Tinnitus Research Initiative / TINNET conference, Regensburg, Germany, March 14-16, 2018.*

Husain, F.T., Schmidt, S.A., Zimmerman, B., Tai, Y., **Khan, R.**, Levy, C., Sherman, P., & Esquivel, C. (2018, February). Replicability and robustness of fMRI biomarkers of tinnitus in military and civilian populations. *Podium presentation at the Association for Research in Otolaryngology 41st MidWinter Meeting, San Diego, CA.*

Khan, R.A., Johnson, M.J. (2017, April). Effects of reflective attention on perceptual memory for color. *Poster presentation at Nebraska Symposium on Motivation, University of Nebraska-Lincoln, Lincoln, NE.*

Teaching

Introduction to Psychology, Fall 2019, Spring 2020, Fall 2020 (Teaching supervisor: Lisa Travis)

Instructor of record

Instructor for two sections of 48 students each in each semester. Topics included study of human behavior with special reference to perception, learning, memory, thinking, emotional life, and individual differences in intelligence, aptitude, and personality; emphasis on the scientific nature of psychological investigations; and discussion of research methods and the relation of their results to daily life and everyday problems.

Undergraduate Open Seminar, Fall 2020

Instructor of record

Instructor for Psychology students who required extra support to supplement their learning to help improve their academic standing.

Awards and Honors

Bob Bilger Graduate Student Award for research dedicated to studying the auditory system.

Included in the University of Illinois “*List of Teachers Ranked as Outstanding by Their Students*” based on student evaluations for Spring 2020 (average rating >4.5/5.0 for all student evaluations).

Included in the University of Illinois “*List of Teachers Ranked as Excellent by Their Students*” based on student evaluations for Fall 2019, Fall 2020 (average rating >4.0/5.0 for all student evaluations).

Accepted to NIH funded fMRI training course at The University of Michigan, to be held August 3-14, 2020. (*Canceled due to COVID-19 pandemic*)

Mentorship

Mentored undergraduate student Donald Mascio
Fall 2021 through Spring 2022

Mentored undergraduate student Rosa Lin
Summer 2019 through Fall 2019

Mentored START program fellow Jenna Vangalis
Fall 2018 through Spring 2019

Professional service

Member of the Neuroscience Program Seminar Committee, tasked with selecting and inviting speakers for the Neuroscience Program’s Seminar series.
2021-2022

Developed and administered core course for the Neuroscience Program at UIUC, aimed at furthering science communication within the program, and providing students with a space to develop presentation and speaking skills.
2019-2021

Co-organized the virtual conference “Brain Imaging and Tinnitus: International Interdisciplinary Conference” at the University of Illinois at Urbana-Champaign
Nov 20-22, 2020

Invited external reviewer at Missouri State University’s Einhellig Interdisciplinary Forum
May 2, 2020

Elected committee member of the Neuroscience Student Organization at the University of Illinois Urbana-Champaign, holding various positions
2018-2021

Ad-hoc reviewer

Brain & Behavior
Ear & Hearing
Perspectives of the ASHA Special Interest Groups