XV International Tinnitus Seminar
WTC
4th World Tinnitus Congress
LONDON 2027

🔬 1. Neurophysiology and Neural Correlates of Tinnitus

This track explores the neural mechanisms underlying tinnitus, with a focus on brain activity patterns, connectivity, and plasticity. Emerging insights from EEG, MEG, and fMRI are revealing how auditory and limbic networks contribute to the generation and maintenance of tinnitus. Particular attention is given to thalamocortical dysrhythmia, cortical inhibition, and the use of auditory evoked potentials as tools for identifying abnormal auditory pathway processing. Computational modelling, including machine learning, is increasingly employed to predict neural correlates and tinnitus outcomes. The track also examines how disruptions in the default mode and salience networks may account for cognitive and attentional difficulties frequently observed in tinnitus sufferers.

- Advances in EEG, MEG, and fMRI mapping of auditory and limbic network disruptions
- Role of thalamocortical dysrhythmia, cortical inhibition, and auditory evoked potentials
- Machine learning models for predicting brain activity in tinnitus
- Studies of cortical and subcortical plasticity in tinnitus perception
- Default mode and salience network disruptions

🧠 2. Cognitive, Emotional, and Psychological Mechanisms

This track focuses on cognitive and emotional neuroscience, exploring the psychological dimensions of tinnitus, including its bidirectional relationship with mental health. It examines how emotional states such as anxiety, depression, trauma, and insomnia exacerbate tinnitus distress, and how cognitive patterns—such as executive function, attention control, and emotional processing—contribute to chronicity. Emerging research on psychological inflexibility, personality traits, and stress reactivity sheds light on individual vulnerability and heterogeneity in response. Advanced network analyses are helping to identify clusters of symptoms and clarify whether tinnitus is best understood as a symptom, a comorbidity, or a condition in its own right. Unlike Track 3, which focuses on cognitive-behavioural and therapeutic interventions, this track investigates the mechanisms underlying tinnitus distress—how psychological processes influence perception, regulation, and adaptation. It offers a theoretical and empirical foundation for understanding why some individuals are more affected than others, and how mental health, neurocognitive profiles, and emotional reactivity interact to shape the lived experience of tinnitus.

- Associations with anxiety, depression, distress, and insomnia
- Time perception and executive function disruption in tinnitus distress
- Psychological inflexibility, emotional processing, and personality traits
- Impact of stress, trauma, and attention regulation on tinnitus severity
- Network analysis of comorbid psychological symptoms in tinnitus sufferers

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🗣️ 3. Cognitive Behavioural Therapies and Psychosocial Interventions

This track presents evidence on psychological interventions for tinnitus, including therapist-delivered and internet-based cognitive behavioural therapies (CBT). It includes studies evaluating audiologist- and psychologist-delivered CBT, as well as adaptations for insomnia, hyperacusis, and misophonia.

Innovations in delivery such as iCBT, group therapy, and hybrid digital models are reviewed alongside results from RCTs and clinical cohorts. The role of habit reversal, attention redirection, mindfulness, and self-efficacy in reducing tinnitus distress are also discussed. Cultural and linguistic adaptation of CBT programmes — and their readability, acceptability, and clinical impact — form an important component of this session.

- Clinical trials on CBT and mindfulness for tinnitus, including iCBT
- Internet-based CBT adaptations for different populations and delivery modes
- Group CBT, CBT for insomnia, and counselling efficacy studies
- Frameworks for habit formation, directed attention, and psychological reframing
- Readability and cultural adaptation of CBT programmes internationally

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🧬 **4. Genetics, Biomarkers, and Molecular Mechanisms**

This track investigates the biological underpinnings of tinnitus, from molecular pathways to gene expression and emerging biomarkers. Topics include the role of BDNF, DNA methylation, and gene-environment interactions. Studies on animal models using salicylate or noise trauma offer insight into oxidative stress and synaptopathy. Advanced omics and neuroimaging markers are used to explore subtyping and treatment prediction. Deep learning and precision medicine approaches offer a window into individualised risk profiles and responses. The track encourages interdisciplinary dialogue between geneticists, neuroscientists, and clinicians to bridge the translational gap.

- Studies on BDNF, DNA methylation, and antisense RNA polymorphisms
- Salicylate-induced and noise-induced molecular models of tinnitus
- Oxidative stress markers and metabolomic profiles in chronic tinnitus
- Brain-derived neurotrophic factors and gene expression correlates
- Deep learning and biomarker-based prediction models for treatment outcomes

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💡 **5. Neuromodulation, Stimulation, and Emerging Therapies**

This track showcases advances in electrical and non-invasive stimulation approaches for tinnitus, including transcranial random noise stimulation (tRNS), high-definition tDCS, auricular vagus nerve stimulation (VNS), and experimental magnetic methods. Synergistic protocols combining stimulation with CBT or sound therapy are also discussed. In addition, the session reviews the neural impact of alternative modalities such as acupuncture, low-level laser therapy, and smart-device–based interventions. The goal is to identify effective, scalable, and tolerable interventions for various subtypes of tinnitus, especially where conventional treatments fall short.

- Transcranial random noise stimulation and high-definition tDCS protocols
- Auricular vagus nerve stimulation and other non-invasive methods
- Cortical activation changes during acupuncture and laser therapies
- Novel approaches combining stimulation with behavioural interventions
- Pilot studies on smart device-based and virtual tinnitus therapies

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🦻 6. Audiological Interventions and Hearing Technologies

This track addresses the audiological management of tinnitus and associated hearing loss. It includes recent findings on hearing aid fitting strategies (e.g. CROS, BiCROS), cochlear implants, and sound therapy options such as tinnitus retraining therapy (TRT) and modified masking. Digital health tools — including telerehabilitation, virtual consultations, and app-based solutions — are covered alongside clinical assessments like pitch matching and residual inhibition. The track also delves into listening effort, auditory working memory, and speech-in-noise difficulties that affect patients with normal audiograms but persistent tinnitus.

- Impact of hearing aids, CROS/BiCROS, and cochlear implants on tinnitus
- Interaction of tinnitus with speech-in-noise perception and listening effort
- Telerehabilitation and virtual clinics for hearing and tinnitus management
- Acoustical therapies including modified sound masking and TRT
- Psychoacoustic characterisation and pitch-matching methods

⚖️ 7. Somatosensory and Multisensory Influences on Tinnitus

This track explores the somatosensory contributions to tinnitus, with a focus on conditions such as temporomandibular joint disorder (TMD) and cervical spine dysfunction. It addresses how sensory input from non-auditory systems—particularly somatic, visual, vestibular, and olfactory—can modulate tinnitus perception through cross-modal integration and neuroplasticity.

We examine evidence from randomised controlled trials, pilot studies, and case reports on somatosensory stimulation therapies, muscle myoclonus, and unusual phenomena such as tinnitus triggered by forceful eyelid closure. The track encourages researchers and clinicians to adopt multisensory frameworks in both assessment and intervention.

- Somatosensory tinnitus linked to TMD and cervical spine dysfunction
- Forceful eyelid closure and somatic modulation phenomena
- Effects of somatosensory stimulation therapy on tinnitus perception
- Visual, olfactory, and vestibular interactions with auditory pathways
- Parahippocampal involvement in sensory integration and multimodal cortical responses

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🧪 8. Pharmacology, Botanicals, and Nutritional Therapies

This track presents emerging research into pharmacologic and natural therapies for tinnitus. Topics include controlled trials of Ginkgo biloba, St. John's Wort, and antioxidant supplements, as well as exploratory studies on endocannabinoids, resveratrol, and botulinum toxin. Investigations into dietary factors, vitamin D, lipid metabolism, and blood rheology also feature. Novel drug targets — including nicotinic and muscarinic acetylcholine receptors — are discussed in the context of auditory inhibition. While evidence remains mixed, this track aims to critically evaluate biochemical and dietary strategies that may complement other tinnitus interventions.

- Trials of Ginkgo biloba, St. John's Wort, antioxidants, and herbal blends
- Studies on cannabis use, vitamin D deficiency, and dietary correlations
- Resveratrol, BDNF modulation, and botulinum toxin case studies
- Lipid profile responses and blood rheology in tinnitus patients
- Drug target research including nicotinic and muscarinic receptor pathways

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9. Clinical Phenotyping and Subgroup Analysis

This track explores the classification of tinnitus into clinically relevant subgroups. It includes subtyping based on hearing loss, hyperacusis, modulation, laterality, comorbidities, and duration. Research presented will include large-scale epidemiological studies, ecological momentary assessments, and machine learning clustering. The track also examines gender differences, pediatric and elderly profiles, and predictors of treatment outcome or spontaneous resolution. The goal is to identify meaningful phenotypes that can guide personalised care pathways and stratified clinical trials.

- Subtyping based on hearing loss, hyperacusis, modulation, laterality, comorbidities, and duration
- Population-based studies on prevalence, risk factors, and gender effects
- Predictive models for treatment outcomes and distress severity
- Paediatric and elderly tinnitus cohorts with unique features
- Data-driven clustering and ecological momentary assessment methods

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10. Medical and Vascular Etiologies of Tinnitus

This track focuses on identifiable medical causes of tinnitus, particularly pulsatile and objective subtypes. It includes vascular abnormalities (e.g. sigmoid sinus dehiscence, dural AVFs, jugular bulb variants), idiopathic intracranial hypertension, and venous balloon occlusion testing. Additional emphasis is placed on otologic and neurologic disorders such as otosclerosis, Meniere's disease, acoustic neuroma, myoclonus, and stapedial spasm. This track highlights the role of imaging, multidisciplinary diagnostic approaches, and the impact of comorbidities on quality of life.

- Imaging findings: sigmoid sinus dehiscence, dural AVFs, and jugular bulb variants
- Otologic and neurologic causes: otosclerosis, Meniere's, acoustic neuroma, myoclonus
- Venous balloon occlusion tests and outcomes of surgical or medical interventions
- Links to IIH, vascular anomalies, and brain perfusion asymmetry
- Diagnostic pathways, multidisciplinary evaluations, and QoL impact

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11. Consciousness, Inner Music, and Auditory Imagery: Neuroscientific, Clinical, and Cultural Perspectives

This track explores how internally generated auditory experiences — including auditory imagery, musical hallucinosis, and 'exploding head syndrome' — relate to tinnitus and broader theories of consciousness. Active inference and predictive coding models are used to understand how the brain fills in absent sensory input. Other themes include trait suggestibility, volitional control, and the variability of conscious auditory phenomena across individuals. Cultural interpretations of phantom sounds are examined in both clinical and anthropological contexts. The track connects tinnitus research to broader consciousness studies and perceptual neuroscience.

- Neural mechanisms of musical hallucinosis and auditory imagery
- Active inference, predictive coding, and models of auditory consciousness
- Phenomenology and diagnostics of "exploding head syndrome" and imagined soundscapes

- Perceptual diversity, trait suggestibility, and volitional modulation of phantom sounds
- Cultural interpretations and boundaries of internally generated auditory experience