

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

Zentian Limited
Patent Owner.

Case IPR2023-00037
Patent No. 10,971,140

**DECLARATION OF DAVID ANDERSON, Ph.D. IN SUPPORT OF
PATENT OWNER'S RESPONSE**

I, David Anderson, Ph.D, do hereby declare as follows:

I. Introduction

A. Background and qualifications

1. I am a professor in the School of Electrical and Computer Engineering at the Georgia Institute of Technology (“Georgia Tech”) in Atlanta, Georgia. I have been a professor at Georgia Tech since 1999. In 2009 I served as a visiting professor in the Department of Computer Science at Korea University in Seoul, South Korea.

2. My full qualifications, including my professional experience and education, can be found in my Curriculum Vitae, which includes a complete list of my publications, and is attached as Ex. A to this declaration.

3. I received my Ph.D. in Electrical and Computer Engineering from Georgia Tech in 1999. I received my B.S. and M.S. in Electrical Engineering from Brigham Young University in 1993 and 1994, respectively.

4. In my employment prior to Georgia Tech as well as in my subsequent studies and research, I have worked extensively in areas related to the research, design, and implementation of speech and audio processing systems. I have also taught graduate and undergraduate level courses at Georgia Tech on the implementation of signal processing and embedded systems. For example, I have taught courses on statistical machine learning, machine learning for speech, pattern

recognition, multimedia processing and systems, software design, computer architecture, real-time signal processing systems, and applications of signal processing (covering topics in audio processing and speech recognition). I have also designed and taught a course on signal processing in the context of human perception. These courses and my research have covered many topics relevant to the subject matter of the '277 patent and the prior art cited therein.

5. I have served as principal investigator or co-principal investigator in numerous multi-disciplinary research projects including “Blind Source Separation for Audio,” “Audio Classification,” “Auditory Scene Analysis,” “Hearing Aid Audio Processing,” “Speaker Driver Sound Enhancement,” “I-Vector Based Voice Quality,” “Analysis of Voice Exercise Using Signal Processing,” and “Smart Homes for Effective and Safe Remote Work During a Pandemic and Beyond.”

6. I also have extensive experience with the practical implementation of signal processing algorithms, information theory, signal detection, and related topics through my research and consulting. I have published over 200 book chapters and papers in reviewed journals and conferences. Topics include those such as “Speech recognition using filter bank features,” “Speaker adaptation using speaker similarity score on DNN features.” “Segmentation based speech enhancement using auxiliary sensors,” “A framework for estimation of clean

speech by fusion of outputs from multiple speech enhancement systems,”
“Distributed acquisition and processing systems for speech and audio,” “A missing data-based feature fusion strategy for noise-robust automatic speech recognition using noisy sensors,” “Learning distances to improve phoneme classification,” “Identification of voice quality variation using i-vectors,” “Varying time-constants and gain adaptation in feature extraction for speech processing,” “Low bit-rate coding of speech in harsh conditions using non-acoustic auxiliary devices,” “Speech analysis and coding using a multi-resolution sinusoidal transform,” “Biologically inspired auditory sensing system interfaces on a chip,” “Cascade classifiers for audio classification,” and “Single acoustic channel speech enhancement based on glottal correlation using non-acoustic sensors.” I have also contributed book chapters for treatises such as “Independent Component Analysis for Audio and Biosignal Applications,” and written a book on *Fixed-Point Signal Processing* which is related to the practical implementation of systems for processing sound and other signals.

7. I am a named inventor on eight patents, including “Speech activity detector for use in noise reduction system, and methods therefor” (U.S. Patent No. 6,351,731), and “Analog audio signal enhancement system using a noise suppression algorithm” (U.S. Patent No. 7,590,250).

8. I am a Senior Member of the Institute of Electrical and Electronics Engineers (“IEEE”) and have been a Member since 1991. I am also a Member of the IEEE Signal Processing Society. From 1994 to 2016, I was also a member of the Acoustical Society of America. In 2003, I served as the Co-Chair for the NSF Symposium on Next Generation Automatic Speech Recognition. In 2004, I received the Presidential Early Career Award for Scientists and Engineers, presented by then-President George W. Bush, for my work on ultra-low-power signal processing system design.

B. Engagement

9. I have been retained by Patent Owner Zentian Limited (“Zentian” or “Patent Owner”) to provide my opinions with respect to Zentian’s Response to the Petition in *Inter Partes* Review proceeding IPR2023-00037, with respect to U.S. Pat. 10,971,140. I am being compensated for my time spent on this matter. I have no interest in the outcome of this proceeding and the payment of my fees is in no way contingent on my providing any particular opinions.

10. As part of this engagement, I have also been asked to provide my technical review, analysis, insights, and opinions regarding the materials cited and relied upon by the Petition, including the prior art references and the supporting Declaration of Mr. Schmandt.

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.