

ERIC L. CARMICHEL, M.S.

1534 North Dorsey Lane ~ Tempe, Arizona 85281

(520) 400-8305

elcarmichel@elcaudio.com

QUALIFICATIONS

Enterprising innovator with demonstrated academic and professional drive. Combined creative initiative and expertise in engineering and audiology for design of unique inventions to meet specific needs of hospital, industrial and military environments. Founder and owner of audio engineering company, ELC Audio Engineering, which has operated successfully for over a decade. Expert consultation is available for organizations involved with the speech & hearing sciences; test and measurement; sound & vibration assessment and control; OSHA compliance regarding noise in the workplace; and custom electronic design. Passionate to bring expertise in physics, electronics, computers, physiology and hearing science to bear upon advancements in the understanding and treatment of hearing disorders utilizing computer modeling, signal processing, and electronic hardware design. Future and current research endeavors include electrophysiology, otoacoustic emissions, cochlear implants, and studies of psychoacoustics & spatial hearing in simulated, real-world environments. Over 700 hours of clinical practicum experience, including 500 hours as an Audiology Trainee at Tucson Veterans' Administration Hospital. Experienced educator at graduate level. Proficient in MATLAB; LabVIEW; C and C++; Microsoft Office applications including FrontPage, Excel, Word, PowerPoint, and Access; graphic and multimedia applications to include Adobe Photoshop, Illustrator, Premier Pro; and digital audio workstation applications to include Adobe Audition, Cakewalk SONAR, and Steinberg Nuendo.

SELECTED CAREER ACCOMPLISHMENTS

Inventions

- **Speech-Language Facilitator.** Original prototype sold to Kay Elemetrics. After further development by Kay Elemetrics, design is now known as KayPENTAX Model 3500 Facilitator.
- **ELC Audio Engineering Data Recording System** (patent pending). Automated data recording system to record human responses and response time.
- **ENLADTM (Excessive Noise Level Alerting Device)** (US Patent 7315244). Includes patented features for minimization of false triggers.
- **ELC Single-Button VRA System** (patent pending). Reduces tone presentation-to-visual reinforcement time to increase clinical efficacy of Visual Reinforcement Audiometry (VRA).
- **Real-time Gas Emission Analyzer.** Dynamometer and exhaust gas analyzer for miniature, gasoline-powered engines.
- **F-16 FLCS (Flight Control System) Emergency Power System Diagnostic Test Set.** This test set is currently used by the United States Air Force.
- **CARPALTM Engine Annunciator/Shutoff Unit** (patent pending). Original prototype purchased by Pepsi Cola for use in diesel tractors.

Award

- *Recipient*, American Academy of Audiology Student Research Forum Award Winner, 2004.

PUBLICATIONS

Carmichel, E. L., F. P. Harris, & B. H. Story. "Effects of Binaural Electronic Hearing Protectors on Localization and Response Time to Sounds in the Horizontal Plane," *Noise & Health*, Vol. 9, No. 37, 2007, pp. 83-95.

Carmichel, E. L. "Sound Localization Ability with Electronic Hearing Protectors" in Gus Mueller, "Page Ten," *The Hearing Journal*, Vol. 57, No. 9, 2004, p. 16.

Carmichel, E. & Carmichel, J. "The Big Bang!" *Outdoor Life*, April 2000, pp. 68-73, 80.

Carmichel, E. L. "Diff Amp Driver with BJT Source," *Glass Audio*, Vol. 7, No. 4, 1995, pp. 16, 17, 20.

Carmichel, E. "The 6BX7 Amplifier," *Glass Audio*, Vol. 3, No. 2, 1991, pp. 9-11, 65.

PROFESSIONAL EXPERIENCE

ELC AUDIO ENGINEERING, Tucson, Arizona

1996 - Present

Founder and Engineering Consultant

www.elcaudio.com

- Invent and prototype unique audiology and sound control devices for use in clinical and research applications.
- Provide consultation for Navy, FBI, hospitals, clinics, universities and private industry.
- Consult regularly with speech-language pathologists and audiologists concerning particular specifications of devices to be tailored to client needs.
- Perform expert witness services: Review case history and audiograms, perform acoustic measurements and simulations to evaluate subjects' noise exposure. Assess and opine data concerning acoustic trauma and severe-to-profound hearing loss.
- Protect intellectual property rights including obtaining patents for device designs and registering device names as trademarks.
- Design and maintain company website.
- Maintain all records and bookkeeping.
- Developed ELC Audio Engineering as a full-time venture following bankruptcy of McCulloch Corporation.

MCCULLOCH CORPORATION, Tucson, Arizona

1998 - 1999

Vice President, Electrical Engineering

- Designed equipment and systems to measure product performance.
- Automated and streamlined testing and manufacturing processes through innovation of new systems and equipment.

PROFESSIONAL EXPERIENCE*(Continued)*

BIOMETRICS IDENTIFICATION, INC., Tucson, Arizona

1997 - 1998

Electrical Engineer

- Analyzed performance of image sensors and associated circuitry and recommended appropriate design changes for fingerprint identification system.
- Designed mock-up used to evaluate prototype and production units.
- Participated in design and implementation of switch-mode DC-to-DC converters.

TUCSON VETERANS' ADMINISTRATION HOSPITAL, Tucson, Arizona

1996

Audiologist

- Evaluated hearing of patients with ear abnormalities and/or auditory disorders through case history, clinical observation and diagnostic tests of auditory function.
- Administered diagnostic tests of hearing including pure tone and speech audiometry, Auditory Brainstem Response and tympanometry.
- Identified hearing impairment and determined residual hearing.
- Assessed social disability resulting from hearing impairment and predicted potential benefit from hearing aids, auditory training and speech reading.
- Assisted patients in the selection and use of appropriate hearing aids.

TEACHING EXPERIENCE

UNIVERSITY OF ARIZONA, Tucson, Arizona

2002

Lecturer, Sp H 580, Community and Industrial Audiology

- Co-taught course on hearing conservation in industrial, school and community venues, auditory and non-auditory effects of noise, noise assessment, control and protective procedures.
- Prepared course lectures, utilizing previous experience and expertise in noise measurements and familiarity of OSHA guidelines regarding noise in the workplace.
- Devised demonstrations to clarify complicated concepts for the students.

HONORS AND AWARDS

- *Recipient*, Air Reserve Forces Meritorious Service Medal (First Oak Leaf Cluster), 1993.
- *Recipient*, Arizona Meritorious Service Medal, 1993.
- United States Air Force Training Command Honor Graduate G3ABR45135 003 F-16 C/D Avionics Test Station and Component Specialist, 1992.
- *Recipient*, Air Reserves Forces Meritorious Service Medal, 1991.
- *Recipient*, Arizona Meritorious Service Medal, 1991.
- United States Air Force Air Training Command Honor Graduate, 1988.

EDUCATION

ARIZONA STATE UNIVERSITY, Tempe, Arizona

Completed requisite coursework for *Doctor of Philosophy, Hearing Science*. GPA: 3.94
Ph.D. pending completion of dissertation.

UNIVERSITY OF ARIZONA, Tucson, Arizona

Master of Science, Speech and Hearing Science, 2003. GPA: 3.86

UNIVERSITY OF ARIZONA, Tucson, Arizona

Bachelor of Science, Physics, 1994

MILITARY CAREER DEVELOPMENT COURSE (CDC) CERTIFICATES OF COMPLETION

- F-16/A-10 Avionics Test Station and Component Specialist CDC, 1993 (Outstanding Score)
- Integrated Avionic Instrument and Flight Control Systems Specialist (F-16) CDC, 1991
- Integrated Avionic Attack Control Systems Specialist CDC, 1991
- NCO Preparatory Course CDC, 1990
- Integrated Organizational Systems Specialist CDC, 1990
- Integrated Avionics Communication, Navigation, and Pen Aids Systems Specialist (F-16) CDC, 1988 (Outstanding Score)

MILITARY COURSE CERTIFICATES OF COMPLETION

- G3ABR45135-003 F-16 AIS Specialist Course, 1992 (Honor Graduate)
- Avionics Navigation System Technician, 1991
- Integrated Avionics Navigation and Pen Aids System (F-16) Specialist Course, 1988
- Integrated Avionics Phase I Course, 1988 (Honor Graduate)

PROFESSIONAL AFFILIATIONS

AUDIO ENGINEERING SOCIETY

2011

Member

AMERICAN SOCIETY OF AGRICULTURAL AND BIOLOGICAL ENGINEERS

2004

FORMERLY, AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS

Member