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## Jack Goldberg

Jack Goldberg is the President of Metrionix, Inc. and Chief Technical Officer of Hearing Enhancement Group, LLC. Metrionix is a product development and consulting business with expertise in electronic instrumentation and components, medical devices, measurement systems, signal processing, radio frequency and communication systems, audio and acoustics, and manufacturing technology. Hearing Enhancement Group is a business involved with the development and marketing of listening devices and other products related to hearing. Mr. Goldberg has over thirty years of experience in product development and manufacturing. Detailed knowledge includes embedded hardware and software, medical signal processing and vital signs measurement, infusion pumps, RF and microwave, digital and analog circuits and systems, control systems, acoustical design and measurements, and hearing. Seven patents to date.

Mr. Goldberg has served as an expert in product liability, intellectual property, trade secret matters and in cases involving medical instruments, audio measurement and analysis, and communication systems. Experience includes trial testimony on behalf of both plaintiffs and defendants in medical and RF patent cases, including a landmark patent case concerning obviousness, and trial testimony related to criminal earwitness.

Education: MIT Master of Science and Bachelor of Science, Electrical Engineering and Computer Science. Senior member IEEE and member Acoustical Society of America.

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### PROFESSIONAL EXPERIENCE

**Feb 1995-present      Metrionix, Inc., San Diego, CA**  
**President / Owner**

President of contract engineering and consulting business specializing in the area of electrotechnology and focusing on signal processing, sensors, control, measurement, RF technology, audio and acoustics, and medical instrumentation. Consulting efforts have included: research and development for various medical, scientific and audio instrument manufacturers, and expert witness work related to intellectual property, product liability, RF systems, and sound and hearing. R&D projects have included: the design and/or production of miniature human implantable devices and associated sensing means; an optical system for analysis of farm animal biomaterials; radio frequency communication devices for the hard of hearing; sound measurement and processing systems; a headworn ultrasonic sensing system with auditory display for the blind; a motor control system for use in eye surgery, and acoustical apparatus to assist in the fitting of hearing aids. Personally responsible for design of analog and digital circuitry, signal processing and control algorithms, acoustical planning and analysis, testing and evaluation, and software/firmware development. Experienced with embedded firmware programming (C and Assembly languages), LabView, database, MatLab, and Visual Basic. Staff and associates include electrical, software, mechanical, industrial and bioengineers, technicians, and assemblers. Metrionix has laboratory space for device development, analysis and testing.

**Jan 2005-present      Hearing Enhancement Group, LLC, Thousand Oaks, CA**  
**Chief Technical Officer / Owner**

Chief Technical Officer of business involved with the development and marketing of listening devices and other products related to hearing. Technology focus is in the areas of acoustics, signal processing, and control. Responsibilities include development of acoustical design, hardware and software, intellectual property strategy, management of all aspects of product development, including test, and technical interface

with overseas factory. Developed proprietary position-sensing system for determining whether or not a headworn device is in place on a user's head.

**Sep 1992-Feb 1995      IVAC Corporation, San Diego, CA  
Vital Signs Engineering Manager**

Directed entire staff of 24 in Business Unit of hospital equipment manufacturer. Technical and managerial contributor to three Product Development programs. Managed Operations Engineering efforts for existing line of products, with emphasis on cost and quality improvements, automation, regulatory issues, and customer complaints. Lead member of team tasked with Product Recall effort and associated response to FDA. Formulated long-term strategy for business unit and sought both technical and marketing partnerships. Created systems to streamline and better control existing business practices to ensure timely introduction of new products and responsiveness to ongoing production issues. Products included infrared and conventional clinical thermometers, and blood pressure measurement systems.

**Dec 1984-Aug 1992      IVAC Corporation, San Diego, CA  
Principal Engineer/Project Leader, Research and Advanced Development**

Performed research and developed proprietary technology in support of fluid delivery systems product line, including flow and pressure measurement subsystems, data communication, and sensors for detection of air in fluid path. Conceptualized new products, recommended patent strategy, and evaluated business and technical proposals from outside organizations. Led teams for review of technologies for parent corporation, Eli Lilly, including flow measurement of fluids by means of thermal markers, microwave sensing of fluid composition, catheter-based RF tissue ablation, and non-invasive measurement of blood glucose. Set up microelectronics prototype lab. Prepared clinical protocols and regulatory submittals. Served as technical leader in development of new clinical thermometer and devised unique calibration method.

**1983-1984                      Dyn-Aura Engineering Laboratories, San Diego, CA  
Chief Engineer**

Managed design, production, and test engineering functions for manufacturer of hearing aids, hearing test equipment and associated components. Designed analog circuitry and acoustic subassemblies, and improved assembly and test procedures. Supervised microelectronics assembly line, significantly increasing production yield. Implemented documentation standards and inventory control system. Conducted training seminars and product presentations, and contributed to company marketing plans.

**1979-1983                      Steinbrecher Corporation, Woburn, MA  
Project Leader**

Led product development teams for manufacturer of scientific instruments. Projects included a navigation system based on GPS satellite signal reception, a sonar signal filtering subsystem, and a moisture measurement system employing microwave technology. Designed control algorithms, data acquisition subsystems, and software for data analysis and information display. Analyzed communications systems for various military and commercial clients. Wrote technical operation and service manuals for products.

**1978-1979                      Mech-El Industries, Woburn, MA  
Manager of Electrical Design**

Managed engineering group for supplier of equipment used in semiconductor manufacturing.

**1973-1978                      Grason-Stadler, Inc., Concord, MA  
Staff Engineer**

Product development for manufacturer of hearing test and acoustic measurement equipment.

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## EDUCATION

Massachusetts Institute of Technology

MS Electrical Engineering and Computer Science, 9/78

BS Electrical Engineering and Computer Science, 9/73

California Institute of Technology

1993 -- Management of Technology and Innovation (short-term executive program)

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## PROFESSIONAL AFFILIATIONS

Senior Member, Institute of Electrical and Electronics Engineers

*Medicine and Biology, Signal Processing*

Member, Acoustical Society of America

Member, American Auditory Society

Organizing Committee Member, MIT Enterprise Forum -- 1986-1991

Amateur Radio Extra Class license holder: W6JZ

## PRESENTATIONS AND PUBLICATIONS

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| 2008 | US Patent Application                                     | <i>Position sensing apparatus and method for active headworn device</i>                                  |
| 2007 | US Patent Application                                     | <i>Headworn listening device and method</i>  |
| 2007 | US Patent Application                                     | <i>Self-testing programmable listening system and method</i>   |
| 2006 | US Patent Application                                     | <i>Miniature resonating marker assembly</i>  |
| 2007 | US Patent Application                                     | <i>Method and system for noise dosimeter with Quick-Check mode and earphone adapter</i>                  |
| 2006 | US Patent Application                                     | <i>Method and system for noise dosimeter</i>   |
| 2006 | US Patent #7,135,978                                      | <i>Miniature resonating marker assembly</i>  |
| 2000 | US Patent #6,098,463                                      | <i>Method and apparatus for measurement of wide dynamic range signals</i>                                |
| 1999 | US Patent #5,966,639                                      | <i>System and method for enhancing speech intelligibility utilizing wireless communication</i>           |
| 1995 | US Patent #5,455,565                                      | <i>Fluid monitor system and method using a resonator</i>   |
| 1993 | US Patent #5,260,665                                      | <i>In-line fluid monitor system and method</i>   |
| 1992 | US Patent #5,150,969                                      | <i>System and method for temperature determination and calibration</i>                                   |
| 1990 | US Patent #4,938,079                                      | <i>Thermal transit time flow measurement system</i>  |
| 2006 | American Board of Trial Advocates, Orange County, CA      | <i>Masters in Trial (Expert presentation at mock trial)</i>  |
| 2006 | American Auditory Society Annual Meeting                  | <i>An inexpensive noise dosimeter</i>  |
| 2001 | 141 <sup>st</sup> Meeting, Acoustical Society of America  | <i>A new handheld meter for measuring the occlusion effect produced by, and leakage around, earmolds</i> |
| 1997 | 134 <sup>th</sup> Meeting, Acoustical Society of America  | <i>Analog and Digital Signal Processing in a High Performance Miniature Sound Level Meter</i>            |
| 1993 | 13th Annual Northeast Symposium on Health Care Technology | <i>Infrared Thermometry</i>  |

## TECHNOLOGY AND BUSINESS CONSULTATION, RESEARCH, AND PRODUCT DEVELOPMENT

From:	2/2007	Small business funded by US Dept of Agriculture
To:	Present	San Diego, CA
	Duties:	Research and prototype development: solar-powered system for insect abatement.
From:	10/2004	Hearing Enhancement Group, LLC
To:	Present	Thousand Oaks, CA
	Duties:	Product development and consulting regarding acoustics, headset design and listening devices.
From:	3/1995	Etymotic Research
To:	Present	Elk Grove Village, IL
	Duties:	Product development and consulting: noise dose measurement system; miniature sound level meter; communication system for hard of hearing; occlusion effect meter.
From:	6/2008	Investment banking firm
To:	8/2008	Long Beach, CA
	Duties:	Technology due diligence regarding acquisition of medical device company.
From:	4/2004	Coradiant Canada, Inc.
To:	10/2004	Montreal, Quebec
	Duties:	Product development, consulting and prototype production: custom printed circuit board for LAN/power/communications interconnect.
From:	6/2003	Medical device manufacturer
To:	11/2003	
	Duties:	Consultation regarding validation test station for controller board of system for soft tissue aspiration and emulsification.
From:	11/2002	Medical device manufacturer
To:	1/2003	
	Duties:	Product design review and consulting for developer of esophageal ablation apparatus.
From:	9/2000	Calypso Medical
To:	12/2002	Seattle, WA
	Duties:	Product research and development, manufacturing process development: system which aids surgeon, including miniature human implantable devices and extensive signal processing. Technology involves electromagnetic sensing
From:	4/2002	Medical device manufacturer
To:	12/2002	
	Duties:	Product development and consulting: motor control subsystem for laser focus as part of eye surgery system.
From:	12/2001	Advanced Pollution Instrumentation, Teledyne Instruments
To:	6/2002	San Diego, CA
	Duties:	Product development: enhancement of device for the measurement of ozone in gas samples.

From:	5/1999	Progeny Systems, LLC
To:	12/2000	San Diego, CA
	Duties:	Product development and consulting: system for the analysis of farm animal biomaterials. Technology involves optical transmission through sample and associated signal processing.

  

From:	9/1996	Akos Biomedical, Inc.
To:	10/1996	San Diego, CA
	Duties:	Consultation regarding FDA document submittal. Technology involves endoscopic surgery.

## **LITIGATION SUPPORT EXPERIENCE**

AVAILABLE UPON REQUEST

## **OTHER PRIOR AND CURRENT AFFILIATIONS AND CONSULTANCIES NOT DESCRIBED ELSEWHERE**

nCom Systems, San Diego, CA  
 Braydon Corporation, San Ramon, CA  
 VitalWave Corporation, Solana Beach, CA  
 BestProto, San Diego, CA  
 Endocare, Inc., Irvine, CA  
 Poco Power Corporation, San Luis Obispo, CA  
 Misonix, Inc., Farmingdale, NY  
 Medsource Technologies, Inc., Minneapolis, MN  
 World Access for the Blind, Huntington Beach, CA

References and further detail available upon request.