



## Projects List

- **Patent Evaluation**
  - Review a transducer enhancement technology
  - Produce a report detailing issues and risks pertaining to patentability and claims, the function of the device, acoustic and psychoacoustic effects, applications, and practical deployment
  - Perform objective acoustic testing and outsource supplemental tests
  - Attend meetings and provide technical support via phone and Email
  
- **Transducer Design**
  - Assist client with the design of a vibration contact transducer
  - Identify appropriate resources and review design
  - Design QC Test Fixture
  - Provide test instrument training for set up and calibration
  - Perform measurements on prototypes
  - Attend meetings and provide technical support in-person and via phone and Email
  
- **New Technology IP Evaluation**
  - Review a hearing technology with respect to current industry offerings
  - Attend presentation meeting with IP holder on behalf of evaluating client and prepare report
  - Prepare comparative product report against relevant specifications
  - Meetings and technical support via phone and Email
  
- **Comparative Product Testing**
  - Objective measurements of the earphone and microphone response of headphones & headsets
  - Performed measurements and prepared test report
  
- **Earphone Design**
  - Analyze competitive products
  - Assess design and project goals
  - Work with vendors to procure appropriate transducers
  - Run tests on prototype units to ensure design target compliance and iterate as necessary
  
- **Noise Canceling Headset Evaluation**
  - Near field and simulated diffuse files testing of the Send (microphone) response of 25 headsets in a comparative study
  - Design test methods, perform measurements and data handling, and create test report
  - Follow up meetings and technical support via phone and Email
  
- **Intellectual Property Evaluation**
  - Review of an adaptive microphone processing patent
  - Create test plan and test fixture
  - Perform measurements on various embodiments and create a test report
  - Meetings and technical support via phone and Email
  
- **Electroacoustic System Design**
  - Attend meetings and teleconferences with engineering team
  - Acoustical design review of consumer audio and telecom product prototypes
  - Make recommendations to improve performance and comply with standards
  - Evaluate testing process and make recommendation for more accurate data acquisition

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- Provide technical support via phone and Email
- **In-House Training Seminar**
  - In-house training presentation on loudspeaker, microphone, and headphone measurements for the research department of a signal processing and intellectual property licensing company
  - On-on-one hands-on training for the technicians responsible for testing
  - On-going technical support via phone and Email
- **Intellectual Property Evaluation & Expert Witness**
  - Patent analysis and evaluation
  - Draft declaration in support of clients claim construction brief
  - Meet with patent attorneys to prepare case
  - Give sworn deposition as Subject Matter Expert
- **Training and Algorithm Support**
  - Electroacoustics training research team, with emphasis on frequency analysis for speech communications applications
  - Propose alternative architectures for a demodulation speech enhancement algorithm
- **Headset Evaluation**
  - Objective electroacoustical response testing of analog and USB headsets for VoIP and gaming applications
  - Perform measurements, data handling, and create test report
  - Data analysis, failure mode identification and proposed solution
  - Design and fabricate microphone test fixture as per appropriate standards
  - Design microphone power supply for testing
- **Component Specification & System Evaluation**
  - Review the audio design of a distance learning system
  - Recommend/specify microphone and interface
  - Supply test signals for system evaluation
- **QC Test Sequence Programming**
  - Program / re-program QC test sequences for to measure the acoustic impedance of a hearing screening system subcomponent
  - Prepare test report describing improved test methodology
  - Run tests on samples to verify program
- **System Design**
  - Technical analysis and evaluation of sound activated control system
  - Recommend/specify transducers
  - Make recommendations to improve system design
- **Headphone System Design Verification**
  - Performed electroacoustical response measurements of a headphone system for use in a medical environment
  - Verified response, equalization and noise isolation performance
  - Work with client to ensure amplifier interface works with transducers

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- Create test report and spreadsheet 'Gain Calculator' design tool for adjusting input sensitivity
- **Loudspeaker Test Sequence Programming**
  - Program / re-program QC/QA test sequences for active powered loudspeaker measurements
    - Frequency Response & Impulse Response
    - Horizontal & Vertical Polar Response with control of turntable
    - Maximum Steady State SPL output in 1/3 octaves
  - Provide technical support via phone and Email
- **VoIP Handset Re-Design**
  - Run tests on existing handset to determine failure mode(s)
  - Re-design VoIP handset to incorporate leak tolerant, low acoustic impedance receiver, ensuring compliance to TIA-920
  - Calculate mechanical design parameters and provide design drawings
  - Work with vendor to source transducers and optimize design
  - Perform tests on prototype to ensure design target compliance
- **Earphone Design & Test**
  - Re-design earphones incorporating improvements in fit, wear-ability and acoustic performance
  - Analyze anthropomorphic data to determine dimensions for highest fit rate
  - Create test sequences for evaluating electroacoustic performance
  - Run tests on prototype units to ensure design target compliance
- **Test System Specification and Training**
  - Recommend instrumentation configuration and calibration for a headset test lab
  - Electroacoustics training for engineering staff and application specific hands-on training for headset testing
- **Test Sequence Programming and Training**
  - Program / re-program QC/QA test sequences for hearing test instruments
  - Provide technical support via phone and Email
  - Electroacoustics training for the engineering staff and application specific hands-on training in test sequence programming
- **Seminars in Acoustics, Transducers, and Measurements**
  - Preparation of all PowerPoint materials and demonstrations
  - In house seminars upon client request
  - Tutorial sessions at AES, ALMA, and AAA
  - Public seminars on Loudspeaker Testing with Klippel GmbH
  - Self-published book on these topics available from the website:  
<http://www.cjs-labs.com/sitebuildercontent/sitebuilderfiles/OrderingCourseNotes.pdf>
- **Standardization Work**
  - CHAIR: ANSI S3-37 Working Group on Couplers and Ear Simulators
    - ANSI S3.25 – New revision released in 2009
    - ANSI S3.7 (reaffirmation 2008)
    - IEC Liaison: Coordinate US Comment/Vote on IEC Committee Drafts
  - CHAIR: ANSI S3-67 Working Group on Test Manikins
    - ANSI S3.36 – Revision in progress (2011-2012)

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- IEC Liaison: Coordinate US Comment/Vote on IEC Committee Drafts
- IEEE Subcommittee on Telephone Instrument Testing
  - IEEE 1652
  - IEEE 661 (reaffirmation)
  - IEEE 269 (revision and amendments, 2010-2012)
  - IEEE 1329 (revision ballot)
  - IEEE 1027 (ballot and withdrawal)
  - Liaison with ITU-T
- ANSI S3-48 Working Group on Hearing Aids
  - ANSI S3.22 (revision & FDA approval)
  - ANSI S3.35 (revision)
- AES SC-04-03 Standards Committee on Loudspeakers
  - AES 2 (revision)
- **MatLab Programming**
  - HRTF plotter and ASCII file conversion
  - Control and data transfer for Listen SoundCheck
  - Frequency Response data reformat and semi-log interpolator
  - 1/3 octave synthesis from FFT data
  - Loudspeaker passive crossover designer/simulator
  - Loudspeaker Impedance LMS data fitting to Equivalent Circuit Models  
<http://www.cjs-labs.com/sitebuildercontent/sitebuilderfiles/zfitdatasheet.pdf>
  - Interface and data transfer with a measurement system
  - General purpose GUI and graphics routines
  - ISO 532b Loudness Calculation
  - Calibrated FFT and 1/3 octave band measurements
  - 1/3 octave Multispectrum analysis with Calibration, Time Slice, and Excel Data export
  - Macintosh-compatible analysis routines
- **Architectural Acoustics**
  - Meet with client to propose mitigation for poor intelligibility and excessive reverberation in an open plan office
  - Specify speech privacy requirements for a security room
  - Specify requirements for improved intelligibility in teleconference rooms
- **Circuit Design**
  - Re-Design of Electric Guitar passive electronics
  - Produce schematics, wiring diagrams and complete step-by-step annotated assembly and testing instructions  
<http://www.cjs-labs.com/sitebuildercontent/sitebuilderfiles/JPage-LesPaulWiring.pdf>
- **Industrial Design Consulting**
  - Transducer selection for a hand-held PC device
  - Review product requirements, mechanical drawings and candidate transducer specifications
  - System optimization
  - Perform measurements on subcomponents and prototype
- **Comparative Product Testing**
  - Standardized objective testing of the earphone response of various gaming headsets
  - Performed measurements and prepared test report

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- **Acoustical Engineering and Design**
  - Specify transducers, data acquisition, signal processing, and performance metrics for a personal recording device
  - Identify subcomponents and qualify vendors
  - Perform electroacoustic measurements on prototypes
  - System design and optimization
- **Software Consulting**
  - De-bug web-based frequency to musical note conversion program
- **Intellectual Property Evaluation & Expert Witness**
  - Technical analysis and evaluation of a noise reduction algorithm patent
  - Design and specify appropriate tests to identify performance as per patent claims
  - Perform measurements on various embodiments and issue test reports
  - Attend meetings with litigants as Subject Matter Expert
  - Draft and edit technology summaries for legal documents
- **Acoustical Analysis**
  - Room mode calculation and analysis
  - Prepared report and made recommendations for mediating acoustical problems
- **Subcomponent Redesign & Verification**
  - Acoustical testing of prototype subcomponents for audiometry
  - Performed measurements and prepared test report
- **In-House Training Seminar**
  - In-house training presentation on headphone measurements for the research group of a microphone and headphone manufacturer
  - Discussion of test techniques for noise-canceling devices
  - Provide information on time-selective test methods
- **Test Automation**
  - Specify and create test sequences for Hearing Aid QC according to ANSI S3.22 & IEC 60118
  - Architect macro creation into appropriate sub-modules
  - Code and/or review macro routines
  - Create calibration routines – in particular for telecoil tests
  - Perform tests on hearing aids using completed routines to test the software
- **Software Re-architecture and Coding**
  - Research existing patents for a hearing/sound processing program
  - Prepare project documentation
  - Identify code modules and specify appropriate signal processing and data handling
  - Re-code entire program in MatLab
  - Prepare code releases and handle bug/error tracking
- **Instrumentation, Measurement, and Test Training**
  - Test system setup and configuration for a loudspeaker subcomponent manufacturer

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- Provide hands-on software training
- System integration and specification of instrumentation
- Research vendors for long term power testing
- **System Integration and Testing**
  - Revamp QC/QA test process for a critical component in a hearing screening device
  - Specify, install and program new test system
  - Vendor management and component qualification
  - Redesign critical components for compatibility and serviceability
- **Simulation/Optimization**
  - Loudspeaker driver specification and system optimization for a novel closed-box design
- **Training**
  - General Electroacoustics Training for entire scientific staff of an earphone, earplug, and headset manufacturer
  - Recommendations on instrumentation configuration and calibration
  - Recommend test set up for high level impulse measurements of hearing protectors
- **Market Research**
  - Background and market research on Audio Codecs for Financial Services & Investment Firms
  - Hearing Instruments for Entrepreneurs & Start-ups
  - Test Instrumentation for test and measurement instrument makers & End Users
- **Comparative Product Testing**
  - Standardized objective testing of headphones for an industry consortium
  - Performed measurements and prepared test report
- **Product Design**
  - Design and build working prototype battery simulator for hearing aid testing
  - Identify vendors and source components
  - Specify circuit and mechanical designs
  - Create Bill of Materials and Product Data Sheet  
<http://www.cjs-labs.com/sitebuildercontent/sitebuilderfiles/BS-01DataSheet.pdf>
- **Test Instrument Design**
  - Design and build working prototype sound source for microphone testing  
<http://www.cjs-labs.com/sitebuildercontent/sitebuilderfiles/PointSource-PreliminaryDataSheet.pdf>
  - Identify transducer and enclosure vendors
  - Specify protection circuit and outsource prototyping
  - Redesign crossover network
  - Perform electroacoustic measurements to verify performance
- **Sub-Component Testing**
  - Measure driver impedance data and derive small signal parameters for a headphone design
  - Consult on testing, QC methodology and test system hardware
- **Laboratory Measurement System Integration**

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- Consult on room acoustics and sound field verification for clinical experiments for a hearing instrument research facility
- Oversee calibration and coding of data acquisition and analysis routines
- **Technical Marketing**
  - Edit/Co-author journal article for a hearing instrument manufacturer
  - Generate measurements, graphs, and figures as required
  - Research appropriate references
- **Performance Testing**
  - Perform Simulated In-Situ (manikin) Testing and Directional measurements (polar diagrams) on a Completely-In-The-Canal hearing device
  - Perform probe tube in-ear insertion gain tests on test subjects fitted with the device
  - I/O Characterization and compression threshold mapping
- **Acoustical Consulting**
  - Perform modeling and characterization of on-board transducers & signal processing for a transducer-equipped semiconductor product
  - Create performance specification for telecom applications
  - Redesign existing test fixture
  - Perform electroacoustic measurements and provide training
  - Design a test protocol for a noise-canceling headset application
- **Project Management**
  - Led project team of a loudspeaker manufacturer through major phases of design, prototype, and production
  - Initiated a research project to model the new device behaviour
  - Co-authored 2 conference papers describing this work
    - <http://www.cjs-labs.com/sitebuildercontent/sitebuilderfiles/LATModel-AES121st.pdf>
    - <http://www.cjs-labs.com/sitebuildercontent/sitebuilderfiles/LATOverview-AES121st.pdf>

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