

# Steven Sandoval

Affiliate Faculty  
Klipsch School of Elec & Comp Eng  
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## EDUCATION

- Ph.D.*, Electrical Engineering  
Arizona State University, Tempe, AZ May 2016
- Master of Science*, Electrical Engineering  
New Mexico State University, Las Cruces, NM August 2010
- Bachelor of Science*, Electrical Engineering  
Minor: Mathematics  
New Mexico State University, Las Cruces, NM May 2007

## PROFESSIONAL EXPERIENCE

- Cirrus Logic*, Signal Processing Research Intern January 4, 2016–May 6, 2016  
Austin, TX
- Laboratory data collection and MATLAB simulation to architect and design algorithms targeted for real-time, fixed-point DSP processors in various areas of acoustic signal processing.
- Atamir-WSMR*, Systems Analyst/Integration Engineer April 1, 2008–June 15, 2012  
White Sands Missile Range, NM
- Review of System Specification and Test Documentation, Test Monitoring, Data Collection and Coordination, Reporting and Documentation, Mission History Database Maintenance.
  - Provide Data and System Analysis support.
  - Held Secret Security Clearance.
- NCI Information Systems Inc.*, Systems Analyst May 21, 2007–March 31, 2008  
White Sands Missile Range, NM
- Provide test mission support and post mission data analysis and reports.
  - Held Secret Security Clearance.
- Honeywell International Inc.*, Student Engineer May 22, 2006–August 18, 2006  
Aerospace Electronic Systems, Albuquerque, NM (Internship)
- Programmed FPGA embedded microcontroller for F-16 display card redesign. Testing and troubleshooting of system processors for the OH-58 and CH-47 helicopters. Addressed parts obsolescence issues. Document change orders. Designed and organized test equipment builds.
  - Managed project transition to another facility.
- NASA Jet Propulsion Laboratory (JPL)*, Engineering Intern June 13, 2005–August 19, 2005  
Bio-Inspired Technologies and Systems Group, La Cañada Flintridge, CA (Internship)
- Member of the Humanoid Robotics team developing robot fostering techniques for sensory-motor development. Responsible for the integration of current software architecture with artificial neural-fuzzy algorithm for control of the robots arms during an assembly task.
  - Responsible for redesign of robotic arm with the addition of tactile feedback sensors suspended in flesh-like rubber latex to provide grip, protection, and give the robot a sense of touch.

## PEER-REVIEWED JOURNAL PUBLICATIONS

- **S. Sandoval**, “Evaluation of Traditional and Automated Vowel Formant Normalization Procedures,” in preparation (draft available upon request)
- **S. Sandoval**, R. L. Utianski “Average Formant Trajectories,” *Journal of Phonetics*, in review (available at <http://StevenSandoval.info>)
- **S. Sandoval**, P. L. DeLeon, “Theory of the Hilbert Spectrum,” *Applied and Computational Harmonic Analysis*, in review (available on arXiv, <http://arxiv.org/abs/1504.07554>)
- V. Berisha, **S. Sandoval**, R. L. Utianski, J. M. Liss, and A. Spanias, “Characterizing the distribution of the quadrilateral vowel space area,” *The Journal of the Acoustical Society of America*, vol. 135, no. 1, pp. 421-427, 2014
- **S. Sandoval**, V. Berisha, R. L. Utianski, J. M. Liss, and A. Spanias, “Automatic assessment of vowel space area,” *The Journal of the Acoustical Society of America*, vol. 134, no. 5, pp. EL477-EL483, 2013
- L. E. Boucheron, P. L. De Leon, and **S. Sandoval**, “Low Bit-Rate Speech Coding through Quantization of Mel-Frequency Cepstral Coefficients,” *Audio, Speech, and Language Processing, IEEE Transactions on*, vol.20, no.2, pp.610-619, Feb. 2012

## OTHER PUBLICATIONS

- **S. Sandoval**, P. L. DeLeon, and J. M. Liss, “Hilbert Spectral Analysis of Vowels using Intrinsic Mode Functions,” accepted *IEEE Automatic Speech Recognition and Understanding Workshop (ASRU)*, 2015
- V. Berisha, **S. Sandoval**, and J. M. Liss, *Bandwidth Extension of Speech Using Perceptual Criteria*, ser. Synthesis Lectures on Algorithms and Software in Engineering. Morgan & Claypool Publishers, 2013
- V. Berisha, **S. Sandoval**, R. L. Utianski, J. M. Liss, and A. Spanias, “Selecting disorder-specific feature for speech pathology fingerprinting,” *Acoustics, Speech and Signal Processing (ICASSP), 2013 IEEE International Conference on*, pp. 7562-7566, 26-31 May 2013
- L. E. Boucheron, P. L. De Leon, and **S. Sandoval**, “Hybrid Scalar/Vector Quantization of Mel-Frequency Cepstral Coefficients for Low Bit-Rate Coding of Speech,” *Data Compression Conference (DCC)*, 2011, pp.103-112, 29-31 March 2011
- A. Stoica, D. Keymeulen, A Csaszar, Q. Gan, T. Hidalgo, J. Moore, J. Newton, **S. Sandoval**, J. Xu, “Humanoids for lunar and planetary surface operations,” *Humanoid Robots, 2005 5th IEEE-RAS International Conference on*, pp.345-350, 5 Dec. 2005
- A. Stoica, D. Keymeulen, A Csaszar, Q. Gan, T. Hidalgo, J. Moore, J. Newton, **S. Sandoval**, J. Xu, “Humanoids for lunar and planetary surface operations,” *Systems, Man and Cybernetics, 2005 IEEE International Conference on*, vol.3, pp. 2649- 2654, 10-12 Oct. 2005

## PRESENTATIONS

- First place winner of the *Smartphone Acoustic Signal Processing Student Competition* at the 166<sup>th</sup> Meeting of the Acoustical Society of America:  
R. L. Utianski, **S. Sandoval**, N. Lehrer, V. Berisha, and J. M. Liss, “Speech assist: An augmentative tool for practice in speech-language pathology,” *The Journal of the Acoustical Society of America*, vol. 134, no. 5, pp. 4134-4134, 2013
- Oral Presentation at the 166<sup>th</sup> Meeting of the Acoustical Society of America:  
**S. Sandoval**, R. L. Utianski, V. Berisha, J. M. Liss, and A. Spanias, “Feature divergence of pathological speech,” *The Journal of the Acoustical Society of America*, vol. 134, no. 5, pp. 4133-4133, 2013
- Oral Presentation at the 166<sup>th</sup> Meeting of the Acoustical Society of America, given by R. L. Utianski:  
R. L. Utianski, **S. Sandoval**, V. Berisha, and J. M. Liss, “The effects of speech compression algorithms on the intelligibility of dysarthric speech,” *The Journal of the Acoustical Society of America*, vol. 134, no. 5, pp. 4132-4132, 2013

## RESEARCH EXPERIENCE

- Motor Speech Disorder Lab*, and  
*Sensor, Signal & Information Processing Center (SenSIP)*, Research Associate 2012–2015  
Arizona State University
- Speech Pathology Fingerprinting, Acoustic Correlates of Dysarthric Speech
- Advanced Speech and Audio Processing Laboratory*, Research Assistant 2010–2011  
New Mexico State University
- Speaker Identification/Verification, Automatic Speech Recognition, Speech Coding/Compression
  - Massively Parallel Signal Processing using Graphics Processing Units (GPU's), NVIDIA CUDA
- Flying Aggies Student Research Team*, Team Member 2004  
New Mexico State University
- National competition for flight slots, 3 projects accepted.
  - Projects are tested aboard NASAs KC-135 at Johnson Space Center. Accepted projects include experiments in the development of deployable structures in zero gravity, overcoming cooling problems of reactors in space, and water treatment in a zero gravity environment.
- Alliance for Minority Participation (AMP) Student Research Program* 2004–2005  
New Mexico State University
- Presented research results at Undergraduate Research Symposiums
- RioRobo Lab, Lab Assistant* 2004–2005  
New Mexico State University
- Design, development, and prototyping of autonomous vehicles.

## PROFESSIONAL AFFILIATIONS

- Institute of Electrical and Electronics Engineers (IEEE), *Graduate Student Member*
- IEEE-Eta Kappa Nu (HKN) Honor Society, *Member*
- Acoustical Society of America, *Student Member*

## INSTITUTIONAL AND PROFESSIONAL SERVICE

IEEE Transactions reviewer, ICASSP 2010 reviewer, CWSPI 2013 reviewer, ISCAS 2014 reviewer

## FELLOWSHIPS

Acoustical Society of America Minority Fellowship, ASU  
Pamela and Jack Saltich Fellowship, ASU  
University Graduate Fellowship, ASU  
New Mexico Higher Education Department, NMSU  
New Mexico Space Grant Fellowship, NMSU  
Summer Undergraduate Research Fellowship (SURF) at Caltech

## COMPUTER SKILLS

MATLAB, L<sup>A</sup>T<sub>E</sub>X, LabVIEW, C, C++, Assembly, BASIC, Quartus II, VHDL, Max Plus-II, Nios II, Microcontroller Programming, FPGA Embedded Microcontrollers, Digital Signal Processors, MS Office

## RESEARCH INTERESTS

Latent signal analysis, AM–FM modeling, Hilbert spectral analysis, time-frequency analysis, signal processing, audio and video coding, audio quality analysis, speech processing, embedded systems, machine learning, pattern recognition, optimization and robotics.

## **CONSULTING, PATENTS, ETC.**

Private Consulting:

- NetLogic (Mountain View, CA), Consultant, 2010-2011

US Patents:

- Application # 61/425525: Low Bit-Rate Speech Coding Through Quantization of Mel-Frequency Cepstral Coefficients, 2010

## **TEACHING EXPERIENCE**

- Guest lecture for Digital Signal Processing (EEE 407) at Arizona State University
- Guest presentation for Time-Frequency Signal Processing (EEE 505) at Arizona State University
- Teaching Assistant (TA) for DSP Algorithms (EEE 509) at Arizona State University for one semester
- Teaching Assistant (TA) for Digital Signal Processing (EEE 407) at Arizona State University for one semester
- Teaching Assistant (LIA/TA) for Circuits (EEE 202) Lab at Arizona State University for six semester long classes
- Two weeks of guest lecturing in the Digital Speech Processing (EE 589) class at New Mexico State University. Project creation, that consisted of creating an Automatic Speech Recognition (ASR) system using Gaussian Mixture Model (GMM) based Hidden Markov Models (HMMs), the project was implemented in MATLAB