

Osonde A. Osoba, Ph.D.

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CURRENT AFFILIATIONS:

Associate Engineer, RAND Corporation

Adjunct Lecturer, Electrical Engineering Department, University of Southern California

EDUCATION:

PhD, Electrical Engineering, University of Southern California (2013)

Dissertation: "Noise Benefits in Expectation-Maximization Algorithms"

Committee: Bart Kosko (Advisor/Chair), Antonio Ortega, James Moore II

MS, Electrical Engineering, University of Southern California (2007)

BS, Electrical & Computer Engineering, University of Rochester (2005)

Honors: With High Distinction *Minor:* Mathematics

RESEARCH INTERESTS:

Statistical Signal Processing, Machine Learning, Optimization, Bayesian Statistics, Decision-making under uncertainty, Stochastic Resonance

JOURNAL ARTICLES:

O. Osoba, B. Kosko, "The Noisy Expectation-Maximization Algorithm for Multiplicative Noise Injection," *[in review]*

O. Osoba, S. Mitaim, B. Kosko, "The Noisy Expectation Maximization Algorithm," *Fluctuation and Noise Letters*, vol.12, no.03, Sept. 2013

O. Osoba, B. Kosko, "Noise-enhanced Clustering and Competitive Learning Algorithms," *Neural Networks*, vol.37, no.0, pp.132-140, Jan. 2013

O. Osoba, S. Mitaim, B. Kosko, "Triply Fuzzy Function Approximation for Hierarchical Bayesian Inference," *Fuzzy Optimization and Decision Making*, vol.11, no.3, pp.241-268, Sept. 2012

O. Osoba, S. Mitaim, B. Kosko, "Bayesian Inference with Adaptive Fuzzy Priors and Likelihoods," *IEEE Transactions on Systems, Man, and Cybernetics-B*, vol.41, no.5, pp.1183-1197, Oct. 2011

K. Audhkhasi, O. Osoba, S. Mitaim, B. Kosko, "Noise Speed-ups in Hidden Markov Models with Applications to Speech Recognition," *[submitted]*

Curriculum Vitae

- K. Audhkhasi, O. Osoba, S. Mitaim, B. Kosko, "Noise Can Speed Backpropagation Neural Learning and Deep Bidirectional Pre-training," *[submitted]*

CONFERENCE PAPERS:

- K. Audhkhasi, O. Osoba, and B. Kosko, "Noise Benefits in Convolutional Neural Networks," *Proceedings of the 2014 International Conference on Advances in Big Data Analytics (ABDA-2014)*, 2014
- K. Audhkhasi, O. Osoba, and B. Kosko, "Noise Benefits in Backpropagation and Deep Bidirectional Pre-Training," *International Joint Conference on Neural Networks (IJCNN)*, pp.2254-2261, Aug. 2013
- K. Audhkhasi, O. Osoba, and B. Kosko, "Hidden Markov Models for Speech Recognition," *International Joint Conference on Neural Networks (IJCNN)*, pp.2738-2743, Aug. 2013
- O. Osoba, S. Mitaim, B. Kosko, "Noise Benefits in the Expectation-Maximization Algorithm: NEM Theorems and Models," *International Joint Conference on Neural Networks (IJCNN)*, pp.3178-3183, Aug. 2011
- O. Osoba, S. Mitaim, B. Kosko, "Triply Fuzzy Function Approximation for Bayesian Inference," *International Joint Conference on Neural Networks (IJCNN)*, pp.3105-3111, Aug. 2011
- O. Osoba, S. Mitaim, B. Kosko, "Adaptive fuzzy priors for Bayesian inference," *International Joint Conference on Neural Networks (IJCNN)*, pp.2380-2387, Jul. 2009

PATENTS:

- B. Kosko, O. Osoba, S. Mitaim, "Iterative Estimation Of System Parameters Using Noise-Like Perturbations," U.S. Patent Application 13/949,048 (Jul. 2013)
- B. Kosko, O. Osoba, "Noise-Enhanced Clustering And Competitive Learning Algorithms," U.S. Provisional Patent Application 61/914,294 (Dec. 2013)
- K. Audhkhasi, O. Osoba, B. Kosko, "Noise-Boosted Hidden Markov Models For Speech Recognition and Other Applications," U.S. Provisional Patent Application 62/032,385 (Aug. 2014)

Other related provisional patent applications in progress with USC.

Curriculum Vitae

AWARDS AND HONORS:

Ming Hsieh Institute Scholar, 2012-2013
National GEM Fellow, 2009-2010
Annenberg Fellow, 2007-2008
USC All-University Pre-doctoral Fellow, 2005-2007

SELECTED WORK EXPERIENCE:

The RAND Corporation

Associate Engineer

Summer Research Associate

- Policy-oriented research on data analytics, decision-making under uncertainty, and emerging tech.
- Worked on PortMan, a proprietary portfolio management algorithm for optimally allocating funds in research and development project portfolios. Performed analysis and stress-testing.

Santa Monica, CA

July 2014 - Present

Summer 2012

Signal and Image Processing Institute (USC)

Postdoctoral Researcher

Research Assistant

- Explored stochastic resonance effects in machine learning algorithms. Worked on careful noise injection schemes for provably speeding up clustering algorithms, backpropagation for neural network training, and other iterative statistical procedures
- Research and publication on a variety of other topics including Bayesian inference, statistical estimation, and machine learning. Worked under direction of Prof. Bart Kosko.

Los Angeles, CA

2013 - Present

2006 - 2013

Viterbi School of Engineering (USC)

Adjunct Faculty

Teaching Assistant

- Taught four sections of graduate and undergraduate probability theory for engineers. Also lectured statistics, machine learning, & complex variables.
- Developed and taught a new seminar course on probabilistic simulation methods. Covered topics including random number generation, resampling methods, Monte Carlo techniques, Markov chains, and MCMC methods.

Los Angeles, CA

2013 - Present

2008 - 2013

Intel Corporation

Graduate Technical Intern

- Analyzed power delivery networks in x86 microprocessors to identify high-power-consumption instruction sequences for Intel's Strategic CAD Labs.
- Developed an identification method based on wavelet decomposition and PCA/SVD analysis.

Hillsboro, OR

Summer 2009