

# Assigned Project Lab Papers

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After the 7 structured labs that cover basic digital signal processing (DSP) operations, ECE 420 students will explore in depth a chosen fundamental DSP algorithm using high-level languages (such as MATLAB or Python) for 2 weeks on assigned project labs.

Later, the final projects should be **built upon** the assigned project labs. Students have to demonstrate their understanding of the algorithm and its implementation through oral quiz during the assigned project labs.

Students have to develop a **testing and validation plan** to demonstrate that the high-level implementation works. Methodology and results should be included in a short report.

Following is a list of highly common and popular DSP algorithms that are used in many real-time DSP systems. Students should **consult with the instructor and TAs** in picking a paper that is fundamental to their intended final project.

By February 18th, 2017, each group please email your TA and Prof Do your chosen paper for the assigned project lab and the names of people in your group (typically 2).

## Recommended Papers

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Boll, Steven. **Suppression of acoustic noise in speech using spectral subtraction**, Acoustics, Speech and Signal Processing, IEEE Transactions on, 27.2 (1979): 113-120.

Allen, J. B., D. A. Berkley, and J. Blauert. **Multimicrophone signal processing technique to remove room reverberation from speech signals.** The Journal of the Acoustical Society of America 62 (1977): 912.

Klatt, Dennis H. **Software for a cascade/parallel formant synthesizer** the Journal of the Acoustical Society of America 67 (1980): 971.

Auger, Francois, and Patrick Flandrin. **Improving the readability of time-frequency and time-scale representations by the reassignment method** Signal Processing, IEEE Transactions on 43.5 (1995): 1068-1089.

Chowning, John M. **The synthesis of complex audio spectra by means of frequency modulation,** Computer Music Journal (1977): 46-54.

B. Widrow **Adaptive noise cancelling: Principles and applications,** Proc. IEEE, vol. 63, pp.1692 -1716, 1975.

L. Rabiner et al. **A comparative performance study of several pitch detection algorithms,** IEEE Transactions on Acoustics, Speech and Signal Processing, 24.5 (1976): 399-418.

Van Veen, Barry D., and Kevin M. Buckley. **Beamforming: A versatile approach to spatial filtering.,** ASSP Magazine, IEEE 5.2 (1988): 4-24.

M.S. Arulampalam, S. Maskell, N. Gordon, and T. Clapp, **A tutorial on particle for online nonlinear/non-Gaussian Bayesian trackin,** IEEE Transactions on Signal Processing, Volume: 50, Issue: 2, pp. 174 - 188, 2002.

D. Comaniciu and P. Meer, **Mean shift: a robust approach toward feature space analysis,** IEEE Transactions on Pattern Analysis and

Machine Intelligence, vol. 24, issue 5, pp. 603 - 619, 2002.

S. Baker and I. Matthews, **Lukas-Kanade 20 years on: A unifying framework**, International Journal of Computer Vision, vol. 56, no. 3, pp. 221-255, Mar. 2004.

Canny, John. **A computational approach to edge detection**. Pattern Analysis and Machine Intelligence, IEEE Transactions on 6 (1986): 679-698.

Kass, Michael, Andrew Witkin, and Demetri Terzopoulos. **Snakes: Active contour models**, International journal of computer vision 1.4 (1988): 321- 331.

S. Paris and F. Durand. 2009. **A Fast Approximation of the Bilateral Filter Using a Signal Processing Approach**. Int. J. Comput. Vision 81, 1 (January 2009), 24-52.

Shi, Jianbo, and Jitendra Malik. **Normalized cuts and image segmentation**. Pattern Analysis and Machine Intelligence, IEEE Transactions on 22.8 (2000): 888-905.

Boykov, Y.Y.; Jolly, M.-P., **Interactive graph cuts for optimal boundary & region segmentation of objects in N-D images**, Proceedings. Eighth IEEE International Conference on Computer Vision (ICCV), vol.1, pp.105-112, 2001.

Lowe, David G. **Object recognition from local scale-invariant features**. Computer vision, 1999. The proceedings of the seventh IEEE international conference on. Vol. 2. Ieee, 1999.

Ballard, Dana H. **Generalizing the Hough transform to detect arbitrary shapes**. Pattern recognition 13.2 (1981): 111-122.

Matthew Turk and Alex Pentland, **Eigenfaces for Recognition**, Journal of Cognitive Neuroscience 1991 3:1, 71-86