

Scott E. Budge
Department of Electrical and Computer Engineering
Utah State University

Refereed Journal Publications

1. K. A. Perrine, B. L. LaMarche, D. F. Hopkins, S. E. Budge, L. K. Opresko, H. S. Wiley, and M. B. Sowa, “High speed method for in situ multispectral image registration,” *Microscopy Research and Technique*, vol. 70, no. 4, pp. 382–389, Apr. 2007.
2. T. K. Moon and S. E. Budge, “Classification using set-valued Kalman filtering and Levi’s decision theory,” *IEEE Trans. Syst., Man, Cybern.*, vol. 24, no. 2, pp. 313–319, Feb. 1994.
3. T. K. Moon, S. E. Budge, W. C. Stirling, and J. Thompson, “Epistemic decision theory applied to multiple target tracking,” *IEEE Trans. Syst., Man, Cybern.*, vol. 24, no. 2, pp. 234–245, Feb. 1994.

Refereed Conference Papers

1. S. E. Budge, “A laboratory-based course in real-time digital signal processing implementation,” in *5th SPE Workshop*. IEEE, Jan. 2009, pp. 762–767.
2. R. T. Pack, J. A. Swasey, R. R. Fullmer, S. E. Budge, P. D. Israelsen, B. Petersen, and T. D. Cook, “Eyesafe LADAR test-bed with coaxial color imager,” in *Laser Radar Technology and Applications XIV*, M. D. Turner and G. W. Kamerman, Eds., vol. 7323. SPIE, Apr. 2009.
3. K. D. Neilsen, S. E. Budge, R. T. Pack, R. R. Fullmer, and T. D. Cook, “Design and validation of the eyesafe LADAR test-bed (ELT) using the LadarSIM system simulator,” in *Laser Radar Technology and Applications XIV*, M. D. Turner and G. W. Kamerman, Eds., vol. 7323. SPIE, Apr. 2009.
4. M. Mamanakis, R. R. Fullmer, S. E. Budge, and R. T. Pack, “Automatic object recognition implications of attentive ladar,” in *Acquisition, Tracking, Pointing and Laser Systems Technologies XXII*, S. L. Chodos and W. E. Thompson, Eds., vol. 6971. SPIE, Mar. 2008.
5. B. C. Leishman, S. E. Budge, and R. T. Pack, “A validation procedure for a LADAR system radiometric simulation model,” in *Laser Radar Technology and Applications XII*, M. D. Turner and G. W. Kamerman, Eds., vol. 6550. SPIE, May 2007, DOI: 10.1117/12.720240.
6. B. M. Boldt, S. E. Budge, R. T. Pack, and P. D. Israelsen, “A handheld texel camera for acquiring near-instantaneous 3D images,” in *Proc. Asilomar Conf. on Signals, Systems, and Computers*, Nov. 2007.
7. Y. Liang and S. E. Budge, “Rate distortion optimized vector SPIHT for wavelet image coding,” in *Proc. Asilomar Conf. on Signals, Systems, and Computers*, Nov. 2007.

8. S. E. Budge, B. C. Leishman, and R. T. Pack, "Simulation and modeling of return waveforms from a ladar beam footprint in USU LadarSIM," in *Laser Radar Technology and Applications XI*, G. W. Kamerman and M. D. Turner, Eds., vol. 6214. SPIE, Apr. 2006, DOI: 10.1117/12.666404.
9. R. T. Pack, D. Saunders, R. R. Fullmer, and S. E. Budge, "The simulation of automatic ladar sensor control during flight operations using USU LadarSIM software," in *Laser Radar Technology and Applications XI*, G. W. Kamerman and M. D. Turner, Eds., vol. 6214. SPIE, Apr. 2006.
10. Y. Liang and S. E. Budge, "Classified vector SPIHT for wavelet image coding," in *Proc. IEEE Intl. Conf. Image Processing*. IEEE, Oct. 2006, pp. 1865–1868.
11. S. E. Budge, A. M. Mayampurath, and J. C. Solinsky, "Real-time registration and display of confocal microscope imagery for multiple-band analysis," in *Proc. Asilomar Conf. on Signals, Systems, and Computers*, Nov. 2004.
12. M. S. Resat, J. C. Solinsky, H. S. Wiley, K. A. Perrine, T. A. Seim, and S. E. Budge, "3-D multispectral monitoring of living-cell signaling using confocal-imaging and FPGA processing," in *IEEE International Symposium on Biomedical Imaging (ISBI 2004)*, Washington, D.C., 2004, pp. 680–683.
13. J. C. Solinsky, S. E. Budge, P. D. Majors, and B. Rex, "Real-time image analysis of living cellular-biology measurements of intelligent chemistry," in *Sixth International Conference on Quality Control by Artificial Vision*, K. Tobin, Ed., vol. 5132. Bellingham, WA: SPIE, 2003.
14. G. W. Cantwell, S. E. Budge, and G. E. Bingham, "Lossy data compression for imaging interferometer data using a wavelet transform-based image compression algorithm," in *Proceedings of SPIE Vol. 5157 Optical Spectroscopic Techniques and Instrumentation for Atmospheric and Space Research V*, A. M. Larar and J. A. Shaw, Eds. Bellingham, WA: SPIE, 2003.
15. T. K. Moon and S. E. Budge, "Bit-level erasure decoding beyond design distance of Reed-Solomon codes over $GF(2^m)$," in *Proc. Asilomar Conf. on Signals, Systems, and Computers*. IEEE, Nov. 2003, pp. 1783–1787.
16. A. K. Huber, S. E. Budge, T. K. Moon, and G. E. Bingham, "CCA performance of a new source list/EZW hybrid compression algorithm," in *Astronomical Data Analysis*, J. L. Starck and F. D. Murtagh, Eds., vol. 4477. SPIE, Nov. 2001, pp. 173–185.
17. S. E. Budge and C. R. O'Brien, "Design of an FPGA-based high-speed filter-decimator for the GIFTS imaging interferometer," in *Proc. Asilomar Conf. on Signals, Systems, and Computers*, Nov. 2001.
18. S. E. Budge and C. B. Peel, "A fast full-search adaptive vector quantizer for video coding," in *Proc. Asilomar Conf. on Signals, Systems, and Computers*, Nov. 2001.

19. ———, “An adaptive-search residual vector quantizer for airborne reconnaissance,” in *Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing*. IEEE, Jun. 2000, pp. 3291–3294.
20. Budge, “Adaptive-rate tree-structured residual vector quantization,” in *Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing*. IEEE, Jun. 2000, pp. 1887–1890.
21. Q. Gu and S. E. Budge, “Rate-distortion adaptive vector quantization for wavelet image coding,” in *Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing*. IEEE, Jun. 2000, pp. 1903–1906.
22. C. B. Peel, S. E. Budge, K. Liang, and C.-M. Huang, “Locally optimal, buffer-constrained motion estimation and mode selection for video sequences,” in *Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing*, vol. 6, IMDSP-7.7. IEEE, Mar. 1999, pp. 3369–3372.
23. A. K. Huber and S. E. Budge, “Global and local distortion inference during embedded zerotree wavelet decompression,” in *Combined Industry, Space and Earth Science Data Compression Workshop*, A. B. Kiely and R. L. Renner, Eds. Snowbird, UT: Jet Propulsion Laboratory, Apr. 1996, pp. 51–60, JPL Publication 96-11.
24. S. E. Budge, “The SPIRIT III radiometer data compression system,” in *AIAA Computing in Aerospace 9 Conference*. AIAA, Oct. 1993, pp. 622–630.
25. A. K. Huber and S. E. Budge, “Design of the PROM codebook for the SPIRIT III data compressor using the weighted training set LBG algorithm,” in *AIAA Computing in Aerospace 9 Conference*. AIAA, Oct. 1993, pp. 954–958.
26. R. Reed and S. E. Budge, “Application of the Rice Algorithm into a vector quantization-based hybrid compression algorithm,” in *AIAA Computing in Aerospace 9 Conference*. AIAA, Oct. 1993, pp. 959–969.
27. J. Romriell and S. E. Budge, “An adaptive hybrid vector quantization algorithm,” in *AIAA Computing in Aerospace 9 Conference*. AIAA, Oct. 1993, pp. 970–979.
28. S. E. Budge and T. K. Moon, “Classification using set-valued Kalman filtering and risk-sensitive Bayes theory,” in *Thirtieth Annual Allerton Conference on Communication, Control, and Computing*, 1992, pp. 309–318.
29. A. K. Huber, S. E. Budge, and R. W. Harris, “Multi-rate, real time image compression for images dominated by point sources,” in *Space and Earth Science Data Compression Workshop, NASA Conference Publication CP-3183*, J. C. Tilton, Ed. NASA, Mar. 1992, pp. 125–136.
30. P. A. Wheeler, A. Gopalan, and S. E. Budge, “Using acoustical measurements to monitor corn moisture,” *J. Acoust. Soc. Amer.*, vol. 91, no. 4, p. 2371, Apr. 1992, abstract only.

31. A. K. Huber, S. E. Budge, and R. W. Harris, "Variable rate, real time image compression for images dominated by point sources," in *DCC '92 Data Compression Conference*, J. A. Storer and M. Cohn, Eds. Snowbird, UT: IEEE Computer Society, Mar. 1992, p. 440, poster session paper.
32. R. W. Harris, P. D. Israelsen, S. E. Budge, C.-M. Huang, and W. Helms, "Image compression for faster submarine data transmission," in *Submarine Technology Symposium*. Laurel, MD: Applied Physics Laboratory, The Johns Hopkins University, May 1991.
33. K. M. Liang, S. E. Budge, and R. W. Harris, "Rate distortion performances of VQ and PVQ compression algorithms," in *DCC '91 Data Compression Conference*, J. A. Storer and J. H. Reif, Eds. Snowbird, UT: IEEE Computer Society, Apr. 1991, p. 445, poster session paper.
34. R. W. Harris, S. E. Budge, P. D. Israelsen, W. Roark, and J. J. Sojka, "High quality image compression for rockets and satellites," in *Proceedings of the 3rd Annual USU Conference on Small Satellites*. Logan, UT: Utah State University, Sep. 1989.
35. S. E. Budge, C. F. Barnes, L. A. Talbot, D. M. Chabries, and R. W. Christiansen, "Image coding for data compression using a human visual model," in *Human Vision, Visual Processing, and Digital Display*, vol. 1077. SPIE, Jan. 1989, pp. 164–177, invited paper.
36. S. E. Budge, J. T. G. Stockham, D. M. Chabries, and R. W. Christiansen, "Vector quantization of color digital images within a human visual model," in *Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing*, vol. 2. IEEE, Apr. 1988, pp. 816–819.
37. S. E. Budge and R. L. Baker, "Color image compression using vector quantization in product codes," in *Proc. IEEE Int. Conf. Acoustics, Speech, Signal Processing*. IEEE, Mar. 1985.

Non-refereed Conference Papers

1. S. E. Budge, "A laboratory-based course in real-time digital signal processing using the TMS320C40," in *Proceedings of the DSPS Fest*. Texas Instruments, Aug. 2000.
2. T. K. Moon, C. B. Peel, and S. E. Budge, "Very fast tree-structured vector quantization," in *International Telemetry Conference 2001*, Oct. 2001.

Other Publications

1. S. E. Budge and J. Sallay, "Sensors and signal processing for high accuracy passenger counting," Center for Advanced Imaging LADAR, Utah State University, Final Report, Mar. 2009.
2. R. T. Pack, R. R. Fullmer, S. E. Budge *et al.*, *USU LadarSIM Release 3.0 User's Manual*, Utah State University/Space Dynamics Laboratory, Logan, UT, Mar. 2007.

3. K. A. Perrine, D. F. Hopkins, S. E. B. Brian L. LaMarche, and M. B. Sowa, "Pixel perfect: A real-time image processing system for biology," in *Scientific Computing & Instrumentation*, Sep. 2005, pp. 16–20.
4. A. M. Mayampurath, S. E. Budge, D. F. Hopkins, K. A. Perrine, B. L. LaMarche, M. B. Sowa, and J. C. Solinsky, "FPGA-based image capture system – a smartCam initiative," In "Summer Research Institute Interfacial and Condensed Phase Chemical Physics: 2005 Annual Report," at the Pacific Northwest National Laboratory, Nov. 2005, pp. 64–69.
5. S. E. Budge, "Cameras to capture true 3-D images becoming a reality," in *ECE 2005 Electrical and Computer Engineering*, 2005, pp. 12–13.
6. A. M. Mayampurath and S. E. Budge, "Report on the blob analysis in real-time (BART) project," Utah State University, Tech. Rep., Sep. 2004.
7. —, "Correction of geometric distortion in confocal microscope," Utah State University, Tech. Rep., Aug. 2004.
8. G. W. Cantwell, S. E. Budge, and G. E. Bingham, "Supplement to SDL/01-197 for UW contract G065726," Space Dynamics Laboratory, Utah State University, Technical Report SDL/01-197a, Nov. 2001.
9. G. W. Cantwell, S. E. Budge, G. E. Bingham, and J. A. Swasey, "Interferogram-domain frame-wise data compression algorithm development: SDL GIFTS data compression experiment progress," Space Dynamics Laboratory, Utah State University, Technical Report SDL/01-197, Sep. 2001.
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12. J. J. Sojka, R. W. Harris, P. D. Israelsen, and S. E. Budge, "Utilization of VQ data compression in space research," Center for Atmospheric and Space Science, Utah State University, Logan, UT, Tech. Rep. 89-5-1, Mar. 1989.
13. S. E. Budge, S. Smith, D. M. Chabries, and R. Christiansen, "Compression of sonar display data utilizing vector quantization," Electrical Engineering Dept., Brigham Young University, Tech. Rep., Jan. 1986.
14. S. E. Budge, T. M. Mabey, R. R. Furner, B. R. Nokelby, D. M. Chabries, R. W. Christiansen, and R. L. Baker, "Data compression of digital images," Dept. of Electrical Engineering, Brigham Young University, Provo, Utah, Final 1985 Sperry Contract Report, Apr. 1985.

Patents Awarded

1. S. E. Budge and Q. Gu, "Method for image coding by rate-distortion adaptive zerotree-based residual vector quantization and system for effecting same," U.S. Patent 7,437,010, Oct. 14, 2008.
2. S. E. Budge and Y. Zhang, "Forward error correction with codeword cross-interleaving and key-based packet compression," U.S. Patent 7,464,319, Dec. 9, 2008.
3. R. T. Pack and S. E. Budge, "System and method for improving lidar data fidelity using pixel-aligned lidar/electro-optic data," U.S. Patent 7,417,717, Aug. 26, 2008.
4. S. E. Budge and Q. Gu, "Method for image coding by rate-distortion adaptive zerotree-based residual vector quantization and system for effecting same," U.S. Patent 6,944,350, Sep. 13, 2005.
5. K. Liang, C.-M. Huang, P. D. Israelsen, and S. E. Budge, "Bit allocation for sequence image compression," U.S. Patent 5,909,513, Jun. 21, 1999.
6. R. W. Harris, P. D. Israelsen, and S. E. Budge, "Method and apparatus for data compression with reduced distortion," U.S. Patent 5,450,132, Sep. 12, 1995.