

# Curriculum Vitae

Bryan S. Morse  
Department of Computer Science  
Brigham Young University

## Research Interests

Computational vision, image processing, robotics, and computer graphics.

Secondary interests in medical imaging and pattern recognition.

## Education

Ph.D., Computer Science, University of North Carolina at Chapel Hill, May 1995

Dissertation: *Computation of Object Cores from Grey-Level Images*

Advisor: Dr. Stephen M. Pizer

M.S., Computer Science, Brigham Young University, December 1990

Thesis: *Trainable Automated Boundary Tracking Using Two-dimensional Graph-Searching with Dynamic Programming*

Advisor: Dr. William A. Barrett

B.S. *magna cum laude*, Computer Science, Brigham Young University, December 1986

Minor: Mathematics

## Experience and Professional Development

August 2000–Present

Associate Professor, Department of Computer Science, Brigham Young University.

July 2005–June 2008

Associate Chair, Department of Computer Science, Brigham Young University.

August 1994–August 2000

Assistant Professor, Department of Computer Science, Brigham Young University.

August 1990–August 1994

Graduate Research Assistant, Department of Computer Science, University of North Carolina at Chapel Hill.

January 1989–July 1990

Software Engineer, IBM Educational Systems Division, Provo, Utah.

December 1986–December 1988

Systems Engineer/Programmer, IBM Federal Systems Division, Rockville, Maryland.

## Peer-Reviewed Publications

- B. Price, B. Morse, and S. Cohen. LIVEcut: Learning-based interactive video segmentation by evaluation of multiple propagated cues. In *IEEE International Conference on Computer Vision (ICCV)*, October 2009. To appear.
- M. A. Goodrich, B. S. Morse, C. Engh, J. L. Cooper, and J. A. Adams. Towards using UAVs in wilderness search and rescue: Lessons from field trials. *Interaction Studies*, November 2009. To appear.
- D. J. Kennard, W. B. Lund, and B. S. Morse. Improving historical research by linking digital library information to a global genealogical database. In *JCDL '09: Proceedings of the 9th ACM/IEEE-CS Joint Conference on Digital Libraries*, pages 255–258, June 2009.
- N. Toronto, B. Morse, D. Ventura, and K. Seppi. Super-resolution via recapture and Bayesian effect modeling. In *IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2009.
- S. Brown, B. Morse, and W. Barrett. Interactive part selection for mesh and point models using hierarchical graph-cut. In A. A. Gooch and M. Tory, editors, *Proceedings of the Graphics Interface 2009 Conference*, pages 23–30, May 2009.
- J. A. Adams, C. M. Humphrey, M. A. Goodrich, J. L. Cooper, B. S. Morse, C. Engh, and N. Rasmussen. Cognitive task analysis for developing UAV wilderness search support. *Journal of Cognitive Engineering and Decision Making*, 3(1):1–26, 2009.
- N. Rasmussen, D. R. Thornton, and B. S. Morse, “Enhancement of unusual color in aerial video sequences for assisting wilderness search and rescue,” in *IEEE International Conference on Image Processing (ICIP)*, October 2008.
- B. S. Morse, D. Gerhardt, M. Goodrich, D. Thornton, and N. Rasmussen, “Application and evaluation of spatiotemporal enhancement of live aerial video using temporally local mosaics,” *CVPR 2008: IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, June 2008.
- M. A. Goodrich, B. S. Morse, D. Gerhardt, J. L. Cooper, J. Adams, C. Humphrey, and M. Quigley, “Supporting wilderness search and rescue using a camera-equipped mini UAV,” *Journal of Field Robotics*, vol. 25, pp. 89–110, January 2008.
- N. Toronto, B. Morse, D. Ventura, and K. Seppi, “The Hough transform’s implicit Bayesian foundation,” *IEEE International Conference on Image Processing*, September 2007.
- B. Morse, D. Thornton, Q. Xia, and J. Uibel, “Image-based color schemes,” *IEEE International Conference on Image Processing*, September 2007.
- N. Rasmussen, B. Morse, and C. Taylor, “A fixed-wing mini-UAV system for aerial search operations,” in *AIAA GNC: Guidance, Navigation, and Control Conference*, August 2007.
- T. Arnold and B. S. Morse, “Interactive image repair with assisted structure and texture completion,” in *WACV '07: Proceedings of the Eighth IEEE Workshop on Applications of Computer Vision*, IEEE Computer Society, February 2007.

- D. Hubbard, B. Morse, C. Theodore, M. Tischler, and T. McLain, "Performance evaluation of vision-based navigation and landing on a rotorcraft unmanned aerial vehicle," in *WACV '07: Proceedings of the Eighth IEEE Workshop on Applications of Computer Vision*, IEEE Computer Society, February 2007.
- J. Merrell, D. Ventura, and B. Morse, "Clustering streaming music via the temporal similarity of timbre," in *MUSIC-AI 2007: International Workshop on Artificial Intelligence and Music*, January 2007.
- D. T. Chen, B. S. Morse, B. Lowekamp, and T. S. Yoo, "Hierarchically partitioned implicit surfaces for interpolating large point set models," in *Proceedings of the 4th International Conference on Advances in Geometric Modeling and Processing, GMP 2006* (M.-S. Kim and K. Shimada, eds.), vol. 4007 of *Lecture Notes in Computer Science*, (Berlin), pp. 553–562, Springer-Verlag, July 2006.
- K. L. Steele, P. K. Egbert, and B. S. Morse, "Histogram matching for camera pose neighbor selection," in *Third International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT '06)*, pp. 153–160, IEEE Computer Society, June 2006.
- B. S. Morse, W. Liu, T. S. Yoo, and K. Subramanian, "Active contours using a constraint-based implicit representation," in *IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 285–292, IEEE Computer Society Press, June 2005.
- N. Toronto, D. Ventura, and B. Morse, "Edge inference for image interpolation," in *Proceedings IEEE International Joint Conference on Neural Networks*, pp. 1782–1787, August 2005.
- B. Morse, W. Liu, and L. Otis, "Empirical analysis of computational and accuracy tradeoffs using compactly supported radial basis functions for surface reconstruction," in *SMI '04: Proceedings of the International Conference on Shape Modeling & Applications*, pp. 358–361, June 2004.
- T. C. Howard and B. S. Morse, "Interactive level-set smoothing for photo editing," in *IEEE International Conference on Image Processing*, pp. 1057–1060, September 2003.
- B. S. Morse and D. Schwartzwald, "Image magnification using level-set image reconstruction," in *IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 333–340, IEEE Computer Society Press, December 2001.
- B. S. Morse, T. S. Yoo, D. T. Chen, P. Rheingans, and K. R. Subramanian, "Interpolating implicit surfaces from scattered surface data using compactly supported radial basis functions," in *SMI '01: Proceedings of the International Conference on Shape Modeling & Applications*, pp. 89–98, IEEE Computer Society Press, May 2001.
- T. S. Yoo, B. S. Morse, K. R. Subramanian, P. Rheingans, and M. J. Ackerman, "Anatomic modeling from unstructured samples using variational implicit surfaces," in *Proceedings of Medicine Meets Virtual Reality (MMVR 2001)*, Jan. 2001.
- X. Yu, B. S. Morse, and T. W. Sederberg, "Image reconstruction using data-dependent triangulation," *IEEE Computer Graphics & Applications*, vol. 21, pp. 62–68, March 2001.
- B. B. Hansen and B. S. Morse, "Multiscale image registration using scale trace correlation," in *IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 2202–2209, IEEE Computer Society Press, June 1999.

- B. Morse, J. Wilkes, and P. Egbert, "Hough transform assisted rectangle extraction," in *Proceedings of the IASTED International Conference on Signal and Image Processing (SIP)*, 1999.
- B. Morse, T. Howard, S. Larson, M. Bastian, and E. Mortensen, "Color quantization and dithering gamuts," in *Proceedings of the International Conference on Signal and Image Processing (SIP'99)*, 1999.
- S. Yu, M. J. Clement, Q. Snell, and B. Morse, "Parallel algorithm and processor selection based on fuzzy logic," in *HPCN Europe '99: Proceedings of the 7th International Conference on High-Performance Computing and Networking*, vol. 1593 of *Lecture Notes In Computer Science*, pp. 440–449, Springer-Verlag, April 1999.
- M. J. Clement, G. M. Judd, B. S. Morse, and J. K. Flanagan, "Performance surface prediction for wan-based clusters," *Journal of Supercomputing*, vol. 13, no. 3, pp. 267–281, 1999.
- B. Morse, D. Ashton, and M. Bastian, "A Bayesian exclusionary rule for Hough transforms," in *Proceedings International Conference on Computer Vision, Pattern Recognition, and Image Processing (CVPRIP)*, Joint Conference on Information Sciences, 1998.
- E. Sokolowsky, C. Songer, B. Morse, and P. Egbert, "User-assisted localized line segment extraction using the Hough transform," in *Proceedings International Computer Vision, Pattern Recognition, and Image Processing (CVPRIP'98)*, Joint Conference on Information Sciences, 1998.
- B. S. Morse and D. Schwartzwald, "Isophote-based interpolation," in *IEEE International Conference on Image Processing (ICIP)*, pp. 227–231, October 1998.
- B. S. Morse, "Analysis of the interpolation error between multiresolution images," in *IEEE International Conference on Image Processing (ICIP)*, pp. 213–216, October 1998.
- B. Morse and B. Hansen, "Scale trace correlation," in *International Conference on Imaging Science, Systems, and Technology (CISST)*, 1998.
- M. Clement, S. Yu, Q. Snell, and B. Morse, "Parallel algorithms for image convolution," in *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, July 1998.
- S. M. Pizer, B. S. Morse, D. Eberly, and D. S. Fritsch, "Zoom-invariant vision of figural shape: The mathematics of cores," *Computer Vision and Image Understanding*, vol. 69, pp. 55–71, January 1998.
- B. S. Morse, S. M. Pizer, D. T. Puff, and C. Gu, "Zoom-invariant vision of figural shape: Effects on cores of image disturbances," *Computer Vision and Image Understanding*, vol. 69, pp. 72–86, January 1998.
- M. J. Clement, B. S. Morse, J. K. Flanagan, W. Wei, and P. Crandall, "The chordal spoke ATM interconnection network," in *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA)*, pp. 1249–1258, June 1997.
- C. Duncan, M. Clement, and B. Morse, "Simulation and analysis of credit- and rate-based switch interoperability in an ATM network," in *Proceedings of the Fifth International Conference on Telecommunications Systems*, pp. 265–269, March 1997.

- C. A. Burbeck, S. M. Pizer, B. S. Morse, D. Ariely, G. S. Zauberaman, and J. Rolland, "Linking object boundaries at scale: A common mechanism for size and shape judgements," *Vision Research*, vol. 36, no. 3, pp. 361–372, 1996.
- D. Eberly, R. Gardner, B. Morse, S. Pizer, and C. Scharlach, "Ridges for image analysis," *Journal of Mathematical Imaging and Vision*, vol. 4, no. 4, pp. 353–373, 1994.
- B. S. Morse, S. M. Pizer, and A. Liu, "Multiscale medial analysis of medical images," in *Information Processing in Medical Imaging XIII (IPMI'93)* (H. H. Barrett and A. F. Gmitro, eds.), vol. 687 of *Lecture Notes in Computer Science*, pp. 112–131, 1993. In revised form in *Image and Vision Computing*, vol. 12, pp. 327–338, July 1994.
- S. M. Pizer, C. A. Burbeck, J. M. Coggins, D. S. Fritsch, and B. S. Morse, "Object shape before boundary shape: scale-space medial axes," *Journal of Mathematical Imaging and Vision*, vol. 4, pp. 303–313, July 1994.
- A. Liu, S. M. Pizer, D. H. Eberly, B. S. Morse, J. G. Rosenman, E. L. Chaney, E. Bullitt, and V. Carrasco, "Volume registration using the 3D core," in *Visualization in Biomedical Computing* (R. A. Robb, ed.), vol. 2359, pp. 217–226, SPIE, Sept. 1994.
- B. S. Morse, S. M. Pizer, and C. A. Burbeck, "General shape and specific detail: Context-dependent use of scale in determining visual form," in *Aspects of Visual Form Processing* (C. Arcelli, L. Cordella, and G. S. di Baja, eds.), pp. 374–383, World Scientific, 1994. Presented at the *Second International Workshop on Visual Form*.
- D. Fritsch, S. Pizer, B. Morse, D. Eberly, and A. Liu, "The multiscale medial axis and its applications in image registration," *Pattern Recognition Letters*, vol. 15, pp. 445–452, 1994.
- B. S. Morse, S. M. Pizer, and D. S. Fritsch, "Robust object representation through object-relevant use of scale," in *SPIE Medical Imaging*, pp. 104–115, 1994.
- S. Pizer, C. Burbeck, D. Fritsch, B. Morse, A. Liu, S. Murthy, and D. Puff, "Human perception and computer image analysis of objects in images," in *Proceedings of the Conference of Australian Pattern Recognition Society (DICTA)*, 1993.
- S. M. Pizer, D. S. Fritsch, B. S. Morse, D. H. Eberly, and A. Liu, "Multiscale medial axis approaches for object definition and registration in medical images," in *Proceedings of the International Conference on Volume Image Processing (VIP'93)*, pp. 1–4, Dept. of Radiology, University of Utrecht, The Netherlands, Stichting Computer Vision Research SCVR, 1993.
- E. N. Mortensen, B. S. Morse, W. A. Barrett, and J. K. Udupa, "Adaptive boundary detection using 'live-wire' two-dimensional dynamic programming," in *IEEE Proceedings of Computers in Cardiology*, pp. 635–638, October 1992.
- W. A. Barrett and B. S. Morse, "A relaxation algorithm for segmentation of the endocardial surface from cine CT," in *IEEE Proceedings of Computers in Cardiology*, pp. 95–98, September 1989.

## Books

S. Weixel, J. Fulton, C. Morse, B. Morse, and K. Barksdale, *Multimedia Basics*, Course Technologies, 2003.

C. Morse, B. Morse, J. Uibel, and K. Barksdale, *Introductory Adobe Photoshop CS 2 Basics*, Course Technologies, 2006.

## Other Publications

M. Clement, B. Morse, G. Judd, and J. Peterson, “Performance surface analysis of WAN-based clusters,” in *Proceedings of the 31st Hawaii International Conference on System Sciences*, vol. 7, pp. 564–573, January 1998.

D. Tam, W. Barrett, B. Morse, and E. Mortensen, “Breakpoint skeletal representation and compression of document images,” in *Proceedings Data Compression Conference*, March 1998.

## Other Presentations

B. Morse, “Applications of radial basis functions to surface reconstruction,” invited presentation at *SIAM Conference on Geometric Design and Computing*, November, 2003.

T. Howard and B. Morse, “Interactive level-set tools for photo editing,” Technical Sketch presented at *ACM SIGGRAPH*, July 2002.

## Research Funding

U.S. Army, SBIR Phase II with ATM Mosaic (2009–2012)

\$251,755, “Persistent Tactical Seeability Through Integrated Sensor Guidance”,  
Randy Beard, Tim McLain, and Bryan Morse

U.S. Army, SBIR Phase I with ATM Mosaic (2009)

\$39,615, “Persistent Tactical Seeability Through Integrated Sensor Guidance”,  
Randy Beard, Tim McLain, and Bryan Morse

National Science Foundation (2008–2011)

\$446,784, “Supporting Wilderness Search and Rescue Personnel: Acquiring and Visualizing Aerial Imagery”, Bryan Morse and Michael Goodrich.

Lawrence Livermore National Laboratory (2008)

\$60,000, “Mosaics and Super-resolution of UAV-Acquired Video Using Locally Adaptive Warping”.

National Science Foundation (2005-2008)

\$501,426, “UAV-Enabled Wilderness Search and Rescue: A Human-Centered Approach”,  
Michael Goodrich, Bryan Morse, and Tim McLain.

Adobe Systems, Inc. (1998–2008)

\$42,000, “Video Object Selection”, 2008.

\$39,000, “Video Segmentation”, 2007.

\$45,000, “Image Magnification (cont’d)”, 2006.

\$45,000, “Image Magnification”, 2005.

\$40,000, “Interactive Image Repair”, 2004.

\$40,000, “Enhanced Interactive Level-Set Tools”, 2002.

\$77,000, “Interactive Filling-In Tools”, 2001-2002.

\$37,000, “Level-Set Based Global Sharpening”, 2001.

\$37,000, “Comparison of Hierarchical Tobogganing to Data Sieve Segmentation”, 2000.

\$52,800, “Resolution Enhancement Through Combined Geometric Reconstruction and Data-dependent Triangulation”, with Tom Sederberg (co-PI), 1999.

\$71,000, “Integrated Color Quantization and Dithering”, 1998–1999.

\$35,500, “Resolution Enhancement Through Geometric Reconstruction”, 1998.

Utah State Centers of Excellence Program (1996–2001)

\$600,000, “Center for Research in Interactive Visual and Imaging Technologies (RIVIT)”,  
William A. Barrett, Bryan S. Morse, Parris Egbert, and Tom Sederberg.

Sprint Corporation (1996–1998)

\$99,900, “Using ATM Networks For High Performance Computing”,  
Bryan S. Morse, Mark Clement, and J. Kelly Flanagan.

\$150,000, “Performance Surface Analysis of Wide-Area Distributed Systems”,  
J. Kelly Flanagan, Mark Clement, and Bryan S. Morse.

\$30,000, “Distributed Computing Services for WAN Based Environments”,  
Mark Clement, Bryan S. Morse, and Quinn Snell.

## Honors

Excellence in Teaching Award (3–10 years), BYU College of Physical and Mathematical Sciences, 2001.

## Courses Taught

### Brigham Young University, Department of Computer Science

CS 235, “Computer Science Fundamentals”

CS 330, “Concepts of Programming Languages”

CS 450, “Introduction to Digital Signal and Image Processing”

CS 455, “Computer Graphics”

CS 621, “Pattern Recognition”

CS 650, “Computer Vision”

CS 750, “Computer Vision II”

**University of North Carolina at Chapel Hill, Department of Computer Science**

COMP 140, "Program Translation"

**Theses And Dissertations Advised**

Jason Ready, "Real-Time Registration of MAV Video via GPU Acceleration", M.S. Thesis, 2009 (anticipated).

Nathan Rasmussen, "Combined Visible and Infrared Video for Use in Wilderness Search and Rescue", M.S. Thesis, Brigham Young University, March 2009.

Stephen Cluff, "Super-resolution Mosaics for Mini-UAV Assisted Wilderness Search and Rescue", M.S. Thesis, Brigham Young University, February 2009.

Cameron Engh, "A See-ability Metric to Improve Mini Unmanned Air Vehicle Operator Awareness Using Video Georegistration to Terrain Models", M.S. Thesis, Brigham Young University, October 2008.

Steven Brown, "Interactive Parts Selection of Complex 3D Models using Hierarchical Graph-cut Segmentation", M.S. Thesis, Brigham Young University, June 2008.

Jacob Merrell, "Generalized Constrained Interpolation", M.S. Thesis, Brigham Young University, April 2008.

David Hubbard, "Vision-Based Control and Flight Optimization of a Rotocraft UAV", M.S. Thesis, Brigham Young University, February 2007.

Damon Gerhardt, "Feature-Based Mini Unmanned Air Vehicle Video Euclidean Stabilization with Local Mosaics", M.S. Thesis, Brigham Young University, February 2007.

Cameron Egbert, "Real-Time Motion Transition by Example", M.S. Thesis, Brigham Young University, October 2005.

Teryl Arnold, "Interactive Image Filling-In", M.S. Thesis, Brigham Young University, April 2005.

Daniel Goggins, "Constraint-Based Interpolation", M.S. Thesis, Brigham Young University, April 2005.

Qing Xia, "Automatic Color Selection Based on Digital Images", Undergraduate Honors Thesis, Brigham Young University, 2004.

Weiming Liu, "Constraint-Based Implicit Snakes Using Thin-Plate Spline Radial Basis Functions", M.S. Thesis, Brigham Young University, April 2004.

Thomas C. Howard, "Level-Set Interactive Tools", M.S. Thesis, Brigham Young University, August 2001.

Airald Hapairai, "Edge-Enhanced JPEG Compression", M.S. Thesis, Brigham Young University, June 1999.

Duane Schwartzwald, "Image Interpolation Enhancement Using Isophote Curvature Flow", M.S. Thesis, Brigham Young University, February 1999.

Bruce Hansen, "Scale Space Registration", M.S. Thesis, Brigham Young University, December 1998.

Russ Young, "XML-Based Document Image Analysis", M.S. Thesis, Brigham Young University, August 1998.

## Professional Societies and Organizations

Member, Association for Computing Machinery (ACM)  
Special Interest Group for Graphics (SIGGRAPH)

Member, Institute of Electrical and Electronics Engineers (IEEE)

Member, IEEE Computer Society  
Technical Committee on Pattern Analysis and Machine Intelligence (PAMI TC)

## Professional Service

Finance Chair, *IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, 2010.

General Chair, *IEEE Computer Society Winter Vision Meetings*, December 2009.

Session Chair, *Graphics Interface 2009*, May 2009.

Review Panelist, National Science Foundation, 2008 (two panels).

Treasurer, IEEE Computer Society Technical Committee on Pattern Analysis and Machine Intelligence (PAMI TC), 2007–present.

Technical program committee for

*Shape Modeling International 2008*

*Workshop on Interactive Computer Vision 2007*

*ScaleSpace 2003*

Reviewer for

*IEEE Trans. Pattern Analysis and Machine Intelligence*

*IEEE Trans. Medical Imaging*

*IEEE Trans. Image Processing*

*IEEE Trans. Visualization and Computer Graphics*

*ACM Trans. Graphics*

*ACM Trans. Applied Perception*

*Journal of Mathematical Imaging and Vision*

*Image and Vision Computing*

*Medical Image Analysis*

*The Visual Computer*

*Graphical Models*

*Computer Graphics Forum*

*Pattern Analysis and Applications*

*SIAM Journal on Scientific Computing*

*Control and Intelligent Systems*

*ACM SIGGRAPH*

*IEEE International Conference on Computer Vision*

*IEEE Computer Vision and Pattern Recognition*

*IEEE Visualization*

*Eurographics*

*Shape Modeling International*

*ScaleSpace*

*IEE Vision, Image, and Signal Processing*

*Workshop on Interactive Computer Vision*

August, 2009