SCOTT ACTON

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EDUCATION

PhD	University of Texas at Austin, Electrical & Computer Engineering	Dec. 1993
MS	University of Texas at Austin, Electrical & Computer Engineering	May 1990
BS	Virginia Tech, Electrical Engineering	May 1988

EXPERIENCE

Chair, Electrical & Computer Engineering, 2022-
Acting Deputy Division Director, Directorate for Computer and Information Science and Engineering, National Science Foundation, 2021-2022
Program Director, Directorate for Computer and Information Science and Engineering, National Science Foundation, 2019-2021
Professor, University of Virginia, 2005-
Editor-in-Chief, *IEEE Transactions on Image Processing*, 2014-2018
Walter N. Munster Assoc. Prof. and Faculty Fellow, University of Virginia, 2003-2005
Joint Appointment in Biomedical Engineering, University of Virginia, 2002-
Associate Professor, University of Virginia, Charlottesville, VA, 2000 - 2005
Associate Professor, Oklahoma State University, Stillwater, OK, 1998 - 2000
Asst. Professor, Oklahoma State University, Stillwater, OK, 1994 - 1997
Postdoctoral Fellow, The Center for Space Research, Austin, TX, 1994
Research Asst. (Motorola, Inc. grant), The Laboratory for Vision Systems, The University of Texas at Austin, Austin, TX, 1990 - 1993
Research and Development Engineer, Motorola, Inc., Phoenix, AZ, 1991
Microelectronics and Computer Development Fellow, The University of Texas at Austin, Austin, TX, 1988 - 1990
Member of the Technical Staff, The MITRE Corp., McLean, VA, 1988
C^3I Intern, The MITRE Corp., McLean, VA, 1985 - 1987
Programmer, AT&T Corp., Oakton, VA, 1982 - 1984

HONORS AND AWARDS

- Fellow, IEEE. For "contributions to biomedical image analysis," 2013
- Director's Award for Superior Accomplishment, National Science Foundation, 2021
- Best paper recognition (top 10% of accepted papers), IEEE International Conference on Image Processing, 2019 (with J. Wang, T. Batabyal, A. Gahlmann)
- Educational Innovation Award, 2017
- Best paper recognition (top 10% of accepted papers), IEEE International Conference on Image Processing, 2015 (with T. Batabyal & A. Vaccari)
- Best Oral Presentation (with Ed Hoppe), Transport Research Arena, 2014
- Finalist, Thomas E. Hutchinson Award, 2013 for "contributions to the students of the Engineering School"
- External Advisory Board, Carnegie Mellon University, 2013-2016, 2018-2021
- Best Paper Award, 2011 IEEE International Symposium on Biomedical Imaging (with U.Va. student Saurav Basu and Dr. Barry Condron)
- Finalist, State Council of Higher Education Outstanding Faculty Award, 2010
- All University Teaching Award, University of Virginia, 2009
- Visiting Professor, University of New Mexico, 2007-2008
- Selected for UVA's Unforgettable Lectures, 2007, 2009
- Darden Business Concept Contest Award, 2006
- Walter N. Munster Associate Professorship for Research in Intelligence Enhancement, 2003
- Faculty Fellow of the School of Engineering and Applied Science, 2003
- New Faculty Teaching Award, 2002
- Best Paper Award, IEEE International Conference on Image Processing, 2002 (with U.Va. student Nilanjan Ray)
- Whitaker Biomedical Engineering Research Grant, 2001
- Outstanding Young Electrical Engineer, 1996
  (National award given by Eta Kappa Nu annually since 1936)
- Halliburton Outstanding Young Faculty Award, 1997
- Senior Member, IEEE, 1999
- Big 12 Faculty Fellowship, 1998
- Most Influential Professor, OSU Athletics, 1998
- Army Research Office Young Investigator Award, 1995
- Motorola Partnerships in Research Award, 1993
- Microelectronics and Computer Development Fellowship, 1988
- Member, Eta Kappa Nu Honorary Society, 1987
- Marshall Hahn Engineering Fellowship, 1985
- Virginia Scholar's Award, 1984

PUBLICATIONS
REFEREED JOURNALS

M. Korban, P. Youngs and S.T. Acton, "TAA-GCN: A temporally aware adaptive graph convolutional network for age estimation," *Pattern Recognition*, 109066, 2023.

M.S. Pattichis, S.T. Acton, C.S. Pattichis and A.S. Panayides, "Large-scale medical image and video analytics for clinical decision support," *IEEE Journal of Biomedical and Health Informatics*, vol. 27, pp. 2-6, 2023.

J. Zhang, Y. Wang, E.D. Donarski, T.T. Toma, M.T. Miles, S.T. Acton and A. Gahlmann, "BCM3D 2.0: Accurate segmentation of single bacterial cells in dense biofilms using computationally generated intermediate image representations," *Biofilms and Microbiomes*, vol. 8, pp. 1-13, 2022.

J. Wang, N. Tabassum, T.T. Toma, Y. Wang, A. Gahlmann and S.T. Acton, "3D GAN image synthesis and dataset quality assessment for bacterial biofilm," Bioinformatics, vol. 38, pp. 4598-4604, 2022.

T. Batabyal, D. Weller, J. Kapur and S.T. Acton, "Efficient learning of transform-domain LMS filter using graph Laplacian," *IEEE Transactions on Neural Networks and Learning Systems*, February 2022 (online).

H. Ma, S.T. Acton and Z. Lin, "CAT: centerness-aware anchor-free tracker," *Sensors*, vol. 22, pp. 354-367, 2022.

N. Sadeghzadehyazdi, T. Batabyal, A. Glandon, N. Dhar, B. Familoni, K. Iftekharuddin and S.T. Acton, "Using skeleton correction to improve flash Lidar-based gait recognition," *Applied Artificial Intelligence*, vol. 16, pp. 1-33, 2022.

J. Wang, M. Zhang, J. Zhang, Y. Wang, A. Gahlmann and S.T. Acton, "Graph-theoretic post-processing of segmentation with application to dense biofilms," *IEEE Transactions on Image Processing*, vol. 20, pp. 8580-8594, 2021.

N. Sadeghzadehyazdi, T. Batabyal and S.T. Acton, "Modeling spatiotemporal patterns of gait anomaly with a CNN-LSTM deep neural network," *Expert Systems with Applications*, vol. 185, 115582, 2021.

J. Zhang, Y. Wang, M. Zhang, A. Achimovich, J. Wang, S.T. Acton and A. Gahlmann, "High-resolution imaging of single-cell behaviors in 3D bacterial biofilms using lattice-light sheet microscopy and deep learning-based image processing," *Microscopy and Microanalysis*, vol. 27, pp 3038-3040, 2021.

N. Tabassum, J. Wang, M. Ferguson, J. Herz, M. Dong, A. Louveau, J. Kipnis and S.T. Acton,

"Image segmentation for neuroscience: lymphatics," *J. Physics: Photonics*, vol. 3, 035004, 2021.

T. Ly, J. Wang, K. Bisht, U. Eyo and S.T. Acton, "C3VFC: A method for tracing and quantification of microglia in 3D temporal images," *Applied Sciences* (Special issue on Medical Image Analysis: From Small Size Data to Big Data), vol. 11, p. 6078, 2021.

L. Liu, K.N. Kearns, I. Eli, K.A. Sharifi, S. Soldozy, E.W. Carlson, K.W. Scott, M.F. Sluzewski, S.T. Acton, K. Stauderman, M. Kalani, M. Park and P. Tvrdik, "Microglial calcium waves during the hyperacute phase of ischemic stroke," *Stroke*, vol. 52, 274-283, 2021.

M. Zhang, J. Zhang, Y. Wang, J. Wang, A. Achimovich, S.T. Acton and A. Gahlmann, "Non-invasive single-cell morphometry in living bacterial biofilms," *Nature Comm.*, vol. 11, pp. 1-13, 2020.

S. Govinahallisathyanarayana, S.T. Acton and J.A. Hossack, "Closed loop low rank echocardiographic artifact removal," *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, vol. 68, pp. 510-525, 2020.

A. Dutta, T. Batabyal, M. Basu, and S.T. Acton, "An efficient convolutional neural network for coronary heart disease prediction," *Expert Systems with Application*, vol. 159, 113408, 2020.

H. Ma, S.T. Acton and Z. Lin, "SITUP: Scale invariant tracking using average peak-to-correlation energy," *IEEE Transactions on Image Processing*, vol. 29, pp. 3546-3557, 2020.

T. Batabyal, B. Condron, S.T. Acton, "NeuroPath2Path: Classification and elastic morphing between neuronal arbors using path-wise similarity," *Neuroinformatics*, vol. 18, pp. 479-508, 2020.

H. Ma, Z. Lin and S.T. Acton, "FAST: Fast and accurate scale estimation for tracking," *IEEE Signal Processing Letters*, vol. 27, pp. 161-165, 2019.

M. Dombrovski, A. Kim, L. Poussard, A. Vaccari, S.T. Acton, E. Spillman, B. Condron and Q. Yuan, "A plastic visual pathway regulates cooperative behavior in Drosophila larvae," *Current Biology*, vol. 29, pp. 1866-1876, 2019.

H. Jeelani, H. Liang, S.T. Acton and D.S. Weller, "Content-aware enhancement of images with filamentous structures," *IEEE Transactions on Image Processing*, vol. 28, pp. 3451-3461, 2019.

S. Da Mesquita, A. Louveau, A. Vaccari, I. Smirnov, R.C. Cornelison, K.M. Kingsmore, C. Contarino, S. Onengut-Gumuscu, E. Farber, D. Raper, K.E. Viar, W. Baker, N. Dabhi, S. Rich, J.M. Munson, C.C. Overall, S.T. Acton and J. Kipnis, "Meningeal lymphatics affect brain perfusion and underlie age-dependent cognitive decline and Alzheimer's pathology," *Nature*, vol. 560, pp. 185-191, 2018.

J.L. Vilas, N. Tabassum, J. Mota, D. Maluenda, A. Jimenez-Moreno, T. Majtner, J.M. Carazo, S.T.

Acton and C.O.S. Sorzano, "Advances in image processing for single particle analysis by electron cryomicroscopy and challenges ahead," *Current Opinion in Structural Biology*, vol. 52, pp. 127-145, 2018.

A. Vaccari, T. Batabyal, N. Tabassum, E. Hoppe, B. Bruckno and S.T. Acton, "Integrating remote sensing data in decision support systems for transportation asset management," *Transportation Research Record*, 0361198118786645, 2018.

K.M. Kingsmore, A. Vaccari, D. Abler, S.X. Cui, F.H. Epstein, R.C. Rockne, S.T. Acton, J.M. Munson, "MRI analysis to map interstitial flow in the brain tumor microenvironment," *APL Bioengineering*, vol. 2(3), 031905, 2018.

J.C. Cronk, A.J. Filiano, A. Louveau, I. Marin, R. March, E. Ji, D. Goldman, I. Smirnov, N. Geraci1, S.T. Acton, C.C. Overall and J. Kipnis, "Peripherally-derived macrophages can engraft the brain independent of irradiation and maintain an identity distinct from microglia," *Journal of Experimental Medicine*, vol. 215, pp. 1627-1647, 2018.

S.T. Acton, "Farewell editorial," *IEEE Transactions on Image Processing*," vol. 27, pp. 8-9, 2018.

R. Sarkar and S.T. Acton, "SDL: Saliency-based dictionary learning framework for image similarity," *IEEE Transactions on Image Processing*," vol. 27, pp. 749-763, 2018.

A. Paul, D.P. Mukherjee and S.T. Acton, "Speckle removal using diffusion potential for optical coherence tomography images," in press, *IEEE Journal of Biomedical Informatics*, DOI: 10.1109/JBHI.2018.2791624, 2018.

N. Tabassum, A. Vaccari and S.T. Acton, "Speckle removal and change preservation by distance-driven anisotropic diffusion of synthetic aperture radar temporal stacks," *Digital Signal Processing*, vol. 74, pp. 43-55, 2018.

M. Dombrovski, L. Poussard, K. Moalem, L. Kmecova, N. Hogan, E. Schott, A. Vaccari, S.T. Acton and B. Condron, "Cooperative behavior emerges among Drosophila larvae," *Current Biology*, vol. 27, pp. 2821-2826, 2017.

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Image Alignment for Microscopy Image Sequences," *IEEE Journal of Biomedical and Health Informatics*, vol. 20, pp. 1575-1584, 2016.

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S. Mukherjee, B. Condron and S.T. Acton, "Tubularity flow field – a technique for automatic neuron segmentation," *IEEE Transactions on Image Processing*, vol. 24, pp. 374-389, 2015.

S. Basu, J. Poulin and S.T. Acton, "Manifolds for pose tracking from monocular video," *SPIE Journal of Electronic Imaging*, vol. 24(2), 023014-1-21, 2015.

S. Mukherjee and S.T. Acton, "Region based segmentation in presence of intensity inhomogeneity using Legendre polynomials," *IEEE Signal Processing Letters*, vol. 22, pp. 298-302, 2015.

Q. Sang, Z. Lin and S.T. Acton, "A grid-based tracker for erratic targets," *Pattern Recognition*, vol. 48, pp. 3527–3541, 2015.

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S. Basu, B. Condron, A. Aksel, S.T. Acton, "Segmentation and Tracing of Single Neurons from 3D Confocal Microscope Images," *IEEE Journal of Biomedical and Health Informatics*, vol. 17, pp. 319-335 2013.

A.L. Shada, L.T. Dengel, G.R. Petroni, M.E. Smolkin, S.T. Acton and C.L. Slingluff, Jr., "Infrared thermography of cutaneous melanoma metastases," *Journal of Surgical Research*, vol. 182, pp. 9-13, 2013.

E.K. Koltsova, Z. Garcia, G. Chodaczek, M. Landau, S. McArdle, S. Scott, S. Von Vietinghoff, E. Galkina, Y. Miller, S.T. Acton and K. Ley, "Dynamic T cell–APC interactions sustain chronic inflammation in atherosclerosis," *Journal of Clinical Investigation*, vol. 122, pp. 3114-26, 2012.

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X. Liu, Z. Lin and S.T. Acton, "A grid-based Bayesian approach to robust visual tracking," *Digital Signal Processing*, vol. 22, pp. 54-65, 2012.

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P. Tay, S.T. Acton, and J.A. Hossack, "A wavelet thresholding method to reduce ultrasound artifacts," *Computerized Medical Imaging and Graphics*, vol. 35, pp. 42-50, 2011.

K.R. Prasad, Y. Xu, Z. Yang, S.T. Acton and B.A. French, "Robust cardiomyocyte-specific gene expression following systemic injection of AAV: in vivo gene delivery follows a Poisson distribution," *Gene Therapy*, vol. 18, pp. 43-52, 2011.

P. Tay, C.D. Garson, S.T. Acton and J.A. Hossack, "Ultrasound despeckling for contrast enhancement," *IEEE Transactions on Image Processing*, vol. 19, pp. 1847-1860, 2010.

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E.L. McGarvey, M. Leon-Verdin, L. Baum, K. Bloomfield, D.R. Brenin, C. Koopman, S.T. Acton, B. Clark, E.B. Parker, Jr., "An Evaluation of a Computer Imaging Program to Prepare Women for Chemotherapy-related Alopecia," *PsychoOncology*, DOI 10.1002, 2010.

A.D. Gilliam, F.H. Epstein and S.T. Acton, "Cardiac motion recovery via active trajectory field models," *IEEE Transactions on Information Technology in Biomedicine*, vol. 13, pp. 226-235, 2009.

P. Tay, B. Li, C.D. Garson, S.T. Acton and J.A. Hossack, "Left ventricle segmentation using model fitting and active surfaces," *Journal of Signal Processing Systems*, vol. 55, pp. 139-156, 2009.

B. Li and S.T. Acton, "Automatic active model initialization via Poisson inverse gradient," *IEEE Transactions on Image Processing*, vol. 17, pp. 1406-1420, 2008.

J. Cui, N. Ray, S.T. Acton and Z. Lin, "An affine invariance approach to cell tracking," *Computerized Medical Imaging and Graphics*, vol. 32, pp. 554-565, 2008.

C.D. Garson, S.T. Acton and J.A. Hossack, "Guiding automated left ventricular chamber segmentation in cardiac imaging using the concept of conserved myocardial volume," *Computerized Medical Imaging and Graphics*, vol. 32: 321-330, 2008.

A. Aksel, J.A. Hossack and S.T. Acton, "ACU-SEG: Automated cardiac ultrasound image segmentation and tracking," *CSI Communications*, vol. 32, pp. 11-16, 2008.

B. Li and S.T. Acton, "Active contour external force using vector field convolution for image segmentation," *IEEE Transactions on Image Processing*, vol. 16, pp. 2096-2097, 2007.

D.P. Mukherjee and S.T. Acton, "Affine and projective active contour models," *Pattern Recognition*, vol. 40, pp. 920-930, 2007.

G. Dong and S.T. Acton, "Detection of rolling leukocytes by marked point processes," *Journal of Electronic Imaging*, vol. 16, no. 3, #033013, 2007.

M.S. Grant, S.T. Acton, S.J. Katzberg, "Terrain-moisture classification using GPS surface-reflected signals," *IEEE Geoscience and Remote Sensing Letters*, vol. 4, pp. 41-45, 2007.

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S. Millington, B. Li, J. Tang, S. Trattnig, J.R. Crandall, S.R. Hurwitz, S.T. Acton, "Quantitative and topographical evaluation of ankle articular cartilage using high resolution MRI," *Journal of Orthopaedic Research*, vol. 25, pp. 143-151, 2007.

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A.L. Klibanov, J.J. Rychak, W.C. Yang, B. Li, S.T. Acton, J.R. Lindner, K. Ley and S. Kaul, "Targeted ultrasound contrast agent for molecular imaging of inflammation in high-shear flow," *Contrast Media and Molecular Imaging*, vol. 1, pp. 259-266, 2006.

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vector flow snakes," *IEEE Transactions on Biomedical Engineering*, vol. 53, pp. 896-907, 2006.

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A.P. Goobic, J. Tang and S.T. Acton, "Image stabilization and registration for tracking cells in the microvasculature," *IEEE Transactions on Biomedical Engineering*, vol. 52, pp. 287-289, 2005.

Q. Sun, J. Hossack, J. Tang and S.T. Acton, "Speckle reducing anisotropic diffusion for 3-D ultrasound images," *Computerized Medical Imaging and Graphics*, vol. 8, pp. 461-470, 2004.

N. Ray and S.T. Acton, "Motion gradient vector flow: an external force for tracking rolling leukocytes with shape and size constrained active contours," *IEEE Transactions on Medical Imaging*, vol. 23, pp. 1466-1478, 2004.

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gradient vector flow snakes," *IEEE Transactions on Biomedical Engineering*, vol. 51, pp. 316-324, 2004.

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C.A. Segall and S.T. Acton, "Adaptive templates in scale-space," *Proc. of the SPIE Conference on Real-time Imaging* (part of *Photonics West*), San Jose, January 23-29, 1999.

D.P. Mukherjee and S.T. Acton, "On disocclusion of fingerprint images," *Advances in Pattern Recognition and Digital Techniques*, Calcutta, India, Dec. 27-29, 1999.

S.T. Acton, "Anisotropic diffusion and local monotonicity," *Proc. of the IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP-98)*, Seattle, May 12-15, 1998.

C.A. Segall and S.T. Acton, "Gradient independent translation via differential morphology," *Proc. of the IEEE Int. Conference on Image Processing*, Chicago, October 4-7, 1998.

S.T. Acton, "A PDE technique for generating locally monotonic images," *Proc. of the IEEE Int. Conference on Image Processing*, Chicago, October 4-7, 1998.

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K. Pope and S.T. Acton, "Modified mean curvature motion for multispectral anisotropic diffusion," *Proc. of the IEEE Southwest Symposium on Image Analysis and Interpretation*, Tucson, April 6-7, 1998.

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A. Wright and S.T. Acton, "Watershed pyramids for edge detection," *Proc. of the IEEE Int. Conference on Image Processing*, Santa Barbara, Ca., October 26-29, 1997.

M.C. Burton and S.T. Acton, "Target tracking using the anisotropic diffusion pyramid," *Proc. of the IEEE Southwest Symposium on Image Analysis and Interpretation*, San Antonio, April 8-9, 1996.

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K.A. Davis, S.T. Acton, and B.J. Ackerson, "Segmentation of colloidal crystal images by local histogram analysis," *Proc. of the IEEE Southwest Symposium on Image Analysis and Interpretation*, San Antonio, April 8-9, 1996.

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S.T. Acton, "A pyramidal edge detector based on anisotropic diffusion," *Proc. of the IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP-96)*, Atlanta, May 7-10, 1996.

A. Yaicharoen and S.T. Acton, "Hybridized edge preservation coefficient for anisotropic diffusion," *Proc. of the SPIE Symposium on Visual Communications and Image Processing (VCIP-96)*, Orlando, March 17-20, 1996.

S.T. Acton and A.C. Bovik, "Piecewise and local class models for image restoration," *Proc. of the IEEE Int. Conference on Image Processing*, Austin, Texas, November 13 - 16, 1994.

S.T. Acton, A.C. Bovik and M.M. Crawford, "Anisotropic diffusion pyramids for image segmentation," *Proc. of the IEEE Int. Conference on Image Processing*, Austin, Texas, November 13 - 16, 1994.

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S.T. Acton and A.C. Bovik, "Nonlinear regression for image enhancement via generalized deterministic annealing," *Proc. of the SPIE Symposium on Visual Communications and Image Processing (VCIP-93)*, Boston, November 7-12, 1993.

S.T. Acton, A.C. Bovik, and J. Ghosh, "Generalized deterministic annealing," *Proc. of the World Congress on Neural Networks*, Portland, Oregon, July 11-15, 1993.

S.T. Acton, J. Ghosh, and A.C. Bovik, "Fast combinatorial optimization using generalized deterministic annealing," *Proc. of the SPIE Conf. on the Science of Artificial Neural Networks (part of OE/Aerospace Science and Sensing)*, Orlando, Florida, April 12-16, 1993.

S.T. Acton and A.C. Bovik, "Anisotropic edge detection using mean field annealing," *Proc. of the IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP-92)*, San Francisco, March 23-26, 1992.

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S.T. Acton and A.C. Bovik, "GRUPO: A 3-D structure recognition system," *Proc. of the SPIE Symposium on Visual Communications and Image Processing (VCIP-90)*, Lausanne, Switzerland, October 2-4, 1990.

INVITED CONFERENCE PAPERS

M. Korban, S. Singh, G. Watson, P. Youngs, and S.T. Acton, "AI assisted object and activity detection in K-6 classroom environments: A preliminary framework to assist in pedagogical performance evaluation," *Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, November 1-3, 2021.

N. Sadeghzadehyazdi, T. Batabyal, L. Barnes and S.T. Acton, "Graph-based classification of healthcare provider activity," *Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, November 6-9, 2016.

T. Ly, R. Sarkar, K. Skadron and S.T. Acton, "Feature extraction and image retrieval on an automata structure," *Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, November 6-9, 2016.

N. Tabassum, A. Vaccari and S.T. Acton, "Speckle removal by distance-driven anisotropic diffusion of SAR temporal stacks," *Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, November 8-11, 2015.

R. Sarkar, S. Ozer, K. Skadron and S.T. Acton, "Image classification by multi-kernel dictionary learning," *Asilomar Conf. on Signals, Systems and Computers*, Pacific Grove, California, November 2-4, 2014.

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S. Mukherjee and S.T. Acton, "Neuron segmentation with level sets," *Asilomar Conf. on Signals, Systems and Computers*, Pacific Grove, California, November 4-7, 2013.

A. Vaccari and S.T. Acton, "Spatiotemporal Gaussian feature detection in sparsely sampled data with application to InSAR," *Proc. SPIE 8746, Algorithms for Synthetic Aperture Radar Imagery XX*, Baltimore, May 2, 2013.

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S.T. Acton, "Biomedical image analysis at the cellular level," *Proc. Int. Machine Vision and Image Processing Conference*, Northern Ireland, September 3-5, 2008.

N. Ray, B. Saha and S.T. Acton, "Oil sand image segmentation using the inclusion filter," *Proc. IEEE Conf. on Image Processing*, San Diego, California, September, 2008.

S.T. Acton, P. Soliz, M.S. Pattichis, "Content based image retrieval: The foundation for future case-based and evidence-based ophthalmology," *Proc. IEEE Int. Conf. on Multimedia and Expo*, Hannover, Germany, June 23-26, 2008.

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N. Ray and S.T. Acton, "Image segmentation by curve evolution with clustering," *Proc. 34th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California, October 29 – November 1, 2000.

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ABSTRACTS

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B. Bruckno, A. Vaccari, E. Hoppe, S.T. Acton and E. Campbell, "Integration and Delivery of interferometric synthetic aperture radar data into stormwater planning within karst terranes," *Proceedings of the 14th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst*, Rochester, MN, pp 371-379, October 5-9, 2015.

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S. Millington, B. Li, S. Trattnig and S.T. Acton, "Topography of talar articular cartilage determined by high resolution MRI and semi-automated image segmentation," Proc. International Cartilage Repair Society Meeting, San Diego, CA, January 6-11, 2006.

A.L. Klibanov, J.J. Rychak, W.C. Yang, B. Li, S.T. Acton, J.R. Lindner, K.F. Ley and S. Kaul,

"Targeted ultrasound contrast agents for molecular imaging in high-shear flow," *Contrast Media Research 2005*, Evian, France, October 11-16, 2005.

G. Dong, S.T. Acton, E. Damiano, "Detecting microspheres in venules for automated particle image velocimetry via a marked point process," *2005 Summer Bioengineering Conference*, Vail, CO, June 22-26, 2005.

J.J. Rychak, A.L. Klibanov, W. Yang, B. Li, S. Acton, A. Leppanen, R.D. Cummings, K. Ley, "Enhanced Microbubble Adhesion to P-selectin with a Physiologically-tuned Targeting Ligand," *10th Ultrasound Contrast Symposium*, San Diego, California, March 4-5, 2005 (Winner: Best Presentation Award).

R.L. Janiczek, N. Ray, B. French, F. Epstein and S.T. Acton, "Automated calculation of myocardial mass and infarct size in mice using a Monte Carlo Markov chain active contour," *Society for Cardiovascular Magnetic Resonance*, San Francisco, California, January 21-23, 2005

S.A. Millington, J. Tang, S.R. Hurwitz, S.T. Acton and J.R. Crandall, "Quantitative measurement of ankle cartilage using an isotropic MRI sequence and a directional gradient vector flow snake," *9th World Congress of the OsteoArthritis Society*, Chicago, Illinois, December 2-5, 2004.

J.J. Rychak, B. Li, S.T. Acton, A. Leppannen, R.D. Cummings and K. Ley, "Enhanced adhesion of ultrasound contrast agents targeted to p-selectin using a physiological ligand," *Proc. of the Biomedical Engineering Society Annual Meeting*, Philadelphia, Pennsylvania, October 13-16, 2004.

Y. Yu, J. Molloy and S.T. Acton, "Automated segmentation of the prostrate from ultrasound imagery using the instantaneous coefficient of variation," *Proc. American Association of Physicists in Medicine*, San Diego, California, August 10-14, 2003.

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G. Usanmaz, S.T. Acton, and M. M. Crawford, "Multiresolution supervised nonparametric algorithm for feature extraction and classification in multispectral imagery," *Proc. of the SPIE Conference on Remote Sensing*, Rome, Italy, Sept. 1994.

S.T. Acton and A.C. Bovik, "Local and piecewise classes of nonlinear regression for image enhancement," *IEEE Signal Proc. Soc. Workshop on Multidimensional Signal Processing*, Cannes, France, September 8-10, 1993.

INVITED PRESENTATIONS

"Microscopic image analysis for answering questions in smart health," Keynote Address, IEEE/ACM Conference on Connected Health Applications, Systems and Engineering Technologies, Washington, DC, November 17, 2022.

"Bioimage Analysis at Microscopic Scales," Invited Talk, Boston University, October 27, 2022.

"Bioimage Analysis at Microscopic Scales," NSF CISE-CCF Tech Talk, January 13, 2021.

"Statistics and Imaging Data," Keynote talk, *Recent Advances in Statistical Analysis of Imaging Data*, Tallahassee, Florida, December 5, 2020.

"Image analysis for neuroscience and relevant signal, image, and data processing at the NSF," Plenary Address, SPIE Optics and Photonics, San Diego, California, August 25, 2020.

"You, Image Analysis and the NSF," Invited Talk, IEEE SSIAI, Santa Fe, New Mexico, April 1, 2020.

"Signal Processing for Neuroscience," Invited Seminar, National Science Foundation, March 11, 2019.

"Research at VIVA," Invited Speaker, Siemens, February 13, 2019.

"Brain Pixels: image analysis for neuroscience," Keynote Address, IEEE SSIAI, Las Vegas, April 9, 2018.

"Research at VIVA," General Electric, May 1, 2018.

"An Engineer among Scientists: Research in image analysis for neuroscience," Department of Biochemistry and Molecular Genetics Colloquium, UVA, Charlottesville, Virginia, February 22, 2018.

"Reverse Engineering of Neurons," ECE Departmental Seminar, UVA, Charlottesville, Virginia, November 10, 2017.

"Neuroscience image analysis in progress," Brain, Immunology and Glia Research-in-progress, UVA, Charlottesville, Virginia, October 23, 2017.

"Virginia Image and Video Analysis," UVA Brain, Charlottesville, Virginia, September 28, 2017.

"Solving the mysteries of the brain, one pixel at a time," Keynote Address, International Symposium on Image Computing and Digital Medicine, Chengdu, China, September 23, 2017.

"Engineering and Biology Team Together to Reserve Engineer the Brain: An Image Analysis Perspective," Invited Talk, Tsinghua University, Beijing, China, September 21, 2017.

"State of the Transactions," IEEE ICIP, Beijing, China, September 20, 2017.

"Machine Learning and Image Processing: the Future," ICIG, Shanghai, China, September 15, 2017.

"Using Image Processing to Reverse Engineer the Brain," Plenary Talk, ICIG, Shanghai, China, September 14, 2017.

"Overview of the International Symposium on Biomedical Imaging," IEEE ISBI, Melbourne, Australia, April 21, 2017.

"State of the Transactions," IEEE ICASSP, New Orleans, Louisiana, March 6, 2017.

"Do Engineers have a Heart?" Keynote speech, Thomas E. Hutchinson Dinner, Rotunda, UVA, January 28, 2017.

"Best Practices for Associate Editors," IEEE SPS editorial meeting, Phoenix, October 27, 2016.

"Engineers help unravel mysteries of the brain," Distinguished Lecture, OSU, Stillwater, OK, October 11, 2016.

"Image analysis in the century of the brain," Invited Lecture, UESTC, Chengdu, China, March 24, 2016.

"Workshop on Radar for Transportation," TRB, Washington, D.C., January 8, 2016.
"An encyclopedia via media: Image analysis for the Neurome," IEEE ISM Distinguished Lecture, Miami, December 14, 2015.
"InSAR Remote Sensing for Performance Monitoring of Transportation Infrastructure at the Network Level," Commercial Remote Sensing & Spatial Information Technologies Workshop, Oklahoma City, December 3, 2015.
"Network level infrastructure inspection," Geotechnical Research Advisory Committee Meeting, Virginia Department of Transportation, October 16, 2015.
"How to be an effective Editor," IEEE ICIP, Quebec City, Quebec, September 30, 2015.
"How to be an effective Editor," IEEE SPS, Brisbane, Australia, April 22, 2015 (w/ Alessandro Foi).
"You've got a nerve to be doing your engineering on my biology," IEEE W. North Carolina section invited talk, April 10, 2015.
"Integration of Interferometric Synthetic Aperture Radar Data into Geotechnical Planning and Design," Transportation Research Board, Washington, D.C., January 11, 2015 (w/ B. Bruckno).
"Visual media reasoning: Self-nomination in retrieval," DARPA, Arlington, Virginia, February 26, 2014 (w/ K. Skadron, S. Ozer).
"Updates to applications of Interferometric Synthetic Aperture Radar to sinkhole detection and rock slope monitoring," Transportation Research Board, Washington, D.C., January 12, 2014 (w/ B. Bruckno).
"Image Analysis Challenges in the Drosophila Neurome," Plenary Talk, Video Bioinformatics Conference, UCLA Conference Center, December 6, 2013.
"Blood and Neurons – Digital Image Analysis Conquers ALL," Penn State University, March 22, 2013.
"Image Analysis in Neuromics," Bioinformatics 2012, Dresden Germany, September 19, 2012.
"Image Analysis in Biology: From Blood to Fruit Flies," Iowa State University, September 14, 2012.
"Image Analysis in Heterogeneous Computer Systems," Cloud Day, Washington DC, May 17, 2012.
"Object Identification and Dynamics in Biological Images," ISBI, Barcelona, Spain, May 1, 2012.
"Investigating Interferometric Synthetic Aperture Radar for Transportation Infrastructure Monitoring," Transportation Research Board, Washington DC, January 22, 2012.
"Electrical Engineering Attacks Biology with Image Analysis," Old Dominion U., Norfolk, VA, February 9, 2012.
"Image Analysis for UAVs," Bosh, Charlottesville, VA, November 17, 2011.
"ATR: Not just for the Battlefield Anymore," MITRE, July 11, 2011.
"Image Analysis at Virginia," DARPA, Falls Church, VA, June 1, 2011.
"Challenges in Biological Image Analysis: Blood and Brains," Purdue University, April 22, 2011.
"Detection of Sinkholes using InSAR Imagery," Dept. of Transportation, Washington DC, February 2, 2011.
"The Next Grand Challenge for Image Analysis: the Neurome," Groningen University, Netherlands, November 23, 2010.
"Can Image Processing Help Neuroscience?" Shanghai Jiao Tong University, Shanghai, China, September 24, 2010.
"Biomedical Image Analysis," Waterloo University, Waterloo, Ontario, Canada, July 8, 2010.

"A Graph theoretic Approach to Neuron Segmentation," HHMI Janelia Farm, Ashburn, Virginia, May 11, 2010.
"Cellular Level Image Analysis," U. of Aachen, Aachen, Germany, April 20, 2010.
"Image and Video Analysis at the University of Virginia," Advanced Research Institute Seminar, Charlottesville, Virginia, March 4, 2010.
"Image and Video Analysis," IARPA program director briefing, Charlottesville, Virginia January 13, 2010.
"Image Analysis at the Cellular Level," ECE Eminent Speaker, Carnegie Melon U., April 2, 2009.
"Billy the Kid and The Fourier Transform," LASE 360: UVA's Unforgettable Lectures, March 11, 2009.
"Cellular Image Analysis in 2009," U. of Alberta, March 20, 2009.
"Advanced Image Segmentation using Active Models," AFRL Meeting, Pittsburgh, November 2, 2009.
"Image Analysis at the Cellular Level," IMVIP Plenary Talk, September 2, 2009.
"The Future: Cellular Image Analysis," U. of New Mexico, April 25, 2008.
"The Future: Cellular Image Analysis," U. of Texas, February 19, 2008.
"Linear Filters," U. of Texas, February 21, 2008.
"Analysis of Intravital Microscopic Images of Rolling Leukocytes," U.C.S.B., January 18, 2008.
"The Future: Cellular Image Analysis," New Mexico State University, March 13, 2008.
"Anisotropic Diffusion," U. of Texas, February 20, 2008.
"The Future: Cellular Image Analysis," Texas Tech University, April 11, 2008.
"Anisotropic Diffusion," U. of New Mexico, March 10, 2008.
"Speckle Reducing Anisotropic Diffusion," U. of New Mexico, March 31, 2008.
"Image and Video Analysis Research at VIVA," Department of Homeland Security, July 9, 2007.
"Automated Detection and Tracking of Cells," Boston College, Chestnut Hill, Massachusetts, April 24, 2007.
"Content Based Image Retrieval," Lockheed Martin, Rockville, Maryland, January 29, 2007.
"CellTrek: a Tool for Drug Discovery and Validation," Darden School of Business, U.Va., Charlottesville, Virginia, October 24, 2006.
"The Aorta Stomp: Image Analysis for Leukocytes and the Myocardium," BME Seminar Series, University of Virginia, Charlottesville, September 24, 2004.
"Detection and tracking of rolling leukocytes from intravital microscopy," IEEE Int. Symp. On Biomedical Imaging, Invited Session on Image Formation and Analysis in Microscopy, Arlington, Virginia, April 16, 2004.
"Tracking Targets: from Military to Biomedical," Air Force Research Laboratory Invited Lecture, Boston, Massachusetts, March 2, 2004.
"Snakes, blood and pixels," U. of Maryland Center for Automation Research Invited Lecture, College Park, Maryland, November 21, 2003.
"Tracking Targets through Scale Changes and Clutter using a Monte Carlo Method," Army Research Laboratory, Adelphi, Maryland, May 19, 2003.
"Enhancements to Image2000," Invited Talk, NASA Goddard, Maryland, July 3, 2002 (with Kate Weber).
"Signal and Image Compression," Naval Surface Warfare Center, Dahlgren Division, Virginia, November 13, 2002.
"Tracking Leukocytes using Active Contours," Imaging Science, Boston, Mass., March 4, 2002.
"Simplifying the Use of Automated Liquid Handling Robotics Using Computer Vision,"

LabAutomation 2002, Palm Springs Convention Center, CA, January 26-30, 2002 (with Joseph Bosworth, Chris Estey and Robin Felder).

"Attacking Inflammatory Disease with Snakes: Intravital Video Tracking for Rolling Leukocytes," Biomedical Engineering Seminar, Charlottesville, Virginia, October 19, 2001.

"Image Segmentation with Application to Medical Imaging," Invited Seminar, NIH, Bethesda, Maryland, October 24, 2000.

"Image and Video Processing Using Anisotropic Diffusion," Invited Seminar, Center for Imaging Science, Johns Hopkins University, October 23, 2000.

"NASA-related Image Processing Research at the University of Virginia," Invited Talk, NASA Goddard, Maryland, October 23, 2000.

"Image Segmentation and Medical Applications," Invited Seminar, Varian Medical Systems, Charlottesville, Virginia, October 5, 2000.

"Diffusion-based Image and Video Processing," Plenary Talk, International Conference on Advances in Pattern Recognition and Digital Techniques, ICAPRDT '99, Calcutta, India, December 28, 1999.

"Document page segmentation using multiscale clustering," IEEE Int. Conf. on Image Processing Special Session on Document Compression, Kobe, Japan, October 25, 1999.

"PDE-based Video Processing," Northwestern University invited seminar, Evanston, Illinois, February 17, 1999.

"Image Diffusion," Wichita State University Seminar Series, Wichita, Kansas, September 18, 1998.

"Multiscale Video Tracking and Related Topics," Science Applications International Corporation (SAIC), Denver, August 7, 1998.

"Image Diffusion," University of Texas Signal Processing Seminar, Austin, March 12, 1998.

"The Miracle of Vision," Fellowship of Christian Faculty and Staff, Stillwater, March 25, 1998.

"Anisotropic Diffusion," OSU Center for Laser and Photonics Research Colloquium, Stillwater OK, March 27, 1998.

"Order statistic filters," Electrical and Computer Engineering Seminar, University of Oklahoma, Norman, March 30, 1998.

"Image enhancement and binary image processing," Electrical and Computer Engineering Seminar, University of Oklahoma, Norman, Feb. 11, 1998.

"Annealing methods for high-speed optimization," U. of Houston Computer Science Invited Talk, Houston, May 11, 1993.

RESEARCH FUNDING

Title: Creating InstructionNet
Source: Schmidt Futures
Amount: $500,000
Duration: 1/1/23-12/31/26
PI: Peter Youngs, UVA Education
Person Months Per Year: 1
Status: granted

Title: Non-Invasive Single-Cell Morphometry and Tracking in Living Bacterial Biofilms
Source: NIH R01
Amount: $1,615,000
Duration: 10/1/20-9/31/24
PI and Co-I: A. Gahlmann (Chemistry) and Acton
Person Months Per Year: 0.8 (after Acton leaves NSF)
Status: granted

Title: Secondarily generalized tonic clonic seizure: a functional anatomy
Source: NIH R37
Amount: $554,363
Duration: 9/1/21-8/31/25
PI: J. Kapur, Neurology
Person Months Per Year: 0.8 (after Acton leaves NSF)
Status: granted

Title: Using Neural Networks for Automated Classification of Elementary Mathematics Instructional Activities
Source: NSF
Amount: $1,499,962
Duration: 9/1/20-8/31/23
PI: Peter Youngs, UVA Education
Person Months Per Year: 1 (after Acton leaves NSF)
Status: granted

Title: CISE/CCF IPA Agreement
Source: NSF
Amount: $858,002
Duration: 9/1/19-8/31/22
PI: Acton
Person Months Per Year: 10.8
Status: granted

Title: A Deep Reinforcement Learning based Long-term Tracker for Salient Event Detection
Source: ARO
Amount: $480,000

Duration: 7/1/20-6/30/23
PI: Acton with Co-PI Z. Lin
Person Months Per Year: 1
Status: granted

Title: Using Neural Networks for Automated Classification of Elementary Reading and Mathematics Instructional Activities
Source: Robertson Foundation
Amount: $230,115
Duration: 7/1/20-6/31/23
PI: Peter Youngs, Curry School of Education
Person Months Per Year: 1
Status: granted

Title: ABI: Innovation: Analyzing Neuroglial Cell Dynamics in their Natural Environment with Video Microscopy
Source: NSF
Amount: $629,258
Duration: 3/1/18-2/27/21
Co-PIs: D. Weller (PI) and Acton and G. Rohde (BME)
Person Months Per Year: 1
Status: granted

Title: A systems approach to understanding a neuronal circuit for detecting motion
Source: Three Cavaliers
Amount: $60,000
Duration: 3/1/19-2/28/20
Co-PIs: B. Condron, S.T. Acton, D. Meliza
Status: granted

Title: Myeloid Cell Control Of CNS Infection
Source: NIH
Amount: $399,281
Duration: 3/1/19-2/28/20
Co-PIs: T. Harris (Neuroscience)
Person Months Per Year: 0.56
Status: granted

Title: Data Science Fellowship: Visualizing Cellular Behaviors in Bacterial Biofilms using Lattice Light Sheet Microscopy
Source: DSI
Amount: $41,000
Duration: 6/1/19-5/30/20
Co-PIs: Acton and Gahlmann (Chemistry)
Status: granted

Title: Image Analysis, Machine Learning and Advanced Imaging for Brain Immunology
Source: SEAS Research Innovation Award
Amount: $100,000
Duration: August 2017 – August 2018
Co-PIs: Acton (PI), J. Kipnis, C. Overall, S. Hu, V. Ordonez
Number of Students Supported: 1
Person Months Per Year: 1.8
Status: Granted

Title: Case-based Curricular Integration of Systems Thinking
Source: SEAS Teaching Innovation Award
Amount: $149,000
Duration: August 2017 – August 2018
Co-PIs: R. Bailey (PI), S.T. Acton, W.T. Scherer, M. Smith, others
Status: Granted

Title: Graph-based representations and multifidelity machine learning for anthropometrics-based human identity recognition
Source: Army Night Vision and Electronics Sensors Directorate
Amount: $300,000
Duration: January 2017 – March 2020
Co-PIs: Khan (ODU) and Acton
Person Months Per Year: 1
Status: Granted

Title: Automating Glia Neuroimaging
Source: UVA Brain
Amount: $100,000
Duration: January 2017 – January 2018
Co-PIs: Weller and Acton (ECE), Overall and Harris (Neuroscience), Rohde (BME)
Number of Students Supported: 1
Status: Granted

Title: Breaking Barriers to Building Better Brains
Source: SEAS Research Innovation Award
Amount: $142,000
Duration: August 2016 – August 2017
Co-PIs: Weller, Acton, Ghosh, Stan (ECE), Skadron (CS)
Number of Students Supported: 1
Status: Granted

Title: Harnessing the Power of Bacterial Populations
Source: Jeffress Trust
Amount: $100,000
Duration: June 2016 – August 2017
PI: Andreas Gahlmann, Chemistry

Co-PI: S.T. Acton
Number of Students Supported: 4
Status: Granted

Title: A Sparse Coding Approach to Spatiotemporal Saliency Detection in Image and Video Databases
Source: ARO
Amount: $615,433
Duration: June 2015 – May 2018
PI: S.T. Acton
Co-PI: Z. Lin
Number of Students Supported: 2
Status: Granted

Title: Bioimage Informatics for the Neurome
Source: Hobby Foundation
Amount: $260,700
Duration: May 2015 – April 2017
Co-PIs: S.T. Acton, B.G. Condron
Number of Students Supported: 2
Status: Granted

Title: Autoimage Development, Neuronal Degeneration and Stem Cell Adhesion
Source: Jeffress Trust
Amount: $100,000
Duration: June 2015 – March 2017
PI: K. Siller, Biology
Co-PI: S.T. Acton
Number of Students Supported: 4
Status: Granted

Title: Activity Detection & Retrieval for Image & Video Data with Limited Training
Source: ARO
Amount: $50,000
Duration: August 2014 – May 2015
PI: S.T. Acton
Co-PI: Z. Lin
Number of Students Supported: 1
Status: Granted

Title: InSAR Remote Sensing for Performance Monitoring of Transportation Infrastructure at the Network Level
Source: U.S. DOT
Amount: $1.6M
Duration: January 2014-January 2016
PI: S.T. Acton

Number of Students Supported: 2
Status: Granted

Title: ABI Innovation: Towards the Neurome -- Automated Image Analysis for Neuroinformatics
Source: NSF
Amount: $483,475
Duration: May 2011-April 2016 (on no-cost extension)
PI: S.T. Acton
Number of Students Supported: 2
Status: Granted

Title: Historical Study of Displacements at the Approaches to the Monitor Merrimac Memorial Bridge Tunnel
Source: VDOT
Amount: $129,413
Duration: November 2013-June 2014
PI: S.T. Acton
Number of Students Supported: 1
Status: Granted

Title: Prototype for Meta-Algorithmic, Content-Aware Image Analysis
Source: DARPA
Amount: $351,650
Duration: June 2012-July 2014
PI: S.T. Acton
Number of Students Supported: 2
Status: Granted

Title: Surface Characterization and Identification
Source: CCAM
Amount: $449,658
Duration: January 2012 – January 2014
PI: J. Fitz-gerald
Number of Students Supported: 2 (plus several undergraduates)
Status: Granted

Title: Sinkhole Detection & Bridge/Landslide Monitoring for Transportation Infrastructure by Automated Analysis of Interferometric Synthetic Aperture Radar Images
Source: DOT
Amount: $869,970
Duration: July 2011-July 2013
PI: S.T. Acton
Number of Students Supported: 3
Status: Granted

Title: Portable Ultrasound Image Analysis
Source: Army SBIR through PocketSonics, Inc.
Amount: $29,912
Duration: January 2013 – July 2013
PI: S.T. Acton
Number of Students Supported: 1
Status: Granted

Title: Tracking and Image Characterization Research
Source: Night Vision, ARL via CACI, Inc. (CACI is the main contractor; UVA is a sub)
Amount: $313,225.76
Duration: June 2010-May 2014
PI: S.T. Acton
Number of Students Supported: 1
Status: Granted

Title: Video Data Mining and Target Tracking: A Model Adaptation and Feedback Control Approach
Source: ARO
Amount: ~$300K
Duration: September 2010-August 2014
PI: Z. Lin
Number of Students Supported: 1
Status: Granted

Title: High Resolution 3D Ultrasound Imaging and Quantification of the Murine Heart
Source: NIH
Amount: ~$1.3M
PI: John Hossack, BME; Co-I: Acton
Duration: August 2009-September 2013
Number of Students Supported: 3
Status: Granted

Title: Tracking and Classification Services III (add-on to previous NRO work)
Source: NSF WiCAT Center (NRO project)
Amount: $66,700 (Acton portion) (Total add-on is $491,987)
Duration: Apil 2008- Dec. 2008
PI: Barry Horowitz (SIE)
CoPIs: S.T. Acton et al.
Duration: June 2008-May 2009
CY Support (Acton): 16%
Number of Students Supported: 1 Acton
Status: Granted

Title: Tracking and Image Characterization Research
Source: Night Vision, ARL via CACI, Inc. (CACI is the main contractor; UVA is a sub)

Amount: $295,470
Duration: June 2007-May 2010
PI: S.T. Acton
Number of Students Supported: 1
Status: Granted

Title: Pilot Study of the Dermagram
Source: Swortzel Foundation
Amount: $60,000 (Acton portion $23,333.33)
PI: C. Slingluff, UVA Surgery
Duration: May 2008-April 2009
Number of Students Supported: 1
Status: Granted

Title: Tracking and Classification Services II (add-on to previous NRO work)
Source: NSF WiCAT Center (NRO project)
Amount: $28,606 (Acton portion)
Duration: Jan. 2008- Dec. 2008
PI: Barry Horowitz (SIE)
CoPIs: M. Devore (SIE) and S.T. Acton
CY Support (Acton): 0%
Number of Students Supported: 1 Acton
Status: Granted

Title: STIR: Model Adaptation and Feedback Control in Multi-Sensor Image Fusion and Multiple Target Tracking
Source: Army Research Office
Amount: $50,000
Duration: September 2007 – May 2008
PI: Z.Lin
CY Support (Acton): 4%
Number of Students Supported: 1
Status: Granted

Title: SEI: Hierarchical Dependency Graphs for Col-Space Design with Application to Leukocyte Detection and Tracking
Source: NSF
Amount: $703,479
Duration: June 2006 – May 2009
PI: J. Lach
CY Support (Acton): 8%
Number of Students Supported: 3
Status: Granted

Title: Sequential Monte Carlo Method for Real-time Tracking of Multiple Targets

Source: Army Research Office
Amount: $140,000
Duration: July 2006 – June 2008
PI: S.T. Acton
CY Support (Acton): 8%
Number of Students Supported: 1
Status: Granted

Title: Image Processing Architecture in Support of Mobile Users with Limited Support Technology
Source: NRO through NSF WiCAT Center
Amount: $125,000 (Horowitz and Acton portion)
Duration: Jan. 2007- Dec. 2007
PI: Barry Horowitz (SIE)
CY Support (Acton): 2%
Number of Students Supported: 1 Acton, 1 Horowitz
Status: Granted

Title: Automated hemodynamic analysis in microvessels using μ-particle image velocimetry
Source: NIH
Amount: $188,000 (Acton portion)
Duration: Dec. 2005- Nov. 2007
PI: E. Damiano, Boston U.
CY Support (Acton): 15%
Number of Students Supported: 2
Status: Granted

Title: Changes in Cartilage Thickness in the Ankle Following Compressive Loads that Exceed the Deformation Threshold of the Joint Surface But Do Not Fracture the Subchondral Bone
Source: Zimmer, Inc.
Amount: $51,555
Duration: June 2004 – Jan 2006
PI: S. Hurwitz, MD (Orthopedic Surgery, UVA)
Co-I: S.T. Acton, J. Crandall (MAE)
Number of Students Supported: 1
Status: Granted

Title: Real-time Hardware for Enhancement and Segmentation of Ultrasonic Imagery of the Prostate
Source: Mellon Prostrate Cancer Research Institute
Amount: $100,000
Duration: October 2003 – September 2005
PI: S.T. Acton
Co-I: J. Lach (ECE)
Number of Students Supported: 2
Status: Granted

Title: MRI of myocardial function in post-infarct knockout mice
Source: NIH
Amount: $1,159,580
Duration: January 2004 – December 2007
PI: F. Epstein, UVA Radiology and UVA Biomedical Engineering
Other Personnel: B. French, Z. Yang, S.T. Acton, P. Allaire, C. Kramer
CY Support (Acton): 10%
Number of Students Supported: 2
Status: Granted

Title: High Resolution Anatomic and Elastographic Transrectal Ultrasound for Improved Diagnosis of Prostate Cancer
Source: U.S. Army Medical Research and Materiel Command
Amount: $527,128
Duration: January 2004 – December 2006
PI: J. Hossack, BME
Other Personnel: S.T. Acton, D. Theodorescu (Urology)
CY Support (Acton): 5%
Number of Students Supported: 2
Status: Granted

Title: Quantitative 3D Ultrasound Imaging of The Murine Heart
Source: NIH
Amount: $1,015,000 ($700K direct costs)
Duration: January 2004 – December 2006
PI: J. Hossack, BME
Other Personnel: S.T. Acton, B. French (BME), Z. Yang (BME), S. Berr (BME), S. Kaul (Med. School)
CY Support (Acton): 10%
Number of Students Supported: 2
Status: Granted

Title: System for Automated Tracking of Leukocytes *In Vivo* (R33 Mechanism)
Source: NIH
Amount: $902,161
Duration: October, 2002 – September, 2005
PI: S.T. Acton
Co-I: Klaus Ley, M.D., U.Va. Biomedical Engineering
CY Support (Acton): 25%
Number of Students Supported: 1
Status: Granted
Brief Synopsis: We are developing a laboratory tool to automatically track rolling leukocytes *in vivo*. The system will aid in the analysis of inflammatory disease.

Title: System for Automated Tracking of Leukocytes *In Vivo* (R21 Mechanism)

Source: NIH
Amount: $140,897
Duration: October, 2001 – September, 2002
PI: S.T. Acton
Co-I: Klaus Ley, M.D., U.Va. Biomedical Engineering
CY Support (Acton): 15%
Number of Students Supported: 1
Status: Granted
Brief Synopsis: The R21 phase of this project involved creating a proof of concept system and collecting validation data for the system. The report showing that all milestones have been achieved was submitted in July, 2002.

Title: Decentralized Image Retrieval for Education
Source: NSF
Amount: $494,424
Duration: January, 2002 – December, 2004
PI: S.T. Acton
CY Support (Acton): 15%
Number of Students Supported: 2
Status: Granted
Brief Synopsis: In collaboration with SSAI, Inc. and the University of Oklahoma, we are developing a decentralized digital library system for content-based retrieval of digital images.

Title: Advanced Biomedical Image Processing for Tracking Leukocytes *In Vivo* from Video Microscopy
Source: Whitaker Foundation (Biomedical Engineering Research Award)
Amount: $239,983
Duration: September, 2001 – August, 2004
PI: S.T. Acton
CY Support (Acton): 25%
Co-PI: Klaus Ley, M.D., U.Va. Biomedical Engineering
Number of Students Supported: 1
Status: Granted
Brief Synopsis: This project investigates the impact of automated tracking and data collection on the study of leukocyte rolling, adhesion and recruitment. The focus of the Whitaker project is the creation of new image processing techniques to extract information regarding the inflammatory process.

Title: Clutter-reducing, Scalable Image Processing Methods for Target Acquisition and Tracking
Source: U.S. Army Research Office
Amount: $466,907
Duration: May, 2001 – April, 2004
PI: S.T. Acton
CY Support (Acton): 18%
Number of Students Supported: 4

Status: Granted
Brief Synopsis: This work involved morphological and PDE-based image processing methods for reducing image clutter for target tracking. New metrics of image and video clutter were developed. Biomedical technology-transfer applications in cell tracking were implemented.

Title: Advanced Image Processing for Image2000 Enhancements
Source: NASA
Amount: $242,541
Duration: July, 2001 – April, 2004
PI: S.T. Acton
CY Support (Acton): 9%
Number of Students Supported: 2
Status: Granted
Brief Synopsis: In this project, we developed advanced image processing tools for the analysis of remotely sensed imagery.

Title: Rapid deployment of drug discovery automation using machine vision
Source: Carilion Biomedical Institute
PI: Dr. R. Felder, Medical Automation Research Center
CY Support (Acton): 0%
Duration: September 2000 – May 2002
Total Subcontract: $45,150
Number of Students Supported: 1
Status: Granted
Brief Synopsis: Dr. Felder supported a Ph.D. student (J. Bosworth) in my laboratory to look at automating drug testing using image processing.

Title: Multi-Resolution Segmentation via Fusion of Mesonet Data and Remotely Sensed Imagery (Years 4 and 5)
Source: NASA (subcontract to U.Va. from OU)
Amount: $2,000,000 (for Years 4 and 5)
Amount (Acton): $203,924 (for Years 4 and 5: Year 4 at OSU; Year 5 at U.Va.)
Duration: November, 1999 - February, 2002
Co-PI's: V. Duca, S.T. Acton, C. Duchon, R. Elliott, S. Marks, M. Morrissey, B. Vieux, J. Vitek, D. Waits, M. Yuan, D. Zrnic
AY Support (Acton): 22%
Number of Students Supported: 2 for Acton group; 20 total
Status: Granted
Brief Synopsis: We investigated multimedia applications for databases of remotely sensed imagery. Content based image retrieval and object-based image coding were explored in conjunction with novel image segmentation algorithms.

Title: Multiresolution Sensor Fusion Using Morphological Pyramids
Source: NSF
Amount: $15,709
Duration: July, 1997 – June, 1998

PI: S.T. Acton
AY Support (Acton): 0%
Number of Students Supported: 1
Status: Granted
Brief Synopsis: We examined methods of fusing image data from infrared and visible wavelength video cameras. The main applications of this technique are sensor fusion for biomedical image processing (circulation analysis) and video tracking with multiple sensors.

Title: Multiresolution, Multi-Scale Target Identification and Tracking Using the Anisotropic Diffusion Pyramid
Source: U.S. Army Research Office (**Young Investigator Award**)
Amount: $239,850
Duration: September, 1995 – August, 1998
PI: S.T. Acton
AY Support (Acton): 0% (66% Summer support)
Number of Students Supported: 2
Status: Granted
Brief Synopsis: This project investigated new methods of tracking objects in video sequences. The solutions utilize multi-scale image pyramids to decrease the computational cost of tracking and to increase the accuracy of the tracking systems.

Title: Processing Digital Images Obtained From Indium Antimonide Sensors
Source: NSF
Amount: $10,413
Duration: August, 1996 - July, 1997
PI: S.T. Acton
AY Support (Acton): 0%
Number of Students Supported: 1
Status: Granted
Brief Synopsis: Specialized methods to detect edges and segment images that have been sensed by infrared imagers were investigated. Biomedical applications such as blood circulation studies were the focus of this NSF research.

Title: Multi-Resolution Segmentation via Fusion of Mesonet Data and Remotely Sensed Imagery
Source: NASA
Amount: $3,000,000
Amount (Acton): $295,394
Duration: November, 1996 - November, 1999
Co-PI's: V. Duca, S.T. Acton, C. Duchon, R. Elliott, S. Marks, M. Morrissey, B. Vieux, J. Vitek, D. Waits, M. Yuan, D. Zrnic
AY Support (Acton): 22%
Number of Students Supported: 2 for Acton group; 20 total
Status: Granted
Brief Synopsis: This investigation led to a method for segmentation and classification of remotely sensed imagery using Mesonet data as ground truth information. Multiresolution

techniques are utilized to rapidly subdivide the imagery into constituent regions according to specific characteristics such as soil moisture.

Title: Fusion of Infrared and X-ray Imagery for Automated Circuit Inspection
Source: Lucent Technologies
Amount: $153,730
Duration: December, 1997 – November, 1998 (extension)
PI: S.T. Acton
AY Support (Acton): 11% (33% Summer support)
Number of Students Supported: 2
Status: Granted
Brief Synopsis: The research project investigated the combination of infrared and X-ray imaging for automated circuit inspection.

Title: Vision-based Circuit Board Inspection System
Source: Lucent Technologies
Amount: $181,318
Duration: September, 1996 – November, 1997
PI: S.T. Acton
AY Support (Acton): 11% (33% Summer support)
Number of Students Supported: 2
Status: Granted
Brief Synopsis: The goal of this research effort was to develop an automated inspection for circuit boards manufactured by Lucent Technologies. Wavelet analysis, morphological analysis, multiresolution methods and watershed algorithms were used in the feature extraction system. The system provides real-time inspection.

Title: Fusion of Infrared and X-ray Imagery for Automated Circuit Inspection (Feasibility Study)
Source: Lucent Technologies
Amount: $31,013
Duration: June, 1996 - August, 1996
PI: S.T. Acton
AY Support (Acton): 0% (33% Summer support)
Number of Students Supported: 2
Status: Granted
Brief Synopsis: The three-month study confirmed that inspection of circuit boards using a combination of infrared sensors and X-ray laminography is possible. Research into the specific image processing methods for inspection was originated.

Title: Automated Video Tracking and Inspection (additional time and funds)
Source: SVS, Inc., Albuquerque NM
Amount: $3,946
Duration: October, 1995 - July, 1996
PI: S.T. Acton
AY Support (Acton): 4%

Number of Students Supported: 0
Status: Granted
Brief Synopsis: This project was a continuation of the earlier work performed on automated power line inspection using image processing. The successful feasibility study performed at the university led to a $5M project for SVS, Inc. from PacCorp.

Title: Image Processing for Agricultural Remote Sensing
Source: Site-Specific Technology Development Group, Stillwater OK
Amount: $9,685 (other expenditures allowed as necessary)
Duration: August, 1995 – June, 1996
PI: S.T. Acton
Number of Students Supported: 0 (supported costs for an undergrad. research team)
AY Support (Acton): 11%
Status: Granted
Brief Synopsis: Methods to integrate state-of-the-art image processing algorithms into site-specific farming were considered. A portable four-band remote sensing system was developed and demonstrated.

Title: Automated Video Tracking and Inspection
Source: SVS, Inc., Albuquerque NM
Amount: $31,218
Duration: June, 1995 – September, 1995
PI: S.T. Acton
AY Support (Acton): 11% (33% Summer support)
Number of Students Supported: 1
Status: Granted
Brief Synopsis: This study addressed the possible solutions to two problems involved with the inspection of power line systems: (1) tracking the power line components from a helicopter-mounted video camera and (2) detecting faults within the components. Particular fault detection problems that were addressed include broken and missing insulators, frayed wires, and warped spacers.

GRADUATE STUDENTS DIRECTED

Ph.D. Students and Dissertation Title	***Graduation Date***
Wei Chen	Summer, 1997
"Morphological Image Pyramids for Automatic Target Recognition"	
(Currently: Senior Research Scientist with KLA Tencor)	
Joseph Bosworth	Spring, 2002
"Morphological Local Monotonicity for Multiscale Image Segmentation"	
(Currently: Founder and Owner at Black Mesa Imaging, LLC)	
Yongjian Yu	Spring, 2003
"Ultrasound Image Enhancement for Detection of Contours Using Speckle Reducing Anisotropic Diffusion"	

(Currently: Senior Research Engineer with Axon Connected)

Nilanjan Ray Spring, 2003
"Tracking Rolling Leukocytes In Vivo Using Active Contours with Motion Gradient Vector Flow"
(Currently: Associate Professor at University of Alberta)

Dong Gang Fall, 2005
"Detection of Rolling Leukocytes from Intravital Microscopy Images"
(Currently: Senior Research Scientist with KLA Tencor)

Jing Cui (co-advised w/ Z. Lin) Spring, 2006
"In Vivo Multi-leukocyte Tracking by Enhanced Particle Filter"
(Currently: with University of Michigan)

Michael Grant Summer, 2006
"Surface Reflected Global Positioning System Signals for Terrain Classification"
(Currently: Chief Engineer w/ NASA Langley Research Center)

Bing Li Summer, 2007
"Image Segmentation Using Vector Field Convolution Active Models and Poisson Inverse Gradient Initialization"
(Currently: General Manager and Cofounder, SVision, Inc.)

Drew Gilliam Summer, 2008
"MRI-assisted Segmentation of Cardiac Ultrasound using Active Trajectory Models"
(Currently: Vision Scientist at Vision Systems, Inc.)

Robert Janiczek Summer, 2012
"Measurement of wall stress using magnetic resonance imaging"
(Currently: Scientific Director, Glaxo Smith Kline)

Saurav Basu Summer, 2012
"Using manifold geometry in image analysis: shape based recognition and pose tracking"
(Currently: with IBM)

Alla Aksel Fall, 2014
"Automated tracking and analysis of aerial surveillance data"
(Currently: with Northrup Grumman)

Andrea Vaccari Spring, 2014
"An automated image analysis framework for model-based feature detection in sparse data"
(Currently: Assistant Professor of Computer Science, Middlebury College)

Suvadip Mukherjee Fall, 2015
"Segmentation and enhancement of filamentous objects for biological image analysis"
(Currently: Research Associate with Pasteur Institute)

Rituparna Sarkar Spring, 2017
"Dictionary learning and sparse representation for image analysis with application to segmentation, classification and event detection"
(Currently: Research Associate with Pasteur Institute)

Tamal Batabyal Spring, 2019
"Graph-theoretic data modeling with application to neuromorphology, activity recognition

and event detection"
(Currently: with MIT)

Nasrin Sadeghzadehyazdi — Spring, 2021
Topic: Image analysis of lidar for person identification
(Currently with Chemours, formerly Dupont)

Tiffany Ly — Summer, 2021
Topic: Image analysis of Glia
(Currently with IBM)

Jie Wang — Fall, 2021
Topic: Super-resolution Microscopy Image Analysis
(Currently with Nanjing University of Posts and Telecommunications)

Nazia Tabassum — Spring, 2021
Topic: Image Analysis for Meningeal Lymphatics
(Currently with SAS Institute)

Haoyi Ma — Spring, 2022
Topic: Long-term Video Tracking, Reinforcement Learning for Tracking
(Currently with Meta)

Samarth Singh — Spring, 2024 (expected)
Topic: Machine learning for video activity recognition

Tanjin Toma — Spring, 2024 (expected)
Topic: Tracking of bacteria in biofilms

Soumee Guha — Spring, 2025 (expected)
Topic: Machine learning in video analysis

Shuhan Ding — Spring, 2026 (expected)
Topic: Machine learning in video analysis

M.S. Students and Thesis Title — ***Graduation Date***

Auapong Yaicharoen — Summer, 1995
"The Anisotropic Diffusion Coefficient"
(Currently: Professor, KMUTT, Thailand)

Melynda Reed — Summer, 1995
"B-Spline Representations for Moire Fringes"
(Currently: with Williams Communications)

Timothy Jackson — Spring, 1996
"Automated Video Tracking and Inspection of Power Transmission Components"
(Currently: U.S. Air Force)

Darren Tepe — Spring, 1996
"Infrared Inspection Techniques"
(Currently: Senior Engineer with the Federal Aviation Administration)

Jerome Landis — Spring, 1996
"A Multispectral Algorithm for Anisotropic Diffusion"
(Currently: with Seagate, Inc.)

Mark Taiclet — Fall, 1996
"Spatially Adaptive Anisotropic Diffusion"
(Currently: with U.S. Sprint telecommunications)

C. Andrew Segall — Fall, 1997

"Construction of the Scale Aware Anisotropic Diffusion Pyramid with Application to Multi-scale Tracking"
(Currently: Sharp USA Research)

Kelsey Pope — Summer, 1997
"Modified Gradient Mean Curvature Motion and Vector Distance Dissimilarity for Multispectral Anisotropic Diffusion"
(Currently: with Seagate, Inc.)

Takashi Koshimizu — Summer, 1998
"Watershed merging with application to remote sensing"
(Currently: engineering manager for Bayer, Inc., Japan)

Anthony Wright — Fall, 1998
"Multiresolution Watershed Segmentation"
(Currently: Director of Network Planning at Solinet, Inc.)

Matthew Burton — Spring, 1999
"Sliding Mode Control Study for Application to Disk Drive Servo Systems"
(Currently: with Rational Corp.)

David Cary — Summer, 1999
"Differential Average Equal-Size Image Compression"
(Currently: working on GPS systems with Brunswick)

Zhongxiu Hu — Fall, 1999
"Morphological Pyramid Image Registration"
(Currently: with Motorola, Inc.)

Badrinarayan Ragunathan — Summer, 2000
"Image Segmentation and Content-based Retrieval"
Winner, Graduate Research Award (Best Thesis), 2000
(Currently: with Bosch Corporation.)

Junaid Ahmed — Summer, 2000
"Image Segmentation for Object Based Image Compression"
(Currently: with Applied Science Fiction, Inc.)

Kate Weber — Spring, 2003
"On Connected Filters in Color Image Processing"
(Currently: with Night Vision Laboratories)

Michael Welser — Spring, 2003
"Projection Model Snakes for Tracking Using a Monte Carlo Approach"
(Currently: with Air Force Research Laboratories)

Adam Goobic — Spring, 2003
"Image Registration and Stabilization for Tracking Leukocytes in the Microvasculature"
(Currently: with Air Force Research Laboratories)

Sridhar Reddy — Fall, 2003
"Segmentation using classification and spatial constraints applied to image retrieval"
(Currently: with image processing start-up in CA)

Sean Jellish — Summer, 2004
"Real-Time Video Detection and Tracking of Rolling Leukocytes"
(Currently: with Night Vision Laboratories)

Robert Janiczek — Fall, 2005
"Automated Segmentation of Cardiac MRI"
(Currently at GSK)

John Pickard — Spring, 2005
"Automated MCE Perfusion Analysis"
(Currently with UVA Patent Foundation)

Bing Li — Spring, 2005
"Multiassignment Interactive Multiple Model for Multiple Target Tracking"
(Currently with SVision, Inc.)

Marija Cvijetic — Summer, 2007
"Intravital Cell Detection"
(Currently with Anderson Consulting)

Adam Bergeron — Spring, 2008
"Video Tracking Using Base View Active Contours"
(Currently with Lockheed Martin)

Katherine Outland (Co-advised with Barry Johnson) — Spring, 2008
"Face Detection and Tracking via Active Contours"
(Currently with MITRE Corp.)

Josh Poulin — Spring, 2010
"Human pose tracking from monocular video"
(Currently with Air Force Research Labs)

Michael Landau — Spring, 2011
"Adaptive acceptance gate for target tracking"
(Currently with APL, Johns Hopkins U.)

Kirill Orlov — Spring, 2012
"The missing cone problem in hyperspectral imaging"

Clare Yang — Summer, 2012
"Multiscale Vector Field Convolution for Image Segmentation"

Michael Stuecheli — Fall, 2013
"Image analysis methods for locating geohazards"

Anoosha Papireddy — Summer, 2013
"Image segmentation for multimodal radiography"
(Currently with Google)

Aanchal Gupta (M.E.) — Fall, 2013

Nazia Tabbasum — Summer, 2016
"Speckle Removal and Change Preservation by Distance-Driven Anisotropic Diffusion of Synthetic Aperture Radar Temporal Stacks"

Jie Wang — Spring, 2017
"3D Segmentation for Super-Resolution Imaging of Bacterial Biofilms"

Tiffany Ly — Spring, 2017
"IP on AP: Exploring Image Processing on the Automata Processor"

Ruoyi Zeng (M.E.) — Spring, 2019

Filip Sluzeski — Summer, 2019
"Methods for Analyzing Microglial Signaling and Cortical Spreading Depression Wavefronts in 2-Photon Calcium Images"
(Currently with Allen Institute for Brain Science)

Undergraduate Theses

Michael Welser Spring, 2002
"Clutter Reducing Filters for Target Tracking"

Adam Goobic Spring, 2002
"A Comparison of Trackers for Rolling Leukocytes *In Vivo*"
Finalist, Undergraduate Research Design Symposium (Best Thesis)

Conor Sibley Spring, 2002
"Content-based Image Retrieval"

Alexander Kepler Spring, 2002
"Gabor Filters in Texture Recognition and Matching, for Content-based Image Retrieval"

Robert Janiczek Spring, 2003
"Classification of Lung Ventilation in Hyperpolarized Helium-3 Magnetic Resonance Images"

Aaron Domnitch Spring, 2003
"An Image Compressor that Removes Psycho-Visual Redundancies"

Avneet Kang Spring, 2003
"Naturalness in Text-to-Speech Synthesis"

Kevin Schaal Spring, 2003
"A comparison of trackers on military targets"

Stacey Opaska Spring, 2003
"Developing a Directional Filtering Algorithm for Improving Image Compression"

Mark Peverill Spring, 2003
"Tracking actin filaments in vitro"

John Hunter Fall, 2003
"Motion tracking for T-cells"

Xung Nham Fall, 2003
"Compression of elevation data"

Dorothy Wang Spring, 2004
"Biometric identification using retinal scans"

Marquita Henderson Spring, 2005
"Cartilage volume computation for MR images"

Kirill Orlov Spring, 2005
"Robust Multiple Event Detection in Hyperspectral Infrared Video"

Marija Cvijetic Spring, 2006
"A Graphical User Interface for Leukocyte Detection and Tracking"

Henry Abbot Spring, 2007
"dvoc: An Open Source Real-time Vocoder"

Ashley Elkin Spring 2007
"RFID for Mobile Nurse Station"

Edward Farley Will Spring, 2009
"Dermagram image processing"

Jisoon Kim Spring 2009

"Skin cancer imaging system"
Lindsay Browder (Co w/ Harry Powell) Spring 2009
"Signal processing for gait analysis"
Sattyik Kundu Spring 2012
"Iris recognition using gray level co-occurrence matrix based features and classifier fusion"
Ashutosh Priyadarshy Spring 2012
"Segmentation of vascular endothelial cells"
R. Ben Campbell Spring 2013
"Matching Neurons in *Drosophila*"
Silvio Mancone Fall 2013
"UAVs for Viticulture Inspection"
Adam Campbell Spring 2014
"Image Recognition using Automata Architecture"
Elizabeth Orrico Spring 2015
"Momentum Algorithm for Quantifying Dendritic Cell Movement"
Winner, Undergraduate Research Design Symposium (Best Thesis)
Caroline Crockett Spring 2015
"Momentum Algorithm for Quantifying Dendritic Cell Movement"
Winner, Undergraduate Research Design Symposium (Best Thesis)
Leo Cao Spring 2016
"InSAR Analysis on Culverts: Applying Remote Sensing on Infrastructure Maintenance"

Visitors and Postdoctoral Fellows
Dr. Alfredo Restrepo, Summer 1998
Current position: Associate Professor, Universidad de los Andes, Bogota, Colombia
Dr. Dipti Prasad Mukherjee, 1999-2000, 2001-2002, 2013
Current position: Full Professor, Indian Statistical Institute, Calcutta, India
Dr. Nilanjan Ray, Research Associate, 2003-2005, 2013
Current position: Associate Professor, University of Alberta, Alberta, Canada
Dr. Jinshan Tang, Research Scientist, 2002-2005
Current position: Associate Professor, Michigan Tech
Dr. Peter Tay, Research Associate, 2005-2006
Current position: Associate Professor, W. Carolina University
Dr. Sedat Ozer, Research Associate, 2013-2015
Current position: Research Scientist, M.I.T.
Dr. Andrea Vaccari, Research Scientist, 2014-2019
Current position: Assistant Professor, Middlebury College

SERVICE TO THE UNIVERSITY

- Graduate, Leadership in Academic Matters, University of Virginia, 2021
- Senator, Faculty Senate, University of Virginia, 2018-2019
- Chair, Neural Engineering Search committee, 2016-2019
- Member, SEAS Tenure and Promotions Committee (out of cycle cases), 2018
- Member, ECE P&T Process Support Committee, 2018-2019
- Member, University Committee on Information Technology, 2018-2019
- Member, SEAS Faculty Council, 2018-2019
- Member, Diversity and Inclusion Committee, UVA, 2018-2019
- Member, UVA Fontaine Research Building Committee, 2018-2019
- Member, Neuroscience internal review committee, 2017-2019
- Member, Neuroscience Cluster hiring committee, 2017-2019
- Member, CS Peer Assessment Committee, 2016, 2017
- Member, Search Committee, ECE Department Chair, 2017
- Member, SEAS Tenure and Promotions Committee, 2013-2015
- Chair, Search Committee (two positions), ECE, 2013-2014
- Member, ECE Peer Assessment Committee, 2013
- Chair, SEAS Graduate Module implementation committee, 2011-2014
- Member, ECE Chair Search Committee, 2012
- Member, ECE Search committee (opto-electronics), 2013
- Member, ECE ASSET speaker committee, 2012-2014
- Member, SEAS strategic planning (graduate module), 2010-2011
- Member, Committee on Post-Tenure Review and Teaching Load Policy, 2010-2011
- Chair, ECE Graduate Fellowships Committee, 2009-2013
- Chair, ECE Eminent Speaker Series, 2004-2007
- Chair, ECE Graduate Recruiting Committee, 2003-2007
- Member, ECE Faculty Recruiting Committee, 2004-2007
- Member, ECE Faculty Recognition Committee, 2003-2007
- Member, Dean's Research Advisory Council, SEAS, 2003-2007
- Member, Nominations and Elections Committee, SEAS, 2003-2007
- Chair, Teaching Effectiveness Committee, SEAS, 2004-2005
- Member, SEAS Faculty Fellows, 2003-2005
- Member, Teaching Effectiveness Committee, SEAS, 2002-2004
- Speaker, SEAS New Faculty Orientation, 2003
- Mentor, Faculty-Student Mentoring Program, Office of African-American Affairs, 2001-2002
- Member, ECE Chair Search Committee, 2003
- First Year Advising, SEAS, 2004-2007
- Chair, ECE Undergraduate Planning Committee, 2001-2002
- Exhibitor, SEAS Open House, 2001, 2002, 2003
- Exhibitor, ECE Open House, 2000, 2001, 2002
- Member, hiring committee for support staff, 2003, 2004
- Member, ECE Graduate Committee, 2002-2003

- Member, STS 401/402 Committee, 2001-2004
- Member, ECE Undergraduate Committee, 2000-2002
- Member, ABET Planning Committee, 2000-2001
- Member, ECE Computer Resources Committee, 2000-2002
- Member, SEAS Student Affairs Committee, 2000-2001
- Member, Ad Hoc Committee on Teaching Loads, Spring 2001
- Chair, Graduate Programs Committee, OSU, 1998-2000
- Member, Hall of Fame Award Committee, OSU, 1998
- Member, ECEN Head Search Committee, OSU, 1997-1998
- Member, Faculty Search Committee, OSU, 1996-1997, 1998-1999, 1999-2000
- Member, Halliburton Awards Committee, OSU, 1998
- Member, Lohmann Medal Committee, OSU, 1997
- Member, ECEN Computer Committee, OSU, 1995-1997
- Member, ECEN Laboratory Development Committee, OSU, 1995-1997
- Member, Technical Advisory Committee, Center for Sensors and Sensor Technologies, OSU, 1997-2000
- Mentor, OKAMP-SEM (Oklahoma Alliance for Minority Participation in Science, Engineering and Mathematics), 1995-1997

SERVICE TO THE PROFESSION

Membership in Professional Societies

- Institute of Electrical and Electronics Engineers (IEEE), Fellow
- Signal Processing Society of the IEEE
- Engineering in Medicine and Biology Society of the IEEE
- Virginia Neuroscience Initiative

Editorial Work

- **Editor-in-Chief, *IEEE Transactions on Image Processing*, 2014-2018**

- Guest Editor, *IEEE Journal on Biomedical and Health Informatics*, Special Issue on Large scale video analytics for clinical decision support, 2021-2022

- Guest Editor, *IEEE Journal on Special Topics in Signal Processing*, Special Issue on Machine Learning for Medicine, 2019-2020

- Guest Editor, *IEEE Journal on Special Topics in Signal Processing*, Special Issue on Bioimaging, 2014-2015

- Associate Editor, *IEEE Transactions on Image Processing*, 1997-2003, 2007-2011, 2013- 2014

- Associate Editor, *IEEE Signal Processing Letters*, 2001-2004

- Guest Editor, Special Issue on Multimedia System Technologies for Educational Tools, *Multimedia Systems Journal*, 2005

IEEE (or other international) Committees

- Member (elected), IEEE Bioimaging and Signal Processing Technical Committee, 2019-2022
- Asilomar SS&C Conference Corporation Board of Directors, Member, 2008-
- Member, IEEE SPS Technical Directions Board (ISBI Representative), 2018-2019
- Member, IEEE Fellow Evaluating Committee, 2017-2019, Engineering in Medicine and Biology Society
- Member, IEEE Signal Processing Society Publications Board, 2015-2018
- Chair, IEEE Bioimaging and Signal Processing Technical Committee Awards Board, 2013-2014
- Member, IEEE Image, Video, and Multidimensional Signal Processing Technical Committee, 2011-2016 (re-elected in 2013)
- Member, IEEE Bioimaging and Signal Processing Technical Committee, 2011-2016 (re-elected in 2013)

Conference Organization and Leadership

- North American Liaison Chair, IEEE International Conf. on Image Processing, 2019
- **General Co-Chair**, IEEE Int. Symposium on Biomedical Imaging, 2018
- Associate Editor, IEEE International Symposium on Biomedical Imaging, 2017
- Student Paper Contest Chair, Asilomar Conf. on Signals, Systems and Computers, 2017
- Student Paper Contest Chair, Asilomar Conf. on Signals, Systems and Computers, 2016
- Special Sessions Chair, IEEE Southwest Symposium on Image Understanding and Interpretation, 2016
- North American Liaison, IEEE International Conf. on Image Processing, 2019
- Awards Chair, IEEE GlobalSIP, 2015
- SPS Liaison to ISBI, 2013-
- Technical Area Chair, IEEE International Conf. on Image Processing, 2013
- Program Committee, 2013 Computational Imaging Conference
- Publicity Chair, 2013 IEEE International Symposium on Biomedical Imaging
- Technical Area Chair, IEEE International Conf. on Image Processing, 2011
- Technical Area Chair, IEEE International Symposium on Biomedical Imaging, 2011
- **General Co-Chair**, 2010 IEEE SW Symposium on Image Analysis and Interpretation
- Vice Technical Chair, 43nd Asilomar Conf. on Signals, Systems and Computers, 2009
- Finance Chair, 2009 IEEE International Symposium on Biomedical Imaging
- Technical Area Chair, 42nd Asilomar Conf. on Signals, Systems and Computers, 2008

(in charge of organizing six sessions in the Biomedical Signal & Image processing area)

- **Program Co-Chair**, 2008 IEEE Southwest Symposium on Image Understanding and Interpretation
- Technical Area Chair, IEEE International Conf. on Image Processing, 2009
- Technical Area Chair, IEEE International Conf. on Image Processing, 2008
- Special Sessions Chair, IEEE International Conf. on Image Processing, 2007
- **General Chair**, 40th Asilomar Conf. on Signals, Systems and Computers, 2006
- **Technical Program Chair**, 38th Asilomar Conf. on Signals, Systems and Computers, 2004
- Student Paper Contest Chair, 37th Asilomar Conf. on Signals, Systems and Computers, 2003
- Track Chair, 45th Midwest Symposium on Circuits and Systems, 2002 (in charge of organizing five sessions in the image processing area)
- Technical Area Chair, 35th Asilomar Conf. on Signals, Systems and Computers, 2001 (in charge of organizing nine sessions in the signal & image processing area)
- Technical Area Chair, 34th Asilomar Conf. on Signals, Systems and Computers, 2000 (in charge of organizing eight sessions in the signal & image processing area)
- **Program Co-Chair**, 1996 IEEE SW Symposium on Image Understanding and Interpretation

Conference Committees

- Member of Technical Program Committee, IEEE SW Symposium on Image Understanding and Interpretation, 2020
- Member of Review Board, IEEE International Conference on Acoustics, Speech and Signal Processing, 2018
- Member of Technical Program Committee, IEEE SW Symposium on Image Understanding and Interpretation, 2018
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2017
- Member of Review Board, IEEE International Conference on Acoustics, Speech and Signal Processing, 2017
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2016
- Member of Review Board, IEEE International Conference on Acoustics, Speech and Signal Processing, 2016
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2015
- Member of Review Board, IEEE International Conference on Acoustics, Speech and Signal Processing, 2015
- Member of Review Board, IEEE International Conference on Acoustics, Speech and Signal Processing, 2014
- Member of Review Board, IEEE International Symposium on Biomedical Imaging,

2014

- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2014
- Member of Review Board, IEEE International Symposium on Biomedical Imaging, 2011
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2011
- Member of Review Board, IEEE International Symposium on Biomedical Imaging, 2013
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2013
- Member of Review Board, IEEE International Symposium on Biomedical Imaging, 2010
- Member of Review Board, IEEE International Symposium on Biomedical Imaging, 2010
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2010
- Member of Review Board, IEEE International Symposium on Biomedical Imaging, 2009
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2009
- Member of Review Board, IEEE International Symposium on Biomedical Imaging, 2008
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2007
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2008
- Member of Review Board, IEEE International Conference on Acoustics, Speech and Signal Processing, 2007
- Member of Review Board, Medical Image Computing and Computer-Assisted Intervention, 2007
- Member of Review Board, IEEE International Symposium on Biomedical Imaging, 2007
- Member of Program Committee, International Conference on Advances in Pattern Recognition, 2007
- Member of Technical Program Committee, Workshop on Microscopic Image Analysis with Applications in Biology, 2006
- Member of Technical Program Committee, Workshop on Orthopedic Image Analysis with Applications in Biology, 2006
- Member of Technical Program Committee, IEEE SW Symposium on Image Understanding and Interpretation, 2006
- Member of Review Board, IEEE International Symposium on Biomedical Imaging, 2006
- Member of Review Board, IEEE International Conference on Acoustics, Speech and Signal Processing, 2006

- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2005
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2004
- Member of Program Committee, SIAM Imaging Science, 2004
- Member of Program Committee, Conf. on Computer Vision, Graphics and Image Processing, 2004
- Member, Technical Program Committee, IEEE SW Symposium on Image Understanding and Interpretation, 2004
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2003
- Member of Advisory Committee, ICAPR, 2003
- Member, Technical Program Committee, IEEE SW Symposium on Image Understanding and Interpretation, 2002
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2002
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 2001
- Member, ACIVS 2001 Program Committee
- Member, Referee Board, International Conference on Pattern Recognition, 2000
- Member, Technical Program Committee, IEEE SW Symposium on Image Understanding and Interpretation, 2000
- Member of Review Board, IEEE International Conf. on Image Processing, 1999
- Member of the Advisory Committee, International Conference on Advances in Pattern Recognition and Digital Techniques, ICAPRDT '99
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 1998
- Member, Technical Program Committee, IEEE SW Symposium on Image Understanding and Interpretation, 1998
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 1997
- Member, Organizing Committee, IEEE SW Symposium on Image Understanding and Interpretation, 1995-1998
- Member of Technical Program Committee, IEEE International Conf. on Image Processing, 1994

Conference Session Chair

- Session Chair, IEEE Int. Symposium on Biomedical Imaging, 2020
- Session Chair, IEEE International Conf. on Image Processing, 2019
- Session Chair, IEEE International Conf. on Image Processing, 2018
- Session Chair, IEEE Southwest Symposium on Image Understanding and Interpretation, 2018
- Session Chair, IEEE International Conf. on Image Processing, 2017

- Session Chair, IEEE Int. Symposium on Biomedical Imaging, 2017
- Session Chair, IEEE International Conf. on Image Processing, 2016
- Session Chair, IEEE Southwest Symposium on Image Understanding and Interpretation, 2016
- Session Chair, IEEE Int. Symposium on Biomedical Imaging, 2015
- Session Chair, IEEE International Conf. on Image Processing, 2015
- Session Chair, IEEE International Conf. on Image Processing, 2014
- Session Chair, IEEE Southwest Symposium on Image Understanding and Interpretation, 2014
- Session Chair, IEEE International Conf. on Acoustics, Speech and Signal Processing, 2014
- Session Chair, IEEE CAMSAP, 2014
- Session Chair, IEEE International Conf. on Image Processing, 2013
- Session Chair, Asilomar Conference on Signals, Systems and Computers, 2013
- Session Chair, Asilomar Conference on Signals, Systems and Computers, 2012
- Session Chair, IEEE Int. Symposium on Biomedical Imaging, 2012
- Session Chair, IEEE International Conf. on Image Processing, 2012
- Session Chair, Asilomar Conference on Signals, Systems and Computers, 2011
- Session Chair, IEEE Int. Symposium on Biomedical Imaging, 2011
- Session Chair, IEEE Southwest Symposium on Image Understanding and Interpretation, 2010.
- Session Chair, Asilomar Conference on Signals, Systems and Computers, 2010
- Session Chair, IEEE International Conf. on Image Processing, 2009
- Session Chair, IEEE Int. Symposium on Biomedical Imaging, 2009
- Session Chair, Asilomar Conference on Signals, Systems and Computers, 2007
- Session Chair, IEEE International Conf. on Image Processing, 2007
- Session Chair, IEEE Int. Symposium on Biomedical Imaging, 2007
- Session Chair, IEEE International Conf. on Image Processing, 2006
- Session Chair, IEEE Southwest Symposium on Image Understanding and Interpretation, 2006.
- Session Chair, IEEE International Conf. on Image Processing, 2005
- Session Chair, Asilomar Conference on Signals, Systems and Computers, 2005
- Session Chair, Computer Based Medical Systems, NIH, 2004
- Session Chair, IEEE Southwest Symposium on Image Understanding and Interpretation, 2004.
- Session Chair, IEEE International Conf. on Image Processing, 2003
- Session Chair, IEEE International Conf. on Image Processing, 2002
- Session Chair, IEEE Southwest Symposium on Image Understanding and Interpretation, 2002.
- Session Chair, IEEE International Conf. on Image Processing, 2001
- Session Chair, IEEE International Conf. on Image Processing, 2000
- Session Chair, IEEE International Conf. on Acoustics, Speech and Signal Processing, 2000
- Session Chair, IEEE International Conf. on Image Processing, 1999

- Session Chair, International Conference on Advances in Pattern Recognition and Digital Techniques, ICAPRDT '99, Calcutta, India
- Session Chair, IEEE International Conf. on Acoustics, Speech and Signal Processing, 1999
- Session Chair, IEEE International Conf. on Image Processing, 1998
- Session Chair, IEEE International Conf. on Image Processing, 1994

Service at the National Science Foundation

- Acting Deputy Division Director, Computing and Communication Foundations, 2021-2022
- Program Director, Communication and Information Foundations (within CISE-CCF), 2019-2022
- Program Director, Smart and Connected Health, 2019-2022
- Program Director, National Robotics Initiative, 2019-2020
- Program Director, Foundational Research in Robotics, 2020-2022
- Program Director, Artificial Intelligence Institutes, 2020-2022
- Member, Committee on Pandemic Predictive Intelligence, 2020-2022
- Member, CISE Committee on Diversity in Panels, 2020-2022
- Member, Working Group on Large Proposals, 2021-2022
- Member, Tiger Team on Hybrid Panels, 2021

Proposal Review

- Proposal Reviewer, Engineering in Medicine, 2018, 2019
- Proposal Reviewer, Center for Innovative Technology (state of Virginia), 2018
- Panelist, Portuguese National Science Foundation, 2015, 2017
- Technical Proposal Evaluator for the Army Research Office, 1996- (served every year since 1996)
- Proposal Reviewer, Hobby Foundation, 2017
- Member (ad hoc), NIH Study Section
    - Enabling Bioanalytical and Imaging Technology, 2015
    - Microscopic Imaging, 2004-2008, 2010-2012
    - Immunology, 2005-2006
    - Bioengineering Research Partnerships, 2006-2007
- Panelist, NSF SBIR Review, 2006, 2007
- Proposal Reviewer, Michigan Technology Corridor, 2004, 2005, 2006
- Proposal Reviewer, Nebraska EPSCoR competition, 2005
- Proposal Reviewer, Tennessee DEPSCoR competition, 2005, 2006, 2007
- Panelist, NSF, 1997-2000, 2002, 2023
- Proposal Reviewer, Netherlands Organization for Scientific Research, 2002
- Proposal Reviewer, U.S. Civilian Research and Development Foundation (CRDF), 2001