

## Sameer K. Antani, PhD

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### Education and Training

Institution	Degree	Year(s)	Field of Study
University of Pune, Pune, India	B.E.	1994	Computer Engineering
The Pennsylvania State University, PA, USA	M. Eng.	1998	Computer Sci. & Eng.
The Pennsylvania State University, PA, USA	Ph.D.	2001	Computer Sci. & Eng.
Lister Hill National Center for Biomedical Communications, National Library of Medicine, NIH	Postdoctoral Fellow	2001-2002	Content-Based Image Retrieval for Biomedical Image Archives

### Positions and Employment

1993-1995	Business Owner, Samssoft Tech, Pune, India
6/1994 – 12/1994	Instructor, Pune Institute of Computer Technology.
1/1995 – 5/1995	Project Officer, Advanced Systems and Computer Training Pvt. Ltd., Pune, India
5/1998 – 8/1998	Summer Graduate Research Fellow, Philips Research Briarcliff, USA
8/1995 – 5/1996	Instructor, Computer Science & Engineering, The Pennsylvania State University.
8/2000 – 12/2000	Instructor, Computer Science and Engineering, The Pennsylvania State University.
5/1996 – 5/2001	Graduate Research Assistant, Computer Science and Engineering, The Pennsylvania State University.
11/2001 – 4/2002	Postdoctoral Fellow, Lister Hill National Center for Biomedical Communications, National Library of Medicine, NIH.
4/2002 -	Staff Scientist, Lister Hill National Center for Biomedical Communications, National Library of Medicine, NIH.

### Other Experience and Professional Memberships

1993 – 1994	Secretary, IEEE Student Chapter, Pune, India
1996 – 1998	Member Strategic Planning Committee, Dept. of Computer Science & Engineering, and other university-wide leadership positions at The Pennsylvania State University.
1997 – 1998	President, Engineering Graduate Student Council, Pennsylvania State University.
2002	Member of Program Committee, ACM Multimedia Conference
2003	Session co-chair and co-organizer, Special invited session on “Knowledge Discovery, and Image and Signal Processing in Medicine”, IEEE International Joint Conference on Neural Networks (IJCNN) 2003, Portland, OR.
2004	Session co-chair and co-organizer, Special invited session on “Shape and Pattern Analysis in Content-Based Diagnostic Information Retrieval”, 8th World Multi-Conf Systemics, Cybernetics, and Informatics (SCI) 2004, Orlando, FL.
2004	General co-chair, 17th IEEE Symposium on Computer-Based Medical Systems (CBMS), Bethesda, MD.
2006	Program co-chair, 19th IEEE Symposium on Computer-Based Medical Systems (CBMS), Salt Lake City, UT
2006	External examiner for PhD dissertation in Electrical and Computer Engineering. Brigham Young University, Provo, Utah.
2007	Member of Program Committee, IEEE International Conference on Data Mining: Workshop on Data Mining in Medicine, Omaha, Nebraska.
Current	Member IEEE, IEEE Computer Society, IEEE Technical Committee on Computational Medicine (TCCM).

Current Member Steering Committee for Computer-Based Medical Systems.

### Honors

1987 National Merit Scholarship Award, Government of India  
1994 Rotary International Award for Computer Excellence, Pune, India  
2003 Staff Achievement Award, National Library of Medicine, NIH, HHS  
2004 Staff Achievement Award, National Library of Medicine, NIH, HHS  
2005 Staff Achievement Award, National Library of Medicine, NIH, HHS  
2005 Group Performance Award, National Library of Medicine, NIH, HHS  
2006 Staff Achievement Award, National Library of Medicine, NIH, HHS  
2007 Staff Achievement Award, National Library of Medicine, NIH, HHS  
2007 Performance Award, National Library of Medicine, NIH, HHS

### Current Projects

**Content-Based Image Retrieval:** The goals of the project include reliable, automated, advanced medical image analysis for extraction of medically significant image features from large biomedical image and clinical data archives, indexing them, and used in hybrid (image, text) queries that support the content-based image retrieval (CBIR) paradigm. Goals include algorithm design, development of standalone prototype software, data collection, evaluation, and validation. Other research interests in this area include R&D into approaches for applying the distributed computing paradigm to CBIR.

**Interactive Publications:** The challenge in this project is to create comprehensive, self-contained and platform-independent multimedia-rich “interactive publication” for scientific articles, in particular, allowing access to erstwhile supplementary materials and basic research data within the context of the article. This document could contain many media objects: text, video, audio, bitmapped images, spreadsheets, presentation graphics, or animation sequences and in using it one should be able to: (a) view any of these objects on the screen; (b) hyperlink from one object to another; (c) interact with the objects; and (d) reuse the media content for analysis and presentation. It is the last objective that differentiates “traditional” multimedia documents from an “interactive publication.”

**Image and Text Integration (ITI) for Clinical Decision Support:** The goal of this project is to develop robust algorithms to augment the repository of facts for informed clinical decision making with images. This research focuses on the algorithms for automatic biomedical image annotation by utility for evidence-based practice, and integration of text and image content search strategies. The project combines text searching, natural language processing, and content-based image retrieval (CBIR), respectively.

### Selected Publications

Xue Z, Antani SK, Long LR, Jeronimo J, Thoma GR. Investigating CBIR Techniques for Cervicographic Images. Proc Ann Symp Am Med Info Assoc (AMIA) 2007.  
Qian X, Tagare HD, Fulbright RK, Long R, Antani S. Indexing of Complete and Partial 2-D Shapes for NHANES II. Proc 10<sup>th</sup> Int Conf Med Image Comput and Comput Ass Intervention (MICCAI): Wksp Content-Based Image Retr for Biomed Image Arch: Achievements, Problems, and Prospects. 2007.  
Xu X, Lee DJ, Antani S, Long LR. A Spine X-ray Image Retrieval System Using Partial Shape Matching. (In Press) IEEE Trans Info Tech Biomed. 2007.  
Stanley RJ, Antani S, Long R, Thoma G, Gupta K, Das M. Size-invariant descriptors for detecting regions of abnormal growth in cervical vertebrae. (In Press) Comput Med Imaging Graphics. 2007.  
Demner-Fushman D, Antani SK, Thoma GR. Automatically Finding Images for Clinical Decision Support. Proc IEEE Int Conf Data Mining: Wksp on Data Mining in Med (DMMed). 2007. 139-44.  
Antani SK, Deserno TM, Long LR, Thoma GR. Geographically distributed complementary Content-Based Image Retrieval Systems for Biomedical Image Informatics. Proc World Cong Med Info (MEDINFO) 2007:493-7  
Hsu W, Antani S, Long LR. SPIRS: A Framework for Content-based Image Retrieval from Large Biomedical Databases. Proc World Cong Med Info (MEDINFO) 2007:188-92.

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- Antani SK, Deserno TM, Long LR, Güld MO, Neve L, Thoma GR. Interfacing global and local CBIR systems for medical image retrieval. Proc Wksp on Med Imaging Research (Bildverarbeitung für die Medizin). 2007:166-71.
- Xue Z, Antani SK, Long LR, Thoma GR. Performance analysis of cervix ROI extraction and specular reflection removal algorithms for uterine cervix image analysis. Proc SPIE Med Imaging. 2007. Vol. 6512:65124I-1-9.
- Deserno TM, Antani SK, Long LR. Gaps in content-based image retrieval. Proc SPIE Med Imaging 2007. Vol. 6516:65160J-1-11.
- Deserno TM, Antani SK, Long LR. Exploring access to scientific literature using content-based image retrieval. Proc SPIE Med Imaging. 2007. Vol. 6516:65160L-1-8.
- Lotenberg S, Greenspan H, Gordon S, Long LR, Jeronimo J, Antani SK. Automatic evaluation of uterine cervix segmentations. Proc SPIE Med Imaging 2007. Vol. 6515:65151J-1-12.
- Long LR, Antani S, Jeronimo, Schiffman M, Bopf, Neve L, Cornwell C, Budihas SR, Thoma GR. Technology for medical education, research, and disease screening by exploitation of biomarkers in a large collection of uterine cervix images. Proc 19<sup>th</sup> Int Symp on Compt-Based Med Sys (CBMS). 2006:826-31.
- Yao J, Antani S, Long R, Thoma G, Zhang Z. Automatic medical image annotation and retrieval using SECC Proc 19<sup>th</sup> Int Symp on Compt-Based Medical Systems (CBMS), 2006:820-5.
- Xu X, Lee DJ, Antani S, Long LR. Pre-indexing for fast partial shape matching of vertebrae images. Proc 19<sup>th</sup> Int Symp on Compt-Based Medical Systems (CBMS), 2006:105-10.
- Gordon S, Zimmerman G, Long LR, Antani S, Jeronimo J, Greenspan H. Content Analysis of Uterine Cervix Images: Initial Steps Towards Content Based Indexing and Retrieval of Cervigrams. Proc SPIE Med Imaging. 2006. Vol. 6144: 61444U-8.
- Jeronimo J, Long LR, Neve L, Bopf M, Antani S, Schiffman M. Digital Tools for Collecting Data from Cervigrams for Research and Training in Colposcopy. J Lower Genital Tract Dis, 2006, 10(1):16-25.
- Antani S, Cheng J, Long J, Long LR, Thoma GR. Medical Validation and CBIR of Spine X-ray Images over the Internet. Proc IS&T/SPIE Electr Imaging: Internet Imaging VII. 2006, Vol. 6061:60610J-1-9.
- Thoma GR, Ford G, Chung M, Vasudevan K, Antani S. Interactive publications: creation and usage. Proc IS&T/SPIE Electronic Imaging: Digital Publishing. 2006.
- Xu X, Lee DJ, Antani SK, and Long LR. Relevance Feedback for Spine X-ray Retrieval. Proc 18<sup>th</sup> Int Symp on Compt-Based Medical Systems, 2005:197-202.
- Long LR, Antani SK, Thoma GR. Image informatics at a national research center. Comput Med Imaging Graphics 29(2):171-193.
- Lee DJ, Antani SK, Xu X, Long LR. Design and evaluation of a curve matching- based spine x-ray image retrieval system. Proc SPIE Med Imaging. Vol. 5748:365-373.
- Antani SK, Natarajan M, Long JL, Long LR, Thoma GR. Developing a comprehensive system for content-based image retrieval of image and text from a national survey. Proc SPIE Med Imaging, Vol. 5748:152-161.
- Antani SK, Long LR, Thoma GR. Applying vertebral boundary semantics to CBIR of digitized spine x-ray images. Proc IS&T/SPIE Electr Imaging: Storage Retr Meth Apps for Multim. 2005. Vol. 5682:98-107.
- Tagare HD, Qian X, Fulbright R, Long R, Antani S. Shape Based Retrieval in NHANES II. Proc 12<sup>th</sup> ACM Int Conf Multim. 2004, 776-9.
- Antani S, Long LR, Thoma G. Content-Based Image Retrieval for Large Biomedical Image Archives Proc 11<sup>th</sup> World Cong Med Info (MEDINFO) 2004:829-33.
- Antani S, Lee DJ, Long LR, Thoma GR. Evaluation of shape similarity measurement methods for spine x-ray images. J Vis Comm Image Representation. Special issue: Multim Datab Manag Sys. 15(3):285-302.
- Qian X, Tagare HD, Fulbright R, Long R, Antani S. Shape Indexing in Medical Image Databases using Pre-Shape Embedding Proc Distributed Databases and processing in Medical Image Computing, Proc 7<sup>th</sup> Int Conf Med Image Computing and Computer Assisted Intervention (MICCAI). 2004:36-44
- Shou J, Antani S, Long LR, Thoma GR. Evaluating Partial Shape Queries for Pathology-based Retrieval of Vertebra. Proc 8<sup>th</sup> World MultiConf Systemics, Cybernetics and Informatics (SCI); 2004. Vol. 12:155-60.
- Xu X, Lee DJ, Antani S, Long LR. Curve Matching for Spine X-ray Image Retrieval using Dynamic Programming. Proc 8<sup>th</sup> World MultiConf Systemics, Cybernetics and Informatics(SCI); 2004:172-6.
- Xu X, Lee DJ, Antani S, Long LR. Partial shape matching of spine x-ray shapes using dynamic programming Proc 17<sup>th</sup> IEEE Symp Compt-Based Med Sys. 2004:97-102.
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- Jeronimo J, Schiffman M, Long LR, Neve L, Antani S. A Tool for Collection of Region Based Data from Uterine Cervix Images for Correlation of Visual and Clinical Variables Related to Cervical Neoplasia. Proc 17<sup>th</sup> IEEE Symp Compt-Based Med Sys. 2004:558-62.
- Stanley RJ, Seetharaman S, Long LR, Antani S, Thoma GR, Downey E. Image analysis techniques for the automated evaluation of subaxial subluxation in cervical spine x-ray images. Proc 17<sup>th</sup> IEEE Symp Compt-Based Med Sys. 2004:204-9.
- Jeronimo J, Herrero R, Ferris DG, Long LR, Antani SK, Schiffman M. Web-Based tools for Research and Education on HPV Natural History based on 100,000 digitized cervical images. Proc 21<sup>st</sup> Int Papillomavirus Conf. 2004.
- Chamarthy P, Stanley RJ, Cizek G, Long R, Antani S, Thoma G. Image analysis techniques for characterizing disc space narrowing in cervical vertebrae interfaces. Comput Med Imaging Graphics, 2004, 28(1-2):39-50
- Antani S, Xu X, Long LR, Thoma GR. Partial Shape Matching for CBIR of Spine X-ray Images. Proc IS&T/SPIE Electr Imaging: Storage Retr Meth App Mult. 2004. Vol. 5307:1-8.
- Antani S, Long LR, Thoma GR, Lee DJ. Anatomical shape representation in spine x-ray images. Proc 3<sup>rd</sup> IASTED Int Conf Visual Imaging Image Proc (VIIP), 2003. Vol. 1:510-5.
- Antani S, Long LR, Thoma G, Stanley RJ. Vertebra Shape Classification using MLP for Content-Based Image Retrieval. Proc Int Joint Conf Neural Net (IJCNN). 2003:160-5.
- Long LR, Antani SK, Thoma GR. A prototype content-based image retrieval system for spine x-rays. Proc 16<sup>th</sup> IEEE Symp Compt-Based Med Sys (CBMS). 2003:156-62.
- Lee DJ, Bates D, Dromey C, Xu X, Antani S. An imaging system correlating lip shapes with tongue contact patterns for speech pathology research. Proc 16<sup>th</sup> IEEE Symp Compt-Based Med Sys (CBMS). 2003:307-13.
- Xu X, Lee DJ, Antani S, Long LR. Localizing contour points for indexing an x-ray image retrieval system. Proc 16<sup>th</sup> IEEE Symp Compt-Based Med Sys. 2003:169-74.
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- Antani S, Long LR, Lee DJ, Thoma GR. Evaluation of shape indexing methods for content-based retrieval of x-ray images. Proc IS&T/SPIE Electr Imaging: Storag Retr Media Datab 2003. Vol. 5021: 405-16.
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- Antani S, Long LR, Thoma GR. A Biomedical Information System for Combined Content-Based Retrieval of Spine X-ray Images and Associated Text Information. Proc 3<sup>rd</sup> Indian Conf Comput Vis, Graphics, Image Proc (ICVGIP). 2002,:242-47.
- Antani S, Kasturi R, and Jain R. A Survey on the use of Patt Recog Methods for Abstraction, Indexing and Retrieval of Images and Video. Patt Recog, 35(4): 945-965, 2002.
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- Antani S, Crandall D, Kasturi R. Robust Extraction of Text in Video. Proc 15<sup>th</sup> IEEE Int Conf Patt Recog (ICPR). 2000:1:1445-9.
- Gandhi T, Kasturi R, Antani S. Application of Planar Motion Segmentation for Scene Text Extraction. Proc 15<sup>th</sup> IEEE Int Conf Patt Recog (ICPR). 2000:1:1831-4.
- Antani S, Gargi U, Kasturi R. A System for Automatic Text Detection in Video. Proc 5<sup>th</sup> Int Conf Doc Anal Recog (ICDAR) 1999:29-32.
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- Gargi U, Antani S, Kasturi R. VADIS: A Video Analysis, Display and Indexing System. Proc 1998 IEEE Conf Comput Vis Patt Recog (CVPR) 1998:965-965

#### **Book Editor**

- Lee DJ, Nutter B, Archibald J, Antani S, Mitra S, Eds. Proc 19<sup>th</sup> IEEE Symp Compt-Based Medical Systems (CBMS), 2006
- Long R, Antani S, Lee DJ, Nutter B, Zhang M, Eds., Proc 17<sup>th</sup> IEEE Symp Compt-Based Medical Systems (CBMS), 2004.
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