

## Curriculum Vitae

### Kanav Kahol

Assistant Professor, Department of Biomedical Informatics, Arizona State University  
Research Faculty, Simulation Education and Training Center, Banner Good Samaritan Medical Center

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### Education

University	Degree	Graduation Date	GPA
<i>Graduate Studies</i>			
Arizona State University (ASU)	PhD, Computer Science, <i>Thesis Advisor.</i> Dr. Sethuraman Panchanathan, <i>Thesis Title.</i> Distal object perception through haptic user interfaces	Spring 2006	4.1/4
Arizona State University	MS, Computer Science, <i>Thesis Advisor.</i> Dr. Sethuraman Panchanathan, <i>Thesis Title.</i> Gesture segmentation in complex motion sequences	Summer 2003	3.7/4
<i>Undergraduate Studies</i>			
Guru Nanak Dev Engineering College, Ludhiana, Punjab India	B. Tech Electronics and Communication Engineering	Spring 2001	3.9/4

### Professional Appointments

- 2007-Present Assistant Professor, Department of Biomedical Informatics, School of Computing and Informatics, Arizona State University
- 2007-Present Research Faculty, Simulation Education and Training Center, Banner Good Samaritan Medical Center, Phoenix, Arizona

2006-2007      Assistant Professor Research, Center for Cognitive Ubiquitous Computing, Arizona State University

2001-2006      Research Associate, Center for Cognitive Ubiquitous Computing, Arizona State University

### **Honors and Awards**

1. Best Poster award for a poster Vankipuram M, Kahol K, Islam G, Cohen T, Patel V., Visualization and Analysis of Medical Errors in Immersive Virtual Environments at Medicine Meets Virtual Reality Conference Jan 19<sup>th</sup>-22<sup>nd</sup> 2009.
2. Best Poster award for a poster Kahol K, Sridaran A., Smith M., Panchanathan S., Physics Based Hybrid Deformation Model for Configurable Haptic Training for Virtual Surgery at Medicine Meets Virtual Reality Conference Jan 29<sup>th</sup>-Feb 1st 2008.
3. Best Presentation Award, International Southwestern Trauma association resident, Jodi Gerdes, Kahol K, Ferrara, J., The effect of fatigue on trauma attending and residents, Southwest Region Trauma Surgeons Association March 2008
4. Best Presentation Award, Regional American College of Surgeons Committee on Trauma resident, Jodi Gerdes, Kahol K, Ferrara, J., The effect of fatigue on trauma attendings, Southwest Region Trauma Surgeons Association Nov 2007
5. Best New Curriculum Award, Veterans Hospital Administration to the team of Phoenix Integrated Residency Program and Simulation Education and training Center, Phoenix
6. Haemonetics Best Paper award, Leyba M, Kahol K et al. The effect of fatigue on cognitive and psychomotor skills, American College of Surgeons 2007
7. Best Poster award for a poster Kahol K, Smith M, Panchanathan, S. Configurable haptic training system for laparoscopy, at Medicine Meets Virtual Reality Conference 15 Feb 6th - Feb 9th 2007.
8. Best Poster award for a poster Kahol K, Smith M, Ferrara J, et al. Gesture Based Hand Movement Analysis and Haptic Feedback for Surgical Training. at Medicine Meets Virtual Reality Conference 14 Jan 24th –Jan 27th 2006.
9. Biography listed in who's who in America 2006.
10. Awarded the second position (\$4000) in Arizona State University Entrepreneur 2003, competition for presenting a business case for technologies in the field of real-time motion capture.
11. Nominated for the best student paper award at the IEEE International Conference on Image Processing 2003, held in Barcelona Spain. The paper titled Gesture Segmentation in Complex Motion Sequences is selected for oral presentation.

### **Grants**

1. Telemedicine and Telesurgery Research Center, Department of Defense, Socially relevant knowledge based telemedicine, \$442,000, PI Dr Kanav Kahol, co-PI Dr Douglas Fridsma,
2. James McDonnell Foundation, Complexity and Error in critical Care, \$5,000,000 Jan 2008-Dec2012 PI Dr Vimla Patel, Co-PI Dr Kanav Kahol, Dr Trevor Cohen

3. ASU Mayo Foundation, Investigation of Spatial Memory Formation and Retention in Patients with Early Alzheimer's Disease, \$39,720 PI Dr Kanav Kahol, Co-PI Dr Sethuraman Panchanathan, Dr Donald Homa, Dr. Richard Caselli, Mayo Clinic Scottsdale
4. National Science Foundation, Information and Intelligent systems, Universal Access, SGER: Incorporation of a psychological basis of haptics in the design of assistive haptic user interfaces, Award Id: 0554698. PI: Dr Sethuraman Panchanathan, Co-PI: Dr Kanav Kahol, Dr Terri Hedgpeth, Dr Donald Homa, Dr Dianne Hansford
5. Banner Good Samaritan Medical Center, Surgical Movement Analysis Project \$11,000, PI Dr Kanav Kahol
6. ASU Support Funds, Haptic user interfaces, \$40,000 PI: Dr. Kanav Kahol
7. Banner Good Samaritan Medical Center, Orthopedic Surgical Simulation Project \$10,684 PI: Dr Kanav Kahol, Dr Alex McLaren

### **Editorial, Organizational and Peer Review Activities**

1. Panel Organizer, *Pre-Operative Warmup: Science, Theory and Implications on Policy and Practice*, At Medicine Meets Virtual Reality Conference 2009.
2. *Guest Editor*, IEEE Transactions on Haptics, 2009 Haptics in Ambient Systems (Co-editor Dr. Vincent Hayward)
3. *Workshop Organizer*, ICST Haptics in Ambient Systems Workshop February 2008 Quebec City, Canada
4. *Panel Chair*, *Pervasive Healthcare*, International Congress on Pervasive Computing and Management, 2009 Delhi, India.
5. *Panel Chair*, *Pre-operative warmup: science, theory and implications on policy and practice*, Medicine meets Virtual Reality 2009 Long Beach CA.
6. *Guest Editor* IEEE Multimedia 2006 Special Issue on Haptic User interfaces in multimedia systems (co-editor Dr Sethuraman Panchanathan)
7. *Member Program Committee*, IEEE Haptic Audio Visual Environment Workshop 2007, 2008
8. *Member Program Committee*, The Second International Conferences on Advances in Computer-Human Interactions 2009
9. *Member*, *International Advisory Board*, International Conference on Pervasive Computing and Management 2008.
10. Member American Association of Certified Plastic Surgeons, Adhoc Virtual Reality Simulator Group
11. NSF Panel Reviewer Small Business Innovation Research (SBIR) & Small Business Technology Transfer (STTR) Programs
12. Reviewer Stemmler Fund, National board of Medical Examiners
13. Reviewer Journal of Biomedical Informatics,
14. Reviewer IEEE Multimedia, IEEE Transactions on Robotics.
15. Reviewer 3rd International Conference on Computing, Communications and Control Technologies CCCT 2005
16. Reviewer ACM SIGACCESS conference on computers and accessibility conference (ASSETS 2006, 2006, 2007)
17. Member Organizational Committee of the Ethics of Entertainment Conference held in Tempe, Arizona Oct 22<sup>nd</sup>-23<sup>rd</sup> 2005.

## **Professional Memberships**

1. Member American Medical Informatics Association
2. Member IEEE computer society, robotics and automation society, computational intelligence society, Task committee on Multimedia 2001-Present
3. Member ACM, SIGCHI member

## **Research Interests**

1. Knowledge based simulations for medical applications.
2. Team Training and Collaborative Work in Medical Environments.
3. Haptic User Interfaces, haptic rendering and haptic devices (*Haptics* refers to science of touch)
4. Neurological and psychological basis of haptics
5. Assistive and rehabilitative systems

## **Students Supervision**

### ***PhD***

Mithra Vankipuram (BMI Expected Graduation 2012)

### ***Masters***

Anusha Sridaran (MS Computer Science Graduation 2007), Mithra Vankipuram (MS Computer Science Graduation Fall 2008), Daniel Villanueva (MS Computer Science Graduation Fall 2008), Foad Saeidi (MS Computer Science Graduation Fall 2008), Aaron Ashby (MS BMI Expected Graduation Fall 2009), Gazi Islam (MS Electrical Engineering Expected Graduation Fall 2009), Kumaraguru Paramasivam (MS Computer Science Expected Graduation Spring 2010).

## **Publications, Presentations and Tutorials**

### ***Tutorials***

ACM Multimedia Conference 2008, tutorial title, "Haptics Technologies: Theory and Applications from a Multimedia Perspective", Ottawa Canada.

### ***PhD Dissertation***

Kahol K, Distal Object Perception through haptic user interfaces, Dissertation Advisor Dr. Sethuraman Panchanathan, Computer Science and Engineering, Arizona State University, Library Call No: LD179.15 2006d .K346

### ***Masters Thesis***

Kahol K. Gesture Segmentation in Complex Motion Sequences, Thesis Masters of Science. Thesis Advisor Dr. Sethuraman Panchanathan, Thesis Committee: Dr. Thanassis Rikakis, Dr. Fourouzan Golshani, Dr. Hari Sundaram, Computer Science, Arizona State University Library Call No LD179.15 2003 .K346

### ***Invited Presentations***

1. Kahol K, Keynote Presentation Haptic Ambient Systems, IEEE Haptics Audio Visual Environments Conference, Ottawa Canada, Oct 18-19 2008
2. Kahol K, invited presentation, Defense Science Board on Improvised Explosive Devices II 2008
3. Kahol K, Invited Panelist, "Designing Cognitive Simulators" in panel titled *Cognition and Surgery* at Medicine Meets Virtual Reality Long Beach California February 2008.
4. Kahol K, "Haptic user interfaces for assistance, rehabilitation and learning", Northern Arizona University E Learn Conference May 21-24 2007.
5. Kahol K, Smith M, "Watch One, Do one, Teach one Never Again", Academic Excellence Day Arizona Medical Education Consortium, May 2nd 2007.
6. Kahol K, Smith, M. "Into the Future of Surgical training", Grand Rounds, OBGYN Banner Good Samaritan Medical Center, Phoenix Arizona 850016
7. Kahol K, "Haptic user interfaces for assistance, rehabilitation and learning" SIGMA XI society invited Lecture March 27th 2007.
8. Kahol K, Smith, M. "Surgical training and Simulation", Grand Rounds, General Surgery Banner Good Samaritan Medical Center, Phoenix Arizona 850016
9. Kahol K., "Designing haptic user interfaces for medical applications", Industrial Designers Society of America National Conference and Design Gallery held in Washington DC August 24th-27th 2005.
10. Kahol K., "Distal Object Perception Through Haptic User Interfaces", Math and Cognition Seminar, Arizona State University January 31st 2006.

### **Refereed Journals**

1. Kahol K., Tripathi P., Panchanathan S., Documenting Motion Sequences: Development of a Personalized Annotation System, published in IEEE Multimedia Magazine Jan-Mar 2006 13(1) Pg 37-45.
2. K Kahol, P Tripathi, S Panchanathan, Recognizing Whole Body Movements and Gestures through Activities in Human Anatomy, International Journal on Systemics, cybernetics and Informatics, Vol 3 Jan 2006 25-32 ISSN 0973-4864
3. K Kahol, S Panchanathan, Distal Object Perception through Haptic User Interfaces for individuals who are blind, ACM SIGACCESS Newsletter 84 30-33 2006.
4. Kahol K., Tripathi P., McDaniel T., Bratton L., and Panchanathan S., Modeling context in haptic perception, visualization and rendering, ACM Transactions on Multimedia Computing, Communications and Applications, vol. 2, pp. 219-240, 2006.
5. Kahol K., Panchanathan S., Smith M., Human Centered Computing in Surgical Environments, International Journal on Systemics, cybernetics and Informatics, Jan 2007, Pg 9-15.
6. Kahol K., Panchanathan S., "Neurocognitively inspired haptic user interfaces", Springer Journal of Multimedia Tools and Applications, vol 37(1), pp 15-38 2007.
7. Kahol K., Leyba M., Deka M., Deka V., Mayes S., Smith M., Ferrara J., and Panchanathan S., " Effect of Fatigue on Psychomotor and Cognitive Skills," American Journal of Surgery, vol. 195(2), pp 195-204, 2008

8. Kahol K., Gerdes J., Smith M., Leyba M., Ferrara J., "The effect of fatigue on cognitive and psychomotor skills of trauma residents and attending surgeons", accepted for publication in American Journal of Surgery 2008.
9. McDaniel T., Kahol K., Panchanathan S., "An Interactive Wearable Assistive Device for Individuals Who Are Blind for Color Perception", accepted for publication at Springer Journal on Universal Access and Information Systems
10. Homa D., Kahol K., Tripathi P., Bratton L., Panchanathan S., " Haptic concepts in the blind", accepted for publication at Perception and Psychophysics.

### ***Journals submitted***

1. Kahol K, Smith M, "Cognitive surgical simulators", submitted for review at Springer Journal for Biomedical Informatics.
2. Vankipuram M., Kahol K., McLaren A., Kauvar L., Panchanathan S., "Virtual Multimodal Surgical Training Environment for Orthopedic Drilling Skill " IEEE Transactions on Haptics.
3. Villanueva D., Kahol K., Smith M., Panchanathan S., "Design and Evaluation of Collaborative Game Based Knowledge Acquisition Systems for Specialized Community of Practice", submitted IEEE Computer Magazine
4. Kahol K., Saeidi F., Panchanathan S., "Prediction of errors before they happen through information fusion and hidden markov models", submitted IEEE Transactions on Pattern Analysis and Machine Intelligence.

### ***Refereed Book Sections***

1. Kahol K, Tripathi P, McDaniel T, Panchanathan S. Modeling Context in Haptic Perception, Rendering and Visualization. Advanced in Multimedia Information Systems Lecture Notes in Computer Science, Vol. 3665. Berlin: Springer, 2005. pp. 102-114.
2. Kahol K, French J, Panchanathan S, Smith M. Augmented Virtual Reality for Laparoscopic Surgical Tool Training. Human-Computer Interaction. HCI Applications and Services Lecture Notes in Computer Science, Vol. 4553. Berlin: Springer, 2007. pp. 459-467.
3. Kahol K, Smith M, Mayes S, et al. The Effect of Fatigue on Cognitive and Psychomotor Skills of Surgical Residents. In Schmorow D, ed. Foundations of Augmented Cognition, Lecture Notes in Computer Science, Vol. 4565. Berlin: Springer, 2007. pp. 304-313.
4. McDaniel T, Kahol K, Panchanathan S. An Interactive Wearable Assistive Device for Individuals Who Are Blind for Color Perception. Universal Access in Human Computer Interaction. Coping with Diversity, Lecture Notes in Computer Science, Vol. 4554. Berlin: Springer, 2007. pp. 751-760.
5. Tripathi P, Kahol K, Sridaran A, Panchanathan S. A Model for Visio-Haptic Attention for Efficient Resource Allocation in Multimodal Environments In Schmorow D, ed. Foundations of Augmented Cognition, Lecture Notes in Computer Science, Vol. 4565. Berlin, Germany: Springer, 2007. pp. 329-336.

### ***Refereed Conferences and Workshops***

1. Black J, Gargasha M, Kahol K, et al. Framework for performance evaluation of face recognition algorithms. SPIE--Volume Internet Multimedia Management Systems III, 2002. pp. 163-174.
2. Black JA, Jr., Kahol K, Kuchi P, Panchanathan S. The use of lexical basis functions to characterize faces, and to measure their perceived similarity. Proceedings of the 9th International Conference on Neural Information Processing, 2002. ICONIP '02., Vol. 3. Singapore: IEEE, 2002. pp. 1201-1205 vol.3.
3. Black J, Kahol K, Kuchi P, et al. Characterizing the high-level content of natural images using lexical basis functions. SPIE Human Vision and Electronic Imaging VIII: SPIE, 2003. pp. 378-391.
4. Black J, Kahol K, Tripathi P, Panchanathan S. Visual Concept Derivation from Natural Scenery Images Using Lexical Basis Functions, Multidimensional Scaling, and Density Clustering. 1st Indian International Conference on Artificial Intelligence, IICAI 2003. Hyderabad, India, 2003. pp. 5-17.
5. Kahol K, Tripathi P, Panchanathan S. Gesture Segmentation in Complex Motion Sequences. IEEE International Conference on Image Processing, Vol. II. Barcelona, Spain: IEEE, 2003. pp. 105-108.
6. Panchanathan S, Black J, Tripathi P, Kahol K. Cognitive Multimedia Computing. International Symposium on Information Science and Electrical Engineering. Fukoka, Japan, 2003. pp. 1-7.
7. Black J, Kahol K, Tripathi P, et al. Indexing natural images for retrieval based on Kansei factors. SPIE Human Vision and Electronic Imaging, 2004. pp. 363-375.
8. Kahol K, Tripathi P, Panchanathan S. Automated gesture segmentation from dance sequences. Sixth IEEE International Conference on Automatic Face and Gesture Recognition, 2004. Proceedings. . Seoul, South Korea, 2004. pp. 883-888.
9. Kahol K, Tripathi P, Panchanathan S. Computational analysis of mannerism gestures. Proceedings of the 17th International Conference on Pattern Recognition, 2004. ICPR 2004. , Vol. 3, 2004. pp. 946-949 Vol.3.
10. Kahol K, Tripathi P, Panchanathan S, Goldberg M. Formalizing cognitive and motor strategy of haptic exploratory movements of individuals who are blind. The 3rd IEEE International Workshop on Haptic, Audio and Visual Environments and Their Applications, 2004. HAVE 2004. Proceedings., 2004. pp. 25-30.
11. Kahol K, Tripathi P, McDaniel T, Panchanathan S. Rendering block diagrams accessible through audio haptic interface. IEEE First International workshop on computer vision applications for the visually impaired held in conjunction with IEEE International Conference on Computer Vision and Pattern Recognition. San Diego, 2005. pp. 8-13.
12. Kahol K, Tripathi P, Panchanathan S. Recognizing whole body movements and gestures through activities in human anatomy. International Conference on systemics, cybernetics and informatics. Hyderabad, India: Pentagram Publications, 2005. pp. 45-49.
13. Kahol K, Tripathi P, Panchanathan S. Hand anatomy based modeling of manual haptic gestures. International Conference on Cognition and Recognition. Mysore, India, 2005. pp. 67-76.
14. Kahol K, Tripathi P, Panchanathan S. Haptic user interfaces: Design, testing and evaluation of haptic cueing systems to convey shape, weight, material and texture information. International Conference on Human computer Interfaces ISBN 0-8058-5807-5, Vol. 5. Las Vegas, NV, 2005.
15. Kahol K, Tripathi P, Panchanathan S. Tactile cueing in haptic visualization. ACM Computer Human Interaction Workshop on Haptic Visualization. Portland, Oregon, 2005. pp. 2-6.

16. McDaniel TL, Kahol K, Tripathi P, et al. A methodology to establish ground truth for computer vision algorithms to estimate haptic features from visual images. IEEE International Workshop on Haptic Audio Visual Environments and their Applications, 2005., 2005. pp. 94-99.
17. Tripathi P, Kahol K, Panchanathan S. Rehabilitation of patients with hemispatial neglect using visual-haptic feedback in virtual reality environment. International Conference on Human Computer Interfaces ISBN 0-8058-5807-5. Las Vegas, NV, 2005.
18. Kahol K, French J, Bratton L, Panchanathan S. Learning and perceiving colors haptically. Proceedings of the 8th international ACM SIGACCESS conference on Computers and accessibility. Portland, Oregon, USA: ACM, 2006.
19. Kahol K, French J, Cooper G, et al. Evaluating the role of haptic feedback in multimodal interfaces through EEG analysis. Augmented Cognition in conjunction in Human Factors and Ergonomics Society, 2006. pp. 45-52.
20. Kahol K, Krishnan C, Balasubramanian V, et al. Measuring movement expertise in surgical tasks. Proceedings of the 14th annual ACM international conference on Multimedia. Santa Barbara, CA, USA: ACM, 2006.
21. Kahol K, McDaniel T, Panchanathan S. Methodology for Efficient Perception in Exclusively Haptic Environments. IEEE International Workshop on haptic Audio Visual Environments and their Applications, 2006. HAVE 2006. , 2006. pp. 140-145.
22. Kahol K, Panchanathan S. Biologically Inspired Haptic Virtual Reality. International Conference on Cognitive Systems. New Delhi, India: NIIT, 2006. pp. 34-43.
23. McDaniel TL, Kahol K, Panchanathan S. A Bayesian Approach to Visual Size Classification of Everyday Objects. 18th International Conference on Pattern Recognition, 2006. ICPR 2006. , Vol. 2, 2006. pp. 255-259.
24. Kahol K, Smith M. Neuro-cognitively Designed Dynamic Simulations For Laparoscopic Surgical Skills. MODSIM. Virginia Beach, 2007. pp. 34-39.
25. Sridaran A, Hansford D, Kahol K, Panchanathan S. Surface Interrogation Methods for Haptic Rendering of Virtual Objects. Second Joint EuroHaptics Conference, 2007 and Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems. World Haptics 2007. , 2007. pp. 237-242.
26. Kahol K, Crews D. Linguistic Analysis of Golf Movement: Towards motor plan driven analysis and instruction. In Crews D, Lutz R, eds. Science and Golf V. Tempe, Arizona: Ironwood Lithographers, 2008. pp. 387-394.
27. Kahol K, Vankipuram M., Panchanathan S., " Hand motion expertise analysis using dynamic hierarchical activity modeling and isomap", accepted for publication at IEEE IAPR International Conference on pattern Recognition 2008
28. Vankipuram M, Kahol K, McLaren A, Panchanathan S, " Virtual Training to resolve visio-motor conflicts in surgical environments" accepted for publication at IEEE Workshop on Haptics Audio Visual environments 2008
29. Briggs K, Kappenman W, Kahol K, Greenlee J, Johnson K, Smith ML, "Scientific Framework for Selecting Simulation Games for Rehabilitation and Assistance: A case study with the Wii®", accepted for publication at Medicine Meets Virtual Reality 17 2009

30. Vankipuram M, Kahol K, Cohen T, Patel VL, "Visualization and Analysis of Medical Errors in Immersive Virtual Environments", accepted for publication at Medicine Meets Virtual Reality 17 2009
31. Noe C, Chu G., Smith ML, Kahol K, " The effect of Central venous catheter placement simulation training on patient safety", accepted for publication at Medicine Meets Virtual Reality 17 2009
32. Kahol K, Ghaemmaghami V, Szafranski C, Frankin S, Smith ML, Ferrara J, "The effect of noise and distractions on surgeons proficiency: An educational perspective", accepted for publication at Medicine Meets Virtual Reality 17 2009

***Conference papers submitted for review***

1. Noe C, Chu G., Smith ML, Kahol K, " The effect of Central venous catheter placement simulation training on patient safety", submitted for review at International Medical Simulation In Healthcare Meeting 2009
2. Vankipuram M, Kahol K, "DB Scan based volumetric rendering" submitted for review at IEEE Haptics Symposium 2009.

***Presentations, Posters***

1. Homa D, Kahol K, Tripathi P, et al. Haptic concepts in the blind Psychonomics, 2005.
2. Panchanathan S, Kahol K, Tripathi P, McDaniel T. Conversion of visual data into haptic information. IEEE Sensor, Signal and Information Processing Workshop. Tempe, Arizona, 2005.
3. Kahol K. Distal object perception through haptic user interfaces-Doctoral Consortium Summary SIGACCESS Access. Comput. Baltimore, 2006. pp. 20-21.
4. Kahol K, Homa D, Tripathi P, et al. Multidimensional scaling of commonplace object by the blind Psychonomics, 2006.
5. Kahol K, Smith M, Tripathi P, et al. Gesture Based Hand Movement Analysis and Haptic Feedback for Surgical Training Medicine Meets Virtual Reality. Long Beach, CA, 2006.
6. Deka M, Leyba M, Kahol K, et al. The effect of fatigue on psychomotor and cognitive skills of surgical residents. 5th Annual Meeting of American College of Obstetricians and Gynecologists. San Diego, CA, 2007.
7. Kahol K. Cognitive Design of Simulation Training. Medicine Meets Virtual Reality. Long Beach, CA, 2007.
8. Kahol K, McDaniel T, Smith M, et al. The effect of real-time visualization of skill on surgical training. Medicine Meets Virtual Reality. Long Beach, CA, 2007.
9. Kahol K, Smith M, Panchanathan S. Configurable Haptic Training System for Laparoscopy (Best Poster). Medicine Meets Virtual Reality. Long Beach. CA, 2007.
10. Leyba M, Kahol K, Smith M, et al. The effect of fatigue on psychomotor and cognitive skills of surgical residents Annual Meeting of American College of Surgeons 2007. SELECTED AS BEST RESIDENT PAPER AWARD HAEMONETICS BEST PAPER AWARD Washington DC, 2007.

11. Mayes S, Deka V, Kahol K, et al. Evaluation of Cognitive and Psychomotor Skills of Surgical Residents at Various Stages in Residency. 5th Annual Meeting of American College of Obstetricians and Gynecologists. San Diego, 2007.
12. Kahol K, Smith M. Surgeons on Wii. Medicine Meets Virtual Reality. Long Beach, CA, 2008.
13. Kahol K, Sridaran A, Smith M, Panchanathan S. Physics Based Hybrid Deformation Model for Configurable Haptic Training for Virtual Surgery (Best Poster Award). Medicine Meets Virtual Reality. Long Beach, CA, 2008.
14. Villanueva D, Kahol K, Smith M, Panchanathan S. Collaborative Surgical Proficiency initiative: [www.ratethesurgeons.com](http://www.ratethesurgeons.com). Medicine meets virtual Reality. Long Beach, CA, 2008.
15. Kahol K, Smith M, Satava R. Pre-operative warm-up using simulators. Duration of effectiveness decreases over time. SAGES Scientific Session, Phoenix, PA, 2009.
16. Vankipuram M, Kahol K, Islam G, Cohen T, Patel V. Visualization and Analysis of Medical Errors in Immersive Virtual Environments. Medicine Meets Virtual Reality. Long Beach, CA, 2009.

### ***Media Coverage***

**Surgeons on Wii:** News coverage in New Scientist Magazine, Arizona Republic, Wall Street Journal, BBC News, Telegraph, Wired News, ABC News, Fox News, MedGadgets (**71 news articles total with international coverage**) Television coverage with ABC 15, CBS 5, Fox 10

[www.ratethesurgeons.com](http://www.ratethesurgeons.com) News coverage CBS 5.

Face Recognition Research: CBS 5 (2002)

### **Teaching**

#### ***Courses taught***

1. Human Computer Interaction in Biomedicine 2007, 2009
2. Haptic user interfaces 2006
3. Multimedia Information Systems 2004, 2005

#### ***Courses designed***

1. Human Computer Interaction in Biomedicine 2007
2. Haptic user interfaces 2006
3. Redesign of curriculum for multimedia information systems

### ***Patents, licenses and Intellectual Property***

1. Kahol, K., Panchanathan, S., "HAPTIC-enabled Simulations for Cognitive Training", Regular, United States, 12/027,969, (application: February 7, 2008).

2. Kahol K., Tripathi P., Panchanathan S., "distal object perception through haptic user interfaces", Regular United States, 11/804,864 (application May 2007)
3. Kahol K., Atwood W., "Gaming adaptations for surgical simulation", licensing being negotiated with a leading simulation company.