Irfan Essa

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■ Most entries in this CV are listed in Reverse Chronological order, with the most recent items at the bottom. Additional details and papers available from the website http://www.irfanessa.com ■

■ [Updated: March 7, 2023] ■

Table of Contents

Irfan Essa, Short BIO

Irfan Essa is a Distinguished Professor in the School of Interactive Computing (IC) and Senior Associate Dean in the College of Computing (CoC) at the Georgia Institute of Technology (GA Tech) in Atlanta, Georgia, USA. He also serves as the Executive Director of an Interdisciplinary Research Center on Machine Learning at GA Tech (ML@GT), which he founded in 2016 to develop a research and educational effort on Machine Learning at the Institute level. Currently, he is on partial leave from GA Tech, working as a Senior Research Scientist at Google (Research) and Site Lead for Google Research, Atlanta.

Professor Essa works in the areas of Computer Vision, Machine Learning, Computer Graphics, Computational Perception, Robotics and Computer Animation, Machine Learning, and Social Computing, with potential impact on Artificial Intelligence, Video Analysis, and Production (*e.g.*, Computational Photography & Video, Image-based Modeling, and Rendering, *etc.*) Human-Computer Interaction, Computational Behavioral/Social Sciences, and Computational Journalism research. He has published over 150 scholarly articles in leading journals, and conference venues on these topics and several of his papers have also won best paper awards. He has been awarded the NSF CAREER and was elected to the grade of IEEE Fellow. He has held extended research positions with Disney Research and Google Research and also was an Adjunct Faculty Member at Carnegie Mellon's Robotics Institute. He joined GA Tech Faculty in 1996 after he earned his MS (1990) and Ph.D. (1994) and held a research faculty position at the Massachusetts Institute of Technology (Media Lab) [1988-1996].

Google Scholar Page. **H-index = 66** (accessed March 1, 2023).

I. EARNED DEGREES

Degree	Year	University	Field
Ph.D.	1995	Massachusetts Institute of Technology, Cambridge, MA., USA.	*Media Arts & Sciences* (from the MIT Media Labs)
S.M.	1990	Massachusetts Institute of Technology, Cambridge, MA., USA.	*Engineering*
B.S.	1988	Illinois Institute of Technology, Chicago, IL., USA.	*Engineering*

II. EMPLOYMENT HISTORY

Title	Organization	Years
Distinguished Professor	School of Interactive Computing / College of Computing Georgia Institute of Technology, Atlanta, GA., USA	*2018-Present*
Senior Research Scientist	Google Inc. Research and Machine Intelligence / Machine Perception Mountain View, CA, USA	*2018-Present*
Executive Director	Machine Learning Center @ Georgia Tech (ML@GT) Georgia Institute of Technology, Atlanta, GA., USA	*2016-Present*
Senior Associate Dean	College of Computing (CoC) Georgia Institute of Technology, Atlanta, GA., USA	*2014-Present*
Adjunct Professor	School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA., USA	*1998-Present*
Professor	School of Interactive Computing / College of Computing Georgia Institute of Technology, Atlanta, GA., USA	*2008-2018*
Researcher/ Consultant	Google Research Mountain View, CA, USA & Atlanta, GA, USA	*2011-2018*
Adjunct Professor	Robotics Institute Carnegie Mellon University, Pittsburgh, PA., USA	*2008-2009*
Visiting Scientist	Disney Research Pittsburgh, PA., USA	*2008-2009*
Associate Professor	School of Interactive Computing / College of Computing Georgia Institute of Technology, Atlanta, GA., USA	*2002-2008*
Assistant Professor	College of Computing Georgia Institute of Technology, Atlanta, GA., USA	*1996-2002*

Research Scholar/Scientist	Media Laboratory, Perceptual Computing Section, Massachusetts Institute of Technology, Cambridge, MA., USA	*1994-1996*
Research Assistant	Media Laboratory, Perceptual Computing Section, Massachusetts Institute of Technology, Cambridge, MA., USA.	*1988-1994*
Researcher	Vision, Graphics and Visualization Group, Thinking Machines Corporation, Cambridge, MA., USA	*1990*

ADMINISTRATIVE POSITIONS

Title	Organization	Years
Senior Associate Dean	Georgia Tech College of Computing Represent the College at the Institute and Externally. Responsible for Strategic Planning. On Leadership Team and Dean's Cabinet.	*2019-Present*
Research Site Lead	Google Proposed and established the Research Office in Atlanta.	*2019-Present*
Associate Dean Research and Space Planning	Georgia Tech College of Computing Represent the College's Research Portfolio at the Institute and Externally. Responsible for Space Planning. On Leadership Team and Dean's Cabinet.	*2014-2019*
Executive Director (Founding)	Machine Learning Center @ Georgia Tech (ML@GT) Directing a new Center for Machine Learning. Helped establish this new center 2014-2016. Now the Center serves as an Interdisciplinary Research Center (IRC) for all of Georgia Tech.	*2016-Present*
Associate Dean Off-Campus and Special Initiatives	Georgia Tech College of Computing Directing International, Distance Learning and Online Programs and other Special Initiatives for the College. On Leadership Team and Dean's Cabinet.	*2014-Present*
Director Off-Campus Initiatives	Georgia Tech College of Computing Directing all International, Distance Learning and Online Initiatives.	*2012-2014*
Associate Director Research	GVU Center at Georgia Tech Managed external and internal research initiatives.	*2004-2005*
Director	Georgia Tech, College of Computing's Summer Internship Program for Underrepresented Minorities	*1998-2000*

OTHER POSITIONS

Title	Organization	Years
Founding Director	Computational Perception Laboratory at Georgia Tech Currently, Co-Directing this Research Lab with 5 other faculty	*1996-Present*
Founding Director	Computational Journalism Initiative at Georgia Tech Founded in 2008 to study Journalism in context of technology.	*2008-Present*
Founding Member	Aware Home Research Initiative at Georgia Tech	*1999-Present*

III. HONORS AND AWARDS

Research Honors and Awards

1. Imlay Fellowship, 1996-98. Awarded as a Jr Faculty Chair by GA Tech.
2. Edenfield Faculty Fellowship 1997. Awarded as a Project Seed Funding by GA Tech.
3. National Science Foundation, CAREER Award, 2000.
4. Georgia Tech. College of Computing, Outstanding Junior Faculty Research Award, 2000.
5. Georgia Tech. College of Computing, Outstanding Senior Faculty Research Award, 2005.
6. Georgia Tech. GVU Center, GVU Impact Award. One of 15 awards, given to individuals who have made significant contributions to GVU's identity, community and influence at Georgia Tech and in the world, for "research and educational activities surrounding digital special effects and image-based computational expression." 2007.
7. Raytheon Faculty Fellowship 2009 (with Guy Lebanon). Awarded as a Project Seed Funding by GA Tech.
8. Awarded Best Research Paper Award (2011) by Google Research for paper on Video Segmentation (B.2.75).
9. Elected to IEEE Fellow Grade 2011.
10. Awarded Best Research Paper Award (2012) by Google Research for paper on Video Stabilization (B.2.80).
11. Awarded Best Paper in International Conference on Computational Photography (ICCP) 2012 (B.2.82).
12. Awarded Best Paper in ECCV 2012 Workshop on Web-scale Vision and Social Media 2012 (B.2.86).
13. Awarded Best Paper (Honorable Mention) in MICCAI 2014 Workshop on Modeling and Monitoring of Computer Assisted Interventions (M2CAI) (B.2.100).
14. Awared Best Paper in IEEE Winter Conference on Applications of Computer Vision (WACV) 2015 (B.2.106).
15. Best Short Paper Award in ACM Conference on Intelligence User Interfaces (IUI) 2015 (B.2.107).

Teaching Honors and Awards

1. Georgia Tech. Outstanding use of Innovative Technologies in Teaching Award, 2000.
2. Georgia Tech. College of Computing's William A. "gus" Baird Faculty Teaching Award, 2002.

Service Honors and Awards

1. 1999 Dean's Award for Service to the College of Computing, GA Tech.
2. 2011 Outstanding Faculty Mentor Award by the College of Computing, GA Tech.
3. 2017 Dean's Award for Service to the College of Computing, GA Tech.

IV. RESEARCH AND CREATIVE SCHOLARSHIP

■ *All publications listed in reverse chronological order, with recent publications showing at the end.* ***Advisee (Student, Post-Doc)*** *and Professor* ***Essa****'s name highlighted in* ***bold.*** ■

A. Published Books, Parts of Books and Edited Volumes

A.1. Books

A.2. Refereed Book Chapters

A.2.1 **Essa, I.**, S. Sclaroff, and A. Pentland. (1993) "Physically-based Modeling for Graphics and Vision." Chapter in *Directions in Geometric Computing*, pp. 161–196, R. Martin (Editor), Information-Geometers, UK., 1993.

A.2.2 Pentland, A., S. Sclaroff, B. Horowitz, and **I. Essa**. (1993) "Modal Descriptions for Modeling, Recognition and Tracking." *In Three-Dimensional Object Recognition Systems*, Vol. I, A K. Jain and P. J. Flynn (Editors), pp. 423–445, Elsevier Science Publishers, 1993.

A.2.3 Pentland, A., **I. Essa**, T. Darrell, A. Azarbayejani and S. Sclaroff. (1996) "Visually Guided Animation." In *Interactive Computer Animation*, N. Thalmann and D. Thalmann (Editors), pp. 143–164, Prentice-Hall, 1996

A.2.4 **Essa, I.** and Alex Pentland. (1997) "Facial Expression Recognition Using Image Motion." In *Motion Based Recognition*, M. Shah and R. Jain (Editors), Chapter 12 , Kluwer Academic Publishers, Computational Imaging and Vision Series, 1997.

A.2.5 **Essa, I.** (2004) "Facial Expressions." In *Encyclopedia on Human Computer Interaction* , W. Bainbridge (Editor) Berkshire Publishing.

A.2.6 **Essa, I.** and Aaron Bobick. (2005) "Simulation Humans." In *Organizational Simulation*, W. Rouse and K. Boff (Editors), Wiley Publishers.

A.2.7 **Thomaz, E.**, **I. Essa** and G. Abowd (2017), "Challenges and Opportunities in Automated Detection of Eating Activity," Chapter in *Mobile Health Sensors, Analytic Methods, and Application*, J. M. Rehg, S, A. Murphy amd S. Kumar (Editors), Springer, 2017.

A.3. Edited Proceedings and Collections

A.3.1 Proceedings of Second International Conference on Automatic Face and Gesture Recognition (Program Chair), Killington, VT., USA. IEEE Computer Society Press, October, 1996.

A.3.2 Proceedings of IEEE Workshop on Nonrigid and Articulated Motion, (Program Co-chair), San Juan, Puerto Rico, IEEE Computer Society Press, June 1997.

A.3.3 Proceedings of IEEE Conference on Computer Vision and Pattern Recognition, (Program Co-chair), Miami, FL, USA, IEEE Computer Society Press, June 2009.

A.4. Thesis

A.4.1 **Essa, I.** (1990), "Contact Detection, Collision Response and Friction for Physically-based Virtual World Modeling and Vision Systems." *S.M. Thesis*, Massachusetts Institute of Technology, June 1990.

A.4.2 **Essa, I.** (1995), "Analysis, Interpretation, and Synthesis of Facial Expressions." *Ph.D. Thesis*, Massachusetts Institute of Technology, February 1995.

B. Refereed Publications And Submitted Articles

B.1. Published Journal Papers (refereed)

B.1.1 Pentland A., **I. Essa**, M. Friedmann, B. Horowitz, and T. Starner, (1990) "The ThingWorld Modeling System: Virtual Sculpting by Modal Forces", In *ACM Computer Graphics*, 24(2), pp. 143-144, ACM Press, March 1990.

B.1.2 **Essa, I.**, S. Sclaroff, and A. Pentland. (1992) "A Unified Approach for Physical and Geometric Modeling for Graphics and Animation." In *Computer Graphics Forum, The International Journal of the Eurographics Association*, Vol. 11 (3), C129-C138, C470–C471, Cambridge, England, September 1992.

B.1.3 Darrell, T., **I. Essa**, and A. Pentland (1996). "Task-specific Gesture Modeling using Interpolated Views." In *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Volume 18 (12), pp. 1236–1242, IEEE Computer Society Press, December 1996.

B.1.4 **Essa, I.**, and A. Pentland. (1997) "Coding, Analysis, Interpretation and Recognition of Facial Expressions." In *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Volume 19 (7), pp. 757–763, IEEE Computer Society Press, July, 1997.

B.1.5 **Essa, I.** (2000) "Computers Seeing People", in *AI Magazine,* Volume 20 (1), pp. 69–82, AAAI Press, Summer 1999.

B.1.6 **Essa, I.** (2000) "Ubiquitous Sensing for Smart and Aware Environments", In *IEEE Personal Communications, Special Issue on Networking the Physical World,* Volume 7(5), pp. 47–49, IEEE Press. October 2000..

B.1.7 **Schödl, A.**, R. Szeliski, D. Salesin, and **I. Essa**. (2000) "Video Textures", In *ACM SIGGRAPH 2000*, pp. 489-498, ACM Press, New Orleans, LA, August 2000.

B.1.8 **Brostow, G.**, and **I. Essa**. (2001) "Image-based Motion Blur for Stop Motion Animation" In *ACM SIGGRAPH 2001*, Los Angeles, CA., USA. August 2001.

B.1.9 **Kwatra, V.**, **Schödl, A.**, **Essa, I.**, Turk, G., & Bobick, A. (2003). "Graphcut textures: Image and video synthesis using graph cuts." *ACM Transactions on Graphics, SIGGRAPH 2003 Special Issue*, *22*(3), 277–286. ACM Press.

B.1.10 **Sukel, K.E.**, Catrambone, R., **I. Essa** and **Brostow, G.**, (2003) "Presenting movement in a computer-based dance tutor." *International Journal of Human-Computer Interaction*, Volume 15(3), 433–452.

B.1.11 Angelov, Y., Ramachandran, U., Mackenzie, K., Rehg, J. and **Essa, I.**(2005) "Optimizing Stream-Oriented Applications for Cluster Execution." *Journal of Parallel and Distributed Computing*.

B.1.12 **Kwatra, V.**, **Essa, I.**, Bobick, A. and **Kwatra, N.** (2005) "Texture Optimization for Example-based Synthesis." *ACM Transactions on Graphics, SIGGRAPH 2005 Special Issue* ACM Press.

B.1.13 Rogers, W., **I. Essa**, A. Fisk, (2007) "Designing a Technology Coach" In *Ergonomics in Design, Journal of the Human Factors and Ergonomics Society*.October 2007

B.1.14 Rusu. R., J. Bandouch, **F. Meier**, **I. Essa** and M. Beetz (2009) ÃŠHuman Action Recognition Using Global Point Feature Histograms and Action ShapesÃŞ, in Journal of Advanced Robotics, volume 23, pages 1873ÃŘ1908, Koninklijke Brill NV, Leiden and The Robotics Society of Japan, 2009.

B.1.15 **Hamid R.**, S. Maddi, A. Johnson, A. Bobick, **I. Essa** and C. Isbell (2009) "A Novel Sequence Representation for Unsupervised Analysis of Human Activities," In *Artificial Intelligence Journal*, 2009.

B.1.16 **Kwatra. N.**, C. Wojtan, M. Carlson, **I. Essa**, P. J. Mucha, G. Turk (2010) "Fluid Simulation with Articulated Bodies," In *IEEE Transactions on Visualization and Computer Graphics*, January/February 2010 (vol. 16 no. 1), pp 70–80, 2010.

B.1.17 **Yin, P.**, A. Criminisi, J. Winn, and **I. Essa** (2011) "Bilayer Segmentation of Webcam Videos Using Tree-based Classifiers", In *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2011.

B.1.18 **Kim, K.**, S. Oh, J. Lee, and **I. Essa** (2011). "Augmenting aerial earth maps with dynamic information from videos". In *Virtual Reality Journal*, Springer, March 2011.

B.1.19 **Hamid, R.**, R. Kumar, J. Hodgins, and **I. Essa** (2013), "A Visualization Framework for Team Sports Captured using Multiple Static Cameras," In *Journal of Computer Vision and Image Understanding* p. -, 2013.

B.1.20 **Zia, A.**, Y. Sharma, V. Bettadapura, E. L. Sarin, T. Ploetz, M. A. Clements, and **I. Essa** (2016), "Automated video-based assessment of surgical skills for training and evaluation in medical schools" in the *International Journal of Computer Assisted Radiology and Surgery*, vol. 11, iss. 9, pp. 1623-1636, 2016.

B.1.21 **Zia, A.**, Y. Sharma, V. Bettadapura, E. L. Sarin, and **I. Essa** (2018), "Video and Accelerometer-Based Motion Analysis for Automated Surgical Skills Assessment" in the *International Journal of Computer Assisted Radiology and Surgery*, volume 13, issue 3, pp. 443-455, 2018.

B.1.22 **Zia, A.** and **I. Essa** (2018), "Automated surgical skill assessment in RMIS training," in the *International Journal of Computer Assisted Radiology and Surgery*, vol. 13, issue 5, pp. 731-739, 2018.

B.1.23 **Zia, A.**, Guo, L. Zhou, **I. Essa**and A. Jarc (2019), "Novel evaluation of surgical activity recognition models using task-based efficiency metrics," In the *International Journal of Computer Assisted Radiology and Surgery* 2019.

B.1.24 Ghogawala, Z., M. Dunbar, and **I. Essa**(2019), "Artificial Intelligence for the Treatment of Lumbar Spondylolisthesis," *Neurosurgery Clinics of North America*, vol. 30, iss. 3, pp. 383-389, 2019.

B.1.25 **Zia, A.**, L. Guo, L. Zhou, **I. Essa**, and A. Jarc (2019), "Novel evaluation of surgical activity recognition models using task-based efficiency metrics," *International Journal of Computer Assisted Radiology and Surgery*, 2019.

B.1.26 Ghogawala, Z., M. Dunbar, and **I. Essa** (2019), "Lumbar spondylolisthesis: modern registries and the development of artificial intelligence," *Journal of Neurosurgery: Spine (JNSPG 75th Anniversary Invited Review Article)*, vol. 30, iss. 6, pp. 729-735, 2019.

■ *ACM SIGGRAPH papers ([B.1.7] and [B.1.8]) are considered final archival journal publications.* ■

B.2. Conference Presentations and Proceedings (Refereed and Archival Competitive Venues)

■ *Refereed publications in respected conferences, with extensive reviewing, and appearing in* ***archival proceedings****. These are the most popular venues for publications in Dr. Essa's fields of expertise. Additional Conference and Workshop papers with review are included in Section B.3.* ■

• 1994–1996 •

B.2.1 Pentland, A., **I. Essa**, T. Darrell, and S. Sclaroff (1994)., "Visually Guided Animation." , In *Proceedings of Computer Animation 1994 Conference*, pp. 129–138, IEEE Computer Society Press, Geneva, Switzerland, May 1994.

B.2.2 **Essa, I.**and A. Pentland (1994)., "A Vision System for Observing and Extracting Facial Action Parameters" , In *Proceedings of IEEE Computer Vision Pattern Recognition Conference 1994,* pp. 76–83, IEEE Computer Society Press, Seattle, WA., June 1994.

B.2.3 **Essa, I.**, T. Darrell, and A. Pentland (1994)., "Tracking Facial Motion", In *Proceedings of IEEE Nonrigid and Articulated Motion Workshop 1994*, pp. 36–42, Austin, TX., IEEE Computer Society Press, November 1994.

B.2.4 Darrell, T., **I. Essa**, and A. Pentland (1995)., "Correlation and Interpolation Networks for Real-time Expression Analysis/Synthesis", In G. Tesauro, D. S. Touretzky, and T. K. Leen (Editors), pp. 909–916, *Advances in Neural Information Processing Systems (Proceedings of NIPS) 7,* Denver, CO., MIT Press 1995.

B.2.5 **Essa, I.**and A. Pentland (1995)., "Facial Expression Recognition using a Dynamic Model and Motion Energy", In, *Proceedings of the IEEE International Conference on Computer Vision 1995,* pp. 360–367, IEEE Computer Society Press, Cambridge, MA., May 1995.

B.2.6 Basu, S., **I. Essa**, and A. Pentland (1996)., "Motion Regularization for Model-based Head Tracking." In *Proceedings of International Conference on Pattern Recognition*, pp. C8A.3, Vienna, Austria, August 1996.

B.2.7 **Essa, I.**, S. Basu., T. Darrell, and A. Pentland (1996)., "Modeling, Tracking and Interactive Animation of Facial Expressions and Head Movements using Input from Video", In *Proceedings of Computer Animation 1996 Conference,* pp. 68–79, IEEE Computer Society Press, Geneva, Switzerland, June 1996.

• 1997–2000 •

B.2.8 **Schödl, A.**, **A. Haro**, and **I. Essa** (1998)., "Head Tracking using a Textured Polygonal Model", In *Proceedings of Perceptual User Interfaces Workshop*, (held in Conjunction with ACM UIST 1998), pp. 43–48, November 1998.

B.2.9 **Schödl, A.**, K. Schwan, and **I. Essa**, (1999) "Adaptive Parallelization of Model-based Head Tracking", In Proceedings of *1999 International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA'99)* (7 pages), Monte Carlo Resort, Las Vegas, Nevada, USA, June 1999.

B.2.10 **Moore, D.**, **I. Essa**, and M. Hayes, (1999) "Exploiting Human Actions and Object Context for Recognition Tasks", In *Proceedings of IEEE International Conference on Computer Vision 1999 (ICCV'99)*, pp. 80–86, IEEE Computer Society Press, Corfu, Greece, September 1999.

B.2.11 **Brostow, G.**, and **I. Essa**, (1999) "Motion-based Video Decompositing." In *Proceedings of IEEE International Conference on Computer Vision 1999 (ICCV'99)*, pp. 8–13, IEEE Computer Society Press, Corfu, Greece, September 1999.

B.2.12 Kidd. C., G. Abowd, C. Atkeson, **I. Essa**, B. MacIntyre, E. Mynatt, T. Starner, (1999) "The Aware Home: A Living Laboratory for Ubiquitous Computing Research", In *Proceedings of Second International Workshop on Cooperative Buildings 1999*, Editors, Streitz, J. Siegel, V. Hartkopf, S. Konomi, Pittsburgh. LNCS 1670. Springer: Heidelberg, 1999.

B.2.13 **Haro, A.**, M. Flickner and **I. Essal. Essa** ((2000)., "Detecting and Tracking Eyes by Using their Physiological Properties, Dynamics and Appearance", In *Proceedings of IEEE Computer Vision and Pattern Recognition 2000 Conference*, pp. I163–I168. IEEE Computer Society Press, Hilton Head, SC, June 2000.

• 2001 •

B.2.14 Mynatt, E., **I. Essa**, and W. Rogers, (2001) "Increasing the Opportunities for Aging in Place", In *Proceedings of First ACM Universal Usability 2000* Conference (Inaugural Conference), pp. 65–71, Arlington, VA, November 2000.

B.2.15 **Schödl, A.**, and **I. Essa**. (2001) "Learning Methods for Video-based Animation", In *Advances Neural Information Processing Systems 13 (Proceedings of NIPS 2000 Conference)*, T. K. Leen, T. .G. Dietrterich, and V. Tresp (Editors), MIT Press, pp. 1002–1008, May 2001.

B.2.16 **Haro, A.**, B. Guenter, **I. Essa**. (2001) "Real-time, Photorealistic, Physically Based Rendering of Human Skin Microstructure" In *Proceedings of Eurographics Rendering Workshop*, pp. 53–62, London, England June 2001.

B.2.17 **Steedly, D.**, and **I. Essa**. (2001) "Propagation of Innovative Information in Non-Linear Least-Squares Structure from Motion" In *Proceedings of IEEE International Conference on Computer Vision 2001 Conference*, Volume II, pp. 223–229, IEEE Computer Society Press, Vancouver, BC, Canada, July 2001.

B.2.18 **Schödl, A**. and **I. Essa**, (2001) "Depth Layers from Occlusions" In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, IEEE Computer Society Press, Kauai, Hawaii, December 2001.

B.2.19 **Stillman, S**. and **I. Essa**, (2001) "Towards Reliable Multimodal Sensing in Aware Environments" In *Perceptual User Interfaces (PUI 2001) Workshop* held in Conjunction with ACM UIST 2001 Conference, ACM Publishers, November 2001.

B.2.20 **Moore, D.** and **I. Essa**, (2001) "Recognizing Multi-tasking Activities using Context-Free Stochastic Grammar" In *Proceedings of Workshop on Models versus Exemplars in Computer Vision*, (held in Conjunction with IEEE Conference on Computer Vision and Pattern Recognition Conference), December 2001.

B.2.21 **Reveret, L**. and **I. Essa**, (2001) "Visual Coding and Tracking of Speech Related Facial Motions" In *Proceedings of Cues in Communications Workshop*, (held in Conjunction with IEEE Conference on Computer Vision and Pattern Recognition), December 2001.

• 2002 •

B.2.22 **Schödl, A.** and **I. Essa**, (2002) "Controlled Animation of Video Sprites" In *Proceedings First ACM Symposium on Computer Animation 2002,* held in conjunction with ACM SIGGRAPH 2002 Conference, San Antonio, TX, USA, July 2002.

B.2.23 **Moore, D.** and **I. Essa**, (2002) "Recognizing Multitasked Activities from Video using Recognizing Multitasked Activities from Video using Stochastic Context-Free Grammar" In *Proceedings of American Association of Artificial Intelligence (AAAI) Conference 2002,* Alberta, Canada, July 2002.

B.2.24 Abowd, G. A. Bobick, **I. Essa**, E. Mynatt, and W. Rogers. (2002), "The Aware Home: Developing Technologies for Successful Aging" In *Proceedings of AAAI Workshop and Automation as a Care Giver*, held in conjunction with American Association of Artificial Intelligence (AAAI) Conference 2002, Alberta, Canada, July 2002.

B.2.25 **Haro, A.** and **I. Essa**. (2002) "Learning Video Processing by Example" In *Proceedings of International Conference on Pattern Recognition 2002,* pp I:487–491, Quebec City, Canada, August 2002.

• 2003 •

B.2.26 **Ruddarraju, R.**, **A. Haro**, and **I. Essa**, (2003) "Fast Multi Camera Head Pose Tracking," In *Proceedings of Visual Interface Conference 2003,* Halifax, Canada, June 2003.

B.2.27 **Minnen, D.**, **I. Essa**, and T. Starner. (2003) "Expectation Grammars: Leveraging High-Level Expectations for Activity Recognition" In *IEEE Proceedings of Computer Vision and Pattern Recognition Conference 2003,* Madison, Wisconsin, June 2003.

B.2.28 **Hamid, M. R.**, **Y. Huang**, **I. Essa**. (2003) "ARGmode: Activity Recognition using Graphical Models" In *Proceedings of IEEE Workshop on Event Mining, Event Detection, and Recognition in Video,* held in Conjunction with IEEE Computer Vision and Pattern Recognition Conference 2003, Madison, Wisconsin, June 2003.

B.2.29 **Steedly, D.**, **Essa, I.**, and Delleart, F. (2003) "Spectral Partitioning for Structure from Motion," In *Proceedings of International Conference on Computer Vision 2003*, Nice, France, October 2003.

B.2.30 Xu, J., R. Lipton, **I. Essa**, M. Sung and Y. Zhu. (2003) "Mandatory Human Participation: A New Authentication Scheme for Building Secure Systems," In *Proceedings of 12th International Conference on Computer Communications and Networks 2003*, pp. 547–552, Dallas, Texas, October 2003.

B.2.31 **Parry, R. M.**, and **I. Essa**, (2003) "Rhythmic Similarity through Elaboration", In *Proceedings of the International Conference on Music Information Retrieval (ISMIR 2003)*, Baltimore, MD, 251–252, 2003.

B.2.32 **Ruddarraju, R.**, **A. Haro**, K. Nagel, Q. Tran, **I. Essa**, G. Abowd, E. Mynatt, (2003) "Perceptual User Interfaces Using Vision-based Eye Tracking." In *Proceedings of Fifth International Conference on Multimodal Interfaces (ICMI-PUI 2003)*, Vancouver, B.C. November 2003.

B.2.33 **Haro, A.**, and **I. Essa**, (2003) "Exemplar Based Surface Texture", In *Proceedings of Vision, Modeling, and Visualization 2003 Conference*, Munich, Germany November 2003.

B.2.34 **Yin, P.**, **Essa, I.**, & Rehg, J. M. (2003) "Boosted Audio-Visual HMM for Speech Reading." In *Proceedings of International Workshop on Analysis and Modeling of Faces and Gestures (AMFG)* (pp. 68–73). Nice, France. .

• 2004 •

B.2.35 **Brostow, G.**, **I. Essa**, D. Steedly and V. Kwatra (2004) "Novel Skeletal Representation for Articulated Creatures", In *Proceedings of European Conference on Computer Vision (ECCV)*, Prague, Czech Republic, May 2004.

B.2.36 **Hays, J.**, and **I. Essa**. (2004) "Image and Video Based Painterly Animation", In *Proceedings of the 3rd International Symposium on Non-Photorealistic Animation and Rendering (NPAR 2004)*, June 2004.

B.2.37 **Yin, P.**, **I. Essa**, & J. M. Rehg (2004). Asymmetrically boosted hmm for speech reading. In *IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR 2004)* Volume I, (pp. 755-761). Washington DC, USA: IEEE Computer Society. .

B.2.38 **Shi, Y.**, **Y. Huang**, **D. Minnen**, A. Bobick, & **Essa, I.**(2004). "Propagation networks for recognition of partially ordered sequential action." In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition Conference (CVPR 2004)* Volume I, (pp. 862-869). Washington, DC: IEEE Computer Society. .

B.2.39 **Diakopoulos, N.**, **Essa, I.**, & Jain, R. (2004). "Content based image synthesis." In *Proceedings of Image and Video Retrieval: Third International Conference, (CIVR 2004)*, Dublin, Ireland, July 21-23, 2004. Springer, Volume 3115, (pp.).

B.2.40 Covington, M., Ahamad, M., **Essa, I.**, Venkateswaran, H. (2004) "Parameterized Authentication" In *9th European Symposium on Research in Computer Security (ESORICS 2004)* (pp. 276-292), Sophia Antipolis, France, September 13 - 15, Springer-Verlag Heidelberg.

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• 2005 •

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B.2.139 **Hickson, S.**, K Raveendran, **I. Essa** (2022), "Sharing Decoders: Network Fission for Multi-Task Pixel Prediction," In **Proceedings of IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)** pp. 3771âĂŞ3780, 2022.

B.2.140 C. Mao, L. Jiang, M. Dehghani, C. Vondrick, R. Sukthankar, **I. Essa** (2022), "Discrete Representations Strengthen Vision Transformer Robustness, " *In Proceedings of International Conference on Learning Representations (ICLR)*, 2022.

B.2.141 **K. Niranjan Kumar**, **I. Essa**, S. Ha (2022), "Graph-based Cluttered Scene Generation and Interactive Exploration using Deep Reinforcement Learning," In *Proceedings International Conference on Robotics and Automation (ICRA)*, pp. 7521-7527, 2022.

B.2.142 **D. Nkemelu**, H. Shah, **I. Essa**, M. Best (2022), "Tackling Hate Speech in Low-resource Languages with Context Experts," In **International Conference on Information Communication Technologies and Development (ICTD)**, 2022.

B.2.143 **H. Haresamudram**, **I. Essa**, Thomas PlÃűtz (2022), "Assessing the State of Self-Supervised Human Activity Recognition using Wearables Journal," *In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*, vol. 6, iss. 3, no. 116, pp. 1âĂŞ47, 2022.

B.2.144 P. Chi, T. Dong, C. Frueh, B. Colonna, V. Kwatra, **I. Essa** (2022), "Synthesis-Assisted Video Prototyping From a Document," In **Proceedings of the 35th Annual ACM Symposium on User Interface Software and Technology**, pp. 1âĂŞ10, 2022.

B.2.145 X. Kong, L. Jiang, H. Chang, H. Zhang, Y. Hao, H. Gong, **I. Essa** (2022), "BLT: Bidirectional Layout Transformer for Controllable Layout Generation," *In European Conference on Computer Vision (ECCV)*, 2022, ISBN: 978-3-031-19789-5.

B.2.146 J. Lezama, H. Chang, L. Jiang, **I. Essa** (2022), "Improved Masked Image Generation with Token-Critic," *In European Conference on Computer Vision (ECCV)*, arXiv, 2022, ISBN: 978-3-031-20050-2.

B.2.147 **E. Wijmans**, **I. Essa**, D. Batra (2022),"VER: Scaling On-Policy RL Leads to the Emergence of Navigation in Embodied Rearrangement," In: Advances in Neural Information Processing Systems (NeurIPS), 2022.

• **2023** •

B.2.148 Y-H. Peng, P. Chi, A. Kannan, M. Morris, **I. Essa** (2023) "Slide Gestalt: Automatic Structure Extraction in Slide Decks for Non-Visual Access," In *ACM Symposium on User Interface Software and Technology (UIST)*, 2023.

B.2.149 J. Lezama, Tim Salimans, Lu Jiang, Huiwen Chang, Jonathan Ho, **I. Essa** (2023) "Discrete Predictor-Corrector Diffusion Models for Image Synthesis," In *International Conference on Learning Representations (ICLR)*, 2023.

B.2.150 **E. Wijmans**, M. Savva, **I. Essa**, S. Lee, A. Morcos, D. Batra, (2023) "Emergence of Maps in the Memories of Blind Navigation Agents," In *Proceedings of International Conference on Learning Representations (ICLR)*, 2023.

B.2.151 D. Bashkirova, J. Lezama, K Sohn., K. Saenko, **I. Essa** (2023) "MaskSketch: Unpaired Structure-guided Masked Image Generation," *In IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)*, 2023.

B.2.152 L. Yu, Y. Cheng, K. Sohn, J. Lezama, H. Zhang, H. Chang, A. Hauptmann, M-H Yang, Y. Hao, **I. Essa**, L. Jiang, (2023) "MAGVIT: Masked Generative Video Transformer," In *IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)*, 2023.

B.2.153 K. Sohn, Y. Hao, J. Lezama, L. Polania, H. Chang, H. Zhang, **I. Essa**, Lu Jiang (2023),"Visual Prompt Tuning for Generative Transfer Learning," In *IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)*, 2023.

■ *For recently submitted papers, go to Section C.* ■

B.3. Conference Presentations with Proceedings (refereed)

■ *Publication in peer-refereed conference/workshop proceedings. This section is for conference and workshop papers with a less structured review process than an archival top-tier conference publication.* ■

B.3.1 Sclaroff, S., **I. Essa**, and A. Pentland. (1992) "Vision-based Modeling: An Application of a Unified Approach for Physical and Geometric Modeling for Graphics and Animation." in *Proceedings of the Eurographics Workshop on Animations and Simulations 1992,* (16 pages) Cambridge, England, September 1992.

B.3.2 Pentland, A., **I. Essa**, T. Darrell, A. Azarbayejani and S. Sclaroff (1994). "Visually Guided Interaction and Animation" *Proceedings of the Twenty-eighth Asilomar Conference on Signals, Systems & Computers 1994,* pp. 1287–1291, Asilomar, CA., November 1994.

B.3.3 **Essa, I.** and A. Pentland (1995). "Facial Expression Recognition using Visually Extracted Facial Action Parameters", In, *Proceedings of the International Workshop on Automatic Face and Gesture Recognition,* pp. 35–40, Zurich, Switzerland, June 1995..

B.3.4 Brand, M. and **I. Essa** (1995). "Causal Analysis for Visual Gesture Understanding", in *Proceedings of AAAI Fall Symposium on Computational Models for Integrating Language and Vision*, pp. 23–28, Cambridge, MA., November 1995.

B.3.5 **Gardner, A.** and **I. Essa** (1997). "Prosody Analysis for Speaker Affect Determination." In *Proceedings of Perceptual User Interfaces Workshop*, (held in conjunction with ACM UIST 1997 Conference), pp 45–46, Banff, Canada, October 1997.

B.3.6 Abowd, G., C. Atkeson, and **I. Essa** (1997). "Computational Perception in Future Computing Environments", In *Proceedings of Perceptual User Interfaces Workshop* (held in conjunction with ACM UIST 1997 Conference), pp. 24–25, Banff, Canada, October 1997.

B.3.7 **Stillman, S.**, **R. Tanawongsuwan**, and **I. Essa** (1999). "A System for Tracking and Recognizing Multiple People with Multiple Cameras", In *Proceedings of Second International Conference on Audio- Vision-based Person Authentication*, April 1999.

B.3.8 **Moore, D.**, **I. Essa**, and M. Hayes (1999) "Object Spaces: Context Management for Human Activity Recognition", In *Proceedings of Second International Conference on Audio- Vision-based Person Authentication*, April 1999.

B.3.9 **Haro, A.**, **I. Essa**, and M. Flickner, (2000) "A Non-invasive Computer Vision System For Reliable Eye Tracking", In Proceedings of *ACM CHI 2000 Conference*, (Late Breaking Short Paper) pp. 167–168. The Hague, Netherlands, April 2000.

B.3.10 Abowd, G., C. Atkeson, A. Bobick. **I. Essa**, B. MacIntyre, E. Mynatt, T. Starner, (2000) "Living Laboratories: The Future Computing Environments Group at Georgia Institute of Technology", In *Proceedings of ACM CHI 2000 Conference*, (Organizational Overview) pp. 215–216. The Hague, Netherlands, April 2000.

B.3.11 Essa, I, G, Abowd, A. Bobick, B. Mynatt, W. Rogers (2002) "Building and Aware Home: Technologies for the way we may live", in *Proceedings of First International Workshop on Man-Machine Symbiosis*, Kyoto, Japan, November 2002.

B.3.12 **Yin, P.**, **Essa, I.**, & Rehg, J. M. (2003). "Boosted audio-visual hmm for speech reading." In *Proceedings of Asilomar Conference on Signals, Systems, and Computer* (pp. 2013–2018). Asilomar, CA, USA.

B.3.13 **Parry, M.** and **I. Essa**, (2006) "Spectrogram Factorization Using Phase Information.", In *Neural Information Processing Systems Workshop on Advances in Models for Acoustic Processing*, Whistler, Canada, December 2006.

B.3.14 **St. Clair, A. M. Fong, N. Diakopoulos**, **I. Essa**. (2007) "NARC: The News Article Revision Comparator." In *Proceedings addendum of User Interface Software Technology (UIST)*. Newport, Rhode Island, USA, October 2007.

B.3.15 Kim, S., F. Li, G. Lebanon, **I. Essa** (2013) "Beyond Sentiment: The Manifold of Human Emotions." In *Proceedings of International Conference on Learning Representations (ICLR) 2013*, Scottsdale, AZ, USA, May 2013.

B.4. Conference Presentations without Proceedings (abstract refereed)

B.4.1 Friedmann, M., **I. Essa**, B. Horowitz, S. Sclaroff, T. Starner, and A. Pentland. "Distributed ThingWorld" Live Demonstration of the system at *G-Tech, ACM SIGGRAPH Conference, '92*, Chicago, IL., August 1992.

B.4.2 Pentland, A., **I. Essa**, M. Friedmann, B. Horowitz, S. Sclaroff, and T. Starner. "ThingWorld" Live Demonstration of the system at *ACM Computer Graphics, Second Interactive 3D Graphics Symposium,* Snowbird, UT., March 1990.

B.4.3 **Essa, I.** "Ubiquitous Sensing for Smart and Aware Environments", A Position paper at *DARPA / NIST / NSF Workshop on Smart Environments*, Atlanta, GA., July 1999.

B.4.4 **Essa, I.** and L. Reveret "Machine Perception of Human Activity: Recognizing and Modeling Facial Expressions and Affect.", Invited Presentation at NIPS workshop on Affective Computing. Beckenridge, CO., USA, December, 2000.

B.4.5 **Hamid, R.**, Maddis, S., Johnson, A., Bobick, A., **Essa, I.**, Isbell, C. (2005) "Unsupervised Activity Discovery and Characterization From Event-Streams." In *Proceedings of Snowbird Machine Learning Conference*, March 2005, Snowbird, UT, USA .

B.4.6 **Diakopoulos, N.**, **I. Essa**. (2005) "Supporting Personal Media Authoring", In *ACM Multimedia workshop on Multimedia for Human Communication (MHC)*, Singapore, November 2005.

B.4.7 **Minnen, D.** T. Starner, **I. Essa**, and C. Isbell (2006) "Activity Discovery: Sparse Motifs from Multivariate Time Series.", In Snowbird Machine Learning Workshop 2006.

B.4.8 **Minnen, D.** T. Starner, **I. Essa**, and C. Isbell (2007) "Pattern Discovery for Locating Motifs in Multivariate, Real-valued Time-series Data.", In Snowbird Machine Learning Workshop 2007.

B.4.9 **Yin, P. I. Essa**, and J. Rehg (2007) "The Segmental Boosting Algorithm for Time-series Feature Selection.", In Snowbird Machine Learning Workshop 2007.

B.4.10 Thomaz, E. T. Plötz **I. Essa**, and G. Abowd (2011) "Interactive Techniques for Labeling Activities Of Daily Living to Assist Machine Learning.", In *Workshop on Interactive Systems in Healthcare*, October 22, 2011, Washington, DC.

B.4.11 Bidwell, J., A. Rozga, J. Kim, H. Rao, M. Clements, **I. Essa**, and G. Abowd (2014), "Automated Prediction of a Child's Response to Name from Audio and Video," in *Proceedings of Annual Conference of the International Society of Autism Research*, 2014.

B.5. Submitted Journal Papers

■ *Two Journal Publications in preparation.* ■

C. Other Publications

C.1. Technical Reports

C.1.1 Tanawongsuwan, R. A. Stoytchev, and **I. Essa** (1999) "Robust Tracking of People by a Mobile Robotic Agent" *Georgia Institute of Technology, Technical Report # GIT-GVU-99-19, 1999.*

C.1.2 Xu, J., D. Lipton, **I. Essa**, M-H. Sung (2001) "Mandatory Human Participation: A New Scheme for Building Secure Systems." *Georgia Institute of Technology, Technical Report # GIT-CC-01-09, 2001.*

C.1.3 Kim, S. F. Li, G. Lebanon, **I. Essa** (2012) "Beyond Sentiment: The Manifold of Human Emotions." arXiv.org. arXiv:1202.1568. 2012

C.1.4 J. C. Balloch, V. Agrawal, **I. Essa**, and S. Chernova (2018), "Unbiasing Semantic Segmentation For Robot Perception using Synthetic Data Feature Transfer," arXiv preprint arXiv:1809.03676, 2018.

C.1.5 N. K. Kannabiran, **I. Essa**, and C. Liu (2019), "Estimating Mass Distribution of Articulated Objects through Physical Interaction," arXiv preprint arXiv:1907.03964, 2019.

C.1.6 E. Wijmans, J. Straub, D. Batra, **I. Essa**, J. Hoffman, and A. Morcos (2020), "Analyzing Visual Representations in Embodied Navigation Tasks," arXiv preprint arXiv:2003.05993, 2020.

C.1.7 H. Haresamudram, **I. Essa**, and Thomas Ploetz (2020),"Contrastive Predictive Coding for Human Activity Recognition," arXiv preprint arXiv:2012.05333, 2020.

C.1.8 E. Wijmans, **I. Essa**, and D. Batra (2020), "How to Train PointGoal Navigation Agents on a (Sample and Compute) Budget," arXiv preprint arXiv:2012.06117, 2020.

C.2. Software

■ *Only a few listed here. Many other softwares provided to sponsors as part of Contracts/Grants.* ■

C.2.1 "The ThingWorld System", a solid modeling, sculpting software developed at the MIT Media Laboratory (1988-1992). Used in over 25 Research Institutions. Developed by a team of six people.

C.2.2 "DFace: A Dynamic Facial Modeling and Analysis Package", a facial analysis package developed at MIT Media Laboratory (1993-1995). At present ported and being further developed for Teleconferencing applications by BT (British Telecom) UK.

C.2.3 "Auto-Directed Video Stabilization with Robust L1 Optimal Camera Paths," with **Grundmann, M.**, V. Kwatra, Running live on Youtube Enhance as a result of work with Google Research. 2011.

C.2.4 "Calibration-Free Rolling Shutter Removal," with **Grundmann, M.**, V. Kwatra, Running live on Youtube Enhance as a result of work with Google Research 2012.

C.3. Video

C.3.1 **Essa, I.**, T. Darrell, and A. Pentland. (1995) "Modeling and Tracking Facial Expression.", in *Standards of Facial Expressions, SIGGRAPH Video Review* 1995.

C.3.2 **Essa, I.** (1999) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 1999.

C.3.3 **Essa, I.** (2000) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 2000.

C.3.4 **Essa, I.** (2001) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 2001.

C.3.5 **Essa, I.** (2002) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 2002.

C.3.6 **Essa, I.** (2003) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 2003.

C.3.7 **Essa, I.** (2004) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 2004.

C.3.8 **Essa, I.** (2005) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 2005.

C.3.9 **Essa, I.** (2006) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 2006.

C.3.10 **Essa, I.** (2007) "Digital Video Effects Final Projects Screening," at Georgia Institute of Technology, April 2007.

D. Presentations

D.1. Invited Keynote Addresses

D.1.1 "Non-invasive Motion Analysis", at *International Symposium on Human Movement Analysis*, Stockholm, Sweden, July 1994.

D.1.2 "Extracting Perceiving and Modeling of Human Activity ", at *ATR Research Laboratories Workshop on Intelligent Agents.*, Kyoto, Japan, March 1996.

D.1.3 "Aware Home: Sensing, Interpretation, and Recognition of Everyday Activities", at *IEEE Signal Processing Soceity, DSP Workshop*, Callaway Gardens, Pine Mountain, GA, USA, October 2002.

D.1.4 "Building and Aware Home: Technologies for the way we may live", at *First International Workshop on Man-Machine Symbiosis*, Kyoto, Japan, November 2002.

D.1.5 "What does Computer Science Teach us About Movies?", at *The Consortium for Computing Sciences in Colleges (CCSC 2003)*, (Banquet Speaker), Atlanta, GA, USA, November 2003.

D.1.6 "Computational Photography and Video", at *Eighth International Workshop on Image Analysis for Interactive Services (WIAMIS)* 6-7 June 2007, Santorini, Greece, June 2007.

D.1.7 "Visualizing and Collaborative Authoring of Video", at *Advanced Visual Interfaces*, Napoli, Italy, May 2008.

D.1.8 "Spatio-Temporal Video Analysis and Visual Activity Recognition", at *Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA) 2011 Conference* in Las Palmas de Gran Canaria. Spain. June 8-10 2011.

D.1.9 "Videos Understanding: Extracting Content and Context from Video.", at *International Workshop on Computer Vision 2012* in , Ortigia, Siracusa, Sicily, May 22-24, 2012.

D.1.10 "Extracting Content and Context from Video.", at *CVPR 2012 workshop on Large Scale Video Search and Mining 2012* in , Providence, RI, USA, June 21, 2012.

D.1.11 "Art In The Digital Culture ... Threat or Opportunity?", at *HIGH Museum of Atlanta, Lumiere Fall Series Innauguration Lecture and Panel*. September 19, 2012.

D.1.12 "Computational Video: Technologies for Analysis, Creation, Enhancement, and Sharing of Video", at *United Technologies Corporation, Annual Fellows Symposium*. September 21, 2017.

D.1.13 "From Aware Home to Alexa: The past, present, and future of Computing in the Home", at *Amazon A126 Labs, Computer Vision Symposium*. November 25, 2017.

D.1.14 "Data-driven Innovation", at *Spine Summit 2020, The 36th Annual Meeting of the American Association of Neurological Surgeons (AANS) and the Congress of Neurological Surgeons (CNS).* March 6, 2020.

D.2. Distinguished/Invited Lectures

D.2.1 "Video Cameras are Everywhere: Data-Driven Methods for Video Analysis and Enhancement," *William Mong Distinguished Lecture* at the University of Hong Kong, December 2014.

D.3. Conference Presentations: Tutorial and Courses (Refereed)

D.3.1 "Computer for Special Effects in Research and Education" at *IEEE Computer Vision and Pattern Recognition Conference, Course on Computer Vision for Special Effects.* (with 4 other instructors). Attendance: 80 2003

D.3.2 "Computational Journalism" at *ACM SIGGRAPH 2008.* (with 4 other instructors). Attendance: 50 2008.

D.3.3 "Video Segmentation"at *IEEE Computer Vision and Pattern Recognition (CVPR) 2014 Conference* (with 2 other instructors). Attendance: 50 2014.

D.4. Seminar Presentations (Invited Papers and Talks at Meetings and Symposia)

■ *Dr Essa has done over a 200 seminar/colloquia presentations. Here a select few are listed.* ■

D.4.1 "Nonrigid and Rigid Dynamic Modeling for Animation & Graphics", at *Ecole Normale Superieure, Department de Mathematiques et Informatique,* Paris, France, (Host: Dr. Marie-Paul Gascuel), September 1992.

D.4.2 "Physically-based Modeling for Vision, Graphics and Control.", at *Academy of Media Arts,* Cologne, Germany, (Host: Dr. Bernd Girod), September 1992.

D.4.3 "Visualization using Vision-based Modeling", at *GMD Super computing Facility, Visualization Group,* Bonn, Germany, (Host: Dr. Wolfgang Kreuger), September 1992.

D.4.4 "Visual Interpretation of Facial Expressions", at *NSF Workshop on Facial Animations* Philadelphia, PA., November 1993.

D.4.5 "Looking at People: Extracting Human Movements." at *International Workshop on Computer Vision and Parallel Processing 1995*, (Invited Speaker) Islamabad, Pakistan, January 1995.

D.4.6 "Looking at People: Facial Expressions", Department of Electrical Engineering Seminar, at *The Beckman Institute, University of Illinois, Urbana-Champaign,* Urbana, IL., (Host: Dr. Thomas Huang), February 1995.

D.4.7 "Looking at People: Expressions and Gestures", at Microsoft Research, Seattle WA., (Host: Dr. Matthew Turk), May 1995.

D.4.8 "Control and Estimation in Systems and Environments that Include People", Intelligent Engineering Systems Laboratory Colloquium, at *Massachusetts Institute of Technology, Department of Civil and Environmental Engineering,* Cambridge, MA., (Host: Dr. Robert Logcher), November 1995.

D.4.9 "Control and Estimation in Systems and Environments that Include People", Computer Science Colloquium, at *New York University, Department of Computer Science,* Cambridge, MA., (Host: Dr. Jack Schwartz), February 1996.

D.4.10 "Perceiving and Understanding Human Actions for Interactive Video Environments", at *Electrotechnical Laboratory*, Ibaraki, Japan, March 1996.

D.4.11 "Computational Perception of Human Activities in Scenes and Environments", at *Graphics, Visualization and Usability Center, Georgia Tech* Atlanta, GA, November 1996.

D.4.12 "Computational Perception of Human Activities in Scenes and Environments", at *Center for Signal and Image Processing, Georgia Tech.* Atlanta, GA, February 1996.

D.4.13 "Intelligent and Aware Environments", at CHI 1997, Ubiquitous Computing Workshop, Atlanta, GA., March 1997.

D.4.14 "Importance of Dynamic Models in Perception of Action", at NSF/DARPA Workshop on Perception of Action, Brewster, MA, May 1997.

D.4.15 "Ubiquitous Video and Audio", at *Broadband Telecommunications Center, Georgia Tech.* Atlanta, GA, March, 1999.

D.4.16 "Aware Home", at *Mitsubishi Electric Research Laboratory*, Cambridge, MA, (Host: Dr. Dick Waters), August 1999.

D.4.17 "Intelligent and Aware Environments", at *Phillips Research,* Briarcliff Manor, NY, (Host: Jim Schmidt), January, 2000.

D.4.18 "Perceiving and Modeling People, Environments and Interactions", at *Microsoft Research*, Seattle, WA (Host: P. Anandan), August 2000.

D.4.19 "Video-based Rendering and Animation" at *Graphics, Visualization and Usability Center, Georgia Tech* Atlanta, GA, November 2001.

D.4.20 "Temporal Reasoning from Video to Temporal Synthesis of Video" at *CMU's Robotics Institute Colloquium*, Pittsburgh, PA, February 2002. 2003

D.4.21 "Temporal Reasoning from Video to Temporal Synthesis of Video" at *Georgia Tech's Cognitive Science Colluquium*, Atlanta, GA, February 2002. 2003

D.4.22 "Aware Home: Sensing and Perception of People" at *University of Rochestor's Center for Future Health Colloquium*, (Host: Phillipe Fauchetti) Rochestor, NY, September 2002. 2003

D.4.23 "Aware Home: Ubiquitous Sensing and Perception of People" at *University of Michigan, Computer Science Department*, Ann Arbor, MI, September 2002. 2003

D.4.24 "Temporal Reasoning from Video to Temporal Synthesis of Video" at *University of Tokyo, Computer Vision Seminar*, (Host: Katsushi Ikeuchi) Tokyo, Japan, November 2002. 2003

D.4.25 "Temporal Reasoning from Video to Temporal Synthesis of Video" at *University of Tokyo, Computer Vision Seminar*, (Host: Katsushi Ikeuchi) Tokyo, Japan, November 2002. 2003

D.4.26 "Analysis and Synthesis of Video for Special Effects and Animation" at *Ohio State University, Advanced Computing Center for Art and Design*, Columbus, OH, USA, October 2003. 2004

D.4.27 "Analysis and Synthesis of Video" at *New York University, Computer Science Colloquium*, (Host: Demetri Terzopoulous) New York City, NY, USA, November 2003.

D.4.28 "Video-based Modeling: Articulations" at *Microsoft Research, Redmond*, (Host: Rick Szeliski) Redmond, WA, USA, August 2004.

D.4.29 "What Computer Science has to do with Movies" at *Microsoft Research, Redmond*, (Host: Rick Szeliski) Redmond, WA, USA, August 2004.

D.4.30 "Interactive and Aware Environments" at *University of Southern California, IMSC and ICT*, (Host: Ulrich Neumann) Los Angeles, CA, USA, October 2004.

D.4.31 "Sensing in the Aware Home" at *Proctor and Gamble: Communities of Practice Symposium*, Cincinnati, OH, USA, March 2005.

D.4.32 "Procedural Synthesis in Games" at *Georgia Tech's Living Gamesworld Symposium*, Atlanta, GA, USA, March 2005.

D.4.33 "Sensing in the Aware Home" at *Georgia Tech Library Perspective Seminar Series*, Atlanta, GA, USA, April 2005.

D.4.34 "The Aware Home Research Initiative" at *Nanyang Technical University* Singapore, November 2005.

D.4.35 "Activity Recognition and Temporal Models" at *TU Munich* Munich, Germany. May 2006.

D.4.36 "Computational Photography and Video: Spatio Temporal Analysis for Synthesis of Novel Images and Videos." at University of Maryland, Computer Science Department, College Park, MD, USA. September 2007.

D.4.37 "From Computational Photography and Video to Computational Journalism" at Qualcomm Research, San Diego, CA, USA. November 2008.

D.4.38 "Computation & Journalism: The Impact of Technology on Journalism, Information Quality, and Civic Literacy" at Duke Unviersity Durham, NC, USA. February 2009.

D.4.39 "From Computational Photography to Computational Journalism" at Carnegie Mellon University, PA, USA. In the Computational Thinking Seminar Series April 2009.

D.4.40 "Augmenting Earthmaps" at Google, Mountain View, CA, USA. In Google Tech Talk Series 2009.

D.4.41 "Augmenting Earthmaps" at Qualcomm, San Diego CA, USA. 2009.

D.4.42 "Video Analysis on Mobile Platforms" at Qualcomm, San Diego, CA, USA. 2010.

D.4.43 "Two talks on Video Analysis: From Video Segmentation to Prediction in Video" at University of Southern Californina, Los Angeles, CA, USA. 2010.

D.4.44 "Two talks on Video Analysis: From Video Segmentation to Prediction in Video" at California Institute of Technology, Pasadena, CA, USA. 2010.

D.4.45 "Two talks on Video Analysis: From Video Segmentation to Prediction in Video" at University of California, Santa Barbara, CA, USA. 2010.

D.4.46 "Two talks on Video Analysis: From Video Segmentation to Prediction in Video" at University of Pennsylvania, Philadelphia, PA, USA. 2010.

D.4.47 "Auto-Directed Video Stabilization" at Google, Mountain View, CA, USA. In Google Tech Talk Series 2011.

D.4.48 "Video Stabilization and Rolling Shutter Removal on YouTube", at Texas Instruments, Dallas, TX, USA. 2012.

D.4.49 "Video Enhancement and Analysis: From Content Analysis to Video Stabilization for YouTube." at the Distinguished Seminar Series in Computer Science at the Imperial College, London, UK, 2012(Host: Maja Pantic).

D.4.50 "Video Analysis and Enhancement: Video Stabilization and Rolling Shutter Removal on YouTube." at the Robotics Institute, Carnegie Mellon University, Pittsburgh, PA, USA, 2012(Host: Takeo Kanade).

D.4.51 "Computational Video: Video Stabilization and Video Segmentation and their Applications" at Microsot Research, Cambirdge, England, August 2014(Host: Andrew Fitzgibbons).

D.4.52 "Computational Video: Video Stabilization and Video Segmentation and their Applications" at University College London, London, England, August 2014(Host: Gabriel Brostow).

D.4.53 "Efficient Graph-based Video Segmentation" at First International Workshop on Video Segmentation at IEEE Computer Vision and Pattern Recognition (CVPR) Conference 2014.

D.4.54 "Data Driven Video Analysis and Enhancement" at Max Planck Institute for Intelligent Systems in Tuebingen September 2015.

D.4.55 "Computer Vision for Sports Sciences" at Dagstuhl Seminar on Modeling and Simulation of Sport Games, Sport Movements, and Adaptations to Training in Wadern, Germany, September, 2015.

D.4.56 "Cameras are Everywhere: Impact on Video" at Max Planck Institute for Informatics in Saarbrucken, September 2015.

E. Grants and Contracts

E.1. Principal Investigator (PI)

■ *These are research grants where Dr. Essa participated explicitly as a Principal Investigator (PI) and Project Director (PD)* ■

E.1.1 **The Summer Internship Program for Socio-economically Disadvantaged Undergraduates.**
Sponsor: Office of Naval Research.
Investigator(s): I. Essa.
Amount: *$ 100,000, for 2 years (1998 and 1999).*
Funded: June 1998 - May 2000.

E.1.2 **Automated Understanding of Captured Experiences.**
Sponsor: National Science Foundation, Program on Experimental Systems 1997.
Investigator(s): I. Essa (PI), C. Atkeson, G. Abowd, and K. Ramachandran.
Amount: *$ 861,216 for 3 years, ($ 60,000 matching from GT).*
Submitted: December 1997.Funded: September 1998.

E.1.3 **Audio Affect Analysis**
Sponsor: Georgia Tech's GVU Seed Grant 1998.
Investigator(s): I. Essa and Mark Clements
Amount: *$ 20,000 for 1998-1999.*
Funded through the GVU Seed Funding Program 1998.

E.1.4 **Display and Audio Infrastructure for GVU Lab**
Sponsor: Georgia Tech's GVU Seed Grant 1999.
Investigator(s): I. Essa with J. Oliverio and G. Abowd
Amount: *$ 15,000 for 1998-1999.*
Funded through the GVU Seed Funding Program 1998.

E.1.5 **Vision-based Transmedia**
Sponsor: Mitsubishi Electric Research Labs.
Investigator(s): I. Essa.
Amount: *$ 20,000 for 1999-2000.*
Funded through the GVU Affiliates Program (1/1/1999).

E.1.6 **Ubiquitous Sensing in an Aware Home.**
Sponsor: Broadband Institute.
Investigator(s): I. Essa, G. Abowd, and C. Atkeson
Amount: *$ 100,000 for 3 years.*
Funded via the Broadband Institute's Industrial Affiliates Program: May 1999.

E.1.7 **Ubiquitous Sensing in an Aware Home.**
Sponsor: Microsoft Research.
Investigator(s): I. Essa.
Amount: *$ 50,000 for 1 year.*
Funded: May 1999.

E.1.8 **Vision Technology Research**
Sponsor: Microsoft Research.
Investigator(s): I. Essa.
Amount: *$ 25,000 for 1 year.*
Funded: January 2000.

E.1.9 **A Spatio-temporal Representation for Analysis and Modeling of Facial Expressions from Video.**
Sponsor: National Science Foundation, CAREER Program.
Investigator(s): I. Essa.
Amount: *$ 300,000 for 4 years.*
Funded: September 2000.

E.1.10 **Video Textures.**
Sponsor: Microsoft Research.
Investigator(s): I. Essa.
Amount: *$ 25,000 for 1 year.*
Funded: March 2000.

E.1.11 **Activity Recognition in an Aware Home.**
Sponsor: Georgia Tech's Broadband Institute.
Investigator(s): I. Essa and A. Bobick
Amount: *$ 100,000 for 3 years.*
Funded via the Broadband Institute's Industrial Affiliates Program: May 2001.

E.1.12 **Animating Interactive Characters.**
Sponsor: Georgia Tech's GVU Center.
Investigator(s): I. Essa and J. Murray
Amount: *$ 25,000*
Funded via the GVU Center's Seed Grant Program: July 2002.

E.1.13 **Cognitive Agent that Learns and Organizes.**
Sponsor: SRI via a contract from DARPA IPTO, via a Subcontract from SRI
Investigator(s): I. Essa, A. Bobick. and J. Rehg (Year 1, PI was A. Bobick)
Amount: *$600,000 for year (2004) and 2 (2005), $390,000 for year 3 (2006), $330,000 for year 4 (2007) renewable.*
Funded: April 2003, Renewed June 2004, November 2005, January 2007

E.1.14 **Style Templates for Video**
Sponsor: Georgia Tech's GVU Center.
Investigator(s): I. Essa and D. Gromala
Amount: *$ 25,000*
Funded via the GVU Center's Seed Grant Program: July 2003.

E.1.15 **Procedural Style-based Animation**
Sponsor: Georgia Tech's GVU Center.
Investigator(s): I. Essa and M. Mateas
Amount: *$ 25,000*
Funded via the GVU Center's Seed Grant Program: July 2004.

E.1.16 **Video Authoring**
Sponsor: Microsoft Research.
Investigator(s): I. Essa
Amount: *$ 20,000*
Unrestricted Gift

E.1.17 **Meeting Capture and Browsing.**
Sponsor: Georgia Research Alliance via Georgia Tech's Venture Labs.
Investigator(s): I. Essa
Amount: *$50,000 for 6 months.*
Funded: Summer 2005.

E.1.18 **Computational Photography and Video**
Sponsor: Microsoft Research.
Investigator(s): I. Essa
Amount: *$ 35,000*
Unrestricted Gift

E.1.19 **Computational Photography and Video**
Sponsor: Microsoft Research.
Investigator(s): I. Essa
Amount: *$ 30,000*
Unrestricted Gift

E.1.20 **Non-photorealistic Rendering for Video**
Sponsor: Samsung Corporation, Korea.
Investigator(s): I. Essa
Amount: *$ 125,000 for 1 year*
Under the newly formed STAR (Samsung Tech Advanced Research) Center at GA Tech

E.1.21 **Persisent, Adaptive, Collaborative Agents**
Sponsor: RIM@GT Seed Grant (Internal).
Investigator(s): I. Essa and C. Isbell
Amount: *$ 25,000 for 1 year*
Seed Grant for Machine Learning for Games

E.1.22 **Activity Recognition in Football Video**
Sponsor: DARPA
Investigator(s): I. Essa, A. Bobick
Amount: *$ 75,000 for 8 months, from Jan 2008*
A DARPA IXO seedling granted by DARPA to evaluate the activity recognition research that was studied under the DARPA ISAT Study on EXPOSE, which Dr. Essa participated in. Total Grant of $500k, to prime Kitware Inc. $ 75k funds allocated each to MIT, University of Maryland and Georgia Tech.

E.1.23 **Crowdcasting**
Sponsor: Alcatel-Lucent.
Investigator(s): I. Essa
Amount: *$ 75,000 for 1 year, July 2008*
Funded via Broadband Institute to explore Mobile Videos for Sports

E.1.24 **Augmented Earth Maps**
Sponsor: Google Inc.
Investigator(s): I. Essa
Amount: *$ 75,000 for 1 year, July 2008*
Foundation funds to work on adding Dynamic Information from Videos to Earth Maps.

E.1.25 **Sports Visualization**
Sponsor: Disney (Walt Disney Imagineering).
Investigator(s): I. Essa
Amount: *$ 10,000 for 1 year, July 2008*
Foundation funds to support work on Sports Visualization.

E.1.26 **Computational Photography**
Sponsor: Microsoft Research.
Investigator(s): I. Essa, F. Dellaert, J. Rehg
Amount: *$ 50,000 for 2 years, July 2008*
Foundation funds to support work on Computational Photography.

E.1.27 **Symposium on Computation and Journalism.**
Sponsor: National Science Foundation(Information & Intelligent Systems (IIS))
Investigator(s): I. Essa
Amount: *$ 20,000 for 2 years, February 2008*
Grant to pay for Invited Speakers to the Symposium on Computation and Journalism.

E.1.28 **Symposium on Computation and Journalism.**
Sponsor: Google Inc., Turner Broadcasting, Yahoo, Science Commons, etc.
Investigator(s): I. Essa
Amount: *$ 35,000 for 2 years, February 2008*
Foundation funds for Symposium on Computation and Journalism.

E.1.29 **Functional Interpretation of Activities**
Sponsor: DARPA SBIR via Kitware Corporation
Investigator(s): I. Essa
Amount: *$ 30,000 for 6 months, May 2009*
An SBIR with Kitware Corporation for DARPA IPTO.

E.1.30 **Video Sports Analysis**
Sponsor: Walt Disney Imagineering
Investigator(s): **I. Essa**
Amount: *$ 25,000 for 12 months, Jan 2010*
Foundation funds for Research in Video Analysis

E.1.31 **Video Content Analysis by Segmentation**
Sponsor: Google Corporation
Investigator(s): **I. Essa**
Amount: *$ 45,000 for 12 months, March 2010*
Foundation funds for Research in Video Analysis

E.1.32 **PerSEAS Project**
Sponsor: DARPA PERSEAS Program, via Kitware
Investigator(s): **I. Essa**
Amount: *$ 700,000 for 24 months, Sep 2010*
A $15 M project led by Kitware Corporation for DARPA, with 5 universities and 3 industrial partners

E.1.33 **Functional Interpretation of Activities**
Sponsor: DARPA SBIR Phase II, via Kitware Corporation
Investigator(s): **I. Essa**
Amount: *$ 160,000 for 18 months, Jan 2011*
An SBIR with Kitware Corporation for DARPA IPTO.

E.1.34 **Robot-Human Interaction and Activities**
Sponsor: DARPA SBIR Phase II, via Kitware Corporation
Investigator(s): **I. Essa**
Amount: *$ 120,000 for 18 months, Jan 2011*
An SBIR with Kitware Corporation for DARPA, with UC Berkley and U of Maryland

E.1.35 **Cardiac Surgery Simulator for Training**
Sponsor: Macquet Cardiovascular

Investigator(s): **I. Essa** & William Cooper (Emory U.)
Amount: *$ 50,000 Jan 2011. GIFT/Discretionary to GT Foundation.*
Seed discretionary / foundation funding, with Emory to Study Surgery Video Visualizations for Surgical Training.

E.1.36 **Video Content Annotation**
Sponsor: Google Corporation
Investigator(s): **I. Essa**
Amount: *$ 85,000 for 12 months, September 2011. GIFT/Discretionary to GT Foundation.*
Foundation funds for Research in Video Analysis

E.1.37 **Computational Photography**
Sponsor: Microsoft Research.
Investigator(s): **I. Essa**
Amount: *$ 25,000 August 2012. GIFT/Discretionary to GT Foundation.*
Foundation funds to support work on Computational Photography.

E.1.38 **Kinect-based Approaches to Study Walking and Gait Patterns of Patients with MCI and Alzheimer's**
Sponsor: Emory Alzheimer's Disease Research Center (ADRC) / Atlanta Clinical and Translational Science Institue (ACTSI) Pilot Grant
Investigator(s): **I. Essa**(PI) D. Gutman, EMORY (Co-PI), G. Abowd (Co-PI) and A. Levey, EMORY (Co-PI)
Amount: *$ 25,000 for 6 months, January 2013*
One year pilot study to explore use of water activity sensor in the home

E.1.39 **Computational Photography**
Sponsor: Microsoft Research.
Investigator(s): **I. Essa**
Amount: *$ 25,000 May 2013. GIFT/Discretionary to GT Foundation.*
Foundation funds to support work on Computational Photography.

E.1.40 **Computational Photography**
Sponsor: Qualcomm
Investigator(s): **I. Essa**
Amount: *$ 50,000 October 2014. GIFT/Discretionary to GT Foundation.*
Foundation funds to support work on Computational Photography.

E.1.41 **NRI: Representing and Anticipating Actions in Human-Robot Collaborative Assembly Tasks**
Sponsor: NSF National Robotics Initiative (NRI) Program
Investigator(s): **I. Essa** (PI), A. Bobock (Co-PI), H. Christensen (Co-PI), M. Stilman (Co-PI)
Amount: *$ 549,993.00 for 3 years*
Approved: August 2014. Taken over as PI in 2015

E.1.42 **An Interdisciplinary Research Center for Machine Learning at Georgia Tech (ML@GT)**
Sponsor: Georgia Institute of Technology's EVPR Office and Dean of College of Computing
Investigator(s): **I. Essa** (PI), S. Pokkutta (Co-PI), J. Romberg (Co-PI)
Amount: *$ 260,000 for 1 years*
Approved: July 2016. Renewed for 2017– 2020 at $200,000 a year.

E.1.43 **Research in Computer Vision at GA Tech**
Sponsor: Facebook AI Research (FAIR)
Investigator(s): **I. Essa** (PI), D. Batra (Co-PI), D. Parikh (Co-PI)
Amount: *$ 250,000 for 2 years GIFT/Discretionary to GT Foundation*
Approved: July 2018. Equally shared by all the PIs

E.1.44 **Enhancing Gait Dynamics via Physical Human-human and Human-Robot Interactions at the Hands.**
Sponsor: NSF Civil, Mechanical and Manufacturing Innovation (CMMI). Directorate For Engineering
Investigator(s): L. Ting (PI. Emory University), **I. Essa** (PI, GA Tech), J. Ueda Co-PI)
Amount: *$ 319,231 to GA Tech for 3 years, August 2018*
Understanding of how intelligent robotic systems can use a model of human intent, perception.

E.1.45 **Research in Multimedia/Video**
Sponsor: Google Research
Investigator(s): **I. Essa** (PI)
Amount: *$ 100,000 for 1 years, GIFT/Discretionary to GT Foundation*
Approved: July 2019.

E.1.46 **FLASH: Fast Learning via Auxiliary Signals, Structured knowledge and Human Experience**
Sponsor: DAPRA Learning with Limited Labels (LwLL) Program, via a Sub Contract from University of Pennsylvania
Investigator(s): **I. Essa** (PI), Le Song (co-PI), Z. Kira (co-PI)
Amount: *$ 450,000 for 1 years, for Phase 1*
Approved: July 2020.

E.1.47 **Research in Machine Learning**
Sponsor: Google X
Investigator(s): **I. Essa** (PI)
Amount: *$ 20,000 for 1 years, GIFT/Discretionary to GT Foundation*
Approved: July 2020.

E.1.48 **Teaching a Deep Learning Course with Facebook**
Sponsor: Facebook AI Research
Investigator(s): **I. Essa** (PI), Z. Kira (Co-PI)
Amount: *$ 160,000 for 1 years, GIFT/Discretionary to GT Foundation*
Approved: July 2020.

E.1.49 **Teaching a Deep Learning Course with Facebook**
Sponsor: Facebook AI Research
Investigator(s): **I. Essa** (PI), Z. Kira (Co-PI)
Amount: *$ 185,000 for 1 years, for Developing Deep Learning Course*
Approved: January 2021.

E.1.50 **Visual Activity and Skills Assessment**
Sponsor: CISCO
Investigator(s): **I. Essa** (PI)
Amount: *$ 169,663 for 1 year*
Approved: January 2021.

E.1.51 **Research Collaboration with Adobe**
Sponsor: Adobe
Investigator(s): **I. Essa** (PI)
Amount: *$ 250,000 for 1 year, annually*
Approved: October 2021.

E.2. As Co-Principal Investigator (CoPI)

■ *These are research grants where Dr. Essa participated as a Co-PI.* ■

E.2.1 **Interaction, Collaboration, and Application Building within a 3D Virtual Environment.**
Sponsor: DURIP Program, Office of Naval Research.
Investigator(s): L. Hodges (PI), B. Ribarsky, I. Essa, J. Rossignac and three other faculty members from the Graphics, Visualization and Usability Center.
Amount: *$ 125,928 (Equipment)*
Submitted: September 1996. Funded: January 1997.

E.2.2 **Building an Intelligent, Adaptive User-Friendly Agent**
Sponsor: Yamaha Corporation, Japan. Research and Development Division
Investigator(s): A. Ram and I. Essa.
Amount: *$ 310,000, for 2 years.*
Submitted: December 1996. Funded: January 1997 - March 1999.

E.2.3 **Digital Imaging Systems for Science and Engineering.**
Sponsor: Hewlett Packard Corporation.
Investigator(s): R. Schafer, N. Ezquerra, I. Essa, and T. Barnwell, and six other faculty members from the Graphics, Visualization and Usability Center (College of Computing) and the Center for Signal and Image Processing (School of ECE).
Amount: *$ 479,000, (Equipment).*
Submitted: May 1997. Funded: June 1997.

E.2.4 **Data-driven Modeling for Real-Time Interaction and Animation.**
Sponsor: National Science Foundation. CISE Research Infrastructure Program 1998.
Investigator(s): J. Hodgins (PI), I. Essa, and C. Atkeson.
Amount: *$ 120,000 ($ 60,000 Matching from GT) (Equipment).*
Submitted: July 1998. Funded: February 1999.

E.2.5 **Augmenting the Capture and Understanding of Everyday Experiences**
Sponsor: National Science Foundation, CISE Research Infrastructure Program 1998.
Investigator(s): G. Abowd (PI), C. Atkeson, I. Essa, T. Starner, ...
Amount: *$ 120,000 ($ 60,000 Matching from GT), Equipment.*
Submitted: July 1998. Funded: February 1999.

E.2.6 **Broadband Institute Residential Laboratory.**
Sponsor: Georgia Research Alliance
Investigator(s): J. Limb (PI), G. Abowd, C. Atkeson, I. Essa
Amount: *$700,000 for construction of a Home on GA Tech. Campus, 1999*
Funded via the Georgia Research Alliance Emminent Scholar's Program: 1999.

E.2.7 **Technology First: Teaching Theory in the Context of Practice**
Sponsor: Hewlett Packard Corporation
Investigator(s): T. Barnwell (ECE) and several ECE and CoC Faculty.
Amount: *~$ 800,000 Equipment Grant ($ 100,000 for Imaging and Video Effects Classroom)*
Funded: February 2000.

E.2.8 **Mechanisms for Securing Emerging Applications.**
Sponsor: National Science Foundation, ITR Program 2000.
Investigator(s): M. Ahamad, I. Essa, and H. Venkateswaran.
Amount: *$ 484,000 for 3 years.*
Funded: November 2000.

E.2.9 **Human Identification by Movement.**
Sponsor: DARPA HumanID Program (IAO)
Investigator(s): A. Bobick, I. Essa, and J. Hodgins.
Amount: *$1,000,000 for 4 years (renewed 2002).*
Funded: August 2000.

E.2.10 **Aware Home Research Initiative.**
Sponsor: A Consortium of Companies that includes, Intel, MERL, Motorola, Accenture, Hewlett Packard.
Investigator(s): G. Abowd, A. Bobick, I. Essa. B. Macintyre, B. Mynatt, T. Starner.
Amount: *~$445,000 per year.*
Consortium Established: Summer 2000.

E.2.11 **The Aware Home: Sustaining the Quality of Life**
Sponsor: National Science Foundation, ITR Program 2001
Investigator(s): G, Abowd, A. Bobick, I. Essa, B. Mynatt, and W. Rogers (Psych)
Amount: *$1,600,000 for 5 years*
Funded, July 2001 - June 2006.

E.2.12 **A Distributed Programming Infrastructure for Integrated Smart Sensors.**
Sponsor: National Science Foundation ITR 2001 Program
Investigator(s): U. Ramachandran, S. Deweerth, I. Essa, K. MacKenzie, T. Starner
Amount: *~ $1,450,000 for 5 years.*
Funded, July 2001 - June 2006.

E.2.13 **Mandatory Human Participation: A New Paradigm for Building Secure Applications**
Sponsor: National Science Foundation, ITR Program 2001
Investigator(s): J. Xu, I. Essa, and D. Lipton
Amount: *$288,000*
Funded, August 2001 - July 2004.

E.2.14 **Analysis of Complex Audio-Visual Events Using Spatially Distributed Sensors.**
Sponsor: National Science Foundation, ITR Program 2002
Investigator(s): J. Rehg and I. Essa
Amount: *$1,000,000*
Funded, August 2002 - July 2007

E.2.15 **Human Activity Inference.**
Sponsor: Central Intelligence Agency, via a Subcontract from MIT
Investigator(s): A. Bobick and I. Essa.
Amount: *$500,000 for 1 year, renewable.*
Funded: August 2002.

E.2.16 **eChronicles for the Soldiers.**
Sponsor: DARPA IPTO, ASSIST Program
Investigator(s): T. Starner, G. Abowd, I. Essa, C. Isbell, with IMTC, IBM and MIT
Amount: *$900,000 for 1 year, renewable.*
Funded: July 2005.

E.2.17 **Future Gaming and Experience Design.**
Sponsor: Turner Entertainment Inc.
Investigator(s): E. Mynatt, I. Essa, B. MacIntyre, J. Bolter, M. Neitsche, J. Murray,
Amount: *$100,000/year renewable.*
Funded: Summer 2005. Renewed: Summer 2006

E.2.18 **CELL Architecture Equipment and Fellowship Grants.**
Sponsor: IBM Shared University Research (SUR) Program and Faculty Fellowships.
Investigator(s): D. Bader, I. Essa, S. Pande, K. Schwan
Amount: *$55,000 equipment and $85,000 personnel funds for 1 year.*
Funded: Fall 2006.

E.2.19 **CELL Sony, Toshiba, IBM (STI) Center Grant.**
Sponsor: Consortium of IBM, Sony, and Toshiba Inc.
Investigator(s): D. Bader, I. Essa, S. Pande, K. Schwan
Amount: *$320,000 for 1 year renewable.*
Funded: Fall 2006.

E.2.20 **GigaPixel Imaging for Virtual Earth**
Sponsor: Microsoft Virtual Earth Research Grant.
Investigator(s): F. Dellaert and I. Essa
Amount: *$ 45,000*
Unrestricted Gift

E.2.21 **Persistent, Adaptive, Collaborative Synthespians**
Sponsor: National Science Foundation, IIS Program 2006
Investigator(s): C. Isbell, I. Essa, and M. Mateas
Amount: *$900,000 for 4 years*
$100,000 for 1 year, funded as a part of NSF SGER Grant.

E.2.22 **CSR-DMSS, SM: Web on Demand - Bridging the Gap Between Social Networks and Ad Hoc Networking.**
Sponsor: National Science Foundation (Division of Computer and Network Systems)
Investigator(s): K. Ramachandran, I. Essa
Amount: *$ 450,000 for 3 years, August 2008*
Three year grant to work on Systems issues underlying Computation and Journalism.

E.2.23 **II-New: Motion Grammar Laboratory.**
Sponsor: NSF Division of Computer and Network Systems
Investigator(s): Mike Stilman (PI), Irfan Essa (Co-PI), Henrik Christensen (Co-PI) Jun Ueda (Co-PI).
Amount: *$303,000. Feb 2011*
Insfrastructure grant for supporting research in complex manipulator motions.

E.2.24 **Proactive Detection of Insider threats with Graph Analysis and Learning (PRODIGAL)**
Sponsor: DARPA ADAMS program, via SAIC
Investigator(s): Lead Organization: SAIC, PI: Ted Senator, GT: David Bader (PI), Irfan Essa (Co-PI)
Amount: *Overall $15M to SAIC, for 5 years. (Co-PI Essa gets $200,000 for each year), September 2011*
SAIC, GTRI and GA Tech project.

E.2.25 **EAGER: Linguistic Task Transfer for Humans and Cyber Systems.**
Sponsor: NSF EArly-concept Grants for Exploratory Research (EAGER) Program
Investigator(s): Mike Stilman (PI), Irfan Essa (Co-PI)
Amount: *$ 99,990 for 2 years, July 2011*
Developing Motion-Grammar for demonstration driven manipulation tasks.

E.2.26 **Social Intelligence (SOCINT) for Social Media In Strategic Communication (SMISC)**
Sponsor: DAPRA SMISC Program
Investigator(s): Eric Gilbert (PI), Irfan Essa (Co-PI), David Bader (Co-PI) Constantine Dovrolis (Co-PI), Lora Weiss (Co-PI)
Amount: *$ 3,200,000 for 4 years, February 2012*
A four year project aimed at analyzing social media

E.2.27 **Using Water-based Events in the Home to Recognize Activities**
Sponsor: Humana Grant via GVU Center
Investigator(s): Gregory Abowd (PI) and Irfan Essa (Co-PI)
Amount: *$ 75,000 for 1 years, January 2012*
One year pilot study to explure use of water activity sensor in the home

E.2.28 **Mobile Computing over Intermittently Connected Networks.**
Sponsor: NSF Networking Technology and Systems (NeTS) Program
Investigator(s): Mostafa Ammar (PI), Irfan Essa (Co-PI), Mayur Naik (Co-PI), Ellen Zegura (Co-PI)
Amount: *$ 695,000 for 3 years, August 2012*
Aimed at research on mobile networking infrastructures for multimedia processing and analysis.

E.2.29 **Virtual Institute for Scientific Software.**
Sponsor: Schmidt Futures
Investigator(s): Alessandro Orso (PI), Irfan Essa (Co-PI)
Amount: *$ 1,250,000 for five years, January 2022*
A Scientific Software Engineering center at Georgia Institute of Technology, in collaboration with several research universities working to accelerate the pace of scientific discovery.

E.3. As a Senior Personnel or Contributor

■ *These are research grants where Dr. Essa contributed directly to the effort that was led by other collaborators.* ■

E.3.1 **Advanced Media-Oriented Systems Research: Ubiquitous Capture, Interpretation, and Access.**
Sponsor: National Science Foundation CISE Instrumentation Program
Investigator(s): U. Ramachandran and several CoC faculty.
Amount: *$ 1,636,194 for 5 years.*
Submitted: November 1998. Funded: July 1999.

E.3.2 **Expeditions in Computing: Computational Behavioral Science: Modeling, Analysis, and Visualization of Social and Communicative Behavior**
Sponsor: National Science Foundation Expeditions Program
Investigator(s): James Rehg (Lead PI), Gregory Abowd (Co-PI). Collaborative Project with GA Tech as lead, MIT, CMU, UIUC, USC, and Boston University as partners.
Amount: *$ 6M for 5 years.*
Funded: July 2010.

E.4. Proposals Submitted but Not Funded (last two years)

E.4.1 **Advanced Human Machine Collaborative Systems - From Workflow Analysis to Action Driven User Interfaces**
Sponsor: European Union's Small/Medium-scale focused research project (STREP), ICT Call 1 FP7-ICT-2007-1, Information and Communication Technologies (ICT) Framework Programme (FP) 7
Investigator(s): D. Stricker [Lead] (IGD, Germany), M. Bergamasco (Scuola Superiore Sant'Anna (SSSA), Italy), N. Chevassus (EADS, France), I. Essa (GA Tech, USA), P. Jannin (INRIA, France), N. Navab (TUM, Germany), G-Z. Yang (Imperial College of London, UK),
Amount: *3,974,501 EUROS for 3 years. Dr. Essa to work with TUM on their share of 647.199 EUROS, NO current plans for funds making to US.*
NOT Funded

F. Other Scholarly Accomplishments

F.1. Patents

■ *Only a few selected recent patents listed here.* ■

F.1.1 "Systems and methods for utilizing motion fields to predict evolution in dynamic scenes," K. Kim, M. Grundmann, A. Shamir, I. Matthews, **I. Essa**, J. Hodgins (2011) [#US20110242326].

F.1.2 "Methods and systems for removal of rolling shutter effects", M. Grundmann, V. Kwatra, and **I. Essa** (2014) [#US20140071299].

F.1.3 "Methods and systems for processing a video for stabilization using dynamic crop" M. Grundmann, V. Kwatra, and **I. Essa** (2014) [#US20140071299].

F.1.4 "Cascaded camera motion estimation, rolling shutter detection, and camera shake detection for video stabilization" M. Grundmann, V. Kwatra, and **I. Essa** (2014) [#US20140267801].

F.1.5 "Visual completion", T. Starner, **I. Essa**, (2015). [#US8971571].

F.1.6 "Object occlusion to initiate a visual search" T. Starner, **I. Essa**, H. Raffle, D. Aminzade (2015) [#US20150242414].

F.1.7 "Using Visual Layers to Aid in Initiating a Visual Search," T. Starner and **I. Essa** (2015)[#US20150286877]

F.1.8 "Systems and methods for attention localization using a first-person point-of-view device." C. Pantofaru, V. Bettadapura, K. Bharat, **I. Essa** (2017). [#US9600723]

F.1.9 "rtCaptcha: A Real-Time Captcha Based Liveness Detection System." E. Uzun, S. Chung, **I. Essa**, W. Lee [Filed/Pending: 62/563,478]

F.1.10 "Vector representation for video segmentation," V. Kwatra, M. Grundmann and **I. Essa** (2018) [US Patent Application # 14/587,420]

F.1.11 "Cascaded camera motion estimation, rolling shutter detection, and camera shake detection for video stabilization," M. Grundmann, V. Kwatra, and **I. Essa**(2018), [US Patent # 9888180], 2018.

F.1.12 "Object occlusion to initiate a visual search." T. E. Starner, **I. Essa**, H. S. Raffle, and D. Aminzade (2019) [US Patent # 10437882].

F.1.13 "Category learning neural networks." S. Hickson, A. Angelova, **I. Essa**, and R. Sukthankar (2020), [US Patent # 10635979],

V. TEACHING

A. Courses Taught

■ *In Reverse Chronological order, most recent at the bottom.* ■

Term/Year	Course Number & Title	Number of Students	Comments
	– Media Laboratory, Massachusetts Institute of Technology. –		
Spring, 1995	MAS 961 Machine Understanding of Video	15	New
	– College of Computing, Georgia Institute of Technology. –		
Winter, 1997	CS 7321 Low-level Computer Vision	26	Revised
Spring, 1997	CS 7322 High-level Computer Vision	15	Revised
Fall 1997	CS 7100 Introduction to Grad Studies	40	Revised
Fall 1997	CS 8113 Computational Perception	15	New
Winter 1998	CS 7321 Low-level Computer Vision	15	
Spring 1998	CS 7322 High-level Computer Vision	20	
Fall 1998	CS 7100 Introduction to Grad Studies	41	
Spring 1999	CS 4803/8113 Digital Special Effects	22	New
Spring 2000	CS 4480 Digital Video Special Effects	32	New
Spring 2001	CS 4480 Digital Video Special Effects	26	
Spring 2002	CS 4480 Digital Video Special Effects	25	
Spring 2002	CS 4496/7496 Computer Animation	33	Revised
Spring 2003	CS 4480 Digital Video Special Effects	37	
Spring 2003	CS 7496 Computer Animation	18	
Spring 2004	CS 4480 Digital Video Special Effects	50	
Fall 2004	CS 4496/7496 Computer Animation	45	Revised
Spring 2005	CS 4480/8113dfx Digital Video Special Effects	30	
Summer 2005	CS 4001 Computerization, Professionalism & Society	20	Barcelona
Summer 2005	CS 4803CP Computational Photography	38	New
Spring 2006	CS 4480/8113dfx Digital Video Special Effects	30	
Summer 2006	CS 4001 Computerization, Professionalism & Society	20	Barcelona
Summer 2006	CS 4475 Computational Photography	38	New Course #
Spring 2007	CS 4480/8803dfx Digital Video Special Effects (SE)	35	Revised
Spring 2007	CS 4803cj/8803cj Computational Journalism	31	New
Spring 2008	CS 4001 Computerization, Professionalism & Society	30	
Spring 2008	CS 4803cj/8803cj Computational Journalism	40	New
Spring 2010	CS 4001 Computerization, Professionalism & Society	30	
Spring 2010	CS 4464/6465 Computational Journalism	40	New
Summer 2010	CS 4001 Computerization, Professionalism & Society	30	Barcelona
Summer 2010	CS 4475 Computational Photography	40	Barcelona
Spring 2011	CS 4001 Computerization, Professionalism & Society	35	
Spring 2011	CS 4475 Computational Photography	30	

Continued on Next Page

Term/Year	Course Number & Title	Number of Students	Comments
Spring 2012	CS 4464/6465 Computational Journalism	40	
Spring 2012	CS 8803PHO Advanced Computational Photography	10	
Spring 2013	CS 4475 Computational Photography	42	
Spring 2014	CS 4464/6465 Computational Journalism	45	
Spring 2014	CS 4001 Computerization, Professionalism & Society	49	
Spring 2015	CS 4475/6475 Computational Photography	56	Revised & Updated
Spring 2015	CS 6475 Computational Photography	186	For MSCS Online
Summer 2015	CS 6475 Computational Photography	142	For MSCS Online
Fall 2015	CS 6475 Computational Photography	140	For MSCS Online
Fall 2015	CS 6476 Computer Vision	220	For MSCS Online
Spring 2016	CS 4475/6475 Computational Photography	75	
Spring 2016	CS 6475 Computational Photography	125	For MSCS Online
Spring 2016	CS 6476 Computer Vision	200	For MSCS Online
Summer 2016	CS 6475 Computational Photography	197	For MSCS Online
Fall 2016	CS 6475 Computational Photography	107	For MSCS Online
Fall 2016	CS 6476 Computer Vision	171	For MSCS Online
Spring 2016	CS 4475/6475 Computational Photography	78	
Spring 2017	CS 6475 Computational Photography	201	For MSCS Online
Spring 2017	CS 6476 Computer Vision	168	For MSCS Online
Fall 2017	CS 6475 Computational Photography	250	For MSCS Online
Fall 2017	CS 6476 Computer Vision	250	For MSCS Online
Spring 2018	CS 6475 Computational Photography	300	For MSCS Online
Spring 2018	CS 6476 Computer Vision	350	For MSCS Online
Fall 2018	CS 6475 Computational Photography	300+	For MSCS Online
Fall 2018	CS 6476 Computer Vision	350+	For MSCS Online
Spring 2019	CS 6475 Computational Photography	300+	For MSCS Online
Spring 2019	CS 6476 Computer Vision	350+	For MSCS Online
Fall 2019	CS 6475 Computational Photography	300+	For MSCS Online
Fall 2019	CS 6476 Computer Vision	350+	For MSCS Online
Spring 2020	CS 6475 Computational Photography	300+	For MSCS Online
Spring 2020	CS 6476 Computer Vision	350+	For MSCS Online
Fall 2020	CS 6475 Computational Photography	300+	For MSCS Online
Fall 2020	CS 6476 Computer Vision	350+	For MSCS Online
Spring 2021	CS 6475 Computational Photography	300+	For MSCS Online
Spring 2021	CS 6476 Computer Vision	350+	For MSCS Online
Spring 2021	CS 4475/6475 Computational Photography	100	On Campus (Online)
Fall 2021	CS 6475 Computational Photography	150+	For MSCS Online
Fall 2021	CS 6476 Computer Vision	450+	For MSCS Online
	++Some of the Number of Students since Spring 2018 are approximate.		
	– Coursera.ORG –		
Spring 2013	Intro to Computational Photography	3,000	3,000 got certificates

Seminars

Quarter/Year	Course Number & Title	Number of Students	Comments
Seminars			
Winter 97-Fall 98	Software Agents	7-10	Seminar
Winter-Spring, 98	Technology and Society	10	Seminar
Fall 97-Spring 00	Future Computing Environments	15-25	Seminar

B. Individual Guidance

■ *In Reverse Chronological order, most recent at the end within each category.* ■

B.1. Visiting Scientists

Atsushi Nakazawa (CoC)
2008- 2009
Publications: *B.2.71*
Visiting from University of Tokyo, JAPAN

Dr. Thomas Plötz (CoC)
2012- 2012
Publications: *B.2.90, B.2.96, B.2.100, B.2.103, B.2.106, B.2.109, B.2.110* and *B.1.20*
Visiting from University of Newcastle, ENGLAND. Now Faculty at Georgia Tech in the School of Interactive Computing

B.2. Post-Doctoral Fellows / Research Scientists

Dr. Lionel Reveret (CoC)
Spring 2000 - Fall 2001.
Publications: *B.4.4, and B.2.21.*
Research on building Conversational Agents.
Faculy *At INRIA Rhöne-Alpes*

Dr. Grant Schindler (School of Interactive Computing)
Spring 2010- 2012.
Publications: *B.2.84, B.2.85, B.2.90*
Research on Mobile Vision and Visual Surveillance

Dr. Josh Jones (School of Interactive Computing, with Prof. Charles Isbell)
Fall 2011- Present.
Research on Activity Recognition and Anomaly Detection

B.3. Ph.D. Students Supervised

Darnell J. Moore (ECE, with Professor M. Hayes)
Winter 1997 - Spring 2000.
Publications: *B.3.8,B.2.10, B.2.20* and *B.2.23.*
Dissertation Title: "Vision-Based Recognition of Actions using Context."
Member of Research Staff Texas Instrument Corp. Dallas, TX. USA. 2000 - Present.

Arno Schödl (CoC)
Fall 1997 - Summer 2002.

Publications: B.2.8, B.2.9, B.1.7, B.2.15, B.2.18, B.2.22, and B.1.9.
PhD Dissertation Title: "Multi-Dimensional Exemplar-Based Texture Synthesis."
Awarded Microsoft Research Fellowship 2000-2002.
Awarded Georgia Tech College of Computing's Outstanding Graduate Student Research Award 2002.
Awarded Georgia Tech College of Computing's Outstanding Thesis Dissertation Award 2003.
Founder and Technical Director, Think-Cell Software, Berlin, Germany, 2002 - Present

Gabriel J. Brostow (CoC)
Fall 1997 - Spring 2004.
Publications: B.1.10, B.2.11, B.1.8 and B.2.35.
PhD Dissertation Title: "Novel Skeletal Representation for Articulated Creatures."
Awarded NSF HCI Trainee Fellowship 1998-2000.
Awarded Intel PhD Student Fellowship 2000-2001.
Awarded Georgia Tech College of Computing's Outstanding Graduate Student Teaching Award 2002.
Awarded Georgia Tech College of Computing's Outstanding PhD Dissertationa Award 2004.
Awarded Marshall Sherfield Post Doctoral Fellowship by Marshall Commission 2004
Lecturer/Assistant Professor at University College of London, U. K.(2009-Present).

Antonio Haro (CoC)
Fall 1997 - Fall 2003.
Publications: B.2.8, B.3.9, B.2.13, B.2.16, B.2.25, B.2.26, B.2.33, and B.2.32
PhD Dissertation Title: "Example-based Image and Video Synthesis".
Awarded AT&T Graduate Fellowship 1998-2003.
Technology Lead Viewpoint Inc. 2007 - Present.

Drew Steedly (CoC)
Spring 1998 - Fall 2004.
Publications: B.2.17, B.2.29 and B.2.35.
PhD Dissertation Title: "Optimal Structure from Motion for Extended Video Sequences."
Transferred from Georgia Tech's School of ECE in Fall 1998.
Awarded Intel PhD Student Fellowship 2001-2002.
Member of Technical Staff at Microsoft, Redmond, WA, Active on Microsoft's Photosynth and Hololense projec (2004-Present).

Vivek Kwatra (CoC, with Professor Aaron Bobick)
Fall 2001 - 2005.
Publications: B.1.9, B.2.35, B.1.12, B.2.75, B.2.76, B.2.80 and B.2.82
PhD Dissertation Title: "Example-based Rendering of Textural Phenomenon."
Awarded Georgia Tech College of Computing's Outstanding Graduate Student Research Award 2005.
Awarded Georgia Tech College of Computing's Outstanding Dissertation Award 2007.
Joined Google Inc. as Researcher (2007-Present).

David Minnen (CoC, with Professor Thad Starner)
Fall 2001 - Summer 2008.
Publications: B.2.27, B.2.38, B.2.52, B.4.7, B.2.56, B.2.59 and B.2.64.
Thesis Research on Human Activity Recognition.
Awarded NSF Graduate Student Fellowship 2002 - 2005. *Currently Director of Computer Vision Research at Oblong Inc, Los Angeles, CA, USA.*

Stephanie Wojtkowski (CoC)
Fall 2002 - Fall 2005.

Awarded NSF Graduate Student Fellowship 2003 - 2006.
Left the PhD program due to personal reasons, currently at Google Inc.

Yan Huang (CoC)
Fall 2002 - Fall 2006.
Publications: *B.2.28*, *B.2.38*, *and B.2.42*
Left the PhD program due to personal reasons, Currently at Google Inc.

Pei Yin (CoC, with Professor Thad Starner)
Fall 2002 - Spring 2010.
Publications: *B.2.34*, *B.3.12*, *B.2.37*, *B.2.58*, *B.4.9*, *B.2.65 and B.1.17*
Thesis on Learning Methods for VideoAnalysis.
Currently working at Google, Mountain View, CA, USA.

R. Mitch Parry (CoC)
Fall 2002 - Fall 2007.
Publications: *B.2.31*, *B.2.41*,*B.2.46*, *B.2.48B.2.49*, *B.3.13*, *B.2.57 and B.2.60*
Thesis Research on Music Processing and Retrieval. Finished PhD October 2007. Currently a Post-Doctoral Fellow in GA Tech's BME Department. Joining Apalachan State College as Assistant Professor in 2012

Ravikrishna Ruddarajju (ECE)
Spring 2002 - Fall 2007.
Publications: *B.2.26*, *and B.2.32*
On leave from PhD program in ECE, working at Goldman-Sachs in NY City. ***Awarded Intel Undergraduate Research Fellowship Award 2002.***
Awarded Georgia Tech Presidential Undergraduate Research Award 2003.
Second Prize, Georgia Tech College of Computing Undergraduate Research in Computing (UROC) Symposium 2003.

Nick Diakopoulos (CoC)
Fall 2003 - Summer 2009.
Publications: *B.2.39*, *B.4.6*, *B.2.47*, *B.2.53*, *B.2.62*, *B.2.68*, *B.2.66*, *and B.2.72*
Thesis Research on Content-based Image and Video Analysis and Synthesis and Computational Journalism.
Awarded the GA Tech's Technological Innovation: Generating Economic Results (TI:GER) Fellowship 2007
Awarded the NSF/CRA/CCC's Computing Innovations Fellowship 2009
Professor at Northwestern

Yifan Shi (CoC, with Professor Aaron Bobick)
Fall 2004 - Fall 2007.
Publications: *B.2.38 and B.2.51*
Research on Activity Recognition.
At Present working at Twitter Inc.

Mohammed Raffay Hamid (CoC, with Professor Aaron Bobick)
Fall 2002 - Fall 2008.
Publications: *B.2.28*, *B.4.5*, *B.2.45*, *B.2.55*, *B.2.63*, *B.1.15*
Research on Activity Recognition. At Present working at Ebay Inc. as a Research Scientist

Kihwan Kim (CoC)
Fall 2005- Fall 2012.
Publications: *B.2.54*, *B.2.67*, *B.2.73*, *B.1.18*, *B.2.77*, *B.2.78*, *B.2.81*, *B.2.79*, *and B.2.83*
Research on Multiview Modeling and Visualization with Geo Spatial Information.
At Present working at Nvidia Research as Research Scientist.

Matthias Grundmann (CoC)
Fall 2008- Spring 2013.
Publications: *B.2.69, B.2.75, B.2.76, B.2.77, B.2.78, B.2.80, B.2.82, B.2.86, B.2.88, B.2.91*
Research on Video Analysis and Synthesis.
Awarded the Google PhD Scholarship/Fellowship in Computer Vision 2011
Awarded Google Excellent research papers awards for 2011and 2012.
Awarded Best Paper Award for a paper in the International Conference in Computational Photography for B.2.82 in 2012.
***Awarded Best Paper Award for a paper in the ECCV twoktwelve Workshop on Web-scale Vision and Social Media** for B.2.86 in 2012.*
Currently at Google Research

Edison Thomaz (CoC, with Professor Gregory Abowd)
Fall 2010- Present.
Publications: *B.2.85, B.4.10, B.2.103, B.2.107, B.2.108, B.2.109, A.2.7, and B.2.118*
Working on Ubiquitous Systems for Food Journaling.
Awarded the Best Short Paper Award in ACM Conference on Intelligence User Interfaces (IUI) for B.2.107 in 2015
Accepted a Facutly Position at University of Texas at Austin 2016

Vinay K. Bettadapura (CoC)
Fall 2010- Present.
Publications: *B.2.85, B.2.90, B.2.96, B.2.100, B.2.103, B.2.106, B.2.109, B.2.110 and B.1.20*
Working on Context-based Visual Recognition.
Joined Google Inc. 2016
Awarded Best Paper (Honorable Mention) in MICCAI 2014 Workshop on Modeling and Monitoring of Computer Assisted Interventions (M2CAI) (B.2.100).
Awarded Best Paper in IEEE Winter Conference on Applications of Computer Vision (WACV) 2015 (B.2.106).

S. Hussain Raza (ECE)
Fall 2012- Spring 2014.
Publications: *B.2.91, B.2.99 and B.2.105*
Worked on Scene Understanding from Video.
Currently working at NVidia Corporation

Yachna Sharma (ECE)
Fall 2012- Spring 2014.
Publications: *B.2.96, B.2.100, B.2.110 and B.1.20*
Worked on Workflow Analysis of Surgery.
Currently working at ViaSat Inc.
Awarded Best Paper (Honorable Mention) in MICCAI 2014 Workshop on Modeling and Monitoring of Computer Assisted Interventions (M2CAI) (B.2.100).

Zahoor Zafrulla (CoC with Professor Thad Starner)
Fall 2007- Spring 2014.
Worked on Visual Recognition of American Sign Language.
Currently working at Bright Sky Labs.

Aneeq Zia (ECE)
Fall 2012- 2018.
Publications: *B.2.110, B.1.20, B.2.113, B.2.117, and B.2.121*
Working on Surgical Activity Recognition and Assessment

Unaiza Ahsan (CoC)
Fall 2012- 2019.
Publications: *B.2.98*, *B.2.116*, *and B.2.114*
Working on Social Networking with Multimedia
Currently at Home Depot

Daniel Castro (CoC)
Fall 2009- 2019.
Publications: *B.2.82 B.2.109*, *B.2.111 and B.2.113*
Research in Computational Photography
2nd Prize (People's Choice Awards category), Georgia Tech College of Computing Undergraduate Research in Computing (UROC) Symposium 2012,
Outstanding Undergraduate Researcher, Georgia Tech College of Computing 2012,
Outstanding Undergraduate Researcher, Georgia Tech UROP Program2012.
Awarded Best Paper Award for a paper in the International Conference in Computational Photography for B.2.82 in 2012.
Currently at Google Research, Atlanta.

Steven Hickson (CoC)
Fall 2012- 2020.
Publications: *B.2.97*, *B.2.104 and B.2.109*
Working on Scene Understanding for Robots.
Currently at Google Research, Atlanta.

Huda Alamri (CoC)
Fall 2016- Present.
Publications: *B.2.125*
Working on Vision and Language

Vincent Cartillier (ECE)
Fall 2017- Present.
Publications: *B.2.125 and B.2.134*
Working on Embodied AI

Erik Wijmans (CoC) with Dhruv Batra
Fall 2017- Present.
Publications: *B.2.124*, *B.2.132*, *C.1.8*, *C.1.6*, *B.2.147*, *and* **??**
Working on Embodied AI

Niranjan K. Kannabiran (ECE) with Sehoon Ha
Fall 2017- Present.
Publications: *C.1.5*
Working on Vision and Robotics

Apoorva Beedu (ECE)
Fall 2018- Present.
Publications: *B.2.128*
Working on Vision and Robotics

Dan Scarafoni (CoC/Machine Learning) with Thomas Ploetz
Fall 2019- Present.
Working on Human Activity Recognition

Daniel Nkemelu (CoC/Human-Centric Computing) with Mike Best
Fall 2019- Present.
Working on Hate Speech Detection in Online media

Nikolai Warner (CoC/Robotics)
Fall 2022- Present.
Working on Human Activity Assessment

Karan Samel (CoC/Machine Learning)
Fall 2022- Present.
Working on Video Analysis

B.4. M.S. Students supervised

■ *Dr. Essa has worked with over 30 MS Student Researchers over the years. Here are listed a select few.* ■

Ken Miller (MIT)
Fall 1994 - Spring 1996.
Graduated: Spring 1996
Thesis title: "Eigenmethods for Representing 3D Face Data."

Sumit Basu (MIT, Co-advised with Dr. Alex Pentland)
Fall 1994 - Spring 1996.
Publications: *B.2.6, and B.2.7.*
Research Scientist at Microsoft Research 2002.

Arno Schödl (CoC)
Fall 1997 - Fall 1999.
Publications: *B.2.8, B.2.9.*
Completed MS June 1999. Continuing towards a Ph.D.

Katherine Sukel (Psychology, with Prof. Richard Catrambone)
Winter 1998 - Present.
Publications: *B.1.10.*
Completed MS June 1999. Admitted to Ph.D. Program in CoC, decided not to pursue PhD.

Sunil Mishra (CoC)
Fall 1997 - Fall 1999.
Research on analyzing audio and video streams to extract relevant communicative features.
Working at Stanford Research Institute (SRI), Menlo Park, California.

J Austin Hijar (CoC)
Summer 2001 - Fall 2001.
Research on Sound Spaces with Vision Support.

Alan Chen (CoC)
Fall 2000 - Fall 2002.
Research on Generating Non-photorealistic Renderings of Motion.
Now at Sony Imageworks Studios

Ramprasadh Ramanarayanan (CoC)
Fall 2001 - Fall 2003.
Research on Fusion of Audio and Video for Interactive Agents.

Jeannie Lee (CoC)
Spring 2002 - Fall 2003.
Research on Fusion of Audio and Video for Distributed Computing. Working at Nexedia Inc.

Clint Hidinger (CoC)
Spring 2003 - 2005.
Research on Motion Capture Synthesis from Data.

Siddhartta Maddi (CoC/Math)
Fall 2002 - Fall 2005.
Publications: *B.4.5, B.2.45,B.2.55 and B.2.63*
Working on Plan Recognition in the Aware Home.
Awarded Georgia Tech's Presidential Undergraduate Research Award 2003.
At Present working at MIT Lincoln Labs.

Guarav Chanda (CoC)
Summer 2003 - Spring 2005.
Research on Image and Video-based Rendering.
At Present working at Amazon Inc. in Seattle, WA, USA.

Nipun Kwatra (CoC)
Fall 2004- Spring 2006.
Publications: *B.1.12*.
Research on Physical Simulation and Motion Capture. Finished PhD at Stanford. At Present working at Google.

Kevin Quennesson (CoC, with Professor Michael Mateas)
Fall 2004- Fall 2005.
Research on Motion Capture Synthesis from Data. Also worked with Professors Dellaert and Mazalek.
Now working at Twitter Inc.

Matthias Grundman (CoC and Exchange Student from TU Munich)
Fall 2006-2008
Publications: *B.2.69*
Research on Video Analysis and Synthesis. Joined PhD program at GT.

Franziska Meier (CoC and Exchange Student from TU Munich)
Fall 2007-2009
Publications: *B.2.69, B.1.14*
Research on Video Analysis and Synthesis.
Currently a PhD student at USC, Los Angeles, CA., USA.

Radford Parker (ECE)
Fall 2011-2012
Research on Video Analysis and Synthesis.
Working at ESPN 2012.

Chris McClanahan (CoC)
Fall 2011-2012
Publications: *B.2.88*
Research on Video Analysis and Synthesis.
Working at Google Research 2017.

Kevin Hampton (CoC)
Fall 2010- Fall 2012.
Research on Interactive Annotation and Tracking
Now working at Microsoft Inc.

Jing Wang (CoC, MS in CS)with Grant Schindler)
Fall 2011-2012
Publications: *B.2.84*
Working on Proprioceptive Vision.

Denis Aleshin (CoC, MS in CS)
Fall 2010- Present.
Publications: *B.2.92*
Working on NSF Expeditions Project to Analyze Child Behaviours.

Julia Deeb (CoC)
Fall 2014- 2018.
Publications: *B.2.115*
Working on Social Networking with Multimedia

B.5. Undergraduate Research Students.

■ *Dr. Essa has worked with over 50 Undergraduate Researchers over the years. Here are listed a select few.* ■

Thad Starner (MIT) with Professor Alex Pentland
Spring 1989 - Spring 1992
Title: "Efficient C implementation of the ThingWorld Modeling System."
Finished Ph.D. from MIT and joined Georgia Tech / College of Computing as faculty (January 1999).

Roberto Peon (CoC)
Spring 1997 - Spring 2000.
Awarded the Georgia Tech Undergraduate Research Internship Award, 1999.
Awarded the Undergraduate Research in Computing Research Award, 2000.
Currently on staff at Google Inc.

Tim Keenan (CoC)
Fall 2000 - Spring 2001.
Awarded Undergraduate Research in Computing Award 2001.
on Staff at PDI Dreamworks Studios.

James Hays (CoC)
Spring 2001 - Fall 2003.
Publications: *B.2.36*
Awarded Intel Undergraduate Research Fellowship Award 2001.
First Prize, Georgia Tech College of Computing's Undergraduate Research in Computing (UROC) Symposium 2002.
Attending PhD Program at CMU CS Dept, 2003.
Georgia Tech Outstanding Undergraduate Award 2003.
NSF Graduate Student Fellowship Honorable Mention 2003.
NSF Graduate Student Fellowship 2005.
Joined Faculty at Brown University in Computer Science in 2009.
Joined Faculty at Georgia Tech in Interactive Computing in 2015.

Scott Carter (CoC)
Spring 2000 - Spring 2002.
Awarded Undergraduate Research in Computing Award 2001.
Passed Away in 2009

Ravikrishna Ruddarajju (ECE)
Spring 2002 - Spring 2004.
Publications: *B.2.26* and *B.2.32*
Awarded Intel Undergraduate Research Fellowship Award 2002.
Awarded Georgia Tech Presidential Undergraduate Research Award 2003.
Second Prize, Georgia Tech College of Computing Undergraduate Research in Computing

(UROC) Symposium 2003
Currently on leave as a PhD Student in ECE at Georgia Tech. Working at Goldmann Sachs.

Siddhartta Maddi (CoC)
Fall 2002 - Spring 2003.
Publications: *B.2.45*
Working on Plan Recognition in the Aware Home.
Awarded Georgia Tech's Presidential Undergraduate Research Award 2003.
Currently at Amazon

Matthew Fong (CoC)
Fall 2006- Spring 2007.
Publications: *B.3.14*
Research in Computational Journalism, primarily advised by PhD Student Nick Diakopoulos.
Third Prize, Georgia Tech College of Computing Undergraduate Research in Computing (UROC) Symposium 2007
First Prize, Georgia Tech Intel Opportunity Scholar's Program (IOS) Symposium 2007

Aaron St. Clair (CoC)
Fall 2006- Summer 2007.
Publications: *B.3.14*
Research in Computational Journalism, primarily advised by PhD Student Nick Diakopoulos.
Third Prize, Georgia Tech College of Computing Undergraduate Research in Computing (UROC) Symposium 2007,
First Prize, Georgia Tech Intel Opportunity Scholar's Program (IOS) Symposium 2007.

Sweta Vajjhala (CoC)
2008- Present.
Research in Computation and Journalism.
Honorable Mention, CRA Outstanding Undergraduate Award 2008.

Joy Buolamwini (CoC)
2011- 2012.
Research in Human Robot Interaction.
Second Prize, Georgia Tech College of Computing Undergraduate Research in Computing (UROC) Symposium 2011.
NASA Astronaut Scholar 2010-2011.
Google Anita Borg Scholar 2011.
Fullbright Scholar 2012-2013.
Rhodes Scholar 2013.
PhD Student at MIT Media Lab 2015.

Ryan Gomba (CoC)
2011- 2012.
Research in Social Photography on Instacam.
Joined Instagram as employee # 13 before Facebook acquisition.

B.6. Dissertation Committees

■ *Dr. Essa has been on more then 40 Ph. D. Area Examining Committees at Georgia Tech and at Other Universities. Titles of Student's Dissertations are skipped for brevity.* ■

Ph.D. Examining Committee – OTHER UNIVERSITIES.

1. Iddo Drori, **School of Computer Science, Tel-Aviv University**, December 2004.
   Thesis Title: Example-based Rendering
   Principal Advisor: Dr. Daniel Cohen-Or.

2. Sebastian Theophil, **Institut für Informatik, Humboldt-Universität zu Berlin**, August 2008.
   Thesis Title: An Efficient Algorithm for Scatter Chart Labeling and Layout
   Principal Advisor: Dr. Dieter Burkhard.

3. Sarah Aboutalib, **Carnegie Mellon University**, November 2008.
   Thesis Title: Context-Dependent Multi-Cue Object Recognition
   Principal Advisor: Dr. Manuela Veloso.

Ph.D. Examining Committee – Georgia Tech.

1. Fu-Huei Liu, Department of ECE, College of Engineering, Georgia Tech., December 1996.
   Thesis Title: "Rate Quality-based Video Coding."
   Principal Advisor: Dr. Russell M. Merserau.

2. Sadik Bayrakeri, Department of ECE, College of Engineering, Georgia Tech., March 1997.
   Thesis Title: "Scalable Video Coding using Spatio-Temporal Interpolation."
   Principal Advisor: Dr. Russell M. Merserau.

3. G. Drew Kessler, College of Computing, Georgia Tech., July 1997.
   Thesis Title: "Simple Virtual Environment."
   Principal Advisor: Dr. Larry Hodges.

4. Alan Docef, Department of ECE, College of Engineering, Georgia Tech., September 1997.
   Thesis Title: "Tele-medicine Applications of Sub-band Image Coding at Very Low Bit Rates"
   Principal Advisor: Dr. Mark Smith.

5. Ram Rao, College of Computing, Georgia Tech., July 1998.
   Thesis Title: "Multi-modal coding of lip movements."
   Principal Advisor: Dr. Russell M. Merserau.

6. Xue Li, College of Computing, Georgia Tech., July 1998.
   Thesis Title: "Scalable and Adaptive Video Multi-cast."
   Principal Advisor: Dr. Mostafa Ammar.

7. Clinton Knight, School of Electrical and Computer Engineering, Georgia Tech., March 1999.
   Thesis Title: "WWW-based Automatic Testing of Analog Circuits."
   Principal Advisor: Dr. Stephen DeWeerth.

8. Jack Tumblin, College of Computing, Georgia Tech., May 1999.
   Thesis Title: "Three Detail-Preserving Contrast Reduction Methods for Displayed Images."
   Principal Advisor: Dr. Gregory Turk.

9. Ara Nefian, School of Electrical and Computer Engineering, Georgia Tech., August, 1999.
   Thesis Title: "A Hidden Markov Model-Based Approach for Face Detection and Recognition."
   Principal Advisor: Dr. Monson Hayes.

10. James O'Brien, College of Computing, Georgia Tech., November, 1999.
    Thesis Title: "Modeling Brittle Fracture."
    Principal Advisor: Dr. Jessica Hodgins.

11. Peter Lindstrom, College of Computing, Georgia Tech., February, 2000.
    Thesis Title: "Image-driven Polygon Simplification and Optimization."
    Principal Advisor: Dr. Gregory Turk.

12. Charles Wilson, School of Electrical and Computer Engineering, Georgia Tech., June 2001.
Thesis Title: "Neuromorphic Implementations of Selective Attention."
Principal Advisor: Dr. Stephen DeWeerth.

13. David Stahl, College of Computing, Georgia Tech., August 2001.
Thesis Title: "Bag-of-Particles: An Interactive, Physically-based Deformable Model."
Principal Advisor: Dr. Norberto Ezquerra.

14. Ron Metoyer, College of Computing, Georgia Tech., August 2001.
Thesis Title: "Combining Character Intelligence and 2D Direction to Control 3D Animations."
Principal Advisor: Dr. Jessica Hodgins.

15. Victor Zordan, College of Computing, Georgia Tech., February 2002.
Thesis Title: "Motion Capture Simulations that Hit and React."
Principal Advisor: Dr. Jessica Hodgins.

16. Amos Johnson, School of Electrical and Computer Engineering, Georgia Tech., May 2002.
Thesis Title: "Human Identification: A Method for Gait Recognition Using Static, Activity Specific Body Parameters."
*Principal Advisor: Dr. Aaron Bobick.*2003

17. Huong Quynh Dinh, College of Computing, Georgia Tech., May 2002.
Thesis Title: "Implicit Shapes: Reconstruction and Transformation"
*Principal Advisor: Dr. Greg Turk.*2003

18. Elliot Moore, School of Electrical and Computer Engineering, Georgia Tech., November 2003.
Thesis Title: "Detecting Depression in Speech"
Principal Advisor: Dr. Mark Clements.

19. Mike Covington, College of Computing, Georgia Tech., January 2004.
Thesis Title: "Parameterized Authentication"
Principal Advisor: Dr. Mustaq Ahamad.

20. Mark Carlson, College of Computing, Georgia Tech., July 2004.
Thesis Title: Rigid, Melting, and Flowing Fluid
Principal Advisor: Dr. Greg Turk.

21. Buyoongmoon Kim, College of Computing, Georgia Tech., November 2006.
Thesis Title: Geometric Selection of Mesh Filter Parameters and Simulation of Fluids with Reduced Diffusion, Thin Liquid Films, and Volume Control
Principal Advisor: Dr. Jarek Rossignac.

22. Robert Brooks Van Horn III, College of Computing, Georgia Tech., December 2006.
Thesis Title: Procedural Reduction Maps
Principal Advisor: Dr. Greg Turk.

23. Huamin Wang, College of Computing, Georgia Tech., March 2009.
Thesis Title: Fast and Realistic Animations of Fluids
Principal Advisor: Dr. Greg Turk.

24. Matt Flagg, College of Computing, Georgia Tech., August 2009.
Thesis Title: Capture, Analysis and Synthesis of Photorealistic Crowds
Principal Advisor: Dr. James Rehg.

25. Kai Ni, College of Computing, Georgia Tech., Sept 2010.
Thesis Title: Tectonic Smoothing and Mapping
Principal Advisor: Dr. Karen Liu.

26. Sumit Jain, College of Computing, Georgia Tech., June 2011.
Thesis Title: Exploiting Contacts For Interactive Control Of Animated Human Characters
Principal Advisor: Dr. Karen Liu.

27. Alireza Fathi, College of Computing, Georgia Tech., May 2012.
Thesis Title: Learning to Recognize Daily Activities using Attention
Principal Advisor: Dr. James Rehg.

B.7. Visiting Researchers

Dr. Hyunsik Ahn (Visiting from Tongmyong University, Korea)
Spring 2007- Spring 2008.
Research on building Persistent Robotic Agents in the Home.

Dr. Atsushi Nakazawa (Visiting from Osaka University, Japan, with Prof. Rehg)
Spring 2007- Spring 2008.
Publications: *B.2.71*
Research on Activity Recognition and Behavioral Imaging.

Dr. Thomas Ploetz (Visiting from New Castle University, UK. with Profs. Abowd & Rehg)
Spring 2011- Spring 2012.
Publications: *B.2.90*,*B.4.10*, *B.2.85*
Research on Activity Recognition and Behavioral Imaging.

VI. SERVICE

A. Professional Contributions

A.1. Memberships and Activities in Professional Societies

- Fellow, Institute of Electrical and Electronics Engineers (IEEE). (Elected to IEEE Fellow Grade 2011)
  - IEEE Computer Society.
  - IEEE Computer Society, Technical Committee on Pattern Analysis and Machine Intelligence.
- Senior Member, Association for Computer Machinery (ACM). (Elected to Senior Membership 2008)
  - SIGGRAPH. (Elevated to a SIGGRAPH Pioneer 2008).
  - SIGCHI.
- Member, Sigma-Xi, Tau Beta Pi.

A.2. Invited Study Panels and Planning Workshops

1. **Invited Panelist/Presenter**, *NSF Workshop on Facial Modeling and Animations*, [Organized by Norm Badler (U. of Pennsylvania)] Philadelphia, PA, USA, November 1993.
2. **Invited Panelist/Presenter**, *NSF/DARPA Workshop on Perception of Action*, [Organized by Aaron Bobick (MIT)] Brewster, MA., USA, May 1997.
3. **Invited Panelist/Presenter**, *NSF/DARPA Workshop on Smart Spaces*, [Organized by Gregory Abowd (Ga Tech) and Bill Schilit (Xerox)] Atlanta, GA., USA, April 2000.
4. **Invited Panelist/Presenter**, *DARPA Activity Recognition and Surveillance Planning Workshop*, [Organized by Jonathan Phillips (DARPA)] Washington, DC., USA, March 2002.

5. **Invited Panelist/Presenter**, *DARPA Next Generation Facial Analysis Planning Workshop*, [Organized by Jonathan Phillips (DARPA)] Washington, DC., USA, May 2002.

6. **Invited Panelist/Presenter**, *DARPA Facial Modeling and Reconstruction Planning Workshop*, [Organized by Rick Satava (DARPA)] Washington, DC., USA, February 2005.

7. **Invited Panelist/Presenter**, *DARPA ISAT Study Panel on Adaptive and Interactive Representations*, [Organized by Trevor Darrell (MIT) and Leslie Kaelbing (MIT)] Boston, MA., USA, February 2006.

8. **Invited Panelist**, *NSF Workshop on Social Dynamics*, [Organized by Tanzeem Chaudhary (Intel) and James Kitts (U. of Washington)] Washington, DC., USA, November 2006.

9. **Invited Panelist/Presenter/Study Member** *DARPA ISAT Study Panel on EXPOSE (Exploitation of Persistent Operational Surveillance)*. (January and March, 2007) Washington, DC., June 2007, Boston, MA., August 2007, Woods Hole MA.2007.

10. **Invited Panelist/Presenter/Study Member** *DARPA ISAT Study Panel on Enahncing Peer Production.* (January and March, 2008) Washington, DC., June 2008, Sunnyvale, CA., August 2008, Woods Hole MA.2008.

A.3. Conference Committee Activities

1. **Member, Program Committee**, *International Conference on Multi-modal Interaction*, Beijing, China, October 1996.

2. **Chair, Program Committee**, *Second International Conference on Automatic Face and Gesture Recognition 1996*, Woodstock, VT., USA, October 1996.

3. **Co-chair, Program Committee**, "Workshop on Nonrigid and Articulated Motion", In Conjunction with *IEEE Computer Vision and Pattern Recognition Conference 1997*, Puerto-Rico, June 1997.

4. **Member, Program Committee**, "Workshop on Recent Advances in Computer Vision", In Conjunction with *IEEE International Conference on Computer Vision 1998*, Bombay, India, January 1998.

5. **Member, Program Committee**, International Conference on Automatic Face and Gesture Recognition 1998, Nara, Japan, April 1998.

6. **Member, Program Committee**, "Workshop on Interpretation of Visual Motion", In Conjunction with *IEEE Computer Vision and Pattern Recognition Conference 1998*, Santa Barbara, CA., June 1998.

7. **Member, Program Committee**, *IEEE Computer Vision and Pattern Recognition Conference 1998*, Santa Barbara, CA., June 1998.

8. **Member, Program Committee**, *Computer Animation Conference 1998*, Philadelphia, PA, June 1998.

9. **Senior Reviewer & Member, Program Committee**, *ACM SIGGRAPH 1998 Conference 1998*, Orlando, FL., July 1998.

10. **Member, Program Committee**, *Computer Animation Conference 1999*, Geneva, Switzerland, June 1999.

11. **Member, Program Committee**, *International Conference on Automatic Face and Gesture Recognition 2000*, Grenoble, France, April 2000.

12. **Member, Program Committee**, *Computer Animation Conference 2000*, Philadelphia, PA, June 2000.

13. **Member, Program Committee**, *IEEE Computer Vision and Pattern Recognition Conference 2000*, Hilton Head, SC., June 2000.

14. **Member, Program Committee**, "Workshop on Modeling People" at the *IEEE Computer Vision and Pattern Recognition Conference 2000*, Hilton Head, SC., June 2000.

15. **Member, Program Committee**, *IEEE Workshop on Human Modeling* in Austin, TX, December 2000.

16. **Member, Program Committee**, *IEEE International Conference of Computer Vision* in Vancouver, BC, Canada, July 2001.

17. **Member, Program Committee**, "IEEE Workshop on Detection and Recognition of Events in Video" at the *IEEE International Conference of Computer Vision* in Vancouver, BC, Canada, July 2001.

18. **Member, Program Committee**, *Computer Animation Conference 2001*, Korea, June 2001.

19. **Member, Program Committee**, *ACM Workshop on Perceptual User Interfaces Workshop (held in Conjunction with UIST 2001)*, Orlando, FLorida, October 2001.

20. **Member, Program Committee**, *IEEE Workshop on Cues in Communications, (held in Conjunction with CVPR 2001)*, Kauai, Hawaii, December 2001.

21. **Member, Program Committee**, *American Association of Artificial Intelligence Conference 2002*, Alberta, Canada, July 2002.2003

22. **Member, Program Committee**, *First ACM Symposium on Computer Animation 2002*, San Antonio, TX, USA, July 2002.2003

23. **Member, Program Committee**, *International Conference on Pattern Recognition 2002*, Quebec City, Quebec, Canada, June 2002.2003

24. **Member, Program Committee**, *IEEE Workshop on Applications of Computer Vision 2002*, Orlando, Florida, December 2002.2003

25. **Member, Program Committee**, *IEEE Conference on Computer Vision and Pattern Recognition 2003*, Madison, Wisconsin, June 2003.

26. **Senior Reviewer and Member Program Committee**, *ACM SIGGRAPH 2003*, San Diego, CA, July 2003.

27. **Member, Program Committee**, *IEEE International Conference on Computer Vision*, Nice, France, October 2003.

28. **Member, Program Committee**, *Neural Information Processing Systems (NIPS) 2003*, Vancouver, BC, CANADA, December 2003.

29. **Area Chair, Program Committee**, *Computer Vision and Pattern Recognition (CVPR 2004)*, Washington, DC, USA, June 2004.

30. **Senior Reviewer and Member, Program Committee**, *ACM SIGGRAPH 2004*, Los Angeles, CA, USA, August 2004.

31. **Member, Program Committee**, *ACM UIST 2004*, Santa Fe, New Mexico, USA, October 2004.

32. **Member, Program Committee**, *Neural Information Processing Systems (NIPS) 2004*, Vancouver, BC, CANADA, December 2004.

33. **Co-chair and Organizer**, *NIPS 2004 Workshop on Activity Recognition and Discovery*, Whistler, BC, CANADA, December 2004.

34. **Member, Program Committee**, *Second International Workshop of Human Interactive Proofs (HIP 2005)*, Lehigh, PA, USA, May 2005.

35. **Member, Program Committee**, *Computer Vision and Pattern Recognition (CVPR 2005)*, San Diego, CA, USA, June 2005.

36. **Member, Program Committee**, *IEEE International Conference on Computer Vision (ICCV 2005)*, Beijing, China, October 2005.

37. **Co-chair and Organizer** (with Dieter Fox), *NIPS 2005 Workshop on Activity and Interaction Recognition and Discovery*, Whistler, BC, CANADA, December 2005.

38. **Member, Program Committee**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2006)*, New York, New York, USA, June 2006.

39. **Member, Program Committee**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2007)*, Minneapolis, MN, USA, June 2007.

40. **Senior Reviewer and Member, Program Committee**, *ACM SIGGRAPH 2007 Conference)*, San Diego, CA, USA, July 2007.

41. **Member, Program Committee**, *ACM and EG Symposium on Computer Animation (SCA 2007)*, San Diego, CA, USA, July 2007.

42. **Member, Program Committee**, *IEEE International Conference on Computer Vision (ICCV 2007)*, Rio de Janeiro, BRAZIL, October 2007.

43. **Program Co-chair**, *AAAI 2008: Special Track on Physically-Grounded AI (Learning, Robotics, and Computer Vision for AI)*, Chicago, IL, USA, July 2008.

44. **Program Co-Chair**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2009)*, Miami, Florida, USA, June 2009.

45. **Program Co-Chair**, *IEEE Workshop on Computer Vision for Humanoids (in conjunction with ICCV 2009)*, Kyoto, JAPAN, September 2009.

46. **Area Chair, Program Committee**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2010)*, San Francisco, CA, USA, October 2010.

47. **Area Chair, Program Committee**, *IEEE International Conference on Computer Vision (ICCV 2011)*, Barcelona, SPAIN, October 2011.

48. **Area Chair, Program Committee**, *IEEE International Conference on Multimodal Interfaces (ICMI 2013)*, San Diego, CA, USA, April 2012.

49. **Area Chair, Program Committee**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2013)*, Portland, OR, USA, June 2013.

50. **Area Chair, Program Committee**, *IEEE International Conference on Computer Vision (ICCV 2013)*, Sydney, AUSTRALIA, December 2013.

51. **Area Chair, Program Committee**, *IEEE International Conference on Computer Vision (ICCV 2015)*, Santiago, CHILE, December 2015.

52. **Area Chair, Program Committee**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2016)*, Las Vegas, NV, USA, June 2016.

53. **Area Chair, Program Committee**, *European Conference on Computer Vision (ECCV 2020)*, Glasgow, Scotland, August 2020.

54. **Area Chair, Program Committee**, *International Conference on Computer Vision (ICCV 2021)*, Montreal, Canada, August 2021.

55. **Area Chair, Program Committee**, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2022)*, Seattle, WA, July 2022.

56. **Area Chair, Program Committee**, *International Conference on Computer Vision (ICCV 2023)*, Paris, FR, October 2023.

A.4. Invited Conference Session Chair

1. IEEE Workshop of Nonrigid and Articulated Motion 1994, Austin, TX.
2. SIGGRAPH 1998, Orlando FL. Session on Facial Animation.
3. SIGGRAPH 2003, Los Angeles CA. Session on Human Modeling.
4. CVPR 2004, Washington, DC, Poster Session on Tracking and Recognition.
5. SIGGRAPH 2004, Los Angeles CA. Session on Video-based Rendering.
6. SIGGRAPH 2008, Los Angeles CA. Session on Physically-based Modeling of Characters.

A.5. Editorial and Reviewer Work for Technical Journals and Publishers

1. Reviewer, IEEE International Conference on Computer Vision, 1993-2009.
2. Reviewer, IEEE Computer Vision and Pattern Recognition Conference, 1992-2010.
3. Reviewer, ACM SIGGRAPH 1996-Present.
4. Reviewer, ACM UIST 1999, 2000, 2005.
5. Reviewer, International Journal for Computer Vision (IJCV), Image and Visual Computing Journal (IVCJ), IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), IEEE Transactions on Robotics and Automation (R& A), Telepresence, IEEE Transaction on Multimedia, and several other leading journals for Computer Vision and Computer Graphics.
6. Associate Editor (and member Editorial Board), IEEE Transaction on Pattern Analysis and Machine Intelligence, 2004– 2007.
7. Associate Guest Editor (with Sing Bing Kang and Marc Pollefeys), IEEE Transaction on Pattern Analysis and Machine Intelligence, Special Issue Featuring Award Winning Paper of IEEE CVPR 2009 Conference 2011.

A.6. Invited Member of Study Panels

1. DARPA ISAT Study Panel on Persistent Surveillance Systems (POSSE) 2007.
2. DARPA ISAT Study Panel on Harnessing Peer Production 2008.
3. DARPA ISAT Study Panel on Humanoid Robotics 2009.

A.7. Reviewing for International Funding Agencies

1. Austrian Science Fund FWF Visting Review Panel, September 2003.
2. Austrian Science Fund FWF Visting Review Panel, October 2006.

B. Public Service

- Charter Member, Organization of Pakistani Entrepreneurs (OPEN) Atlanta Chapter, 2012-Present.
- Supporter, Active Participant, Developments in Literacy (DIL) Atlanta Chapter, a Charity that builds and maintains schools in Pakistan. 2012-Present.

C. Community Service

C.1. Consulting and Technical Advisory Board Appointments

- Member Local Advisory Board, DVT Sensors Inc. Norcross, GA, USA. 1997 - 1998.
- Consultant, Microsoft Research, Redmond, WA, USA, 2000 - 2001.
- Lead Technical Advisor, Accusense Inc. Atlanta, GA, USA, 1999 - 2004.
- Advisor/Consultant, Logic Junction Inc. Atlanta, GA, USA, 2002 - 2004.
- Advisor/Consultant, DVT Sensors, Norcross, GA, USA, 2002 - 2004.
- Advisor, Lahore University of Management's School of Science and Engineering, Program Development Team, Lahore, PAKISTAN, 2005- 2010.
- Consultant, Kitware Inc., Clifton Park, NY, USA, 2009- 2011.
- Consultant/Visiting Professor/Scientist, Disney Research Labs (Walt Disney Imagineering), Pittsburgh, PA, USA, 2008- 2012.
- Consultant/Visiting Researcher, Google, Mountain View, CA, USA, 2011- Present
- Member, Technical Advisory Board, Vilynx, Palo Alto, CA, USA, 2013- Present
- Member, Technical Advisory Board, Partpic, Atlanta, GA, USA, 2016- 2016

C.2. Other External Appointments

- Limited Partner, Midway Airport Partnership, Chicago, IL, USA. 1996 - Present.
- Limited Partner, Yusuf Midway Partnership, Chicago, IL, USA. 1996 - 2006.
- Managing Member, Piedmont Hospitality Group, Mebane, NC, USA, 2000 - 2013.

C.3. Expert Witness

■ *Recent and Public Instances Listed. Involved in a variety of cases that cannot be disclosed. Details available on request.* ■

- Expert Witness for Yissum Research Development Company of The Hebrew University of Jerusalem (Patent Owner) V. Sony Corporation (Petitioner) in IPR Proceedings (One Patent), 2012- 2014.
- Expert Witness for Mitek Corporation (Petitioner) V. Rotschild Holdings (Patent Owner) in IPR Proceedings (One Patent), 2015- 2016.
- Expert Witness for Samsung Corporation (Petitioner) V. Queens University (Patent Owner) in IPR Proceedings (One Patent), 2015- 2016.
- Expert Witness for Avigilon Fortress (Plaintiff) V. Pelco (Defendant) in License Agreement Dispute, 2016- 2016.

- Expert Witness for Avigilon Fortress (Plaintiff) V. ITX Corporation (Defendant) in License Agreement Dispute, 2018- 2018.
- Expert Witness for Nikon Corporation (Plaintiff) V. Carl Zeiss / ASML Corporation (Patent Owner) in IPR Proceedings (Two Patents), 2017- 2018.
- Expert Witness for Nikon Corporation (Defendant) V. Carl Zeiss / ASML Corporation (Plaintiff) in US District Court Proceedings for Invalidity and Non-Infringement (Two Patents), 2018- 2018.

D. Institute Committees

1. Member, Georgia Tech's College of Computing Awards Committee 1997-1998.
2. Member, Georgia Tech's GVU Center Ad-hoc Committee for GVU/HCI Recruiting 1997-1998.
3. Director, Georgia Tech's College of Computing Undergraduate Summer Internship Program. 1998-2000.
4. Faculty Advisor, Georgia Tech's Pakistan Student Association. 1999-Present.
5. Member, Georgia Tech's College of Computing Faculty Recruiting Committee (for last few months only), 2000-2001.
6. Member (Elected), Georgia Tech's College of Computing Dean's Advisory Committee, 2001-2002.
7. Chair (Elected), Georgia Tech's College of Computing Dean's Advisory Committee, 2002-2003(and also a member of College of Executive Committee and College Management Teams).
8. Chair, Georgia Tech's College of Computing, IC Division Faculty Recruiting Committee, (2003-2006).
9. Member, Georgia Tech's Computational Media Curriculum Committee, (2004-Present).
10. Member, Georgia Tech's College of Computing Executive Committee, (2004-Present).
11. Member, Georgia Tech's GVU Center's Steering Committee, (2004-Present).
12. Member, Georgia Tech's Living Games World Planning and Program Committee, (2004-2006).
13. Member, Georgia Tech's College of Computing Review Committee, (2006-Present).
14. Member, Georgia Tech's College of Computing Web Science Task Force, (2007-Present).
15. Chair, Georgia Tech's School of Interactive Computing's Awards and Honors Committee, (2009-2011).
16. Member, Georgia Tech's International Program Committee, (2011-2013).
17. Chair, Georgia Tech's School of Interactive Computing's Reappointment, Promotion, and Tenure Committee (RPT), (2011-2013).
18. School of IC Representative to College of Computing's Reappointment, Promotion, and Tenure Committee (RPT), (2013-2014).
19. Chair, Task Force on Initiatives in Machine Learning, for the College of Computing, (2014).

VII. ADDITIONAL INFORMATION

For additional information, see the website listed below or contact via email.

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