# Ahmad Humayun

85 5th Street NW, Atlanta, GA 30332
+1 (404) 398-5465

ahumayun@cc.gatech.edu http://ahumayun.com/ http://linkedin.com/in/ahmadhumayun

## Awards & Achievements

**Microsoft Research Project Prize** for best MSc. Computer Graphics, Vision and Imaging thesis at UCL (2010).

**BBC Best Overall Student Prize** in MSc. Computer Graphics, Vision and Imaging at UCL (2010).

**Software Design Finalist** for **Microsoft Imagine Cup 2007 Korea**. The project on Automated Video Recording of Lectures (AVRiL) was selected to represent Pakistan for the first time in this prestigious invitational.

**Mentor Graphics Project Award** for AVRiL - best BSc. senior year project (2007).

## Education

**Georgia Institute of Technology** Aug. '11 - April '18
Ph.D. Computer Science, School of Interactive Computing

**University College London** (UCL) Sept. '09 - Sept. '10
MSc. Computer Graphics, Vision and Imaging - *Distinction*

**Lahore University of Management Sciences** (LUMS) Aug. '03 - July '07
BSc. (Hons.). Computer Engineering (Major) - *High Merit*

## Professional Experience

**Vicarious FPC, Inc.** *Team Lead, and Researcher*, Neural Network Vision. Sept. '18 - to date

**Georgia Institute of Technology** *Graduate Research Assistant*, Computational Perception Lab. Aug. '11 - April '18

**Facebook AI Research, Menlo Park** *Research Intern* with Manohar Paluri and Piotr Dollár May '15 - July '15

**Microsoft Research, Redmond** *Research Intern*, Multimedia, Interaction, & Communication group May '14 - July '14

**The University of Warwick** *Research Associate*, Dept. of Computer Science Sept. '10 - Dec. '10

**Lahore University of Management Sciences** *Research Associate*, Dept. of Computer Science Jan. '07 - July '09

**MobileWeaver ApS** *Junior Software Developer*, Technical Department March '08 - Jan. '09

## Publications

**Iterative Machine Teaching**. (3rd author)
*International Conference on Machine Learning (ICML)* - Aug. '17. ahumayun.com/pubs/itermteach17

**Multiple-Instance Video Segmentation with Sequence-Specific Object Proposals**. (3rd author)
*The 2017 DAVIS Challenge on Video Object Segmentation - CVPR Workshops* - July '17. ahumayun.com/pubs/davisvid17

**The Middle Child Problem: Revisiting Parametric Min-cut and Seeds for Object Proposals** . (1st author)
*International Conference on Computer Vision (ICCV)* - Dec. '15. rehg.org/poise

**Finding Temporally Consistent Occlusion Boundaries in Videos using Geometric Context**. (2nd author)
*IEEE Winter Conference on Applications of Computer Vision (WACV)* - Jan. '15. cpl.cc.gatech.edu/projects/temporaloccl/

**RIGOR: Recycling Inference in Graph Cuts for generating Object Regions**. (1st author)
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* - June '14. cpl.cc.gatech.edu/projects/RIGOR/

**Video Segmentation by Tracking Many Figure-Ground Segments**. (3rd author)
*International Conference on Computer Vision (ICCV)* - Dec. '13. cc.gatech.edu/~fli/SegTrack2/

**Learning a Confidence Measure for Optical Flow**. (2nd author)
*IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)* - May '13. visual.cs.ucl.ac.uk/pubs/flowConfidence

**A Novel Paradigm for Mining Cell Phenotypes in Multi-Tag Bioimages using a Locality Preserving Nonlinear Embedding**. (2nd author)
*International Conference on Neural Information Processing (ICONIP)* - Nov. '12. ahumayun.com/pubs/cellembed12

**RAMTaB: Robust Alignment of Multi-Tag Bioimages**. (2nd author)
*PLoS ONE* - Feb. '12. journals.plos.org/plosone/article?id=10.1371/journal.pone.0030894

**A Framework for Molecular Co-Expression Pattern Analysis in Multi-Channel Toponome Fluorescence Images**. (1st author)
*Microscopy Image Analysis with Apps. in Biology (MIAAB)* - Sept. '11. ahumayun.com/pubs/coexprstis11

## Publications (*Contd.*)

**Towards Protein Network Analysis Using TIS Imaging and Exploratory Data Analysis**. (3rd author)
*Workshop on Computational Systems Biology (WCSB)* - June '11. ahumayun.com/pubs/tisdata11

**Learning to Find Occlusion Regions**. (1st author)
*IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* - June '11. visual.cs.ucl.ac.uk/pubs/learningOcclusion/

**Myosin Motors Drive Long Range Alignment of Actin Filaments**. (3rd author)
*Journal of Biological Chemistry* - Feb. '10. www.jbc.org/content/285/7/4964.abstract

## Research Projects

**Video Object Detection** at Georgia Institute of Technology (*Ph.D. thesis*)
Currently researching on combining motion and appearance cues for localization in video. The goal is to develop deep architectures for generating proposals amenable for detecting and tracking objects. Tools: Lua Torch, Python, C++

**Incremental Learning Inspired by Developmental Psychology** at Georgia Institute of Technology (*Ph.D. thesis*)
Introduced an incremental learning paradigm where the learner sees a streaming set of concepts without any labeling. This is supported by a novel data-generator which can produce any number of synthetic videos of objects. Tools: PyTorch

**Optimization for Object Segmentation** at Georgia Institute of Technology (as *Ph.D. student*)
Research on combinatoric optimization techniques for object segmentation in videos and images. Tools: Matlab, C++

**Video Supervision for Generating Video Proposals** at Facebook AI Research
Research on generating video proposals by unsupervised discovery of objects in large scale video datasets. Tools: Matlab, Python, C++, Javascript, PHP

**Object Proposals for CT Images** at Georgia Institute of Technology (as *Ph.D. student*)
Supervising a project for generating segmentation proposals in 3D CT scans, leading to detection of organs.

**Crowd Tracking with Multiple Depth Sensors** at Microsoft Research
Developed a large area, crowd tracking system by fusing data from multiple depth sensors. Tools: Kinect SDK, C++

**Detecting Occluded Regions** at UCL (*MSc. thesis*)
Worked on a supervised learning method to detect regions of occlusion in a two frame sequence. Tools: Matlab

**Tracking Techniques using Object's Shape Cues** at LUMS
Researched tracking techniques for accurate generation of trajectories using object's non-rigid shape descriptors, resilient to occlusion. This was partly funded by NSF. (ahumayun.com/crspd) Tools: Matlab

**Molecular Pattern Analysis of Cancerous Colon Cells** at The University of Warwick
A multi-disciplinary project for the detection of cancerous tissue. We developed registration and non-linear embedding techniques for analysis of tissues from a multidimensional imaging process. Tools: Matlab

**Automated Video Recording of Lectures - AVRiL** at LUMS (*senior year project*)
Developed an automated *director* that captures a multi-camera lecture environment. (avril.sproj.com) Tools: OpenCV

**Improvements in Google's MapReduce Architecture** at LUMS
Research enabling MapReduce to run speculatively on skewed input data. (tinyurl.com/q3detyg) Tools: Python, Hadoop

**Surveillance Video Compression through Foveation** as a *research initiative*
Researched the development of a novel H.264 encoder which assigns more bits to areas where the human visual system is more likely to foveate in surveillance footage. (http://suraj.lums.edu.pk/~foveation) Tools: Java Media Framework

## Skills & Interests

*Proficient in* Python, Lua, C++, Matlab, Torch, OpenCV | Rock climbing, solving puzzles, and cycling.

## References

**James M. Rehg**
Professor, School of Interactive Computing,
Georgia Institute of Technology
☎ +1 (404) 894-9105
✉ rehg@cc.gatech.edu

**Gabriel J. Brostow**
Associate Professor, Dept. of Computer Science,
University College London
☎ +44 (0)20 3108 7120
✉ brostow@cs.ucl.ac.uk