

### **A Bird's Eye View of Vision Research in US Universities "**

Edulix has few posts listing US universities offering degrees with specialization in computer vision/image processing. Though such posts offer some guiding light, the PhD applicant's queries remain mostly unanswered. The reason is that PhD applicants tend to ask the following two questions –

- Who is the professor in this university working in computer vision?
- What is the specific topic in computer vision he is interested in?

Since Edulix does not have a computer vision thread as such, the objective of the present post is to make a humble attempt at initiating a discussion on current research in computer vision in US universities. The hope is that this thread may serve as a good starting point to PhD applicants for zeroing in on his/her preferable labs. In addition, I would also like to draw the PhD aspirant's attention to [this \(post #3\)](#) while looking for potential research labs.

I have used the alphabetical ranking to maintain some order (and also not to bias my post by preferring any particular computer vision lab) while describing the current research work in computer vision in US universities. Hence, the ranking in no way seeks the assessment of research quality in the area of computer vision, the present post merely serves as a pointer to the current research work going on in US academic labs.

My post elaborates on only computer vision, inclusive of neither medical imaging nor computer graphics (the latter two deserve separate treatment). However, in some places research in computer vision goes hand in hand with the same in medical imaging or computer graphics, hence all of them got mentioned.

Last but most important fact – I heavily rely on fellow Edulixians to make my post/thread complete where it is incomplete. Chime in, please!

1.

#### **Arizona State University**

- a. Gang Qian: structure-from-motion estimation, view-invariant video-based gesture recognition, articulated human movement tracking in silhouette and pose manifolds, robust real-time object tracking in interfering background, efficient sequential pattern modeling and recognition using hidden Markov model, human pose recognition and people tracking using optical motion capture for interactive dance works, kinematic model building for optical motion capture using Markov random field.
- b. Baoxin Li: Statistical inference & learning in visual tracking, content/semantics analysis for image/video retrieval, medical image analysis: automated processing & analysis in diabetic retinopathy diagnosis, free-viewpoint video and television, stereoscopic visualization and HCI, perceptual enhancement of image and video,

vision-based navigation in robotics, content-adaptive video compression and transmission)

## 2. **Boston University**

The Image and Video Computing Lab is directed by the following two vision researchers. Both of them have excellent academic alma maters.

- a. Mergrit Betke: Video-based interfaces for people with disabilities, Medical imaging, Object detection, segmentation, and recognition, Visual observation and analysis of bat behavior, Intelligent vehicles, Cell image analysis
- b. Stan Sclaroff: MIT PhD, Associate editor of T-PAMI, works on kernel methods in computer vision, shape analysis, graphical models, video understanding

## 3. **Brown University**

- a. Michael J. Black: An esteemed figure in computer vision – mostly into shape modeling, human atlas, modeling 3D shape etc.
- b. James Hays: Young faculty, a former student of Alexei Efros at CMU, did post-doc under Antonio Torralba of MIT, works mainly on large scale image understanding.
- c. Erik Sudderth: a machine learning guy but sometimes works on computer vision too.
- d. David Mumford: He is a very senior fellow and might have retired. I cite his name for one reason – do not deprive yourself of the learning experience that comes from studying his pioneering research on mathematical imaging.

## 4. **California Institute of Technology**

- a. Pietro Perona (A leading figure in computer vision research, former student of Jitendra Malik, a fascinating project called VISAPEDIA is going on in his lab which happens to be a joint project between Pietro Perona's Vision Group at Caltech and Serge Belongie's Vision Group at UCSD. Visipedia, short for "Visual Encyclopedia," is an augmented version of Wikipedia, where pictures are first-class citizens alongside text. goals of Visipedia include creation of hyperlinked, interactive images embedded in Wikipedia articles, scalable representations of visual knowledge, largescale machine vision datasets, and visual search capabilities, also works on other areas of machine learning and computer vision.

## 5. **Carnegie Mellon University**

Strong research for detection and recognition of face, facial expression analysis, gaze tracking, and marker-less human tracking (Kanade, Baker, Matthews, Schneiderman), and daily human activity recognition, such as eating and engaging in sports (Atkeson, Efros, Hodgins).

Lee and Lewicki (also with the Center for the Neural Basis of Cognition) are using probabilistic formulations to study various topics, such as the inference of 3D surface structures in the early visual areas, the analysis of motion in the dorsal visual stream, and sensory coding of natural images. The Digital Mapping Laboratory group (Cochran, Harvey, McGlone,

McKeown) has been the national focus of research in this area. They have focused on the use of knowledge-intensive techniques for the detailed analysis of remotely sensed imagery, with a broad scope of research ranging from low-level vision (e.g., stereo matching and scene registration), to systems for cartographic feature analysis (e.g., buildings, roads, airports), to information fusion, using multiple cooperative methods, as well as more recent emphasis on multi-spectral imagery and large-scale databases for advanced distributed simulation.

- a. Martial Hebert: a pioneering figure in computer vision, mostly works in the area of image and video understanding, recent emphasis is on activity recognition)
- b. Alexei Efros: former student of Jitendra malik, works on exemplar based action recognition and image understanding)
- c. Takeo Kanade: who does not know Lucas-Kanade optical flow? A very esteemed and senior vision researcher, he has a very broad area of research starting from video tracking to video understanding!

#### 6. **Columbia University**

- a. Shri Nayar: mostly into computational photography, optics, surface – light interaction modeling.

#### 7. **Cornell University**

- a. Asutosh Saxena (student of Andrew Ng., MRF-CRF based image understanding, pioneering work on depth estimation from single-image)
- b. Dan Huttenlocher (part based model in image understanding)
- c. Ramin Zabih (Medical imaging, discrete optimization, MRF/CRF related optimizations)

#### 8. **Dartmouth College**

- a. Hany Farid (image forensics, clutter modeling, image analysis)
- b. Lorenzo Torresani (designing machine learning algorithms for scalable object recognition and image retrieval, learning models of human motion using video or motion capture data)

#### 9. **Duke University**

***DRIV: Duke Robotics, Intelligence, and Vision*** is an excellent lab for machine learning and computer vision research. Very good courses exist in statistical machine learning and computer vision. Hard core machine learning researchers like Sayan Mukherjee (computational biology, biostatistics, probabilistic graphical models), Ronald Parr (student of Stanford Professor Daphne Koller - the author of Probabilistic Graphical Models) push the theoretical envelope, whereas leading vision researcher Carlo Tomasi, and to some extent the young professor Ronald Parr, build computational framework for novel computer vision problems. I shall definitely recommend it to be one of the top rated computer vision PhD programs in US.

- a. Carlo Tomasi (Renowned professor, associated with Lucas-Kanade-Tomasi optical flow, now associated with computational photography, object detection & recognition, video segmentation)

#### 10. **George Mason University**

- a. Zoran Durić – robotics related computer vision, Video Image Processing, Human-Computer Interaction, understanding the motions of humans and of vehicles, video surveillance.
- b. Jana Košecká - recipient of David Marr award along with Y Ma, S Soatto and Snakar Sastry; part based model in object detection & recognition, vision vased location recognition.
- c. Harry Wechsler – very senior person, his research is in the areas of Computer Vision and Neural Networks (NN) includes multistrategy learning (statistics, adaptive signal processing, information theory, genetic algorithms, machine learning, and neural networks), scale-space and joint (Gabor and wavelets) image representations, attention, functional and selective perception, face recognition, and object recognition.

#### 11. **Georgia Institute of Technology** (spot the **Computational Perception Laboratory**)

- a. Aaron Bobick (image understanding)
- b. Frank Dellaert (video tracking)
- c. Irfan Essa (recently into activity recognition, graphical models)
- d. James Rehg (mostly into multimedia based vision research)

#### 12. **Harvard University**

Not as much a great place for computer vision as it is for robotics, and I find most of its vision related work as some sort of supportive technology towards building smarter robots or developing some social behavior monitoring software. However, following are the glaring exceptions:

- a. Todd Zickler (shape and appearance capture, color image processing, human perception of colors and glossy shapes, reflectance and illumination modeling, physics-based approaches to scene understanding, face recognition, and socially-aware vision systems.
- b. Hanspeter Pfister (visualization, computational photography, point-based graphics, appearance modeling, 3D television, and face animation)
- c. Steven J. Gortler (graphics and graphics related vision)
- d. Yue M. Lu (hardcore signal processing and information theoretic approach towards computer vision)

#### 13. **Indiana University—Bloomington**

- a. David Crandall (very young faculty, a former student of D Huttenlocher of Cornell University, works on visual object recognition and scene understanding, a automatically inferring semantic meaning from images)

#### 14. **Iowa State University**

- a. Namrata Vaswani (A UMD graduate; Real-time (Recursive and Causal) Robust PCA, Sequential Compressed Sensing and applications in dynamic MRI, Particle Filters for Tracking on Large Dimensional State Spaces, Deformable Contour Tracking using PF-MT (Particle Filter with Mode Tracker), ELL for "Slow" Change Detection in State Space Models (with Unknown Change Parameters) and Analyzing the Errors in Estimating ELL, NonStationary "Shape Activities" (NSSA) and Applications in Activity Recognition )

#### 15. **Johns Hopkins University**

This place is ranked one in US in biomedical engineering, hence it is customary to say that medical image analysis and vision guided robotic surgery have state-of-the-art facilities in this university. Also, research areas like statistical image analysis, computer vision and machine learning have excellent infrastructure in terms of coursework, research quality and faculty profile. Look out for this group – Laboratory for Computational Sensing & Robotics (LCSR).

- a. Gregory D. Hager (computer vision & medical robotics, – follow the lab activities at LCSPR)
- b. Rene Vidal (I am a big fan of this guy. His research areas are the following. Biomedical image analysis: estimation and processing of high angular resolution diffusion imaging (HARDI), registration and segmentation of diffusion MRI, segmentation and fiber tracking of cardiac MRI, interactive medical image segmentation, heart motion analysis. Computer vision: camera sensor networks, activity recognition, dynamic texture segmentation and recognition, 3D motion segmentation, non-rigid shape and motion analysis, structure from motion and multiple view geometry, omnidirectional vision. Machine learning: manifold clustering, kernels on dynamical systems, GPCA, kernel GPCA, dynamic GPCA. Dynamical systems: observability, identification, realization, metrics and topology for hybrid systems. Robotics: formation control of teams of non-holonomic robots, coordination and control of multiple autonomous vehicles for pursuit-evasion games, multiple view motion estimation and control for landing an unmanned aerial vehicle. Signal processing: consensus on manifolds, distributed optimization, compressive sensing.
- c. Jerry Prince (Do you remember gradient vector flow (GVF) based active contour initialization famously known as Xu-Prince algorithm? He is the guy! Presently works on Topology Preserving Geometric Deformable Models, Active Shape Models, mesh generation and processing. He is affiliated to ECE department and works in the application area of medical image analysis)

#### 16. **Massachusetts Institute of Technology**

The emphasis of CSAIL is on core computer vision, whereas MIT Media lab

concentrates on computational photography, multimedia and related engineering aspects of computer vision.

- i. CSAIL
  - a. Antonio Torralba (image understanding, large scale image search, e.g. MIT's famous 80 million tiny image dataset)
  - b. William Freeman (Does he need any introduction? Present research interest in probabilistic graphical models)
  - c. Eric Grimson (shifted to medical imaging, pioneer researcher of background modeling, e.g. Stauffer-Grimson background model)
  - d. Ted Adelson (Very senior person, pioneering contribution in image filtering)
  - e. Ruth Rosenholtz (student of Jitendra Malik, works on efficient search in image, clutter modeling, works under direct supervision of Ted Adelson)
  - f. Pollina Golland (medical imaging)
- ii. Media Lab
  - a. Ramesh Raskar (coined the term *cameraculture*, works mainly on engineering aspects, e.g. multimedia, social applications of image processing)
  - b. Andrew Lippman
  - c. Alex Pentland (no longer a vision researcher)

#### **17. Michigan State University**

- . Anil Jain (a very senior researcher in the field of pattern recognition and computer vision, current research interest in biometrics)
- a. George Stockman (at the intersection of graphics & computer vision, interpolation snakes, contour model)
- b. Yiying Tong (novel motion description for fluid, spatial description for surfaces, mesh deformation, Eulerian discretization of Lie-derivatives for differential forms & PDEs, real-time Lagrangian physically-based simulation for water drop and solid surface interaction, hexahedralization method, applicable to various FEM problems.

#### **18. New York University**

- . Chris Bregler's research combines computer vision, motion capture, graphics, animation, and machine learning. The current focus of his group's work is on modeling of human motion styles. Those techniques were applied to improving animation quality of photo-realistic human and cartoon character animations.
- a. Rob Fergus works in computer vision, machine learning and computer graphics. His goal is to build statistical models of images both at the high level of objects and scenes as well as at the low level of pixels and edges. Such models may then be used for a variety of applications including object recognition, image search and computational photography.

- b. Davi Geiger works in computer vision and on related problems in cognitive science. His current research includes understanding stereo vision, human tracking, shape analysis, and memory structure of vision objects. Much of recent is based on applying Bayesian belief propagation networks (graphical models).
- c. Yann LeCun's research interests include energy-based models, "deep learning", relational graphical models, and others (sparse coding) which are applied solve problems in computer vision, robotics, image and signal processing, bioinformatics, medical informatics, and economics. LeCun's group also works with the Center for Neural Science on computational models of biological learning.
- d. Ken Perlin's research spans computer graphics rendering, modeling and animation, user interface software and hardware, surface reflectance measurement devices, and novel display devices.
- e. Olga Sorkine (**Olga Sorkine has moved to ETH, Zurich**) has research interest focusing on computer graphics and geometric modeling, with an emphasis on interactive applications. She is interested in theoretical foundations and practical algorithms for digital content creation tasks, such as shape representation and editing, artistic modeling techniques, computer animation and digital image manipulation, digital geometry processing, including parameterization of discrete surfaces and compression of geometric data.
- f. Denis Zorin's interests span two areas: geometric modeling (efficient and accurate discretizations of various types of surface optimization problems, high-order representations for surfaces, including manifold-based and subdivision surfaces and mesh manipulation), with applications in computer graphics and computer-aided geometric design, and scientific computing and numerical algorithms (fast algorithms for solving boundary integral equations, arising from linear PDEs and their applications (fluid-deformable surface interactions for Stokes fluid).
- g. Eero Simoncelli (an excellent and renown researcher in the filed of image filtering, texture synthesis)

#### 19. **Northwestern University**

- . Ying Wu: (Visual Motion Tracking/Capturing/Recognition, Statistical Learning and Pattern Recognition, Vision-based Interaction, Image/Video Analysis and Understanding, Multimedia Processing, Management and Data Analysis, Biomedical Image Processing and Medical Applications)

#### 20. **Ohio State University**

- . James Davis (MIT PhD, works primarily on video surveillance and motion capture)

#### 21. **Oregon State University**

The Computer Graphics and Vision Group (Interactive Graphics & Vision

Lab) consists of researchers in image processing, computer vision, computer graphics, and machine learning. The primary goals of this group are the analysis, synthesis, understanding, and manipulation of visual data such as images, video sequences, and 3D geometric content.

. Sinisa Todorovic (multiscale image segmentation, structural pattern recognition, object / scene recognition and texture classification and synthesis, activity recognition, group activity recognition).

## 22. **Pennsylvania State University--University Park**

Computer vision in Penn State happens primarily in two places – LPAC lab that is under computer science department, and Intelligent Information Systems Laboratory that belongs to IST department.

- . LPAC (Laboratory for Perception, Action and Cognition)
  - a. Robert Collins (a close associate of Takeo Kanade and having some joint patents with him, works now-a-days on video scene understanding, human body segmentation, activity analysis, and real-time tracking)
  - b. Yanxi Liu (symmetry in images, image de-fencing)
- i. IST Department:
  - a. James Wang (A Stanford guy, pioneering contribution in content based image retrieval, works closely with his wife Jia Li who happens to be a professor in Penn Statistics and also a Stanford graduate)

## 23. **Princeton University**

Princeton's emphasis is much towards computer graphics than it is on computer vision; nevertheless I am mentioning the names of graphics researchers as follows.

- . Szymon Rusinkiewicz (vision & graphics)
  - a. Thomas A. Funkhouser (graphics)
  - b. Adam Finkelstein (graphics)

## 24. **Purdue University-West Lafayette**

- . Avinash Kak (Senior and a very esteemed researcher, coauthored a book with Late A. Rosenfeld)

## 25. **Rensselaer Polytechnic Institute**

- . Charles V. Stewart (Dynamic construction of 3D models from range and video, Medical image registration and segmentation, Applications of computer vision techniques to aiding in the diagnosis and treatment of retinal diseases)
  - a. Daniel Freedman (contour-tracking, photometric-tracking, model-based segmentation, learning, partial differential equations, graph cuts, medical applications, combinatorial curve reconstruction, combinatorial manifold reconstruction - including surfaces, shape space.)
  - b. Qiang Ji (probabilistic graphical models, information fusion under uncertainty, human computer interaction, pattern recognition, and robotics)

- c. Richard J. Radke (3D modeling and tracking from distributed, mobile sensors; Computer vision, machine learning, and optimization for IMRT, change detection and understanding, magnetic field mapping via heavy ion beam spectral imaging)
- d. Volkan Isler (representation, reconstruction, segmentation)

**26. Rice University**

No computer vision work in computer science department. In ECE, Ashok Veeraghavan (student of Rama Chelappa) has recently joined. His research thrust is directed towards computational photography. ECE department, Rice University is famous for one pixel camera movement – a novel domain that evolved as a result of some splendid progress in the area of sparse coding/ compressive sensing.

**27. Rutgers, the State University of New Jersey-New Brunswick**

- . Dimitris Metaxas (distinguished vision researcher – computer vision as well as medical imaging, dynamic object tracking and recognition, statistical modeling, control methods for animation and haptic interaction, special interest on deformable models)
- a. Ahmed Elgammal (activity recognition, manifold learning, learning representations for the shape and the appearance of moving (dynamic) objects that support tasks such as synthesis, pose recovery, reconstruction and tracking, research in context of human motion analysis)

**28. Stanford University**

- . Fei Fei Li (bag-of-word model, probabilistic graphical models in computer vision)
- a. Andrew Ng (mainly into machine learning but works on computer vision too, currently into sparse coding theory and its application into computer vision)

**29. Stony Brook University–SUNY**

- . Alex Berg (large scale machine learning algorithms for object recognition and detection, image retrieval, recognizing and synthesizing human action in video, recovering human body poses from photographs, detecting and identifying human faces in images, detecting vehicles in images)
- a. Tamara Berg (Student of David Forsyth, research interest includes organizing large collections of images with associated text through the use of techniques from Natural Language Processing and Computer Vision)
- b. Klaus Mueller (graphics, shape analysis, medical imaging – segmentation, face recognition)
- c. Dimitris Samaras (machine learning, medical imaging, animation and simulation, image based rendering, physics-based modeling.)

**30. Texas A&M University-College Station**

- . Jinxiang Chai (works at the intersection of graphics & vision, Visual modeling and understanding, data driven graphics & vision)

- a. Dezhen Song (Vision, Surveillance, camera networks, robotics associated computer vision)

### **31. University at Buffalo—SUNY**

- . Jason Corso (Johns Hopkins PhD, former student of Professor Gregory Hager, UCLA post doc, works on high level understanding of image and video)
- a. Raymond Fu (UIUC PhD, works on applied machine learning, Social Media Analytics, Human-Centered Computing, Pattern Recognition, Intelligent Vision System, manifold learning)

### **32. University of Arizona**

- . Kobus Barnard (object recognition and image understanding, learning and fitting models of biological form, the application of computer vision to the organization and effective use of large image collections, and physics based vision problems such as understanding scene illumination. Current focus on action and activity recognition)

### **33. University of California—Berkeley**

- . Trevor Darell (head of the new Computer Vision Group at the [International Computer Science Institute](#), research interest includes multimodal conversation with robots and mobile devices, and methods for object and activity recognition on such platforms)
- a. Jitendra Malik (a supremo in computer vision research, works primarily on segmentation and image/video understanding)
- b. Bruno Olshausen (Mainly into Vision Science research, one of the proponent of sparse coding model)
- c. Ravi Ramamoorthi (mainly a graphics genius, his work can be divided into three main categories --- (1) Signal Processing and Sparse Reconstruction of Visual Appearance, with implications across Rendering, Imaging and Animation; (2) A Digital Visual Appearance Pipeline for complex visually rich materials; (3) Physics-Based Computer Vision with realistic reflectance, illumination and light transport, and more generally problems at the vision-graphics interface.)
- d. Avideh Zakhor (more into multimedia research)

### **34. University of California—Davis**

- . Owen Carmichael --- Medical Image Analysis, Object Recognition From Images, Super-Resolution, Object Recognition From Range Data, 3D Modeling From Range Data, Image Retrieval

### **35. University of California—Irvine**

Donald Bren Information and Computer Science Department (Bren ICS) is a goldmine of resources – their emphasis and rich coursework on theoretical machine learning provides good foundation to the budding vision researchers. Charles Fowlkes happened to be a direct PhD student of Jitendra Malik., whereas Deva Ramannan had David Forsyth as his PhD guys – all big names in computer vision!

- . Charles Fowlkes (studies how to combine bottom-up processing, such as image segmentation with top-down information, such as recognition of familiar shapes, MRF & CRF based relaxation techniques)
- a. Deva Ramannan (articulated pose estimation, video annotation, contextual object detection, part-based object detection, people tracker, MRF & CRF based optimization techniques)
- b. Max Welling (actually a machine learning researcher but also works at the intersection of machine learning and computer vision, provides excellent courses on statistical machine learning, also associate editor-in-chief of IEEE T-PAMI)
- c. Ramesh Jain (Very senior fellow, now a days gives mostly entrepreneurial lectures on managerial matters, not much into active research in computer vision)

#### **36. University of California—Los Angeles**

- . Stefano Soatto (Computer Sc.)
- a. Song-Chun Zhu (affiliated professor of both Stat and CS, former student of David Mumford): image parsing, stochastic context free grammar, scene parsing
- b. Alan Yuille: image analysis

#### **37. University of California—Riverside**

- . Amit Kumar Roy Chowdhury: promising researcher, former student of Rama Chelappa, works in video surveillance, activity recognition.
- a. Bir Bhanu: activity recognition, video understanding

#### **38. University of California—San Diego**

- . Nuno Vascencelos (Electrical & Computer Engineering) (image and video undersampling, medical imaging applications)
- a. Serge Belongie (Computer Sc.) (image and video understanding)
- b. David Kriegman (Computer Sc.) (Face recognition, 3D face modeling)

#### **39. University of California—Santa Barbara**

- . B S Manjunath (ECE Professor, famous researcher in computer vision & image processing, content based image retrieval, bio-image informatics)
- a. Mathew Rurk (CS Professor, 3D tracking, gesture recognition, 2D tracking)

#### **40. University of California—Santa Cruz**

- . Peyman Milanfar: Image enhancement, super-resolution, denoising, training free generic object recognition
- a. James Davis: HCI, human pose modeling

#### **41. University of Central Florida - Orlando, FL**

For vision aspirants, UCF remains as one of the hot favorites for video related research work. Professor Mubarak Shah has excellent collaborations with Professor Rahul Sukthankar (CMU, Pittsburgh) and Professor Takeo Kanade (CMU, Pittsburgh). Recently Marshall Tappen from MIT has joined his lab giving an extra dimension (that includes

European collaboration with researcher like Chris Lampert) to lab's research work.

- . Mubarak Shah (An esteemed name in the area of video processing, research work in video processing without mentioning the name of Professor Mubarak Shah is mostly incomplete)
- a. Marshall Tappen: MRF/CRF, discrete optimization, probabilistic graphical models

#### 42. **University of Chicago**

Though not MIT/Stanford, but this university is one of my favorites for vision related research work.

- . Pedro Felzenszwalb (**no longer in uChicago, has moved to Brown University in Sep, 2011**)(Associate professor of Computer Science, did PhD under Eric Grimson (remember Stauffer-Grimson background model?) at MIT, Associate editor of T-PAMI, works on probabilistic graphical models, object detection, part based object modeling)
- a. Yali Amit (Joint affiliation in statistics and computer science, vision science, statistical shape recognition, 2D & 3D image matching, imports ideas from vision to speech recognition, i.e. acoustic object detection)

#### **Toyota Technological Institute at Chicago:(inside University of Chicago campus)**

Toyota Technological Institute at Chicago (TTIC or the Institute) is a philanthropically endowed academic computer science institute, dedicated to basic research and graduate education in computer science. Its mission is to achieve international impact through world-class research and education in fundamental computer science and information technology. The Institute is distinctive to the American educational scene in its unique combination of graduate education and endowed research. TTIC offers a graduate program leading to a doctorate in computer science, and is currently focusing primarily on theoretical computer science (algorithms and complexity), machine learning (and related AI applications), programming languages (and related areas such as formal verification and security) and scientific computing (including numerical analysis, numerical optimization, and signal processing).

- b. David McAllester: object detection, image parsing.
- c. Dhruv Batra: Computer Vision, Machine Learning, Discrete Optimization. Parameter Learning and Inference algorithms for Graphical Models.
- d. Samuel Hasinoff: computational photography, with a particular interest in theoretical foundations for imaging systems. His work spans computer vision, image processing, optics, and computer graphics.

- e. Tamir Hazan: machine learning and computer vision, recently focusing on graphical models, primal-dual inference algorithms and beliefs propagation. He is also interested in mixture models with various divergence measures, tensor factorization and model selection, and support vector machines.
- f. Devi Parikh: computer vision, pattern recognition and machine learning. Specifically, she works on hierarchical representations of images, exploring the role of context for enhanced image understanding for both machines and humans, and pattern recognition problems involving various aspects of combining classifiers (collaborates with Antonio Torralba, Aude Oliva, Graumen)
- g. Mathieu Salzmann: computer vision, machine learning and computer graphics. In particular, optimization techniques, discriminative methods, latent variable models, and their application to monocular 3D reconstruction and image analysis.
- h. Sameer Sheorey: Object recognition and segmentation, medical image processing, Harmonic analysis (Fourier and Wavelet theory) and partial differential equations with applications to image processing and computer vision.

**43. University of Colorado—Boulder**

- . Jane Mulligan --- computer vision and robot navigation, machine learning (probabilistic graphical model)

**44. University of Florida-Gainesville, FL**

- . Baba Vemuri (Medical Image Analysis, Image Processing and Computational Vision, Computer Graphics, Statistical Learning, Information Geometry and Applied Mathematics.)
- a. Anand Rangarajan (Energy minimization methods in image analysis)

**45. University of Houston**

- . Kakadiaris, Ioannis (See the Computational Biomedicine Lab, research interest: medical image analytics, face & facial expression analysis, action recognition and behavior analysis)
- a. Shah, Shishir (Video Analytics, biometrics, Microscope Image Analysis)

**46. University of Illinois – Urbana Champaign**

- . Yi Ma (sparse coding, face recognition)
- a. Derek Hoiem (image understanding, study of contextual information in image understanding)
- b. David Forsyth (God of computer vision, image and video understanding, studying human poses and activity recognition and literally every area of computer vision)
- c. Narendra Ahuja (very senior person, used to work on 3D computer vision, next generation cameras for 3D vision, image structure detection and representation, currently into sparse coding theory)

- d. Thomas Huang (from ECE, very senior person, activity recognition in video)

**47. University of Maryland - College Park** (A Shangri-La for research in computer vision!)

- . Rama Chelappa (Who in computer vision community does not know him! One of the Gods in computer vision! He has worked literally on everything right from video tracking, particle filter to video understanding, image retrieval and so on, current focus seems to be on sparse modeling of image data set)
- a. Lary Davis (A second God! However Lary Davis is quite senior and entry into computer vision Lab at UMD is insanely difficult --- last I have seen him working on activity understanding by stochastic context free grammar with his PhD student Abhinab Gupta who is doing his post-doc under Prof Martial Hebert, CMU now)

**48. University of Massachusetts—Amherst**

- . Erik G. Learned-Miller (learning from a small number of examples, face recognition, independent component analysis, learned color constancy, developing probability models of shape deformation, and mathematical expression recognition)
- a. R. Manmatha (Image and Video Retrieval)
- b. Allen Hanson (very senior professor, I could not find recent research publications, earlier interests were in knowledge-based image understanding, analysis of motion sequences, autonomous vehicle navigation, and parallel architectures for computer vision)
- c. Howard Schultz (very senior professor, quantitative methods for image understanding and remote sensing, including generating complex, three-dimensional terrain and site models from aerial images.)

**49. University of Michigan--Ann Arbor**

- . Savarese Silvio: (young researcher, former student of Prof. Pietro Perona, CalTech, has strong collaboration with Fei Fei Li, Stanford, current work includes reconstructing the underlying 3D geometry of the scene (cameras, points and objects), human actions recognition by attributes, coherent object recognition and scene layout understanding)
- a. Lee Honglak (former student of Prof Andre Ng of Stanford, more a ML guy but works on machine learning, now into sparse coding applications)
- b. Benjamin Kuipers (actually an AI scientist and NOT into vision related work but works on vision projects in collaborations, his area of work includes representation of commonsense and expert knowledge, with particular emphasis on the effective use of incomplete knowledge)

**50. University of Minnesota--Twin Cities**

- . Nikolaos Papanikolopoulos (IEEE fellow, computer vision specific to robotic applications)

### **51. University of North Carolina--Chapel Hill**

A happening place for medical image analysis and computer vision – a favorite university for vision enthusiasts!

- . Svetlana Lazebnik (student of Jean Ponce, having close collaboration with Cordelia Schmid of INRIA, works on image understanding)
- a. Ron Alterovitz (vision guided surgery, medical image analysis)
- b. Marc Niethammer (medical image analysis – segmentation and classification)
- c. Marc Pollefeys (3D vision, image understanding)
- d. Brad Davis (medical image analysis)
- e. Gary Bishop (medical image analysis)
- f. Mark Foskey (Medical image analysis)

### **52. University of Pennsylvania**

- . Jianbo Shi (segmentation, recognition and other core areas of computer vision, a former student of J Malik, notable for pioneering texture recognition work, now works mostly on activity recognition & video understanding)
- a. C J Taylor (3D reconstruction, vision guided robot navigation, camera network, optimizations)
- b. Kostas Daniilidis (mostly into stereo vision and multiple view geometry)

### **53. University of Rochester**

Ah, they offer research scope in [vision science](#)! Also, rich in computer vision research --- in the [URCS Vision Research](#) the following eminent researchers are present:

- . Dana Ballard (**Left for University of Texas, Austin**) : computational theories of the brain with emphasis on human vision
- a. Christopher Brown: very senior professor, with his Rochester colleague Dana Ballard, he is coauthor of the leading textbook in the field, *COMPUTER VISION*, his interests span a range of topics from traditional symbolic artificial intelligence to low-level aspects of control and includes assembling hardware and software support systems.
- b. Mary Hayhoe (**Left for University of Texas, Austin**): study of eye movements in natural tasks, visual memory, and the coordination of body movements in natural tasks
- c. Randal Nelson: visual navigation by robots, motion recognition and analysis including human motion, vision for robot manipulation and hand-eye coordination, and generic 3D object recognition

### **54. University of South Carolina-Columbia, SC**

- . Prof. Song Wang (Admirable research work! He is a distinguished professor in his own university and respected in computer vision community, research interests include statistical shape analysis, image segmentation and perceptual organization)

### **55. University of Southern California**

- . Ramakant Nevatia (activity recognition in video, human pose analysis)
- a. Isaac Cohen (Optical flow tracking, 3D mesh analysis for medical image segmentation, phase portrait analysis, deformable models)

#### **56. University of Texas—Austin**

- . Computer Science: Kristen Grauman (image search)
- a. ECE: J K Aggarwal (very senior professor, present focus on activity recognition in video)
- b. Dana Ballard (Computer Science): Very senior professor, works at present on computational theories of the brain with emphasis on human vision (more related to vision science rather than computer vision)
- c. Mary Hayhoe (Psychology): Though she is from psychology department (Center for Perceptual Science), she has good collaboration with Dana Ballard regarding cognitive aspect of human vision, study of eye movements in natural tasks, visual memory, and the coordination of body movements in natural tasks.

#### **57. University of Utah-Salt Lake City , UT**

This is a good place for shape based image analysis, computer graphics and medical imaging.

- . Ross Whitaker (statistical shape analysis, topology, manifold theories, graphics, medical imaging, analysis of diffusion tensor imaging)
- a. Guido Gerig (former professor of UNC Chapel Hill, medical image analysis, shape analysis, shape based image segmentation, diffusion tensor imaging)
- b. Tom Fletcher (differential geometry, topology, manifold, diffusion tensor imaging, statistical shape analysis)
- c. Tolga Tasdizen (image neighborhoods and context for image registration and segmentation; and variational methods and level-sets for volume restoration, reconstruction and 3D segmentation)

#### **58. University of Virginia**

- . Scott T Acton (Professor in Electrical Engineering, a respected name in shape based image processing (especially active contour model), image segmentation, enhancement etc)

#### **59. University of Washington**

- . Mecca of computer vision but gruelingly tough to make entry: just see this page ([website](#)), it would be a dishonor to the maestros if I take a small chunk of their activities/team and document it here.

#### **60. University of Wisconsin—Madison**

- . Li Zhang (computational photography, 3D reconstruction, motion estimation, segmentation)
- a. Vikas Singh (medical imaging, joint professor of biomedical engineering and computer science)
- b. Charles Dyer (very senior person – vision and medical image analysis)

- c. Michael Gleicher (senior person, mostly a graphics guy, sometimes works in graphics related vision areas)

61. **Vanderbilt University**

A Mecca for medical image analysis; however, I shall restrict my scope in this post to computer vision only.

62. **Virginia Tech**

Not much work on computer vision, Professor Francis Quek concentrates on HCI mostly with some vision related research that overlaps with his HCI interest.

63. **Washington University in St. Louis, St. Louis, MO**

Research in computer vision here is addressing the current problems in this domain. Do pay a visit to their Media & Machines Lab (<http://mm.cse.wustl.edu/people/index.html>). Good emphasis on latest areas of machine learning and equally well infrastructure for medical image analysis work.

- . Cindy Grimm (surface modeling, illustrative rendering, topology, differential geometry, )
- a. Tao Ju (geometric modeling, mesh processing, visualization, and bio-medical modeling)
- b. Robert Pless (understanding statistics of images captured simultaneously by thousands of webcams worldwide, and Manifold Learning for medical image analysis)

64. **Yale University**

- . Steven Zucker (very senior professor, distinguished contribution in relaxation labeling along with Azriel Rozenfeld, now works mainly on vision science, work includes modeling flowing texture like fur & hair, enhancing and linking curves in images etc.)

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**Conclusion:** Research has no geographical boundaries and hence categorizing researchers simply on the basis of countries is never welcome. However, human spirit in many cases is limited by other constraints, and guessing that such a post that lists vision researchers worldwide would be unduly long, I kept my post specific to research in US, definitely with a caveat that follows next.

There are research labs in other countries which easily brush shoulder with elite US vision labs. I won't name them but I shall ask vision enthusiasts to seriously consult [Microsoft Academic Search](#) before embarking on some decision.

Advanced students can also refer to leading vision conference and journals to zero in on their potential labs/guides. My favorite calender of vision and image processing conference is [this one](#). From this conference calender one can go to the websites of past image processing/computer vision conferences; now a days most of the leading vision conferences (e.g. CVPR/ICCV etc.) have their papers freely available on their respective conference websites. A year wise study of

We would like to thank Gaussian for the informative thread. Please refer this link to find the original post: <http://www.edulix.com/forum/showthread.php?tid/99974>

those papers would expose the vision enthusiasts to recent trends and also the work of the the big shots.