

ABHINAV SHRIVASTAVA

Assistant Professor,
University of Maryland, College Park

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EDUCATION

Ph.D., Robotics, Carnegie Mellon University Awarded Microsoft Research Ph.D. Fellowship (2014-16)	08/2012-08/2017
M.S., Robotics, Carnegie Mellon University	08/2010-12/2011
B.Tech., Computer Science & Engineering, Jaypee Institute of Information Technology (JIIT) Awarded Vice Chancellor Gold Medal	08/2006-05/2010

WORK EXPERIENCE

Assistant Professor, University of Maryland, College Park Department of Computer Science & UMIACS	08/2018- <i>Present</i>
Visiting Research Scientist, Google Research	08/2017-08/2018
Research Associate, Google Research	07/2016-07/2017
Research Intern, Microsoft Research	Summer 2015
Research Intern, Google Research	Summer 2013
Research Intern, Microsoft Research	Summer 2012
Graduate Research Assistant, Carnegie Mellon University	2011-2017
Research Associate III, Carnegie Mellon University	Spring 2012

SELECTED AWARDS & HONORS

Best Paper Award (Applications), IEEE WACV	2020
Best Paper Finalist, CVPR	2019
Outstanding Reviewer Award, CVPR	2015
Microsoft Research Ph.D. Fellowship	2014-16
Best Student Paper Award, IEEE WACV	2014
CNN's Top-10 Ideas of 2013 (Thinking Tech) (link)	2013
CRA Research Highlight, Computing Community Consortium	2011
Vice Chancellor Gold Medal (awarded to Rank 1 out of 120), JIIT	2010

RESEARCH FUNDING

- [1] DARPA SAIL-ON “Synthesizing and Quantifying Novel Videos for Classifying, Detecting, and Tracking Activities” [PI: Shrivastava]. \$2.5 million for 2019-2024.
- [2] DARPA GARD “Repelling Evasion and Poisoning Attacks: A Principled Way Forward” [PI: Goldstein, co-PI: Shrivastava]. \$3.3 million for 2019-2023.
- [3] DARPA SemaFor “Multi-media Analytics Leading to Intent and Semantic Evidence (MALISE)”, [Prime:

SRI, UMD-Co-PI: Yacoob, Senior Personnel: Shrivastava], \$2.5 million for 2020-2024.

- [4] Facebook cooperative agreement “Towards Solving the Cat-and-Mouse Problem of Media Tampering” [PI: Shrivastava]. \$1.5 million for 2018-21.
- [5] DARPA MediFor Add-on “Building Robustness against Adversarial Attacks” [PI: Shrivastava], \$420k for 2019-2021.
- [6] DARPA MediFor Add-on “Satellite image meta-data tamper detection” [PI: Shrivastava], \$217k for 2019-2021.
- [7] AF STTR Phase I “Self-Learned Agents for Collective Analysis of Human Activities and Events in Aerial Videos” [PI: Shrivastava], \$50k for 2019
- [8] STTR Phase II “Self-Learned Agents for Collective Analysis of Human Activities and Events in Aerial Videos” [Prime: IAI, UMD-PI: Shrivastava]. \$225k for 2020-2022.
- [9] IARPA DIVA “Multi-camera Based Detection of Objects, Persons, and Activities” [PI: Chellappa]. Added as senior personnel.
- [10] Honda “Temporal Multimodal Data Segmentation” [PI: Shrivastava], \$50k for 2018-19
- [11] AF STTR Phase I “Self-Learned Agents for Collective Analysis of Human Activities and Events in Aerial Videos” [PI: Shrivastava], \$50k for 2019
- [12] Gifts from Adobe, \$49.5k (multiple), 2019-2021
- [13] Gift from Google, \$15k (multiple), 2020
- [14] Google Cloud Platform Education Grant for CMSC498L (Spring 2019, Spring 2020)
- [15] Google Cloud Platform Education Grant for CMSC828I (Fall 2018, Fall 2019)
- [16] NIH R21 “Robotic Ultrasound for Trauma Care”, [PI: Krieger, co-PI: Shrivastava] (under review)

ADVISING, ACADEMIC ACTIVITY & SERVICE

Advising and Mentorship:

PhD students (as sole adviser): Kamal Gupta, Mara Levy, Lillian Huang, Luyu Yang, Yixuan Ren, Bo He, Hao Chen, Saksham Suri, Sharath Girish, Alex Hanson

PhD students (as co-adviser): Max Ehrlich (with Davis), Pallabi Ghosh (with Davis), Navaneeth Bodla (with Chellappa), Saketh Rambhatla (with Chellappa), Moustafa Meshry (with Davis), Khoi Pham (with Davis), Ahmed Taha (with Davis)

MS students (as sole adviser): Gaurav Shrivastava, Pulkit Kumar, Hanyu Wang

High-school students: Anjali Gupta (Summer’19; Hahn Fellow at Yale), Meili Gupta (Summer’19; Yale), Michelle Tang (Summer’19; Regenron Semi-finalist; Columbia)

Program Committee & Reviewing:

Conference Area Chair (Senior Program Committee): CVPR’18, ECCV’18, CVPR’19, CVPR’21

Conference Reviewer: ICCV’11-19, CVPR’12-17/20, ECCV’12-20, NIPS’12-15, ACCV’12-14, SIGGRAPH’14, AAAI’15, 3DV’14-15

Journal Reviewer: IJCV, TPAMI, CVIU, TKDE

Teaching:

Introduction to Deep Learning (Instructor, UMD): Spring'19 , Spring'20 , Spring'21	2019-
Advanced Techniques in Visual Recognition and Learning (Instructor, UMD): Fall'18 , Fall'19 , Fall'20	2018-
Geometry-based Methods in Vision (TA, CMU). (Instructor: Martial Hebert)	Spring 2013

Department Service:

Computer Science Department Faculty Search Committee (UMD)	2018-19, 19-20
Iribe Building Committee (UMD)	2018-19, 19-20
Visual and Geometric Computing Field Committee (UMD)	2018-
Ph.D. Committees (UMD)	2018-
Master's Thesis Committees (UMD)	2018-
Judge: Northrop Grumman Image Recognition Challenge (UMD)	2018
Graduate Admissions Committee (CMU)	2015-16
Ph.D. Qualifier Committee (CMU)	2015-17
Master's Thesis Committee (CMU)	2014-17

PUBLICATIONS AND PATENTS

Publications

- [1] M. Meshry, Y. Ren, L. S. Davis, **A. Shrivastava**
Style-based Encoder Pre-training for Multi-modal Image Synthesis
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021*
- [2] N. Bodla, G. Shrivastava, R. Chellappa, **A. Shrivastava**
Hierarchical Video Prediction for Human Object Interaction
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021*
- [3] P. Ghosh, N. Sainin L. S. Davis, **A. Shrivastava**
Learning Graphs for Knowledge Transfer with Limited Labels
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021*
- [4] S. Girish, S. Maiya, K. Gupta, H. Chen, **A. Shrivastava**
The Lottery Ticket Hypothesis for Object Recognition
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021*
- [5] H. Li, Z. Wu, **A. Shrivastava**, L. S. Davis
2D or not 2D? Adaptive 3D Convolution Selection for Efficient Video Recognition
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021*
- [6] A. Taha, **A. Shrivastava**, L. S. Davis
Knowledge Evolution in Neural Networks
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021*
- [7] K. Pham, K. Kaffe, Z. Lin, Z. Ding, S. Cohen, Q. H. Tran, **A. Shrivastava**
Learning to Predict Visual Attributes in the Wild
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021*

- [8] M. Levy, V. Ayyagari, **A. Shrivastava**
No-frills Dynamic Planning using Static Planners
In: *IEEE International Conference on Robotics and Automation (ICRA), 2021*
- [9] G. Shrivastava, **A. Shrivastava**
Diverse Video Generation using a Gaussian Process Trigger
In: *International Conference on Learning Representations (ICLR), 2021*
- [10] M. Ehrlich, S-N. Lim, L. S. Davis, **A. Shrivastava**
Quantization Guided JPEG Artifact Correction
In: *European Conference on Computer Vision (ECCV), 2020*
- [11] L. Yang, Y. Balaji, S-N. Lim, **A. Shrivastava**
Curriculum Manager for Source Selection in Multi-Source Domain Adaptation
In: *European Conference on Computer Vision (ECCV), 2020*
- [12] A. Taha, X. Yang, **A. Shrivastava**, L. Davis
L2 Norm: A Generic Visualization Approach for Convolutional Neural Networks
In: *European Conference on Computer Vision (ECCV), 2020*
- [13] P. Ghosh, V. Vineet, L. S. Davis, **A. Shrivastava**, S. N. Sinha, N. Joshi
Depth Completion using a View Constrained Deep Prior
In: *International Conference on 3D Vision (3DV), 2020*
- [14] K. Gupta, S. Jabbireddy, K. Shah, **A. Shrivastava**, M. Zwicker
Improved Modeling of 3D Shapes with Multi-view Depth Maps
In: *International Conference on 3D Vision (3DV), 2020*
- [15] K. Gupta, S. Singh, **A. Shrivastava**
PatchVAE: Learning Local Latent Codes for Recognition
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020*
- [16] D. Oktay, J. Ballé, S. Singh, **A. Shrivastava**
Model Compression by Entropy Penalized Reparameterization
In: *International Conference on Learning Representations (ICLR), 2020*
- [17] S. Singh, N. Johnston, J. Ballé, G. Toderici, **A. Shrivastava**
End-to-end Learning of Compressible Features
In: *International Conference on Image Processing (ICIP), 2020*
- [18] P. Zhou, B.-C. Chen, X. Han, M. Najibi, **A. Shrivastava**, S.-N. Lim, L. S. Davis
Generate, Segment and Refine: Towards Generic Manipulation Segmentation
In: *AAAI Conference on Artificial Intelligence (AAAI), 2020*
- [19] A. Bansal, S. S. Rambhatla, R. Chellappa, and **A. Shrivastava**
Detecting Human-Object Interactions using Functional Generalizations
In: *AAAI Conference on Artificial Intelligence (AAAI), 2020*
- [20] K. Lee, **A. Shrivastava**, H. Kacorri
Hand-Priming in Object Localization for Assistive Egocentric Vision
In: *IEEE Winter Conference on Applications of Computer Vision (WACV), 2020*
Oral Presentation, Best Paper Award (Applications)
- [21] A. Taha, Y.-T. Chen, T. Misu, **A. Shrivastava**, L. S. Davis
Boosting Standard Classification Architectures Through a Ranking Regularizer
In: *IEEE Winter Conference on Applications of Computer Vision (WACV), 2020*

- [22] S. Singh and **A. Shrivastava**
EvalNorm: Estimating BatchNorm Statistics for Evaluation
In: *IEEE International Conference on Computer Vision (ICCV), 2019*
- [23] C. Sun, **A. Shrivastava**, C. Vondrick, R. Sukthankar, K. Murphy, and C. Schmid
Relational Action Forecasting
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019*
- [24] C. Vondrick, **A. Shrivastava**, A. Fathi, S. Guadarrama, and K. Murphy
Tracking Emerges by Colorizing Videos
In: *European Conference on Computer Vision (ECCV), 2018*
- [25] C. Sun, **A. Shrivastava**, C. Vondrick, K. Murphy, R. Sukthankar, and C. Schmid
Actor-centric Relation Network
In: *European Conference on Computer Vision (ECCV), 2018*
- [26] C. Sun, **A. Shrivastava**, S. Singh, and A. Gupta
Revisiting Unreasonable Effectiveness of Data in Deep Learning Era
In: *IEEE International Conference on Computer Vision (ICCV), 2017*
- [27] **A. Shrivastava**, R. Sukthankar, J. Malik and A. Gupta
Beyond Skip Connections: Top-Down Modulation for Object Detection
In: *arXiv, 2017*
- [28] X. Wang, **A. Shrivastava**, and A. Gupta
A-Fast-RCNN: Hard Positive Generation via Adversary for Object Detection
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017*
- [29] **A. Shrivastava** and A. Gupta
Contextual Priming and Feedback for Faster R-CNN
In: *European Conference on Computer Vision (ECCV), 2016*
- [30] **A. Shrivastava** and A. Gupta
Training Region-based Object Detectors using Online Hard Example Mining
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016*
Oral Presentation (3.9% oral acceptance rate) (4th place in MS COCO Detection Challenge)
- [31] I. Misra, **A. Shrivastava**, A. Gupta and M. Hebert
Cross-stitch Networks for Multi-task Learning
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016*
Spotlight Presentation (9.7% spotlight acceptance rate)
- [32] I. Misra, **A. Shrivastava**, A. Gupta and M. Hebert
Watch and Learn: Semi-Supervised Learning of Object Detectors from Videos
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015*
- [33] E. M. Aminoff, M. Toneva, **A. Shrivastava**, X. Chen, I. Misra, A. Gupta and M. J. Tarr
Applying Artificial Vision Models to Human Scene Understanding
In: *Frontiers in Computational Neuroscience, 2015*
- [34] A. Bansal, **A. Shrivastava** and A. Gupta
Mid-level Elements for Object Detection
In: *arxiv, 2015*
- [35] X. Chen, **A. Shrivastava** and A. Gupta
Object Discovery and Segmentation via Discriminative Visual Subcategories
In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2014*

- [36] I. Misra, **A. Shrivastava**, A. Gupta and M. Hebert
Data-driven Exemplar Model Selection
In: *IEEE Winter Conference on Applications of Computer Vision (WACV), 2014*
Oral Presentation, Best Student Paper Award
- [37] **A. Shrivastava** and A. Gupta
Building Parts-based Object Detectors via 3D Geometry
In: *IEEE International Conference on Computer Vision (ICCV), 2013*
- [38] X. Chen, **A. Shrivastava** and A. Gupta
NEIL: Extracting Visual Knowledge from Web Data
In: *IEEE International Conference on Computer Vision (ICCV), 2013*
Oral Presentation (2.52% oral acceptance rate), <http://neil-kb.com>
Popular Press: CNN (Top-10 Ideas 2013), Newsweek, Forbes, Yahoo! News, BBC News, AP, Business Insider, Slashdot, Engadget, Engadget, Techradar.
- [39] **A. Shrivastava**, S. Singh and A. Gupta
Constrained Semi-Supervised Learning using Attributes and Comparative Attributes
In: *European Conference on Computer Vision (ECCV), 2012*
Oral Presentation (2.8% oral acceptance rate)
- [40] **A. Shrivastava**, T. Malisiewicz, A. Gupta and A. Efros
Data-driven Visual Similarity for Cross-domain Image Matching
In: *ACM Transactions of Graphics, (SIGGRAPH Asia), 2011*
Oral Presentation (18% acceptance rate)
Popular Press: *TechCrunch, Y! Hacker News, Computing Community Consortium (Research Highlight of the week), Science Daily*
- [41] T. Malisiewicz, **A. Shrivastava**, A. Gupta and A. A. Efros
Exemplar-SVMs for Visual Object Detection, Label Transfer and Image Retrieval
In: *International Conference on Machine Learning (ICML), 2012*
(Invited Applications Talk + Extended Abstract)

Patents

- [42] Google Inc.; **A. Shrivastava**, S. Singh, J. Balle, S. A. Haija, N. Johnston, G. Toderici
Learning Compressible Features
In: *United States; US20200311548A1*
- [43] Google Inc.; D. Oktay, S. Singh, J. Balle, **A. Shrivastava**
Compression of Machine-Learned Models via Entropy Penalized Weight Reparameterization
In: *United States; US20200364603A1*
- [44] Microsoft Technology Licensing LLC.; S. Mehrotra, J. Li, **A. Shrivastava**
Determining documents that match a query
In: *United States; US9442929B2*

SELECTED TALKS, SEMINARS & LECTURES

Exploratory, Relational, and Predictive Learning

Machine Common Sense, Telluride Neuromorphic Cognition Engineering Workshop, July 2019

Top-down Mechanisms in Bottom-up Deep Networks

Workshop on Deep Learning, University of Maryland, College Park, May 2017

The Small and the Rare: the Twin Menace of Visual Recognition

Colloquium: University of Maryland, College Park, Mar. 2017

GRASP Seminar: University of Pennsylvania, Feb. 2017

Training Region-based Object Detectors with Online Hard Example Mining

Conference: CVPR, Jun. 2016, [video](#)

NEIL: Extracting Visual Knowledge from Web Data

CMU VASC Seminar, Nov. 2013

Conference: ICCV, Dec. 2013, [video](#)

Guest Lecture (Course): Visual Recognition, University of Pittsburgh, Feb 2015

Constrained Semi-Supervised Learning using Attributes and Comparative Attributes

CMU VASC Seminar, Sep. 2012

Conference: ECCV, Oct. 2012, [video](#)

Guest Lecture (Course): Visual Recognition, University of Pittsburgh, Feb. 2015

Data-driven Visual Similarity for Cross-domain Image Matching

Conference: SIGGRAPH Asia, Dec. 2011

Guest Lecture (Course): Visual Recognition, University of Pittsburgh, Feb. 2015

Overview of Object Detection with historical context

Course: Learning Based Methods in Vision, CMU, Oct. 2013

Semantic vs Visual Subcategories in Computer Vision and Neuroscience

Course: The Visual World as seen by the Neurons and Machines, Mar. 2014

Building Part-based Object Detectors via 3D Geometry

CMU VASC Seminar, Nov. 2013

Tutorial on Caffe toolbox

Course: Big Data Approaches, CMU, Sep. 2014

Vanishing Point Estimation, and applications to Scene-layout Estimation

Guest Lecture (Course): Geometry-based Methods in Vision, CMU, 2013-16

Indexing in High-dimensional spaces (for large-scale nearest neighbor search)

Industry: Bing, Microsoft, Aug. 2012

Tutorial, CMU, Sep. 2012

Tutorial and Workshop on Automated Robotics (Micro-mouse)

Course: Microprocessors and Controllers, IIIT, 2008-09

Guest Lecture: Computer Society of India (CSI) Week, IGIT, IP University (India), 2008

Guest Lecture: IEEE Week, NIEC (India), 2008

Workshop: IEEE Winter Academic Program, IIIT, 2008

SELECTED MEDIA COVERAGE

Self-Supervised Tracking via Video Colorization	Google AI Blog; 2018
Revisiting the Unreasonable Effectiveness of Data	Google Research Blog; 2017
AI And 'Enormous Data' Could Make Tech Giants Harder to Topple	Wired; 2017
The Greatest Hits, and Misses, of an Image-Learning AI	Discover Magazine, 2015
Thinking Tech (Top-10 Ideas of 2013)	CNN, 2013
Computer Learns Common Sense From The Internet	Forbes, 2013
Watch out, WATSON. You've got competition	Newsweek, 2013
Computer uses images to teach itself common sense	BBC News, 2013
New research aims to teach computers common sense	Yahoo! News, 2013
Researchers Are Trying To Teach Computers Common Sense	Business Insider, 2013
New research aims to teach computers common sense	Associated Press (AP), 2013
CMU AI Learning Common Sense By Watching the Internet	Slashdot, 2013
Carnegie Mellon computer learns common sense through pictures, shows what it's thinking	Engadget, 2013
Meet NEIL, the computer that thinks like you do	Techradar, 2013
CMU Researchers One-Up Google Image Search & Photosynth With Visual Similarity Engine	Techcrunch, 2011
Computerized method for matching images in photos, paintings, sketches created	Science Daily, 2011
A better search for visually similar images	Y! Hacker News, 2011
CMU algorithm matches sketches, paintings to photographs	New Atlas (formerly Gizmag), 2011
Identifying Similar Images Across Domains, CRA Research Highlight	CCC, 2011