Bharath Hariharan

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EDUCATION

PhD
University of California, Berkeley
Advisor: Jitendra Malik

B'Tech
Indian Institute of Technology
Delhi

EMPLOYMENT

Assistant Professor
Cornell University

Postdoc
Facebook Inc. (Now Meta)

AWARDS

• PAMI Young Researcher Award, 2022
• NSF CAREER
• Excellence in Teaching award, 2019 - 2020
• Microsoft Research Fellowship, 2013.
• Outstanding Graduate Student Instructor Award, 2011.
• Berkeley Graduate Student Fellowship, 2010.
• President’s Gold Medal, IIT Delhi, 2010.

INVITED TALKS

• Invited keynote at the CVPR 2022 Workshop on Fair, Data-Efficient and Trusted Computer Vision
• Invited talk and panel at the S2D-OLAD workshop at ICLR, Spring 2021.
• VASC seminar at CMU, Spring 2021.
• TUM AI Lecture, Fall 2020.
• Invited talk at UC Berkeley, Spring 2021.
• Invited talk at Google research, Spring 2021.
• Invited talk at Amazon, Fall 2021.
• Invited talk at MIT, Spring 2020.
• Invited talk at Rochester Institute of Technology, Fall 2018.
• AFRL Special Topics in Machine Learning Summer Symposium at Griffiss Institute, Fall 2018.
• Machine Learning and Friends Lunch, University of Massachusetts, Amherst, MA, Fall 2018.
• Fifth workshop on Fine-grained Visual Categorization (FGVC5) held at CVPR, 2017.

**Publications**

**Peer-reviewed Conference Publications**

• *Change-Aware Sampling and Contrastive Learning for Satellite Images.*
  Utkarsh Mall, Bharath Hariharan, Kavita Bala.
  In CVPR 2023.

• *Change Event Dataset for Discovery from Spatio-temporal Remote Sensing Imagery.*
  Utkarsh Mall, Bharath Hariharan, Kavita Bala.
  In NeurIPS (Datasets and Benchmarks track) 2022 (Featured).

• *Polynomial Neural Fields for Subband Decomposition and Manipulation.*
  Guandao Yang*, Sagie Benaim*, Varun Jampani, Kyle Genova, Jonathan T. Barron, Thomas Funkhouser, Bharath Hariharan, Serge Belongie.
  In NeurIPS 2022.

• *Unsupervised Adaptation from Repeated Traversals for Autonomous Driving.*
  Yurong You*, Cheng Perng Phoo*, Katie Z Luo*, Travis Zhang, Wei-Lun Chao, Bharath Hariharan, Mark Campbell, Kilian Q. Weinberger.
  In NeurIPS 2022.

• *Visual Prompt Tuning.*
  Menglin Jia*, Luming Tang*, Bor-Chun Chen, Claire Cardie, Serge Belongie, Bharath Hariharan, Ser-Nam Lim.
  In ECCV 2022.
• **Exploiting Playbacks in Unsupervised Domain Adaptation for 3D Object Detection.**
  Yurong You*, Carlos Andres Diaz-Ruiz*, Yan Wang, Wei-Lun Chao, **Bharath Hariharan**, Mark Campbell, Kilian Weinberger.
  In ICRA 2022.

• **Learning to Detect Mobile Objects from LiDAR Scans Without Labels.**
  Yurong You*, Katie Luo*, Cheng Perng Phoo, Wei-Lun Chao, Wen Sun, **Bharath Hariharan**, Mark Campbell, Kilian Weinberger.
  In CVPR 2022.

• **Hindsight is 20/20: Leveraging past traversals to aid 3D perception.**
  Yurong You, Katie Luo, Xiangyu Chen, Junan Chen, Wei-Lun Chao, Wen Sun, **Bharath Hariharan**, Mark Campbell, Kilian Weinberger.
  In ICLR 2022.

• **Geometry Processing using Neural Fields.**
  Guandao Yang, Serge Belongie, **Bharath Hariharan**, Vladlen Koltun.
  In NeurIPS 2021.

• **Coarsely-labeled Data for Better Few-shot Transfer.**
  Cheng Perng Phoo, **Bharath Hariharan**.
  In ICCV 2021.

• **Field Guide-inspired Zero-Shot Learning.**
  Utkarsh Mall, **Bharath Hariharan**, Kavita Bala.
  In ICCV 2021.

• **Extreme Rotation Estimation using Dense Correlation Volumes.**
  Ruojin Cai, Hadar Averbuch-Elor, **Bharath Hariharan**, Noah Snavely.
  In CVPR 2021.

• **Stay Positive: Non-Negative Image Synthesis for Augmented Reality.**
  Katie Luo, Guandao Yang, Wenqi Xian, Harald Haraldsson, **Bharath Hariharan**, Serge Belongie.
  In CVPR 2021.(Oral).

• **Can We Characterize Tasks Without Labels or Features?**
  Bram Wallace, Ziyang Wu, **Bharath Hariharan**.
  In CVPR 2021.

• **Few-Shot Classification with Feature Map Reconstruction Networks.**
  Davis Wertheimer, Luming Tang, **Bharath Hariharan**.
  In CVPR 2021.
• PiCIE: Unsupervised Semantic Segmentation using Invariance and Equivariance in Clustering.
  Jang Hyun Cho, Utkarsh Mall, Kavita Bala, Bharath Hariharan.
  In CVPR 2021.

• Self-training For Few-shot Transfer Across Extreme Task Differences.
  Cheng Perng Phoo, Bharath Hariharan.
  In ICLR 2021(Oral).

• Wasserstein Distances for Stereo Depth Estimation.
  Divyansh Garg, Yan Wang, Bharath Hariharan, Mark Campbell, Kilian Q Weinberger, Wei-Lun Chao.
  In NeurIPS 2020(Oral).

• Learning Gradient Fields for Shape Generation.
  Ruojin Cai, Guandao Yang, Hadar Averbuch-Elor, Zekun Hao, Serge Belongie, Noah Snavely, Bharath Hariharan.
  In ECCV 2020(Spotlight).

• When Does Self-supervision Improve Few-shot Learning?.
  Jong-Chyi Su, Subhransu Maji, Bharath Hariharan.
  In ECCV 2020.

• Extending and Analyzing Self-Supervised Learning Across Domains.
  Bram Wallace, Bharath Hariharan.
  In ECCV 2020.

• Learning Feature Descriptors using Camera Pose Supervision.
  Qianqian Wang, Xiaowei Zhou, Bharath Hariharan, Noah Snavely.
  In ECCV 2020(Oral).

• Fashionpedia: Ontology, Segmentation, and an Attribute Localization Dataset.
  Menglin Jia, Mengyun Shi, Mikhail Sirotenko, Yin Cui, Bharath Hariharan, Claire Cardie, Hartwig Adam, Serge Belongie.
  In ECCV 2020(Oral).

• Revisiting Pose-Normalization for Fine-Grained Few-Shot Recognition.
  Luming Tang, Davis Wertheimer, Bharath Hariharan.
  In CVPR 2020.

• Train in Germany, Test in The USA: Making 3D Object Detectors Generalize.
  Yan Wang, Xiangyu Chen, Yurong You, Li Erran Li, Bharath Hariharan, Mark Campbell, Kilian Q. Weinberger, Wei-Lun Chao.
In CVPR 2020.

• **End-to-end Pseudo-LiDAR for Image-Based 3D Object Detection.**
  Rui Qian, Divyansh Garg, Yan Wang, Yurong You, Serge Belongie, Bharath Hariharan, Mark Campbell, Kilian Q. Weinberger, and Wei-Lun Chao.
  In CVPR 2020.

• **Pseudo-lidar++: Accurate depth for 3d object detection in autonomous driving.**
  Yurong You, Yan Wang, Wei-Lun Chao, Divyansh Garg, Geoff Pleiss, Bharath Hariharan, Mark Campbell, and Kilian Weinberger.
  In ICLR 2020.

• **PointFlow: 3D Point Cloud Generation with Continuous Normalizing Flows.**
  Guandao Yang*, Xun Huang*, Zekun Hao, Ming-Yu Liu, Serge Belongie, Bharath Hariharan.
  In ICCV 2019(Oral).

• **Few-Shot Generalization for Single-Image 3D Reconstruction via Prior.**
  Bram Wallace, Bharath Hariharan.
  In ICCV 2019.

• **On the impact of neural network architecture on the efficacy of knowledge distillation.**
  Jang Hyun Cho, Bharath Hariharan.
  In ICCV 2019.

• **GeoStyle: Discovering Fashion Trends and Events.**
  Utkarsh Mall, Kevin Matzen, Bharath Hariharan, Noah Snavely, Kavita Bala.
  In ICCV 2019.

• **Few-shot Learning with Localization in Realistic Settings.**
  Davis Wertheimer, Bharath Hariharan.
  In CVPR 2019(Oral).

• **Pseudo-LiDAR from Visual Depth Estimation: Bridging the Gap in 3D Object Detection for Autonomous Driving.**
  Yan Wang, Wei-Lun Chao, Divyansh Garg, Bharath Hariharan, Mark Campbell, Kilian Q. Weinberger.
  In CVPR 2019.

• **Design Mining for Minecraft Architecture.**
  Euisun Yoon, Erik Andersen, Bharath Hariharan, Ross Knepper.
  In Artificial Intelligence and Interactive Digital Entertainment (AIIDE) 2018.
• **Learning Single-View 3D Reconstruction with Limited Pose Supervision.**
  Guandao Yang, Yin Cui, Serge Belongie, **Bharath Hariharan**.
  In ECCV 2018.

• **Low-shot Learning from Imaginary Data.**
  Yu-Xiong Wang, Ross Girshick, Martial Herbert, **Bharath Hariharan**.
  In CVPR 2018 (**Spotlight**).

• **Low-shot learning with large-scale diffusion.**
  Matthijs Douze, Arthur Szlam, **Bharath Hariharan**, Hervé Jégou.
  In CVPR 2018.

• **Resource Aware Person Re-identification across Multiple Resolutions.**
  Yan Wang*, Lequn Wang*, Yurong You*, Xu Zou, Vincent Chen, Serena Li, Gao Huang, **Bharath Hariharan**, Kilian Q. Weinberger.
  In CVPR 2018.

• **Low-shot Visual Recognition by Shrinking and Hallucinating Features.**
  **Bharath Hariharan**, Ross Girshick.
  In ICCV 2017 (**Spotlight**).

• **Inferring and Executing Programs for Visual Reasoning.**
  Justin Johnson, **Bharath Hariharan**, Laurens van der Maaten, Judy Hoffman, Li Fei-Fei, C. Lawrence Zitnick, Ross Girshick.
  In ICCV 2017 (**Oral**).

• **Learning Features by Watching Objects Move.**
  Deepak Pathak, Ross Girshick, Piotr Dollár, Trevor Darrell, **Bharath Hariharan**.
  In CVPR 2017.

• **CLEVR: A Diagnostic Dataset for Compositional Language and Elementary Visual Reasoning.**
  Justin Johnson, **Bharath Hariharan**, Laurens van der Maaten, Li Fei-Fei, C. Lawrence Zitnick, Ross Girshick.
  In CVPR 2017.

• **Feature Pyramid Networks for Object Detection.**
  Tsung-Yi Lin, Piotr Dollár, Ross Girshick, Kaiming He, **Bharath Hariharan**, Serge Belongie.
  In CVPR 2017.

• **Iterative Instance Segmentation.**
  Ke Li, **Bharath Hariharan**, Jitendra Malik.
In CVPR 2016.

- **DeepBox: Learning Objectness with Convolutional Networks.**
  Weicheng Kuo, **Bharath Hariharan**, Jitendra Malik.
  In ICCV 2015.

- **Hypercolumns for Object Segmentation and Fine-grained Localization.**
  **Bharath Hariharan**, Pablo Arbelja’ez, Ross Girshick, Jitendra Malik.
  In CVPR 2015(Oral).

- **Simultaneous Detection and Segmentation.**
  **Bharath Hariharan**, Pablo Arbelja’ez, Ross Girshick, Jitendra Malik.
  In ECCV 2014.

- **Detecting objects using Deformation Dictionaries.**
  **Bharath Hariharan**, Larry Zitnick, Piotr Dolljar.
  In CVPR 2014.

- **Using k-poselets for detecting people and localizing their keypoints.**
  Georgia Gkioxari*, Bharath Hariharan*, Ross Girshick, Jitendra Malik.
  In CVPR 2014.

- **Discriminative decorrelation for clustering and classification.**
  **Bharath Hariharan**, Jitendra Malik, Deva Ramanan.
  In ECCV 2012.

- **Semantic segmentation using regions and parts.**
  Pablo Arbelja’ez, **Bharath Hariharan**, Chunhui Gu, Saurabh Gupta, Lubomir Bourdev, Jitendra Malik.
  In CVPR 2012.

- **Semantic contours from inverse detectors.**
  **Bharath Hariharan**, Pablo Arbelja’ez, Lubomir Bourdev, Subhransu Maji, Jitendra Malik.
  In ICCV 2011.

- **Large scale max-margin multi-label classification with priors.**
  **Bharath Hariharan**, Lili Zelnik-Manor, S. V. N. Vishwanathan, Manik Varma.
  In ICML 2010(Oral).

- **Selecting the Best VM across Multiple Public Clouds: A Data-Driven Performance Modeling Approach.**
  Neeraja J. Yadwadkar, **Bharath Hariharan**, Joseph E Gonzalez, Burton Smith, Randy Katz.
In SoCC 2017.

- **Faster Jobs in Distributed Data Processing using Multi-Task Learning.**
  Neeraja J. Yadwadkar, Bharath Hariharan, Joseph Gonzalez, Randy Katz.
  In SDM 2015 (Oral).

- **Verification as learning geometric concepts.**
  Rahul Sharma, Saurabh Gupta, Bharath Hariharan, Alex Aiken, Aditya Nori.
  In Static Analysis Symposium (SAS) 2013.

- **A Data Driven Approach for Algebraic Loop Invariants.**
  Rahul Sharma, Saurabh Gupta, Bharath Hariharan, Alex Aiken, Percy Liang, Aditya Nori.
  In European Symposium on Programming (ESOP) 2013.

**Peer-reviewed Journal Publications**

- **Object Instance Segmentation and Fine-grained Localization using Hypercolumns.**
  Bharath Hariharan, Pablo Arbelajez, Ross Girshick, Jitendra Malik.
  In TPAMI 2015.

- **Efficient max-margin multi-label classification with applications to zero-shot learning.**
  Bharath Hariharan, S. V. N. Vishwanathan, Manik Varma.
  In Machine Learning 2012.

- **Multi-Task Learning for Straggler Avoiding Predictive Job Scheduling.**
  Neeraja J. Yadwadkar, Bharath Hariharan, Joseph Gonzales, Randy Katz.
  In JMLR 2016.

- **Machine Learning (ML) for Tracking Fashion Trends: Documenting the Frequency of the Baseball Cap on Social Media and the Runway.**
  Rachel Rose Getman, Denise Nicole Green, Kavita Bala, Utkarsh Mall, Nehal Rawat, Sonia Appasamy and Bharath Hariharan.
  In Clothing and Textiles Research Journal 2020.

- **A semi-automated machine learning-aided approach to quantitative analysis of centrosomes and microtubule organization.**
  Divya Ganapathi Sankaran, Alexander J Stemm-Wolf, Bailey L McCurdy, Bharath Hariharan, Chad G Pearson.
  In Journal of Cell Science 2020.
**PhD Students**

| Name                        | Graduation Year | Employment after Cornell           |
|-----------------------------|-----------------|------------------------------------|
| Yan Wang (with Kilian Weinberger) | 2021            | Waymo                              |
| Davis Wertheimer             | 2022            | IBM Research                      |
| Bram Wallace                 | 2022            | Salesforce Research                |
| Guandao Yang                 | 2023 (Expected) | Postdoc at Stanford                |
| Utkarsh Mall                 | 2023 (Expected) | Postdoc at Columbia                |
| Qianqian Wang                | 2023 (Expected) | Postdoc at Berkeley                |
| Yurong You                   | 2023 (Expected) | Postdoc at Apple                   |
| Chinasa Okolo                | 2023 (Expected) | Postdoc at MIT                     |
| Cheng Perng Phoo             | 2023 (Expected) |                                    |
| Ruojin Cai (with Noah Snavely) |                 |                                    |
| Luming Tang                  |                 |                                    |
| Yihong Sun                   |                 |                                    |
| Aditya Chetan                |                 |                                    |

**Invited Reviewing and Other Service**

- Invited Meta-reviewer for ICML, 2022
- Invited SPC for International Joint Conferences on Artificial Intelligence (IJCAI), 2020
- Invited meta-reviewer for European Conference for Computer Vision (ECCV), 2020, 2022.
- Invited meta-reviewer (responsible for managing reviewers for 30 papers) for Computer Vision and Pattern Recognition (CVPR), 2019.
- Invited meta-reviewer (responsible for managing reviewers for 30 papers) for International Conference on Computer Vision (ICCV), 2019, 2023.
- Invited reviewer for
  - The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2017, 2018, 2019, 2021, 2022.
  - The International Conference on Computer Vision (ICCV) 2013, 2017.
  - The European Conference on Computer Vision (ECCV), 2018.
  - The Neural Information Processing Conference (NIPS), 2013.
  - The ACM Special Interest Group on Graphics (SIGGRAPH), 2017.
  - The ACM Special Interest Groups on Graphics, Asia (SIGGRAPH-Asia), 2017.
  - The International Conference on Machine Learning (ICML), 2013.
  - The British Machine Vision Conference (BMVC), 2017.
  - The International World-Wide Web Conference (WWW), 2017.
  - Computer Vision and Image Understanding (Elsevier).
  - Nature Communications.
• Invited Special Program Committee (SPC) Member SPC for Association for the Advancement of Artificial Intelligence (AAAI), 2018.

• Co-organizer for the Perceptual Organization in Computer Vision Workshop, ECCV 2018.

• Outstanding Reviewer Award for IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018.

• Outstanding Reviewer Award for European Conference on Computer Vision (ECCV), 2014.

• Outstanding Reviewer Award for IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.