

Yash Sanjay Bhalgat

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EDUCATION

- University of Oxford** Oct '21 - Oct '25 (Expected)
DPhil (PhD), Computer Vision and Machine Learning @ Visual Geometry Group (VGG)
Advisors: Andrew Zisserman, Andrea Vedaldi, João Henriques, Iro Laina
- University of Michigan, Ann Arbor** Sep '17 - Dec '18
Masters, Computer Science and Engineering
- Indian Institute of Technology, Bombay** Jul '13 - May '17
B.Tech. (with Honors) in Electrical Engineering and Minor in Computer Science

WORK EXPERIENCE

- Multiple startups, Part-time AI Consultant** [Feb '23 - Ongoing]
- AI chip company*: Developing real-time low-power Computer Vision algorithms for augmented reality on smart glasses.
 - Content moderation company*: Deploying Large Language Model (LLM) solutions to moderate multimodal data online.
 - Togal.AI*: Building CV solutions for detecting, measuring & comparing project features on architectural plans/drawings.
- Qualcomm AI Research** | *Senior Machine Learning Researcher* [Nov '20 - Jul '21]
| *Machine Learning Researcher* [Jun '19 - Oct '20]
- Spearheaded the ultra-low resource always-on vision project from model design, quantization to final hardware mapping
 - Filed 12 inventions in 2020-21 of which 6 ideas have been filed for patent protection. Notable works on 3D hand-pose estimation [DIR-Net], low-bit quantization [LSQ+, QKD], structured [StructConv] and unstructured [LTP] pruning
 - Led Qualcomm's team in the MicroNet Challenge at NeurIPS 2019, and achieved 3rd position in ImageNet track [Code]
 - Managed/mentored interns - Jangho Kim and John Yang (PhD @ SNU) with contributions to the AR/VR project
- Voxel51, Inc., Computer Vision & Machine Learning Engineer** [Feb '19 - May '19]
- Researched and developed production pipelines for real-time vehicle tracking for querying on large-scale video databases

PUBLICATIONS

- Conference Publications** (Full list: [Google scholar](https://scholar.google.com/citations?user=8888888888888888)) * equal contribution
- 3D-Aware Instance Segmentation and Tracking in Egocentric Videos. [Paper]
ACCV, 2024. Yash Bhalgat*, Vadim Tschernezki*, Iro Laina, João Henriques, Andrea Vedaldi, Andrew Zisserman.
 - N2F2: Hierarchical Scene Understanding with Nested Neural Feature Fields. [Paper]
ECCV, 2024. Yash Bhalgat, Iro Laina, João Henriques, Andrew Zisserman, Andrea Vedaldi.
 - SiLVR: Scalable Lidar-Visual Reconstruction with Neural Radiance Fields for Robotic Inspection. [Paper]
ICRA, 2024. Yifu Tao, Yash Bhalgat, Lanke Frank Tarimo Fu, Matias Mattamala, Nived Chebrolu, Maurice Fallon.
 - Neural Refinement for Absolute Pose Regression with Feature Synthesis. [Paper]
CVPR, 2024. Shuai Chen, Yash Bhalgat, Xinghui Li, Jiawang Bian, Kejie Li, Zirui Wang, Victor Adrian Prisacariu.
 - Contrastive Lift: 3D Object Instance Segmentation by Slow-Fast Contrastive Fusion. [Paper][Code]
NeurIPS, 2023 (**Spotlight**). Yash Bhalgat, Iro Laina, João Henriques, Andrea Vedaldi, Andrew Zisserman.
 - A Light Touch Approach to Teaching Transformers Multi-view Geometry. [Paper]
CVPR, 2023. Yash Bhalgat, João Henriques, Andrew Zisserman.
 - A Prompt Array Keeps the Bias Away: Debiasing Vision-Language Models with Adversarial Learning. [Paper]
AAACL-IJCNLP, 2022. Hugo Berg, Siobhan Hall, Yash Bhalgat, Wonsuk Yang, Hannah Kirk, A. Shtedritski, M. Bain.
 - Dynamic Iterative Refinement for Efficient 3D Hand Pose Estimation. [Paper]
WACV, 2022. John Yang, Yash Bhalgat, Simyung Chang, Fatih Porikli, Nojun Kwak.
 - Structured Convolutions for Efficient Neural Network Design. [Paper]
NeurIPS, 2020. Yash Bhalgat, Yizhe Zhang, Jamie Lin, Fatih Porikli.
 - Teacher-Student Paradigm for Tri-training: An Efficient Method for Unlabeled Data Exploitation. [Paper]
KONVENS, 2019. Yash Bhalgat, Zhe Liu, Pritam Gundecha, Jalal Mahmud, Amita Misra.
 - CatsEyes: Categorizing seismic structures with scattering wavelet networks. [Paper] [Poster]
ICASSP, 2018, Yash Bhalgat, Laurent Duval, Jean Charlety.

Workshop Publications

2. LSQ+: Improving low-bit quantization through learnable offsets & better initialization. *Yash Bhalgat*, Jinwon Lee, Markus Nagel, Tijmen Blankevoort, Nojun Kwak. **CVPRW Efficient Deep Learning in Computer Vision, 2020** [Paper]
1. Annotation-cost Minimization for Medical Image Segmentation using Suggestive Mixed Supervision Fully Convolutional Networks. *Yash Bhalgat**, Meet Shah*, Suyash Awate. *Medical Imaging meets NeurIPS, 2018* [Paper]

Unpublished Manuscripts

3. When LLMs step into the 3D World: A Survey and Meta-Analysis of 3D Tasks via Multi-modal Large Language Models. Xianzheng Ma*, *Yash Bhalgat**, Brandon Smart*, Shuai Chen, Xinghui Li, *et. al.* [arXiv:2405.10255] [Project page]
2. Learned Threshold Pruning. Kambiz Azarian, *Yash Bhalgat*, Jinwon Lee, Tijmen Blankevoort. [arXiv:2003.00075]
1. Quantization-aware Knowledge Distillation. *Yash Bhalgat**, Jangho Kim*, J. Lee, C. Patel, N. Kwak. [arXiv:1911.12491]

PATENTS

6 patents in Computer Vision, Machine (Deep) Learning and Edge Computing.

Patent IDs: *US 17/653,855*; *US 17/175,487*; *US 17/336,048*; *US 17/168,101*; *US 17/067,233*; *US 16/451,693*;

INTERNSHIPS & SELECTED PROJECTS

[Project] **NeurIPS '19 MicroNet challenge - 3rd place, ImageNet track** [Code] [Jul '19 - Oct '19]

- Designed fast evolutionary mixed precision quantization: 8x compression EfficientNet-B0/MixNet-S, <1% accuracy loss

[Internship] **IBM Almaden Research Center, Mentor - Zhe Liu, Pritam Gundecha** [Summer '18]

- Proposed teacher-student learning paradigm for task-agnostic classification in presence of label noise in train data [Paper]

[Internship] **IFP Energies nouvelles, Paris, Mentor - Laurent Duval** [Summer '17]

- Real-time sparsity-based deformation-invariant feature extraction for large geophysical images (ICASSP 2018) [Paper]

[Thesis] **Scattering Wavelet Network based Robust Fingerprint Classification** [Jul '16 - Apr '17]

- *Guide: Prof. Vikram Gadre.* Awarded Undergraduate Research Award (URA02) for this work.

[Internship] **IBM Research, Bangalore, Mentor - Vikas Raykar** [Summer '16]

- Joint multi-modal representations for e-commerce catalog search by visual attributes *without* manual tagging

SKILLS

Languages Python (proficient), C++ (moderate), Julia, MATLAB, Verilog, Bash, L^AT_EX

Frameworks PyTorch (proficient), TensorFlow and Keras (basic), OpenAI gym, CUDA, Theano, OpenCV, git, slurm

TEACHING EXPERIENCE

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|----------------------------------------------------------------------|---------------------------------------------------------------------|------------------------|
| University of Oxford, <i>Tutor</i> | Computer Vision, <i>with Profs Andrea Vedaldi, Andrew Zisserman</i> | [Hillary '22] |
| | Computer Graphics, <i>with Dr. Jassim Happa, Stuart Golodetz</i> | [Hillary '22] |
| | Artificial Intelligence, <i>with Prof. Bernardo Cuenca Grau</i> | [Hillary '22] |
| University of Michigan, <i>Graduate Student Instructor</i> | Computational Data Science, <i>with Prof. Raj Nadakuditi</i> | [Fall '18] |
| | Introduction to Logic Design, <i>with Prof. Matthew Smith</i> | [Winter '18] |
| IIT Bombay, <i>Teaching Assistant</i> | Wavelets, <i>with Prof. Vikram Gadre</i> | [Fall '16, Winter '17] |
| | Quantum Mechanics and Applications, <i>with Prof. Siva Prasad</i> | [Fall '14, Winter '15] |

PROFESSIONAL SERVICE

Workshop Organizer: Learning 3D with Multi-View Supervision, CVPR '24; 3D-VLM/VLA Workshop, CVPR '25

Reviewer: CVPR '24 '23, ECCV '24 '22, ICLR '23, NeurIPS '23, EMNLP '22, '21, TMLR

Area Chair: AI for Content Creation Workshop, CVPR '24. **Website Chair:** BMVC 2022.

SCHOLASTIC ACHIEVEMENTS

- Undergraduate Research Award (URA 02) for exceptional work during Bachelors Thesis at IIT Bombay
- Cargill Global Scholarship 2014-15 and 2015-16 for excellence in leadership and academic skills
- All India Rank **12** in IITJEE-Mains exam among 1,000,000 candidates
- All India Rank **155** in IITJEE-Advanced exam among 150,000 candidates
- All India Rank **60** in KVPY Scholarship by Govt. of India among 0.2 million candidates
- Selected among National Top 30 (for OCSC camp) for International Astronomy Olympiad '13
- Selected among top 300 participants of India to compete in **all three national olympiads**: INPhO (Indian National Physics Olympiad), INChO (Chemistry), INAO (Astronomy)
- Visharad Degree (*equiv.* Bachelors in Music) in Indian Classical Music for playing Tabla