

Girish Varma

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EMPLOYMENT

- Assistant Professor 2019 - now
Center for Security, Theory and Algorithmic Research and [Machine Learning Lab](#),
[Kohli Center for Intelligent Systems](#), **IIIT Hyderabad**.
- Senior Project Scientist 2016 - 2019
[Kohli Center for Intelligent Systems](#), **IIIT Hyderabad**.
Area of Research: Applied Computer Vision and Machine Learning.
Advisor: [Prof. C V Jawahar](#)
- Postdoctoral Researcher 2015 - 2016
[Faculty of Mathematics and Computer Science](#), **Weizmann Institute of Science**, Israel.
Area of Research: Theoretical Machine Learning.
Advisor: [Prof. Irit Dinur](#)

EDUCATION

- PhD. in Computer and Systems Science, [School of Technology and Computer Science](#), 2011 - 2015
Tata Institute of Fundamental Research, Mumbai.
Area of Research: Algorithms and Complexity.
Advisor: [Prof. Prahladh Harsha](#).
- MS. in Computer Science, [School of Technology and Computer Science](#), 2008 - 2011
Tata Institute of Fundamental Research, Mumbai.
Area of Research: Approximate Counting and Sampling Problems.
Advisor: [Prof. Manoj Gopalkrishnan](#).
- B.Tech. Computer Science & Engineering, 2004 - 2008
National Institute of Technology, Calicut.

RESEARCH SUMMARY

My research interest include Computer Vision, Machine Learning, Learning Theory, Graph Theory and Algorithms. Specific research areas include: Model Compression techniques using Graph Theory for making Deep Neural Networks efficient, applications of Computer Vision in Autonomous Navigation and Transportation Problems. I also collaborate on Interdisciplinary problems with faculty and partners from Medical, Science, Mobile Computing domains.

SPONSORED PROJECTS

As PI

- Manjeera Digital Systems: Efficient Implementation of Text to Speech on Specialized Processor.
- Adtechcorp Technologies Pvt Lt: Automated Seed Quality Estimation using Computer Vision.
- Intel Bangalore: Data Sets for Autonomous Navigation Research in Indian Traffic Conditions.

As CoPI

- Fight for Sights Grant: Developing a Prototype Artificial Intelligence-based Eye Tracker (A-EYE) for the Diagnosis and Monitoring of Eye Movement Disorder. In collaboration with clinical researchers from University of Leicester.

PROFESSIONAL SERVICES & CONTRIBUTIONS

Program Committee Duties

- IJCAI'20, IJCAI'18, AMAS'19, AAAI'19, Autonomous Navigation in Unconstrained Environments Workshop, ECCV'18.

Workshop & Challenges

- [IDD Challenge](#). NCVPRIPG '19.
- [AutoNUE Workshop and Challenge at ICCV'19](#).
- [Scene Understanding Challenge for AutoNUE Workshop, ECCV'18](#).
- Autorickshaw Detection Challenge, NCVPRIPG '17.

Summer Schools & Tutorials

- Challenges and Advances in Vision-Based Self-Driving at ICVGIP'18.
- Computer Vision for Autonomous Navigation at NCVPRIPG '17.
- Summer Schools on Computer Vision and Machine Learning. CVIT. IIIT Hyderabad.

RECOGNITION & VISITS

Awards

- JTCF Novel Technology paper award Finalist at International Conference on Intelligent Robots and Systems (IROS), 2018.
- Best Runner-Up award for a paper at CVPR IEEE Embedded Vision Workshop, 2018.

Fellowships

- Dean's Postdoctoral Fellowship, Faculty of Math and Computer Science, 2015 - 2016, Weizmann Institute, ISRAEL.
- Google India PhD Fellowship in Algorithms, 2011.

Invited Talks

- Invited Lecture at [International Center for Transformative Artificial Intelligence \(ICTAI\)](#) Workshop on Unstructured Driving Scenarios in India organized by NITI Aayog, TIFR and Intel.
- Paper invited for Oral/Spotlight Presentations (among 3% of total submissions) at European Conference on Computer Vision (ECCV'18) and British Machine Vision Conference (BMVC'18).

Visits

- MPI Institute for Informatik, Saarbrücken, Germany funded by Indo-German Max Planck Center on Computer Science (IMPECS). Host: Prof. Kurt Melhorn.
- Weizmann Institute of Science, Israel. Host: Prof. Irit Dinur.
- New York University, USA. Host: Prof. Subhash Khot.
- Internship at Google Bangalore during UG.

SELECTED PUBLICATIONS

[List to all publications available at Google Scholar.](#)

Citations: 367, h-index: 9, i10-index: 8

Model Compression

- Dharma Teja Vooturi, Girish Varma, Kishore Kothapalli. Ramanujan Bipartite Graph Products for Efficient Block Sparse Neural Networks. *Concurrency and Computation: Practice and Experience Journal*. 2021
- Girish Varma, Ameya Prabhu, & Anoop Naboothiri. "Deep Expander Networks: Efficient Deep Networks from Graph Theory", European Conference on Computer Vision. **(Oral Presentation ECCV'18)**.
- Nikitha Varullapalli, Sriharsha Annameni, Girish Varma, Manu Mathew, Nagori Soyeb & C V Jawahar, "Efficient Semantic Segmentation using Gradual Grouping", CVPR, IEEE Embedded Vision Workshop, 2018. **Best Runner-Up Award**.
- Dharma Teja Vooturi, Girish Varma, Kishore Kothapalli. Dynamic Block Sparse Reparameterization of Convolutional Neural Networks. The IEEE International Conference on Computer Vision (ICCV) Workshops, 2019.

Complexity Theory

- Amey Bhangale, Ramprasad Saptrishi, Rakesh Venkat & Girish Varma, "On Fortification of Projection Games", *Randomized Algorithms (RANDOM'15)*.
- Venkat Guruswami, Prahladh Harsha, Johan Håstad, Srikanth Srinivasan & Girish Varma. "Superpolylogarithmic hypergraph coloring hardness via low-degree long codes.", *SIAM Journal on Computing (SICOMP)*, 2016. Preliminary version appeared in Proc. 46th ACM Symp. on Theory of Computing (STOC'14).
- Amey Bhangale, Prahladh Harsha & Girish Varma, "A Characterization of hard-to-cover CSPs", *Theory of Computing Journal (ToC)*. Preliminary version appeared in Computational Complexity Conference (CCC'15).
- Girish Varma, "Reducing uniformity in Khot-Saket hypergraph coloring hardness reductions", *Chicago Journal of Theoretical Computer Science (CJTCS)*, 2015(3).

Algorithms & Graph Theory

- Kshitij Gajjar, Girish Varma, Prerona Chatterjee, Jaikumar Radhakrishnan. “Generalized Parametric Path Problems.”, 37th Conference on Uncertainty in Artificial Intelligence (UAI) 2021.
- Irit Dinur, Prahladh Harsha, Srikanth Srinivasan & Girish Varma, “Derandomized graph product results using the low degree long code”, Symp. on Theoretical Aspects of Computer Science (STACS’15).
- Vincenzo Bonifaci, Kurt Mehlhorn, & Girish Varma, “Physarum can compute shortest paths”, Journal of Theoretical Biology (JTB). Preliminary version appeared in Sym. on Discrete Algorithms (SODA’11).
- Ajesh Babu, Nutan Limaye, Jaikumar Radhakrishnan & Girish Varma, “Streaming algorithms for some language recognition problems”, Theoretical Computer Science Journal (TCS). Preliminary version appeared in Theory and Applications of Models of Computation (TAMC’10).

Machine Learning & Computer Vision

- Kalluri, Tarun and Varma, Girish and Chandraker, Manmohan and Jawahar, C.V. *Universal Semi-Supervised Semantic Segmentation*. IEEE International Conference on Computer Vision (ICCV’19).
- Soham Saha, Girish Varma & C V Jawahar, “Improved Visual Relocalization by Discovering Anchor Points”, British Machine Vision Conference (BMVC’18) **Spotlight Presentation**.
- Sudhir Kumar, Girish Varma & C V Jawahar, “Cityscale Road Audit System using Deep Learning”, International Conference on Intelligent Robots (IROS’18), **JTCF Novel Technology paper award for Amusement Culture Finalist**.
- Girish Varma, Anbumani Subramanian, Anoop Namboodiri, Manmohan Chandraker, C V Jawahar. “IDD: A Dataset for Exploring Problems of Autonomous Navigation in Unconstrained Environments”, IEEE Winter Conf. on Applications of Computer Vision (WACV’19).

Interdisciplinary

- *Deep learning enabled inorganic material generator*. Yashaswi Pathak, Karandeep Singh Juneja, Girish Varma, Masahiro Ehara and U. Deva Priyakumar. Journal of Physical Chemistry Chemical Physics.
- *Using Artificial Intelligence (AI) to Classify Retinal Developmental Disorders*. . Invest. Ophthalmol. Vis. Sci. 2020;61(7):4030.

TEACHING

- [Linear Algebra](#) April 2021
- [Probability and Statistics](#) Aug 2020, 2019
- [Machine Learning for Natural Sciences](#) Jan 2021, Jan 2020, Aug 2019, Jan 2019
- [Probabilistic Graphical Models](#) Jan 2020
- [Modern Complexity Theory](#) Aug 2020
- [Advanced Mathematical Structures](#) Aug 2019