# Vijay Rengarajan

5000 Forbes Avenue, B44, Porter Hall
Department of Electrical and Computer Engineering
Carnegie Mellon University
Pittsburgh, PA 15217

Phone: +1 412-517-2181
Email: `vangarai@andrew.cmu.edu`
Email: `urapvr@gmail.com`
Web page: `apvijay.github.io`

**RESEARCH INTERESTS**

Image processing, computer vision, and computational photography.

**STATEMENT**

My primary interests lie in the intersection of image processing, computer vision and computational photography. Motion is an important dimension in the milieu of photography. What we capture in a camera can be completely different from what we see in human eyes due to motion. During my Ph.D., I studied the effect of motion in rolling shutter sensors which are very prevalent in today's consumer cameras for the applications of change detection, super-resolution, and rectification. I now work on techniques based on short and long exposure imaging to capture fast motion.

**WORK EXPERIENCE**

**Carnegie Mellon University**, Pittsburgh, USA                December 2017 – present
*Postdoctoral Research Associate*
- Working with Dr. Aswin Sankaranarayanan to develop techniques that make cameras capture fast motion with sharp textures.
- Part of Deep Intermodal Video Analytics (DIVA) project team with Dr. Aswin Sankaranarayanan and Dr. Deva Ramanan responsible for video activity annotation efforts.

**Rice University**, Houston, USA                May – July 2016
*Research Associate*
Worked with Dr. Ashok Veeraraghavan, Department of Electrical and Computer Engineering, on heart-rate estimation from face videos from rolling shutter cameras.

**Motorola India Private Ltd.**, Bengaluru, India                August 2008 – July 2011
*Software Engineer*
Software development and test engineer for CDMA-EVDO base station products.

**EDUCATION**

**Indian Institute of Technology Madras**, Chennai, India   August 2011 – November 2017
*Ph.D.*, Electrical Engineering
Guides: Prof. A.N.Rajagopalan and Prof. R. Aravind
CGPA: 9.41/10

**PSG College of Technology**, Coimbatore, India                August 2004 – May 2008
(affl. Anna University, Chennai, India)
*Bachelor of Engineering*, Electronics and Communication Engineering
CGPA: 9.48/10

**PUBLICATIONS**

1. *Vijay Rengarajan*, Shuo Zhao, Ruiwen Zhen, John Glotzbach, Hamid Sheikh, and Aswin Sankaranarayanan. "Photosequencing of Motion Blur using Short and Long Exposures," under review.

2. Nimisha T M, *Vijay Rengarajan*, and A.N. Rajagopalan. "Semi-supervised Learning of Camera Motion from a Blurred Image," in International Conference on Image Processing (**ICIP**), October 2018.

3. *Vijay Rengarajan*, Yogesh Balaji, and A.N. Rajagopalan. "Unrolling the Shutter: CNN to Correct Motion Distortions," in International Conference on Computer Vision and Pattern Recognition (**CVPR**), July 2017.

4. *Vijay Rengarajan*, A.N. Rajagopalan, R. Aravind, and Guna Seetharaman. "Image Registration and Change Detection under Rolling Shutter Motion Blur," IEEE Transactions on Pattern Analysis and Machine Intelligence (**PAMI**), November 2016.

5. *Vijay Rengarajan*, Abhijith Punnappurath, and A.N. Rajagopalan. "Rolling Shutter Super-resolution in Burst Mode," in International Conference on Image Processing (**ICIP**), September 2016.

6. *Vijay Rengarajan*, A.N. Rajagopalan, and R. Aravind. "From Bows to Arrows: Single Image Rolling Shutter Rectification," in International Conference on Computer Vision and Pattern Recognition (**CVPR**), June 2016.

7. Abhijith Punnappurath, *Vijay Rengarajan*, and A.N. Rajagopalan. "Rolling Shutter Super-resolution," in the Proceedings of IEEE International Conference on Computer Vision (**ICCV**), December 2015.

8. *Vijay Rengarajan*, Sheetal B. Gupta, A.N. Rajagopalan, and Guna Seetharaman. "Illumination Robust Change Detection with CMOS Imaging Sensors," in SPIE Defense + Security Symposium, International Society for Optics and Photonics, April 2015.

9. *Vijay Rengarajan*, A.N. Rajagopalan, and R. Aravind. "Change Detection in the Presence of Motion Blur and Rolling Shutter Effect," in European Conference on Computer Vision (**ECCV**), Springer International Publishing, September 2014.

10. *Vijay Rengarajan*, A.N. Rajagopalan, and R. Aravind. "Motion Estimation and Classification in Compressive Sensing from Dynamic Measurements," in the Proceedings of IEEE International Conference on Pattern Recognition (**ICPR**), August 2014.

11. *Vijay Rengarajan*, Abhijith Punnappurath, A.N. Rajagopalan, and Guna Seetharaman. "Efficient Change Detection for Very Large Motion Blurred Images," in the Proceedings of IEEE Conference on Computer Vision and Pattern Recognition Workshop on Registration of Very Large Images, June 2014.

**AWARDS**

**Travel Grant** from Google India Pvt. Ltd. to travel to the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2017.
**Doctoral Consortium Participation and Travel Award** for the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2016.
**Institute Research Scholar Award** for excellence in research awarded by Indian Institute of Technology Madras in April 2015.

**ACADEMIC ACTIVITIES**

**Reviewer** for the following publications and conferences:
Transactions on Image Processing (*TIP 2019*)
International Conference on Computer Vision and Pattern Recognition (*CVPR 2018, 2019*)
International Conference on Computer Vision (*ICCV 2019*)
Neural Information Processing Systems (*NeurIPS 2016*)
Association for the Advancement of Artificial Intelligence (*AAAI 2020*)
Winter Conference On Applications of Computer Vision (*WACV 2016–2019*)
Asian Conference on Computer Vision (*ACCV 2018*)
Indian Conference on Computer Vision, Graphics and Image Processing (*ICVGIP 2016*)

**Teaching Assistant**, Indian Institute of Technology Madras        August 2011 – July 2017
Assisted in preparing and conducting lab assignments and class tutorials for the following courses:
*Image Signal Processing* - Prof. A.N. Rajagopalan
*Digital Signal Processing* and *Probability Foundations* - Prof. R. Aravind
*Computational Photography* - Prof. Kaushik Mitra