

Dr. Paramanand Chandramouli, 10.03.1983, male



Institute: Computer Graphics
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G. Scholar: h-index: 10, citations: 438 (retrieved 11 December 2022)

Professional Career

09/2020 - : University of Siegen, Germany
Position: Principal Investigator DFG Project on "Deep Models for Handheld Light Field Acquisition".

04/2017 - : University of Siegen, Germany
Position: Postdoctoral Fellow
Department: Electrical Engineering and Computer Science

09/2013–02/2017: University of Bern, Switzerland
Position: Postdoctoral Fellow
Department: Computer Science

06/2013–08/2013: Indian Institute of Technology Madras
Position: Project Officer
Telecommunications and Computer Networks (TeNet) group

07/2007–06/2013: Indian Institute of Technology Madras
Position: Graduate Research Assistant
Department: Electrical Engineering

07/2005–06/2007: Indian Institute of Technology Madras
Position: Teaching assistant
Department: Electrical Engineering

Education

07/2007 – 06/2013: Doctor of Philosophy, Electrical Engineering (fully funded)
Indian Institute of Technology Madras, India
Thesis: Scene Inference through Camera Blur
Advisor: Prof. Dr. A N Rajagopalan
Examiners: Prof. Dr. Ing. Filip Šroubek, Prof. Dr. Jayanta Mukhopadhyay

01/2005 – 06/2007: Master of Science, Electrical Engineering
Indian Institute of Technology Madras, India
Thesis: Model Based Image Recognition with Line Segments and Arcs
Advisor: Prof. Dr. A N Rajagopalan

09/2000 – 08/2004: Bachelor of Engineering, Telecommunication Engineering (1st Class with Distinction). RV College of Engineering, Bangalore, India

Teaching Experience

Co-instructor:

- Recent Advances in Machine learning, University of Siegen, (2019, 2021)
Practical course for Masters students in Computer Science & Mechatronics.
Supervised 8 students on projects related to computational imaging and deep learning.
- Computer Vision Seminar, University of Bern, (2014, 2015, 2016)
Research seminar for Masters students in Computer Science.
Supervised students on topics related to computer vision and computational imaging.
- Image Signal Processing, Indian institute of Technology Madras, (2012, 2013)
Theory and practical course for Masters students in Computer science & Electrical Engineering.

Teaching Assistant:

Image Signal Processing (2007-2011), Digital Signal Processing (2007,2009,2011), Signals and Systems (2006,2008,2010), Communication Engineering lab (2011)
Department of Electrical Engineering, Indian Institute of Technology Madras

Research Grants

Title: Deep Models für die handgeführte Akquisition von Lichtfeldern (**Principal Investigator**)
Funding: DFG (Project number CH 2530/1-1, Funding duration 09/2020 - 09/2023)
Total Funds: 331K EUR

Research Interests

Computer Vision, Deep learning, Deep Generative models, Computational Photography, Robustness, Light Field Imaging, Algorithms for 3D Imaging sensors, Vision and Language

Membership of Scientific Societies

Member Computer Vision Foundation (CVF)

Professional Services

Reviewer Journals

IEEE Transactions on Pattern Analysis and Machine Intelligence (2016-2022)
IEEE Transactions on Computational Imaging (2016-2022)
IEEE Transactions on Image Processing (2013-2022)
SPIE Journal of Electronic Imaging (2018)
IEEE Transactions on Industrial Electronics (2015-2016)
Computer Vision and Image Understanding (2015)
Journal of Visual Communication and Image Representation (2014)
Elsevier Measurement Journal (2014)

Reviewer Conferences

CVPR 2023, CVPR 2022, ECCV 2022, BMVC 2022, 3DV 2014, NCC 2008

Organization of Scientific Meetings

- 2010 Member of organizing team, Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP 2010), India
- 2010 Member of organizing team, National Conference on Communications (NCC 2010), India
- 2016 Volunteer ECCV

Coding Skills

Python, MATLAB, C, C++ Deep learning tools: PyTorch, Tensorflow, Keras, MatConvNet

Collaborations

Prof. Andreas Kolb, University of Siegen, Prof. Michael Moeller, University of Siegen, Prof. Paolo Favaro, University of Bern, Prof. A.N. Rajagopalan, Indian Institute of Technology Madras, Prof. Edoardo Charbon, EPFL, Prof. Ramalingam Chellappa, Johns Hopkins University

Personal Details

Nationality: Indian

Personal status: Married, 1 child

Projects

Deep models for light fields (05/2020 -). As a part of this project, I developed the first generative model for light field patches based on variational autoencoders, and used it for a variety of light field reconstruction tasks. This work is published in IEEE TPAMI. Following this, I worked on generalized neural implicit representation for light fields, this work was submitted to IEEE TPAMI, and is currently under review. I am now working on neural radiance fields and exploring the use of denoising diffusion generative models for light fields.

Robustness of Deep Networks (08/2021 -). This project investigates the adversarial robustness of deep networks for image recovery as well as for classification and detection tasks. Our preliminary investigations in this direction is published at IEEE ICIP 2022. Current work involves investigations into robustness of deep networks to distribution shifts and adversarial attacks with a focus on medical image classification.

Natural language guided visual scene reconstruction and manipulation (02/2022 -). In this project, I leverage large text-to-image generative models, to perform a variety of 2d/3d scene manipulation and reconstruction tasks. My initial work on text guided image editing is published at BMVC 2022.

Reflection separation with generative priors (05/2019 - 08/2019). I addressed reflection removal from images using pretrained generative models. This was published in ICCVW 2019.

High speed 2D and 3D imaging using photon counting sensors (04/2017 - 05/2020). I worked on developing methods for high speed image, video and depth imaging using SPAD sensors. My work on deep neural model for recovering high speed video from very few photon counts was published in IEEE ICCP 2019.

Dynamic scene deblurring (10/2016 -02/2017). In this project I developed a deep neural network for dynamic scene deblurring using synthesized dynamically blurred images from videos. This work was published in GCPR 2017.

Microscopic scanning system for bacteria detection (02/2015-07/2015). I worked on a EU project wherein I designed a scanning module to image a 3D volume of a filter membrane using a fluorescent microscope and detect the presence of bacterial cells. A commercial product based on my algorithm was developed by Vermicon AG.

Plenoptic image recovery (09/2013-02/2017). In this work, I derived a computationally efficient solution for the image formation model based on geometric optics, and proposed the first motion deblurring method for light field cameras. I also worked on light field reflection separation and super-resolution. My work in this project was published in IEEE TIP 2018, ACCV 2016, ICCV workshops 2016.

Scene inference from camera blur (07/2008 -06/2013). I addressed the problems of estimating structure from motion blur and defocus via recursive filtering. I also addressed restoration and high dynamic range reconstruction for images affected by nonuniform camera blur. This resulted in five conference papers (including a CVPR) and three top tier journal publications (IEEE TIP 2012, TIP 2013, IJCV 2014).

Model based image recognition with line segments and arcs 07/2006-07/2007 I developed a scheme to represent and match image edges by line segments and elliptical arcs, which was efficient and robust to occlusions and outliers. This work resulted in three publications (2 conferences and 1 journal paper in JOSA)

Publications

- **Book chapters**

- Vijay Channarayapatna Shivaram , **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, "HDR imaging in the presence of motion blur," *Motion Deblurring: Algorithms and Systems, Cambridge University Press, Ambasamudram Narayanan Rajagopalan and Rama Chellappa (Editors), 2014.*

- **Journal Publications**

- **Paramanand Chandramouli**, Hendrik Sommerhoff, Andreas Kolb "Light field implicit representation for flexible resolution reconstruction," under review *IEEE Transactions on Pattern Analysis and Machine Intelligence* (submitted in 2021).
- **Paramanand Chandramouli**, Kanchana Vaishnavi Gandikota, Andreas Goerlitz, Andreas Kolb, Michael Moeller "Generative models for generic light field reconstruction," *IEEE Transactions on Pattern Analysis and Machine Intelligence* (online 2020).
- **Paramanand Chandramouli**, Meiguang Jin, Daniele Perrone, Paolo Favaro, "Plenoptic image motion deblurring," *IEEE Transactions on Image Processing* vol. 27, no. 4, pp. 1723-1734, 2018.
- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, "Shape from sharp and motion-blurred image pair," *International Journal of Computer Vision* vol. 107, iss. 3, pp. 272-292, 2014.
- Vijay Channarayapatna Shivaram , **Paramanand Chandramouli**, Ambasamudram Narayanan Rajagopalan and Rama Chellappa "Non-uniform deblurring in HDR image reconstruction," *IEEE Transactions on Image Processing* vol. 22, no. 10, pp. 3739-3750, 2013.
- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, "Depth from motion and optical blur with unscented Kalman filter," *IEEE Transactions on Image Processing* vol. 21, no. 2, pp. 2798-2811, 2012.

- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, “Image matching with higher-order geometric features,” *Journal of the Optical Society of America A*, vol. 27, no. 4, pp. 739-748, 2010.

- Conference Publications

- **Paramanand Chandramouli**, Kanchana Vaishnavi Gandikota “LDEdit: Towards Generalized Text Guided Image Manipulation via Latent Diffusion Models,” *Proc. British Machine Vision Conference*, 2022.
- Kanchana Vaishnavi Gandikota, **Paramanand Chandramouli**, Michael Moeller “On Adversarial Robustness of Deep Image Deblurring,” *Proc. IEEE International Conference on Image Processing*, 2022.
- **Paramanand Chandramouli**, Kanchana Vaishnavi Gandikota “Blind single image reflection suppression for face images using deep generative priors,” *Proc. IEEE International Conference on Computer Vision Workshops*, 2019.
- **Paramanand Chandramouli**, Samuel Burri, Claudio Bruschini, Edoardo Charbon and Andreas Kolb, “A bit too much? high speed imaging from sparse photon counts,” *Proc. IEEE International Conference on Computational Photography (ICCP)*, 2019.
- Mehdi Noroozi, **Paramanand Chandramouli** and Paolo Favaro, “Motion deblurring in the wild,” *Proc. German Conference on Pattern Recognition (GCPR)*, 2017.
- **Paramanand Chandramouli**, Mehdi Noroozi and Paolo Favaro, “ConvNet-based depth estimation, reflection separation and deblurring of plenoptic images,” *Proc. Asian Conference on Computer Vision (ACCV)*, 2016.
- Beate Hamsch, Michael Hügler, Sabrina Kannegiesser, Peter Mühlhahn, Claudia Beimfohr, **Paramanand Chandramouli**, Paolo Favaro, “Automatisierter mikroskopischer Nachweis von FISH-markierten Bakterienzellen,” *Wasser*, 2016.
- Meiguang Jin, **Paramanand Chandramouli** and Paolo Favaro, “Bilayer blind deconvolution with the light field camera,” *Proc. International Conference on Computer Vision Workshops*, 2015.
- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, “Motion blur for motion segmentation,” *Proc. IEEE International Conference on Image Processing (ICIP)*, 2013.
- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, “Non-uniform motion deblurring for bilayer scenes,” *Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2013.
- Vijay Channarayapatna Shivaram , **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, “HDR imaging under non-uniform blurring,” *Proc. European Conference on Computer Vision Workshops*, 2012.
- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, “Inferring image transformation and structure from motion-blurred images,” *Proc. British Machine Vision Conference (BMVC)*, 2010.
- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, “Unscented transformation for depth from motion-blur in videos,” *Proc. IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 2010.

- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, “Efficient geometric matching with higher-order features,” *Proc. IEEE International Conference on Pattern Recognition (ICPR)*, 2008.
- **Paramanand Chandramouli** and Ambasamudram Narayanan Rajagopalan, “An efficient representation of digital curves with line segments and elliptical arcs,” *Proc. IET International Conference on Visual Information Engineering (VIE)*, 2006.