Akshay **Jindal**

Early Stage Researcher · PhD Student

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Summary

I'm a final year PhD student at the Graphics and Interaction (Rainbow) Group at the University of Cambridge under the supervision of Dr Rafał Mantiuk. As a Marie-Curie Early Stage Researcher in the European ITN RealVision Project, my research primarily focuses on perceptual optimisation of real-time graphics. My recent work investigates the subjective evaluation of image artefacts under motion and the application of visual models for quality optimisation in low bandwidth rendering.

I am broadly interested in the field of Computer Graphics, Applied Perception, Artificial Intelligence and Data Structures and Algorithms.

Work Experience

The Computer Laboratory, University of Cambridge

Cambridge, United Kingdom

Early Stage Researcher — *Jan. 2019 - PRESENT*

- Working on perceptually optimising deep learning based rendering methods.
- Developed a visual model and a rendering algorithm for optimising variable-rate shading. [Tech Stack: Unity, C#, Matlab, Python]
- Built a perceptually realistic rendering pipeline for a high dynamic range multi-focal stereoscopic display. [Tech Stack: C++, OpenGL, Matlab]
- Ran a psychophysical study to analyse spatio-temporal resolution adaptive rendering methods in complex motion scenarios. [Tech Stack: Unity, C#, Matlab]
- Supervised students and developed assignments for Introduction to Graphics and Advanced Graphics and Imaging [Tech Stack: Java, GLSL, Python, OpenCL, C++]

Max-Planck-Institut für Informatik

Saarbrücken, Germany

Visiting Scholar — *Feb. 2020 - May 2020*

- Worked on motion quality metrics to efficiently drive variable rate shading pipeline. [Tech Stack: C++, OpenGL, GLSL, Matlab]

WalmartLabs

Bangalore, India

Software Engineer II — *Aug. 2017 - December. 2018*

- Integrated an Augmented Reality feature for product visualization with the Sam's Club iOS application. Implemented features include 3D model optimizations, UX animations, UI, Lighting & shadows, instrumentation and collision detection. [Tech stack: Swift, Scenekit, ARKit]
- Built and deployed overall service infrastructure to serve millions of 3D models, focusing on high-availability, fault tolerance, and auto-scaling. [Tech Stack: Java Spring, Cassandra]
- Developed a VR shopping experience deployable on all major VR headsets and traveled to US head office to showcase it to Walmart's leadership. [Tech Stack: Unity3D, C#]
- Worked on a diminished reality solution to replace real-life objects with virtual models. [Tech Stack: Tensorflow, Python]

Hilti Asia IT Services Sdn. Bhd.

Kuala Lumpur, Malaysia

Intern(Mobile Apps) — *May. 2016 - Jul. 2016*

- Developed an intelligent chatbot for handling all company's products and services related text/image queries. [Tech Stack: Python, OpenCV]
- Responsibilities included Facebook and Google APIs integration, build system management and cloud deployment.

Siemens Tech. IN

Bangalore, India

Intern (Parallel Systems Team) — *May. 2015 - July. 2015*

- Worked on the scalability of one of their binary instrumentation tool. [Tech Stack: C++, Intel Pin]
- Responsibilities included performance evaluation, bottlenecks identification and program optimization.

Education

University of Cambridge

Cambridge, UK

Doctor of Philosophy in Computer Science — *Jan. 2019 - Jan. 2022*

- Ongoing

International Institute of Information Technology, Bangalore

Bangalore, IN

Bachelor of Technology ; Master of Technology in Information Technology under Integrated Master of Technology Programme — *Jul. 2012 - Jul. 2017*

- CGPA: 3.5/4
- Specialization in Theoretical Computer Science

Aklank Public School — *Kota, IN*

Senior Secondary — *Jul. 2010 - Jul. 2012*

- Board: Central Board of Secondary Education, New Delhi
- Percentage: 87%

St. Paul's Sr. Sec. School — *Udaipur, IN*

Secondary — *Jul. 2009 - Jul. 2010*

- Board: Central Board of Secondary Education, New Delhi
- CGPA: 9.4/10

Skills

Programming	Java, Python, C++, C, Swift, Matlab
Computer Graphics	Unity3D, OpenGL, OpenCL, WebGL, Qt, libgdx, AR, VR
API	Android, iOS, Tensorflow, Spring
Web Technologies	PHP, HTML, CSS, Javascript, AngularJs
Database Systems	MySQL, JDBC, Cassandra
Languages	English, Hindi

Certifications

2019	**Entrepreneurship in Technical Science**, Denmark Technical University	*Helsingor, Denmark*
2019	**Vision, Psychophysics, and Modelling**, University of Oxford	*Oxford, UK*
2019	**Team Building and Training School**, Fraunhofer IIS	*Erlangen, Germany*
2018	**Unity3D Shader Development**, Udemy	
2018	**Tensorflow**, Udemy	
2018	**Computer Vision**, Udemy	
2013	**Web Application Development**, HCL-CDC	

Publications

Perceptual Model for Adaptive Local Shading and Refresh Rate — *2021*

Akshay Jindal, Krzysztof Wolski, Karol Myszkowski, Rafał K. Mantiuk. to appear in ACM Trans. Graphics (Proc. of SIGGRAPH Asia'21)

Reproducing Reality with a High-Dynamic-Range Multi-Focal Stereo Display — *2021*

Fangcheng Zhong, **Akshay Jindal**, Ali Özgür Yöntem, Param Hanji, Simon Watt, Rafał K. Mantiuk. to appear in ACM Trans. Graphics (Proc. of SIGGRAPH Asia'21)

A Perceptual Model of Motion Quality for Rendering with Adaptive Refresh-Rate and Resolution — *2020*

Gyorgy Denes, **Akshay Jindal**, Aliaksei Mikhailiuk, Rafał K. Mantiuk., ACM Trans. Graphics (Proc. of SIGGRAPH'20)

Contour Extraction in Buildings in Airborne LiDAR Point Clouds Using Multi-scale Local Geometric Descriptors and Visual Analytics — *2018*

J. Sreevalsan-Nair, **A. Jindal**, and B. Kumari. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (2018)

Using Gradients and Tensor Voting in 3D Local Geometric Descriptors for Feature Detection in Airborne LiDAR Point Clouds in Urban Regions — *2017*

J.Sreevalsan-Nair, and **A. Jindal**. in the Proceedings of the 2017 IEEE International Geoscience and Remote Sensing Symposium, July 2017

Agent-Based Modeling and Simulation of Mosquito-Borne Disease Transmission — *2017*

Akshay Jindal and Shrisha Rao. In Proceedings of the 16th Conference on Autonomous Agents and MultiAgent Systems (AAMAS '17).

Patents

System and method for assessing quality of produce — *US*

Inventors: MNK Wadhonkar, P Aggarwal, A Setia, **A Jindal**, R Kumar, A Jhunjhunwala, AA Grochala — *2018*

Methods and systems for generating a planogram at a retail facility — *US*

Inventors: MNK Wadhonkar, **A Jindal**, N Agarwal — *2018*

Emotion extraction through Computer Vision — *(Under Process)*

Inventors: MNK Wadhonkar, **A Jindal** — *2018*

Honors & Awards

International

2019	**1st Place**, Best Pitch, Entrepreneurship in Technical Science Summer School	*Helsingor, Denmark*
2019	**PhD Grant**, Marie Skłodowska-Curie Actions Innovative Training Network	*Cambridge, UK*
2018	**2nd Place**, Walmart Hackday	*Bangalore,IN*
2016	**1st Place**, Hilti Mobile App Competition World Final	*Selengor, Malaysia*

India

2017	**Travel Grant**, Google India	*India*
2016	**2nd Place**, Steer Quest Animation/VFX/Gaming	*Bangalore, IN*
2016	**Finalist**, DreamWorks Animation Challenge	*India*
2016	**3rd Place**, HackforIndia: The Appfest	*Bangalore, IN*
2016	**Finalist**, IndiaHacks Travel and Transport	*Bangalore, IN*
2016	**1st Place**, DigitalOcean Cloud Hack	*India*
2016	**2nd Place**, MakeMyTrip Hackathon	*Bangalore, IN*
2016	**Scholarship**, Google-TATA-Udacity Android Nanodegree Scholarship	*India*
2015	**1st Place**, Code the future: by AceHacker and Wipro Digital	*Bangalore, IN*
2015	**1st Place**, HackIndia (Bluemix category)	*Bangalore, IN*
2015	**3rd Place**, Applift Datathon	*Bangalore, IN*
2014	**1st Place**, Informatica National Codeathon	*India*

Invited Talks

Huawei Computer Graphics and GPU Architecture Seminar — *Cambridge, UK*

Perceptually Motivated Variable Rate Shading — *Jul. 2021*

- Presented a framework for perceptually optimising adaptive graphics hardware such VRS and G-Sync.

Rainbow Lab Machine Learning Reading Club — *Cambridge, UK*

A Survey of Foveated Rendering Techniques — *Jun. 2021*

- Presented a review of all foveated rendering techniques proposed in the last three decades and the future direction of the field.

International Institute of Information Technology, Bangalore — *Bangalore, India*

Computer Graphics in Retail — *Apr. 2018*

- Covered how 3D computer graphics is being used in retail and the challenges that still remain open.

National Institute of Design, Bangalore — *Bangalore, India*

Quick Realization of AR/VR Design in Unity3D — *Mar. 2018*

- Conducted a workshop on building applications for AR/VR using Unity3D.

Fields of View, Bangalore — *Bangalore, India*

Investigating Epidemics using Agent-Based Models — *Apr. 2017*

- Talked about the potential of ABMs in tracing epidemics and low level policy design.

Extracurricular Activity

OSA Incubator on Visual Perception in AR/VR

Online

Student Volunteer

Sep. 2020

- Helped in organising an online OSA Incubator meeting where the top industry and academic researchers explored the state-of-the-art and future direction of AR/VR.

Univerity of Cambridge

Cambridge, UK

Student Volunteer

Aug. 2019

- I volunteered to represent the Rainbow Group on Cambridge Open Day, 2019, and engaged with the public to raise the aspirations for computer science careers in upcoming students

AAMAS

Sao Paulo, Brazil

Student Volunteer

May. 2017

- Helped in organizing International Conference on Autonomous Agents and Multiagent Systems.

IT & Society Club

Bangalore, IN

Member

2016 - 2017

- Was responsible for organizing debates and discussions on consequences of digitization on society.

Competitive Gaming Club

Bangalore, IN

Member

2014-2017

- Won multiple gaming events as a part of IIIT-B's Counter Strike team.

Siemens Technology India

Bangalore, IN

Volunteer

Jul 2015

- Helped in conducting a workshop raising awareness on parallel computing.

IIIT-B

Bangalore, IN

Volunteer

Aug 2013

- Mentored first year CSE students and helped them with on-boarding

National Cadet Cops

Udaipur, IN

Cadet

Jul. 2008 - Jul. 2010

- Took part and contributed in multiple social service events as a member of NCC.