

# Jitesh Jain

UNDERGRAD RESEARCHER | FOURTH YEAR UNDERGRADUATE | COMPUTER SCIENCE

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## Education

### Indian Institute of Technology, Roorkee

Roorkee, India

B.TECH. IN COMPUTER SCIENCE AND ENGINEERING

2019 - Exp. 2023

- CGPA: 8.95/10

### Central Academy, Kota

Kota, India

GRADE 12 (SENIOR SECONDARY LEVEL)

2019

- Percentage: 96.60%

## Experience

### SHI Labs @ UIUC & U of Oregon

Eugene (OR)

RESEARCH INTERN

November 2020 - Present

- Working with Prof. Humphrey Shi.
- Released a work proposing a multi-task universal image segmentation framework (OneFormer) that outperforms existing specialized models on all three image (panoptic, semantic, and instance) segmentation tasks.
- Published a work proposing an inpainting framework (FcF-Inpainting) using *Fast Fourier Convolutions* which works equally well on structure and texture images and is competitive with the state-of-the-art methods.

### Picsart AI Research

Remote

RESEARCH INTERN

June 2021 - September 2022

- Worked as a part of the then newly founded Picsart AI Research Team and released the first ever open-source project by Picsart.
- Released a work (SeMask) proposing to add semantic context inside vision transformer-based encoders of any existing semantic segmentation framework to obtain considerable performance improvement.
- Worked partly on OneFormer during my internship.

### FilterPixel

Remote

ML ENGINEER INTERN

July 2020 - September 2020

- Worked on developing ML models for automating the process of Photo Culling.
- Developed ML models for classifying images based on their exposure, blurriness, etc.
- [Letter of Recommendation]

## Publications

### OneFormer: One Transformer to Rule Universal Image Segmentation

arXiv 2022

JITESH JAIN, JIACHEN LI\*, MANGTIK CHIU\*, ALI HASSANI, NIKITA ORLOV, AND HUMPHREY SHI

SHI Labs @ UIUC & UO

- Proposed a novel task-guided transformer-based framework, OneFormer, with joint training on all three image segmentation tasks, which only uses panoptic data during training.
- With no additional cost of training time, model size, and FLOPs, OneFormer outperforms existing frameworks, which need to be trained separately on each task.
- [PrePrint] [Project Page]

### Keys to Better Image Inpainting: Structure and Texture Go Hand in Hand

WACV 2023

JITESH JAIN\*, YUQIAN ZHOU\*, NING YU, AND HUMPHREY SHI

SHI Labs @ UIUC & UO

- Proposed an intuitive and effective inpainting framework, FcF-Inpainting, that augments the powerful comodulated StyleGAN2 generator with the high receptiveness ability of FFC to achieve equally good performance on both textures and structures.
- Our model achieves remarkable visual quality to match state-of-the-art performance in both structure generation and repeating texture synthesis using a single network.
- [PrePrint] [Project Page]

### SeMask: Semantically Masked Transformers for Semantic Segmentation

arXiv 2021

JITESH JAIN, ANUKRITI SINGH, NIKITA ORLOV, ZILONG HUANG, JIACHEN LI, STEVEN WALTON, AND HUMPHREY SHI

Picsart AI Research (PAIR)

- First work to study the effect of adding semantic context to hierarchical pretrained vision transformer backbones during fine-tuning for the semantic segmentation task.
- Proposed the SeMask block which can be plugged into any existing hierarchical vision transformer encoder to model the semantic context in the network that shows considerable improvements on various benchmark datasets.
- [PrePrint] [GitHub]

## Projects

### Neural Style Transfer: A Technical Report

IIT Roorkee

CSN-526 COURSE PROJECT

January 2022 - April 2022

- Worked on studying the effects of various factors like feature extractors, optimizers, loss functions, etc. techniques on the NST task.
- We also proposed the use of pseudo-ground truths for evaluating the performance under different settings. [GitHub]

### BackBone Profile

Remote

SHI LAB @ UIUC & UO

December 2020

- Most of the Segmentation works use networks pretrained on Imagenet as backbones for feature extraction.
- Analyzed backbones like ResNet 18/34/50/101, MobileNetV2, etc. to evaluate their inference time performance metrics. [GitHub]

### Other Significant Projects

SOME OTHER SIGNIFICANT PROJECTS ARE AS FOLLOWS:

- **VQ-VAE Implementation in Pytorch:** Implemented VQ-VAE from scratch in Pytorch on the MNIST dataset as a self-learning project. [GitHub]
- **ChatBot with Pytorch:** Implemented a chatbot in PyTorch using GRUs with an Attention mechanism. [GitHub]

## Honours & Achievements

- 2022 **Bronze Medalist**, Awarded the Bronze Medal under Bosch's Age and Gender Detection Track at Inter IIT Tech Meet 10.0. The competition is held every year among all the IITs. [Certificate]
- 2019 **All India Rank - 252**, Joint Entrance Exam (JEE) Advanced is attempted by more than 230,000 students across India for admission into the IITs. [Certificate]
- 2019 **All India Rank - 454**, Joint Entrance Exam (JEE) Main is attempted by more than 1,000,000 students across India to gain eligibility for attempting JEE Advanced. [Certificate]
- 2018 **KVPY Fellowship Holder**, KVPY is a highly prestigious National Fellowship awarded by the Indian Institute of Science to students showing high aptitude in research. [Certificate]
- 2017 **NTSE Scholarship Awardee**, NTSE is a national level examination for the secondary school level to identify and recognize students with high intellect and skills. [Certificate]

## Extracurricular Activity

### Vision and Language Group, IIT Roorkee

Roorkee, India

CO-PRESIDENT

January 2020 - Present

- Co-President of VLG IITR, a student group that promotes *Deep Learning research culture* at IITR by discussing relevant research papers, organizing workshops and working on projects. [Website]

### MDG Space, IIT Roorkee

Roorkee, India

PROJECT MANAGER

January 2020 - Present

- Project Manager at MDG Space in IIT Roorkee, involved in developing and managing mobile applications in Flutter. [Website]

### Student Mentorship Program, IIT Roorkee

Roorkee, India

STUDENT MENTOR

October 2021 - May 2022

- Mentored freshers at IITR for their smooth transition to campus life, motivating their academic and co-curricular endeavors. [Certificate]

## References

### Prof. Humphrey Shi

United States

ADJUNCT ASSISTANT PROFESSOR @UIUC | ASSISTANT PROFESSOR @U OF OREGON | CHIEF SCIENTIST @PICSART

- Email: hshi10@illinois.edu

### Dr. Yuqian Zhou

United States

RESEARCH SCIENTIST @ADOBE RESEARCH

- Email: yuqzhou@adobe.com

### Dr. Ning Yu

United States

RESEARCH SCIENTIST @SALESFORCE RESEARCH

- Email: ning.yu@salesforce.com

### Dr. Nikita Orlove

Russia

TEAM LEADER @PICSART

- Email: nikita.orlov@picsart.com