Lakshita Mohanty
Department of Mechanical Engineering

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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2019 - Present	B.Tech	**Indian Institute of Technology Kanpur**	7.0/10.0
2019	Class XII (CBSE)	MM Public School Pitampura, Delhi	93.8%
2017	Class X (CBSE)	SD Vidya Mandir, Panipat	10/10

Scholastic Achievements

– Secured **All India Rank 6033** in **JEE Advanced 2019** among the 2.45 Lakh shortlisted candidates
– Secured **All India Rank 21999** in **JEE Mains 2019** among the 11.47 Lakh shortlisted candidates
– **Vapi City Topper** in **13th National Science Olympiad 2011** with a score of **99.73 %** and **All India Rank 145**
– Cleared **Phase I** testing and qualified for **Microsoft's Engagement & Mentorship Program – Engage 2021**
– Secured **All India Rank 27** in National Race of Amazon's **AWS DeepRacer Women's League 2021**

Key Projects & Workshops

Modeling Subsurface Mine Detonation | Research Project - SURGE 2021   *May'21 - Present*
Mentor: **Professor Ishan Sharma,** *Dep. of Mechanical Engineering* | ***Students-Undergraduate Research Graduate Excellence Program***

Aim	• Modeling a **flail system** to **trigger** and **detonate** mines wherever buried
Tasks	• Analyzing the **transfer of stresses** from the **point of impact of the flail** to the location of the **buried mine** • Performing **simulations** using **LAMMPS** and **OVITO** to study how **waves travel through discrete media** like soils • To simulate a **granular bed, impact** it with a **flail** & analyse the **stress transfer** through the bed
Progress	• Conducted **Literature Review** on **design of flails** and **force transmission below the surface of soil** • **Constructed** a **granular bed** of **5000 atoms** using **LAMMPS** input script, **simulated settling of atoms** under the effect of **gravity** and currently assessing the **Total Kinetic Energy Analysis** of the **system of atoms**

3D Shape Completion for Autonomous Vehicles | Robotics Club IITK   *May'21 - Present*
• **Aim:** Building a model which **predicts the shape of objects**, detected through **LiDAR data** and **RGB images**
• Implemented **semantic segmentation** for **KITTI semantic dataset** using **UNET architecture** to mask cars only
• Achieved a final **precision** of **0.9407** on **training** and **0.9429** on **validation** after **training the UNET model** for **25 epochs**
• Currently doing **Literature Review** on **Deep Generative Modeling** and implementation of **Variational Autoencoders** (VAEs)

Microsoft Teams Clone Application | Microsoft Engage Mentee 2021   *Jun'21 - Present*
• Implemented a **video call application** with **WebRTC API** using **Scaledrone** as the signaling server
• Incorporated **RTCPeerConnection** instance to establish **WebRTC connection** between local computer and a remote peer

Facial Expression Recognition using ML | Brain and Cognitive Society IITK   *May'20 - July'20*
• Replicated a paper on CNN study **FER** with **Convolutional Neural Network** via a **new face cropping** & **rotation strategy**
• Employed **data augmentation, image cropping and CNN** while working in a team of **9 members**
• Achieved a final accuracy of **93.46%** and **90.54%** on **JAFFE and CK+ dataset** respectively for 7 classes
• Conducted **Literature Review** on the current methods of Facial Expression Recognition

BCS Workshop | Brain and Cognitive Society IITK   *Apr'20*
• Learnt **Basic Python, Machine Learning, Computational Modelling** and **Psychophysics**
• Designed a psychophysics experiment based on **The Role of Categorization in Visual Search for Orientation** using **PsyToolkit**
• Achieved a final accuracy of **93.46%** and **90.54%** on **JAFFE and CK+ dataset** respectively for 7 classes
• Conducted experiment on 7 participants and analysed the data using **Numpy, Pandas & Matplotlib**

Mechanical Watch Model (Course Project) | **Professor Nachiketa Tiwari,** Dep. of Mechanical Engineering   *Jan'21 - May'21*
• Designed an artistic working model of the **ETA 6497-1 Manual Wind Watch** in a team of **14 members**
• Analyzed the **working of a mechanical watch** and various mechanisms involved for **energy transmissions**
• Implemented **Fusion 360** to model the operative watch and added **extra functionalities** for displaying the **day** and **date** as well

Work Experience

Sybylline Robotics Private Limited IC IITP | Summer Intern   *May'21 - Present*
• Comprehended various basics of **ROS2** (Robot Operating System 2), **Client Libraries** and **URDF** (Unified Robot Description Format)
• Brainstormed on **simulations** in **Gazebo, Rviz** using **Nav2** library to perform navigation related actions
• Currently working on **simulations** and **navigation** analysis of **floor disinfecting** and **medical delivery robot** using **Gazebo** and **Rviz**

UnchAI | JEE Mentor   *Sep'20 - Oct'20*
• Tutored in UnchaAI, a **tech-ed startup** by **IITK** and **NITP** alumni, which provides a **mentorship platform** to **JEE aspirants**
• Mentored JEE aspirants with their **PCM** doubts, designed a **customized time table & metric** to track their performance **periodically**

Self Projects

MNIST Digit Recognizer | Kaggle Submission   *May'21*
• Implemented a **Convolutional Neural Network** with **dropout** and **batch-normalization** layers
• Analyzed the performance of the **classification model** by plotting **Confusion Matrix**
• Examined the **predicted versus true** labels for the **top 16** wrong predictions
• Achieved a final accuracy of **99.08%** upon submission on kaggle

Positions of Responsibility

Manager Research Wing | Academics and Career Council IITK   *Apr'21 - Present*

Leadership	• Led a team of **12 secretaries** working towards promoting research culture amongst the students • **Guided the team** to work as a unit aimed at assisting the **Research Community** in fulfilling it's needs
Initiative	• Introduced **Student Spotlight** to create more awareness about **remote research** amidst the **global pandemic** • Guided a team of **3 secretaries** to edit blogs for Student Spotlight on **Research Wing's** website
Impact	• Conducted sessions targeted for **UG community** to increase interaction with **alumni** in **research community** • Successfully hosted **InVar sessions** (Industry vs Research) to help students **explore various career prospects**

Secretary Research Wing | Academics and Career Council IITK   *Apr'20 - Mar'21*
– Approached **15+ startups** for **internship positions** in the field of **E-vehicle R&D** to help students get internship during lockdown
– Interacted with **IITK alumni** and documented their **research experience** in the form of **AnC Blogs**

Student Guide | Counselling Service IITK   *Oct'20 - Present*
– Provided **guidance and emotional support** to a group of **six freshers** by helping them adjust to college life
– Helped in organizing **Orientation (Y20)** for **1000+** freshers

Academic Mentor MTH101/102 | Counselling Service IITK   *Sep'20 - Present*
– **Mentored students** who have faced difficulty in their freshman year **mathematics courses**
– Taken academic classes and **hall-level doubt clearing sessions** for first years

Secretary | Brain and Cognitive Society IITK   *Aug'20 - Mar'21*
– Hosted various **Journal Club Talk** events by researchers and PhD students on **NLP, cognitive studies** and **ML**
– Managed the **LinkedIn page** of the society as a part of the **Web Reach team**

Secretary | Quiz Club IITK   *July'20 - Mar'21*
– Organized and conducted **themed quizzes** for campus community

Relevant Coursework

Data Structures and Algorithms	Real Analysis and Multivariable Calculus	Linear Algebra & Ordinary DE
Fundamentals of Programming	Introduction to Economics	Manufacturing Processes
Engineering Graphics and Design	Introduction to Electrical Engineering	Fluid Dynamics
Thermodynamics	Nature & Properties of Materials	Dynamics

Technical Skills

– **Programming Languages:** C, C++, JavaScript, Python, Java
– **Libraries:** Tensorflow, Keras, Numpy, Matplotlib, Pandas, OpenCV, Scipy, Seaborn
– **Software:** Fusion 360, MATLAB, AutoCAD, LAMMPS, OVITO
– **Robotics:** ROS2, Gazebo, Rviz, Nav2
– **Utilities and Tools:** Git, GitHub, LaTeX, VS Code

Extra-Curricular Activities

• **Volunteer, Raktarpan IITK** (Blood Donation Awareness Club)   *May'20 - Mar'21*
  – Volunteered in spreading awareness and busting misconceptions regarding **Blood Donation** and related topics
  – Collaborated with **Fine Arts Club, IITK** and **organized an art competition** to promote Blood Donation
• Maintained an art-blog of **digital art illustrations** made on **Procreate;** collaborated with **Music Club IITK** to create artistic covers
• Ranked among the **Top 16 players** in IITK Scrabble League; participated in **Inter IIT Scrabble League 2020**
• Worked under **Photography Club** and **Film Club** in **Galaxy'20**, the inter hall Cultural Championship
• Assisted the Senior Executive in activities pertaining to **Public Relations** in **Udghosh'19**, the annual sports fest of IITK   *Sep'19*