

ANKITA RAJA

SHINDE

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Summary

Highly motivated doctoral candidate at the Tandon School of Engineering, specializing in mechanical engineering. Applying additive manufacturing (AM) for implants and tissue engineering. Leveraging a strong foundation in polymer science and engineering (MEng in Polymer/Plastics Engineering), I am currently researching the development of biocompatible scaffolds for bone tissue regeneration and drug delivery. Previously, my experience as a Quality Assurance Engineer in the plastics industry honed my skills in process optimization, material characterization, and ensuring product quality. My expertise includes SolidWorks for design, strong management and unit operation skills.

Current position

In Dr. Witek's lab, I am working on developing advanced medical scaffolds designed to support bone regeneration and also provide a new approach to cancer treatment. My research focuses on creating 3D-printed composite scaffolds made from a combination of Fe_3O_4 , bioceramic, and a biodegradable polymer. The magnetic Fe_3O_4 allows these scaffolds to be used for hyperthermia-based cancer therapy, where heat generated by a magnetic field can help destroy cancer cells. At the same time, the scaffold's controlled drug release system delivers anti-cancer drugs directly to the affected area, which can reduce side effects compared to traditional chemotherapy. Excitingly, our project has been selected for commercialization with support from the National Science Foundation (NSF) under a startup named NeoBoneSculpt.

Professional Interest

As a Chemical Technologist, I possess a strong foundation in chemistry and related sciences like petrochemicals, plastics, and polymers. My expertise lies in processing plastics, understanding polymer chemistry, and designing products using software. Furthermore, I'm passionate about applying Additive Manufacturing techniques like robocasting, FDM, and DIW to the field of medical devices. Specifically, I'm interested in developing drug delivery systems in biocompatible scaffolds for bone regeneration, along with exploring anti-cancer hyperthermia treatments.

Educational Qualification

- Currently pursuing PhD. In mechanical engineering - Tandon School of Engineering (NYU)
- Master of Engineering. In Plastics from Institute Of Chemical Technology, Matunga. 2017 - 2019.
- B.Tech Degree in Petrochemical Engg. - Dr. Babasaheb Ambedkar Technological University, Lonere. 2010 – 2014.
- 10+2 science with first class from Seth Hirachand Mutha College, Kalyan. 2010..
- 10th with distinction from Lourdes High School, Kalyan, India; 2008.

Professional experience

- Worked at Shubhada Polymer Product Pvt. Ltd as Quality Assurance Engineer from Nov 2019 - March 2022.
- Worked at ICICI Bank as an Equity Officer from May 2016 - May 2017..

- Works at Dipesh Engineering Pvt. Ltd. as Estimation engineer. From August 2015 - November 2015.
- Worked at Log-In HR as (Human Resource) HRExecutive From June 2014 – December 2014.

Hobbies:

Reading, watching movies, listening to music,

Lingual Dexterity:

English, Hindi, Marathi

Subject of Interest

Polymer Processing, Polymer Chemistry, Composite materials, Biomaterials, Additive manufacturing, Tissue engineering, Drug delivery.

Strength:

Positive thinking, keen learner, costumer handling.

Professional skills:

Good communication skills, ability to work under pressure, problem solving ability

In-plant Training

- Interned - Production department at Rashtriya Chemical Fertilizer Ltd., Thal (May 2012).
- Interned - Production department at Oil and Natural Gas Ltd., Uran (02 May 2013 – 30 May 2013).
- Trainee - Injection moulding department at Connectwell Pvt. Ltd, Dombivli. From (02 June 2018 – 30 November 2018).

Publications

- Effect of Water Absorption on the Mechanical Properties of Wheat Straw Fibre Reinforced Polystyrene Composites. ASM Science Journal, Aug 19, 2022.
- Functional Scaffolds for Bone Tissue Regeneration: A Comprehensive Review of Materials, Methods, and Future Directions, Sept 25, 2024.
- Canagliflozin-induced adaptive metabolism in bone, Feb 11, 2025.

Conferences

- Poster Presentation : Society For Biomaterials 2024 Regional Symposia held September 19 - 20, 2024 at Northeastern University.
- Presented in National Conference on Recent Advances In Material Science and Technology at Government college of engineering, Keonjhar. (30 March 2019.)

Patent

- U.S. Provisional Application No. 63/884,107, filed September 18, 2025. - Title: "MAGNETIC SCAFLD, METHODS OF MAKING, AND METHODS OF USE THEREOF" Status: Pending

Research Projects

- **Master's in engineering. - Effect of water absorption on mechanical properties of the wheat straw-reinforced polystyrene with silane as a coupling agent.**

The importance of natural fiber reinforced composites is rapidly developing both, in terms of engineering application and research field. These natural fibers are completely renewable, low cost, and biodegradable. The objective of this research work is to determine the effect of water absorption on mechanical (Tensile and Flexural) properties of wheat straw reinforced polystyrene composite. The fiber was treated with NaOH Solution, and silane is used as a coupling agent. Polystyrene based composite were prepared by reinforcing polystyrene with 5, 10, 15, 20, 25 wt.% of wheat straw by extrusion and the extrudates were compressed by compression moulding. Samples were prepared as per ASTM standards. We demonstrated an increase in tensile strength with an increase in fiber loading.

- **Bachelor's in Technology in Petrochemical - Processing of first stage liquid from EPRU LPG-3 and LPG-1.**

The objective of this study was to assess the impact of diversion of First stage liquid from EPRU (Ethane Propane Recovery Unit) to (Liquefied Petroleum Gas) LPG-3 to LPG-1/2. It has been observed that the major source of butane emission was observed from LPG-1/2 Plants during the Second Stage Vapor (SSV) step. The SSV feed stream of EPRU is compressed and subsequently cooled using coolers. During cooling, butane and other heavier hydrocarbon components get liquid. These liquid streams contain a significant amount of butane which could be a potential source for de-butanization of C2C3 products. Based on this study, a scheme for processing 50%

of FSL(First stage liquid) in Second Stage vessels of LPG-1/2 plants was conceptualized and implemented. Presently, after implementation of this optimized scheme, the butane emission in C2C3 product is 4wt%.

- Presented on topic ' **Nano-emulsion** ' as a part of curriculum in fifth semester.
- Presented on topic ' **Desulfurization** ' as a part of curriculum in third semester.

Co-curricular activities

- Participated in National level paper presentation at ‘**TECHNOCRAT**’, held at V.J.T.I., Mumbai 2012.
- Participated in State level paper presentation at **INFINITI’12**, held at Bhartiya Vidyapeeth college, Kharghar. 2012.
- Participated in National level paper presentation held at Gharda College of engineering, Khed 2013.

Extra-curricular activities

- Mentor at Womentorship program at NYU Tandon.
- Mentor at Eklavya India Foundation (Non-profit-education).
- Member of New York science academy, material research society, SAMPE.

Acquainted with machines and characterization methods :

- Manufacturing machines : Twin screw extruder, Compression moulding, Injection Moulding Machine, sheet molding compound machine, dough molding compound machine, material extrusion, fused deposition machine, direct ink writing.
- Mechanical Characterization - tensile, flexural, impact, compressive, barcol hardness,
- Physical Characterization like specific gravity, shrinkage, water absorption, SEM, XRD, gas permeation chromatography.
- Electrical Characterization like flammability, 50kv high voltage test, insulation resistance, 6kv voltage test, arc resistance, comparative tracking index, surface and volume resistivity
- Thermal Characterization : Heat distortion temperature test, TGA and DSC
- Chemical Characterization - FTIR

Computer and software skillsets

Microsoft Office Suite, Solidworks, Unigraphics (NX), MATLAB, Origin, SPSS, Ansys.

References

- Dr. Lukasz Witek - lw901@nyu.edu - Assistant Professor - Biomaterials Division - NYU Dentistry.
- Dr. Nikhil Gupta - ngupta@nyu.edu - Professor, Department of Mechanical and Aerospace Engineering - New York University, Tandon School of Engineering.
- Dr. Rakesh Behera - rakesh.behera@nyu.edu - Industry Associate Professor, Department of Mechanical and Aerospace Engineering - New York University, Tandon School of Engineering.
- Dr. R.S.N. Sahai - rsn.sahai@ictmumbai.edu.in - Assistant Professor - General Engineering Department, Institute of Chemical Technology, Mumbai.
- Dr. Vivek Gaval - vg6618@gmail.com - Assistant Professor - General Engineering Department, Institute of Chemical Technology, Mumbai.

Declaration

I, hereby declare that all the information stated above is true, complete to the best of my knowledge and belief and nothing has been concealed/ distorted.

ANKITAR. SHINDE

