Anurag J Vishal

Junior Undergraduate
Materials Science and Engineering
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ACADEMIC DETAILS

Degree	Specialization	Institute	Year	CPI/%
B.Tech.	*Materials Science and Engineering*	IIT Gandhinagar	2024-Present	7.81
Class XII	*Physics, Chemistry, Maths*	Pace Junior Science College	2019-2021	91.33
Class X		Ryan International School	2018-2019	94

INTERNSHIPS

- **Summer Research Intern, University of Miami** [June '24 - July '24]
  (Advisor - Dr. Qingda Yang)
  - Conducted comprehensive research on CMCs fabricated through the Polymer Infiltration Pyrolysis (PIP) process, specifically focusing on SiHfBCN matrices reinforced with Yttria-stabilized Zirconia fibers.
  - Performed detailed mechanical characterization, including 3-point bending tests, to quantify the flexural strength, toughness, and durability of the CMCs under varied loading conditions.
  - Investigated the high-temperature stability and corrosion resistance of the SiHfBCN matrix, providing insights into the materials' performance in extreme thermal and oxidative environments.
  - Enhanced material design strategies for green energy aerospace applications, optimizing CMC compositions for improved thermal conductivity and mechanical resilience in high-temperature settings.

PROJECTS

- **Hydrophobic Polymer-Coated Aluminum for Aerospace Applications** [August '24 - November '24]
  (Prof. Sriharitha Rowthu, National Aerospace Laboratories (NAL), India)
  - Focused on improving hydrophobicity of polymer-coated aluminum for aerospace applications.
  - Evaluated methods like chemical etching, hot embossing, and laser patterning; chose laser patterning for its precision.
  - Optimized laser parameters to achieve micro- and nano-scale roughness for superior water repellency.
  - Characterized surfaces using SEM, optical profilometry, and water contact angle tests.

- **Self-Healing SLIPS for Sanitation Applications** [August '24 - November '24]
  (Prof. Sriharitha Rowthu, IIT Gandhinagar)
  - Designed slippery liquid-infused porous surfaces (SLIPS) using rare-earth oxides, PDMS, and wax for sanitation applications.
  - Incorporated anti-microbial agents (e.g., silver nanoparticles, copper-based compounds) for enhanced functionality.
  - Developed anti-fouling properties through micro-patterning and surface characterization (AFM, FTIR).
  - Optimized coating parameters to achieve high water contact angles and bacterial adhesion reduction.

- **Silicon Deposition for Advanced Coating Applications** [August '24 - October '24]
  (Prof. Raghavan Ranganathan, IIT GANDHINAGAR)
  - Performed molecular dynamics simulations using LAMMPS to model silicon deposition on a crystalline substrate and analyzed the effects of deposition energy and substrate temperature.
  - Analyzed stress distribution in deposited films by calculating stress tensors and visualizing results using OVITO, assessing the impact of substrate temperature and deposition conditions.
  - Characterized film structure by calculating the radial distribution function (g(r)) and integrating the first peak to determine the coordination number, distinguishing between crystalline and amorphous structures.
  - Conducted high-temperature annealing simulations and studied stress relaxation and structural evolution in the deposited silicon film under varying thermal conditions.

- **Self-Healing Organic Coatings** [January '24 - April '24]
  (Prof. Sriharitha Rowthu, IIT Gandhinagar)
  - Investigated self-healing coatings for enhanced durability and resistance to corrosion.
  - Studied various self-healing mechanisms such as microencapsulation and reversible crosslinking.
  - Optimized coating compositions and curing processes to improve recovery performance post-damage.
  - Characterized coating morphologies and structural integrity using SEM and contact angle analysis.

- **Quantum Dots for Biomedical Applications** [August '23 - November '23]
  (Prof. Jhuma Shah, IIT Gandhinagar)
  - Developed an eco-friendly synthesis method for Quantum Dots (QDs) using plant extracts and ethanol as a solvent.
  - Employed microwave-assisted synthesis to reduce reaction times and control QD size (5-30 nanometers).
  - Characterized QDs exhibiting red fluorescence for biomedical imaging applications.
  - Conducted XRD and FTIR analysis to confirm unique structural and chemical characteristics.

TECHNICAL SKILLS

- **Programming Languages:** LAMMPS, Python, R

- **Tools:** OVITO, Origin, Matlab, EXCEL, Auto Desk.
- **Equipments:** XRD, SEM, DLS, AFM, DSC, contact angle probe, surface profilometer.
- **Soft skills:** Leadership, Communication Skills, Strategic Planning.

ACHIEVEMENTS

- Secured championship titles in major hockey tournaments, including DSO (U14, U19), NMSA (U16), and Nehru Cup (U19), representing Raigarh District.
- Represented Raigarh District in hockey, showcasing leadership and teamwork in district-level competitions.
- Achieved victories in football tournaments, winning LFP 2022 and EOS, demonstrating strategic gameplay and team coordination.

EXTRA-CURRICULAR ACTIVITIES

- Lorem Ipsum
  - Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur.
  - Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

POSITIONS OF RESPONSIBILITY

- **Football Team Vice Captain, IITGN** [October '24 - Present]
  - Led a 25-player team to multiple tournament, fostering strong team cohesion and strategic gameplay.
  - Organized over 20 targeted training sessions, enhancing agility, coordination, and tactical skills.
  - Cultivated a positive team culture, maintaining high morale and commitment among players.
- **Sports Events Management Coordinator, IITGN** [June '24 - Present]
  - Managed logistics for 5+ intercollegiate events, coordinating resources for 500+ participants.
  - Streamlined event operations, ensuring smooth equipment distribution and efficient communication.
  - Organized inclusive sports events, enhancing campus sports engagement and participation.
- **Hallabol Coordinator (Sports Fest), IITGN** [February '23 - February '24]
  - Directed Hallabol, IITGN's largest sports fest, leading 50+ volunteers and collaborating with 6 committees.
  - Optimized resource planning and budgeting to enhance event quality and experience.
  - Established effective communication channels, improving participant satisfaction and event cohesion.