Bhalaji Yadav Kantepalle

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PROFESSIONAL SUMMARY

Chemical Engineer (M.S.) and Researcher specializing in **Soft Materials Mechanics**, **Optical Metrology**, and **Computational Physics**. Expert in developing "ground truth" validation systems using **Python (OpenCV)** and **Fracture Mechanics** principles. Proven ability to characterize complex material behavior (Adhesion, Fatigue, Rheology) and translate findings into scalable engineering solutions. Successfully secured $30,000 in research funding through technical proposal writing.

EDUCATION

Virginia Commonwealth University (VCU) — Richmond, VA
M.S., Chemical & Life Science Engineering | ***GPA: 3.62*** — *Exp. Dec 2026*
Core Research: Fracture Mechanics of Soft Interfaces, Mechanochromic Sensors, Computer Vision for Metrology.

Achievement: Graduate Assistantship Award (Fall 2025) – Full Tuition Waiver & Stipend.

Amrita University — Coimbatore, India
B.Tech., Chemical Engineering — *Jun 2022*

TECHNICAL SKILLS

Materials Characterization: **Fracture Mechanics**, Adhesion Testing (ASTM D2724), Rheology, Optical Microscopy, Tensile Testing
Computational R&D: **Python** (OpenCV, Pandas, Scipy), Image Processing, **CIE L*a*b* Colorimetry**, Data Modeling
Lab Instrumentation:Universal Testing Machine (TA.XTplusC Texture Analyser), NMR Spectroscopy, FT-NIR, UV-Vis, 3D Printing
Engineering Standards: Experimental Design (DOE), Root Cause Analysis (RCA), Technical Grant Writing, FDA cGMP

RESEARCH EXPERIENCE

VCU Soft Functional Materials Lab — Richmond, VA
Graduate Researcher & Metrology Lead — *Sep 2024 – Present*

- **Novel Optical Metrology:** Engineered a high-throughput **Computer Vision pipeline** (Python/OpenCV) to quantify mechanochromic response in smart textiles. Synchronized sub-pixel texture tracking with **CIE L*a*b*** colorimetry to eliminate lighting artifacts.
- **Fracture Mechanics Automation:** Developed a first-principles analysis protocol to identify "false positive" adhesion failures in soft wearables. Automated the extraction of **Peel Stability Index (PSI)** metrics, reducing data processing time by **>80%**.
- **Grant Success ($30,000):** Drafted a successful research proposal for the Commonwealth Cyber Initiative. Synthesized preliminary data to substantiate the clinical viability of thermochromic sensors for diabetic health monitoring.
- **Material Validation:** Characterized the viscoelastic properties of complex polymer fluids using **Rheology models** (Cross/Power-law) to optimize coating formulations for scalable manufacturing.

INDUSTRY EXPERIENCE

Kreative Organics Pvt. Ltd. — Hyderabad, India
Technical Project Manager — *May 2023 – May 2024*

- **Data Engineering:** Designed and containerized a **Python**/**Docker** data protocol to standardize chemical nomenclature across global supply chains, improving data retrieval accuracy by 90%.
- **Validation Logic (FDA):** Managed the **SAP ERP Re-qualification**, partnering with consultants to design rigorous OQ/PQ testing protocols that ensured compliance with FDA data integrity standards.
- **Process Optimization:** Applied engineering principles to optimize system cutover logistics, reducing downtime from 5 days to 5 hours through precise critical-path planning.

Technical Project Intern — *Oct 2022 – Apr 2023*

- **R&D Workflow Automation:** Engineered a digital tool that analyzed global trade datasets, reducing manual research time by **70%** and streamlining the identification of viable chemical targets and markets.

PUBLICATIONS & ACHIEVEMENTS

Journal Article: I. Caloian, J. Trapp, **B. Y. Kantepalle**, et al. “Mechanical Properties of **Dual-Layer Electrospun Fiber Mats**”. *Polymers* 17(13), 1777 (2025). **[doi:10.3390/polym17131777]**

Selected Participant: 1st National Neutron Scattering School, Oak Ridge National Laboratory (Sep 2025).

Poster Presentation: “Adhesives for Personalized Wearable Devices” (ACS Fall 2025, Washington D.C.).