PRATEEK VERMA

PHD / POLYMER SCIENTIST

CONTACT FORM
WWW.PRATEEKVERMA.COM
HIDDEN ONLINE

Polymer scientist and engineer with extensive background in structure-property relationships, metamaterials, machine learning for polymers, processing and characterization, industrial coating technologies and formulations, and organic chemistry.

13 papers published/submitted
17 conference presentations
7 leadership roles **16** researchers advised
17 students mentored **12** classes taught

EXPERIENCE

POSTDOCTORAL FELLOW

UNIVERSITY OF ARKANSAS / Nayani and Nakarmi group / 2021 – present

- Lightweight convolutional neural networks (CNNs) for micrographs
- Machine learning algorithms to predict heat-stress in organisms
- Coronavirus sensor design using CNNs on liquid crystal micrographs

GEORGIA INSTITUTE OF TECHNOLOGY / Shofner and Russo group / 2018 – 2021

- Machine learning for noise detection in scattering data
- Metamaterial composite fabrication using tensegrity/auxetic approaches
- Executive Director (OPALL: Open Polymer Active Learning Laboratory)
  - Established safety, supplies, materials, teams, activities, and website
  - Acted as a liaison between the board of advisors and students

SENIOR COATING CHEMIST

KIMOTO TECH / 2016 – 2018

- Team leader for 5 R&D chemists
- Research and development of protective & flexible coatings exhibiting properties of UV-blocking, scratch and chemical resistance, electrical conductivity, anti-glare, etc.
- Development of conductive coatings and pressure sensitive adhesives
- Scale-up and production of several lab-to-market projects

PHD CANDIDATE

GEORGIA INSTITUTE OF TECHNOLOGY / Griffin and Shofner group / 2011 – 2015

- Synthesized intrinsically auxetic liquid crystal polymers
- Developed a new protocol for accurately measuring Poisson's ratio
- Developed a new method to induce auxetic properties in nonwovens
- Explained and modeled auxetic behavior of paper
- Analyzed network deformations through micro-CT and finite element analysis
- Established processing-structure-property relations for auxetic response in fiber networks

RESEARCH ASSISTANT (MASTER'S)

UNIVERSITY OF AKRON / Karim group / 2011

- Developed a buckling-based metrology to determine strength of thin films
- Prepared and tested strength of polymer-blend films used in tissue engineering

EDUCATION

PHD / 2011 – 2015

GEORGIA INSTITUTE OF TECHNOLOGY
Materials Science and Engineering (polymers)
GPA 4.0 / 4.0

BS AND MS / 2006 – 2011

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
Polymer Science and Technology
GPA 8.5 / 10.0

HONORS & AWARDS

2020 Invited talk, IIT Roorkee
2019 Executive Director, OPALL
2019 Hightower Fellow, OPALL
2017 Chairman, Tech. Conference, Kimoto
2014 2nd best poster, Auxetic Conference

SKILLSETS

POLYMERS
CHEMISTRY
DEEP LEARNING
DATA SCIENCE
COMPUTER LANGUAGES
LAB TECHNIQUES
INDUSTRY
INTERPERSONAL
COMPUTATIONAL

please see subsequent page(s)

EXPERIENCE (CONTD.)

SUMMER INTERN

UNIVERSITY OF MASSACHUSETTS AMHERST / McCarthy group / 2010

- Synthesized uniformly sized silica nanoparticles for composite applications
- Created super-hydrophobic surfaces using silanes; synthesized cross-linked silicones

SUMMER INTERN

UNIVERSITY OF MINNESOTA / Barocas group / 2009

- Synthesized epoxy networks to study flow through kidney membranes
- Synthesized and characterized collagen gels for tissue engineering

SELECT PUBLICATIONS

7 of 19 shown

- H Sun, Z Fang, L Zhao, **P Verma**, B Tian, et al.*; An ultra-sensitive and stretchable strain sensor based on micro-crack structure for motion monitoring*; in press, Micro Nano (Nature Pub. Group); **2022**
- **P Verma**, C Smith, AC Griffin, ML Shofner*; Corrigendum: Wool nonwovens as candidates for commodity auxetic materials*; In press. Engineering Research Express; ERX-101673; **2022**
- Q Kang, X Fang, C Wu, **P Verma**, H Sun, et al.*; Mechanical properties and indentation-induced phase transformation in 4H–SiC implanted by hydrogen ions*; Ceramics International; **2022**
- **P Verma**, C Smith, AC Griffin, ML Shofner*; Wool nonwovens as candidates for commodity auxetic materials*; Engineering Research Express; 2 (4); **2021**
- **P Verma**, C He, AC Griffin*; Implications for auxetic response in liquid crystalline polymers*; Physica Status Solidi B; 2000261; **2020**; (appeared in Wiley's 'Hot Topics: Liquid Crystals')
- N Jappar, **P Verma**, J Holmes*; Development of functional films in roll-to-roll manufacturing*; RadTech; **2018**; (conference paper)
- **P Verma**, ML Shofner, A Lin, KB Wagner, AC Griffin*; Induction of auxetic response in needle-punched nonwovens: Effects of temperature, pressure and time*; Physica Status Solidi B; 253 (7); **2016**

SELECT PRESENTATIONS

7 of 17 shown

- Constructing out-of-plane auxetic response in paper; Denver (USA); 2020
- Auxetic behavior in fiber networks; San Diego (USA); 2019
- OPALL: The open polymer active learning laboratory at Georgia Tech; Orlando (USA); 2019
- X-ray scattering from LC polymers: Implications for auxetic response; Bedlewo (Poland); 2019
- Auxetic liquid crystalline polymers; Crete (Greece); 2017
- Reversibility of thickness change in nonwovens; Poznan (Poland); 2016
- Elastic moduli of polymeric thin films of nanocomposites and blends via buckling on elastomeric substrates; Boston (USA); 2012

LEADERSHIP

2019 – 2021 / GEORGIA TECH
DEI council representative for research staff in the department

2019 – PRESENT / GEORGIA TECH
Co-launched, Postdoc Chats, series of social and professional development gatherings for postdocs campuswide

2019 – PRESENT / GEORGIA TECH
Advisor, to graduate and undergraduate members and users, OPALL Polymer Makerspace

2016 – 2018 / KIMOTO TECH
Team Leader, for 5+ industry research scientists

2013 – 2015 / GEORGIA TECH
Co-manager, Polymer Thermal Analysis Lab

RESEARCH ADVISOR

for **16** industry members / graduates / undergraduates in the following broad areas

- unsupervised & supervised learning
- industrial coatings
- coacervation thermodynamics
- auxetics and metamaterials
- nanocomposites

*direct supervisor for **13**

MENTORSHIP

Served as a mentor for **Mentor Jackets, MSE Industry Mentoring and IITR's Alumni Mentorship Program** since 2016.

- **9** Bachelor's students
- **6** Doctoral students
- **2** Master's students

DIVERSITY

Percentage of the total **33** advised/mentored

- **49** % women
- **16** % hispanics & latinos
- **07** % african americans
- **43** % internationals
- **19** % first-gen college goers

SKILLSETS

POLYMERS
- auxetic materials
- biopolymers
- characterization
- coacervates
- liquid crystals
- machine learning
- network deformations
- networks
- polymer processing
- silanes and silicones
- structure-property relationships
- thermal analysis
- thin films
- tissue engineering
- viscoelasticity

CHEMISTRY
- free-radical polymerization
- LCE synthesis
- polyurethane synthesis
- silane chemistry
- silicone synthesis
- thermal curing
- UV curing

DEEP LEARNING
- CNNs
- image processing
- neural networks
- RESNETs
- supervised learning
- SVMs

DATA SCIENCE
- clustering
- linear regression

COMPUTER LANGUAGES
- ActionScript
- C/C++
- JavaScript
- MATLAB
- PHP
- Python
- SQL

LAB TECHNIQUES
- AFM
- DMA
- DSC
- environmental testing
- FTIR
- ITC
- mechanical testing
- micro-CT
- SEM
- TGA
- viscometry

INDUSTRY
- adhesive coatings
- bar coating
- batch mixing
- coating formulations
- hard coats
- scale-up operations
- slot die coating
- thermal curing
- UV curing

INTERPERSONAL
- career counselling
- illustration
- leadership
- mentoring
- research advising
- speaking
- teaching
- team building

COMPUTATIONAL
- Abaqus
- ChemOffice
- Django
- Material Studio
- MATLAB
- Matplotlib
- Molecular Operating Env.
- NumPy
- Pandas
- PILLOW
- TensorFlow

TEACHING

Guest lecturer, guest instructor (for labs) and teaching assistant for a total of 12 courses at Georgia Tech in the following broad areas:

Thermal analysis of polymers, polymerization reactions, mechanical and viscoelastic properties of polymers, rheology, and introductory materials science

EXTRACURRICULARS

- Gets way too excited about web development and graphics design
- Is the best table tennis player in the break room
- Paints and draws

REFERENCES

ANSELM C GRIFFIN
Professor Emeritus, Georgia Tech
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MEISHA L SHOFNER
Associate Professor, Georgia Tech
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KARTHIK NAYANI
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