PRATEEK VERMA

PHD / POLYMER SCIENTIST

CONTACT FORM
WWW.PRATEEKVERMA.COM
HIDDEN ONLINE

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

14 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
- Teaching computers about functional groups on polymer chains
- Deep learning algorithms to extract pollutant composition from totals

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

2021 5 year Mentorship Award
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 20 shown

- **P Verma**, KB Wagner, AC Griffin, ML Shofner*; Reversibility of auxetic response in polyester fiber needle-punched nonwovens*; Physica Status Solidi B; **2022**
- H Sun, X Fang, Z Fang, L Zhao, B Tian, et al.*; An ultra-sensitive and stretchable strain sensor based on micro-crack structure for motion monitoring*; Micro Nano (Nature); 8 (111); **2022**
- **P Verma**, C Smith, AC Griffin, ML Shofner*; Towards textile metamaterials: A pathway to auxeticity and tensegrity in a needle-punched nonwoven stiff felt*; Materials Advances (RSC); **2022**
- Q Kang, X Fang, C Wu, **P Verma**, H Sun, et al.*; Improvement mechanism of brittle-plastic transition and residual stress in scratching 4H–SiC implanted by hydrogen ions*; Ceramics International; **2022**
- **P Verma**, C Smith, AC Griffin, ML Shofner*; Corrigendum: Wool nonwovens as candidates for commodity auxetic materials*; Engineering Research Express; 4 029501; **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**

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 scientists & postdocs 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
anselm.griffin@mse.gatech.edu

MEISHA L SHOFNER
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