**ARYA AJEEV**

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## OBJECTIVE

Ph.D. candidate in Chemical Engineering (May 2026) with 6+ years of hands-on experience in polymer synthesis, characterization, and sustainability-driven materials design. Seeking a full-time industry R&D role to contribute to product innovation, testing, and development

## EDUCATION

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| PhD | Chemical Engineering | May 2026 | University of Maine | GPA: 3.81/4 |
| M. Tech | Polymer Technology | July 2022 | Cochin University India | GPA: 8.41/10 |
| B. Tech | Polymer Technology | May 2020 | Mahathma Gandhi University India | GPA: 8.40/10 |

## WORK EXPERIENCE

**Materials Engineering and Nanosensor (MEAN) Lab,** University of Maine (Graduate Research Assistant, September 2022 - present)

- Lab Safety Officer (In charge of keeping lab SOPs current and monitoring/disposing of wastes.).
- Elucidated structure-property relationships for phosphoric-acid dopants in PANI/PAAMPSA films: evaluated NTMPA, PPA, and BNHP, showing that dense H-bonding with PPA yields record 3750 % elongation and 17 % water uptake, whereas the more dynamic NTMPA maximizes self-healing (98 % electrical, 77 % mechanical), and bulky BNHP impedes both stretchability and healability.
- Engineered carboxylic-acid-doped PANI/PAAMPSA films that self-heal, dissolve in water in ≤ 10 min, photodegrade under UV within 24 h, and biodegrade in soil in < 24 h—yielding fully reprocessable, eco-friendly conductive substrates for stretchable electronics
- Leading a comparative study of four sulfonic-acid dopants—4-dodecylbenzene sulfonic, trifluoromethane sulfonic, p-toluenesulfonic, and 5-sulfosalicylic—to elucidate structure-conductivity relationships in PANI/PAAMPSA films and optimize high-signal, stretchable substrates for next-generation human–machine interface sensors.
- Graduate Teaching Assistant – Chemical Engineering Thermodynamics & Elements of Chemical Engineering

**Dissertation title:** Exploring the chemical modifications of PAAMPSA/PANI polymer complex system.
P.I: Dr. Evan. K. Wujcik

**Center for Materials for Electronics Technology (CMET,** Thrissur, India**),** (Project Intern, November 2021 – July 2022)

- Engineered a conductive rubber composite for wearable Medical Intelligent Prosthetics (i-Prosthetics) and developed a wearable strain band for gesture-controlled AI applications, achieving exceptional linearity with an $R^2$ value of 0.99 and 300% extensibility
- Formulated conductive inks with strong adhesion to various substrates, including paper, Teflon, and rubber, showcasing versatility in application.
- Fabricated an eco-friendly, degradable paper-based acetone sensor using ZnO-PANI active layers for room temperature sensing applications, achieving broad sensitivity across a physiological range of 260 ppm to over 1000 ppm.
- Reviewed the advantages of ternary-based supercapacitors over binary and single systems, highlighting the synergistic effects of combining PANI-Graphene with a ternary element to enhance supercapacitor performance.

**M. Tech Thesis Title**: Conducting rubber composites for gesture controlled artificial intelligence applications.
P.I: Dr. Arulraj Arulkashmir

**Center for Materials for Electronics Technology (CMET,** Pune, India**),** (Project Intern, January 2020 – March 2020)

- Developed a highly sensitive latex-rubber-based strain sensor with 250% extensibility, a gauge factor of 1.2 x $10^4$, and stability over 1000 cycles, and created a human–machine interactive system to monitor military postures for non-verbal communications, including shotgun, dog, rifle, and pistol.

**B. Tech Thesis Title**: Ultrahigh sensitive carbon-infused conducting rubbers for flexible and wearable human–machine intelligence sensing. P.I: Dr. Arulraj Arulkashmir

## SKILLS

- **Software**: AutoCAD, Arduino UNO, Origin, Mathcad, Aspen Plus, COMSOL.
- **Instrument Expertise**: Scanning Electron Microscopy (SEM), Thermogravimetric Analyzer (TGA), Differential Scanning Calorimetry (DSC), Electrochemical Impedance Analysis, Four-Probe Conductivity meter, Keithley, Fourier-Transform Infrared spectroscopy (FTIR), Dip coater, Spin Coater, Two-roll mill, Banbury mixer, Ball mill, Injection Molding, Extrusion Molding, Compression Molding, Ultrasonicator, Nuclear Magnetic Resonance spectroscopy (NMR), Spectrophotometer, Instron, Dynamic Mechanical Analysis (DMA), Dynamic Light Scattering (DLS)
- **Soft Skills**: Team worker, cross-functional collaborator, effective communicator, goal-oriented and highly organized.

## Grants & Awards

- Recipient, **Graduate Student Government (GSG) Grant Award**, University of Maine, 2025

## LEADERSHIP & MEMBERSHIP ACTIVITIES

- **Active member**, Society of Women Engineers (SWE), South Asian Association of Maine (SAAM) University of Maine, 2023-2025
- Member, **American Institute of Chemical Engineers (AIChE), SWE, American Chemical Society (ACS),** and **Materials Research Society (MRS)**- Actively participate in professional development events, conferences, and networking opportunities, 2022-2025
- **Graduate Mentor**- Mentored undergraduate and graduate students in polymer synthesis, and data analysis for independent research projects, 2022-present
- **STEM Outreach Volunteer**, Girl Scouts of Maine - Led hands-on invisible ink demonstrations as part of a science outreach event to encourage girls' participation in STEM fields, 2024
- **Technical Reviewer**, IEEE International Conference on Flexible and Printable Sensors and Systems (FLEPS), 2023-2025
- **Peer Reviewer**, *Microchimica Acta* (Springer), 2025

## PEER-REVIEWED PUBLICATIONS

1. **Ajeev, A**., Javaregowda, B.H., Ali, A., Modak, M., Patil, S., Khatua, S., Ramadoss, M., Kothavade, P.A. and Arulraj, A.K., 2020. Ultrahigh sensitive carbon-based conducting rubbers for flexible and wearable human–machine intelligence sensing. ***Advanced Materials Technologies***, *5*(12), p.2000690. https://doi.org/10.1002/admt.202000690
2. Davis, D., Narayanan, S.K., **Ajeev, A**., Nair, J., Jeeji, J., Vijayan, A., Viyyur Kuttyadi, M., Nelliparambil Sathian, A. and Arulraj, A.K., 2023. Flexible paper-based room-temperature acetone sensors with ultrafast regeneration. ***ACS Applied Materials & Interfaces***, *15*(21), pp.25734-25743. https://doi.org/10.1021/acsami.2c21712
3. **Ajeev, A**., Warfle, T., Maslaczynska-Salome, S., Alipoori, S., Duprey, C. and Wujcik, E.K., 2025. From the synthesis of wearable polymer sensors to their potential for reuse and ultimate fate. ***Chemical Science***, *16*(21), pp.9056-9075.https://doi.org/10.1039/D5SC01634G.
4. Duprey, Colton., **Ajeev, A**., …& Wujcik, E. (2025). A Recyclable PANI/PAAMPSA Nanocomposite with Repeatable, Rapid, Autonomous Self-Healing and Unprecedented Electro-Mechanical Properties. (**Manuscript Accepted-** ***Advanced Composites and Hybrid Materials*****)**
5. **Ajeev, A**., Duprey, Colton., …& Wujcik, E. (2025) Effect of Protonating Phosphoric Acid-Based Dopants on the Electroconductive and Mechanical Properties of Polyaniline/Poly(2-acrylamido-2-methylpropane Sulfonic Acid) Complexes (**Manuscript under Review-*ACS Applied Polymer Materials*)**
6. **Ajeev, A**., Salome-Maslaczynska S., …& Wujcik, E. (2025) The Effect of Varying Whey Protein in Anti-bacterial Gelatin/Polyaniline Complexes Doped with Phytic Acid for Bio-compatible Bio-sensors (**Manuscript submitted**)
7. **Ajeev, A**., Warfle, Theodore., …& Wujcik, E. (2025) Sustainable and Reprocessable Carboxylic Acid-Doped Polyaniline Electroconductive Films with Rapid Environmental Degradation. (**Manuscript under Preparation)**