CHARINI MALADENIYA, Ph.D

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SUMMARY

• Research experience in the synthesis and characterization of monomer, sustainable polymer materials, composites utilizing sulfur, waste, and organic precursors for construction applications.
• Over six plus years' experience in characterization techniques such as TGA, DSC, DMA, spectroscopy, chromatography, and microscopy techniques.
• Productive scientist with superior written/verbal communication skills and analytical/problem solving skills.
• A self-starter and a team player with the ability to manage multiple tasks, ready to be deployed on a multidisciplinary team.

KEY SKILLS

• **Analytical Techniques:** UV-Vis, FTIR, NMR (1D, 2D), SEM, EDX, MALDI, GC-MS, GPC, TGA, DSC, XRR, Fluorescence microscopy, Flexural strength/ rheology/viscoelastic properties analysis with DMA, Compressive/Tensile Strength Measuring Instrument, Ellipsometry
• **Experimentation and Data analysis:** High temperature Parr bomb Reactor, glovebox and inert atmosphere techniques, Air-free Schlenk-line techniques, Hydrogen flow reactor, High vacuum line, Spin Coater
• **Data Bases and Computational Skills:** ChemDraw, MestReNova (Mnova), Topspin, Origin, MS Office, MS Excel, BioRender, Endnote, Mendeley, Sci Finder, Python
• **Management Skills:** Lab safety supervision, SOP preparation, Lab start-up, Instrument maintenance.
• **Soft Skills:** Communication, Collaboration, Leadership, Individualization, Critical thinker, Problem solving skills.

EXPERIENCE

Postdoctoral Research Associate (Polymer Chemistry), Oak Ridge National Laboratory, Oak Ridge, TN
Oct 2023 – present

- Designing and synthesizing monomers and macromolecules for investigating non-equilibrium phenomena and transport behavior in polymer materials, including solid state and solution properties.
- Synthesis and characterization of polymers using different polymerization methods (RAFT, Radical, Anionic).
- Collaborate with scientists from diverse fields on various projects, fostering interdisciplinary teamwork and achieving project goals effectively.
- Prepare polymer films on different substrates (quartz, SiO_2) and characterize using NMR, XRR, XPS, GPC, FT-IR, AFM, QCM-D, Ellipsometry, etc. for various DOE projects.
- Present and report research results and publish in peer-reviewed journals in a timely manner.
- Ensure compliance with environment, safety, health, and quality program requirements.

Graduate Research Assistant (Chemistry), Clemson University, Clemson, SC
Aug.2019–Aug. 2023

• Synthesized and characterization of various polymer materials and monomers for ongoing research projects using radical polymerization, inverse vulcanization methods aimed at developing alternative construction materials (**OPC** – Ordinary Portland Cement).
• Developed C–S bond-forming reactions to synthesize organosulfur polymers from more sustainable monomers or waste products
• Conducted mechanical testing using compressive/tensile strength instruments and analyzed data using a mechanical test stand to evaluate polymer performance under different conditions.
• Investigated thermal characteristics of polymers using TGA and DSC and analyzed data to evaluate the thermal stability of synthesized polymers
• Investigate the morphological characteristics of polymer nanocomposites using SEM.
• Proficiently operated, maintained, and troubleshot laboratory equipment, including glovebox, Parr bomb reactor, DSC, TGA, GC-MS, DMA and mechanical test stand
• Published research findings in ten peer-reviewed journals, contributing to the understanding of structure-property relationships and potential applications
• Presented research results at international (Gordan Conference,Spain) and national conferences, engaging with the scientific community and exchanging ideas on polymer research advancements
• Mentored six graduate students and assisted in designing and executing polymerization reactions, purification, and characterization using techniques such as NMR, FT-IR, and GPC.

Graduate Teaching Assistant (Chemistry), University of Sri Jayewardenepura, Sri Lanka
March 2013 – Nov. 2017

• Synthesized novel ligands and designed three platinum sulfonamide compounds as potential anticancer drugs.
• Conducted multi-step organic synthesis, purification, and characterization of the synthesized complexes using XRD, NMR, FT-IR, and UV-Vis spectroscopy
• Collaborated with a team of researchers and evaluated the cytotoxicity of the synthesized platinum complexes against various cancer cell lines, including breast and lung cancer.
• Investigated the biological imaging activities of the platinum complexes using fluorescence microscopy, contributing to potential applications in cancer cell imaging.
• Published research findings in a peer-reviewed journal, showcasing the novel anticancer agents and their mechanisms of action.
• Presented research results at national conferences, receiving recognition for the contribution to the field of anticancer drug development.

PUBLICATIONS

• Katelyn M. Derr, Claudia V. Lopez, **Charini P. Maladeniya**, Andrew G. Tennyson, and Rhett C. Smit. "Transesterification-Vulcanization Route to Durable Composites from Post Consumer Poly(ethylene terephthalate), Terpenoids, and Industrial Waste Sulfur"(2023) – Accepted for publication in *Journal of Polymer Science.*
• **Charini P. Maladeniya**, Andrew G. Tennyson, and Rhett C. Smith. "Thermal and Mechanical Properties of Guaiacol-Fatty Acid-Sulfur Composites" (2023) – in preparation for *Journal of Applied Polymer Science*
• **Charini P. Maladeniya**, Andrew G. Tennyson, and Rhett C. Smith. "Single-Stage Chemical Recycling of Plastic Waste to Yield Durable Composites via a Tandem Transesterification-Thiocracking Process" (2023)

• Menisha S. Karunarathna,a **Charini P. Maladeniya**, Moira K. Lauer,a Andrew G. Tennyson, and Rhett C. Smith. "Durable Composites by Vulcanization of Oleyl-Esterified Lignin." *RSC Advances* (2023)

• Graham, M. J., Lopez, C. V., **Maladeniya, C. P**., Tennyson, A. G., & Smith, R. C. (2023). Influence of pozzolans on plant oil-sulfur polymer cements: More sustainable and chemically-resistant alternatives to Portland cement. *Journal of Applied Polymer Science*, 140(13), e53684.

• Tisdale Katelyn A., **Charini P. Maladeniya**, Claudia V Lopez, Andrew G,Tennyson and Rhett C Smith. "Sustainable Composites from Waste Sulfur, Terpenoids, and Pozzolan Cements." Journal of Composites Science

• **Maladeniya, Charini P**., Menisha S. Karunarathna, Moira K. Lauer, Claudia V. Lopez, Timmy Thiounn, and Rhett C. Smith. "A role for terpenoid cyclization in the atom economical polymerization of terpenoids with sulfur to yield durable composites." Materials Advances 1, no. 6 (2020): 1665-1674.

• **Maladeniya, Charini P.,** and Rhett C. Smith. "Influence of Component Ratio on Thermal and Mechanical Properties of Terpenoid-Sulfur Composites." Journal of Composites Science 5, no. 10 (2021): 257.

• **Maladeniya, Charini**, Taniya Darshani, Sameera R. Samarakoon, Frank R. Fronczek, W. M. C. Sameera, Inoka C. Perera, and Theshini Perera. "Biological Evaluation of Platinum (II) Sulfonamido Complexes: Synthesis, Characterization, Cytotoxicity, and Biological Imaging," Bioinorganic Chemistry and Applications, vol. 2022, Article ID 7821284, (2022)

• Lopez, Claudia V., **Charini P. Maladeniya**, and Rhett C. Smith. "Lithium-sulfur batteries: Advances and trends." Electrochem 1, no. 3 (2020): 226-259.

• Lopez, Claudia V., Menisha S. Karunarathna, Moira K. Lauer, **Charini P. Maladeniya**, Timmy Thiounn, Edward D. Ackley, and Rhett C. Smith. "High strength, acid-resistant composites from canola, sunflower, or linseed oils: Influence of triglyceride unsaturation on material properties." Journal of Polymer Science 58, no. 16 (2020): 2259-2266

EDUCATION

Ph.D. in Polymer Chemistry, Clemson University, USA
Aug.2019−Aug.2023

• Dissertation Title: "Atom Economical Polymerization of Terpenoids, Post-consumer plastic with Sulfur to Yield Durable Composites"

B.Sc. in Chemistry (Honors), University of Sri Jayewardenepura, Sri Lanka
Aug.2010−Feb. 2015

• Thesis Title: "Biological evaluation of Platinum (II) sulfonamide complexes: synthesis, characterization, cytotoxicity and biological imaging"

PRESENTATIONS

International

• Gordon Research Conference, Spain (Oral and Poster) and Gordon Research Seminar (2022) "Post-consumer Plastic, Terpene Derivatives and Elemental Sulfur:Towards Sustainable Building Materials"

• 5th International Conference on Multidisciplinary Approaches, Sri Lanka (2018) Oral presentation on the abstract on the abstract title "Biological Evaluation of Platinum (II) Sulfonamido Complexes: Synthesis, Characterization, Cytotoxicity, and Biological Imaging

Domestic

• Annual Research Symposium, Clemson University, Clemson – Invited 3-Minute Thesis presentation (2023)
• American Chemical Society (ACS) Spring Research Conference, Indianapolis, Oral presentation (2023)
• 8th Annual Chemistry Research Symposium, Clemson University, Clemson – Poster presentation (2023)
• Conference of Southern Graduate Schools (CSGS), Tampa, Florida - Represented Clemson University as a 3-Minute Thesis (3MT) competitor. (2023)
• American Chemical Society (ACS) Spring Research Conference, San Diego- Oral presentation on the abstract on the abstract title "Carbon-Negative Polymer Cements from Terpenoids and Waste Sulfur as Recyclable, Acid-Resistant Building Materials" (2022)
2019 – present

PROFESSIONAL DEVELOPMENT

• Thermal Analysis Workshop, organized by Mettler Toledo (2022)
• Clemson Thinks^2 Graduate Teaching Institute: a two-day, intensive workshop devoted to enhancing critical thinking pedagogy skills (2022)
• Certificate Course in Human Resource Management, Institute of Personnel Management (IPM), Sri Lanka (2014)

HONORS AND AWARDS

• Champion of 3-Minute Thesis competition in the PhD candidate category in Clemson University (2022)
• Recipient of Professional Enrichment Grant, Clemson University (2022)
• Graduate Student Travel Grant - International Travel Grant**,** Clemson University (2022)
•Recipient of Mandel Fellowship for achieving an outstanding level of productivity in research, Clemson University (2021)
• First -authored paper got selected as a 2020 HOT article featured by the journal *Materials Advances* (2020)
• Earl C Ray '38 Fellowship, Clemson University (2019)
• B.Sc. (Chemistry special) First class Honors, University of Sri Jayewardenepura (2017)

LEADERSHIP

•Organizing committee member of 6th Chemistry Research Symposium actively participate in 2022 Chemistry symposium organizing by Department of Chemistry, Clemson University (2021)

•Committee member of Chemistry faculty member search committee, Department of Chemistry, Clemson University (2021)
•Panelist of Call me Doctor summit, international student session, Clemson University (2021)

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