Oliyad Dibisa

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Summary

Polymer scientist with experience in the formulation of UV-curable biopolymers and emulsions. Proven ability to translate theoretical models into high-performance commercial products, including an ammonia-free latex adhesive that outperformed market leaders up to 150**%**. Confident in establishing structure-process-property relationships using advanced characterization and process simulation. Experienced in navigating IP landscapes, ensuring regulatory compliance (OSHA), and synthesizing complex data for technical publications and stakeholder presentations.

Education

University of Wisconsin-Madison

PhD Mechanical Engineering **August 2021 – May 2026 or Beyond**

Advisor: Prof. Tim A. Osswald and Xiao Kuang

Research Title: *Structure–Process-Property Relationships in Colloids: for Advanced Manufacturing and Adhesives.*

University of Wisconsin-Madison

M.S. Mechanical Engineering, **August 2022**

Pacific Union College, Angwin, CA

B.S. Chemistry – Analytical Chemistry **June 2021**

Graduate research assistant, UW-Madison, Polymer Engineering Center, March 2022 – Present

Photopolymer process development and advanced characterization

- Elucidated mechanical reinforcement mechanisms via rheological modeling and simulations, establishing a versatile UV-curable platform compatible with 3D printing, dip-coating, and spray processing.
- Established structure–property–process relationships to replace toxic raw materials with bio-derived components in UV-curable inks.
- Designed and validated a parametric rheological framework for in-situ UV-curing of latex and polyurethane emulsions, resulting in up to 70% bio-based UV ink (>2000% elongation, low modulus) that secured a provisional patent and Q1 publications.
- Characterized nuclear relaxation and viscoelastic transitions across multiple timescales by engineering variable-delay CPMG pulse sequences and flow-sweep rheometry

Product support and commercialization of high-performance, sustainable adhesive

- Benchmarked sustainable, ammonia-free latex adhesives against competitors using D6004 (lap-shear) protocols under high humidity/temperature conditions.
- Demonstrated superior performance, outperforming ammoniated NRL by 183% and leading commercial brands by 22–148%; these results defined the market-entry strategy and secured intellectual property protection.

Industrial consulting & technical partnerships, January 2023 -Present

Polymer materials consultant | *Freelance/ Polymer Engineering Center*

- Assisted in diagnosing root cause failures in silane-grafted LLDPE insulation for SAKO AEI Polymers; collected data, utilized VT and Solid-State NMR to pinpoint premature hydrolysis, and proposed solutions.
- Executed comparative mechanical testing (lap-shear) on diverse adhesive systems to define the manufacturing strategy for a footwear brand.
- Conducted compression-recovery analysis on recycled PET composites to substantiate product recoverability claims during a legal dispute.

International R&D collaborators | *Universidad Autónoma de Chile (Remote/Hybrid)*

- Led a cross-functional study on sustainable tire recycling, operating a twin-screw Brabender mixer to execute a Design of Experiments (DOE/RSM).
- Validated a 20% devulcanization efficiency in natural rubber granules using DSC and time-domain NMR, providing critical data for the development of circular economy elastomer technologies.

Technical author & researcher | *Institute of Polymer Science & Technology; Madrid, Spain, June 2023 – July 2024*

- Synthesized complex technical data into a textbook chapter on Additive Manufacturing of Elastomers (TPE, PU, Siloxane, Latex) for FDM and SLA/DLP platforms.
- Conducted a strategic IP landscape analysis, reviewing 50+ patents and 100+ literature sources to map the current state of technology and identify innovation gaps.

Graduate teaching assistant, UW-Madison, Mechanical Engineering, August 2022 – Present

- Instructed and mentored 120+ students per semester across Manufacturing and Mechanics labs, delivering weekly technical presentations and managing course logistics.

Experience (continued)

- ❖ Supervised hands-on polymer processing operations (extrusion, injection molding, AM) and taught process optimization using DOE, CFD simulations, and statistical analysis.
- ❖ Oversaw mechanical characterization testing (tensile, flexural, impact) for virgin and composite materials, ensuring strict adherence to safety protocols and testing standards.

Undergraduate researcher, Pacific Union College, August 2020 - June 2021

Advising Professors: Marie Pak and Robert Wilson

- ❖ Performed bio-separation and characterization of complex protein systems (egg-white) using differential centrifugation and resolved Ovalbumin, Lysozyme, Ovotransferrin, and Ovomucoid via SDS-PAGE gel electrophoresis.
- ❖ Synthesized high-purity terephthalate standards to benchmark the executed chemical recycling of PET bottles, recovering terephthalate monomers with ≥90% purity via IR, refractive index, and melting point analysis.

Selected leadership and outreach

R&D operations lead | *Polymer Engineering Center, UW-Madison*: Managed undergraduate recruitment, talent placement, and J-1 visa compliance/onboarding for visiting scholars.

Facility maintenance lead | *Camp Tuolumne Trails (Groveland, CA):* Managed facility upkeep and equipment maintenance, ensuring operational safety and infrastructure reliability.

Youth program coordinator | *Modesto Central Church / STEM Camps*: Led logistics and mentorship for youth programs, directing large groups and managing event operations.

Skills

Laboratory and Analytical instrumentation skills

Materials characterization: Solution state (2D) NMR, Time-domain NMR, (photo)-rheometry, DSC, TGA, MFI, Mechanical testing (Transient/Dynamic), UV-vis spectrometer, DLS, SEM, GPC

Polymer processing equipment: Injection molding, single and Twin-screw extrusion, Brabender, SLA, and Thermoforming

Computer skills

Mathematical solving techniques and programming: VSCode (Copilot), R, and Python, GitHub

Data Processing: Origin, MestReNova, Minitab, JMP, MITloas

Physics simulation software: Moldex3D, COMSOL Multiphysics, Digimat Structural Simulations

Languages

English (Fluent), Afan Oromo (Fluent), Amharic (Proficient)

Selected awards and honors

Distinguished teaching award from Pi Tau Sigma, 2023
TDS Most valuable educator nominee 2023
Student poster winner at SPE ANTEC 2025.
Student poster winner at SPE Thermoset Division in 2023 and 2024.

Journal publications

1. *Román AJ,* ***Dibisa O****, Pardo G, J.C. Rodríguez, Osswald TA.* ***https://doi.org/10.1002/pls2.10103***
2. ***Dibisa O****, Roman AJ, Cabush H, O'Brien G, Kuang X, Osswald TA.* ***https://doi.org/10.1002/pls2.70011***
3. ***Dibisa O****, Hector A. Arroyave, Roman AJ, J.C. Rodríguez, Tim A. Osswald* ***https://doi.org/10.1063/5.0255679****,* ***scilight https://doi.org/10.1063/10.0036338.***
4. ***Dibisa O****, and Tim A. Osswald.* ***https://doi.org/10.1002/pen.70041***
5. ***Dibisa O*** *and Xiao Kuang****. (Advanced Materials) adma202509115 (under review)***

Patent

6. ***Dibisa, O.*** *& Kuang, X. "UV-curable colloids" (Patent Application in preparation).* ***WARF Reference: P260184***

Selected conference presentations

7. *Román, A. J., J.C. Rodríguez,* ***Dibisa O****, and T.A. Osswald, International Rubber Conference 2024, Lima, Peru.*
8. ***Dibisa O****, T.A. Osswald, SPE Thermoset Latex Week 2025, Chennai, India.*
9. ***Dibisa O****, T.A. Osswald, SPE ANTEC March 3-6, 2025, Philadelphia, PA.*

Book chapters

10. *Roman, A.J., Lendvai, L., Perilla, J.,* ***Dibisa, O****., Osswald, T.A. (2025). Elsevier. Paperback ISBN: 9780443289897; eBook ISBN: 9780443289903*
11. *Osswald, T.A., Rodríguez, J.C., Adler, E.P., Arroyave, H.A., J.E.,* ***Dibisa, O****., Pardo Morales, G., and Román, A.J., Latex Handbook, Chapter, TechnoBiz, 2024*

References

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