

Gerardo Andrés Mazzei Capote

45 N. Randall Ave, Apt. 109 • Madison, WI- 53715

(608) 622-4643 • mazzeicapote@wisc.edu

[linkedin.com/in/gerardo-mazzei-capote](https://www.linkedin.com/in/gerardo-mazzei-capote)

ORCID: 0000-0002-1951-6600

SUMMARY

Mechanical engineer with a minor in business. Experienced in polymer-based additive manufacturing technologies and polymer processing. Highly skilled in thermal analysis and mechanical testing of polymers, composite theory, and failure criteria. Versatile communicator fluent in three languages.

EDUCATION

- **University of Wisconsin-Madison** - *Madison, WI, U.S.A.*
 - **PhD:** Mechanical Engineering — 2018 - *present* (Expected August 2021)
 - **MSc:** Mechanical Engineering — 2016 - 2018.
- **Universidad Simón Bolívar** - *Caracas, Venezuela*
 - **BSc:** Materials Engineering — 2009 - 2016.

PROFESSIONAL EXPERIENCE

Research Assistant Polymer Engineering Center, UW-Madison **August 2016 - Present**

- Constructed a failure surface for Fused Filament Fabrication (FFF) parts using careful design of experiments based on statistics and mechanics of materials.
- Designed and produced customized 3D printed coupons with unusual extrudate orientations using a 6-axis robotic printer.
- Extruded ABS and PET thermoplastic filaments with geometric tolerances within 2% of target value.
- Offered expertise in manufacturability of topological crystal insulators to be produced through various Additive Manufacturing technologies, resulting in project-wide part design guidelines and fabrication protocols.
- Developed a Machine Learning system capable of predicting mechanical properties of FFF parts based on processing parameters and in-line measurements.

Teaching Assistant Mech. Eng. Department, UW-Madison **August 2017 - December 2020**

Responsible for the instruction and grading of 'ME370 - Energy Systems Lab', 'ME514 - Additive Manufacturing', and 'ME418 - Engineering Design with Polymers', all offered by the Mechanical Engineering Department. Consistently received high ratings from students.

SKILLS

Polymer processing techniques: Extrusion, Injection Molding, FDM/FFF, SLS, DLS

Analysis techniques: TGA, DSC, LFA, DMA, FTIR, Mechanical Testing, μ CT

Programming languages: MATLAB, Python, R, RAPID, G-code

Engineering software: Solidworks, EES, Origin, Moldflow, ANSYS

Other software: Microsoft Office Suite, Adobe Animate

Languages: English, Spanish, Portuguese

OTHER EXPERIENCE

Vice President Society of Plastic Engineers - Madison Chapter **August 2018 - May 2020**

Coordinated industry visits and outreach activities aimed at increasing the interest of engineering students in the field of polymer processing. Highlights include visits to the 3M campus in the Twin Cities - MN, and to the Trek facilities in Waterloo - WI.

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Resume – page 2

TECHNICAL PRESENTATIONS

1. *A Novel Failure Criteria Applied for Fused Filament Fabrication Parts*. AMUG - Chicago, IL - 2019.
2. *A Tensor Based Failure Criterion for FFF Manufactured Parts*. RAPID - Fort Worth, TX - 2018.
3. *Towards a Robust Production of FFF End-User Parts with Improved Tensile Properties*. SFF - Austin, TX - 2017.

PUBLICATIONS

1. T Pfeifer et al. "Optimization of the FDM™ additive manufacturing process". In: *74th Annual Technical Conference and Exhibition of the Society of Plastics Engineers, Indianapolis 2016* (2016), pp. 22–26. URL: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85010644519&partnerID=40&md5=1f4521e160fe433ad37ef9bb587ee72e>
2. Gerardo A. Mazzei Capote et al. "Towards a Robust Production of FFF End-User Parts with Improved Tensile Properties". In: *Proceedings of the 28th Annual International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference*. Austin, TX, 2017, pp. 507–518
3. Gerardo A. Mazzei Capote et al. "Failure surface development for ABS fused filament fabrication parts". In: *Additive Manufacturing* 28, April (2019), pp. 169–175. ISSN: 22148604. DOI: [10.1016/j.addma.2019.05.005](https://doi.org/10.1016/j.addma.2019.05.005). URL: <https://doi.org/10.1016/j.addma.2019.05.005>
4. J.L. Colón Quintana et al. "Viscoelastic properties of fused filament fabrication parts". In: *Additive Manufacturing* 28 (2019). ISSN: 22148604. DOI: [10.1016/j.addma.2019.06.003](https://doi.org/10.1016/j.addma.2019.06.003)
5. Gerardo A. Mazzei Capote, Alec Redmann, and Tim A. Osswald. "Validating a Failure Surface Developed for ABS Fused Filament Fabrication Parts through Complex Loading Experiments". In: *Journal of Composites Science* 3.2 (2019). DOI: <https://doi.org/10.3390/jcs3020049>
6. P. V. Osswald et al. "Failure Criterion for PA 12 Multi-Jet Fusion Additive Manufactured Parts". In: *Additive Manufacturing* July (2020). ISSN: 2214-8604. DOI: [10.1016/j.addma.2020.101668](https://doi.org/10.1016/j.addma.2020.101668). URL: <https://doi.org/10.1016/j.addma.2020.101668>
7. Jose L. Colon Quintana et al. "Application of the stress interaction failure criterion in platelet composite compression molded parts". In: *Polymer Composites* November 2020 (2021), pp. 1–12. DOI: [10.1002/pc.26084](https://doi.org/10.1002/pc.26084)