

Yailuth Alexandra Loaiza Lopera, Ph.D. Candidate

Purdue University
School of Materials Engineering
West Lafayette, IN 47906

2101 Cumberland Avenue, West Lafayette,
IN. 47906
☎ (814) 441 3827 | ✉ yloaizal@purdue.edu

EDUCATION

- Purdue University** **Doctor of Philosophy in Materials Engineering, May 2022**
Thesis: Nanostructured Materials with Bulk Strengthening Mechanisms
Advisor: David F. Bahr
- University of Antioquia** **Master of Science, Materials Engineering, December 2017**
Thesis: Efecto de las Adiciones de Polvos de Acería (EAFD) en las propiedades de concretos Asfálticos.
Advisor: Henry A. Colorado Lopera
- University of Antioquia** **Bachelor of Science, Materials Engineering, July 2013**

RESEARCH EXPERIENCE

- Research Assistant:** **Purdue University** **West Lafayette, IN**
Advisor: David F. Bahr August 2018-Present
Fabricate and characterize microstructure of nanometallic foams such as copper and copper alloys. Characterize microstructure of multi-layer thin films of niobium, chromium and copper. Assess mechanical properties of nanomaterials by nanoindentation.
- Research Assistant:** **The Data Mine - Purdue University** **West Lafayette, IN**
Advisor: Mark Ward August 2020-May 2021
Analyzed membership data for Purdue Research Foundation by using data mining techniques. Created prediction models to help Beck's Hybrids forecast annual crop yield by using RStudio.
- Research Assistant:** **University of Antioquia** **Medellin, Colombia**
Advisor: Henry Colorado January 2015-December 2017
Fabricated and characterized asphalt cement and asphalt concrete materials with additives considered as waste from the metallurgic industry. Analyzed and reported results in peer-reviewed journals.

TEACHING AND MENTORING EXPERIENCE

- Graduate Teaching Assistant:** **Purdue University** **West Lafayette, IN 2020-2021**
Prepared lab sessions and trained undergraduate students on different characterization techniques: X-Ray Diffraction (XRD) and Scanning Electron Microscopy (SEM).
- Graduate Mentor:** **Purdue University** **West Lafayette, IN 2019**
Mentored one undergrad student in data collection and analysis to study the influence of precursors viscosity on synthesis of metallic nanofoams.
- Lecturer:** **National University** **Medellin, Colombia 2018**
Taught “Casting techniques of metallic materials” to university juniors.
- Lecturer:** **University of Antioquia** **Medellin, Colombia. 2017 – 2018**
Taught “Casting techniques of metallic materials” to university juniors.

FELLOWSHIPS, GRANTS AND AWARDS

- Best Poster in Recycling and Sustainability Division. A. Loaiza; S. Cifuentes, A. Colorado. “Structure-Property Relation of Asphalt Blended with Electric Arc Furnace Dust (EAFD)”. The Minerals, Metals and Materials Society (TMS2017). San Diego, California.
- The American Ceramic Society (ACerS) travel grant to attend Summer School in Budapest Hungary (2017).
- Purdue Women in Engineering Program travel grant to attend the Materials, Science and Engineering (MS&T2019) in Portland Oregon.

PUBLICATIONS

- Ke, H., **Loaiza, A.**, Jimenez, A. G., Bahr, D. F., & Mastorakos, I. (2021). A Multiscale Simulation Approach for the Mechanical Response of Copper/Nickel Nanofoams With Experimental Validation. *Journal of Engineering Materials and Technology*, 144(1), 011011.
- Florez, R., **Loaiza, A.**, Giraldo, C. H. C., & Colorado, H. A. (2021). Calcium silicate phosphate cement with samarium oxide additions for neutron shielding applications in nuclear industry. *Progress in Nuclear Energy*, 133, 103650. (2021).
- Loaiza, A.**, Garcia, E., & Colorado, H. A. (2018). Evaluación de asfalto mezclado con polvo de corteza y fibras residuales de coco para aplicaciones estructurales. *Revista de la construcción*, 17(3), 542-554.
- Loaiza, A.**, Garcia, E., & Colorado, H. A. (2018). Evaluation of asphalt binder blended with coconut coir dust and residual coconut fibers for structural applications. *Revista de La Construcción. Journal of Construction*, 17(3), 542-554.
- Loaiza, A.**, & Colorado, H. A. (2018). Marshall stability and flow tests for asphalt concrete containing electric arc furnace dust waste with high ZnO contents from the steel making process. *Construction and Building Materials*, 166, 769-778.
- Colorado, H. A., & **Loaiza, A.** (2017). Portland cement paste blended with pulverized coconut fibers. *Advances in Materials Science for Environmental and Energy Technologies VI*, 262, 79.
- Loaiza, A.**, Cifuentes, S., & Colorado, H. A. (2017). Asphalt modified with superfine electric arc furnace steel dust (EAF dust) with high zinc oxide content. *Construction and Building Materials*, 145, 538-547.

CONFERENCE PRESENTATIONS AND POSTERS

- Oral Presentations:**
- A. Loaiza, JT. Tsai, D. F.Bahr.** “Structure-Mechanical Properties In Solid Solution Strengthened Nanoporous Copper Alloys”. Oral presentation at Materials, Science and Technology (MS&T2019). Portland, Oregon.
 - A. Loaiza, H. Colorado.** “Portland Cement Paste with Pulverized Coconut fiber”. Oral presentation at 3rd Pan American Material Congress, 2017 (PAM). San Diego, California.
 - A. Loaiza, S. Cifuentes, Sergio; H. Colorado.** “Effect of Electric Arc Furnace Dust in Asphalt. Oral presentation at Materials, Science and Technology (MS&T2016). Salt Lake City, Utah.
- Poster Presentations:**
- A. Loaiza, A. Colorado.** “Effect of coconut fibers in asphalt properties” Poster presentation at Materials, Science and Technology (MS&T2017). Pittsburgh, Pennsylvania.
 - A. Loaiza, S. Cifuentes, H. Colorado.** “Structure-Property Relation of Asphalt Blended with Electric Arc Furnace Dust (EAFD)”. Poster presentation at The Minerals, Metals and Materials Society (TMS2017). San Diego, California.
 - A. Loaiza, R. Flórez, CH. Castaño, H Henry.** “Phosphate Cement Blended with Samarium Oxide as Irradiation Shielding Materials”. Poster presentation at Materials, Science and Technology (MS&T2016). Salt Lake City, Utah.
 - A. Loaiza, S. Cifuentes, H. Colorado.** “Steel Slag as Ceramic Reinforcement for Polymeric Thin Films”. Poster presentation at Materials, Science and Technology (MS&T2015). Columbus, Ohio.

PROFESSIONAL EXPERIENCE

- Production Engineer:** **Fundiciones Espitia** **Medellin, Colombia. 2013 – 2015**
Planned, supported, and controlled the casting and melting processes.
Analyzed chemical composition of alloys for record keeping purposes.
Analyzed data for several melting processes to assess production.

COMMUNITY SERVICE

- Spanish teacher:** **International Center** **West Lafayette, IN 2019**
Thought Spanish Language to students at beginning level

SKILLS

Technical Skills: Characterization equipment including but not limited to: X-Ray Diffraction (XRD), Electronic Microscope (SEM), Brunauer-Emmett-Teller (BET) Optical Microscope
Mechanical testing equipment: Nanoindenter
Potentiometric measurements: Open Circuit Potential (OCP)
Processing: Electrospinning technique, magnetron sputtering, spin coating.

Business and Social Skills: Strategic thinking, highly motivated, analytical skills, written and verbal communication skills, accomplished writer.

Software and applications: StatGraphics, OriginLab, R

Spoken Languages: English (Proficient) and Spanish (native speaker).

REFERENCES

David Bahr, Professor and Head of School of Materials Engineering
School of Materials Engineering
Purdue University
+765 49-44100, dfbahr@purdue.edu

RESEARCH AND EDUCATION PLAN

During my Ph.D., I have been working on studying the strengthening mechanism on nanostructured materials. The understanding of the behavior of nanostructured materials opens the opportunity to explore other research for the use and application of these materials. For instance, nanometallic foams (NMF) had been used in catalytic processes. NMF had shown high catalytic activity for the catalysis of CO_2 to convert in CO. What makes these materials appealing is its potential to contribute to the closing of the so-called carbon cycle. CO_2 presence in the atmosphere had accelerated the planet warming in last years.

In my project I studied how nanostructured materials could be strengthened by the well-known methods used to strengthened bulk crystalline materials. Solid solution strengthening and precipitation strengthening are the most used methods to enhance mechanical properties on bulk crystalline materials. NMF had been previously synthesized by dealloying methods which produce NMF with high relative density and does not allow the production of NMF with other alloy elements. To fabricate NMF in our lab we used a templated method called electrospinning which allow us to produce NMF with high alloy content and extremely low density.

My goal for future years would be to these fabricated NMF on a device that could convert CO_2 into Co by catalytic activity. By reducing CO_2 in atmosphere, the global warming could be decelerated and life in the earth planet could extended.

During my Ph.D. studies I have been given the opportunity to teach characterization of materials to undergrad students at junior level. I strongly promote during my classes, the importance of understanding of nanomaterials behavior and all materials in general with the instruments and resources we have in the Materials Engineering department at Purdue University. I promote in my students, some challenging activities that will help them to develop a critical thinking. For instance, instead of me telling me which methods they will use to characterize materials, they will come up with their own ideas and proposals. They would also be challenged by finding possible applications the material in question.

Characterization of materials is a very general topic that I enjoy teaching, however, I would be happy to go more in depth in any other research topic. I also enjoy encouraging my students to participate and talk, by creating a safe space and healthy environment. I believe that they always have great ideas to share ideas with the rest of the group.