# JORGE GALEANO-CABRAL

jgaleanocabral.com ◇ jgaleanocabral@gmail.com ◇ Google Scholar
National High Magnetic Field Laboratory ◇ Florida State University
1800 E. Paul Dirac Dr., Tallahassee, FL 32310

## EDUCATION

**Florida State University**, Tallahassee, FL. *May 2024*
*Doctor of Philosophy in Mechanical Engineering* GPA: 3.85/4.00
Academic Advisor: Dr. Juan Ordonez (ordonez@eng.famu.fsu.edu)
Lab Supervisor: Dr. Kaya Wei (wei@magnet.fsu.edu)

**Florida State University**, Tallahassee, FL. *December 2022*
*Master of Science in Mechanical Engineering* GPA: 3.81/4.00
Advisor: Dr. Juan Ordonez (ordonez@eng.famu.fsu.edu)

**Federal University for Latin American Integration**, Foz do Iguaçu, Brazil *December 2016*
*Bachelor of Science in Energy Engineering* GPA: 3.52/4.00
Advisor: Dr. Walfrido Pippo (walfrido.pippo@unila.edu.br)

## RESEARCH INTERESTS

Sustainable Energy Systems; Thermal Science; Experimental Condensed Matter Physics; Thermoelectricity; Semiconductors; Device Fabrication; Quantum Materials

## PEER-REVIEWED JOURNAL ARTICLES

1. **Galeano-Cabral, J.R.**, Karr E., Schundelmier B., Oladehin O., Choi E.S., Siegrist T., Ordonez J., Shastri S., Petkov V., Baumbach R, and Wei K. (2023). Enhanced thermoelectric properties of heavy-fermion compounds $Yb_xCe_ySm_zIr_2Zn_{20}$ (x+y+z=1). *Physical Review Materials*, 7(2).
2. **Galeano-Cabral, J.R.**, Schundelmier B., Oladehin O., Feng, K., Ordonez J., Baumbach R.E., and Wei K. (2023). Effect of Ni in the Thermoelectric Properties of $YbCo_2Zn_{20}$. *Materials* 17 (8), 1906.
3. Porto-Hernandez, L. A., J. V. C. Vargas, M. N. Munoz, **Galeano-Cabral, J.R.**, J. C. Ordonez, W. Balmant, and A. B. Mariano. (2023). Fundamental Optimization of Steam Rankine Cycle Power Plants. *Energy Conversion and Management*, 289:117148.
4. Feng, K., **Galeano-Cabral J.**, Wei, K., and Baumbach, R. (2023). Revealing Strongly Correlated Quantum Spin States in $GdNiAl_4Ge_2$. *Physical Review Materials*, 7(124409)
5. Kyrk, T.M., Kennedy, E., **Galeano-Cabral, J.R.**, McCandless, G.T., Scott, M.C., Baumbach, R.E. and Chan, J. (2023). Much More to Explore with an Oxidation State of Nearly Four: Pr Valence Instability in Intermetallic m-$Pr_2Co_3Ge_5$. *Science Advances 10 (eadl2818)*
6. Wei, K., **Galeano Cabral, J.**, Olatunde, O., Karr, E., Graf, D., Baumbach, R., and Siegrist, T. (2024). Fermi Surface of Frustrated Kagome Metal CoSn. [*to be submitted*]
7. Amir Z., **Galeano-Cabral J.**, Schundelmier B., Wei, K., Baumbach, R., and Latturner S. (2024). Synthesis of Zintl Phase Metal Silicide Thermoelectric Materials via Mg/Zn flux. Submitted to *Inorganic Chemistry: A Dialogue on Zintl Chemistry*
8. Oladehin, O., Bravo, M., Feng, K., **Galeano-Cabral J.**, Wei, K., Chan, J., and Baumbach, R. (2024). Evolution of Structure and Magnetism in the Square Net Series $TbTe_{2-x}Sb_x$. [*to be submitted*]

9. **Galeano-Cabral, J.R.**, Porto-Hernandez, L.A., Vargas, J.V.C., and J.C. Ordonez (2022). Exergetic Optimization of an Integrated Municipal Solid Waste Incinerator and Wastewater Treatment Plant. *International Journal of Energy for a Clean Environment*, 23(4).

10. Kyrk, T.M., Kennedy, E., **Galeano-Cabral, J.R.**, Wei, K., McCandless, G.T., Scott, M.C., Baumbach, R.E., and Chan, J. (2022). Anisotropic Magnetic and Transport Properties of Orthorhombic o-$Pr_2Co_3Ge_5$. *Journal of Physics: Materials*, 5(044007).

11. Petkov, V., Rao, T.D., Abeykoon, A.M., **Galeano-Cabral, J.R.**, and Wei, K. (2022). Spin-lattice coupling in magnetocaloric $Gd_5(Ge,Si)_4$ alloys by *insitu* x-ray pair distribution analysis in magnetic field. *Physical Review Materials*, 6(10).

12. Oladehin, O., Feng, K., Haddock, J., **Galeano-Cabral, J.R.**, Wei, K., Xin, Y., Latturner, S., and Baumbach, R.E. (2022). Mn Substitution in the Topological Metal $Zr_2Te_2P$. *Journal of Physics. Condensed Matter*, 34(485501).

## SELECTED ORAL PRESENTATIONS

1. Improved Thermoelectric Properties of $YbCo_2Zn_{20}$ through Ni Doping.
   *American Physical Society March Meeting.* *Minneapolis, MN. March 2024*

2. Enhanced Thermoelectric Properties of $YbCo_2Zn_{20}$ through Charge Carrier Tunning.
   *American Physical Society March Meeting.* *Las Vegas, NV. March 2023*

3. Investigations on the thermoelectric properties of $YbCo_{2-x}Ni_xZn_{20}$.
   *American Physical Society March Meeting.* *Chicago, IL. March 2022*

4. Enhanced Thermoelectric Properties of $YbCo_2Zn_{20}$ through Fe and Ni Doping.
   *88th Annual Meeting of the APS Southeastern Section* *Tallahassee, FL. November 2021*

5. Enhanced Thermoelectric Properties of 1-2-20 Compounds through Multi-filler Approach.
   *American Physical Society March Meeting.* *Virtual. March 2021*

## PROFESSIONAL EXPERIENCE

**National High Magnetic Field Laboratory (MagLab)** *May 2024 - Present*
**Condensed Matter Science Group/Experimental** *Tallahassee, FL. USA*
*Postdoctoral Research Associate*
Supervisor: Dr. Kaya Wei (kwei@magnet.fsu.edu)

- Synthesis and characterization (structural, thermal, electrical, and magnetic properties) of crystalline quantum materials.
- Operate, calibrate, and maintain lab equipment and tools; write Standard Operating Procedures (SOPs) and scientific papers; perform user support for external users.
- Mentor high school, undergraduate, and doctoral students.

**National High Magnetic Field Laboratory (MagLab)** *December 2019 - April 2024*
**Condensed Matter Science Group/Experimental** *Tallahassee, FL. USA*
*Graduate Research Assistant*
Supervisor: Dr. Kaya Wei (kwei@magnet.fsu.edu)

- Synthesized over 100 high-quality crystalline intermetallics previously unreported, through diverse synthesis techniques such as flux growth, vapor transport, and arc melting.

- Characterized materials using SEM-EDS and x-ray diffraction; executed physical properties characterization (magnetometry, thermal/electrical transport); presented at prestigious conferences.
- Collaborated with 6 colleagues in my group, 7 research groups from various fields, and mentored 3 undergraduates and 3 high school students in summer research.

**Florida A&M University (FAMU)** *May 2021 - August 2021*
**Department of Industrial Engineering** *Tallahassee, FL. USA*
*OPS Researcher*
Supervisor: Dr. Juan Ordonez (ordonez@eng.famu.fsu.edu)

- Performed analysis and optimization of energy systems through numerical simulations.
- Prepared technical documents and reports, including manuscripts and conference presentations.

**Florida State University (FSU)** *August 2020 -April 2021*
**Department of Mechanical Engineering** *Tallahassee, FL. USA*
*Teaching Assistant*
Supervisor: Dr. Juan Ordonez (ordonez@eng.famu.fsu.edu)

- Courses: Introduction to Aeropropulsion; Matlab; PTC Creo; Energy Systems for Sustainability.

**Federal University For Latin American Integration (UNILA)** *January 2017 - February 2018*
**Electron Microscopy Laboratory** *Foz do Iguaçu, PR. Brazil*
*Laboratory Assistant*
Supervisor: Dr. Rodrigo Basso (rodrigo.basso@unila.edu.br)

- Operated the SEM for high-quality imaging and EDS analysis, including user training & support.
- Conducted SEM maintenance, addressing technical issues, and drafting safety SOPs.
- Performed sample preparation, including cutting, polishing, and coating, for organic and inorganic materials.

**Technological Park of Itaipu (PTI)** *July 2016 - December 2016*
**Automation and Simulation of Electrical Systems (LASSE)** *Foz do Iguaçu, PR. Brazil*
*Engineering Intern*
Supervisor: Prof. Larissa Machado (larissa.machado@unila.edu.br)

- Real-Time Digital Power System Simulations (RTDS) of solar-photovoltaic generation systems.

## SKILLS SUMMARY

**Material Synthesis:** Flux Growth, Arc-Melting, Vapor Transport (CVT), and Thin-film Deposition.

**Sample Preparation:** Cross-sectioning, Polishing, Pelleting, Etching, Spot-welding, Coating.

**General Equipment:** Torch Bench, Glove Box, Fume Hood, Furnace, SEM-EDS, XRD, Physical Properties Measurement System (PPMS), Magnetic Properties Measurement System (MPMS).

**Software:** Python, MatLab, LaTeX, OriginPro, AutoCAD, PTC Creo, Autodesk Inventor, COMSOL Multiphysics, LabVIEW, VESTA, FullProf, Adobe Creative Suite (Photoshop, Illustrator, Acrobat).

**Safety Training Library:** Compressed Gas, Cryogenics, Electrical Safety, Hazard Communication, Hazardous Waste, Magnetic Field Safety, Quartz Glass Sealing, Radiation, and Laser.

## SPOKEN LANGUAGES

English (Fluent)
Portuguese (Fluent)
Spanish (Native)
Guarani (Native)

## SELECTED AWARDS AND HONORS

**Global Citizen Award**, Florida State University *2023*

**Professional Development Travel Funding award**, NHMFL *2021, 2022, 2023, 2024*

**Oak Ridge Associated Universities Travel Funding Award**, ORNL *2022*

**FULBRIGHT Scholarship Program**, U.S. Department of State *2018-2020*

**Best Project in the Chemistry, Physics, and Mathematics Section**, at "VI Meeting of Scientific Initiation, UNILA", for the project: *"Relaxation Phenomena in Nanostructured Systems"* *2015*

**Brazilian National Permanence Grant**, a five-year scholarship to pursue a Bachelor's degree in Brazil. 2011-2016 Scholar Period. Brazilian Federal Government. *2011*

## PROFESSIONAL DEVELOPMENT

**American Physical Society (APS)** *March 2024*
**Group on Energy Research & its Applications (GERA)** *Minneapolis, MN. USA*
*2024 GERA Energy Workshop*

**Florida State University (FSU)** *October 2023*
**High-Performance Materials Institute (HPMI)** *Tallahassee, FL. USA*
*Electron Microscopy Workshop*

**American Physical Society (APS)** *March 2023*
**Group on Energy Research & its Applications (GERA)** *Las Vegas, NV. USA*
*2023 GERA Energy Workshop*

**Oak Ridge National Laboratory** *October 2022*
**Spallation Neutron Source** *Oak Ridge, TN. USA*
*Magnetic Structure Determination from Neutron Diffraction Data*
School & Workshop

**University of Maryland & NIST** *June 2022*
*Fundamentals of Quantum Materials* *College Park, MD. USA*
Summer School & Workshop

**Mississippi State University** *March 2018 - July 2018*
**The English Language Institute** *Starkville, MS. USA*
*Academic English*

**Internation Center for Renewable Energies** *August 2015*
**Technological Park of Itaipu (PTI)** *Foz do Iguaçu, PR. Brazil*
*Biogas Energy Update*

## LEADERSHIP, SERVICES & ORGANIZATIONS

**Leadership:**

- Provost Quality Enhancement Committee, Florida State University - **Member** *2022 – 2024*
- FSU Congress of Graduate Students (COGS) - **Representative** *2022 – 2024*
- Provost Selection Advisory Committee, Florida State University - **Member** *2021*
- Hispanic Graduate Student Association (HiGSA) – **Excecutive Board Officer** *2019 – 2021*
- Cinehassee: Tallahassee Iberoamerican Film Festival – **Director** *2019 – 2020*
- Rioplatense Mathematical Olympiad, Argentina – **Paraguayan Team Leader** *2018*
- Paraguayan National Mathematical Olympiad, Paraguay – **Judge** *2011 - 2017*

**Services:**

- Capital Regional Science and Engineering Fair – **Judge** *2023-2024*
- High School Externship, National High Magnetic Field Laboratory – **Mentor** *2022-2023*
- Camp TESLA, National High Magnetic Field Laboratory – **Volunteer** *2022*
- SciGrils, National High Magnetic Field Laboratory – **Volunteer** *2022*
- MagLab User Summer School, National High Magnetic Field Laboratory – **Volunteer** *2022*
- High School Mentorship, National High Magnetic Field Laboratory – **Volunteer** *2022*
- MagLab Open House, National High Magnetic Field Laboratory – **Volunteer** *2019, 2023*

**Professional Membership:**

-American Physics Society (APS)
-American Society of Mechanical Engineers (ASME)
-Society of Hispanic Professional Engineers (SHPE)
-Fellows Society at Florida State University
-Omicron Delta Kappa (OΔK): The National Leadership Honor Society
-Golden Key International Honours Society