Juanita Hidalgo, Ph.D.

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Professional Appointments

New York University — Brooklyn, NY, USA
Assistant Professor in Chemical and Biomolecular Engineering — *Sep. 2025*

Massachusetts Institute of Technology — Cambridge, MA, USA
Distinguished Postdoctoral Research Fellow — *Sep. 2023 – Aug. 2025*

Education

Georgia Institute of Technology — Atlanta, GA, USA
Ph.D. Materials Science and Engineering — *Aug. 2023*
M.S. Materials Science and Engineering — *May 2021*

Universidad de los Andes — Bogotá, Colombia
B.S. Chemical Engineering — *Oct. 2017*

Awards

Rising Stars in Materials Science and Engineering — Palo Alto, CA, USA
Stanford University — *2024*

Julian Baumert Thesis Award — Upton, NY, USA
National Synchrotron Light Source II, Brookhaven National Laboratory — *2024*

Early Career Distinguished Scholar Award UC Irvine (Honorable Mention) — Irvine, CA, USA
Materials Science and Engineering, University of California, Irvine — *2023*

Best in Show Poster Award — Atlanta, GA, USA
School of Materials Science and Engineering, Georgia Institute of Technology — *2023*

1st Place Graduate Poster Award – Structural and Functional — Atlanta, GA, USA
School of Materials Science and Engineering, Georgia Institute of Technology — *2023*

Neutron and X-ray Scattering Summer School — Oak Ridge, TN and Lemont, IL, USA
Department of Energy program in the use of X-ray facilities — *2019*

Journal of Materials Chemistry C Poster Prize — Cali, Colombia
IV International Congress Next Generation Solar Energy — *2017*

Fellowships

MIT Postdoctoral Fellowship of Engineering Excellence — Cambridge, MA, USA
School of Engineering, Massachusetts Institute of Technology — *2023 – 2025*

Novelis Scholarship — Atlanta, GA, USA
Novelis, Georgia Institute of Technology — *2023*

DAAD Scholarship - One Year Grant — Berlin, Germany
German Academic Exchange Service, Helmholtz Zentrum Berlin — *2021 – 2022*

GEM (Graduate Education for Minorities) Fellowship — Atlanta, GA, USA
Georgia Institute of Technology, Oak Ridge National Laboratory — *2021 – 2022*

GAANN (Graduate Assistance in Areas of National Needs) Fellowship — Atlanta, GA, USA
Georgia Institute of Technology — *2019 – 2021, 2022 – 2023*

Research

Massachusetts Institute of Technology Cambridge, MA, USA
Distinguished Postdoctoral Fellow, Department of Materials Science and Engineering (Prof. Yildiz) *2023 – 2025*

- Studied perovskite oxides as host materials for metal nanocatalysts, useful in fuel and electrolysis cells.

Georgia Institute of Technology Atlanta, GA, USA
Graduate Researcher, Materials Science and Engineering (Prof. Correa-Baena) *2019 – 2023*

- Understanding structure-property relationships of lead halide perovskites for solar cells.

Helmholtz Zentrum Berlin Berlin, Germany
Doctoral Researcher, Structure and Dynamics of Energy Materials (Prof. Dr. Schorr) *2021 – 2022*

- Investigation of halide perovskite crystal structure and phase transitions at low temperatures.

Oak Ridge National Laboratory Oak Ridge, TN, USA
GEM fellow intern, Materials Science and Technology Division (Dr. Hermann) *Summer 2021*

- Studied the atomic vibrations in tin iodide perovskites by neutron and X-ray inelastic scattering.

Helmholtz Zentrum Berlin Berlin, Germany
Doctoral Researcher, Interfaces for Stable Perovskite Solar Cells (Prof. Abate) *Spring 2019*

- Fabricated high efficiency lead halide perovskite solar cells over 20% power conversion efficiency.

Universidad de los Andes Bogotá, Colombia
Graduate Research and Teaching Assistant, Chemical Engineering (Prof. Ortiz) *2017 – 2018*

- Study and optimization perovskite solar cell fabrication in air and high relative humidity.

Princeton University Princeton, NJ, USA
Visiting Student Researcher, Electrical and Computer Engineering (Prof. Kahn) *Summer 2018*

- Designed a project to understand the effect of humidity in perovskites by X-ray photoelectron spectroscopy.

Microban International Huntersville, NC, USA
Research and Development Undergraduate Intern, Materials Division *Summer 2016*

- Developed a method to calculate additive concentration in different polymers by thermal gravimetric analysis.

Publications

23. Datta, K.; van Laar, SCW.; Taddei, M.; **Hidalgo, J.**; Kodalle, T.; Aslers, G.J.W; Lai, B.; Li, R.; Tamura, N.; Frencken, J.T.; Quiroz Monnens, S.V.; Westbrook, R.J.; Graham, D.J.; Sutter-Fella, C.M.; Correa-Baena, J.P.; Ginger, D.S.; Wienk, M.M.; Janssen, R.A. (**2025**) "Local halide heterogeneity drives surface wrinkling in mixed-halide wide-bandgap perovskites," *Nature Communications*, 16, 1967.

22. Grimaldi, G.; Schuringa, I.; Geuchies, J.J.; Rigter, S.A.; Hoekstra, T.; Versluis, J.; **Hidalgo, J.**; Correa-Baena, J.P.; v.d. Groep, J.; Kim, H.; Bonn, M.; Ehrler, B. (**2024**) "Atmospheric Exposure Triggers Light-Induced Degradation in 2D Lead-Halide Perovskites," *ACS Energy Letters*, 9, 12, 5771-5779.

21. **Hidalgo, J.**; Breternitz, J.; Többens, D.; LaFollette, D.K.; Pedorella, C.N.B.; Sher, M.J.; Schorr, S.; Correa-Baena, J.P. (**2024**) "Br-Induced Suppression of Low-Temperature Phase Transitions in Mixed Cation Mixed Halide Perovskites," *Chemistry of Materials*, 36, 20, 10167-10175.

20. Yang, J.; **Hidalgo, J.**; Song, D.; Kalinin, S.V.; Correa-Baena, J.P.; Ahmadi, M. (**2024**) "Accelerating materials discovery by high-throughput GIWAXS characterization of quasi-2D formamidinium metal halide perovskites," *Advanced Functional Materials*, 49, 2409293.

19. LaFollette, D.K.; **Hidalgo, J.**; Allam, O.; Yang, J.; Shoemaker, A.; Li, R.; Lai, B.; Lawrie, B.; Kalinin, S.; Perini, C.A.R.; Ahmadi, M.; Correa-Baena, J.P. (**2024**) "Bromine Incorporation Affects Phase Transformations and Thermal Stability of Lead Halide Perovskites," *Journal of the American Chemical Society*, 146, 18576-18585.

18. **Hidalgo, J.**; Kaiser, W.; An, Y.; Li, R.; Oh, Z.; Castro-Mendez, A.F.; LaFollette, D.K.; Kim, S.; Lai, B.; Breternitz, J.; Schorr, S.; Perini, C.A.R.; Mosconi, E.; De Angelis, F.; Correa-Baena, J.P. (**2023**) "Synergistic Role of Water and Oxygen Leads to Degradation in Formamidinium-Based Halide Perovskites," *Journal of the American Chemical Society*, 145, 24549-24557.

17. **Hidalgo, J.***; Atourki, L.*; Li, R.; Castro-Mendez, A.F.; Kim, S.; Sherman, E.A.; Bieber, A.S.; Sher, M.J.; Nienhaus, L.; Perini, C.A.R.; Correa-Baena, J.P. (**2023**), "Bulky cation hinders undesired secondary phases in $FAPbI_3$ perovskite solar cells," *Materials Today*, 68, 13-21.

16. **Hidalgo, J.**; An, Y.; Yehorova, D.; Li, R.; Breternitz, J.; Perini, C.A.R.; Hoell, A.; Boix, P.P.; Schorr, S.; Kretchmer, J.S.; Correa-Baena, J.P. (**2023**) "Solvent and A-site Cation Control Preferred Crystallographic Orientation in Bromine-Based Perovskite Thin Films," *Chemistry of Materials*, 35, 11, 4181-4191.

15. Perini, C.A.R; Castro-Mendez, A.F.; Kodalle, T.; Ravello, M.; **Hidalgo, J.**; Gomez-Dominguez, M.; Li, R.; Taddei, M.; Giridharagopal, R.; Pothoof, J.; Sutter-Fella, C.; Ginger, D.S.; Correa-Banea, J.P. (**2023**) "Vapor-deposited n=2 Ruddlesden-Popper Interface Layers Aid Charge Carrier Extraction in Perovskite Solar Cells," *ACS Energy Letters*, 8 ,3, 1408-1415.

14. Perini, C.A.R.; Rojas-Gatjens, E.; Ravello, M.; Castro-Mendez, A.F.; **Hidalgo, J.**; An, Y.;Kim, S.;Lai, B.;Li, R.;Silva-Acuña, C.; Correa-Baena, J.P. (**2022**) "Interface Reconstruction from Ruddlesden-Popper Structures Impacts Stability in Lead Halide Perovskite Solar Cells," *Advanced Materials*, 34, 51, 2204726.

13. Castro-Mendez, A.F.; Perini, C.A.R.; **Hidalgo, J.**; Ranke, D.; Vagott, J.N.; An, Y.; Lai, B.; Luo, Y.; Li, R.; Correa-Baena, J.P. (**2022**) "Formation of a Secondary Phase in Thermally Evaporated $MAPbI_3$ and Its Effects on Solar Cell Performance," *ACS Appl. Mater. Interfaces*, 14, 30, 34269-34280.

12. Vagott, J.N.; Bairley, K.; **Hidalgo, J.**; Perini, C.A.R.; Castro-Mendez, A.F.; Lombardo, S.; Lai, B.; Zhang, L.; Kisslinger, K.; Kacher, J.; Correa-Baena, J.P. (**2022**) "PbI_2 Nanocrystal Growth by Atomic Layer Deposition from $Pb(tmhd)_2$ and HI," *Chemistry of Materials*, 34 (6), 2553-2561.

11. Yuce, H.; Perini, C.A.R.; **Hidalgo, J.**; Castro-Mendez, A.F.; Evans, C.; Betancur, P.F.; Vagott, J.N.; An, Y.; Bairley, K.; Demir, M.M.; Correa-Baena, J.P. (**2022**) "Understanding the impact or SrI_2 additive on the properties of Sn-based halide perovskites," *Optical Materials*, 111806, ISSN 0925-3467.

10. An, Y.; Perini, C.A.R; **Hidalgo, J.**; Castro-Mendez, A.F; Vagott, J.N; Li, R.; Saidi, W.A.; Wang, S.; Li, X.; Correa-Baena, J.P. (**2021**) "Identifying high-performance and durable methylammonium-free lead halide perovskites via high-throughput synthesis and characterization," *Energy & Environmental Science*, 14, 6638-6654

9. Erodici, M. P.; Pierone, P. J.; Hartono, N. T. P.; **Hidalgo, J.**; Lai, B.; Buonassisi, T.; Correa-Baena, J.-P.; Sher, M.-J. (**2021**) "Enhanced Charge Carrier Lifetime and Mobility as a Result of Rb and Cs Incorporation in Hybrid Perovskite," *Appl. Phys. Lett.*, 118 (6), 063901.

8. **Hidalgo, J.**; Perini, C.A.R.; Castro-Mendez, A.F.; Jones, D.; Kobler, H.; Lai, B.; Li, R.; Sun, S.; Abate, A.; Correa-Baena, J.P. (**2020**) "Moisture-induced crystallographic re-orientations and effects on charge carrier extraction in metal halide perovskite solar cells," *ACS Energy Letters*, 5, 3526-3534.

7. Wang, Ti.; Jin, L.; **Hidalgo, J.**; Chu, W.; Snaider, J.M.; Deng, S.; Zhu, T.; Lai, B.; Prezhdo, O.; Correa-Baena, J.P.; Huang, Li. (**2020**) "Protecting hot carriers by tuning hybrid perovskite structures with alkali cations," *Science Advances*, 6, 43, eabb1336.

6. Phung, N.; Felix, R.; Meggiolaro, D.; Al-Ashouri, A.; Sousa e Silva, G.; Hartmann, C.; **Hidalgo, J.**; Kobler, H.; Mosconi, E.; Lai, B.; Gunder, R.; Li, M.; Wang, K.; Wang, Z.; Nie, K.; Handick, E.; Wilks, R.G.; Marquez, J.A.; Rech, B.; Unold, T.; Correa-Baena, J.P; Albrecht, S.; De Angelis, F.; Bar, M.; Abate, A. (**2020**) "The Doping Mechanism of Halide Perovskite Unveiled by Alkaline Earth Metals," *Journal of the American Chemical Society*,142, 2364-2374.

Reviews and perspectives:

5. Jones, D.; An, Y.; **Hidalgo, J.**; Evans, C.; Vagott, J.N; Correa-Baena, J.P. (**2021**) "Polymers and interfacial modifiers for durable perovskite solar cells: a review," *Journal of Materials Chemistry C*, 9, 12509-12522.

4. Hoye, R. L. Z.; **Hidalgo, J.**; Jagt, R. A.; Correa-Baena, J. P.; Fix, T.; MacManus-Driscoll, J. L. (**2021**) "The Role of Dimensionality on the Optoelectronic Properties of Oxide and Halide Perovskites, and Their Halide Derivatives," *Advanced Energy Materials*, 12, 4, 2100499.

3. An, Y.; **Hidalgo, J.**; Perini, C. A. R.; Castro-Méndez, A. F.; Vagott, J. N.; Bairley, K.; Wang, S.; Li, X.; Correa-Baena, J. P. (**2021**) "Structural Stability of Formamidinium- And Cesium-Based Halide Perovskites," *ACS Energy Letters*, 6 (5), 1942–1969.

2. **Hidalgo J.***; Castro-Méndez, A.F.*; Correa-Baena, J.P. (**2019**) "Imaging and Mapping Characterization Tools for Perovskite Solar Cells," *Advanced Energy Materials*, 9, 1900444.

1. Castro-Méndez, A.F; **Hidalgo, J.**; Correa-Baena, J.P. (**2019**) "The Role of Grain Boundaries in Perovskite Solar Cells," *Advanced Energy Materials*, 9, 38, 1901489.

*co-first author

Oral Presentations

1. "End-of-life mechanisms of lead halide perovskites to improve long-term stability," Materials for Sustainable Development Conference (MATSUS) Spring 2025, Seville, Spain, March **2025**.
2. "Unraveling the role of surfaces on nanoparticle exsolution: Designing multi-component catalysts for hydrogen production," Electronic Materials and Applications 2025: Basic Science and Electronics Division Meeting from the American Ceramic Society, Denver, CO, February **2025**. (*Invited Speaker*)
3. "Structure-property relationships in perovskites for energy conversion," Seminar at the Department of Chemical and Biomolecular Engineering's Colloquium Series Fall 2024, New York University, Brooklyn, NY, December **2024**. (*Invited Speaker*)
4. "Surface Sensitive and In-Situ Characterization of Perovskite Materials for Energy Conversion: Optimizing Material Design," Guest seminar within the Cluster of Excellence Materials for Energy Conversion and Storage, TU Vienna, Austria, July **2024**. (*Invited Speaker*)
5. "Understanding the effect of microstructure on nanoparticle exsolution probed by X-ray scattering," 24th International Conference on Solid State Ionics, London, UK, July **2024**.
6. "Surface sensitive and in-situ characterization of perovskite materials for energy conversion: Optimizing material design," Seminar in the Department of Chemistry, University of Cambridge, UK, July **2024**. (*Invited Speaker*)
7. "Surface sensitive and in-situ characterization of perovskite materials for energy conversion: Optimizing material design," Seminar in the Chemistry Research Laboratory, University of Oxford, UK, July **2024**. (*Invited Speaker*)

8. "Structure-property relationships in lead halide perovskites for solar cells," NSLS II & CNF Users' Meeting 2024, Upton, NY, May **2024**. (*Invited Speaker*)
9. "Structure-property relationships in lead halide perovskites for solar cells: Undesired phase transformations," Novelis Scholar Day 2023, Kennesaw, GA, September **2023**.
10. "Synergy of water and oxygen accelerates undesired phase transformations in lead halide perovskites," Center for Organic, Hybrid Photonics and Electronics (COPE) 3rd Materials for Optoelectronics, Ferroelectrics, and Photonics Workshop Spring 2023, Atlanta, GA, February 2023. (*Invited Speaker*)
11. "Water and oxygen synergy induce undesired phase transitions in FA lead halide perovskites: strategies to stabilize the metastable phase," Materials Research Society Fall Meeting and Exhibit 2022, Boston, MA, November **2022**.
12. "Unraveling low-temperature dependent phase transitions in methylammonium-free lead halide perovskites by in-situ X-ray diffraction," German Conference for Research with Synchrotron Radiation, Neutrons, and Ion Beams at Large Facilities 2022, Berlin, Germany, September **2022**.
13. "Water and Oxygen induce undesired phase transitions in cesium-formamidinium lead halide perovskites," 14th International Conference on Hybrid and Organic Photovoltaics, Valencia, Spain, May **2022**.
14. "Beyond humidity: The underlying phase transitions in cesium-formamidinium lead halide perovskites," 30th Annual Meeting of the German Crystallographic Society, virtual, March **2022**.
15. "The role of composition and moisture in the orientation of lead halide perovskites," American Chemical Society Fall Meeting 2021, Atlanta, GA, August **2021**.
16. "The role of composition and moisture in the orientation of lead halide perovskites," NanoGe Spring Meeting 2021, virtual, March **2021**.
17. "The role of 2D and 3D defects in perovskites," Monash University- Georgia Tech Photovoltaics Workshop, Atlanta, GA, June **2019**.

Poster Presentations

1. "Designing a Circular Economy for Energy Materials: Bridging Fundamental Mechanisms and Recycling," Materials Research Society Fall Meeting 2024 (Meet the future faculty candidates), Boston, MA, December **2024**.
2. "Effect of surface microstructure on nanoparticle exsolution in perovskite oxides to optimize nano-catalyst design," Materials Research Society Fall Meeting 2024, Boston, MA, December **2024**.
3. "Synergy of water and oxygen accelerate undesired phase transformations in lead halide perovskites: strategies to stabilize the perovskite phase," Materials Research Society: Georgia Tech Chapter – 10th Annual poster competition, awarded 1st place and "Best in show", Atlanta, GA, March **2023**.
4. "Moisture induced crystallographic re-orientations and effects on charge carrier extraction in metal halide perovskite solar cells," Materials Research Society: Georgia Tech Chapter- 8th Annual poster competition, awarded 3rd place, virtual, March **2021**.
5. "Understanding the effects of moisture and stoichiometry on perovskite solar cells by synchrotron-based characterization tools," Materials Research Society Spring/Fall Meeting and Exhibit 2020, virtual, November **2020**.
6. "Unraveling moisture-induced crystallographic re-orientations and photocurrent effects in metal halide perovskite solar cells," Women in Renewable Energy: Second Severo Ochoa Workshop on Energy Storage and Harvesting, virtual, October **2020**.
7. "Understanding the effects of moisture and stoichiometry variations on structure in halide perovskite solar cells," Absorbers and solar cells (StabPero) NanoGe conference, virtual, June **2020**.

8. "Understanding the effects of moisture and stoichiometry variations on structure in halide perovskite solar cells", 12th International Conference on Hybrid and Organic Photovoltaics, virtual, May **2020**.
9. "Understanding the effects of moisture on perovskite solar cells by synchrotron-based characterization tools," 8th Annual U.S C3E Women in Clean Energy Symposium, College Station, TX, November **2019**.
10. "Understanding reversible hydration processes of perovskite solar cells and their effects on performance and morphology," 11th International Conference on Hybrid and Organic Photovoltaics, Rome, Italy, May **2019**.
11. "A study of the deposition parameters and performance of selective contact layers in the function of perovskite solar cells", IV International Congress Next Generation Solar Energy, Cali, Colombia, December **2017**.

Mentoring

Georgia Institute of Technology Atlanta, GA, USA
Mentor of graduate Ph.D. student Diana LaFollette *2021 – 2023*
Mentor of undergraduate student Zion Oh *2021 – 2022*
Mentor of undergraduate student Mica Landwermeyer *2020 – 2021*
Mentor of undergraduate student Luke Grater (Current: Ph.D. student, University of Toronto) *2019 – 2020*

Teaching

Georgia Institute of Technology Atlanta, GA, USA
Graduate Teaching Assistant of "Materials Characterization: XRD texture" (Prof. Hamid Garmestani) *2021*
Graduate Teaching Assistant of "Materials Property Lab: Electrochemistry" (Dr. Himani Sharma) *2020 – 2021*

Universidad de los Andes Bogotá, Colombia
Graduate Teaching Assistant of "Chemical and Phase Equilibrium" (Prof. Pablo Ortiz) *2017 – 2018*

Academic Service

Peer reviewer for American Chemical Society Journals *2024*
Peer reviewer for the Royal Society of Chemistry Journals *2024*

Outreach

Women in Materials Science and Engineering (WiMSE) at Georgia Tech Atlanta, GA, USA
Finance and Outreach Chair *2019 – 2021*

- Responsible of finances, reaching out to sponsors, and managing social activities.

References

Prof. Bilge Yildiz – Postdoctoral Advisor
Breene M. Kerr (1951) Professor
Professor of Nuclear and Materials Science and Engineering, Massachusetts Institute of Technology, USA
Email: byildiz@mit.edu
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Prof. Juan-Pablo Correa-Baena – Ph.D. Advisor
Associate Professor of Materials Science and Engineering, Georgia Institute of Technology, USA
Email: jpcorrea@gatech.edu
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Prof. Dr. Susan Schorr – Visiting researcher advisor, Collaborator
Professor at the Department of Mineralogy-Petrology, Freie Universität Berlin, Germany
Head the Department Structure and Dynamics of Energy Materials, Helmoltz Zentrum Berlin, Germany
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