Catalina Gómez Caballero

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Research Interests

Building digital health solutions with human-centered AI. I study human-AI interactions through human-computer interaction methods and human factors engineering.

Education

PhD in Computer Science 08/2020-present
Johns Hopkins University, advisor: Mathias Unberath Baltimore, MD

MSc in Computer Science 08/2020-05/2022
Johns Hopkins University Baltimore, MD

MSc in Biomedical Engineering, *cum laude* 08/2017-12/2018
Universidad de los Andes, advisor: Pablo Arbeláez, Mario Valderrama Bogotá, Colombia

BS in Biomedical Engineering, *summa cum laude* 07/2013-05/2017
Universidad de los Andes Bogotá, Colombia

Publication Summary

I have (first/co)-authored 16 (8/8) journal articles and 3 (2/1) conference papers. A detailed list is available towards the end of this document and on my Google Scholar.

Fellowships, Honors, and Awards

- Best Presentation Award 2025
  For paper W-5 at the 1st MICCAI Workshop on Human-AI Collaboration
- Best Paper Award 2025
  For paper J-14 at IPCAI 2025
- Link Foundation Fellowship in Modeling, Simulation, and Training 2025
  Competitive fellowship for Ph.D. students to lead the research submitted in a proposal.
- Honorable Mention, MICCAI Outstanding Reviewer Award 2025, 2024
  Acknowledges all reviewers who completed all their assignments, reviewed four or more papers, and received "Exceed expectations" scores for more than half of their reviews.
- MICCAI SOCIETY PARTICIPATION GRANT 2023
  Aims to provide financial support for students and early-career scientists, including those from diverse and underserved backgrounds, to participate in MICCAI Conferences.
- Joel Dean Excellence in Teaching Award 2023
  Recognizes graduate students and faculty at JHU who have exhibited extraordinary performance in teaching undergraduates.
- Instructional Enhancement Grant Johns Hopkins University 2022
  Recognizes teams collaborating on innovative learning tools to be implemented in an upcoming undergraduate course.
- Intuitive Surgical Best Project Award 2020
  Outstanding project in Deep Learning course CS.682 at Johns Hopkins University.
- LCSR Fellowship for outstanding incoming PhD students 2020
  Competitive scholarship awarded to a prospective CS PhD student who has shown exceptional promise.

- Fulbright Minciencias Scholarship Colombia 2019
  Supports 40 nationals to strengthen regional capacities in Science, Technology and Innovation that promote social and productive development.
- Project funding 2018
  Two-year funding awarded by the Vice-Chancellor of Research at Universidad de los Andes.
- Award of Semester Excellence at Universidad de los Andes 2014
  Recognizes undergraduate students with the best GPA in their program.

Academic Experience

Johns Hopkins University
Teaching Assistant 01/2022-12/2022, 01/2024 - 05/2025

- Supervised projects and met with students during office hours for the course Machine Learning: Deep Learning (EN.601.482/682)
- Graded, delivered lectures, and met with students during office hours for the course Machine Learning: Interpretable Machine Learning Design (EN.601.484/684)

Universidad de los Andes
Graduate Research Assistant 08/2017-08/2020

- Developed a benchmark to study astronomical transient object detection with deep learning techniques from image sequences

- Applied Deep Learning techniques to identify mineral components in thin sections from databases collected by the Colombian Geological Service

Undergraduate Teaching Assistant 01/2015-05/2017

- Supported freshmen in Biomedical Engineering with first level courses (calculus, physics, chemistry) and advise them in academical decisions

Max Planck Institute for Astrophysics
Summer Intern 07-08/2018

- Contributed to the characterization of data from the IllustrisTNG project to analyze Local Group catalogs.

Publications

$*$ indicates co-first authorship

Peer-reviewed Journal Articles

J-16. Chen, H., **Gomez, C.**, Correa, Z. M., Liu, A., Milman, T., Eiger-Moscovich, M., ... Unberath, M. (2025). An Interactive and Explainable AI Approach to Improve Human-Machine Teaming in Cancer Subtyping from Digital Cytopathology. Medical Image Analysis, 103856.

J-15. **Gomez, C.***, Wang, R.*, Breininger, K., Casey, C., Bradley, C., Pavlak, M., ... Unberath, M. (2025). The Explainable AI Dilemma under Knowledge Imbalance in Specialist AI for Glaucoma Referrals in Primary Care. Nature npj Digital Medicine, 8(1), 706.

J-14. Killeen, B. D., Suresh, A., **Gomez, C.**, Íñigo, B., Bailey, C., Unberath, M. (2025). Intelligent control of robotic X-ray devices using a language-promptable digital twin. International Journal of Computer Assisted Radiology and Surgery, 1-10.
Honored with the **Best Paper Award** at IPCAI'25

J-13. **Gomez, C.**, Cho, S. M., Ke, S., Huang, C. M., Unberath, M. (2025). Human-AI collaboration is not very collaborative yet: a taxonomy of interaction patterns in AI-assisted decision making from a systematic review. Frontiers in Computer Science, 6, 1521066

J-12. **Gomez, C***., Yin, J.*, Huang, C. M., Unberath, M. (2024). How large language model-powered conversational agents influence decision making in domestic medical triage contexts. Frontiers in Computer Science, 6, 1427463.

J-11. **Gomez, C.**, Smith, B. L., Zayas, A., Unberath, M., Canares, T. (2024). Explainable AI decision support improves accuracy during telehealth strep throat screening. Nature Communications Medicine, 4(1), 149.

J-10. Chen, H., Dreizin, D., **Gomez, C.**, Zapaishchykova, A., Unberath, M. (2024). Interpretable Severity Scoring of Pelvic Trauma Through Automated Fracture Detection and Bayesian Inference. IEEE Transactions on Medical Imaging.

J-9. Marey, A., Saad, A., Killeen, B. D., **Gomez, C.**, Tregubova, M., Unberath, M., Umair, M. (2024). Gen-AI: Enhancing Patient Education in Cardiovascular Imaging. BJR—Open, tzae018.

J-8. Cho, S. M., Grupp, R. B., **Gomez, C.**, Gupta, I., Armand, M., Osgood, G., ... Unberath, M. (2023). Visualization in 2D/3D registration matters for assuring technology-assisted image-guided surgery. International Journal of Computer Assisted Radiology and Surgery, 18(6), 1017-1024.

J-7. **Gomez, C.**, Unberath, M., Huang, C. M. (2023). Mitigating knowledge imbalance in AI-advised decision-making through collaborative user involvement. International Journal of Human-Computer Studies, 172, 102977.

J-6. Liu, T. A., Chen, H., **Gomez, C.**, Correa, Z. M., Unberath, M. (2023). Direct Gene Expression Profile Prediction for Uveal Melanoma from Digital Cytopathology Images via Deep Learning and Salient Image Region Identification. Ophthalmology Science, 3(1), 100240.

J-5. Chen, H.*, **Gomez, C.***, Huang, C. M., Unberath, M. (2022). Explainable medical imaging AI needs human-centered design: guidelines and evidence from a systematic review. Nature npj Digital Medicine, 5(1), 156.

J-4. Escobar, M., Jeanneret, G., Bravo-Sánchez, L., Castillo, A., **Gómez, C.**, Valderrama, D., ... Arbelaez, P. (2022). Smart pooling: AI-powered COVID-19 informative group testing. Scientific reports, 12(1), 1-12.

J-3. **Gómez, C.**, Neira, M., Hernández Hoyos, M., Arbeláez, P., Forero-Romero, J. E. (2020). Classifying image sequences of astronomical transients with deep neural networks. Monthly Notices of the Royal Astronomical Society, 499(3), 3130-3138.

J-2. Neira, M., **Gómez, C.**, Suárez-Pérez, J. F., Gómez, D. A., Reyes, J. P., Hoyos, M. H., ... Forero-Romero, J. E. (2020). MANTRA: A Machine-learning Reference Light-curve Data Set for Astronomical Transient Event Recognition. The Astrophysical Journal Supplement Series, 250(1), 11.

J-1. **Gómez, C.**, Arbeláez, P., Navarrete, M., Alvarado-Rojas, C., Le Van Quyen, M., Valderrama, M. (2020). Automatic seizure detection based on imaged-EEG signals through fully convolutional networks. Scientific reports, 10(1), 1-13.

Peer-reviewed Conference Papers

C-3. Cao, S.*, **Gomez, C.***, Huang, C. M. (2023). How Time Pressure in Different Phases of Decision-Making Influences Human-AI Collaboration. Proceedings of the ACM on Human-Computer Interaction, 7(CSCW2), 1-26.

C-2. Daza, L., **Gómez, C.**, & Arbeláez, P. (2020). Learning to segment brain tumors. 15th International Symposium on Medical Information Processing and Analysis (Vol. 11330, p. 113300G). International Society for Optics and Photonics.

C-1. **Gómez, C.**, & Herrera, D. S. (2017). Recognition of skin melanoma through dermoscopic image analysis. 13th International Conference on Medical Information Processing and Analysis (Vol. 10572, p. 1057211). International Society for Optics and Photonics.

Peer-reviewed Workshops

W-5. **Gomez, C.***, Seenivasan, L.*, Zou, X.*, Yoon, J., Chu, S., Leong, A., ... Unberath, M. Explainable AI for Automated User-specific Feedback in Surgical Skill Acquisition. In International Workshop on Human-AI Collaboration (pp. 25-34). Cham: Springer Nature Switzerland, 2025.
Honored with the **Best Presentation Award** at the MICCAI'25 Workshop on HAIC

W-4. **Gomez, C.**, Smith, B.L., Zayas, A., Unberath, M, Canares, T. Explainable AI for Strep Throat Increases Clinicians Ability to Identify Positive Cases in Telehealth". CHI Workshop on Human-Centered Explainable AI (HCXAI), 2023.

W-3. **Gomez, C.**, Unberath, M., Huang, C.-M. Knowledge Imbalance in AI-Assisted Decision-Making: Collaborating with Non-experts", NeurIPS Workshop on Human-centered AI, 2021.

W-2. Chen, H., Liu, T.Y.A., **Gomez, C.**, Correa, Z., Unberath, M. (2021). An Interpretable Algorithm for Uveal Melanoma Subtyping from Whole Slide Cytology Images. ICML Workshop on Interpretable Machine Learning in Healthcare.

W-1. Daza, L., **Gómez, C.**, Arbeláez, P. (2020). Cerberus: A multi-headed network for brain tumor segmentation. In International MICCAI Brainlesion Workshop (pp. 342-351). Springer, Cham.

In process

1. **Gomez, C.***, Jia, M.Y.*, Cho, S.M., Huang, C.M., Unberath, M. (2025). Dynamic Compensation Can Enhance User Engagement by Triggering Sensitivity to Financial Losses in Crowd-sourced Studies (under review at CHI conference on Human Factors in Computing Systems).

Presentations

Johns Hopkins Department of Medicine and Whiting School of Engineering Research Retreat - Poster presentation: Enhancing Glaucoma Referral Decisions with Explainable AI
Baltimore, 2025
Johns Hopkins Data Science and AI Institute (DSAI) End of Semester Social - Demo presentation
Baltimore, 2024
MICCAI 2023 MIC and CAI with Humans In The Loop - Tutorial
Vancouver, 2023
CHI 2023 Human-Centered Explainable AI workshop - Poster presentation: Explainable AI for Strep Throat Increases Clinicians Ability to Identify Positive Cases in Telehealth
Virtual, 2023
NeurIPS 2021 Human Centered AI workshop - Oral presentation: Knowledge Imbalance in AI-Assisted Decision-Making: Collaborating with Non-experts
Virtual conference, 2021
SIPAIM 2019 - Oral presentation: Learning to Segment Brain Tumors
Instituto Tecnológico Metropolitano de Medellín, Medellín, Colombia 2019
ICTALS 2019 - Poster presentation: Automatic Seizure Detection in Scalp and Intracranial Recordings through Convolutional Neural Networks
International Conference for Technology and Analysis of Seizures, Exeter, England, 2019
Neuroscience 2018 - Poster presentation: Seizure Detection based on "imaged-EEG" signals through statistical learning
Society for Neuroscience, San Diego, 2018
SIPAIM 2017 - Oral presentation: Recognition of skin melanoma through dermoscopic image analysis
Universidad Nacional de Colombia, San Andrés, Colombia 2017

Advising

7. Hyewon Jung (JHU undergraduate) — Fall 2025 - present
6. Sampath Rapuri (JHU undergraduate) — Fall 2025 - present
5. Mung Yao Jia (JHU undergraduate) — Summer 2023 - Summer 2025
    - PhD student at University of Illinois Urbana-Champaign
4. Bella Xia (JHU undergraduate) — Spring 2023 - Fall 2023
3. Iris Gupta (JHU undergraduate) — Fall 2022 - Spring 2025
2. Junjie Yin (JHU undergraduate) — Fall 2022 - Fall 2023
    - Outstanding Undergraduate Research Award
    - PhD student at University of Washington
1. Shichang Ke (JHU undergraduate) — Fall 2022 - Fall 2023

Reviewing

- International Conference on Information Processing in Computer-Assisted Interventions (IPCAI) 2026
- Conference on Human Factors in Computing Systems (CHI) 2026

- International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2023, 2024, 2025

- LatinX in Computer Vision Workshop (LatinX@CVPR) 2023, 2024, 2025
- International Journal of Human-Computer Studies 2025
- Nature Communications 2025