

Juan C. Caicedo, Ph.D.

Research Fellow, Principal Investigator
Broad Institute of MIT and Harvard
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Current position

Broad Institute of MIT and Harvard, Boston, MA, USA July 2019 - present
Director, Caicedo Lab.
Machine learning and computational biology.

Education

The National University of Colombia
Ph.D, Computer Engineering Feb, 2013
M.Sc., Systems and Computer Engineering Jul, 2008
B.Sc., Computer Engineering Sep, 2005

Research Experience

Broad Institute of MIT and Harvard, Boston, MA, USA
Postdoctoral Researcher, Carpenter Lab. 2016 - 2019
Deep learning, object segmentation, image-based profiling

University of Illinois at Urbana-Champaign, Urbana, IL, USA
Postdoctoral Researcher, Computer Vision Group. 2013 - 2014
Deep learning, object detection, reinforcement learning

Google Inc., Mountain View CA, USA
Research Intern, Computer Vision Group. Jun-Sep 2011
Large scale image classification

Microsoft Research, Redmond WA, USA
Research Intern, Interactive Visual Media Group Jun-Sep 2010
Image enhancement, cloud computing

Queen Mary University of London, London, UK
Associate Researcher 2009 - 2010
Image search, feature fusion

Research Interests

Artificial Intelligence, machine learning, reinforcement learning.
Computer vision, visual recognition, image analysis.
Computational biology, image-based profiling, biological data analysis.

List of publications

Google Scholar: <https://scholar.google.com/citations?user=U50zLvKAAAAJ&hl=en>

NIH <https://www.ncbi.nlm.nih.gov/myncbi/juan.caicedo.1/bibliography/public/>

Selected Journal Publications

1. Caicedo, J.C., et al., "Nucleus Segmentation across Imaging Experiments: The 2018 Data Science Bowl". **Nature Methods**, 2019
2. Caicedo, J.C., et al., "Evaluation of Deep Learning Strategies for Nucleus Segmentation in Fluorescence Images." **Cytometry Part A**, 2019
3. Caicedo, J.C., et al., "Data-analysis strategies for image-based cell profiling." **Nature Methods** 14.9, 2017
4. Caicedo J.C., Singh S., Carpenter A., "Applications of Image-Based Profiling of Perturbations". **Current Opinion in Biotechnology**, 2016
5. Caicedo J.C., Vanegas J.A., Paez F. Gonzalez F.A., "Histology image search using multimodal fusion". **Journal of Biomedical Informatics**, 2014
6. Kapoor A., Caicedo J.C., Lischinski D., Kang S.B., "Collaborative Personalization of Image Enhancement". **International Journal of Computer Vision**, 2014
7. Caicedo J.C., Romero E., Gonzalez F.A., "Content-based Medical Image Retrieval Using a Kernel-based Semantic Annotation Framework". **Journal of Biomedical Informatics**, 2011

Selected Conference Publications

1. Caicedo, J. C., McQuin, C., Goodman, A., Singh, S., & Carpenter, A. E. "Weakly supervised learning of single-cell feature embeddings". **Computer Vision and Pattern Recognition Conference**, IEEE CVPR 2018.
2. Caicedo J.C., Lazebnik S. "Active Object Localization with Deep Reinforcement Learning". **International Conference in Computer Vision**. IEEE ICCV, 2015.
3. Plummer B.A., Wang L., Cervantes C.M., Caicedo J.C., Hockenmaier J., Lazebnik S. "Flickr30k Entities: Collecting Region-to-Phrase Correspondences for Richer Image-to-Sentence Models". **International Conference in Computer Vision**, IEEE ICCV 2015.
4. Caicedo J.C., Gonzalez F.A. "Image Retrieval Using Multimodal Fusion based on Matrix Factorization". **ACM Int. Conference on Multimedia Information Retrieval**. ICMR 2012.
5. Caicedo J.C., Kang S.B, Kapoor A. "Collaborative Personalization of Image Enhancement". **Computer Vision and Pattern Recognition**. IEEE CVPR 2011.

6. Caicedo J.C., Moreno J.G., Nino E.A. and Gonzalez F. "Combining Visual Features and Text Data for Medical Image Retrieval Using Latent Semantic Kernels". *ACM Int. Conference on **Multimedia Information Retrieval***, ACM MIR 2010.
7. Caicedo J.C., Cruz-Roa A., and Gonzalez F. "Histopathology Image Classification Using Bag of Features and Kernel Functions". ***Artificial Intelligence in Medicine** Conference*, AIME 2009.

Patents

Inventors: Sing Bing Kang, Ashish Kapoor, Juan C. Caicedo
 Establishing Clusters of User Preferences for Image Enhancement.
 US Patent 8526728 B2.

Professional Service

2015-Present: Reviewer for the Neural Information Processing Systems (NeurIPS) conference.
 2017-Present: Board Member of the CytoData Society (Education and outreach chair).
 2019: Reviewer for the BioImage Computing Workshop at CVPR 2019.
 2019: Guest Editor - PLOS Computational Biology.
 2019: Reviewer for the International Conference on Computer Vision - ICCV 2019
 2019: Reviewer for the Visual Recognition in Medical Imaging - ICCV 2019 Workshop

Invited Talks

1. "Nucleus segmentation across imaging experiments: The 2018 Data Science Bowl", **SBI2 Machine Learning / Artificial Intelligence Session**. September, **2019**.
2. "Image-based profiling using deep learning". **Machine Learning in Developmental Biology Symposium**. July **2019**.
3. "Image-based profiling using deep learning". **University of Maryland College Park**. May **2019**
4. "Deep learning for the next generation of bioimaging tools". **Broad Institute Retreat** - Boston, MA. USA. December **2018**.
5. "Computer Vision for Computational Biology". **University of La Rochelle**, France. October, **2018**.
6. "Interpreting Deep Learning Models". **SBI2 Educational Courses**. Boston, MA, USA. September **2018**.
7. "Predicting cancer-associated variant impact using Cell Painting and deep learning". **Cancer Program Seminar**, Broad Institute of MIT and Harvard. Boston, USA. Together with Shantanu Singh. September **2018**.
8. "How to make a picture worth a thousand numbers: Models and methods in biological image analysis". **Models, Inference and Algorithms (MIA) Seminar**, Broad Institute. Together with Jane Hung, Mohammad Rohban and Shantanu Singh. May **2018**.
9. "Variant impact phenotyping using deep morphological profiling". **RECOMB, Computational Cancer Biology (CCB)**, Paris, France. April **2018**.

Teaching

University of Toulouse, Paul Sabatier, France

Visiting professor

2018

Fundación Universitaria Konrad Lorenz, Colombia

Computer Engineering

2015

Machine Learning

Universidad de la Sabana, Colombia

Machine Learning

2012

Software Engineering

2012

Computer Programming

2011

The National University of Colombia

Research Seminar (graduate students)

2011 - 2012

Computer Programming

2008

Numerical Methods

2007

Systems Theory

2006