Alex Gaudio

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EDUCATION

Carnegie Mellon University

Ph.D. Candidate in Electrical Computer Engineering **Aug 2018 – current**

- Advisors: Professor Asim Smailagic and Professor Aurelio Campilho
- Thesis: Explainable Deep and Machine Learning for Medical Image Analysis

University of Porto, Faculdade de Engenharia

Ph.D. Candidate in Electrical Computer Engineering **Aug 2018 – current**

- Advisors: Professor Aurelio Campilho and Professor Asim Smailagic
- Fellowship awarded through the CMU Portugal Program for Dual Ph.D. Degrees

Carnegie Mellon University

Masters in Electrical Computer Engineering **Aug 2018 – current**

- Advisors: Professor Asim Smailagic and Professor Aurelio Campilho

Bard College

Bachelor of Arts in Music **Aug 2006 – May 2010**

- Award: Recipient of the Larry McLeod Award in Jazz.
- Thesis: Connecting With Others Through Jazz: Performances and All-Original Composition

JOURNAL PUBLICATIONS (PEER-REVIEWED)

* indicates equal contributions † indicates corresponding author(s)

[1] **A. Gaudio**[*†], C. Faloutsos, A. Smailagic, P. Costa, and A. Campilho. "ExplainFix: Explainable Spatially Fixed Deep Networks". In: *Wiley WIREs Data Mining and Knowledge Discovery* (Nov. 2022, accepted).

[2] H. Montenegro[*†], W. Silva[*], **A. Gaudio**[*], M. Fredrikson, A. Smailagic, and J. S. Cardoso. "Privacy-Preserving Case-Based Explanations: Enabling Visual Interpretability by Protecting Privacy". In: *IEEE Access* 10 (2022), pp. 28333–28347. URL: https://doi.org/10.1109/ACCESS.2022.3157589.

[3] A. Smailagic[*†], P. Costa[*], **A. Gaudio**[*], K. Khandelwal, M. Mirshekari, J. Fagert, D. Walawalkar, S. Xu, A. Galdran, P. Zhang, A. Campilho, and H. Y. Noh. "O-MedAL: Online active deep learning for medical image analysis". In: *Wiley WIREs Data Mining and Knowledge Discovery* 10.4 (Jan. 2020). DOI: 10.1002/widm.1353. URL: https://doi.org/10.1002/widm.1353.

CONFERENCE PUBLICATIONS (PEER-REVIEWED)

[4] P. Costa[*†], **A. Gaudio**[*], A. Campilho, and J. S. Cardoso. "Explainable Weakly-Supervised Cell Segmentation by Canonical Shape Learning and Transformation". In: *Medical Imaging with Deep Learning*. 2022.

[5] **A. Gaudio**[*], M. Coimbra, A. Campilho, A. Smailagic, S. Schmidt[*], and F. Renna[*†]. "Explainable Deep Learning for Non-Invasive Detection of Pulmonary Artery Hypertension from Heart Sounds". In: *Computing in Cardiology Conference*. IEEE. 2022. URL: https://cinc.org/2022/Program/accepted/295.html.

[6] E. Johnson[*], S. Mohan[*], **A. Gaudio**[*†], A. Smailagic, C. Faloutsos, and A. Campilho. "HeartSpot: Privatized and Explainable Data Compression for Cardiomegaly Detection". In: *IEEE-EMBS International Conference on Biomedical and Health Informatics*. Oct. 2022.

[7] **A. Gaudio**[*†], A. Smailagic, and A. Campilho. "Enhancement of Retinal Fundus Images via Pixel Color Amplification". In: *International Conference on Image Analysis and Recognition*. Springer International Publishing, 2020, pp. 299–312. DOI: 10.1007/978-3-030-50516-5_26. URL: https://doi.org/10.1007/978-3-030-50516-5_26.

[8] A. Smailagic*, A. Sharan*, P. Costa†, A. Galdran, **A. Gaudio**, and A. Campilho. "Learned Pre-processing for Automatic Diabetic Retinopathy Detection on Eye Fundus Images". In: *International Conference on Image Analysis and Recognition*. Springer International Publishing, 2019, pp. 362–368. DOI: 10.1007/978-3-030-27272-2_32. URL: https://doi.org/10.1007/978-3-030-27272-2_32.

[9] Q. Xiao*, J. Zou*, M. Yang, **A. Gaudio**, K. Kitani, A. Smailagic†, P. Costa, and M. Xu. "Improving Lesion Segmentation for Diabetic Retinopathy Using Adversarial Learning". In: *International Conference on Image Analysis and Recognition*. Springer International Publishing, 2019, pp. 333–344. DOI: 10.1007/978-3-030-27272-2_29. URL: https://doi.org/10.1007/978-3-030-27272-2_29.

PATENTS

[10] G. I. Kestenbaum* and **A. Gaudio***. *Physical asset recognition platform*. U.S. Patent No. 10803542. Oct. 2020.

INVITED TALKS

[11] **A. Gaudio**. *Addressing Private and Explainable AI via Compression*. Invited Speaker. Yale School of Medicine VAMOS Lab Seminar Series, Oct. 2022. URL: https://docs.google.com/presentation/d/1ahgpzV6QEHmemYSt9zPAdl9It-U7t5-LIIRUyjkhDYE/edit?usp=sharing.

[12] **A. Gaudio**. *Panel Discussion*. Invited Speaker. CMU Portugal Encontro Ciencia, 2022. URL: https://youtu.be/DMKc9t1I6VY?t=1374.

[13] **A. Gaudio**. *ExplainFix: Explainable Spatially Fixed Deep Networks*. Invited Speaker. CMU Portugal Doctoral Symposium, 2021. URL: https://youtu.be/-_Zlkp82y_Y?t=10537.

[14] **A. Gaudio**. *Balancing Infrastructure with Optimization and Problem Formulation*. Invited Speaker. Cornell Tech Data Science Hackathon, 2015. URL: https://www.youtube.com/watch?v=7FeKV46Us_0.

[15] **A. Gaudio**. *Tmux + IPython = Awesome*. Invited Speaker. PyGotham, 2011. URL: http://pyvideo.org/pygotham-2011/pygotham-2011--tmux---ipython---awesome.html.

TEACHING

Fall 2021, Intro to Machine Learning (PhD Level), Teaching Assistant

- With Prof. Jaime Cardoso at FEUP, University of Porto, Portugal
- Three lectures, each three hours long, and weekly office hours. slides1 slides2 slides3

Spring 2022, Intro to Biomedical Engineering (Undergraduate Level), Teaching Assistant

- With Prof. Ana Maria Mendonca at FEUP, University of Porto, Portugal
- Two lectures, each one hour long. slides

INDUSTRY EXPERIENCE

NYC Makerspace: Co-Founder Feb 2017 – Oct 2020

- A non-profit establishing makerspaces throughout New York City. We provide advanced resources and education freely to the public, where learning and innovation is a form of recreation.
- Forged partnerships with Columbia University, Columbia Teacher's College and NYC Parks and Recreation.
- Taught three 12-week courses on robotics, programming, mathematics and 3D modeling to high school seniors.
- Established Harlem's first makerspace, and brought over $17,000 to the space.
- Honored as a Champion of Social Justice by the Wilson Major Morris Community Center in Jan. 2018.

Columbia University, Creative Machines Lab (Prof. Hod Lipson)

- **Software Engineer: DARPA Transformative Design (TRADES) program Nov 2017 – Jun 2018**
  - Mass-spring simulator for generative design of 3D models, an alternative to Finite Element Analysis.
- **Independent Research, advised by Prof. Hod Lipson Dec 2016 – Jul 2017**
  - Multi-Agent Collaborative Learning simulator: MACL.

BuildingLink: Data Scientist Nov 2016 – Jul 2018

- ImageR: Machine Learning and Vision to solve matching problems, such as to connect images of packages to building residents. I designed and implemented the production ready algorithms, then coordinated development and release of the mobile apps for iOS and Android. ImageR processes 50K packages a day, 18 million packages processed by Jan. 2021, launched May 2018. Awarded Patent: 10,803,542

Alluvium: Senior Data Scientist, 1st employee Dec 2015 – May 2016

- Machine learning and IoT business that deploys intelligent autonomous agents close to sources of streaming data.

Sailthru: Senior Data Scientist and Engineer Aug 2012 – Nov 2015

- Inc. 5000's 30^{th} fastest-growing company in the US in 2013. Subsequently acquired in 2019.
- Founded data science team, hired my boss, VP of Data Science Jeremy Stanley and grew team from 1 to 4 full time employees. Promotion to "Senior" in 2014.
- Created and launched Sightlines^{TM} to predict user behavior, and architected a robust, fault tolerant and distributed data science platform.

Adaptly: Developer Dec 2011 – Jul 2012

Flat World Knowledge: Software Engineer, Backend Feb 2011 – Dec 2011

Bard College: Systems Engineer Jul 2009 – Sep 2010

Lawrence and Memorial Hospital: Emergency Room Technician (Level I) Jun 2008 – Aug 2008

NDP Emergency Medical Services: Emergency Medical Technician (EMT-B) Nov 2007 – Mar 2008

AWARDS

- **Champion of Social Justice** by the Wilson Major Morris Community Center Jan 2018
- **Larry McLeod Award in Jazz** by Bard College May 2010