Carlo Alberto **Barbano**

Postdoc · Deep Learning

University of Turin, Italy

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Summary

I am a postdoctoral researcher at the Computer Science department of University of Turin. My research focuses on deep learning, biases and fairness, regularization and medical imaging. I received a double Ph.D. from University of Turin, Italy and IP Paris, France.

Research Experience

Postdoctoral Researcher — *Turin, Italy*

University of Turin — *Oct. 2023 - Current*

Deep learning and biomedical image processing.

Research Scolarship — *Turin, Italy*

University of Turin — *Aug. 2018 - Apr. 2018*

Computer aided diagnosis of colorectal polyps and adenomas. Work carried out in the context of the EU project DeepHealth.

Education

Ph.D. in Computer Science — *Paris, France*

LTCI, Télécom Paris, IP Paris — *Oct. 2020 - Dec. 2023*

Advanced deep learning methods for biomedical image and data analysis and debiasing. Awarded with honors.

Ph.D. in Computer Science — *Turin, Italy*

Computer Science Dept., University of Turin — *Oct. 2020 - Dec. 2023*

Computer vision and deep learning. Awarded with honors.

M.S. in Artificial Intelligence — *Turin, Italy*

University of Turin — *Sept. 2018 - Sept. 2020*

Thesis: COVID-19 Diagnosis From Chest X-Rays Using Artificial Intelligence. Final grade: 110/110 with honors.

B.S. in Computer Science — *Turin, Italy*

University of Turin — *Sept. 2015 - Sept. 2018*

Thesis: Deep Learning for Colorectal Polyps Diagnosis. Final grade 110/110.

Selected Publications

- Unbiased supervised contrastive learning. C. A. Barbano, B. Dufumier, E. Tartaglione, M. Grangetto, and P. Gori. *ICLR*, 2023.
- Integrating Prior Knowledge in Contrastive Learning with Kernel B. Dufumier, C. A. Barbano, R. Louiset, E. Duchesnay, and P. Gori. *ICML*, 2023
- Contrastive learning for regression in multi-site brain age prediction. C. A. Barbano, B. Dufumier, E. Duchesnay, M. Grangetto, and P. Gori. *ISBI*, 2023. *Best poster award.*
- End: Entangling and disentangling deep representations for bias correction. E. Tartaglione, C. A. Barbano, and M. Grangetto. *CVPR*, 2021.

Projects

Co.R.S.A. - Covid Radiographic imaging System based on AI — *WP Leader*

Regione Piemonte — *Apr. 2022 - Present*

AI-based diagnostic system for detection of COVID-19 cases from Chest X-Ray (CXR): `https://corsa.di.unito.it/`.

DeepHealth — *Collaborator*

European Commission — *Jan. 2019 - Jul. 2022*

HPC and deep learning techniques for biomedical applications: `https://deephealth-project.eu`.

Awards

2023 **Top Reviewer**, NeurIPS

2023 **Best Poster Award**, International Symposium on Biomedical Imaging (ISBI)

2021 **Best Poster Award**, Eastern European Machine Learning Summer School (EEML)

2018 **Weekly Kernel Award**, Kaggle

Extra

2021 **Simplify**, Pytorch-compatible software library for simplifying pruned model, to accelerate inference and training times `https://github.com/EIDOSLAB/simplify`

2020 **Torchstain**, Popular stain normalization library for histological analysis and computational pathology compatible with PyTorch, TensorFlow and NumPy `https://github.com/EIDOSLAB/torchstain`

2018 **TranscriberBot**, Popular Telegram bot for speech to text, with more than 500k active users `https://github.com/charslab/TranscriberBot/`

All Publications

Journal Papers

- **Simplify: A python library for optimizing pruned neural networks.** A. Bragagnolo and C. A. Barbano. *SoftwareX*, 2022. `https://doi.org/10.1016/J.SOFTX.2021.100907`
- **Unveiling covid-19 from chest x-ray with deep learning: A hurdles race with small data.** E: Tartaglione, C. A. Barbano, C. Berzovini, M. Calandri, and M. Grangetto. *International Journal of Environmental Research and Public Health*, 2020. `https://doi.org/10.3390/IJERPH17186933`

Conference Papers

- **Unbiased supervised contrastive learning.** C. A. Barbano, B. Dufumier, E. Tartaglione, M. Grangetto, and P. Gori. *ICLR*, 2023. `https://openreview.net/forum?id=Ph5cJSfD2XN`
- **Integrating Prior Knowledge in Contrastive Learning with Kernel** B. Dufumier, C. A. Barbano, R. Louiset, E. Duchesnay, and P. Gori. *ICML*, 2023. `https://arxiv.org/abs/2206.01646`
- **Contrastive learning for regression in multi-site brain age prediction.** C. A. Barbano, B. Dufumier, E. Duchesnay, M. Grangetto, and P. Gori. *ISBI*, 2023. `https://arxiv.org/abs/2211.08326` *Best-poster award.*
- **A two-step radiologist-like approach for Covid-19 computer-aided diagnosis from chest X-ray images.** C. A. Barbano, E. Tartaglione, C. Berzovini, M. Calandri, and M. Grangetto. *ICIAP*, 2022. `https://doi.org/10.1007/978-3-031-06427-2_15`
- **End: Entangling and disentangling deep representations for bias correction.** E. Tartaglione, C. A. Barbano, and M. Grangetto. *CVPR*, 2021. `https://doi.org/10.1109/CVPR46437.2021.01330`
- **Bridging the gap between debiasing and privacy for deep learning.** C. A. Barbano, E. Tartaglione, and M. Grangetto. *ICCV (Workshop)*, 2021. `https://doi.org/10.1109/ICCVW54120.2021.00424`
- **Unitopatho, a labeled histopathological dataset for colorectal polyps classification and adenoma dysplasia grading.** C. A. Barbano, Daniele Perlo, E. Tartaglione, A. Fiandrotti, L. Bertero, P. Cassoni, and M. Grangetto. *ICIP*, 2021. `https://doi.org/10.1109/ICIP42928.2021.9506198`

Under Review

- **Unsupervised learning of unbiased visual representations.** C. A. Barbano, E. Tartaglione, and M. Grangetto. Submitted to *Journal of Machine Learning Research*, 2023. `https://arxiv.org/abs/2204.12941`
- **Detection of subclinical atherosclerosis by image-based deep learning on chest x-ray: a retrospective model development and validation study**. G. Gallone, A. Presta, F. Iodice, D. Tore, O. D. Filippo, M. Visciano, C. A. Barbano, A. Serafini, W. G. Marra, J. Hughes, M. Iannacone, P. Fonio, A. Fiandrotti, A. Depaoli, M. Grangetto, G. M. D. Ferrari, F. D'Ascenzo. Submitted to *Radiology*, 2023. *Preprint not available*
- **AI-Assisted Diagnosis for Covid-19 CXR Screening: From Data Collection to Clinical Validation**. C. A. Barbano, R. Renzulli, M. Grosso, D. Basile, M. Busso, M. Grangetto. Submitted to *ISBI 2024*.
- **Multi-target stain normalization for histology slides**. D. Ivanov, C. A. Barbano, M. Grangetto. Submitted to *ISBI 2024*.