



Florian Dubost, Ph.D.

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Summary

I am a postdoctoral researcher in biomedical data science at Stanford University, U.S., designing deep learning models for video and EEG data. During my doctoral studies, I focused on optimization and interpretability of deep learning models with applications to neuroimaging. I significantly contributed to automating the quantification of vascular brain lesions, which resulted in invited lectures and collaborations with Harvard Medical School, Massachusetts Institute of Technology, and other institutes. I have also supervised 17 graduate students and successfully led teams to top rankings in international deep learning competitions.

Education

- 2021 **Postdoc in Medical Computer Vision**, Stanford University, US.
Executive Education, Stanford University Graduate School of Business, US.
Ignite program: Entrepreneurship
- 2020 **Ph.D. in Medical Computer Vision**, Erasmus University Medical Center, Netherlands.
Thesis title: *Artificial Intelligence with Light Supervision: Application to Neuroimaging.*
- 2016 **M.Sc. in Medical Engineering**, Technical University of Munich, Germany.
Thesis title: *Hands-free segmentation of medical volumes via binary inputs.*
M.Sc. in Engineering, Ecole Centrale Marseille, France.
Thesis title: *Ensemble methods for inter-subject machine learning from fMRI data.*

Current Position

- 2020 – Present **Postdoctoral Scholar in Biomedical Data Science**, Department of Biomedical Data Science and Department of Radiology, Stanford University School of Medicine, U.S.

Previous Positions

- 2020 – 2020 **Director**, Zelos Mediacorp - Education in Artificial Intelligence Research, Netherlands.
- 2016 – 2020 **Doctoral Researcher**, Departments of Radiology and Medical Informatics, Erasmus University Medical Center, Netherlands.
Project: *Artificial Intelligence with Light Supervision: Application to Neuroimaging.*
- 2018 – 2019 **Short-Term Scholar**, J. Philip Kistler Stroke Research Center, Massachusetts General Hospital, Harvard Medical School, U.S.
Project: *Does white matter lesion burden differ in clinical versus subclinical vascular brain disease?*
- 2014 – 2015 **Mentee**, Siemens IT Mentoring Program, Germany.
- 2014 – 2014 **Intern in Machine Learning Research**, Computer Science and Systems Laboratory and Institute of Neuroscience of Timone, French National Centre for Scientific Research, France.
Project: *Ensemble methods for inter-subject machine learning from fMRI data.*

Awards

- 2019 **3rd Place**, International Deep Learning Competition, Accurate Automated Spinal Curvature Estimation, MICCAI 2019 challenge, China.
- 2018 **3rd Place** as of 09/03/2018, International Deep Learning Competition, White Matter Hyperintensity Segmentation Challenge, Netherlands.

Awards (continued)

- 2017 **3rd Prize Poster Award**, ICT.OPEN, a Dutch IT research conference, Netherlands.
2nd Prize Poster Award, NFBIA summer school, a Dutch summer school on medical image analysis, Netherlands.

Grants

- 2019 **400€**, Travel grant, Trustfonds, Erasmus University Medical Center.
2018 **5.8k€**, Personal grant, De Drie Lichten association, Netherlands.
Project: *Does white matter lesion burden differ in clinical versus subclinical vascular brain disease?*
≈6k€, Research grant with Prof. MD. M. Vernooij (GPU Quadro P6000), NVIDIA, U.S.
≈3.7k€, Pilot grant for 450,000 Billing Units, SURFsara, Dutch National Computing Facilities, Netherlands.
2017 **≈ 3.7k€**, Pilot grant for 450,000 Billing Units, SURFsara, Dutch National Computing Facilities, Netherlands.
2015 **2.7k€**, Scholarship, Franco-German University, Germany.
2014 **2.7k€**, Scholarship, Franco-German University, Germany.

Supervision of Graduate Students

- 2020 **1 Graduate student**, Zelos Mediacorp, Netherlands (Corentin Giroud).
2019 **3 Graduate students**, collaboration between Brigham and Women Hospital, Harvard Medical School, U.S. and Erasmus University Medical Center, Netherlands. (Laetitia Bobet, Siddharth Bakshi, and Avantika Dasgupta)
Project: *Deep learning for Processing of Sleep Data*.
2017-2020 **4 Master's theses**, Erasmus University Medical Center, Netherlands. (Oliver Werner, Kimberlin van Wijnen (cum Laude), Florian Calvet, Arne Barkema)
9 Graduate Students, Erasmus University Medical Center, Netherlands. (Nicolas Posocco, Robin Camarasa, Corentin Doue, Axel Roc, Antonin Renaudier, Benjamin Collery, Filipe Marques, Pauline Dame, Vera de Vos)

Teaching Activities

- 2020 **Creation and dissemination of educational videos**, research in artificial intelligence, Zelos Mediacorp, Netherlands.
2018 – 2020 **Training of medical students**, rating and annotation of brain lesions from MRI scans, Quantib BV, Netherlands, and Otto von Guericke University Hospital, Germany.
2019 **Teaching Assistant**, Advanced Image Processing course, Clinical Technology Master Program, TU Delft, Netherlands.

Institutional Responsibilities

- 2020 **Co-organiser of international deep learning competition**, MICCAI challenge: Vascular Lesions Detection, planned in 2021, in collaboration with Kimberlin van Wijnen (Erasmus University Medical Center), Carole Sudre (King's College London), and Marleen de Bruijne (Erasmus University Medical Center).

Institutional Responsibilities (continued)

- Program committee member**, MICCAI conference workshop: Simulation and Synthesis in Medical Imaging, Virtual.
- Program committee member**, MICCAI conference workshop: Large-scale Annotation of Biomedical data and Expert Label Synthesis, Virtual.
- 2019 **Program committee member**, NeurIPS conference workshop: Medical Imaging meets NeurIPS, Canada.
- Program committee member**, MICCAI conference workshop: Large-scale Annotation of Biomedical data and Expert Label Synthesis, China.
- 2018 **Master's thesis defense committee member**, TU Delft, Netherlands.
Thesis title: *Detecting Perivascular Spaces: a Geodesic Deep Learning Approach*.

Invited Lectures

- 2019 **Massachusetts Institute of Technology (MIT)**, Computer Science and Artificial Intelligence Laboratory, U.S. Invited by Prof. Golland.
- Harvard Medical School**, Massachusetts General Hospital, U.S. Invited by Prof. Rost.
- Harvard Medical School**, Athinoula A. Martinos Center, U.S. Invited by Prof. Fischl.
- Boston University**, U.S. Invited by Prof. Seshadri.
- Otto von Guericke University Hospital**, Department of Neurology, Germany. Invited by Prof. Schreiber and Dr. Oeltze-Jafra.
- 2018 **Netherlands Organisation for Applied Scientific Research (TNO)**, The Netherlands. Invited by Dr. Van Opbroek.

Societal Impact of Own Research

- Public Outreach **I Lab U**, "Speed dates" between scientists and general public, Erasmus University Medical Center, the Netherlands.
- Twitter **1.4K followers** – @fpgdubost, dissemination of research outcomes.
- YouTube **Two channels** – "Florian Dubost" and "Education in AI Research", talks and tutorials.
- Github **Three public repositories**, code sharing.

Volunteer Work

- 2016 **Staff member**, European Conference on Computer Vision (ECCV), Netherlands.
- 2015 **Staff member**, International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), Germany.
- 2014 **Healthy control subject**, autism fMRI study, Institute of Neuroscience of Timone, France.

Reviewing Activities

- Journals Medical Image Analysis (IF 11.1), IEEE Transactions on Medical Imaging (IF 9.7), NeuroImage (IF 5.8), Scientific Reports (IF 4.5), Frontiers in Pharmacology (IF 4.4), NeuroImage Clinical (IF 4.4), IEEE Transactions on Biomedical Engineering (IF 4.3), Quantitative Imaging in Medicine and Surgery (IF 3.1), IEEE Sensors (IF 3.1).
- Conferences International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), IEEE International Symposium on Biomedical Imaging (ISBI), Medical Imaging with Deep Learning (MIDL), International Workshop on Machine Learning in Clinical Neuroimaging (MLCN).

Memberships of Scientific Societies

- 2018 – 2019 **Member**, European Society of Radiology.
- 2017 – Present **Member**, Dutch Society of Pattern Recognition and Image Processing.
Member, Medical Image Computing and Computer Assisted Intervention Society.

Major Collaborations

- Prof. Rost, Massachusetts General Hospital, Harvard Medical School, U.S.
- Prof. Guttman, Brigham and Women's Hospital, Harvard Medical School, U.S.
- Prof. Seshadri, Boston University, U.S., and University of Texas Health Science Center at San Antonio, U.S.
- Prof. Schreiber and Dr. Oeltze-Jafra, Department of Neurology, Otto von Guericke University Hospital, Germany.

Top Publications

- 1 **Dubost, F.**, Adams, H., Bortsova, G., Ikram, M. A., Niessen, W., Vernooij, M., & de Bruijne, M. (2019a). 3D regression neural network for the quantification of enlarged perivascular spaces in brain MRI. *Medical Image Analysis* (Impact factor 11.1). 17 Citations.
- 2 **Dubost, F.**, Yilmaz, P., Adams, H., Bortsova, G., Ikram, M. A., Niessen, W., Vernooij, M., & de Bruijne, M. (2019a). Enlarged perivascular spaces in brain MRI: Automated quantification in four regions. *NeuroImage* (Impact factor 5.9). 24 Citations.
- 3 **Dubost, F.**, Bortsova, G., Adams, H., Ikram, A., Niessen, W. J., Vernooij, M., & De Bruijne, M. (2017a). GP-Unet: Lesion detection from weak labels with a 3D regression network. *International Conference on Medical Image Computing and Computer-Assisted Intervention* (Acceptance rate 30%). 34 Citations.

Patents

- Submitted **AI method for segmentation of medical images.** Patent Application in The Netherlands No. 2023982. Inventors: Gerda Bortsova, Dr. Marleen de Bruijne, Dr. Ioannis Katramados, and Dr. Florian Dubost. Title: Method for training a neural network, trainable neural network system and trained neural network processor.

Other Activities

- 2020 – Present Design of the deep learning framework of Spine Virtual Laboratory of Prof. Guttman's group, Brigham and Women's Hospital, Harvard Medical School.
- 2017 – Present Design and use of my own GPU-cluster for my personal use in side projects, as additional resources for my students, and for colleagues' projects. The cluster is distributed across France and the Netherlands.
- 2017 – 2020 Design of GPU-clusters for the BGR department at Erasmus University Medical Center, Netherlands.
- 2016 – 2019 Deep learning advice for the start-up company Quantib B.V., Netherlands.

Research Publications

Journal Articles

- 1 **Dubost, F.**, Adams, H., Yilmaz, P., Bortsova, G., van Tulder, G., Ikram, M. A., Niessen, W., Vernooij, M., & de Bruijne, M. (2020). Weakly supervised object detection with 2D and 3D regression neural networks. *Medical Image Analysis*, 101767. (Impact factor 11.1).
- 2 **Dubost, F.**, de Bruijne, M., Nardin, M., Dalca, A. V., Donahue, K. L., Giese, A.-K., Etherton, M. R., Wu, O., de Groot, M., Niessen, W. Et al. (2020). Multi-atlas image registration of clinical data with automated quality assessment using ventricle segmentation. *Medical Image Analysis*, 101698. (Impact factor 11.1).
- 3 **Dubost, F.**, Adams, H., Bortsova, G., Ikram, M. A., Niessen, W., Vernooij, M., & de Bruijne, M. (2019b). 3D regression neural network for the quantification of enlarged perivascular spaces in brain MRI. *Medical Image Analysis*, 51, 89–100. (Impact factor 11.1).
- 4 **Dubost, F.**, Yilmaz, P., Adams, H., Bortsova, G., Ikram, M. A., Niessen, W., Vernooij, M., & de Bruijne, M. (2019b). Enlarged perivascular spaces in brain MRI: Automated quantification in four regions. *NeuroImage*, 185, 534–544. (Impact factor 5.9).
- 5 Wang, J., Knol, M. J., Tiulpin, A., **Dubost, F.**, de Bruijne, M., Vernooij, M. W., Adams, H. H., Ikram, M. A., Niessen, W. J., & Roshchupkin, G. V. (2019). Gray matter age prediction as a biomarker for risk of dementia. *Proceedings of the National Academy of Sciences*, 116(42), 21213–21218. (Impact factor 9.6).

Conference Proceedings

- 1 Kayal, S., **Dubost, F.**, Tiddens, H. A., & de Bruijne, M. (2020). Spectral data augmentation techniques to quantify lung pathology from CT-Images, In *2020 IEEE 17th International Symposium on Biomedical Imaging (ISBI)*. IEEE. (Oral).
- 2 Bortsova, G., **Dubost, F.**, Hogeweg, L., Katramados, I., & de Bruijne, M. (2019). Semi-supervised medical image segmentation via learning consistency under transformations, In *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. (Acceptance rate 30%).
- 3 **Dubost, F.**, Bortsova, G., Adams, H., Ikram, M. A., Niessen, W., Vernooij, M., & de Bruijne, M. (2019). Hydranet: Data augmentation for regression neural networks, In *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. (Acceptance rate 30%).
- 4 **Dubost, F.**, Collery, B., Renaudier, A., Roc, A., Posocco, N., Niessen, W., & de Bruijne, M. (2019). Automated estimation of the spinal curvature via spine centerline extraction with ensembles of cascaded neural networks, In *International Workshop and Challenge on Computational Methods and Clinical Applications for Spine Imaging*. Springer. (Oral).

- 5 **Dubost, F.**, Dünnwald, M., Huff, D., Scheumann, V., Schreiber, F., Vernooij, M., Niessen, W., Skalej, M., Schreiber, S., Oeltze-Jafra, S. Et al. (2019). Automated quantification of enlarged perivascular spaces in clinical brain mri across sites, In *OR 2.0 Context-Aware Operating Theaters and Machine Learning in Clinical Neuroimaging*, Springer. (Oral, Dubost, F.; Dünnwald, M. have an equal contribution).
- 6 Egger, B., Schirmer, M. D., **Dubost, F.**, Nardin, M. J., Rost, N. S., & Golland, P. (2019). Patient-specific conditional joint models of shape, image features and clinical indicators, In *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. (Acceptance rate 30%).
- 7 van Wijnen, K. M., **Dubost, F.**, Yilmaz, P., Ikram, M. A., Niessen, W. J., Adams, H., Vernooij, M. W., & de Bruijne, M. (2019). Automated lesion detection by regressing intensity-based distance with a neural network, In *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. (Acceptance rate 30%, Dubost, F. and van Wijnen, K. have an equal contribution).
- 8 Venkatraghavan, V., **Dubost, F.**, Bron, E. E., Niessen, W. J., de Bruijne, M., Klein, S., Initiative, A. D. N. Et al. (2019). Event-based modeling with high-dimensional imaging biomarkers for estimating spatial progression of dementia, In *International Conference on Information Processing in Medical Imaging*. Springer. (Acceptance rate 30%, Dubost, F. and Venkatraghavan, V. have an equal contribution).
- 9 Zhang, C., **Dubost, F.**, de Bruijne, M., Klein, S., & Poot, D. H. (2019). APIR-Net: Autocalibrated parallel imaging reconstruction using a neural network, In *International Workshop on Machine Learning for Medical Image Reconstruction*. Springer. (Oral).
- 10 Bortsova, G., **Dubost, F.**, Ørting, S., Katramados, I., Hogeweg, L., Thomsen, L., Wille, M., & de Bruijne, M. (2018). Deep learning from label proportions for emphysema quantification, In *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. (Acceptance rate 30%).
- 11 Marques, F., **Dubost, F.**, Kemner-van de Corput, M., Tiddens, H. A., & de Bruijne, M. (2018). Quantification of lung abnormalities in cystic fibrosis using deep networks, In *Medical imaging 2018: Image processing*. International Society for Optics and Photonics. (Oral).
- 12 Bortsova, G., van Tulder, G., **Dubost, F.**, Peng, T., Navab, N., van der Lugt, A., Bos, D., & De Bruijne, M. (2017). Segmentation of intracranial arterial calcification with deeply supervised residual dropout networks, In *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. (Acceptance rate 30%).
- 13 **Dubost, F.**, Bortsova, G., Adams, H., Ikram, A., Niessen, W. J., Vernooij, M., & De Bruijne, M. (2017b). GP-Unet: Lesion detection from weak labels with a 3D regression network, In *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. (Acceptance rate 30%).
- 14 **Dubost, F.**, Peter, L., Rupperecht, C., Becker, B. G., & Navab, N. (2016). Hands-free segmentation of medical volumes via binary inputs, In *Deep Learning and Data Labeling for Medical Applications*, Springer.

Books and Chapters

- 1 **Dubost, F.** (2020). *Artificial Intelligence with Light Supervision: Application to Neuroimaging*.

Preprints

- 1 Chatterjee, S., Prabhu, K., Pattadkal, M., Bortsova, G., **Dubost, F.**, Mattern, H., de Bruijne, M., Speck, O., & Nürnberger, A. (2020). *Ds6: Deformation-aware learning for small vessel segmentation with small, imperfectly labeled dataset*.
- 2 **Dubost, F.**, Hong, E., Y Fu, D., Bhaskhar, N., Tang, S., Saab, K., Dunnmon, J., Rubin, D., & Lee-Messer, C. (2020). *Inaccurate supervision of neural networks with incorrect labels: Application to epilepsy*.

- 3 Werner, O., van Wijnen, K. M., Niessen, W. J., de Groot, M., Vernooij, M. W., **Dubost, F.**, & de Bruijne, M. (2020). *When weak becomes strong: Robust quantification of white matter hyperintensities in brain MRI scans. (Dubost, F. and de Bruijne, M. have an equal contribution).*
- 4 Wetstein, S. C., González-Gonzalo, C., Bortsova, G., Liefers, B., **Dubost, F.**, Katramados, I., Hogeweg, L., van Ginneken, B., Pluim, J. P., de Bruijne, M. Et al. (2020). *Adversarial attack vulnerability of medical image analysis systems: Unexplored factors.*
- 5 Camarasa, R., Doué, C., de Bruijne, M., & **Dubost, F.** (2018a). *Segmentation of brain structures with an ensemble of multi-dimensional convolutional gated recurrent units.*
- 6 Camarasa, R., Doué, C., de Bruijne, M., & **Dubost, F.** (2018b). *Segmentation of white matter hyperintensities with an ensemble of multi-dimensional convolutional gated recurrent units.*

Additional Skills

Languages	Strong reading, writing and speaking competencies in English and French. Upper-intermediate in German. Intermediate in Dutch. Basics in Russian and Chinese.
Coding	Python, Bash, R, C++, MATLAB.
O.S.	Windows, Linux, Mac.
Web Dev	WordPress.
Misc.	Academic research, teaching, training, and consultation.

References

Available on Request.