

Michaël Gharbi

PhD Candidate, MIT CSAIL

Research interests. computational photography, image and video processing, computer vision, machine-learning

Education

- currently **PhD in Computer Science**, *Massachusetts Institute of Technology*, Cambridge, MA, USA, *GPA 5.0/5.0*.
Research Assistant. Supervised by Prof. Fredo Durand (fredo@mit.edu)
relevant coursework. Machine Learning, Advances in Computer Vision, Distributed Systems Engineering, Cryptography and Cryptanalysis
- 2015 **MSc in Computer Science**, *Massachusetts Institute of Technology*, Cambridge, MA, USA, *GPA 5.0/5.0*.
- 2013 **MSc in Applied Mathematics**, *Ecole Polytechnique*, Palaiseau, France, *GPA 4.0/4.0*.
Admitted first in the nationwide competitive exams

Experience

- 2018 **Research Scientist**, *Adobe*, San Francisco, CA, USA.
- 2016 **Research Intern**, *Google*, Mountain View, CA, USA.
ML-based pipeline for real-time image processing on mobile [3]. (Tensorflow/Halide) (hasinoff@google.com).
- 2015 **Teaching Assistant**, *MIT*, Cambridge, MA, USA.
Designed C++ computational photography coding assignments and created a Django platform and a semi-automated grading system for students to submit their work online. Held office hours. (50 enrolled students) (fredo@mit.edu).
- 2015 **Research Intern**, *Adobe Creative Technologies Lab*, Cambridge, MA, USA.
State-of-the-art ML-based demosaicking/denoising, 10x faster than previous work [2]. (Halide/C++)
- 2014 **Research Intern**, *Adobe Creative Technologies Lab*, Cambridge, MA, USA.
Designed a mobile cloud image-processing algorithm that reduces bandwidth, power consumption and latency by **10x** over a naive JPEG-based solution [6]. (Python/C++) (sparis@adobe.com).
- 2013 **Research Assistant**, *MIT*, Cambridge, MA, USA.
Designed an algorithm to visualize spatio-temporal motion differences in videos of a similar action.
- 2012 **Research Intern**, *Adobe Creative Technologies Lab*, Cambridge, MA, USA.
Designed an object detection algorithm over **100x** faster than state-of-the-art baseline with matched accuracy (MATLAB) [5]. **Award for best internship** in computer science from Ecole Polytechnique. (sparis@adobe.com).
- 2009 **Officer Cadet**, *EP 1G133 airborne commandos, French Air Force*, Nancy, France.
Second in command. Trained and supervised **80** soldiers. Organized a European military competition.

Skills

leadership. Public relations for the *Jumping de l'X* 2011, an international high level horse-riding competition.

coding. Python, C/C++, Halide, Tensorflow, CUDA, Caffe, L^AT_EX, MATLAB, Java

languages. French (native), English (fluent), Spanish (fair), Arabic (basic knowledge)

- 2013 **Splitsy**, *personal side-project*.
Vision-based iOS app for receipt digitization co-developped with Andrea Tacchetti (atacchet@mit.edu).
- 2011 **GnG, co-founder**, Paris, France.
Web development business with Simon Georges. (Ruby on Rails) (simon.georges@polytechnique.edu)

Service

- Reviewer Siggraph (2017–2019), Siggraph Asia (2017–2019), CVPR (2017–2019), ECCV (2018), ICCV (2019), ACCV (2018), Eurographics (2018–2019), IEEE Transactions on Image Processing, IEEE Transactions on Computational Imaging, IEEE Transactions on Pattern Matching and Machine Intelligence.

Publications

- [1] Andrew Adams, Karima Ma, Luke Anderson, Michaël, Tzu-Mao Li, Benoit Steiner, Steven Johnson, Kayvon Fatahalian, Frédo Durand, and Jonathan Ragan-Kelley. Learning to optimize halide with tree search and random programs. *ACM Siggraph*, 2019.
- [2] Michaël Gharbi, Gaurav Chaurasia, Sylvain Paris, and Frédo Durand. Deep joint demosaicking and denoising. *ACM Siggraph Asia*, 2016.
- [3] Michaël Gharbi, Jiawen Chen, Jonathan T. Barron, Samuel W. Hasinoff, , and Frédo Durand. Deep bilateral learning for real-time image enhancement. *ACM Siggraph*, 2017.
- [4] Michaël Gharbi, Tzu-Mao Li, Miika Aittala, Jaakko Lehtinen, and Frédo Durand. Sample-based monte-carlo denoising using a kernel-splatting network. *ACM Siggraph*, 2019.
- [5] Michael Gharbi, Tomasz Malisiewicz, Sylvain Paris, and Frédo Durand. A gaussian approximation of feature space for fast image similarity. Technical report, MIT CSAIL, 2012.
- [6] Michaël Gharbi, YiChang Shih, Gaurav Chaurasia, Jonathan Ragan-Kelley, Sylvain Paris, and Frédo Durand. Transform recipes for efficient cloud photo enhancement. *ACM Siggraph Asia*, 2015.
- [7] Tzu-Mao Li, Michaël Gharbi, Andrew Adams, Frédo Durand, and Jonathan Ragan-Kelley. Differentiable programming for image processing and deep learning in halide. *ACM Siggraph*, 2018.
- [8] Thibaut Perol, Michaël Gharbi, and Marine Denolle. Convolutional neural network for earthquake detection and location. *Science Advances*, 2018.
- [9] Julien Philip, Michaël Gharbi, Tinghui Zhou, Alyosha Efros, and George Drettakis. Multi-view relighting using a geometry-aware network. *ACM Siggraph*, 2019.