

Jongmin Baek (Ph. D.)

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INTERESTS Machine learning, computer vision, computational photography, image processing, signal processing, computational optics, compression, performance optimization.

Informally speaking, I make bits do interesting things, and do so very efficiently at algorithmic and architectural levels. Recently I have worked on more high-level machine learning tasks.

I also try to find opportunities to do impactful work outside my core expertise.

CURRENT EMPLOYMENT **Dropbox, Inc. (Current)**, San Francisco, CA USA

Senior Machine Learning Engineer **2015–**

Machine Learning Engineer **2014–**

- Developed novel computer vision and machine learning algorithms, optimized and integrated them into production across backend and mobile platforms.
 - Owned most of the algorithms in Dropbox's mobile document scanner (detection, rectification, shadow removal, quantization, compression) and the strategy for cross-platform integration of the computer vision code.
 - Built and optimized parts of Dropbox's in-house OCR pipeline.
 - Developed recurrent neural networks for user behavior predictions and production-ized them.
 - Authored [several technical blog posts](#) and patents related to the said algorithms.
 - Drove internal tooling around machine-learning development as appropriate.
- Authored the image processing stack at Dropbox, which processes orders of petabytes of data daily and powers the preview pipeline.
- Worked on and open-sourced a few libraries for [image processing](#) and [compression](#).
- Served as one of the dozen or so senior members of the engineering organization that moderated hiring debriefs for engineers.
- Won or was nominated for award at company Hack Week for each of the past five years.

EDUCATION **Stanford University**, Stanford, CA USA

Ph.D. in [Computer Science](#) (2008 – 2013) under Prof. [Marc Levoy](#).

- Thesis title: *WYSIWYG Computational Photography via Viewfinder Editing*

M.S. in [Computer Science](#) (2008 – 2011; GPA 4.3/4.0)

Massachusetts Institute of Technology, Cambridge, MA USA

M.Eng. in [Electrical Engineering and Computer Science](#) (2008) under Prof. [Frédo Durand](#).

- Thesis title: *Multi-channel Coded-aperture Photography*

B.S. in [Computer Science and Engineering](#) (2004 – 2008; GPA 5.0/5.0)

B.S. in [Mathematics \(Theory\)](#) (2004 – 2008; GPA 5.0/5.0)

- PUBLICATIONS Baek, J., Pająk, D., Kim, K., Pulli, K. and Levoy, M. [WYSIWYG Computational Photography via Viewfinder Editing](#). *ACM SIGGRAPH Asia*. 2013.
- Baek, J., Adams, A. B. and Dolson, J. Lattice-based High-Dimensional Gaussian Filtering and the Permutohedral Lattice. *Journal of Mathematical Imaging and Vision*. 2013.
- Baek, J., Jacobs, D. E. and Levoy, M. [Accelerating Spatially Varying Gaussian Filters](#). *ACM SIGGRAPH Asia*. 2010.
- Adams, A. B., Talvala, E., Park, S. H., Jacobs, D. E., Ajdin, B., Gelfand, N., Dolson, J., Vaquero, D., Baek, J., Tico, M., Lensch, H. P. A., Matusik, W., Pulli, K., Horowitz, M. and Levoy, M. [The Frankencamera: an Experimental Platform for Computational Photography](#). *ACM SIGGRAPH*. 2010.
- Dolson, J., Baek, J., Plagemann, C. and Thrun, S. [Upsampling Range Data in Dynamic Environments](#). *IEEE Computer Vision and Pattern Recognition*. 2010.
- Baek, J. [Transfer Efficiency and Depth Invariance in Computational Cameras](#). *IEEE International Conference in Computational Photography*. 2010.
- Adams, A. B., Baek, J. and Davis, M. A. [Fast High-Dimensional Filtering using the Permutohedral Lattice](#). *Eurographics*. 2010.
- REPORTS Jacobs, D. E., Baek, J. and Levoy, M. [Focal Stack Compositing for Depth of Field Control](#). Tech. report CSTR-2012-01, Stanford.
- Karpenko, A., Jacobs, D. E., Baek, J. and Levoy, M. [Digital Video Stabilization and Rolling Shutter Correction using Gyroscopes](#). Tech. report CSTR 2011-03, Stanford.
- INVITED TALKS WYSIWYG Computational Photography via Viewfinder Editing. *GPU Technology Conference*. Santa Clara, CA USA, 2014.
- PATENTS U.S. Patents 9,407,814; 9,799,106; 9,941,900; a few more pending.
- RECENT EMPLOYMENT **NVIDIA Research**, Santa Clara, CA USA
Mobile Visual Computing (MVC) Group **Summer 2012, 2013**
- Worked with the Mobile Visual Computing group and led the development of algorithms and interfaces for editing on a live viewfinder of a mobile camera. See above sections on education and publications. (C++, GLSL, Assembly, Matlab)
- Department of Computer Science, Stanford University**, Stanford, CA USA
Teaching Fellow **Winter 2011**
- Taught [CS478](#), a graduate course in computational photography; was responsible for lectures, assignments, and development environment; advised students on final projects.
- Google, Inc.**, Mountain View, CA USA
Site Reliability Engineering **Summer 2010**
- Analyzed the search indexing pipeline to identify latencies in various stages, processing large datasets with map-reduce pattern. (C++)
- RECOGNITIONS
- Recipient of Lucent Technology Fellowship (Stanford Graduate Fellowship), 2010.
 - National Science Foundation Graduate Research Fellowship: Honorable Mention (2009)
 - William Lowell Putnam Mathematical Competition: Honorable Mention (2005)
 - USA Mathematical Olympiad: Winner (2004), Honorable Mention (2002, 2003)