

Frank Ong

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Education

- 2013-2018 **University of California, Berkeley**, *Ph.D. Electrical Engineering and Computer Sciences.*
- o Dissertation: [Low Dimensional Methods for High Dimensional Magnetic Resonance Imaging](#)
 - o Committee: [Michael Lustig](#), [Kannan Ramchandran](#), and [Ming Gu](#)
- 2009-2013 **University of California, Berkeley**, *B.S. Electrical Engineering and Computer Sciences.*

Academic Positions

- 2019-Present **Stanford University**, *Postdoctoral Scholar.*
- o Advisors: [Shreyas Vasawala](#) (Professor of Radiology) and [John Pauly](#) (Professor of EE)
- 2013-2018 **University of California, Berkeley**, *Graduate Student Researcher.*
- o Advisor: [Michael Lustig](#) (Associate Professor of EECS)
- Fall 2013 **University of California, Berkeley**, *Graduate Student Instructor.*
- Spring 2015 o Description: Teach discussion sessions and design labs for the undergraduate signal processing class
- Spring 2016

Industry Positions

- 2019-Present **Lively Sensors (Startup)**, *Consultant.*
- o Supervisor: [Krishna Nayak](#) (Founder, Professor of EE at USC)
 - o Description: Develop signal estimation methods for NMR medical devices.
- 2018-2019 **Subtle Medical (Startup)**, *Consultant.*
- o Supervisor: [Tao Zhang](#) (Head of Research)
 - o Description: Develop deep learning based image enhancement techniques for PET and MRI.
- Summer 2017 **Google Research**, *Intern.*
- o Supervisor: [Peyman Milanfar](#) (Principal Scientist)
 - o Description: Develop innovative computational imaging methods.

Honors and Awards

- 2017 [Teaching Effectiveness Award](#)
- 2016-2017 [Outstanding Graduate Student Instructor Award](#)
- 2013-2015 [NSF Graduate Research Fellowship](#)
- 2013 [CRA Undergraduate Researcher Award, Second Place](#)

Mentoring

- Junior research staffs
- o [Cedric Yue Sik Kin](#)
- Graduate students

- Elizabeth Cole
- Christopher Sandino
- Ke Wang

Undergraduate students

- Gaby Nahum
- Stefan Ivanovic
- Shahab Amin (Now at Social Calendar)
- Siddharth Iyer (Now at MIT PhD)
- Harrison Rosenberg (Now at UW Madison PhD)
- Jianqiao Yang (Now at MIT PhD)
- Andrew Li (Now at Alameda Research)

Patents

- [1] Cole, E., **Ong, F.**, Vasawala, S. S., Pauly, J., “Deep learning generative method for learned reconstruction from undersampled MRI datasets,” pat. Filed.
- [2] **Ong, F.**, Kin, C. Y. S., Lustig, M., Pauly, J., Vasawala, S. S., “Methods for reconstruction coupled, fast and memory efficient visualization for high dimensional medical image datasets,” pat. Filed.

Preprints

- [1] Koundinyan, S. P., Baron, C. A., Malave, M. O., **Ong, F.**, Addy, N. O., Cheng, J. Y., Yang, P. C., Hu, B. S., Nishimura, D. G., “High-resolution, respiratory-resolved coronary MRA using a phyllotaxis-reordered variable-density 3d cones trajectory,” *Submitted to Magnetic Resonance in Medicine*, 2019. arXiv: [1910.12199](https://arxiv.org/abs/1910.12199).
- [2] Malavé, M. O., Baron, C. A., Koundinyan, S. P., Sandino, C. M., **Ong, F.**, Cheng, J. Y., Nishimura, D. G., “Reconstruction of undersampled 3d non-cartesian image-based navigators for coronary MRA using an unrolled deep learning model,” *Submitted to Magnetic Resonance in Medicine*, 2019. arXiv: [1910.11414](https://arxiv.org/abs/1910.11414).
- [3] **Ong, F.**, Zhu, X., Cheng, J. Y., Johnson, K. M., Larson, P. E. Z., Vasawala, S. S., Lustig, M., “Extreme MRI: Large-scale volumetric dynamic imaging from continuous non-gated acquisitions,” *Submitted to Magnetic Resonance in Medicine*, Sep. 30, 2019. arXiv: [1909.13482](https://arxiv.org/abs/1909.13482).
- [4] Iyer, S., **Ong, F.**, Doneva, M., Lustig, M., “SURE-based automatic parameter selection for ESPIRiT calibration,” *Submitted to Magnetic Resonance in Medicine*, Nov. 14, 2018. arXiv: [1811.05672](https://arxiv.org/abs/1811.05672).

Journal Articles

- [1] **Ong, F.**, Uecker, M., Lustig, M., “Accelerating non-cartesian MRI reconstruction convergence using k-space preconditioning,” *IEEE Transaction of Medical Imaging*, vol. Early View, 2020. DOI: [10.1109/TMI.2019.2954121](https://doi.org/10.1109/TMI.2019.2954121).
- [2] Tamir, J. I., **Ong, F.**, Anand, S., Karasan, E., Wang, K., Lustig, M., “Computational MRI with physics-based constraints: Application to multi-contrast and quantitative imaging,” *IEEE Signal Processing Magazine*, vol. Early View, 2020.

- [3] Holme, H. C. M., Rosenzweig, S., **Ong, F.**, Wilke, R. N., Lustig, M., Uecker, M., “ENLIVE: An efficient nonlinear method for calibrationless and robust parallel imaging,” *Scientific Reports*, vol. 9, no. 1, p. 3034, Dec. 2019. DOI: [10.1038/s41598-019-39888-7](https://doi.org/10.1038/s41598-019-39888-7).
- [4] **Ong, F.**, Milanfar, P., Getreuer, P., “Local kernels that approximate bayesian regularization and proximal operators,” *IEEE Transactions on Image Processing*, vol. 28, no. 6, pp. 3007–3019, Jun. 2019. DOI: [10.1109/TIP.2019.2893071](https://doi.org/10.1109/TIP.2019.2893071).
- [5] Jiang, W., **Ong, F.**, Johnson, K. M., Nagle, S. K., Hope, T. A., Lustig, M., Larson, P. E., “Motion robust high resolution 3d free-breathing pulmonary MRI using dynamic 3d image self-navigator,” *Magnetic Resonance in Medicine*, vol. 79, no. 6, pp. 2954–2967, Jun. 2018. DOI: [10.1002/mrm.26958](https://doi.org/10.1002/mrm.26958).
- [6] **Ong, F.**, Cheng, J. Y., Lustig, M., “General phase regularized reconstruction using phase cycling,” *Magnetic Resonance in Medicine*, vol. 80, no. 1, pp. 112–125, 2018. DOI: [10.1002/mrm.27011](https://doi.org/10.1002/mrm.27011).
- [7] **Ong, F.**, Lustig, M., “Beyond low rank + sparse: Multiscale low rank matrix decomposition,” *IEEE Journal of Selected Topics in Signal Processing*, vol. 10, no. 4, pp. 672–687, Jun. 2016. DOI: [10.1109/JSTSP.2016.2545518](https://doi.org/10.1109/JSTSP.2016.2545518).
- [8] **Ong, F.**, Uecker, M., Tariq, U., Hsiao, A., Alley, M. T., Vasanawala, S. S., Lustig, M., “Robust 4d flow denoising using divergence-free wavelet transform,” *Magnetic Resonance in Medicine*, vol. 73, no. 2, pp. 828–842, Feb. 2015. DOI: [10.1002/mrm.25176](https://doi.org/10.1002/mrm.25176).

Conference Proceedings

- [1] Holmes, S., **Ong, F.**, Lustig, M., Brunsing, R., Sheth, V., Alley, M. T., Carl, M., Pauly, J., Cheng, J. Y., Vanawala, S., “Time-efficient fully 3d non-cartesian dynamic contrast-enhanced free-breathing MRI of the pelvis with an ultrashort TE cones trajectory,” in *Proceedings of the ISMRM 28th Annual Meeting*, Montreal, Quebec, Canada, May 2019, p. 0705.
- [2] Koundinyan, S. P., **Ong, F.**, Nishimura, D., Vasanawala, S., Cheng, J., “Motion-robust pediatric abdominal angiography using dynamic 3d image self-navigator with 3d cones,” in *Proceedings of the ISMRM 27th Annual Meeting*, May 11, 2019, p. 0706.
- [3] Malavé, M. O., Koundinyan, S. P., Sandino, C. M., **Ong, F.**, Cheng, J. Y., Nishimura, D., “Accelerated 3d non-cartesian reconstruction with deep learning,” in *Proceedings of the ISMRM 27th Annual Meeting*, Montreal, Quebec, Canada, May 11, 2019, p. 4662.
- [4] **Ong, F.**, Heckel, R., Ramchandran, K., “A fast and robust paradigm for fourier compressed sensing based on coded sampling,” in *ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Brighton, United Kingdom: IEEE, May 2019, pp. 5117–5121. DOI: [10.1109/ICASSP.2019.8682063](https://doi.org/10.1109/ICASSP.2019.8682063).
- [5] **Ong, F.**, Lustig, M., “SigPy: A python package for high performance iterative reconstruction,” in *Proceedings of the ISMRM 27th Annual Meeting*, Montreal, Quebec, Canada, May 11, 2019, p. 4819.
- [6] **Ong, F.**, Zhu, X., Larson, P. E. Z., Cheng, J. Y., Vasanawala, S. S., Lustig, M., “Extreme MRI: Super-high-res dynamic volumetric MRI from continuous non-gated acquisition,” in *Proceedings of the ISMRM 27th Annual Meeting*, Montreal, Quebec, Canada, May 11, 2019, p. 1176.
- [7] Sandino, C. M., **Ong, F.**, Cheng, J. Y., Lustig, M., Alley, M. T., Vasanawala, S. S., “High spatiotemporal resolution cones 4d flow using memory-efficient iterative reconstruction,” in *Proceedings of the ISMRM 27th Annual Meeting*, Montreal, Quebec, Canada, May 11, 2019, p. 1952.

- [8] Wang, K., **Ong, F.**, Tamir, J., Lustig, M., "Unsupervised learning for improved fidelity multi-contrast MRI," in *Proceedings of the ISMRM 27th Annual Meeting*, Montreal, Quebec, Canada, May 11, 2019, p. 4645.
- [9] Driscoll, M., Brock, B., **Ong, F.**, Tamir, J., Liu, H.-Y., Lustig, M., Fox, A., Yelick, K., "Indigo: A domain-specific language for fast, portable image reconstruction," in *2018 IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, Vancouver, BC: IEEE, May 2018, pp. 495–504. DOI: [10.1109/IPDPS.2018.00059](https://doi.org/10.1109/IPDPS.2018.00059).
- [10] Getreuer, P., Garcia-Dorado, I., Isidoro, J., Choi, S., **Ong, F.**, Milanfar, P., "BLADE: Filter learning for general purpose computational photography," in *2018 IEEE International Conference on Computational Photography (ICCP)*, Pittsburgh, PA: IEEE, May 2018, pp. 1–11. DOI: [10.1109/ICCPHOT.2018.8368476](https://doi.org/10.1109/ICCPHOT.2018.8368476).
- [11] Hu, Y., Wang, X., Levin, E. G., Tian, Q., Taviani, V., **Ong, F.**, Vasanawala, S., McNab, J. A., Daniel, B. L., Hargreaves, B., "Multishot high-resolution brain diffusion-weighted imaging using phase regularized reconstruction," in *Proceedings of the ISMRM 27th Annual Meeting*, Paris, France, Jun. 2018, p. 0750.
- [12] **Ong, F.**, Amin, S., Vasanawala, S., Lustig, M., "Mridata.org: An open archive for sharing MRI raw data," in *Proceedings of the ISMRM 27th Annual Meeting*, Paris, France, Jun. 2018, p. 3425.
- [13] **Ong, F.**, Lustig, M., "K-space aware convolutional sparse coding: Learning from undersampled k-space datasets for reconstruction," in *Proceedings of the ISMRM 27th Annual Meeting*, Paris, France, Jun. 2018, p. 3378.
- [14] **Ong, F.**, Uecker, M., Lustig, M., "K-space diagonal preconditioner: Speeding up iterative reconstruction for variable density sampled acquisitions without compromises," in *Proceedings of the ISMRM 27th Annual Meeting*, Paris, France, Jun. 2018, p. 0934.
- [15] Holme, H. C. M., **Ong, F.**, Rosenzweig, S., Wilke, R. N., Lustig, M., Uecker, M., "ENLIVE: A non-linear calibrationless method for parallel imaging using a low-rank constraint," in *Proceedings of the ISMRM 25th Annual Meeting*, Honolulu, Hawaii, USA, Apr. 2017, p. 5160.
- [16] **Ong, F.**, Cheng, J., Lustig, M., "General phase regularized reconstruction with phase cycling," in *Proceedings of the ISMRM 25th Annual Meeting*, Honolulu, Hawaii, USA, Apr. 2017, p. 1201.
- [17] **Ong, F.**, Lustig, M., "Joint non-rigid motion estimation and image reconstruction via sparse blind deconvolution," in *Proceedings of the ISMRM 25th Annual Meeting*, Honolulu, Hawaii, USA, Apr. 2017, p. 3937.
- [18] Ou, T., **Ong, F.**, Uecker, M., Waller, L., Lustig, M., "NUFFT: Fast auto-tuned GPU-based library," in *Proceedings of the ISMRM 25th Annual Meeting*, Honolulu, Hawaii, USA, Apr. 2017, p. 3807.
- [19] Iyer, S., **Ong, F.**, Lustig, M., "Towards a parameter-free ESPIRiT: Soft-weighting for robust coil sensitivity estimation," in *Proceedings of the ISMRM 24th Annual Meeting*, Singapore, May 2016, p. 1083.
- [20] Jiang, W., **Ong, F.**, Johnson, K. M., Nagle, S., Hope, T., Lustig, M., Larson, P. E. Z., "Soft-gating and motion resolved reconstructions for free-breathing pulmonary imaging," in *Proceedings of the ISMRM 27th Annual Meeting*, Singapore, May 2016, p. 1139.
- [21] **Ong, F.**, Lustig, M., "A shinnar le-roux transform for t1, t2 and frequency selective pulses," in *Proceedings of the ISMRM 24th Annual Meeting*, Singapore, May 2016, p. 1895.

- [22] **Ong, F.**, Pawar, S., Ramchandran, K., "Fast sparse 2-d DFT computation using sparse-graph alias codes," in *2016 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Shanghai, China: IEEE, Mar. 2016, pp. 4059–4063. DOI: [10.1109/ICASSP.2016.7472440](https://doi.org/10.1109/ICASSP.2016.7472440).
- [23] Tamir, J. I., **Ong, F.**, Cheng, J. Y., Uecker, M., Lustig, M., "Generalized magnetic resonance image reconstruction using the berkeley advanced reconstruction toolbox," in *ISMRM Workshop on Data Sampling and Image Reconstruction*, Sedona, Arizona, USA, 2016.
- [24] Zwart, N. R., Anderson III, A. G., Robison, R. K., Li, A., Doneva, M., **Ong, F.**, Uecker, M., Lustig, M., Pipe, J. G., "Uniting reconstruction software for native use in GPI," in *Proceedings of the ISMRM 27th Annual Meeting*, Singapore, 2016, p. 1781.
- [25] **Ong, F.**, Uecker, M., Lustig, M., "Fast non-cartesian reconstruction with pruned fast fourier transform," in *Proceedings of the ISMRM 23rd Annual Meeting*, Toronto, Ontario, Canada, 2015, p. 3639.
- [26] **Ong, F.**, Zhang, T., Cheng, J., Uecker, M., Lustig, M., "Beyond low rank + sparse: Multi-scale low rank reconstruction for dynamic contrast enhanced imaging," in *Proceedings of the ISMRM 23rd Annual Meeting*, Toronto, Ontario, Canada, May 2015, p. 0575.
- [27] Uecker, M., **Ong, F.**, Tamir, J. I., Bahri, D., Virtue, P., Cheng, J. Y., Zhang, T., Lustig, M., "Berkeley advanced reconstruction toolbox," in *Proceedings of the ISMRM 23rd Annual Meeting*, Toronto, Ontario, Canada, 2015, p. 2486.
- [28] **Ong, F.**, Uecker, M., Tariq, U., Hsiao, A., Alley, M., Vasanawala, S., Lustig, M., "Compressed sensing 4d flow reconstruction using divergence-free wavelet transform," in *Proceedings of the ISMRM 22nd Annual Meeting*, Milan, Italy, Mar. 2014, p. 0326.
- [29] **Ong, F.**, Uecker, M., Tariq, U., Hsiao, A., Alley, M., Vasanawala, S., Lustig, M., "Improved visualization and quantification of 4d flow MRI data using divergence-freewavelet denoising," in *2013 IEEE 10th International Symposium on Biomedical Imaging*, San Francisco, CA, USA: IEEE, Apr. 2013, pp. 1186–1189. DOI: [10.1109/ISBI.2013.6556692](https://doi.org/10.1109/ISBI.2013.6556692).
- [30] Uecker, M., Virtue, P., **Ong, F.**, Murphy, M. J., Alley, M. T., Vasanawala, S. S., Lustig, M., "Software toolbox and programming library for compressed sensing and parallel imaging," in *ISMRM Workshop on Data Sampling and Image Reconstruction*, Sedona, Arizona, USA, 2013.

Invited Talks

- [1] **Ong, F.**, "Extreme MRI: Reconstructing hundred-gigabyte volumetric dynamic MRI from continuous non-gated acquisitions," University of California, Los Angeles, California, USA, Jun. 18, 2019.
- [2] **Ong, F.**, "Extreme MRI: Reconstructing hundred-gigabyte volumetric dynamic MRI from continuous non-gated acquisitions," Medical Imaging Seminar, University of South California, Los Angeles, California, USA, Jun. 17, 2019.
- [3] **Ong, F.**, "Extreme MRI: Reconstructing hundred-gigabyte volumetric dynamic MRI from continuous non-gated acquisitions," Radiology Research Forum, New York University, New York, USA, May 9, 2019.
- [4] **Ong, F.**, "Extreme MRI: Reconstructing hundred-gigabyte volumetric dynamic MRI from continuous non-gated acquisitions," Imaging Elevated Symposium, Salt Lake City, Utah, USA, Sep. 21, 2019.
- [5] **Ong, F.**, "Extreme MRI: Reconstructing hundred-gigabyte volumetric dynamic MRI from continuous non-gated acquisitions," Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, Nov. 5, 2019.

- [6] **Ong, F.**, "Learning from undersampled k-space datasets for reconstruction," International BASP Frontiers workshop, Villars-sur-Ollon, Switzerland, Feb. 4, 2019.
- [7] **Ong, F.**, "Tutorial on python programming for computational imaging," Computational imaging IMA workshop, Minneapolis, Minnesota, USA, Oct. 15, 2019.

Service

Reviewer for IEEE Transactions on Medical Imaging
Reviewer for Magnetic Resonance in Medicine
Reviewer for Journal of Magnetic Resonance
Reviewer for IEEE Transactions on Signal Processing

References

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