Kenneth L. Ho

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Academic and Employment History

08/2017 –	Principal Engineer, TSMC, San Jose, CA
08/2015 – 08/2017	Sr. Engineer, TSMC, San Jose, CA
01/2013 – 07/2015	NSF Postdoctoral Fellow, Mathematics, Stanford University
09/2012 – 12/2012	Visiting Scholar, Courant Institute, NYU
08/2012	Visiting Scholar, Theoretical Systems Biology, Imperial College London
06/2012 – 08/2012	Assistant Research Scientist, Courant Institute, NYU
10/2011 – 02/2012	Consultant, Schrödinger, New York, NY
06/2010 – 09/2010	Intern, Schrödinger, New York, NY
05/2012	Ph.D., Computational Biology (Mathematics), Courant Institute, NYU
06/2007	B.S. (with honor), Applied and Computational Mathematics, Caltech

Technical Summary

- Broad knowledge of applied mathematics, computer science, statistics, biology, and chemistry
- Research expertise in fast multipole methods, fast direct solvers, structured matrices; numerical analysis, scientific computing, numerical linear algebra; mathematical modeling, computational biology, systems biology; computational physics; computational chemistry
- Experience with molecular modeling, computational electromagnetics, machine learning, optimization, parallel computing, computational lithography
- *Computing*: C, C++, Fortran, Julia, MATLAB, MPI, Octave, OpenMP, Python
- *Awards*: NSF graduate and postdoctoral fellowships, NYU dissertation award, Caltech merit award
- 15+ peer-reviewed publications, 43 conference/seminar presentations, 5 open-source codes
- Google Scholar: `6gr2NYwAAAAJ` (350+ citations); ORCID: `0000-0001-5450-4966`

Publications

17. H.A. Harrington, K.L. Ho, N. Meshkat. Differential algebra for model comparison. Preprint, `arXiv:1603.09730` [math.DS].

16. V. Minden, A. Damle, K.L. Ho, L. Ying. Fast spatial Gaussian process maximum likelihood estimation via skeletonization factorizations. To appear, Multiscale Model. Simul. Preprint, `arXiv:1603.08057` [stat.ME].

15. F. Fang, K.L. Ho, L. Ristroph, M.J. Shelley. A computational model of the flight dynamics and aerodynamics of a jellyfish-like flying machine. J. Fluid Mech. 819: 621–655, 2017. `doi:10.1017/jfm.2017.150`.

14. V. Minden, K.L. Ho, A. Damle, L. Ying. A recursive skeletonization factorization based on strong admissibility. Multiscale Model. Simul. 15 (2): 768–796, 2017. `doi:10.1137/16M1095949`.

13. E. Gross, B. Davis, K.L. Ho, D.J. Bates, H.A. Harrington. Numerical algebraic geometry for model selection and its application to the life sciences. J. R. Soc. Interface 13: 20160256, 2016. `doi:10.1098/rsif.2016.0256`. PMID:27733697.

12. K.L. Ho, L. Ying. Hierarchical interpolative factorization for elliptic operators: differential equations. Comm. Pure Appl. Math. 69 (8): 1415–1451, 2016. `doi:10.1002/cpa.21582`.

11. K.L. Ho, L. Ying. Hierarchical interpolative factorization for elliptic operators: integral equations. Comm. Pure Appl. Math. 69 (7): 1314–1353, 2016. `doi:10.1002/cpa.21577`.

10. V. Minden, A. Damle, K.L. Ho, L. Ying. A technique for updating hierarchical skeletonization-based factorizations of integral operators. Multiscale Model. Simul. 14 (1): 42–64, 2016. `doi:10.1137/15M1024500`.

9. Y. Li, H. Yang, E.R. Martin, K.L. Ho, L. Ying. Butterfly factorization. Multiscale Model. Simul. 13 (2): 714–732, 2015. `doi:10.1137/15M1007173`.

8. K.L. Ho, L. Greengard. A fast semidirect least squares algorithm for hierarchically block separable matrices. SIAM J. Matrix Anal. Appl. 35 (2): 725–748, 2014. `doi:10.1137/120902677`.

7. L. Greengard, K.L. Ho, J.-Y. Lee. A fast direct solver for scattering from periodic structures with multiple material interfaces in two dimensions. J. Comput. Phys. 258: 738–751, 2014. `doi:10.1016/j.jcp.2013.11.011`.

6. K.L. Ho. Fast direct methods for molecular electrostatics. Ph.D. thesis, New York Univ., 2012.

5. H.A. Harrington, K.L. Ho, T. Thorne, M.P.H. Stumpf. Parameter-free model discrimination criterion based on steady-state coplanarity. Proc. Natl. Acad. Sci. U.S.A. 109 (39): 15746–15751, 2012. `doi:10.1073/pnas.1117073109`. PMID:22967512.

4. K.L. Ho, L. Greengard. A fast direct solver for structured linear systems by recursive skeletonization. SIAM J. Sci. Comput. 34 (5): A2507–A2532, 2012. `doi:10.1137/120866683`.

3. J.A. Bell, K.L. Ho, R. Farid. Significant reduction in errors associated with nonbonded contacts in protein crystal structures: automated all-atom refinement with *PrimeX*. Acta Cryst. D68 (8): 935–952, 2012. `doi:10.1107/S0907444912017453`. PMID:22868759.

2. K.L. Ho, H.A. Harrington. Bistability in apoptosis by receptor clustering. PLoS Comput. Biol. 6 (10): e1000956, 2010. `doi:10.1371/journal.pcbi.1000956`. PMID:20976242.

1. H.A. Harrington, K.L. Ho, S. Ghosh, KC Tung. Construction and analysis of a modular model of caspase activation in apoptosis. Theor. Biol. Med. Model. 5: 26, 2008. `doi:10.1186/1742-4682-5-26`. PMID:19077196.

Presentations

- *Conferences and workshops*: SIAM CSE15; WYRMB 2014; SIAM AN14; FACM 2014; SIAM UQ14; BIRS Workshop on Integral Equations, 2013; SIAM CSE13; NYU/Columbia RTG Symp., NYU, 2012; SIAM LS12; SIAM AN12; SIAM ALA12; CJR, Yale, 2012; DOE Appl. Math. Prog. Meet., 2011; Courant 75th Anniv., NYU, 2011; COB Day, NYU, 2009; NSF IGERT PI Meet., 2009; Bioeng. Bootcamp, Caltech, 2008; Summer Grad. Prog., MBI, 2007; RIPS-IPAM 2006; SURF Semin. Day, Caltech, 2005

- *Seminars and colloquiua*: Argonne Natl. Lab., CMU (2), Caltech, Colorado State, Imperial College London (2), JPL, LBL, NCSU, NJIT, NYU (4), Stanford, Theranos, TSMC, U. Minnesota, U. Wisconsin-Madison, UC Irvine (2), UC Riverside

Codes

All codes hosted at `http://klho.github.io` unless noted otherwise.

5. SparseFFT.jl: sparse fast Fourier transforms in Julia (`SparseFFT.jl`)

4. LowRankApprox.jl: fast low-rank matrix approximation in Julia (`JuliaMatrices/LowRankApprox.jl`)
   - original developer; now maintained by JuliaMatrices

3. FLAM: fast linear algebra in MATLAB (`FLAM`)

2. PyMatrixID: fast interpolative decompositions in Python (`PyMatrixID`)
   - merged into SciPy as scipy.linalg.interpolative

1. hypoct: hyperoctree construction and manipulation (`hypoct`)