Curriculum Vitae

BENJAMIN W. ONG

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RESEARCH INTERESTS

High Performance Scientific Computing: Domain Decomposition, Boundary-Integral Methods, Fast-Summation Treecodes, Moving Mesh Methods, Fault-Tolerant Paradigms, Machine Learning, Numerical Linear Algebra

EDUCATION AND TRAINING

Simon Fraser University,	Mathematics,	Ph.D.	2007
Simon Fraser University,	Mathematical Physics,	B.Sc.	2000

APPOINTMENTS

1/15 – present	Assistant professor, Department of Mathemtical Sciences Michigan Technological University
1/14 – 12/14	Director of Research, Institute for Cyber Enabled Research Michigan State University
8/11 –12/13	Research Specialist, Institute for Cyber Enabled Research Michigan State University
8/10–8/11	Visiting Assistant Professor, Department of Mathematics Michigan State University
8/07–8/10	Post Doctoral Fellow, Department of Mathematics Michigan State University

TEACHING I have taught a wide variety of courses at the various academic institutions I have been affiliated with. My more recent teaching assignments at Michigan Tech are listed below. Instructor ratings are on a scale of 1 (poor) – 5 (excellent)

- Fall 2016, MA 3520 – "Differential Equations" (in progress)
- Fall 2016, MA 5629 – "Numerical PDEs" (in progress)
- Spring 2016, MA 1600 – "Introduction to Scientific Simulations" (4.5/5)
- Spring 2015, MA 1600 – "Introduction to Scientific Simulations" (4.4/5)

PUBLICATIONS

1. B. Mandal and **B. Ong**, Pipeline Waveform Relaxation Methods, preprint

2. A. Christlieb, **B. Ong** and B. Quaife, A new family of regularized kernels for the harmonic oscillator, in revision, Journal of Scientific Computing

3. A. Christlieb, Y. Cheng, W. Guo and **B. Ong**, An asymptotic preserving Maxwell Solver resulting in the Darwin Limit of Electrodynamics, in review

4. M. Iwen and **B. Ong**, A distributed and Incremental SVD algorithm for Agglomerative Data Analysis on Large Networks, accepted, SIAM Matrix Analysis and Applications

5. R. Haynes, K. Ladd and **B. Ong**, (2016) Algorithm 965: RIDC Methods - A Family of Parallel Time Integrators, *ACM TOMS*, 43(Aug):8:1–8:13 doi:10.1145/2964377 (PDF)

6. S. High, F. Kwok and **B. Ong**, (2016) Pipeline Schwarz Waveform Relaxation, Domain Decomposition Methods in Science and Engineering XXII, Lecture Notes in Computational Science and Engineering, Springer-Verlag, 179-187, doi:10.1007/978-3-319-18827-0_36 (PDF)

7. A. Christlieb, C. Macdonald, **B. Ong** and R. Spiteri, (2015) Revisionist Integral Deferred Correction with Adaptive Error and Stepsize Control, *Comm. Math. Sci.*, 10(1):1–25, doi:10.2140/camcos.2015.10.1 (PDF)

8. M. Causley, A. Christlieb, **B. Ong**, L. Van Groningen, (2014) Method of Lines Transpose: An implicit solution to the wave equation, *Mathematics of Computation*, 83:2763–2786, doi:10.1090/S0025-5718-2014-02834-2 (PDF)

9. R. Haynes and **B. Ong**, (2013) MPI-OpenMP algorithms for the parallel space-time solution of Time Dependent PDEs, Domain Decomposition Methods in Science and Engineering XXI, Lecture Notes in Computational Science and Engineering, Springer-Verlag (PDF)

10. **B. Ong**, R. Russell and S. Ruuth (2012), An h-r moving mesh method for one dimensional time dependent PDEs, Proceedings of the 21st International Meshing Roundtable, 39–54, doi://10.1007/978-3-642-33573-0_3 (PDF)

11. A. Christlieb, A. Melfi and **B. Ong** (2012), Parallel Semi-Implicit Time Integrators, arXiv:1209.4297v1, (PDF)

12. A. Christlieb, R. Haynes and **B. Ong** (2012), A parallel space–time algorithm, *SIAM J. Sci. Comput*, 34(5):233–248, doi://10.1137/110843484 (PDF)

13. A. Christlieb and **B. Ong** (2011), Parallel implicit time integrators, *J. Sci. Comput*, 49(2):167–179, doi:10.1007/s10915-010-9452-4, (PDF)

14. A. Christlieb, M. Morton, **B. Ong** and J. Qiu (2011) Semi-implicit integral deferred correction using high order additive Runge–Kutta integrators, *Comm. Math. Sci.*, 9(3):879-902, (PDF)

15. A. Christlieb, C. Macdonald, and **B. Ong** (2010), Parallel high-order integrators, *SIAM J. Sci. Comput*, 32(2):818-835, doi:10.1137/09075740X, (PDF)

16. J. Qiu, **B. Ong** and A. Christlieb (2010), Integral deferred correction methods constructed with high order Runge-Kutta Methods, *Math. Comp.*, 79:761-783, 2010, doi:10.1090/S0025-5718-09-02276-5, (PDF)

17. A. Christlieb, **B. Ong** and J. Qiu (2009) Comments on high order integrators embedded within integral deferred correction methods, *Comm. Appl. Math and Comp. Sci.*, 4(1):27-56, (PDF)

18. J. Barber, C. Bose, A. Bourlioux, J. Braun, E. Brunelle, T. Garcia, T. Hillen and **B. Ong** (2008) Burning issues with PROMETHEUS, the Canada's wildfire growth simulator, *Canadian Applied Mathematics Quarterly*, 16(4):337-378, (PDF)

MENTORING

Undergraduates: A. Melfi (2010–2012); K. King (2010–2011); M. McQuiston (2011–2012); J. Fila (2012–2013); K. Ladd (2011–2014); K. Stankowski (2015); J. Prewett (2015); M. Herringa (2016)

Graduate: Dr. M. Morton (PhD, graduated 2011, co-advised with A. Christlieb); Dr. L. Van Groningen (PhD, graduated 2012, co-advised with A. Christlieb); S. High (Masters, graduated 2014); E. Novak (project, Summer 2015) A. Alazigg (project, Fall 2015)

Post Doctoral Fellows: Dr. K. Wang (2013–2014); Dr. B. Mandal (2015–2016)

Thesis committee: B.Franklin (2015 – present)

CURRENT GRANTS

XSEDE Resource Allocation request, (compute resources, approximately $6,500 in value)
Agglomerative Data Analysi on Large Networks
Role: PI

RECENTLY DECLINED GRANTS

NSF Big Data, *IA: Application of Satellite Data for Global Change Modelling*,
01/17 – 12/19, ($1,226,364),
Role: PI (50%)

DOE Early Career Award, *Geometric Multiscale Methods for Large Data Sets in High Dimensions*, 09/16 – 08/21, ($749,000)
Role: PI (100%)

NSF CDSE, *Multi-Agent Multiscale Geometric Methods*,
09/16 – 08/19, ($268,283)
Role: PI (100%)

COMPLETED GRANTS

(2016) IMA PI Summer Graduate Program, *Finite Element Methods for Eigenvalue Problems* $17,610 Role: Co-PI (25%)

(2016) IAS Travel Award Travel, *The Mathematics of Data* $5,000

(2012–2015) Air Force Office of Scientific Research, *Fault Tolerant Paradigms* ($677,129)
Role: PI (34%)

(2015) Jackson Learning Grant, *Introduction to Scientific Simulations* ($1,000) Role: PI (100%)

(2015) IMA Travel Grant ($750)

(2011–2012) NVIDIA Teaching Center Award ($12,000) Role: co-PI (50%)

(2011–2012) XSEDE Allocation (200,000 CPU hours, $\sim \$20,000$) Role: PI (100%)

SERVICE

(12/2015 – present), MTU Research Computing Committee

(9/2015 – present), Data Science Committee

(9/2015 – present), Undergraduate Committee

(9/2015 – present), MTU Applied Math & Statistics Seminar organizer

(2016), Finite Element Methods for Transmission Eigenvalue Problems, Workshop co-organizer

Reviewer for: AMS MathSciNet, Domain Decomposition, XSEDE, SIAM SISC, SIAM SINUM, JCP, JPDC (Journal for Parallel and Distributed Computed)

Talks (Recent)

8/2016, An Incremental SVD for Distributed Data, International Conference on Computational Mathematics and Inverse Problems, Houghton, MI

7/2016, An Incremental SVD for Distributed Data, The Mathematics of Data, PCMI Workshop, Park City, Utah

7/2016, Pipeline Waveform Relaxation Methods, SIAM Annual Meeting, Boston MA

10/2015, Speeding up your computations – an Introduction to high performance computing & mathematical libraries, MTU Applied Math Seminar, Houghton MI

8/2015, Towards Exascale Computations, AFOSR Computational Math Meeting, Arlington VA

6/2015, RIDC Methods with stepsize control, Parallel–In–Time Workshop, Dresden, DE