


Ted Ashton

Contact Information

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Education

- May 2007 Ph.D., Mathematics, University of Georgia
- All requirements completed 19 Apr 2007
 - Graduate School Dissertation Completion Assistantship, 2005–2006
 - Graduate School Nonteaching Assistantship, 2002–2004
 - Pythagoras Award (for excellence in graduate studies)
 - Outstanding Teaching Assistant Award
 - GPA: 4.0
 - Member $\Phi K \Phi$
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- Dec 1999 B.S., Mathematics, Southern Adventist University, *magna cum laude*
- Outstanding Mathematics Senior Award
 - Passed first Actuarial exam
- Dec 1993 B.S.E., Electrical Engineering, Walla Walla College, *magna cum laude*
- Passed Engineer In Training examination
 - Who's Who Among Students in American Universities and Colleges
 - National Merit Finalist Scholarship
 - Alma Louise Potter Grammar Award (for exceptional achievement in Linguistics and Advanced English Grammars)
- May 1990 A.S., Engineering Studies, Southern College of Seventh-day Adventists, *magna cum laude*
- National Merit Finalist Scholarship
 - Calculus Award

Employment — Industry

- 6/95–8/02 Programmer/Systems Analyst/HP3000 System Manager, Southern Adventist University
- Developed and supported tools and applications written in Pascal, SPL, BASIC/V, COBOL, SLS, Cognos Powerhouse, C and Perl on the HP3000 and managed HP3000 and Linux systems. Also developed online applications using HTML and CGI (Perl).
- 6/90–6/95 Unix System Manager/Programmer, Walla Walla College
- Managed Sun/Sparc, HP-UX, SCO and DellSVR4 Unix systems. Did trouble-shooting and training for Internet connection and utilities, C and Perl programming under Unix, and C programming on an HP3000 (both application and library development).
- 3/85–5/90 Student Programmer (Records, Computer Service, Accounting), Southern College of SDA
- HP3000 support and programming in Cognos Powerhouse, SLS, Pascal, BASIC/V, SPL and COBOL.

Employment — Education

6/07 – Temporary Instructor, University of Georgia
 8/02 – 5/07 Graduate Research and Teaching Assistant, Math Tutor, University of Georgia
 8/96 Adjunct Instructor, Math Department, Southern Adventist University
 8/91 – 6/92 Student Missionary (ESL and Drama teacher), Strisuksa School, Roi-Et, Thailand, 1991–1992

Software Development (Open Source)**liboctrope**

-Ted Ashton and Jason Cantarella. Open-source implementation of the algorithm from [?0ctrope2005], available for download under the GPL at <http://ada.math.uga.edu/research/software/octrope/index.html>.

Devel::SmallProf

-Perl profiler crafted from code suggested by Philippe Verdret. Allows one to profile one's code line-by-line instead of routine by routine as with Devel::DProf.

MPE::Image

-A module to make the native database system, IMAGE, in the MPE operating system accessible to Perl.

Publications

- [1] Ted Ashton, *Exploring Continuous Tensegrities*, Ph. D. Thesis, University of Georgia, 2007, arXiv:0704.2784 [math.MG].
 - I introduce a generalization of the tensegrity framework described in “Tensegrity Frameworks” by Roth and Whiteley. The new “continuous tensegrities” can have arbitrarily many vertices and edges. I extend a key lemma from that paper to many continuous tensegrities and also derive a closely related theorem which applies to all continuous tensegrities.
- [2] Ted Ashton and Jason Cantarella, *A Fast Octree-based Algorithm for Computing Ropelength*, Physical and Numerical Models in Knot Theory, Series on Knots and Everything, vol. 36, World Scientific Publishing, River Edge, NJ, 2005, available at arXiv:math.DG/0409416.
 - We present a new algorithm for finding the self-contacts of a tube around a space polygon of n sides in (best case) $O(n \log n)$ steps. The resulting code is faster than all previous algorithms.
- [3] Ted Ashton, Jason Cantarella, Michael Piatek, and Eric Rawdon, *Self-contact Sets for 50 Tightly Knotted and Linked Tubes*, unpublished, available at arXiv:math.DG/0508248.
 - Here we present the results of our work in computer-simulated knot tightening, giving new ropelength bounds for 212 tight knots and links as well as pictures and strut plots for 50 selected knots and links.
- [4] ———, *Knot Tightening by Constrained Gradient Descent*, in revision.
 - In this paper we present experimental and theoretical results on the simulation of the (conjectured) “knot tightening flow”: a version of the curvature flow for space curves which is constrained by an embedded tube around the core curve. The software used in this paper, RidgeRunner is built around liboctrope.
- [5] Otto Krötenheerdt and Sigrid Veit, *Zur Theorie massiver Knoten*, 1976; English transl. in *On the Theory of Solid Knots*, translated by Ted Ashton, Series on Knots and Everything, vol. 36, World Scientific Publishing, River Edge, NJ, 2005.

- In this 1976 paper, which I translated from the German, Krötenheerdt and Veit examine solid knots constructed of congruent components (spheres, cubes and “kalottes”) and knots of uniform thickness. They establish upper bounds on the minimum number of components and the minimum core length (for uniform-thickness knots) needed to tie $T(m, 2)$ torus knots.