

## Curriculum Vitae - Bryce Sandlund

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### EDUCATION

**University of Wisconsin-Madison** – Madison, WI

*M.S. in Computer Science*

Advisor: Eric Bach

GPA: 3.81

Fall 2014 – Spring 2017 (expected)

**Iowa State University** – Ames, IA

*B.S. in Computer Science and Math*

Math Advisor: Steve Butler

GPA: 3.81

Fall 2010 – Spring 2013

### PUBLICATIONS

1. Baby-Step Giant-Step Algorithms for the Symmetric Group  
Eric Bach and Bryce Sandlund  
*Journal of Symbolic Computation, to appear*  
<https://arxiv.org/abs/1612.03456>
2. Baby-Step Giant-Step Algorithms for the Symmetric Group  
Eric Bach and Bryce Sandlund  
**ISSAC 2016**
3. Numerical Tic-Tac-Toe on the  $4 \times 4$  Board  
Bryce Sandlund, Kerrick Staley, Michael Dixon, and Steve Butler  
**COCOON 2014**

### HONORS AND AWARDS

- ACM-ICPC:
  - 2012 (Iowa State University) – 2nd/230 at Regional, Honorable Mention at the World Finals.
  - 2013 (Iowa State University) – 5th/239 at Regional.
  - 2015 (University of Wisconsin-Madison) – 1st/273 at Regional, 64th/128 at the World Finals.
  - 2016 (University of Wisconsin-Madison) – Coach for UW-Madison teams. Our teams placed 1st, 3rd, 5th, 6th, 11th, and 33rd out of 223 teams in the Regional and received Honorable Mention at the World Finals.
  - 2017 (University of Wisconsin-Madison) – Coach for UW-Madison teams. Our teams placed 1st, 5th, and 19th out of 225 teams in the Regional this fall.
- Golden Brick award for ICPC coaching and volunteer work for Welcome Weekend, University of Wisconsin-Madison, 2016.
- Computer Science Service Scholar, Iowa State University, 2013.

- Boeing Computer Science Scholar, Iowa State University, 2012.

**RESEARCH  
POSITIONS  
HELD**

University of Wisconsin-Madison – Madison, WI  
*Research Assistant* in computational algebra under Eric Bach  
 Spring 2015, Summer 2015, Spring 2016, Summer 2016

Iowa State University – Ames, IA  
*Research Assistant* for SmartHome Lab  
 Spring 2012, Summer 2012, Fall 2012

**TEACHING  
EXPERIENCE**

**CS 577 – Introduction to Algorithms**

University of Wisconsin-Madison  
 Fall 2015, Fall 2016

**CS 311 – Design and Analysis of Algorithms**

Iowa State University  
 Fall 2012, Spring 2013

**CS 302 – Introduction to Programming**

University of Wisconsin-Madison  
 Fall 2014

**CS 228 – Data Structures**

Iowa State University  
 Fall 2011

**WORK  
EXPERIENCE**

Microsoft Corporation – Redmond, WA  
*Software Development Engineer* in ISS Live Research and Development  
 Development team for Xbox One  
 June 2013 – August 2014

Direct Supply – Milwaukee, WI  
*Software Engineering Intern*  
 Web development  
 May 2011 – January 2012

**RELEVANT  
PROJECTS**

1. Offline Dynamic Higher Connectivity  
 Yu Gao, Richard Peng, Bryce Sandlund, and Daniel Sleator  
 Ongoing work. We are looking at extending offline dynamic connectivity algorithms for  $k$ -edge connectivity and vertex connectivity.
2. Euler's Criterion in Quadratic Time  
 Eric Bach and Bryce Sandlund  
 To determine if  $x \in \mathbb{Z}_n$  is a cubic or quartic residue, Euler's Criterion can be evaluated in  $O(\log^3 n)$  time. We explore analogies to the Jacobi symbol that permit  $O(\log^2 n)$  algorithms using naive multiplication.

3. Approximate Nearest Neighbor Queries in High-Dimensional Space  
 Bryce Sandlund and Michael O'Neill  
 We give a heuristic algorithm that constructs an approximate nearest neighbor graph. Experimental results suggest graph-based nearest neighbor approaches perform nearly as well on our approximate graph than on an exact one.  
<http://pages.cs.wisc.edu/~sandlund/ApproximateNNGraph.pdf>
  
4. Clustering with Advice  
 Andrew Morgan and Bryce Sandlund  
 We show that with  $O(n^{1-\epsilon})$  uniformly random advice pairs,  $k$ -median or  $k$ -means remain NP-hard. We give an overview of other geometrical formulations and pitfalls where an exact optimal solution remains difficult to construct.  
<http://pages.cs.wisc.edu/~sandlund/ClusteringWithAdvice.pdf>
  
5. ICPC Code Library  
 Andrew Morgan and Bryce Sandlund  
 We built a powerful library for ICPC. Lightweight implementations of lazy segment tree, suffix array, max flow, dynamic kd-tree, FFT, KMP, and an array of algebraic and geometric routines are available, to name a few.  
<https://github.com/atmorgan/ICPC2014>
  
6. Graph Connectivity and its applications to Space-Bounded Computation  
 Bryce Sandlund  
 This is primarily an overview of Reingold's paper on st-connectivity in log space.  
<http://pages.cs.wisc.edu/~sandlund/STConnectivityInLogSpace.pdf>
  
7. Prime Harmonic Sum Code  
 Bryce Sandlund, Eric Bach, Dominic Klyve, and Jonathan Sorenson  
 I revitalized the code for computing  $\sum_{p \leq x} 1/p$ ,  $p$  prime.  
 This is a work in progress, as there are some bugs when computing for large  $x$ .  
<http://pages.cs.wisc.edu/~sandlund/PrimeHarmonicSums.html>

**VOLUNTEER  
AND  
LEADERSHIP**

- President of Computer Science/ Software Engineering Club, Iowa State University, 2012-2013.
- Vice President of Computer Science/ Software Engineering Club, Iowa State University, 2011-2012.
- Volunteer for Welcome Weekend Committee, 2016.
- Volunteer for ACM-ICPC Regional Problem Generation, 2014, 2015, 2016.
- Volunteer for K-12 Computer Science Outreach, 2011, 2012.
- Volunteer for Science Bowl, 2013.
- Volunteer for Computational Thinking Competition, 2013.

**COMPUTER  
SKILLS**

*Languages & Software:* Java, C#, C++, C, Sage, Python, SQL, HTML, JavaScript.  
*Operating Systems:* Unix, Mac, Windows.