

# Adam Blank

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EDUCATION **Carnegie Mellon University** *2012 – 2014*  
Master of Science in Computer Science  
Thesis: *Technological and Pedagogical Innovations for Teaching Introductory Discrete Mathematics to Computer Science Students*  
Advisors: *Randy Bryant, Klaus Sutner*

**Carnegie Mellon University** *2008 – 2012*  
Bachelor of Science in Computer Science, Minor in Mathematics

TEACHING **CMU 15-151: Mathematical Foundations of Computer Science**  
Course Designer and Instructor (*Fall 2012, Fall 2013*)  
100 – 140 students, all freshmen

All computer science majors at CMU take two introductory discrete math courses: one in their first semester and another in their second. The course taken in the spring is “15-251” (see below), and it is traditionally a very difficult course. I created 15-151 for CS majors to make 15-251 less overwhelming. I used programming analogies and various techniques like group work, quizzes worth no points to check their understanding, and interactivity to increase learning. In 2011 and 2012, I taught three lectures of 15-151 on Monday, Wednesday, and Friday. In 2011, my mentor, Klaus Sutner, gave half of the lectures.

**CMU 15-131/98-172: Great Practical Ideas for Computer Scientists**  
Course Designer and Instructor (*Fall 2011*)  
Co-instructor (*Fall 2012*)  
100 students, all freshmen

CMU recently changed their introductory sequence to include additional content on verification and parallelism. After this change, students needed additional background on UNIX, bash scripting, and C debugging; so, I created 98-172, a student-taught course to fill this need. I gave lecture once a week, and held four “lab-itations” (a cross between recitation and lab) each week as well. In Fall 2013, CMU decided to make 98-172 a course in the CS department, and I helped the effort to make the necessary changes.

**CMU 15-251: Great Theoretical Ideas in Computer Science**  
Head Teaching Assistant (*Spring 2012*)  
Teaching Assistant (*Fall 2010, Spring 2012, Spring 2009*)  
150 – 200 students, primarily freshmen

This course is a very difficult introduction to discrete mathematics and computability theory. It covers a new topic every week, and the homework questions are traditionally time consuming. Every semester I TAed, I held a recitation for around 40 students, held at least 3-4 office hours every week, developed homework assignments and recitations, and graded. I also maintained the course submission and grading system and over many of the semesters, I developed a new one. In Spring 2012, I had several additional duties as the head teaching assistant. I acted as liaison between the other TAs and professors, and I held extra “conceptual” office hours every week in which I repeated the topics from lectures for students who were struggling. These office hours usually were attended by 20-30 students.

**CMU 15-451: Algorithm Design and Analysis**Teaching Assistant (*Spring 2012*)

100 – 150 students, primarily juniors and seniors

This course is an introduction to traditional algorithms. This semester, the professors added in some extra material about computational geometry. I held weekly recitations, graded oral presentations, written homework, and exams, and held office hours.

**CMU 21-127: Concepts of Mathematics**Teaching Assistant (*Fall 2011*)

200 – 300 students, primarily freshmen

It is a generic introduction to discrete mathematics for various disciplines. I held recitation for 50 students twice a week, wrote my own handouts and quizzes, wrote several of the exams, graded for my entire recitation, and held 3-4 office hours every week.

**CMU 15-211: Fundamental Data Structures and Algorithms**Teaching Assistant (*Summer 2010, Fall 2009*)

200 students, primarily freshmen

This course used to be taken by freshmen computer science majors and minors. It covered essential graph, string, searching, etc. algorithms and data structures. Both times, I graded, wrote exam questions, held recitation for around 35 students, and held several office hours a week.

HONORS	Alan J. Perlis Undergraduate Student Teaching Award <span style="float: right;"><i>2012</i></span>
	Honorable Mention for CRA Outstanding Undergraduate Award <span style="float: right;"><i>2012</i></span>

RESEARCH	<b>A compiler for introductory discrete mathematics</b> <span style="float: right;"><i>2012 – Current</i></span> I designed a programming language called “Setty” and implemented a compiler. The standard library builds naturals, pairs, etc. from sets using the standard mathematical constructions. The goal of this language (which we used in 15-151) was to allow students to learn “the mathematical language” such as set comprehensions like $\{x \in [5] \mid x > 2\}$ and quantified statements like $\forall(x \in [5]). x < 5$ by evaluating them in a computational environment.
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RESEARCH	<b>Improving submission, annotation, review, and feedback of proofs</b> <span style="float: right;"><i>2010 – Current</i></span> I developed a course infrastructure system that handles LaTeX submissions, annotation, grading, and feedback of proofs. The system allows graders to first review and mark up the student submissions while re-using comments without worrying about point values, and then apply a rubric to their reviews. By providing an interface to easily reuse comments and update the rubric globally with a single click, we reduce the grading time while increasing the usefulness of feedback.
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RESEARCH	<b>Peer grading of proofs</b> <span style="float: right;"><i>2010 – Current</i></span> The system we developed for submission and feedback also allowed students to anonymously review each other’s submissions. I ran a study which showed that students who <i>reviewed</i> more proofs rather than <i>doing</i> more proofs wrote better proofs later.
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SERVICE	<b>CMU SCS CSD Teaching Assistant Advisory Committee</b> <span style="float: right;"><i>2012 – Current</i></span> The TA Advisory Committee reviews and recommends policies for the TA program in the CS department. I serve on a subcommittee which is working on the end-of-semester evaluation process for TAs.
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INTERNSHIPS	<b>Software Engineering Intern at Duolingo</b> <span style="float: right;"><i>Summer 2011</i></span> With Luis von Ahn I developed a data entry portal for language experts to enter practice sentences into. I worked on the language practice system and helped implement alternative strategies for practicing languages. I also wrote a prototype of the API used to allow customers to ask for content to be translated.
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REFERENCES

**Randal E. Bryant**

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