Richard Matthew McCutchen
https://mattmccutchen.net/, matt@mattmccutchen.net
(Please email me if you need my phone number or postal address.)

INTERESTS (not exhaustive)

- End-user development
- Programming languages and formal methods
- Information security

EXPERIENCE

1/2022–present	**Applied scientist at Amazon.** Working on Amazon Verified Permissions (https://aws.amazon.com/verified-permissions/), a system that eases development of high-assurance authorization models for third-party applications.
9/2020–12/2021	**Software engineer at Correct Computation.** Contributed to 3C, a tool that partially automates conversion of C programs to Checked C to verify spatial memory safety (https://github.com/correctcomputation/checkedc-clang).
9/2014–10/2018	**Graduate student in computer science in the Software Design Group, Massachusetts Institute of Technology.** Developed Espalier (https://sdg.csail.mit.edu/projects/espalier), a tool that truly integrates structured data into the spreadsheet paradigm to make it easier for non-experts to build a wide class of interactive applications (paper in Onward! 2016, demo in LIVE 2018).
6/2017–8/2017, 5/2018–6/2018	**Internships with Calc Intelligence team at Microsoft Research.** Developed "elastic sheet-defined functions" (https://mattmccutchen.net/elastic-sdfs/), a spreadsheet extension that helps non-experts reuse computations on input arrays of different sizes (paper in JFP, presented at ICFP 2020).
5/2016–8/2016	**Internship at Microsoft Research.** Built a lightweight verification framework for web-based single sign-on implementations (https://github.com/cs0317/svAuth/) with Shuo Chen and Shaz Qadeer (short paper in IEEE SecDev 2016).
6/2015–8/2015	**Internship with Microsoft Tools for Software Engineers team.** Implemented and tested a concurrent protocol to migrate a data set while applications are accessing it, as a case study of the P# systematic concurrency testing tool. (https://github.com/mattmccutchen/MigratingTable, paper in FAST 2016.)
9/2011–8/2014	**Software engineer at Google.**
5/2012–8/2014	• Web Search SRE (production) team. On call, and extended Python-based system deployment tools to automate more steps of the process.
1/2012–5/2012	• Google Programmable Ads. Developed and maintained large integration tests in Python.
9/2011–1/2012	• AdWords front end. Completed two internal code migrations (Java).
6/2011–8/2011	**Internship at MITRE Corporation.** Co-lead for a proof-of-concept integration of web-based data analysis tools written by different teams into a common dashboard, using JavaScript and Java servlets.
3/2011–5/2011	Implemented a wiki in the Servlet Information Flow framework (http://www.cs.cornell.edu/jif/sif/) as a case study.
9/2010–12/2010	Implemented a prototype TLS client and server that support arbitrary server authentication policies written in the Alpaca logic (see http://pdos.csail.mit.edu/uia/).
7/2010–8/2010	**Internship at Google.** Strengthened data validation in a Java-based web service framework.
6/2010–5/2011	Deployed and analyzed security of web applications for the Office of Information Technology, University of Maryland (part time).

11/2009–1/2010	Research on strategies for automatic insertion of type coercions in a program with Michael Hicks, University of Maryland.
6/2009–8/2009	**Internship at Bell Labs (Alcatel-Lucent) with Randeep Bhatia.** Implemented a prototype system to deliver video to cell phones in the background.
1/2006–9/2008	**Algorithms research with Samir Khuller, University of Maryland:**
6/2008–9/2008	• Developed software to match papers to reviewers, which was later used for POPL 2012. See https://mattmccutchen.net/match/.
8/2008	• Presented a paper (with Samir Khuller) on streaming algorithms for clustering very large sets of points at APPROX 2008. See https://mattmccutchen.net/clustering/.
4/2008	• Presented a paper on matching of people to positions with one-sided preferences at LATIN 2008. See https://mattmccutchen.net/lumc/.
6/2006–8/2006	Helped implement, tested, and evaluated a compiler and an inference tool for Javari, which consists of Java plus a reference immutability type qualifier. With Michael Ernst, Massachusetts Institute of Technology (Research Science Institute).
8/2005–1/2006	Developed an Eclipse plugin that helps Cyclone programmers understand why certain pointers require additional runtime overhead to maintain memory safety. With Michael Hicks, University of Maryland.
6/2005–8/2005, 6/2006	**Developer, CharityWeb** (provider of Web services for nonprofits). Overhauled email list implementation to personalize messages to donors.
12/2004–12/2005	**Developer and system administrator, Montgomery Blair High School.** Maintained the school's shared shell server and made enhancements to the course management system.

TEACHING EXPERIENCE

2/2011	Gave a guest lecture about matching with one-sided preferences to a graduate-level algorithms course at the University of Maryland.
5/2006, 4/2007, 3/2008	Gave a lesson on the mathematical model of a single product market to AP Microeconomics classes at my high school; students said it greatly improved their understanding.

EDUCATION

8/2007–5/2011	B.S. in computer science and mathematics, University of Maryland College Park. University Honors Program, Banneker/Key scholarship. GPA 3.974. Graduate-level coursework including approximation algorithms, software verification, theory of programming languages, software security.
9/2003–5/2007	Montgomery Blair High School Science, Math, Computer Science Magnet Program. GPA 3.99 (unweighted), 4.86 (weighted).

OTHER PROJECTS

11/2016–present	Co-maintainer of Braid (https://cristibalan.github.io/braid/), a tool to mirror one Git repository into a subdirectory of another (merging with downstream changes).
9/2010–1/2012	Contributed to IETF standardization of DNSSEC-based designation of TLS server certificates (https://tools.ietf.org/wg/dane/).
9/2005–3/2010	Contributed to rsync (https://rsync.samba.org/), a versatile open-source file-copying tool, and provided expert advice and clever solutions to users.
9/2007	Built a web application to organize tennis games for a group of University of Maryland faculty members.

3/2006	Wrote an article about the USA Computing Olympiad for Imagine magazine (http://cty.jhu.edu/imagine/).

HONORS

4/2014	National Science Foundation Graduate Research Fellowship.
4/2009, 2/2010	ACM Intercollegiate Programming Contest World Finals: 20th place, 14th place (University of Maryland team).
11/2009	Computing Research Association Outstanding Undergraduate Research Award.
11/2008, 11/2009, 11/2010	Virginia Tech Regional Math Contest: first place 2008 and 2010, second place 2009.
4/2009, 4/2010	Aziz Scholarship from Math Department, University of Maryland.
5/2009	Pete Stewart Undergraduate Research Award from Computer Science Department, University of Maryland.
4/2009	J.R. Dorfman Prize for Undergraduate Research from College of Computer, Math, and Physical Sciences, University of Maryland.
1/2008	Appeared in *Hard Problems* documentary about the Math Olympiad (http://hardproblemsmovie.com/).
8/2005, 8/2006, 8/2007	International Olympiad in Informatics: gold medal 2007 and 2005, silver medal 2006.
6/2006, 6/2007	National champion, 2006 and 2007 USA Computing Olympiads.
1/2007	Finalist, 2007 Intel Science Talent Search.
4/2007	IBM Thomas J. Watson Memorial Scholarship.
3/2007	National Merit Scholar.
5/2006	Caltech Signature Award.
5/2005, 5/2006	USA Math Olympiad: winner 2006, honorable mention 2005.
4/2006	Invited to the Research Science Institute 2006. Final presentation was judged one of the top five.

EXTRACURRICULAR ACTIVITIES

1/2016–9/2018	Hosted Dance Dance Revolution sessions open to everyone at Massachusetts Institute of Technology.
2/2015–5/2015	Tutor, English as a Second Language for Service Employees, Massachusetts Institute of Technology.
6/2012–5/2014	Leader of the Young Adult Group at the Unitarian Universalist Church of Palo Alto.
10/2012–3/2014	English as a Second Language tutor and teaching assistant for the Building Skills Partnership (http://www.buildingskills.org/) at Google.
9/2013–3/2014	Tutored a local middle school student with Partners for New Generations (http://www.pngmvla.org/).
9/2007–5/2011	Member, University of Maryland Linux Users Group. Gave presentations about git and rsync.
1/2008–9/2010	Piano accompanist, University of Maryland Catholic Student Center.
9/2005–2/2007	President, Montgomery Blair High School Computer Club. Gave weekly lectures, most on programming competition techniques and problems.
2000–5/2007	Math teams and competitions including Mathcounts, American Regions Math League, Mandelbrot, and Calculus League.
~1995–8/2007	Piano: recitals and private lessons.