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https://landon.github.io/

landon rabern

work history

principal engineer: performance star 2019 -
analysis and fault detection on time-series data from semiconductor manufacturing machine sensors such as gas flow rates, valve angles, pressure, and temperature. fourier analysis, wavelets, empirical mode decomposition. recurrent neural net models. (python, keras, pywavelet, tslearn, numpy, scikit-learn, pandas)

data scientist: facebook 2018 - 2019
worked with the world.ai team to ingest and digest open street map diffs. helped create accurate population density maps of africa combining census data and satellite imagery (python, presto, giraph, hadoop, hive, gluster, C++, java, javascript)

senior staff engineer: iqvia 2017 - 2018
built general diagram of things charting engine with arbitrary depth axis-aligned recursively nested, interactive, animated charts. chart components and databinding specified by an xml-based markup language used by a team of 100+ engineers in india to build client specific applications (C#, javascript)

cto, co-founder: lbd data 2008 - 2018
built a suite of mobile video software for police and public transit. the suite is used throughout the united states. (C#, winforms, wpf, libavcodec, openstreetmap, opencv, amazon s3, dynamodb, sql, javascript, html5, C++)

adjunct assistant professor, mathematics: franklin & marshall college 2014 - 2017
taught math!

senior software engineer: markit on demand 2010 - 2011
optimized middleware supporting hundreds of developers (C#, C++)

kernel engineer: synaptics 2009 - 2010
improved reliability of touchpad (C++)

software engineer: markit on demand 2007 - 2009
charts, reports, and tools for the financial services industry (C#, C++, html5, javascript)

scientific programmer: titan national security 2006 - 2007
created software to model the effects of electromagnetic pulses on military systems (C++, C#)

education

phd, mathematics: arizona state university 2011 - 2013
- research: discrete math, combinatorics, graph coloring, games and algorithms
- dissertation on the borodin-kostochka conjecture
- advisor: hal kierstead

ma, mathematics: uc santa barbara 2003 - 2005
- research: noncommutative noetherian rings, quantum groups, low dimensional topology

ba, mathematics: washington university in st. louis 1999 - 2003
- ross middlemiss prize for top graduating mathematics major
- study abroad in the netherlands at utrecht university 2001 - 2002

honors & activities

- **erdős number 2** 2011 - ∞
- **1st place, mentor graphics state programming competition** 1997 and 1998
- **developed betsy, a strong chess ai, in C and x86 assembly** 1998 - 2003
- **built tesla coils and produced massive lightning bolts** 1997 - 1999

research

30^+ publications in top-tier discrete mathematics and philosophy journals—including journal of graph theory, journal of combinatorial theory, combinatorica, discrete mathematics, journal of philosophical logic, and, analysis. a couple favorites:

- planar graphs are $\frac{9}{2}$-colorable *journal of combinatorial theory*, 2017 (with d.w. cranston)

  this article is about coloring countries on a map so that adjacent countries receive distinct colors. it was conjectured in 1852 that any map could be colored thusly using only 4 colors. this was finally proved in 1976, but the proof is not human-checkable; it requires many hours of computer time to check thousands of cases. finding a human-checkable proof is still an open problem. to prove that 5 colors suffice is relatively simple. we gave a human-checkable proof that 4.5 colors suffice; this means that we get to use 9 colors, but have to assign each country 2 colors.

  - settled a 20-year old conjecture on the existence of such a proof.
  - featured on computational complexity, a popular computer science blog by lance fortnow & bill gasarch.

- a simple solution to the hardest logic puzzle ever. *analysis*, 68(2), 2008 (with b. rabern)

  three gods A, B, and C are called, in no particular order, true, false, and random. true always speaks truly, false always speaks falsely, but whether random speaks truly or falsely is a completely random matter. your task is to determine the identities of A, B, and C by asking three yes-no questions; each question must be put to exactly one god. the gods understand english, but will answer all questions in their own language, in which the words for yes and no are da and ja, in some order. you do not know which word means which.

  - showed how to trivialize the puzzle by asking questions that elicit meaningful answers from random.
  - showed how to solve the puzzle in only two questions by using paradoxes to explode god-heads.
  - this article led to the problem getting a lot of press and many follow-up papers have been written.