landon rabern, phd

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Work History

CTO, Co-founder   2008 - 2017
LBD Data

- Contract development for Safety Vision, a producer of mobile video solutions for police and public transit.
- Wrote SafetyView (C#)
    - P/Invoke wrapper of libavcodec for H264/MPEG4 decoding, up to 12 channel playback at once.
    - Vehicle location display via embedded Google map (JavaScript).
    - Custom AVI writer for export.
    - Shareable web links, multichannel playback in HTML5 for mobile (using Amazon S3 with DynamoDB).
    - Both WinForms and WPF versions.
- Wrote SafetyNet (C#)
    - Automatic wireless download of video from vehicles.
    - Video searchable by metadata in database (SQL).
    - Streaming video to SafetyView.
- Wrote LiveLook (C++ / C#)
    - Live playback of multiple IP camera streams.
    - Uses LIVE555 to eat the streams, passing frames up to a C# WPF viewer.
- Contract development for ipDatatel
- Wrote uDownloader (C#)
    - NT service that talks to household appliances
    - Tray application to monitor connections, view data transmission
- Made custom version of com0com null-modem emulator driver (C++)

Adjunct Assistant Professor   2014 - 2016
Mathematics Department
Franklin & Marshall College   Lancaster, PA

- 6 sections of Calculus.
- 3 sections of Algebra & Trigonometry.

Senior Software Engineer   2010 - 2011
Wall Street On Demand   Boulder, CO

- Made an attribute-based runtime object to/from stream protocol mapping engine using compiled expression trees in C#.
- Heavily optimized the mapping of built-in types to/from the stream protocol achieving a 10x speed increase.
- Optimized the memory profile of the multithreaded socket server by writing a lockless thread-safe memory pool in C#. This allowed the server to handle a 2x increase in load.

Senior Software Engineer   2009 - 2010
Synaptics   Santa Clara, CA

- Debugged and fixed issues in the Synaptics TouchPad driver, ranging from blue screens to gesture recognition problems (C++).
- Built a tool to play back and analyze gestures from customer log files (C#).
- Built a tool to verify and optimize driver INF files (C#).

Software Engineer   2007 - 2009
Wall Street On Demand   Boulder, CO

- Rewrote the company's entire distributed computing layer in C#. This included the implementation of socket based clients and servers that communicate using the company's custom data transfer protocol.
- Wrote large portions of Goldman Sachs' (the parent company) new C# financial plotting tool.
- Built the foundation for the company's new chart and pdf generation server. This uses WPF to generate thumbnail charts for web pages as well as creating complete stock and research reports.

Scientific Programmer   2006 - 2007
L-3 Communications - Applied Technologies Division   Santa Barbara, CA
Security Clearance: Secret

- Developed a C# control encapsulating NASA's WorldWind 3D mapping application. Wrote algorithms to display shaded contours on WorldWind's globe.
- Exposed Unmanaged C++ algorithms and graphics packages for use in Managed C# code using both P/Invoke services and C++/CLI wrappers.
- Wrote a C++ application that provides nuclear effects simulation in real-time wargaming exercises for White Sands Missile Range.
- Wrote a COM object that provides source region electromagnetic pulse effects simulation (the thing that happens when a nuke goes off at low altitude).
- Wrote a parallel Monte Carlo electromagnetic simulation to compute damage probabilities.
- Wrote a finite difference time domain Maxwell's equations visualizer in C++.

Education

Ph.D., Mathematics   2011 - 2013
Arizona State University
Research: Discrete math, graph coloring, games and algorithms.
Advisor: Hal Kierstead

M.A., Mathematics   2003 - 2005
University of California, Santa Barbara

B.A., Mathematics   1999 - 2003
Washington University in St. Louis
Ross Middlemiss Prize (for top graduating Mathematics major)
Study Abroad in the Netherlands (Utrecht University)   2001 - 2002

Honors & Activities

Erdős number 2   2011
1st place, Mentor Graphics State Programming Competition   1997 and 1998
Developed Betsy, a master strength chess program, in C   1998 - 2003
Built Tesla coils and produced massive lightning bolts   1997 - 1999

Technical Skills

- **Languages and Technologies**
  - C#, C/C++, JavaScript, Go, Python, Solidity, F#, Dart, Java, Pascal, VB.NET, Scheme, Fortran, x86 assembly
  - LINQ, LaTeX, SQL, ASP.NET MVC, HTML, CSS, XML, XSLT, Bridge.NET, Google protobufs
  - WinForms, WPF, Silverlight, Xamarin
- **Development Tools and Platforms**
  - ANTS profiler, dotTrace
  - .NET Reflector, dotPeek
  - Visual Studio, Notepad++
  - Git, Subversion, CVS
  - Windows, Linux, Mac

Research Articles

[1] D.W. Cranston and L. Rabern. Beyond Degree Choosability. *Electron. J. Combin.*, Accepted.

[2] D.W. Cranston and L. Rabern. Planar graphs are 9/2-colorable. *J. Combin. Theory Ser. B*, Accepted.

[3] D.W. Cranston and L. Rabern. Short fans and the 5/6 bound for line graphs. *SIAM J. Discrete Math*, Accepted.

[4] L. Rabern. A better lower bound on average degree of 4-list-critical graphs. *Electron. J. Combin.*, **23** (3), 2016.

[5] H. Kierstead and L. Rabern. Extracting list colorings from large independent sets. *J. Graph Theory*, Accepted.

[6] D.W. Cranston and L. Rabern. Edge Lower Bounds for List Critical Graphs, via Discharging. *Combinatorica*, Accepted.

[7] D.W. Cranston and L. Rabern. Planar graphs have independence ratio at least 3/13. *Electron. J. Combin.*, **23** (3), 2016.

[8] D.W. Cranston and L. Rabern. List-coloring claw-free graphs with $\Delta - 1$ colors. *SIAM J. Discrete Math.*, Accepted.

[9] D.W. Cranston and L. Rabern. Subcubic edge chromatic critical graphs have many edges. *J. Graph Theory*, Accepted.

[10] D.W. Cranston and L. Rabern. Painting squares in $\Delta^2 - 1$ shades. *Electron. J. Combin.*, **23** (2), 2016.

[11] H. Kierstead and L. Rabern. Improved lower bounds on the number of edges in list critical and online list critical graphs. *J. Combin. Theory Ser. B*, Accepted.

[12] D.W. Cranston and L. Rabern. The fractional chromatic number of the plane. *Combinatorica*, Accepted.

[13] D.W. Cranston and L. Rabern. Graphs with $\chi = \Delta$ have big cliques. *SIAM J. Discrete Math.*, Accepted.

[14] D.W. Cranston and L. Rabern. A note on coloring vertex-transitive graphs. *Electron. J. Combin.*, Accepted.

[15] D.W. Cranston and L. Rabern. Brooks' Theorem and Beyond. *J. Graph Theory*, Accepted.

[16] D.W. Cranston and L. Rabern. Conjectures equivalent to the Borodin-Kostochka conjecture that appear weaker. *European J. Combinatorics*, Volume 44, Part A, February 2015, Pages 2342.

[17] L. Rabern. A game generalizing Hall's Theorem. *Discrete Math.*, **320**(6):87-91, 2014.

[18] L. Rabern. Coloring graphs with dense neighborhoods. *J. Graph Theory*, **76**(4):323-340, 2014.

[19] L. Rabern. A different short proof of Brooks' theorem. *Discuss. Math. Graph Theory*, **34**(3), 2014.

[20] L. Rabern, B. Rabern, and M. Macauley. Dangerous reference graphs and semantic paradoxes. *Journal of Philosophical Logic*, **42**(5):727-765, 2013.

[21] L. Rabern. Partitioning and coloring graphs with degree constraints. *Discrete Math.*, **313**(9):1028-1034, 2013.

[22] D.W. Cranston and L. Rabern. Coloring claw-free graphs with $\Delta - 1$ colors. *SIAM J. Discrete Math.*, **27**(1):534-549, 2013.

[23] L. Rabern. Destroying non-complete regular components in graph partitions. *J. Graph Theory*, **72**(2):123-127, 2013.

[24] A.V. Kostochka, L. Rabern and M. Stiebitz. Graphs with chromatic number close to maximum degree. *Discrete Math.*, **312**(6):1273-1281, 2012.

[25] L. Rabern. A strengthening of Brooks' Theorem for line graphs. *Electron. J. Combin.*, N145, **18** (1), 2011.

[26] L. Rabern. Δ-Critical graphs with small high vertex cliques. *J. Combin. Theory Ser. B*, **102**(1):126-130, 2012.

[27] L. Rabern. On hitting all maximum cliques with an independent set. *J. Graph Theory*, **66**(1):32-37, 2011.

[28] L. Rabern. A note on Reed's conjecture. *SIAM J. Discrete Math.*, **22**(2):820-827, 2008.

[29] B. Rabern and L. Rabern. A simple solution to the hardest logic puzzle ever. *Analysis*, **68**(2), April 2008.

[30] L. Rabern. Applying Groebner basis techniques to group theory. *J. Pure Appl. Algebra*, **210**(1):137-140, 2007.

[31] L. Rabern. The Borodin-Kostochka conjecture for graphs containing a doubly critical edge. *Electron. J. Combin.*, N22, **14** (1), 2007.

[32] D. Gernert and L. Rabern. A knowledge-based system for graph theory, demonstrated by partial proofs for graph-colouring problems. *Comm. Math. Comput. Chem.*, **58**, N2 2007.

[33] L. Rabern. On graph associations. *SIAM J. Discrete Math.*, **20** (2):529–535, 2006.

[34] L. Rabern. Properties of magic squares of squares. *Rose Hulman Undergraduate J. Math.*, **4**(1), 2003.