Eric Grosse

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Employment

Google
VP - Security Engineering Aug 2011—present
Engineering Director Apr 2007—Aug 2011
Google Security Team of approximately three hundred engineers, responsible for protecting the security of users, customers, staff, and systems.

Bell Laboratories, Murray Hill NJ
CTO, CloudControl Sep 2005—Apr 2007
Bell Labs Fellow May 2005
Director, Secure Networking Research May 1997—Sep 2005
Department Head, Scientific Computing Research May 1996—Apr 1997
Distinguished Member of Technical Staff September 1993—present
Member of Technical Staff summer 1978, November 1980—August 1993
Wide variety of topics in scientific computing and secure networking; see next page.

Stanford Linear Accelerator Center, Palo Alto CA
Numerical Analysis Consultant summer 1977
Numerical Analysis Program Library.

General Motors Research Labs, Warren MI
Research Mathematician summer 1976
Algorithms for paint spray robot and sheet metal bending.

Argonne National Labs, Argonne IL
Summer Research Participant summer 1975
Helped test Linpack as it was being completed.

Structural Dynamics Research Corp., Cincinnati OH
part-time, after school January—August 1971
Ported a collection of engineering codes.

Education

Stanford University 1975—1980
My Computer Science Ph.D. under Gene Golub presented a method for fitting spectral data from protein crystallography using tensor product splines and then used a specialized optimization technique on that representation to efficiently and accurately locate the thousands of local maxima of biochemical interest. Also, I proved a surprising result on the stability of the normal equations for least squares tensor splines. NSF Graduate Fellowship, research and teaching assistantships.

Michigan State University 1971—1975
B.S. Mathematics, Alumni Distinguished Scholar, National Merit Scholar, Honors College, Phi Beta Kappa, Pi Mu Epsilon.

Other

Have served on the editorial boards of: ACM Trans. Math. Software, IEEE Computational Science & Engineering, Netlib/NHSE, Numerical Algorithms, SIAM Journal on Scientific Computing, SIAM News, SIAM Software Environments and Tools. Co-chair, SIAM Electronic Publishing. SIAM Board of Trustees and Council. U.S. citizen. Active clearance.

Research Program

Network security has been my main interest for the past decade. At Google I work with a group I consider among the best in the world at fighting off actual and potential threats to our users' data. Some of the team's work is published in conferences or open source; some is kept confidential as needed by security operations.
Previously at Bell Labs I was creator and technical lead on Alcatel-Lucent's (cancelled) security product, CloudControl, which throttled trash traffic by analyzing at the enterprise but enforcing in the service provider cloud. Before that, I was part of the redesign of the Plan 9 operating system security model, using encrypted key exchange to bootstrap an agent-based authentication mechanism, which won a Best Paper award at USENIX Security 2002. I held responsibility for the Bell Labs security strategy for VoIP and IMS. Earlier, I supervised the group creating Lucent's firewall product and contributed the security part of a novel VPN system, Viaduct, still the most popular telecommuting access for Bell Labs researchers. More broadly, I am working toward a world whose network infrastructure will be more secure and self-diagnosing.

Network services may seem like the latest buzzword, but I've been active since the early eighties. Our "netlib" collection of mathematical software quickly became a dominant source of numerical algorithms for the computing world, and the systems and security issues involved in scaling that up were intriguing. The experience also contributed to SIAM's move to electronic journal publication and to corporate web services, for example an intensive weekend in which we built AT&T's 800 number directory. At the same time, heavy numerical calculations were moved onto the network at Bell Labs for domain decomposition methods for differential equation solution and for web-based optimization through AMPL.

Algorithms for approximation and visualization, especially ones driven by problems from semiconductor design and fabrication, were the main theme of my first years at Bell Labs.
Powerful tools like splines enabled rapid addition of new transistor designs into circuit simulators that had previously used ad hoc, labor intensive semi-analytic models. Technically, this was a challenge because of the multiple variables, the need to preserve monotonicity, and the continuity and performance requirements. In combination with numerical optimization, some of these spline techniques allow unique nondestructive measurement of heterostructure lasers.
For 2D and 3D semiconductor device partial differential equations, interpretation of the voluminous output is almost as challenging and computationally expensive as the simulations themselves. RenderMan animations of field variables and aural rendering of scalar variables helped us understand and convey issues with CMOS latchup and other phenomena of engineering importance.
My other multivariate approximation innovations include: isosurface-aligned grids, critical to more accurate silicon energy band models for Boltzman transport; multivariate generalization of the lowess moving least squares algorithm, widely used in the statistical community for smoothing scattered data; first proof of non-obtuse, no-small-angle triangulation of polygons, a result that launched a flurry of additional work on the outside leading to some of today's best grid generators.

Throughout my career, I've been known locally and in the world community as someone on the lookout for creative approaches to real-life problems, implemented in solid, reusable software, and comfortable leading teams of able, independent-minded researchers to make good things happen.

publications at http://netlib.org/bibnet/authors/g/grosse-eric.bib