Jeffrey Lee Hellrung, Jr.

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SKILLS

Proficient primarily in Java and C++, but also familiar with a wide range of other programming languages, packages, and paradigms; including C, Go, LaTeX, Matlab(R), MIPS assembly, ML/SML, Perl, Python, Qt 4, R, and Z80 assembly.

Former active member of the Boost C++ open source community.

Adept at problem solving, as exemplified by placement in the "Putnam exam", Microsoft Imagine Cup Algorithm Invitational, ACM Programming Contest, ICFP Programming Contest, and Google Games.

Solid computational mathematics and scientific computing background; mathematical modeling experience from clinic, research in reaction-diffusion PDEs, and the MCM.

EXPERIENCE

Software Engineer at Google, Inc., Venice Beach, CA; December 2012 – present. Member of the "search lift"/"brand interest" team, which measures ad effectiveness via Google search.

Postdoctoral Appointee at Sandia National Laboratories, Albuquerque, NM; fall 2012. Integrated a new efficient mesh duplication algorithm into SIERRA's XFEM framework to enable crack branding and merging. Conducted preliminary work in SSE/AVX vectorization of computationally intensive code paths within SIERRA.

Teaching Fellow for Department of Mathematics, UCLA, Los Angeles, CA; 2005 – 2012. Led discussion sections to review lecture material, tutored at the Student Math Center, prepared review sessions before exams, and held office hours to provide students with additional help.

Park City Mathematics Institute, Park City, UT; summer 2010. Teaching assistant for Professor Joseph Teran's week-long workshop on nonlinear elasticity.

Walt Disney Animation Studios, Burbank, CA; summer 2008. Created a Maya plugin front-end and developed the back-end algorithms to volumetrically fracture non-volumetric (i.e., quad surface) animation models.

The Aerospace Corporation, El Segundo, CA; summer 2005, 2006, 2007. Supported various programming projects relating to SOAP (Satellite Orbit Analysis Program) and SRE (Software Reliability Engineering). Created and modified existing code in C, C++, and Perl. Used Qt 4 to develop cross-platform graphical user interfaces in C++. Designed and prototyped several algorithms to solve satellite positioning problems.

EDUCATION

University of California Los Angeles, Los Angeles, CA

Master of Arts in Mathematics, June 2006 — **GPA** : 3.909

Ph.D. in Mathematics, June 2012 (Adviser: Professor Joseph Teran) — **GPA** : 3.951

Dissertation Title: *On Embedded Methods for Crack Propagation, Virtual Surgery, Shattered Objects in Computer Animation, and Elliptic Partial Differential Equations*

Harvey Mudd College, Claremont, CA — **Overall GPA** : 3.858

Bachelor of Science in Mathematics, May 2005 — **Major GPA** : 4.000

Graduated with High Distinction, Honors in Mathematics

PUBLICATIONS

Yongning Zhu, Yuting Wang, **Jeffrey Hellrung**, Alejandro Cantarero, Eftychios Sifakis, Joseph M. Teran. "A second-order virtual node algorithm for nearly incompressible linear elasticity in irregular domains." *Journal of Computational Physics*, 231(21):7092–7117, August 2012, DOE:10.1016/j.jcp.2012.05.015

Jeffrey Lee Hellrung, Jr., Luming Wang, Eftychios Sifakis, Joseph M. Teran. "A Second Order Virtual Node Method for Elliptic Problems with Interfaces and Irregular Domains in Three Dimensions." *Journal of Computational Physics*, 231(4):2015–2048, February 2012. DOI:10.1016/j.jcp.2011.11.023

Casey L. Richardson, Jan Hegemann, Eftychios Sifakis, **Jeffrey Hellrung**, Joseph M. Teran. "An XFEM method for modeling geometrically elaborate crack propagation in brittle materials." *International Journal for Numerical Methods in Engineering*, 88(10):1042–1065, December 2011. DOI:10.1002/nme.3211

Jeffrey Hellrung, Andrew Selle, Arthur Shek, Eftychios Sifakis, Joseph Teran. "Geometric fracture modeling in BOLT." *SIGGRAPH 2009: Talks*, SIGGRAPH '09, pp. 7:1–7:1, New York, NY, USA, 2009. DOI:10.1145/1597990.1597997

Eftychios Sifakis, **Jeffrey Hellrung**, Joseph Teran, Aaron Oliker, Court Cutting, M.D. "Local Flaps: A Real-Time Finite Element Based Solution to the Plastic Surgery Defect Puzzle." *Studies in Health Technology and Informatics*, 142:313–318, 2009. PMID:19377176

M. Hecht, D. Buettner, **J. Hellrung**. "Risk assessment of real time digital control systems." *Proceedings of the RAMS '06. Annual Reliability and Maintainability Symposium, 2006*, pp. 409–415, 2006. DOI:10.1109/RAMS.2006.1677409

AWARDS

ICFP (International Conference on Functional Programming) Programming Contest - 80^{th} (of 215 with positive scores, 872 registered) place (2010); 95^{th} (of 199) place (2011); 84^{th} (of 221 in Round 1) and 105^{th} (of 117 in Round 2) (2012)

Google Games Santa Monica - 3^{rd} place (2011)

VIGRE Fellowship (2005 – 2009) and Chancellor's Prize (2005 – 2006) (awarded by UCLA)

Robert Borrelli Clinic Prize for Most Outstanding Clinic Team (awarded by HMC) (2005)

William Lowell Putnam Mathematical Competition - Top-200 (2003, 2002) and Top-500 (2004, 2001) Individual Placement and 11^{th} (2004) Team Placement

Microsoft Imagine Cup Algorithm Invitational - 18^{th} place internationally (2004)

MCM (Mathematical Contest in Modeling) - Meritorious Winner (2004)

ACM (Association for Computing Machinery) Programming Contest - 7^{th} / 63 place (2004) and 20^{th} / 59 place (2003)

Stavros Busenberg Prize in Applied Mathematics (awarded by HMC) (2004)

Courtney S. Coleman Prize in Mathematics (awarded by HMC) (2003)

HMC Dean's List, 2002 – 2004