Sergei Shudler, PhD

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Summary

- Computer scientist and software engineer; specialized in parallel programming and performance modeling
- Author of 9 publications in peer-reviewed conference and workshop proceedings including 4 first-author papers
- Experienced software engineer with 8 years of development experience with proven success in all aspects of the full software lifecycle
- Excellent interpersonal skills used to great effect in building rapport with collaborators and colleagues alike

Professional and Research Experience

Argonne National Laboratory (IL, USA) **Aug 2018 – Present**
Postdoctoral Researcher

- Evaluates the applicability of in-situ analysis and visualization techniques in Nek5000 and HACC scientific codes
- Investigates performance related issues in SENSEI, a general in-situ analysis framework
- Collaborates with 2 research teams

Technical University of Darmstadt and RWTH Aachen University (Germany) **Feb 2013 – July 2018**
Graduate Researcher

- Investigated the applicability of machine learning for performance analysis of parallel programs
- Designed a framework for validating performance expectations of libraries; the framework allows users to uncover unexpected scalability bottlenecks and evaluate alternative library implementations
- Devised a practical method for deriving isoefficiency functions of real-world task-based applications; the method allows users to choose appropriate input sizes to maintain target efficiency as the core count increases
- Designed and developed a replay engine for task dependency graphs that can be used to analyze resource contention
- Administered yearly seminars focused on various topics in parallel computing
- Prepared MPI and multithreading exercises for graduate-level courses focused on parallel programming
- Supervised 2 students (one bachelor and one masters student)
- Collaborated with fellow graduate students and researchers in Germany, Switzerland, and the US

Lawrence Livermore National Laboratory (CA, USA) **Oct 2016 – Mar 2017**
Research Intern

- Designed and developed a tool (*libtdg*) that creates task dependency graphs from OpenMP code
- Extended the LLVM OpenMP runtime to generate callbacks for loop chunks
- Evaluated resource contention overhead at a task and chunk level using *libtdg*

Paradigm Geophysical Ltd. (Israel) **Nov 2011 – Jan 2013**
Software Developer II

- Worked on a C++ and OpenGL-based 3D visualization system for seismic data
- Improved the responsiveness of the system and user experience by introducing a multithreaded, progressive fetching mechanism for multi-resolution visual data
- Implemented a capability to correlate two instances of 3D volumetric data
- Developed a functionality to display semi-transparent, floating text annotations within an OpenGL 3D scene; used Win32 to port this functionality to Windows

SagivTech Ltd. (Israel) **Apr 2011 – Nov 2011**
Software Developer

- SagivTech specializes in development of GPGPU algorithms for image and signal processing applications
- Optimized morphological operators for a de-noising algorithm using OpenCL
- Helped to prepare a three day OpenCL course by converting CUDA code to OpenCL

Tiltan Systems Engineering Ltd. (Israel) **Nov 2009 – Oct 2011**
3D Graphics Developer

- Maintained the company's main 3D engine that was developed in C++ on top of DirectX
- Developed DirectX shaders in HLSL to render terrain-embedded geometric entities and 3D objects
- Implemented the shadow-map algorithm to display shadows cast by 3D objects

Israeli Air Force (IAF) **Jan 2004 – Aug 2009**
C++ Programmer

- Worked on a distributed, Windows-based command & control system for operational units
- Developed a multithreaded communication (TCP / UDP) module on top of WinSockets
- Ported the entire code-base from Visual Studio 6 to Visual Studio 2005 enabling developers to use the .NET framework
- Mentored junior developers and counseled them on complex technical issues

Education

Technical University of Darmstadt (Germany) **Feb 2013 – June 2018**
Ph.D. Computer Science (magna cum laude)
Dissertation title: "Scalability Engineering for Parallel Programs Using Empirical Performance Models"
Advisor: Prof. Felix Wolf

The Hebrew University of Jerusalem (Israel) **Oct 2004 – Dec 2009**
M.Sc. Computer Science (Grade: 92/100)
Advisor: Prof. Amnon Barak

The Hebrew University of Jerusalem (Israel) **Oct 2000 – Aug 2003**
B.Sc. in Computer Science (Grade: 95/100, magna cum laude)
Top 15% of graduating class; Dean's List in the 2nd year

Skills

Programming: C/C++, Python, Matlab, Java, HLSL, R, SQL

APIs: MPI, OpenMP, STL, CUDA, OpenCL, OpenGL, DirectX, Win32

Tools: UNIX tools, Git, SVN, GDB, Totalview, Visual Studio

Languages: English (fluent), Hebrew (native), Russian (native), German (basic proficiency)

Selected Publications (4 out 9)

ESPT'18: S. Shudler, J. Vrabec, F. Wolf: Understanding the Scalability of Molecular Simulation using Empirical Performance Modeling. *ESPT*, 2018 (held in conjunction with *SC'18*).

EuroPar'17: P. Reisert, A. Calotoiu, S. Shudler, F. Wolf: Following the Blind Seer—Creating Better Performance Models Using Less Information. *EuroPar*, 2017.

PPoPP'17: S. Shudler, A. Calotoiu, T. Hoefler, F. Wolf: Isoefficiency in Practice: Configuring and Understanding the Performance of Task-based Applications. *PPoPP*, 2017.

ICS'15: S. Shudler, A. Calotoiu, T. Hoefler, A. Strube, F. Wolf: Exascaling Your Library: Will Your Implementation Meet Your Expectations?. *ICS*, 2015.