Sergei Shudler, PhD

Postdoctoral researcher and software engineer; specialized in parallel programming and performance analysis

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EXPERIENCE

Postdoctoral Researcher Argonne National Laboratory

Aug 2018 - Ongoing

♀ IL, USA

- Evaluates in-situ analysis and visualization techniques in extreme-scale scientific codes
- Investigates performance related issues in SENSEI, a general in-situ analysis framework
- Collaborates with 2 research teams

Graduate Researcher Technical University of Darmstadt

Feb 2013 - July 2018

♀ Germany

- Investigated the applicability of machine learning for performance analysis of parallel programs
- Devised a practical method for deriving isoefficiency functions of realworld task-based applications
- Completed 2 projects (see Projects section below)
- Prepared MPI and multithreading exercises for graduate-level courses
- Presented in tutorials (VI-HPS Tuning Workshops) and conferences
- Collaborated with colleagues in Germany, Switzerland, and the US

Software Developer II Paradigm Geophysical Ltd.

Mov 2011 - Nov 2013

♀ Israel

- Worked on an OpenGL-based 3D visualization system for seismic data
- Improved the responsiveness of the system and user experience by introducing a multithreaded data fetching mechanism
- Implemented a capability to correlate two instances of volumetric data
- Developed a functionality to display semi-transparent, floating text annotations within an OpenGL 3D scene; ported the code to Win32

3D Graphics Developer Tiltan Systems Engineering Ltd

Mov 2009 - Oct 2011

♀ Israel

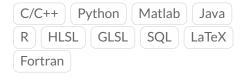
- Maintained the company's main 3D engine developed in C++ on top of DirectX; the engine was designed to support vast terrains
- Developed DirectX shaders in HLSL to render terrain-embedded geometric entities and 3D objects
- Implemented the shadow-map algorithm to display shadows cast by 3D objects

SUMMARY

- 7 publications in peer-reviewed conference and workshop proceedings
- 4 first-author papers
- 8 year of software development experience in various projects
- Excellent interpersonal and communication skills

SKILLS

Programming



APIs

MPI O _I	penMP pthreads		CUDA	
OpenCL	OpenGL	Win32		

Dev tools

UNIX tools CMa		CMal	(e	GDB	Git
SVN	TotalView		Visual Studio		
Eclipse	Op	enCV			

Methodologies

Multithreading	Mach	ine learning
Performance pro	filing	Data analytics

LEADERSHIP

- Administered yearly seminars focused on various topics in parallel computing
- Supervised 2 students (one bachelor and one master's student)
- Mentored junior developers and counseled them on complex technical issues

C++ Programmer Israeli Air Force (IAF)

math display="block"> Jan 2004 - Aug 2009

♀ Israel

- Worked on a distributed, Windows-based command & control system for operational units
- Developed a multithreaded communication (TCP/UDP) module to support application-level communication protocols on top of WinSockets
- Ported the entire code-base from Visual Studio 6 to Visual Studio 2005 enabling developers to use the .NET framework

PROJECTS

Scalability validation framework Technical University of Darmstadt

Feb 2013 - July 2018

♀ Germany

Designed a framework for continuous validation of performance expectations of HPC libraries. It allows users to uncover unexpected scalability bottlenecks and evaluate alternative implementations. As part of the framework, I developed a lightweight benchmarking platform for MPI collective operations. The framework was evaluated on different implementations of MPI, on OpenMP constructs, and on parallel sorting algorithms.

Paper: ICS'15

Task dependency profiler Lawrence Livermore National Laboratory

m Oct 2016 - Mar 2017

CA, USA

Developed a tool (over 3000 lines of code) that creates task dependency graphs from OpenMP code. For this project, I extended the LLVM OpenMP runtime to generate callbacks for loop chunks and did a partial evaluation of resource contention overhead at a chunk level.

Source code: github.com/sshudler/libtdg

Task replay engine

Technical University of Darmstadt

Feb 2013 - July 2018

Germany

Designed and developed a replay engine (over 1500 lines of code) for task dependency graphs. For the replay either the LLVM/OpenMP runtime or pthreads could be used. The purpose of this engine is to analyze resource overhead and contention.

Source code: github.com/sshudler/replay-engine

Paper: PPoPP'17

GPU-based denoising

SagivTech Ltd.

Mar 2011 - Nov 2011

♀ Israel

Completed this project for SagivTech Ltd. that specializes in development of GPGPU algorithms for image and signal processing applications. I implemented an image denoising algorithm based on the Haar wavelet transform using OpenCL. The code uses OpenCV to load and display the image. Source code: github.com/sshudler/DeNoising

EDUCATION

Ph.D. in Computer Science Technical University of Darmstadt

Feb 2013 - June 2018

♀ Germany

Thesis title: "Scalability Engineering for Parallel Programs Using Empirical Performance Models"

Thesis advisor: Prof. Felix Wolf

M.Sc. in Computer Science Hebrew University of Jerusalem

♀ Israel

Thesis advisor: Prof. Amnon Barak

B.Sc. in Computer Science Hebrew University of Jerusalem

Ct 2000 - Aug 2003

♀ Israel

Top 15% of graduating class (magna cum laude)

LANGUAGES

English	•••••
Hebrew	•••••
Russian	••••
German	•••••

SEL. PUBLICATIONS

ESPT'18 S. Shudler, J. Vrabec, F. Wolf: Understanding the Scalability of Molecular Simulation using Empirical Performance Modeling. ESPT, 2018 (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