Sergei Shudler

Computer Scientist

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Education

06/2018 **Dr.-Ing. (Ph.D.) in Computer Science**, *Technische Universität Darmstadt*, Germany, *magna cum laude*.

12/2009 **M.Sc. in Computer Science**, *Hebrew University of Jerusalem*, Israel.

08/2003 **B.Sc. in Computer Science**, *Hebrew University of Jerusalem*, Israel, *magna cum laude*.

Objective

An engineer with a mind of a scientist—having specialized in parallel programming and HPC tools in a scientific context, looking to apply this expertise in a suitably challenging engineering position.

Professional Experience

08/2018 – present **Postdoctoral Researcher**, *Lawrence Livermore and Argonne National Laboratories*, USA.

- Investigated in-situ analysis and visualization techniques in extreme-scale scientific applications.
- Worked on SENSEI, a generic in-situ data analysis platform based on C++, and published a paper focusing on one of its use cases (EGPGV'19).
- Implemented modules in Ascent, a lightweight in-situ analysis and visualization platform based on C++.
- Implemented analysis routines in Python and Numpy for a summer datacamp.
- Experimented with OpenMP 4.5 offloading API and OpenCL in an effort to understand a new HPC system.

02/2013 – 07/2018 **Research Associate**, *Technische Universität Darmstadt and RWTH Aachen University*, Germany.

- Designed a framework that helps users validate the scalability of their HPC code.
- Implemented a lightweight benchmark for MPI in C++ and used it to profile performance.
- Implemented scripts in Bash and Python to run benchmarks and analyze the results.
- Proposed an experimental method to understand the relation between parallelism, input sizes, and efficiency.
- Developed a tool in C++ that allows users to understand contention and parallelism in OpenMP applications.
- Published 4 first-author peer-reviewed papers in: ICS'15, PPoPP'17, ESPT'18, TPDS'19.
- Administered biannual seminars that were focused on various topics in parallel computing and HPC.
- Developed MPI exercises for parallel programming courses.
- Supervised and mentored two students; one bachelor and one masters student.
- Collaborated with fellow graduate students and researchers in Germany, Switzerland, and the US.

11/2011 **Software Developer II**, *Paradigm Geophysical Ltd*, Israel.
01/2013
- Worked on a C++ and OpenGL-based 3D visualization system called 3D-Canvas.
- Introduced a multithreaded, progressive fetching mechanism for multi-resolution visual data and worked with other developers to integrate it into 3D-Canvas.
- 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.

05/2011 **Software Developer (part-time)**, *SagivTech Ltd.*, Israel.
11/2011
- Implemented (using OpenCL) an image denoising algorithm based on the Haar wavelet transform. Source code: github.com/sshudler/DeNoising.
- Ported CUDA code to OpenCL as part of a preparation for a 3-day course.

11/2009 **3D Graphics Developer (part-time)**, *Tiltan Systems Engineering Ltd*, Israel.
10/2011
- Learned the inner workings of a 3D engine in 3 months and proceeded to successfully maintain it.
- 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.

01/2004 **C++ Programmer**, *Israeli Air Force*, Israel.
08/2009
- Worked on a distributed, Windows-based command & control system for operational units.
- Developed a multithreaded communication (TCP/UDP) module in C++ 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.
- Reviewed code and mentored junior developers.

Technical Skills

Languages	C, C++, Python, Bash, Matlab, Fortran, GLSL
APIs	MPI, OpenMP, STL, pthreads, Pandas, NumPy, OpenCL, CUDA, OpenGL
Dev tools	Git, CMake, SVN, Autotools, Spack, GDB, Totalview, Score-P

Languages

English	Fluent	German	Basic proficiency (A2/B1 level)
Hebrew	Fluent	Russian	Native

Selected Publications

[1] S. Shudler, Y. Berens, A. Calotoiu, T. Hoefler, A. Strube, and F. Wolf. Engineering Algorithms for Scalability through Continuous Validation of Performance Expectations. *IEEE Transactions on Parallel and Distributed Systems*, TPDS '19.

[2] S. Shudler, A. Calotoiu, T. Hoefler, and F. Wolf. Isoefficiency in Practice: Configuring and Understanding the Performance of Task-Based Applications. In *Proc. of the 22nd ACM SIGPLAN Symp. on Principles and Practice of Parallel Programming*, PPoPP '17.

[3] S. Shudler, N. Ferrier, J. Insley, M. E. Papka, S. Patel, and S. Rizzi. Fast Mesh Validation in Combustion Simulations through In-Situ Visualization. In *Eurographics Symp. on Parallel Graphics and Visualization*, EGPGV '19.