

Miguel Vargas

Email: miguel.vargas@gmail.com

Skype: miguel.vargas.felix

Mobile: +(52) 473 1210775

An unusual combination of computer scientist and experienced industrial software developer. With a broad domain set and strong analytical skills I can provide deep insight and solve advanced scientific and technical challenges.

EXPERTISE

COMPUTER SCIENCE RESEARCH

With a background in physics and strong math and computer science skills I can attack complex problems from different points of view.

INDUSTRIAL SOFTWARE DEVELOPMENT

Passion for writing efficient and clear computer code. With more than ten years of experience I have polished software engineering practices.

PRODUCT OWNERSHIP

Analyze user needs, identify core challenges and break down tasks. Project management: time and resources estimation, progress tracking, team engagement.

SOFTWARE ARCHITECT

Hands on experience on scalable algorithms that process very large datasets. 15+ years designing and reaching goals on large projects.

TECHNICAL EXPERTISE

Ability to choose the right tool for the problem. Extensive knowledge on debugging, and identifying problems and bottlenecks.

GIVE ME A CALL

I'm ready to talk about new challenges.

RECENT EXPERIENCE

CIMAT | RESEARCH ASSISTANT

2010 - 2016 | Guanajuato, Mexico

- Cutting edge scientific research on numerical methods.
- Design and development of advanced numerical simulation software and libraries aimed for High Performance Computing.
- Experience presenting and discussing complex ideas and concepts via oral presentations and research papers.
- Teach and mentor grad students on advanced technologies.

AVNTK | SCIENTIFIC PROGRAMMER

2005 - 2006 | Guadalajara, Mexico

- Author of technical requirements and project plannings.
- Software design and development for solving complex technical challenges.
- Creation of user interfaces for editing and reporting complex information.

ASCI | SENIOR SOFTWARE DEVELOPER

1995-2005 | Guadalajara, Mexico

- Both front-end and back-end software design and development, incorporating diverse frameworks.
- Rapid prototyping of software using new technologies.
- Product owner, software architect and technical advisor.
- Operating system administration.

COMPUTER SCIENCE SKILLS

HPC ▪ object-oriented programming ▪ data structures ▪ multi-threading ▪ algorithm optimization ▪ cache-aware algorithms ▪ cross-platform ▪ stochastic optimization ▪ evolutionary algorithms ▪ artificial intelligence ▪ computer graphics ▪ databases ▪ image processing ▪ machine learning ▪ template metaprogramming ▪ FFT

MATH SKILLS

Numerical methods ▪ partial differential equations ▪ finite element analysis ▪ isogeometric analysis ▪ sparse linear algebra solvers ▪ optimizacion ▪ graph algorithms ▪ domain decomposition ▪ vector calculus ▪ analytic geometry ▪ applied statistics and probability ▪ non-linear simulations ▪ NURBS

TECHNOLOGIES

EXTENSIVE EXPERIENCE

C ▪ C++ ▪ Linux ▪ Windows ▪ GCC ▪ GDB ▪ Visual Studio ▪ OpenMP ▪ MPI ▪ SSH ▪ Win32 API ▪ XLib ▪ Cygwin ▪ Visual Basic ▪ Excel ▪ Word

SOME EXPERIENCE

Matlab ▪ Fortran 77/90 ▪ shell scripting ▪ OpenGL ▪ HTML ▪ CSS ▪ JavaScript ▪ C# ▪ SQL ▪ Gprof ▪ Valgrind ▪ VTune ▪ UNIX ▪ TCP/IP sockets ▪ HTTP ▪ NFS ▪ POSIX Threads ▪ CVS ▪ LaTeX ▪ Doxygen

IN PROGRESS

Python ▪ Git ▪ CUDA ▪ x3d ▪ WebGL ▪ Java ▪ SSE/AVX ▪ OS X

RECENT PROJECTS

	Domain	Technologies	Product owner	Software architect	R & D	Technical advisor
Multipatch FEA simulator	FEA, IGA, computer geometry, sparse matrix, solvers, CAE	C++, OpenGL, Linux, Windows, Valgrind, VTune	■	■	■	
TCAiNMaND [↗] , CIMNE PLCD [↗]	FEA, composite materials	Fortran 90, Linux, Windows, OpenMP, VTune				■
Topological structure optimization [↗]	FEA, HPC, structural mechanics, stochastic optimization	C++, MPI, Linux	■	■	■	
FEMT library and toolbox [↗]	FEA, CAE, HPC, sparse matrix, solvers, graph algorithms	C++, OpenMP, MPI, Linux, Windows, OS X, Valgrind, Gprof	■	■	■	
RRT* simulator	Robotics, movement planning	C++, OpenGL, Linux, Windows	■	■	■	
Tomography by capacitance simulator	FEA, CAE, electrostatics, tomography	C++, OpenMP, Linux, Windows		■	■	■
Technicolor DVD image inspection	Image processing, correspondence analysis, FFT, GUI	C++, Win32 API, TWAIN, Fortran 77, SQL, HTML		■	■	
Hitachi head slider mask inspection	Image processing, GUI	C++, Win32 API		■	■	
Hitachi wafer microscope and stage control	Image processing, electronics control	C#, C++, Windows	■		■	
HP Web Jetadmin Ricoh devices plugin	Remote device control, networking	SNMP, HTML, JavaScript			■	■
HP WebJetadmin NFS plugin	Networking, socket programming	C++, Java, HTML, JavaScript, TCP/IP			■	
Tunnelling velocimetry. Light scattering by small particles	Electromagnetism, multipole expansion	C++, OpenGL, Matlab	■	■	■	
News agencies data acquisition	Text and image processing, web interface, GUI	C++, Visual basic, HTML, HTTP, SQL, Win32 API	■		■	

EDUCATION

CENTRE FOR MATHEMATICAL RESEARCH (CIMAT)

PhD in Computer Science

April 2016 (expected)

MSc in Computer Science and Industrial Mathematics

April 2010

UNIVERSITY OF GUADALAJARA

BSc in Physics

December 2005

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REFEREED ACADEMIC PUBLICATIONS

M. Vargas, S. Botello. **Structure Optimization With a Bio-Inspired Method**. High Performance Computer Applications, Vol. 595, pp. 188-200, Springer. 2016. [↗]

M. Vargas, S. Botello. **FEMT, An Open Source Library for Solving Large Systems of Equations in Parallel**, XXII Escuela Nacional de Optimización y Análisis Numérico (ENOAN). Villahermosa, México, 2012. [↗]

M. Vargas, S. Botello. **Solution of finite element problems using hybrid parallelization with MPI and OpenMP**. Acta Universitaria, Vol. 22-7, pp. 14-24. 2012. [↗]

M. Vargas, S. Botello. **Parallel direct solvers for finite element problems**. Comunicaciones CIMAT. 2010. [↗]