

LAYLA ANAHITA-SHIREEN MAH

Objective

An R&D-style position, utilizing my current strengths, yet challenging me in new ways, thus providing me with the opportunity for growth in unexplored directions; both as an employee, and as a person.

Preferred areas: DOOM 4, 3D Graphics, Physical Simulation, Robotics, AI, Game Engine/OS Design, Linguistics.

Education	2002-Present	Rensselaer Polytechnic Institute	Troy, NY
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- B.S. Philosophy, B.S. Computer Science, PhD. Computer Science – In Progress. Semesters Remaining: ~6.

Relevant Undergraduate Coursework: Computer Architecture, Computer Organization, Operating Systems, Minds & Machines - Lego Robots, Physics Simulation (I,II), Distributed Haptic Feedback Networks, AI/Robotics, Advanced Parallel Simulation, 3D Engine Development (I,II), Game Development, Japanese 1-4, Study Abroad (China), etc.

Relevant Graduate Coursework: Advanced 3D Graphics, Optimization Methods for Distributed Sensing, Game Engine Development, Image Processing, Cryptography.

Experience	2007-Present	Freelance Software Engineer	上海, 中国
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Senior Software Engineer

- Led a team developing a Chinese IME + Dictionary for Windows, Linux and Windows Mobile.
- Designed and developed a Data Engine capable of searching and enumerating a heterogeneous set of databases much larger than the 32mb process address space of a Windows Mobile device while only consuming a small amount of system memory, and having average-case user-imperceptible latency. This same code runs on Windows/Linux; using a different (template) pre-fetching algorithm, exploiting additional memory.
- Developed a Chinese/Japanese/English Flashcard Application for Windows and Windows Mobile.

Education	Spring 2007+	East China Normal University (华东师范大学) – Shanghai	上海, 中国
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Mandarin Chinese - Study Abroad

Advisor: Yanfeng Li

Attended courses on Mandarin Chinese, Communicative Chinese, and Chinese Traditional Landscape Painting, as well as a special topics course in the Shanghainese Dialect, accompanied by multiple 1-on-1 tutor sessions each week.

Publication	2006	IEEE International Conference on Robotics and Automation	Rome Italy
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With: Stephen Berard, Binh Nguyen, Jeff Trinkle, Jon Fink, and Vijay Kumar
Advisor: Jeff Trinkle

daVinci Code: A multi-model simulation and analysis tool for multi-body systems. Published in ICRA, 2007.

Experience	2006	Xerox	Albany, NY
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Software Engineer

Researched and tested various bridge technologies for interfacing software with a distributed set of Oracle databases.

Research	Spring 2006+	Rensselaer Polytechnic Institute	Troy, NY
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PhD Research

Advisor: Jeff Trinkle

Continued research on physics simulation, soft shadows, and developing software for massively parallel computers.

Research	Fall 2005	Rensselaer Polytechnic Institute	Troy, NY
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Advanced 3D Computer Graphics

Advisor: Barbara Cutler

Implemented my area-light source (soft-shadow) algorithm using PS 3.0 shader hardware, with tone mapping support. Implemented: 3D Fractal Generation, Subdivision Surfaces, Radiosity, Navier Stokes, etc. Studied: Particle Systems, Cloth Simulation, Dist. Ray Tracing, Monte Carlo, Irradiance Caching, Photon Mapping, Subsurface Scattering, etc.

Experience	2005	New York State Department of Health - Wadsworth Labs	Albany, NY
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Medical Image Processing Research

Worked with another PhD student to develop software for use in medical image processing; using Matlab and C++.

Research	Spring 2005	Rensselaer Polytechnic Institute	Troy, NY
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Advanced Physics Simulation Research II

Advisor: Jeff Trinkle

Continued development on the Physics Simulator started in 2004.

Research	Spring 2005	Rensselaer Polytechnic Institute	Troy, NY
Advanced Cross-Genre and Cross-Platform Game Engine Design		Advisor: Marc Destefano	
This R&D project was aimed at optimizing the design of a cross-genre game engine, such that it could be used to create games of any genre, yet still perform as well as an engine optimized for a single genre, without being cumbersome.			
Research	Spring 2005	Rensselaer Polytechnic Institute & Wadsworth Research Lab	Troy, NY
Image Processing Independent Study		Advisor: Qiang Ji	
This was an R&D Project aimed at creating a C++ library usable for tracking edges, contours, objects, etc. in image sets.			
Research	Fall 2004	Rensselaer Polytechnic Institute	Troy, NY
Advanced Physics Simulation Research		Advisor: Jeff Trinkle	
Was one of two lead developers on a from-the-ground-up C++ Physics Simulator project for the accurate simulation of planar systems of bodies experiencing unilateral contacts with friction.			
Research	Fall 2004	Rensselaer Polytechnic Institute	Troy, NY
Distributed Haptic Feedback Networks Research		Advisor: Suvranu De	
Developed a physics based distributed haptic feedback system for use over computer networks such as the internet.			
Research	Fall 2004	Rensselaer Polytechnic Institute	Troy, NY
Minds & Machines – AI/Robotics		Advisor: Bram van Huelven	
Led and mentored a team during the development of an autonomous robot with the ability to solve any theoretically solvable instantiation of the Wumpus World problem. See http://www.cs.rpi.edu/~roggab/research/minds_and_machines_ai_robotics_urp.doc for an in-depth explanation.			
Experience	2004	Vicarious Visions	Troy, NY
Console Engineer – DOOM 3 XBOX			
<ul style="list-style-type: none"> • Was responsible for the engineering development of the Xbox Exclusive feature: Co-op Mode. <ul style="list-style-type: none"> • Led Co-op development from an engineering standpoint, and instructed designers in their work on integrating constructs new to Co-op mode into their workflow. • Synchronized the single player experience over the network, which required an understanding of the way that the engine functioned as a whole, as well as the intricacies of many systems. • Developed data structures and algorithms which were used extensively within the Co-op network code. • Worked with (and fixed bugs in) most parts of the engine code (e.g. graphics renderer, sound renderer, animation system, IK system, physics system, script system, network system, file system). • Wrote separate (when relevant) documentation for engineers, designers and artists. • Created a Replay-able Simulation mode for recording game data for the purposes of performance profiling, game testing & debugging, and creating game demos. • Created a build test system which kept the team abreast of breaking changes to assets. • Created a utility to assist artists in automating the process of modifying (usually reducing) animation frame rates. • Commonly assisted programmers on other projects with advanced OpenGL questions. 			
Award	Fall 2003	Minds & Machines Lego Robot Competition – First Place	Troy, NY
Won first place in the 6 th annual Minds & Machines Lego Robot Competition. See: http://www.rpi.edu/~khemls/mm/index.html for a description of the competition and our Robot.			

Research	Fall 2003	Rensselaer Polytechnic Institute	Troy, NY
Advanced Parallel Simulation Research Project		Advisor: Chris Carothers	
Continued development of the 3D engine I developed during the first two independent studies, specifically investigating my research interests in parallel simulation.			
<ul style="list-style-type: none"> Created a new lighting algorithm to compute accurate lighting from arbitrarily complex polygonal or non-polygonal area light sources in real time (Implicitly Generates Physically-Accurate Soft-Shadows). Developed a "Dynamic Pipeline Reordering Algorithm" to dynamically reconfigure the execution order of engine pipeline stages and sub stages on the fly, on a per-frame basis, in order to maximize parallelism and pipeline efficiency and minimize execution-bubbles resulting from uneven pipeline latencies. Researched hybrid async/synchronous multithreading architectures, with an emphasis on scalability (100+ CPUs) 			
Research	Summer 2003	Rensselaer Polytechnic Institute	Troy, NY
Advanced 3D Engine Development Independent Study		Advisor: Marc Destefano	
Continued engine development where the first independent study left off; Began advanced research into topics which truly caught my interest as exciting and challenging problems: Efficient Stenciled Shadow Volumes, Real Time Soft Shadows, High Dynamic Range Processing, Efficient HDR Global & Dynamic Lighting, Real Time HDR Texture Usage, Highly Efficient Parallel Execution and GPU Programmability as a problem solving tool.			
Research	Spring 2003	Rensselaer Polytechnic Institute	Troy, NY
3D Engine Development Independent Study		Advisor: Marc Destefano	
Developed a first person 3D engine using C++ and x86 Assembly along with the OpenGL and DirectX API's atop the Win32 platform. Key research areas: 3D Graphics, real-time data structures & algorithms, memory management, parallel computing, OS kernel design, API development, etc.			
<ul style="list-style-type: none"> Researched proven implementations in each of these areas; always contemplating novel ideas for extending these implementations to better suit the needs of the system and or overcome problems. <ul style="list-style-type: none"> Developed a hierarchical culling algorithm utilizing a novel approach to the popular Portal/Sector data structure, with a pre-computed potentially-visible-set, providing efficient visibility-culling and an extremely flexible system for organizing world space and object/world interaction. 			
Experience	2001-2002	Cingular Wireless	Rocky Hill CT
Senior Sales Representative		2 Years	
<ul style="list-style-type: none"> Developed relationships with technical and non-technical customers both face-to-face and via telephone; was responsible for explaining technical details in an accurate, yet easy to understand manner and for assisting the customers with any problems they may have experienced throughout their time as a customer of the company. Held several sales records including higher net sales figures than all full-time employees while working part-time. Achieved 71 net activations in a single month while working only 15 hours per week. 			
Experience	2000-2001	D&Z Soda King	Brooklyn, CT
IT Consultant		1.5 Years	
<ul style="list-style-type: none"> Advised the owner on all technology decisions; carried out all technology implementation and educated other employees on the use of said technology. 			
Experience	1998-2000	Infotree Web Services	Manchester, CT
Software Engineer		2 Years	
<ul style="list-style-type: none"> Developed an extensible Java based chat client/server system for internal and external use. Created specific clients for each of several different usage models. Researched new and emerging technologies to assist management in business decisions related to future development work and presented this research during in-house meetings. 			

Relevant Skills			Programming Languages
SKILL	LEVEL OF PROFICIENCY	LENGTH OF EXPERIENCE USING	LENGTH OF KNOWLEDGE
ASSEMBLY: x86, MIPS, SSE, ETC.	ADVANCED	5 YEARS	6 YEARS
3D GRAPHICS GPU LANGUAGES	EXPERT	3 YEARS	4 YEARS
INTERACTIVE C (EMBEDDED)	EXPERT	2 YEARS	5 YEARS
C	EXPERT	10 YEARS	10 YEARS
C++	EXPERT	10 YEARS	10 YEARS
TEMPLATE METAPROGRAMMING	EXPERT	4 YEARS	4 YEARS
C#	INTERMEDIATE HIGH	2 MONTHS	3 YEARS
JAVA	ADVANCED HIGH	6 YEARS	11 YEARS
SALSA	INTERMEDIATE	3 MONTHS	2 YEARS
SCHEME & LISP	ADVANCED	2 YEARS	4 YEARS
Oz	INTERMEDIATE	3 MONTHS	2 YEARS
PROLOG	INTERMEDIATE	3 MONTHS	2 YEARS
PERL	ADVANCED	6 MONTHS	4 YEARS
PHP	INTERMEDIATE HIGH	1 YEAR	2 YEARS
JAVASCRIPT	ADVANCED	6 YEARS	12 YEARS
ASP/CSS/CSS2/CSS3/XHTML	EXPERT	12 YEARS	12 YEARS
BASIC/VB/VB SCRIPT	EXPERT	5 YEARS	13 YEARS
SH & VARIOUS SHELL SCRIPTING	EXPERT	11 YEARS	11 YEARS
MATLAB	INTERMEDIATE	1 YEAR	3 YEARS

Relevant Skills			Libraries/APIs
SKILL	LEVEL OF PROFICIENCY	LENGTH OF EXPERIENCE USING	LENGTH OF KNOWLEDGE
WIN32	ADVANCED HIGH	10 YEARS	10 YEARS
WXWIDGETS	ADVANCED HIGH	5 YEARS	6 YEARS
MFC	ADVANCED HIGH	10 YEARS	10 YEARS
.NET	INTERMEDIATE	2 MONTHS	3 YEARS
STL	EXPERT	8 YEARS	8 YEARS
BOOST	ADVANCED	6 YEARS	6 YEARS
POSIX	ADVANCED	4 YEARS	6 YEARS
BSD SOCKETS, WINSOCK	ADVANCED	4 YEARS	6 YEARS
GTK+	ADVANCED	4 YEARS	6 YEARS
OPENGL	EXPERT	10 YEARS	10 YEARS
DIRECTX + DIRECT3D	ADVANCED	4 YEARS	8 YEARS

Other Various Libraries/APIs

LOKI, WIN32 DDK, PPC SDK, XBOX XDK, GLUT, SDL, SGI INVENTOR, SGI PERFORMER, PQP, IMMERSION SDK, OPENAL, FMOD, FTGL, FOX -TOOLKIT

Relevant Skills			Spoken Languages
SKILL	LEVEL OF PROFICIENCY	LENGTH OF EXPERIENCE USING	LENGTH OF KNOWLEDGE
ENGLISH	NATIVE SPEAKER	LIFETIME	LIFETIME
MANDARIN CHINESE (中文)	ADVANCED / FLUENT	1 YEAR	1 YEAR
JAPANESE (日本語)	CONVERSATIONAL, BUT OUT OF USE	2 YEARS	5 YEARS
SHANGHAINESE DIALECT	SURVIVAL SPEAKING, OK LISTENING	3 MONTHS	3 MONTHS
CANTONESE DIALECT	SURVIVAL SPEAKING & LISTENING	1 WEEK	6 MONTHS
RUSSIAN	LEARNING	1 MONTH	1 YEAR
ITALIAN	LEARNING	1 MONTH	1 YEAR
SPANISH	SURVIVAL	1 YEAR	9 YEARS

Relevant Skills	Operating Systems
Windows (3x/9x/NT/2k/XP/2k3/Vista), Windows Mobile 5/6, Symbian S40/S60, Mac OS X, MacOS, DOS	
Linux (Slackware, Debian, Ubuntu, Redhat/Mandrake/Fedora), Unix (AIX, IRIX, Digital Unix, Solaris), BSD (Free, Net)	

Relevant Skills	Software Packages
Visual Studio 4/5/6/7/8, gcc/g++, gdb, Comeau C++, Intel C Compiler, Intel VTune, Xbox Perf Analyzer, Xbox PIX, etc.	
3D Studio Max, Character Studio, Gmax, Lightwave, Maya, Soft Image, Radiant, Flexporter, Photoshop, HDRShop, etc.	

Relevant Skills	Teamwork Ability
Experience working with and writing documentation for programmers, artists, designers, QA, managers, and users.	
Ability to work under (sane) time constraints, independently and or in groups, with or without defined leadership.	

Interests
Technology: AI, Robotics, Biomechanics, Physics Simulation, Real Time Soft Shadows, Hi-Fi Audio, Mobile Phones. Passions: Dancing, Driving, Racing, Philosophy, Languages, Learning, Innovating, Teaching, Music, Art, Movies, Skiing. Sports: Skiing (Alpine Racing), Soccer, Running, Tennis, Volleyball, Mountain Biking, Rock Climbing, Judo, etc.