Anirudh Modi

235 Hammond Building, IHPCA, The Pennsylvania State University, University Park, PA 16802
Office: (814) 865-1965, Home: (814) 867-5867, Fax: (253) 323-4540
E-mail: anirudh@anirudh.net, Personal page: http://www.anirudh.net

OBJECTIVE

To apply my knowledge and skills in software programming, high performance computing, virtual reality and/or computer graphics and vision in the areas of engineering and research for an advanced-technology company.

EDUCATION

The Pennsylvania State University – Expected date of graduation: 08/2002.
Doctor of Philosophy (Ph.D.) in Computer Science and Engineering (GPA: 3.7/4.0)
Thesis: Software System Development for Real-Time Simulations Coupled to Virtual Reality for Aerospace Applications.
Emphasis: Computational Steering, High Performance Computing, Computer Graphics, Virtual Reality.

The Pennsylvania State University – 05/1999.
Master of Science (MS) in Aerospace Engineering with Minor in High Performance Computing (HPC) (GPA: 3.7/4.0)
Thesis: Unsteady Separated Flow Simulations using a Cluster of Workstations (C and MPI).
Emphasis: Computational Fluid Dynamics (CFD), High Performance Computing, Parallel Programming.

Indian Institute of Technology-Bombay, India - 04/1997
Bachelor of Technology in Aerospace Engineering (GPA : 8.2/10.00)
Thesis: Unstructured Mesh Generation in 2D/3D using Graded Triangulation.
Emphasis: Numerical programming, Aerodynamics, Grid generation, CFD, Computer Graphics.

PROJECT EXPERIENCE

PhD Dissertation (Jun '99-): On a Graduate Research Assistantship under the supervision of Prof. Lyle N. Long (lnl@psu.edu) and Prof. Paul E. Plassmann (plassman@cse.psu.edu) on the dissertation titled *"Software System Development for Real-Time Simulations Coupled to Virtual Reality for Aerospace Applications"*. This work involves a very high degree of knowledge related to software systems, virtual reality systems, computer graphics, high performance computing, numerical simulations, network programming and Air-Traffic Control systems. This work involves intensive programming in C++ using OpenGL, CAVELib, MPI and socket APIs. More information on this work is available on the web at:
http://www.anirudh.net/phd/

Project COCOA-2 (Jan '01-Feb '01): Built a 50 processor Pentium III Linux cluster similar to COCOA (and currently manage it). More information on COCOA-2 (COst effective COmputing Array 2) can be obtained at:
http://cocoa2.ihpca.psu.edu

Master's Thesis (Aug '97-May '99): Worked as a Graduate Research Assistant under Prof. Lyle N. Long (lnl@psu.edu) in the Department of Aerospace Engineering. I was attached to the *Institute of High Performance Computing Applications (IHPC*A). My thesis was titled "*Unsteady Separate Flow Simulations using a Cluster of Workstations*". The work involved intensive programming in *MPI* (Message Passing Interface) and C. The entire report is available on the web at:
http://www.anirudh.net/thesis/

Project COCOA (May '98-Dec '98): Built a 50 processor Pentium II PC cluster running Linux for our research group to run our parallel programs, tackling all the hardware/software problems single-handedly. Currently, I play a key role in helping build other such clusters across the campus, and also maintain and administer the entire system. More information on COCOA (COst effective COmputing Array) can be obtained at its website:
http://cocoa.ihpca.psu.edu

BTech Project (Jul '96-Apr '97): Worked towards a B.Tech thesis titled "*Unstructured 2D/3D Mesh Generation using Graded Triangulatio*n" under the guidance of Prof. G.R. Shevare (shevare@aero.iitb.ernet.in). The complete report is available online as:

http://www.anirudh.net/btp/

The project required good understanding of computational geometry and excellent programming skills in C. I also studied and programmed various other triangulation methods (such as Advancing Front Triangulation and Delaunay Triangulation) as a part of the project. The project was a part of the *"Grid Generation Project: IITZeu*s" being developed by the Aerospace Engineering department of IIT, Bombay headed by Prof. G.R. Shevare.

Summer Project (May '96-Jul '96): Worked as a summer trainee in National Centre for Software Technology (NCST), Juhu, Bombay under Dr. S. Gopalsamy (gopal@konark.ncst.ernet.in) in their Computer Graphics division for a project titled "*Hidden Line Removal using BSP Tree and Polygon Clipping*". During the project, I learnt the basics of Computer Graphics and got an excellent exposure of working in an integrated programming environment. The complete report is available online at:

http://www.anirudh.net/practical_training/

I did the entire programming for the project in *C* (using *X11* libraries). I also did complete programming for the Weiler-Atherton Polygon Clipping algorithm (handling all the special cases).

In general, I have taken a range on courses in the field of Numerical and High Performance Computing, Computer Graphics, Computer Vision and Database Systems. Most of my recent course projects and reports can also be found at:

http://www.anirudh.net/courses.html

My *computer vision* and *digital image processing* related course projects can be found online at:

http://www.anirudh.net/courses/vision.html

COMPUTER PROGRAMMING AND SKILLS

- Have been a regular computer user/programmer since 1986 from the Sinclair Spectrum days. I have extensive programming experience in C and C++ using MPI, OpenGL and CAVELib APIs. I also have reasonable experience with FORTRAN 77/90, Java, HPF, DBASE, BASIC, HTML, PERL, Awk, Unix Shell programming, Unix network programming and X-windows API. I also have experience in cross-platform GUI programming using the FLTK API and 3D visualization using the Visualization ToolKit (VTK).
- Have always been an avid user of Linux OS since 1994 and use it for most of my computing tasks. I also currently maintain and administer several of our department UNIX/Linux machines and clusters. I also have extensive work experience with several other flavors of UNIX (SunOS, DEC, AIX, IRIX, HP-UX), MS-DOS and MS-Windows 9x/2000/NT systems. I have worked as a system administrator for several Linux/Unix servers for over 7 years.
- Am fluent in the use of TECPLOT (for post-processing and visualization), Mathematica, MATLAB, LaTeX, Cantata/Khoros (for image processing) and several other freely available/popular UNIX packages.

HONORS

- *Rotorcraft Center of Excellence (RCOE)* Fellowship (1998, 1999).
- *Institute for High Performance Computing Applications (IHPCA)* Fellowship (1997).
- Secured 2nd position in *Graduate Aptitude Test in Engineering (GATE)* among several thousand applicants for graduate study at the IITs in India.
- Secured 2nd and 4th Rank in *IIT-Bombay Annual Math Olympiad* in Jan 1993 and 1992 respectively (amongst over 1000 participants from all over India).
- Secured 11th Rank in *Regional/State Math Olympiad* (Maharashtra State, India) in Jan 1992. Appeared for the National Math Olympiad as one of the Top-500 students in the country in 1992.

PUBLICATIONS

- *Real-Time Visualization of Vortex-Wake Simulation using Computational Steering and Beowulf Clusters*, A. Modi, L. N. Long and P. E. Plassmann, *VECPAR 2002*, Lisbon, Portugal, June 2002.
- *Solution and Visualization of Complex Flow Simulations Using an Interactive Computational Fluid Dynamics System*, A. Modi, L. N. Long and P. E. Plassmann, AIAA 2002-2750, *32nd AIAA Fluid Dynamics Conference and Exhibit*, St. Louis, MO, June 2002.
- *Turbulent Flow and Aeroacoustics Simulations using a Cluster of Workstations*, L. N. Long and A. Modi, Linux Revolution Conference, Champaign, IL, June 2001.
- *Unsteady Separated Flow Simulations using a Cluster of Workstation*s, A. Modi and L.N. Long, *AIAA 2000-0272, 38th AIAA Aerospace Sciences Meetin*g, Reno, NV, January 2000.
- *Multiple Attractors in Inertia-Coupled Roll Maneuvers of Airplanes*, A. Modi and N. Ananthkrishnan, Journal of Aircraft, Vol. 35, No. 4, 1998, pp 659-661.